



## Court of Appeal Supreme Court New South Wales

Case Name: **Queensland Bulk Water Supply Authority t/as Seqwater v Rodriguez & Sons Pty Ltd**

Medium Neutral Citation: [2021] NSWCA 206

Hearing Date(s): 17-21 and 24-28 May 2021

Date of Orders: 8 September 2021

Date of Decision: 8 September 2021

Before: Basten JA; Meagher JA; Leeming JA

Decision: (A) In matter 2020/189434 (Seqwater's appeal) –

- (1) In relation to orders relating to group members not the subject of final orders, grant Seqwater leave to appeal.
- (2) Allow the appeal and –
  - (a) set aside order (3) made on 29 May 2020 in *Rodriguez (No 23)* and orders (3)-(6) made on 7 May 2021 in *Rodriguez (No 29)*;
  - (b) set aside order (2) made on 29 May 2020 in *Rodriguez (No 23)* and order (1) made on 7 May 2021 in *Rodriguez (No 29)* in so far as the answers to the common questions relate to Seqwater or its employees;
  - (c) set aside orders 1-4 made on 28 October 2020 in *Rodriguez (No 24)*, in so far as they relate to costs payable by Seqwater, and remit to the primary judge any outstanding issue as to the costs of the proceeding in the Common Law Division in matter 2014/200854 involving Seqwater.
- (3) Subject to the remittal provided in order (2)(c), dismiss the proceedings in the Common Law

Division in matter 2014/200854 as against Seqwater.

(4) Order that the first respondent (Rodriguez & Sons Pty Ltd) pay the appellant's costs of the appeal.

(B) In matter 2020/189716 (Rodriguez' application for leave to appeal) –

Dismiss the summons seeking leave to appeal (with no order as to costs).

Catchwords:

APPEALS – leave to appeal – representative proceedings – interlocutory orders – orders final with respect to the representative party – no finality as to group members claims – challenge to answers to common questions

TORTS – negligence – standard of care – acts or omissions of public authority – exercise of statutory function – statutory protection – application of *Wednesbury* standard of care – *Civil Liability Act 2003* (Qld) s 36

NEGLIGENCE – standard of care – conduct of flood operations – compliance with Flood Operations Manual – construction of Manual written by flood engineers for application by flood engineers – purposive construction – dual purposes of water supply and flood mitigation – concept of flood mitigation – releases not to exceed peak inflows – use of best available rainfall forecasts – degrees of tolerance – scope for professional judgment – role of the senior flood operations engineer in determining strategies

NEGLIGENCE – causation – factual causation – cumulative effect of sequential breaches – series of acts jointly sufficient to cause harm – division of single course of conduct into discrete breaches artificial

TORTS – damage to property – whether liability apportionable – concurrent wrongdoers – whether acting independently of each other – *Civil Liability Act 2003* (Qld) s 30

TORTS – damages – prejudgment interest on damages – property damage – awards with respect

to cleaning undertaken by volunteers – interest on such awards – interest on subventions in form of charitable relief

COSTS – apportionment of costs – wrongful conduct governed by Queensland law – proceedings brought in New South Wales – *Civil Procedure Act 2005* (NSW), s 98 applied

Legislation Cited:

*Acts Interpretation Act 1954* (Qld), ss 2, 6, 35C  
*Brisbane and Area Water Board Act 1979* (Qld), ss 9, 106, 107, 108  
*Civil Law (Wrongs) Act 2002* (ACT), s 111  
*Civil Liability Act 2002* (NSW), ss 5D, 43, 43A; Pt 4  
*Civil Liability Act 2002* (Tas), s 40  
*Civil Liability Act 2002* (WA), ss 5Y, 5X  
*Civil Liability Act 2003* (Qld), ss 9, 11, 16, 22, 28, 30, 31, 32A, 32B, 32C, 34, 35, 36, 37, 38; Ch 2, Pt 2, Pt 3, Div 1  
*Civil Procedure Act 2005* (NSW), ss 56, 58, 98, 100, 162, 180; Pt 10  
*Civil Proceedings Act 2011* (Qld), s 58  
Constitution, ss 51(xx), 73  
*Federal Court of Australia Act 1976* (Cth), s 33ZC; Pt IVA  
*Fire Brigades Act 1909-1956* (NSW), s 46  
*Human Rights Act 1998* (UK), s 6  
*Jurisdiction of Courts (Cross-Vesting) Act 1987* (NSW), s 9  
*Jurisdiction of Courts (Cross-Vesting) Act 1987* (Qld), ss 3, 4, 11  
*Law Reform (Miscellaneous Provisions) Act 1946* (NSW), s 5  
*Law Reform (Vicarious Liability) Act 1983* (NSW), s 10  
*Law Reform Act 1995* (Qld), ss 6, 7  
*South East Queensland Water (Restructuring) Act 2007* (Qld), ss 3, 6, 7, 9, 11, 14, 15, 17, 18, 19, 34, 44, 45, 47, 48, 49, 50, 51, 54, 56, 57, 61, 63, 64, 67, 72, 73, 81; Ch 2, Pt 1, Pt 4, Divs 1, 2, 3, 4, Pt 6; Sch 3 (Dictionary)  
*South East Queensland Water Board Act 1979* (Qld), s 106  
*Statutory Instruments Act 1992* (Qld), s 7  
*Supreme Court Act 1933* (ACT), s 69  
*Supreme Court Act 1970* (NSW), ss 101, 103  
*Supreme Court Act 1986* (Vic), Pt 4A  
*Water Act 2000* (Qld), ss 19, 38, 50, 95, 98, 103, 107, 107A, 108, 109, 110, 119, 497, 808, 813, 1071; Sch 4 Dictionary

*Water Resources Act 1989* (Qld), ss 215F, 215Y  
*Water Supply (Safety and Reliability) Act 2008* (Qld),  
ss 13, 21, 22, 370, 371, 374, 589, 613; Ch 4, Pt 2  
*Wivenhoe Dam and Hydro-Electric Works Act 1979*  
(Qld), ss 32, 33, 34, 35  
*Workers' Compensation Act 1926* (NSW), s 16  
*Wrongs Act 1958* (Vic), s 84

Uniform Civil Procedure Rules 2005 (NSW), r 51.40;  
Pt 58

Cases Cited:

*Associated Provincial Picture Houses Ltd v  
Wednesbury Corporation* [1948] 1 KB 223  
*Aston Cantlow and Wilmcote with Billesley Parochial  
Church Council v Wallbank* [2004] 1 AC 546  
*Attorney-General for the State of New South Wales v  
Quin* (1990) 170 CLR 1; [1990] HCA 21  
*Avon Downs Pty Ltd v Federal Commissioner of  
Taxation* (1949) 78 CLR 353; [1949] HCA 26  
*Bailey v Federal Commissioner of Taxation* (1977)  
136 CLR 214; [1977] HCA 11  
*Bankstown City Council v Zraika; Roads and  
Maritime Services v Zraika* (2016) 94 NSWLR 159;  
[2016] NSWCA 51  
*Batchelor v Burke* (1981) 148 CLR 448; [1981] HCA  
30  
*Blundell v Musgrave* (1956) 96 CLR 73; [1956] HCA  
66  
*Board of Fire Commissioners (NSW) v Ardouin*  
(1961) 109 CLR 105; [1961] HCA 71  
*Boensch v Pascoe* (2019) 268 CLR 593; [2019] HCA  
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*Bunnings Group Ltd v CHEP Australia Ltd* (2011) 82  
NSWLR 420; [2011] NSWCA 342  
*Chapman v Hearse* (1961) 106 CLR 112; [1961]  
HCA 46  
*Chase Oyster Bar Pty Ltd v Hamo Industries Pty Ltd*  
(2010) 78 NSWLR 393; [2010] NSWCA 190  
*CHEP Australia Ltd v Bunnings Group Ltd* [2010]  
NSWSC 301  
*Communications, Electrical, Electronic, Energy,  
Information, Postal, Plumbing and Allied Services  
Union of Australia v Queensland Rail* (2015) 256  
CLR 171; [2015] HCA 11  
*Coulton v Holcombe* (1986) 162 CLR 1; [1986] HCA  
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*Crimmins v Stevedoring Industry Finance Committee*  
(1999) 200 CLR 1; [1999] HCA 59  
*CSR Ltd v Eddy* (2005) 226 CLR 1; [2005] HCA 64

*Curtis v Harden Shire Council* (2014) 88 NSWLR 10; [2014] NSWCA 314  
*Darling Island Stevedoring and Lighterage Co v Long* (1957) 97 CLR 36; [1957] HCA 26  
*Davidson v J S Gilbert Fabrications Pty Ltd* [1986] 1 Qd R 1  
*Ferguson v Wilson* (1866) LR 2 Ch App 77  
*Fire & All Risks Insurance Co Ltd v Callinan* (1978) 140 CLR 427; [1978] HCA 31  
*George v Federal Commissioner of Taxation* (1952) 86 CLR 183; [1952] HCA 21  
*Giles v Thompson* [1994] 1 AC 142  
*Gill v Donald Humberstone & Co Ltd* [1963] 1 WLR 929  
*Griffiths v Kerkemeyer* (1977) 139 CLR 161; [1977] HCA 45  
*Grincelis v House* (2000) 201 CLR 321; [2000] HCA 42  
*Hamcor Pty Ltd v Queensland* [2014] QSC 224  
*Hamcor Pty Ltd v State of Queensland* [2016] 1 Qd R 271; [2015] QCA 183  
*Hollis v Vabu Pty Ltd* (2001) 207 CLR 21; [2001] HCA 44  
*Housman v Camuglia* [2021] NSWCA 106  
*James Hardie & Coy Pty Ltd v Wyong Shire Council* (2000) 48 NSWLR 679; [2000] NSWCA 107  
*John Pfeiffer Pty Ltd v Rogerson* (2000) 203 CLR 503; [2000] HCA 36  
*Kars v Kars* (1996) 187 CLR 354; [1996] HCA 37  
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*Leichhardt Municipal Council v Montgomery* (2007) 230 CLR 22; [2007] HCA 6  
*MBP (SA) Pty Ltd v Gogic* (1991) 171 CLR 657; [1991] HCA 3  
*National Insurance Co of New Zealand Ltd v Espagne* (1961) 105 CLR 569; [1961] HCA 15  
*NEAT Domestic Trading Pty Ltd v AWB Ltd* (2003) 216 CLR 277; [2003] HCA 35  
*O'Brien v Dawson* (1942) 66 CLR 18  
*Oceanic Crest Shipping Company v Pilbara Harbour Services Pty Ltd* (1986) 160 CLR 626  
*O'Toole v Charles David Pty Ltd* (1990-1991) 171 CLR 232; [1990] HCA 44  
*Pioneer Mortgage Services Pty Ltd v Columbus Capital Pty Ltd* (2016) 250 FCR 136; [2016] FCAFC 78  
*Plaintiff S157/2002 v Commonwealth of Australia* (2003) 211 CLR 476; [2003] HCA 2

*Plymouth Brethren (Exclusive Brethren) Christian Church v The Age Company Ltd* (2018) 97 NSWLR 739; [2018] NSWCA 95  
*Powercor Australia Ltd v Thomas* (2012) 43 VR 220; [2012] VSCA 87  
*Prince Alfred College Inc v ADC* (2016) 258 CLR 134; [2016] HCA 37  
*Project Blue Sky Inc v Australian Broadcasting Authority* (1998) 194 CLR 355; [1998] HCA 28  
*Puntoriero v Water Administration Ministerial Corporation* (1999) 199 CLR 575; [1999] HCA 45  
*Queensland v Masson* [2020] HCA 28; 94 ALJR 785  
*R v Panel on Take-overs and Mergers; Ex parte Datafin Plc* [1987] 1 QB 815  
*Re Anti-Cancer Council (Vic); Ex parte State Public Services Federation* (1992) 175 CLR 442; [1992] HCA 53  
*Redding v Lee* (1983) 151 CLR 117; [1983] HCA 16  
*Renmark Hotel Inc v Federal Commissioner of Taxation* (1949) 79 CLR 10; [1949] HCA 7  
*Roads and Maritime Services v Grant* [2015] NSWCA 138  
*Screenco Pty Ltd v R L Dew Pty Ltd* (2003) 58 NSWLR 720; [2003] NSWCA 319  
*Sempra Metals Ltd v Inland Revenue Commissioners* [2008] 1 AC 561  
*Soblusky v Egan* (1960) 103 CLR 215; [1960] HCA 9  
*South West Helicopters Pty Ltd v Stephenson (No 2)* (2018) 98 NSWLR 96; [2018] NSWCA 99  
*Southern Properties (WA) Pty Ltd v Executive Director of the Department of Conservation and Land Management* (2012) 42 WAR 287; [2012] WASCA 79  
*Stovin v Wise* [1996] AC 923  
*Strong v Woolworths Ltd* (2012) 246 CLR 182; [2012] HCA 5  
*Sutherland Shire Council v Heyman* (1985) 157 CLR 424; [1985] HCA 41  
*Suttor v Gundowda Pty Ltd* (1950) 81 CLR 418; [1950] HCA 35  
*Thompson v Australian Capital Television Pty Ltd* (1996) 186 CLR 574; [1996] HCA 38  
*Van Gervan v Fenton* (1992) 175 CLR 327; [1992] HCA 54  
*Voli v Inglewood Shire Council* (1963) 110 CLR 74; [1963] HCA 15  
*Zhang v ROC Services (NSW) Pty Ltd* (2016) 93 NSWLR 561; [2016] NSWCA 370  
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Qld Govt Gazette, vol 353, no 15 published 22 January 2010

Category: Principal judgment

Parties: **2020/189434:**  
Queensland Bulk Water Supply Authority t/as Seqwater (Appellant)  
Rodriguez & Sons Pty Ltd (First Respondent)  
SunWater Ltd (Second Respondent)  
State of Queensland (Third Respondent)

**2020/189716:**  
Rodriguez & Sons Pty Ltd (Appellant)  
Queensland Bulk Water Supply Authority t/as Seqwater (First Respondent)  
SunWater Ltd (Second Respondent)  
State of Queensland (Third Respondent)

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File Number(s): 2020/189434; 2020/189716

**Decision under appeal**

Court or Tribunal: Supreme Court

Jurisdiction: Common Law Division

Medium Neutral Citation: [2019] NSWSC 1657; [2020] NSWSC 650; [2020]  
NSWSC 1498; [2021] NSWSC 145; [2021] NSWSC  
483

Date of Decision: 29 November 2019; 29 May 2020; 28 October 2020;  
26 February 2021; 7 May 2021

Before: Beech-Jones J

File Number(s): 2014/200854

*[Note: The Uniform Civil Procedure Rules 2005 provide (Rule 36.11) that unless the Court otherwise orders, a judgment or order is taken to be entered when it is recorded in the Court's computerised court record system. Setting aside and variation of judgments or orders is dealt with by Rules 36.15, 36.16, 36.17 and 36.18. Parties should in particular note the time limit of fourteen days in Rule 36.16.]*



## HEADNOTE

**[This headnote is not to be read as part of the judgment]**

The appellant, Queensland Bulk Water Supply Authority (“Seqwater”), owns and operates two dams in south-east Queensland, west of Brisbane. Outflows from Somerset Dam on the Stanley River flow into Wivenhoe Dam, which is on the Brisbane River. The dams supply water for south-east Queensland, including the City of Brisbane. The dams also mitigate downstream flooding by storing water at the peak of heavy rains and releasing it over time. The operation of the dams in flood events is directed by flood engineers following strategies described in a Flood Operations Manual. In ascending order of priority, the strategies address the protection of bridges from submergence, urban areas from inundation and the dams from structural failure. The Manual recorded the flows at which the downstream bridges would be submerged, and the maximum flow beyond which urban areas would be inundated.

Releases of water from Wivenhoe flow east down the Brisbane River through Brisbane and Ipswich. Before reaching the city two major tributaries, Lockyer Creek and the Bremer River, flow into the Brisbane River. Roughly half the catchment of the Brisbane River lies above Wivenhoe and half below it. Flows below Wivenhoe are measured at Lowood, being the junction with Lockyer Creek, and at Moggill, just below the Bremer River junction and before the Brisbane River enters the urban areas.

In early January 2011, torrential rains fell in the catchment of the Brisbane River and its tributaries. A large volume of water was released from Wivenhoe Dam to prevent it overtopping, which, once combined with heavy downstream flows, flooded large areas of Brisbane and Ipswich.

In 2014 the respondent, Rodriguez & Sons Pty Limited (“Rodriguez”), the owner of a Brisbane sporting goods store which had suffered loss as a result of the flooding, commenced a class action against Seqwater, SunWater Ltd and the State of Queensland on behalf of some 6500 group members, alleging that negligent operation of the dams had resulted in widespread property damage. Rodriguez alleged that the flood operations engineers should have made substantial releases from the dams before the heaviest of the forecast rain to create extra storage capacity. Rodriguez alleged that had the engineers followed the Manual, they would not have had to make substantial releases of water to prevent the dams from overtopping at a time of high flows from Lockyer Creek and the Bremer River.

The primary judge delivered his principal judgment on 29 November 2019, finding in Rodriguez’ favour on the question of liability. Several additional judgments followed assessing and awarding damages to Rodriguez and three group specific members, answering common questions in respect of group members generally, and dealing with costs. The orders apportioned liability between the three defendants, namely 50% to Seqwater, 30% to SunWater and 20% to the State. (Other questions and the assessment of damages payable to group members remained to be determined.)

Seqwater appealed against these findings. Prior to the hearing of the appeal, Rodriguez settled its claims against SunWater and the State.

The issues before the Court were whether, contrary to findings made by the primary judge:

- (1) a lower standard of care provided statutory protection to Seqwater, limiting the circumstances in which it could be liable in damages;
- (2) flood mitigation strategies under the Manual were not to be determined by assuming that no releases of water would be made;
- (3) the strategies did not require decisions based on forecast rainfall but only “rain on the ground”;
- (4) releases were not permitted which would take the dams below Full Supply Level;
- (5) the reference in the Manual to releases not exceeding “peak inflow” precluded high releases in advance of heavy rainfall;
- (6) the engineers acted reasonably in opening sluice gates at Somerset Dam in order to co-ordinate the storage levels in the two dams;
- (7) the Senior Flood Operations Engineer bore primary responsibility for determining strategies;
- (8) the engineers were not required to have made releases in accordance with simulations prepared by Dr Christensen;
- (9) it was reasonable to terminate the December Flood Event on 2 January;
- (10) the strategies adopted by the engineers from 6-10 January were reasonable;
- (11) breaches of duty for which Seqwater was liable had not been shown to cause loss to the claimants where damage resulted from a series of sequential breaches;
- (12) the commercial value of cleaning undertaken by volunteers was fully recoverable;
- (13) interest was payable on damages awarded for cleaning services provided gratuitously by volunteers;
- (14) the apportionment of 50% of the damages against Seqwater was just and reasonable; and

- (15) costs should have been apportioned on the basis of liability.

**The Court (Basten, Meagher and Leeming JJA) held:**

*As to (1) – statutory protection for Seqwater*

- (1) Section 36 of the *Civil Liability Act 2003* (Qld) should not be read down to apply only to proceedings where the cause of action was breach of statutory duty. The omission of “duty” from s 36 suggested that the section was not limited to any particular cause of action; the term appeared only in the heading to that section and did not limit its operation: [69].
- (2) The reference to “functions” in s 36 applied to the functions of Seqwater provided for by statute, including flood prevention and floodwater control. The case against Seqwater correctly assumed it had functions with respect to the operation of the dam for flood mitigation purposes and that it was required to exercise its powers in accordance with a flood mitigation manual: [82].
- (3) Where Seqwater employed engineers to carry out its statutory functions, the acts or omissions of the engineers were attributable to Seqwater. Seqwater was therefore vicariously liable for the acts of the flood engineers: [102].
- (4) Seqwater is a public authority for the purposes of s 36, as it was established under statute, has the functions and powers conferred on it by the statute, does not have members of its corporate body who would benefit from its exercise of its functions, and its dominant purpose was to supply water for the benefit of residents and businesses in south-east Queensland. Although Seqwater was required to carry out its functions as a commercial enterprise, this did not prevent its functions from being those of a public authority: [116], [117], [121].
- (5) Although s 36(2) adopts the language of *Wednesbury* unreasonableness, the standard adopted by the statute should not be paraphrased or reformulated by reference to the *Wednesbury* standard in administrative law cases: [135]-[137]. For an authority to be liable, the exercise of a power must be so unreasonable that the court cannot envisage any authority in that position considering it to be a reasonable exercise of the power: [137].

*Civil Liability Act 2003* (Qld) s 36; *Acts Interpretation Act 1954* (Qld), s 35C(1), applied.

*Board of Fire Commissioners (NSW) v Ardouin* (1961) 109 CLR 105, 116; [1961] HCA 71; *Darling Island Stevedoring and Lighterage Co v Long* (1957) 97 CLR 36; [1957] HCA 26, applied; *Attorney-General for the State of New South Wales v Quin* (1990) 170 CLR 1; [1990] HCA 21; *Avon Downs Pty Ltd v Federal Commissioner of Taxation* (1949) 78 CLR 353; [1949] HCA 26; *Crimmins v Stevedoring Industry Finance Committee* (1999) 200 CLR 1; [1999] HCA 59; *Plaintiff S157/2002 v*

*Commonwealth of Australia* (2003) 211 CLR 476; [2003] HCA 2; *Puntoriero v Water Administration Ministerial Corporation* (1999) 199 CLR 575; [1999] HCA 45; *Prince Alfred College Inc v ADC* (2016) 258 CLR 134; [2016] HCA 37; *Renmark Hotel Inc v Federal Commissioner of Taxation* (1949) 79 CLR 10; [1949] HCA 7; *Re Anti-Cancer Council (Vic)*; *Ex parte State Public Services Federation* (1992) 175 CLR 442; [1992] HCA 53; *Sutherland Shire Council v Heyman* (1985) 157 CLR 424; [1985] HCA 41; *Curtis v Harden Shire Council* (2014) 88 NSWLR 10; [2014] NSWCA 314; *Pioneer Mortgage Services Pty Ltd v Columbus Capital Pty Ltd* (2016) 250 FCR 136; [2016] FCAFC 78; *Southern Properties (WA) Pty Ltd v Executive Director of the Department of Conservation and Land Management* (2012) 42 WAR 287; [2012] WASCA 79; *Stovin v Wise* [1996] AC 923, considered.

*Hamcor Pty Ltd v Queensland* [2014] QSC 224, not followed.

*As to (2) – the “no release” assumption*

- (6) In determining the appropriate release strategy, the Manual required the engineers to predict the water level of each dam. Although initial assessments could well be based on predicted inflows without releases, the Manual did not require that engineers select a strategy on the assumption that no water would be released during the likely period of the flood. It was not unreasonable for the engineers to have regard to the water which was being released: [261], [285].

*As to (3) – “rain on the ground” forecasts*

- (7) Modelling was required to take into account predicted rainfall based on forecasts, not just rain on the ground measurements. The engineers were required to determine strategies and releases having regard to forecast rainfall, which was permitted by their real time flood modelling: [205], [291], [294].

*As to (4) – releases bringing the dams below Full Supply Level*

- (8) The Manual did not prohibit releases from being made during a flood event while the dams were below full supply level, however the engineers were not obliged to make releases in such circumstances, including if the December flood event had continued beyond 2 January: [319]-[322].

*As to (5) – references to “peak inflow” precluded high releases prior to heavy rainfall*

- (9) While the general purpose of flood mitigation is to reduce the peak levels of flow in the river, rather than exacerbate them, the Manual permitted the use of rainfall predictions to consider in advance what the “peak inflow” during a flood event would be; however, this was not the only reasonable reading of the Manual: [330], [340].

*As to (6) – opening sluice gates at Somerset Dam*

- (10) The Manual required coordinated releases from Wivenhoe and Somerset Dams, generally following an Operating Target Line (OTL). On 9 and 10 January releases were made from Somerset Dam by opening its sluice gates. There was no apparent negligence in seeking to follow the OTL: [604].

*As to (7) – responsibilities of the Senior Flood Operations Engineer*

- (11) The senior flood engineer was employed by SunWater. It was a relevant consideration in applying s 36(2) and apportioning liability, that Seqwater's engineers adhered to the strategy determined by the senior flood engineer: [659].

*As to (8) – Dr Christensen's simulations*

- (12) The principal significance of Dr Christensen's simulations was that they provided a counterfactual, consistent with non-negligent flood operations, which could form a basis for Rodriguez' causation and damages case. Contrary to Seqwater's submissions, Rodriguez' breach case did not require it to establish that on each day from 2 to 11 January the flood engineers were required to conduct flood operations in accordance with one or more of those simulations: [424]-[433].

*As to (9) – terminating the December Flood Event on 2 January*

- (13) Seqwater's engineer on duty on 2 January terminated the Flood Event when the level of Wivenhoe Dam reached 67.1m, when the dam had, for practical purposes returned to the FSL of 67.0m. That decision was not negligent. The Manual recognised that there was a degree of uncertainty inherent in measuring the water level of the dam. In addition, the weather forecasts did not predict significant rainfall: [455]-[460].

*As to (10) – strategies on 6-10 January*

- (14) The findings of breach of duty on 6, 7, 8 and 9 January were based on the "no release" assumption. The Manual did not require that assumption to be made. Absent that assumption, the evidence did not support a conclusion that a flood engineer must have adopted the strategies found to constitute reasonable flood operations; nor were there findings of breach if releases could be taken into account: [517], [519], [545], [573], [574], [602].
- (15) There is no utility in resolving the grounds directed to breach on 10 January. Those breaches involved releasing a relatively small amount of water that was immaterial and had no relevance to the causation analysis: [611]-[614].

- (16) Applying the s 36(2) standard, the four flood engineers acted by way of consensus, ultimately following the strategy determined by the Senior Flood Operations Engineer. Failure by Seqwater's flood engineers to depart from that strategy was not proven to be in breach of the s 36(2) standard. Even if their conduct departed from the Manual, that did not of itself entail a breach of that standard: [659], [662], [666], [669], [672], [676], [683], [687].

*As to (11) – causation – a series of sequential breaches*

- (17) The primary judge found that losses had been caused by the cumulative effect of several breaches by the flood engineers. That approach was artificial: it involved the dividing of a singular course of conduct into discrete temporal segments and assumed that each flood engineer could and should exercise independent judgment. The flood engineers acted in a collaborative manner. On that basis all were liable for each breach. The fact that a particular engineer was on duty at a particular time was not a critical factor. The complaint as to causation was therefore rejected: [697]-[698].

*Civil Liability Act 2003 (Qld) ss 11, 31(1)(a), applied; Strong v Woolworths Ltd (2012) 246 CLR 182; [2012] HCA 5, referred to.*

*As to (12) – quantifying the commercial value of cleaning by volunteers*

- (18) It was not necessary nor appropriate to deal with the issue as to how cleaning services undertaken gratuitously were to be valued. There were contingent factual disputes, and uncertainty as to the legal basis upon which damages for such services were recoverable: there is doubt as to the application of principles developed in personal injury cases. The approaches to valuation advanced by the parties did not involve any question of law: [712], [715]-[717], [729].

*Boensch v Pascoe (2019) 268 CLR 593; [2019] HCA 49 applied; Blundell v Musgrave (1956) 96 CLR 73; [1956] HCA 66; CSR Ltd v Eddy (2005) 226 CLR 1; [2005] HCA 64; Davidson v J S Gilbert Fabrications Pty Ltd [1986] 1 Qd R 1; Griffiths v Kerkemeyer (1976) 139 CLR 161; [1977] HCA 45; Powercor Australia Ltd v Thomas (2012) 43 VR 220; [2012] VSCA 87; Screenco Pty Ltd v R L Dew Pty Ltd (2003) 58 NSWLR 720; [2003] NSWCA 319, referred to.*

*As to (13) – interest payable on damages for cleaning services*

- (19) Claims for interest were in their nature compensatory and therefore Queensland law applied: [736].

*John Pfeiffer Pty Ltd v Rogerson (2000) 203 CLR 503; [2000] HCA 36 applied.*

- (20) In dealing with cleaning costs with respect to damaged chattels or property, there was no error in refusing to award interest: [750].

*Screenco Pty Ltd v R L Dew Pty Ltd* (2003) 58 NSWLR 720; [2003] NSWCA 319, applied.

- (21) With respect to interest on damages not reduced for charitable payments, there were issues of principle as to when and on what basis subventions operated to reduce damages; because these issues were not addressed, the approach of the primary judge accorded with current practice: [759].

*Batchelor v Burke* (1981) 148 CLR 448 at 455; [1981] HCA 30; *Fire & All Risks Insurance Co Ltd v Callinan* (1978) 140 CLR 427 at 432; [1978] HCA 31; *Grincelis v House* (2000) 201 CLR 321; [2000] HCA 42, referred to.

*As to (14) – apportionment of 50% of the damages against Seqwater*

- (22) There are real doubts as to the statutory basis of apportionment: [704]. In the absence of a finding as to damages it was not appropriate to determine the issue. However, as Seqwater was the sole licensee responsible for controlling releases into the Brisbane River, it was difficult to envisage that its liability would be less than 50%: [709]-[710].

*Civil Liability Act 2003* (Qld) ss 28(4) and 30(1) referred to.

*As to (15) – apportionment of costs*

- (23) The ground challenging the costs order was brought as of right: [760]. The relevant law to the determination of this question was that of New South Wales, as the services generated in the plaintiff's costs were in New South Wales: [765]-[767].

*Civil Procedure Act 2005* (NSW) s 98 applied; *Law Reform Act 1995* (Qld) ss 6, 7; *Civil Liability Act 2003* (Qld) s 32A referred to.

*Housman v Camuglia* [2021] NSWCA 106; applied; *James Hardie & Coy Pty Ltd v Wyong Shire Council* (2000) 48 NSWLR 679; [2000] NSWCA 107; *South West Helicopters Pty Ltd v Stephenson (No 2)* (2018) 98 NSWLR 96; [2018] NSWCA 9; *Labuda v Langford* [2001] ACTSC 126; 36 MVR 154, referred to.

- (24) To apportion costs by reference to the apportionment of responsibility for damages did not of itself demonstrate error. The decision of the primary judge not to depart from the starting point of 50% liability did not disclose error: [763]; [773]-[774].

*Chapman v Hearse* (1961) 106 CLR 112; [1961] HCA 46; *Voli v Inglewood Shire Council* (1963) 110 CLR 74 at 101; [1963] HCA 15; *Soblusky v Egan* (1960) 103 CLR 215 at 239; [1960] HCA 9 referred to.



# JUDGMENT

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Appendix A			

## 1 THE COURT:

### 1. Introduction

In January 2011 a large volume of rain fell in the catchment of the Brisbane River. In its upper catchment, the Brisbane River was contained by the Wivenhoe Dam and, above it, the Somerset Dam. The dams had two functions, namely, to supply water to Brisbane and south-east Queensland, and to mitigate flooding of the Brisbane River. However, at the height of the heavy rainfall a volume of water released from the Wivenhoe Dam which, in combination with the inflows from downstream tributaries, led to the inundation of significant areas of Brisbane and Ipswich.

2 In 2014 a small business which had suffered loss as a result of the flooding, Rodriguez & Sons Pty Ltd (“Rodriguez” or “the plaintiff”), commenced a class action seeking to recover damages from the operators of the Wivenhoe Dam. Relevantly for present purposes, it alleged that the operators had been negligent in failing to commence releasing water from the Wivenhoe Dam several days earlier than they did, in anticipation of the heavy rainfall, so as to avoid the need to release much larger volumes in a short period after the rainfall caused large inflows and a surge in the dam level. The rising level caused fears for the safety of the dam, necessitating releases which, when combined with high flows from downstream tributaries, rendered extensive flooding of urban areas inevitable.

3 A trial held before Beech-Jones J extended from December 2017 through much of 2018, the last written submissions being received in May 2019. The principal judgment (one of many judgments delivered in the proceedings), was published on 29 November 2019<sup>1</sup> and ran to more than 1,500 pages. The judgment was divided into 15 chapters, each with its own paragraph numbering. References to passages in that judgment will take the form “*Rodriguez (22)* Ch 1 [22].” Subsequent judgments have also given rise to issues addressed by the notice

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<sup>1</sup> *Rodriguez & Sons Pty Ltd v Queensland Bulk Water Supply Authority trading as Seqwater (No 22)* [2019] NSWSC 1657 (“*Rodriguez (22)*”).

of appeal, the latest being *Rodriguez (29)* delivered on 7 May 2021, just 10 days before the hearing of the appeal commenced.<sup>2</sup>

- 4 Answers were given to numerous common questions which had been identified as appropriate for separate determination. The judgment upheld the claims of the plaintiff in negligence against the State of Queensland, and two statutory agencies responsible for operating the dams, namely Queensland Bulk Water Supply Authority trading as Seqwater (“Seqwater”) and SunWater Ltd. Other than the State of Queensland, each of the parties filed notices of appeal, although the plaintiff’s appeal was confined to a narrow issue. Final orders have been made with respect to the plaintiff itself in *Rodriguez (23)*,<sup>3</sup> in an amount (payable by Seqwater) in excess of \$100,000, and in *Rodriguez (29)* with respect to three other members of the class, whose claims raised particular issues not raised by the plaintiff’s case. These matters are relevant to whether, and to what extent, Seqwater required leave to appeal, discussed below.
- 5 Shortly before the appeals were listed for hearing, Rodriguez (in its representative capacity and in its own right), SunWater and the State of Queensland settled all claims between them. As a consequence, the only outstanding issues are those arising between Rodriguez (in its representative capacity and in its own right) and Seqwater. The issues for determination by this Court fall within a far narrower compass than those confronting the primary judge.
- 6 The trial judgment being divided into 15 chapters, it was inevitable in such a large factual case that findings would be made on specific issues which were then relied upon in the assessment of higher level issues, including ultimately the resolution of questions as to the existence and scope of the duty of care owed by each defendant, whether the duty was breached by each defendant and its employees, whether such breaches caused the harm suffered by the plaintiff, and the assessment of damages. At each of these stages, the

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<sup>2</sup> *Rodriguez & Sons Pty Limited v Queensland Bulk Water Supply Authority t/as Seqwater (No 29)* [2021] NSWSC 483 (“*Rodriguez (29)*”).

<sup>3</sup> *Rodriguez & Sons Pty Limited v Queensland Bulk Water Supply Authority t/as Seqwater (No 23)* [2020] NSWSC 650 (“*Rodriguez (23)*”).

judgment meticulously cross-referenced both later and earlier findings, so that the trail of the reasoning was readily ascertainable. That was as true of the complex technical evidence and the computer simulations relied upon by the plaintiff as it was of the factual circumstances as they occurred in January 2011. The tasks to be undertaken by this Court have been immeasurably assisted by the care and ultimately the clarity of the primary judgment.

## **2. Issues on appeal**

7 As the primary judge noted, practically no aspect of the case presented by the plaintiff was not in dispute at the trial. For example, each defendant challenged the claim that it owed a duty of care to the plaintiff and group members. When Seqwater filed its notice of appeal, it challenged findings by the judge as to its duty of care. However, those challenges (grounds 4 and 5) were abandoned shortly prior to the hearing of the appeal. Nevertheless, there remained 30 grounds, some with sub-grounds. A further amended notice of appeal, filed on 10 May 2021, included two new grounds 31 and 32. The issues in dispute on the appeal primarily focused on the applicable standard of care and the findings as to breach of duty.

8 As the primary judge explained, three factual issues predominated at trial, namely that:<sup>4</sup>

- (a) the flood engineers determined the amount of water to release only by reference to the estimate of inflows into the dam determined by rain that had already fallen, referred to as “rain on the ground” (or ROG), effectively ignoring forecasts as to rain;
- (b) the engineers wrongly gave priority to avoiding inundation of bridges downstream of Wivenhoe Dam at the expense of avoiding or minimising the risk of urban inundation, and

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<sup>4</sup> *Rodriguez (22)*, Ch 1 [28] set out in full at [147] below.



(c) to the extent that the engineers did model future rainfall, they assumed that it would fall in the upper catchment, thus giving insufficient attention to the likely flood levels reached in downstream tributaries.

9 The activities of the flood engineers were regulated by a Flood Operations Manual (the Manual) which had been revised in November 2009.<sup>5</sup> The plaintiff's case was identified by the primary judge in broad terms as follows:

“[26] At the heart of the plaintiff's case is the contention that during the period from 2 January 2011 to 10 January 2011 the flood engineers were obliged but failed to evacuate water from the dams in advance of rainfall predicted by rainfall forecasts. Critical to this allegation is the contention that the content of any duty of care owed by the flood engineers in relation to flood operations was governed by the Manual. The plaintiff contended that, irrespective of the approach at other dams, the Manual unambiguously required the use of forecasts in conducting flood operations, especially the selection of flood strategies by reference to predictions about reservoir levels based on rainfall forecasts and the making of releases from the dams, determined at least in part by reference to forecast rainfall. The plaintiff also contended that the Manual embodied an overall risk management approach to flood operations. This was said to require that releases from the Dams be made with a view to minimising the risk of urban damage, as well as dam failure, at the expense of the disruption to local communities caused by the inundation of bridges that span the upper part of the Brisbane River below Wivenhoe Dam as well as the risk to the water supply if the full supply level of water was not retained in the dams following the completion of flood operations.”

10 Three issues as to the Manual arose on this appeal. The first was a matter of legal principle, namely how to construe the Manual. Was it to be construed by the court as a legal document, or was the correct approach to determine whether the conduct of the flood engineers was consistent with an understanding of its terms which was reasonably open in the circumstances? Because, as will be explained, the Manual did not create legally enforceable standards, the latter approach should be adopted.

11 The second and third issues involved specific issues in the application of the Manual. The second issue was whether it was reasonable to construe the Manual as not permitting reduction of the level of Wivenhoe Dam below Full

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<sup>5</sup> Seqwater, Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam (Revision No 7, November 2009).

Supply Level (FSL) in anticipation of a possible future flood event. If that were so, the plaintiff's case as to releases between 2 and 6 January 2011 was difficult to uphold. The third issue was whether assessments of the appropriate "strategy" (as described in the Manual) for managing the dams during a flood event were to be undertaken by reference to expected inflows, without taking account of likely outflows. The strategies were defined by the level to which it was expected water would rise. The plaintiff contended that, in assessing likely dam levels, the engineers were required to assume "no releases"; that meant estimating the likely level to which water would rise during the adopted forecast period on the basis that no water would be released.

- 12 However, at the forefront of Seqwater's case on appeal was the legal submission that the standard of care to be applied was not that of reasonable care under s 9 of the *Civil Liability Act 2003* (Qld), but rather the attenuated standard required of public authorities under s 36 of the *Civil Liability Act*. Section 36, if applicable, imposed a higher hurdle for the plaintiff in establishing that Seqwater acted tortiously in the exercise of its functions. Establishing the standard by which Seqwater's conduct was to be judged was a necessary preliminary to considering the factual elements of the claim in negligence. The primary judge found that s 36 of the *Civil Liability Act* was not engaged: as a result, the standard of care applied in judging Seqwater's conduct was the ordinary standard of a failure to take reasonable precautions against a foreseeable and not insignificant risk of harm, as required by s 9 of the *Civil Liability Act*. However, if engaged, s 36(2) provided that an act or omission was not "wrongful" unless it was "so unreasonable that no public or other authority having the functions of the authority in question could properly consider the act or omission to be a reasonable exercise of its functions."
- 13 The challenge to the finding that s 36 was not engaged was identified as ground 1 in Seqwater's appeal. Determining that issue is a preliminary and necessary step before addressing the factual basis of the alleged negligence. That in turn requires a consideration of the legal framework under which Seqwater operated.

### 3. Leave to appeal

- 14 The issues sought to be raised by Seqwater undoubtedly warrant a grant of leave to appeal, if required: indeed, leave was not opposed and could be granted by consent. However, it is desirable to explain why leave may be required.
- 15 The *Supreme Court Act 1970* (NSW), s 101(2)(e), provides that an appeal shall not lie from an interlocutory judgment of the Court in a Division except by leave. Separately, s 103 requires leave for an appeal from a decision of any question or issue ordered to be decided separately from any other question or issue. Where the answers to the separate questions result in the proceedings being finally determined, it has been held that an appeal lies as of right. In *Plymouth Brethren (Exclusive Brethren) Christian Church v The Age Company Ltd*,<sup>6</sup> the principal majority judgment held that such an appeal was as of right, whilst noting that the issue had not been raised or argued.<sup>7</sup> That statement relied upon a discussion in the judgment of Brennan J in *O'Toole v Charles David Pty Ltd*,<sup>8</sup> a case dealing with questions directed to be answered separately by a judge of the Federal Court, in a matter which was removed to the High Court before any answers were entered in the record of the Federal Court and thus raising a question as to the availability of appellate jurisdiction under s 73 of the Constitution. The other member of the majority in *Plymouth Brethren* had been party to a decision which took a different view and expressly declined to revisit the question, on the basis that if leave were required it should be granted.<sup>9</sup> Support for the conclusion that leave was not required may be found in the dissenting judgment at [120]-[123].
- 16 On one view, the question is to be resolved by the specific provision in relation to stated questions, namely s 103 of the *Supreme Court Act*. That section appears to remove the issue from the ambit of the generic requirement with respect to an interlocutory order. Giving priority to the specific provision, the

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<sup>6</sup> (2018) 97 NSWLR 739; [2018] NSWCA 95.

<sup>7</sup> *Plymouth Brethren* at [111] (McColl JA).

<sup>8</sup> (1990-1991) 171 CLR 232 at 257; [1990] HCA 44.

<sup>9</sup> *Plymouth Brethren* at [2] (Beazley P).

need for leave does not depend upon whether it is possible, because of the way the question is answered, to make a final order consequential upon the answer, or whether that is not possible. However, at least on one view, the function of s 103 is to sidestep the issue which troubled Brennan J in *O'Toole*, which was whether the answer to the separate question affected the rights and liabilities of the parties, or whether the answer was non-conclusive, in the sense that the judge who reserved the question for separate determination would not be bound by the answer in resolving the proceeding: *O'Toole* at 258. Only the former would result in a judgment, decree or order from which an appeal might lie to the High Court: *O'Toole* at 259. If that were in fact the function of s 103, there would be no inconsistency with the general approach to interlocutory orders: whether leave was required would turn on the legal effect of the order. Thus an appeal would lie as of right where the answers did give rise to a final order, despite the unqualified language of s 103.

- 17 The issue is complicated by the fact that the present matter involves a class action. Although a final order has been made as between the plaintiff and Seqwater, which should entitle Seqwater to an appeal as of right, the answers to the common questions have not given rise to final orders involving members of the class, other than three members, who are not parties to the appeal.
- 18 The proceedings brought by the plaintiff in a representative capacity engaged Part 10 of the *Civil Procedure Act 2005* (NSW). Part 10 deals with appeals in s 180, but only by providing for appeals by the representative party. It does not vary the rights or procedures governing appeals by individual defendants, nor appeals by a plaintiff in its own right. It does, however, permit Rodriguez to bring an appeal in its representative capacity, which it did with respect to a limited issue concerning the calculation of damages. Presumably because an appeal is a fresh proceeding, s 180(5) appears to envisage that the class members have the right to opt out under s 162: that issue was not addressed in the present case.<sup>10</sup> The Uniform Civil Procedure Rules 2005 (NSW) ("UCPR"), Pt 58 does not take the matter any further. Nor does s 180 address

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<sup>10</sup> Cf *Federal Court of Australia Act 1976* (Cth), s 33ZC(8), introduced in 2010.

the capacity of a representative plaintiff to be a representative respondent to an appeal.

- 19 Similar legislation with respect to class actions is found in Pt IVA of the *Federal Court of Australia Act 1976* (Cth), and Pt 4A of the *Supreme Court Act 1986* (Vic). However, the issue as to the nature of a judgment which determines the final outcome for the plaintiff, but not for class members, appears not to have arisen.
- 20 The correct view may be that to the extent that the appeal seeks relief with respect to the plaintiff's judgment against Seqwater, which is in an amount in excess of the threshold in s 101(2)(r) of the *Supreme Court Act*, it is an appeal against a final order and may be brought as of right. However, to the extent the relief sought challenges answers to common questions affecting the basis on which the claims of class members are determined, Seqwater requires leave, pursuant to s 103. Because the issues form a common substratum for the individual and representative claims, and because the representative claims collectively involve a sum many times greater than the threshold, there should be a grant of leave to address the answers to the common questions.

#### **4. Jurisdiction and choice of law**

- 21 As the primary judge noted, the events in question all occurred in Queensland; the plaintiff is a body corporate located in Queensland, as are the defendant statutory authorities and the State of Queensland. The primary judge suggested that the Court's jurisdiction to hear the matter may derive, at least in part, from the *Jurisdiction of Courts (Cross-Vesting) Act 1987* (Qld), s 4(1). That section purports to vest jurisdiction in the Supreme Court of another state or territory with respect to "State matters." A "State matter" is one in respect of which the Queensland Supreme Court has jurisdiction otherwise than under a law of the Commonwealth or of another state: s 3(1).
- 22 However, there is no doubt that the New South Wales Supreme Court also has jurisdiction as to the subject-matter of the claims, which were claims in tort, including causes of action in negligence, trespass and nuisance. Jurisdiction

over the defendants depended on service of the initiating process. So far as personal jurisdiction over the defendant Queensland entities is concerned, they were served with the initiating statement of claim and filed appearances. Accordingly, the jurisdiction of the Supreme Court did not depend on the Queensland Act, nor on the reciprocal s 9 of the *Jurisdiction of Courts (Cross-Vesting) Act 1987* (NSW), providing that the Supreme Court may exercise jurisdiction in relation to a matter cross-vested by a law of another state.

- 23 The real issue in this case was identification of the correct State law to be applied. There was no dispute that the substantive law of Queensland governed the liability of both the State and the Queensland authorities, including, so far as necessary, the *Acts Interpretation Act 1954* (Qld) in relation to questions of liability.<sup>11</sup> That Act states that it applies to “all Acts” (s 2), “Act” being defined to mean, relevantly, an Act of the Queensland Parliament: s 6. Conversely, the *Interpretation Act 1987* (NSW) does not apply to statutes enacted by other State legislatures. In any event, the only choice of law questions arose in relation to identification of the interest payable on elements of the damages awarded and the apportionment of costs. For reasons which will be discussed in relation to that topic, the law of Queensland was the applicable law.

## 5. Factual background

- 24 To understand the extensive evidence concerning the storm event in south-east Queensland in January 2011, and the effects of releasing water from the dams, it is necessary to outline the general topography of the affected areas. This was described by the primary judge in the following terms:<sup>12</sup>

“The Brisbane River catchment is bounded by the Great Dividing Range to the west and a number of smaller coastal ranges to the east and the north. Its headwaters are at the northern extent of the catchment, bounded by the Brisbane and Jimna Ranges. From there it meanders in a generally south-easterly direction, before running almost north-easterly to enter Moreton Bay

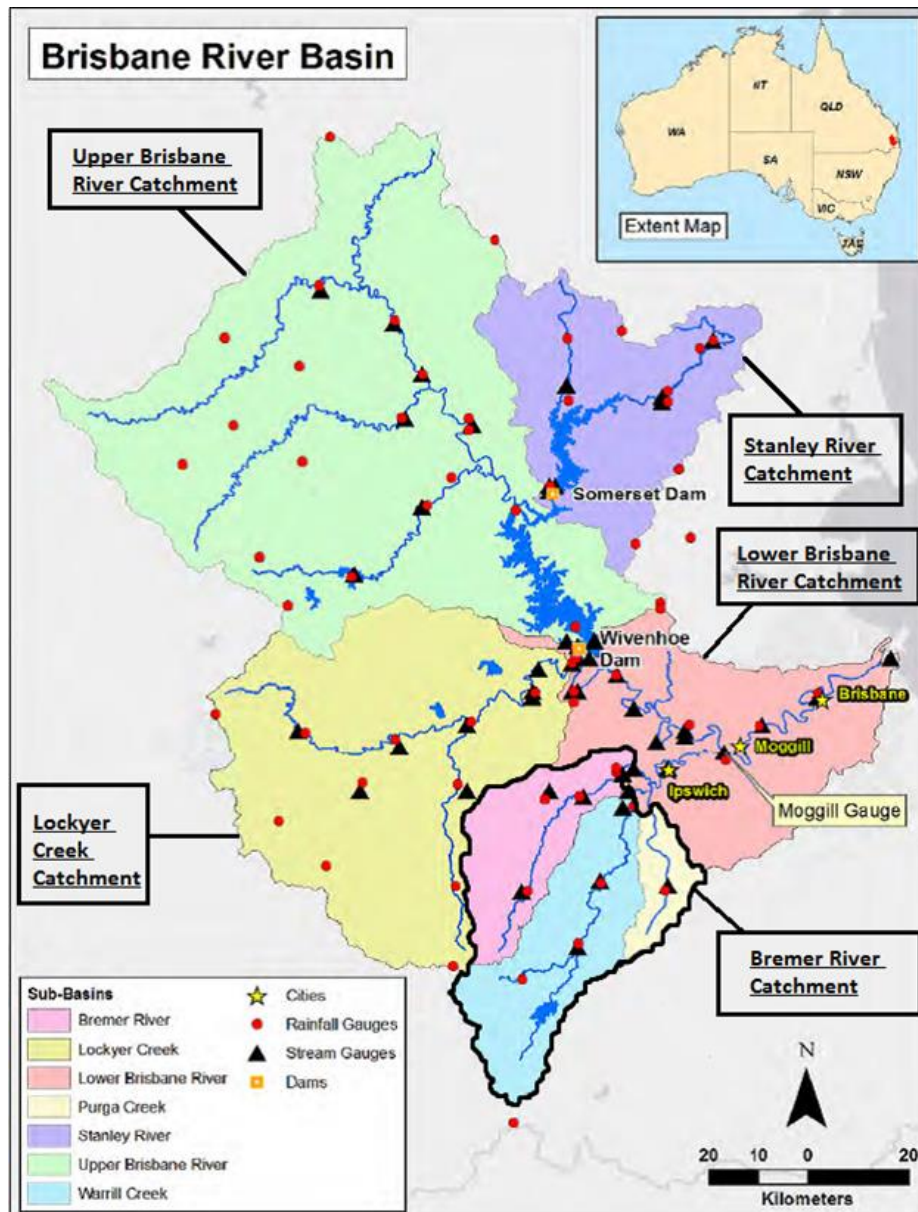
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<sup>11</sup> *John Pfeiffer Pty Ltd v Rogerson* (2000) 203 CLR 503; [2000] HCA 36; *Rodriguez* (22), Ch 11 [1].

<sup>12</sup> *Rodriguez* (22), Ch 2 [37].

near Brisbane. About half of the Brisbane River catchment lies downstream from Wivenhoe Dam.”

- 25 A plan outlining the different catchments was conveniently set out by the primary judge. (Brisbane is shown on the far right of the map, downstream from Moggill gauge, which was the last measuring point for flows in the Brisbane River before they reached the urban areas of the city itself.)



- 26 The total catchment area is in the order of 13,570km<sup>2</sup> of which approximately half, some 7,000km<sup>2</sup>, flow into Wivenhoe Dam (some via Somerset Dam): Ch 2 [39], [40]. The remainder produces flows into tributaries below Wivenhoe. As may be seen from the plan, Brisbane River flows broadly south-east from

Wivenhoe Dam until it meets the Bremer River at which point it turns to flow north-east through Brisbane to the sea at Morton Bay. The other major tributary is Lockyer Creek, which joins the Brisbane River below Wivenhoe Dam at Lowood.

- 27 Somerset Dam was built first, construction being completed in 1956; the construction of Wivenhoe Dam was completed in 1984. The dams have three functions. First, and taken together, they are intended to supply water to south-east Queensland; secondly, they mitigate flooding in the Brisbane River valley and, thirdly, there is a small hydroelectric plant which feeds electricity into the south-east Queensland grid. The third function was irrelevant in the present case, except that the ownership of the dams vested in Seqwater did not allow that authority to control the hydroelectric plant or its operations.
- 28 The distinction between the first and second functions was identified by the designation of a FSL for each dam. Although the focus of the case was on the operation of Wivenhoe Dam, one particular issue concerned the operation of Somerset Dam. Wivenhoe Dam was considerably larger than Somerset, having a storage capacity at FSL approximately three times that of Somerset. As will be seen from the plan, the outflow from Somerset travelled along the course of the Stanley River a short distance into Wivenhoe.
- 29 The spillway of Wivenhoe Dam had a crest at an elevation of 57m.<sup>13</sup> Above the crest were five radial gates which could be raised to allow the release of water over the spillway. Full Supply Level for Wivenhoe was 67m. The top of the core of the dam was 80m but was described as “not resistant to overtopping”;<sup>14</sup> thus, once the dam level reached 80m there was an expectation of a structural failure with potentially “catastrophic consequences.”
- 30 Overtopping was not likely to occur because the dam had an auxiliary spillway below 80m on which were situated three “fuse plug” embankments designed to

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<sup>13</sup> All heights are recorded as an Elevation Level (EL) in metres according to the Australian Height Datum (AHD).

<sup>14</sup> Manual at p 9 [3.2].



erode once water flowed over them. Although the erosion was intended to occur in a “controlled manner”, erosion would result in a large and uncontrolled discharge of water. The “trigger levels” for the erosion of the three fuse plug embankments were stated as 75.7m, 76.23m and 76.78m respectively. However, the seeming precision of the trigger levels was qualified by the statement that initiation of the fuse plugs was expected to occur when the lake exceeded those levels by 0.1m-0.15m.<sup>15</sup>

31 In broad terms, the water supply function of Wivenhoe was to be met by maintaining the reservoir volume at the FSL of 67m. The area above 67m was identified in the Manual as “temporary flood storage”. However, to avoid uncontrolled discharge of water, it was necessary to keep the water level below 75.7m. The strategies for management of the water level during a “flood event” were identified in the Manual and will be discussed below.

32 As may also be seen from the Brisbane River Basin plan, there are two major tributaries of the Brisbane River below Wivenhoe Dam, but above the city of Brisbane. The first is Lockyer Creek, which flows into the Brisbane River at Lowood. There is a gauge at Lowood which measures combined flows from Lockyer Creek and Wivenhoe releases. The second tributary, the Bremer River, meets the Brisbane River some distance below Lowood. The combined flows from Lockyer, Bremer and Wivenhoe are measured at a gauge upstream from the major conurbation, known as Moggill gauge. Rates of flow likely to cause urban inundation are measured by the readings taken at Moggill.

## **6. Operation of the dams: legal structure**

33 The references to relevant legislation discussed below identify the provisions at the date of the events giving rise to the plaintiff’s claims, namely January 2011. The early (pre-2007) legislative scheme is not dealt with here, but in Part 10(2) in addressing the Flood Operations Manual.

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<sup>15</sup> Flood Operations Manual, p 21.

34 There is no dispute that the “ownership” of both Wivenhoe Dam and Somerset Dam was vested in Seqwater. That was effected by notices published in the Queensland Government Gazette of 26 June 2008, pursuant to a power conferred on the responsible Ministers under the *South East Queensland Water (Restructuring) Act 2007* (Qld) (“Restructuring Act”), s 67.<sup>16</sup> Nothing was said to turn on the concept of “ownership” in this context. It at least provided a basis for Seqwater to exercise its statutory functions in circumstances where its juristic nature was not entirely clear. Various provisions of the Restructuring Act bore upon submissions regarding the engagement of s 36 of the *Civil Liability Act* and, in particular, whether Seqwater was a “public authority constituted under an Act”, and what functions it exercised in carrying out flood mitigation activities. It is convenient at this point to address that legislative framework.

(1) *Restructuring Act*

35 The purposes of the Restructuring Act were set out in s 3:

**3 Purpose**

The purpose of this Act is to facilitate a restructure of the water industry in south east Queensland to deliver significant benefits to the community, including—

- (a) improved regional coordination and management of water supply; and
- (b) more efficient delivery of water services; and
- (c) enhanced customer service for water consumers; and
- (d) a clearer accountability framework for water supply security.

36 Pursuant to s 6, four “new water entities” were established, including “the Queensland Bulk Water Supply Authority” (Seqwater). Section 6(2) stated that a new water entity was “not a body corporate” and did not “represent the State.” Nevertheless, each new water entity was stated to have “all the powers of an individual” including the power to enter into contracts, and the power to acquire,

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<sup>16</sup> *Rodriguez (22)*, Ch 2 [10].

hold, dispose of and deal with property: s 7(1)(a) and (b). Further, “it” was said to have the powers given to it under an Act, but subject to any limitations under an Act: s 7(2) and (3). A new water entity was able to sue and be sued in the name given under s 6(1): s 7(4).<sup>17</sup> Section 14(2) provided that the entity must have a “board”, but was not constituted by the members of its board.

- 37 Despite the express terms of s 6(2), Seqwater was undoubtedly a trading corporation for the purposes of s 51(xx) of the Constitution: see *Communications, Electrical, Electronic, Energy, Information, Postal, Plumbing and Allied Services Union of Australia v Queensland Rail*,<sup>18</sup> dealing with relevantly identical legislation establishing Queensland Rail. It is not aptly described as a corporation aggregate or a corporation sole, but it is clearly an entity having a separate juristic personality. It may well be a corporation for other purposes; however, the only question for present purposes was whether it was a public authority for the purposes of another Queensland statute, namely the *Civil Liability Act*. No party submitted that s 6(2), defining it as an entity other than a corporation, had any consequence for this purpose.
- 38 Chapter 2, Pt 1 of the Restructuring Act, identifying the establishment, powers and functions of the new water entities, contained three provisions which were relied upon in considering whether the terms of s 36 of the *Civil Liability Act* were engaged; it is convenient to set them out in full.
- 39 First, the generic powers of the new water entities were set out in s 7:

#### **7 Powers of new water entities**

- (1) A new water entity has all the powers of an individual and may, for example—
- (a) enter into contracts; and
  - (b) acquire, hold, dispose of, and deal with property; and
  - (c) employ staff; and

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<sup>17</sup> Section 7 is set out at [39] below.

<sup>18</sup> (2015) 256 CLR 171; [2015] HCA 11.

- (d) appoint agents and attorneys; and
  - (e) engage consultants; and
  - (f) fix charges, and other terms, for services and other facilities it supplies; and
  - (g) do anything else necessary or convenient to be done for its functions.
- (2) Without limiting subsection (1), a new water entity has the powers given to it under an Act.
  - (3) However, a new water entity's powers are subject to any limitations under an Act.
  - (4) A new water entity may sue and be sued in the name it is given under section 6(1).

40 The functions of the new water entities, including Seqwater, were identified as follows:

**9 Functions of new water entities other than the water grid manager**

- (1) This section applies to a new water entity other than the water grid manager.
- (2) A new water entity has the following functions to the extent they are consistent with its operational and strategic plans—
  - (a) carrying out water activities and other ancillary activities;
  - (b) supplying water services and other ancillary services;

*Example of an ancillary service—*

delivering a community education program relating to the entity's functions

  - (c) supplying other services relating to the water industry, including—
    - (i) engineering services; and
    - (ii) services for operating or maintaining infrastructure; and
    - (iii) business management services; and

*Example—*

services for managing government or business initiatives to save water

- (iv) energy generation; and
- (v) scientific services;
- (d) developing water supply works;
- (e) improving the supply, delivery and quality of water, including by way of—
  - (i) riverine area protection; and
  - (ii) soil erosion control; and
  - (iii) land degradation treatment and prevention; and
  - (iv) nutrient management; and
  - (v) vegetation management;
- (f) using or managing the entity's land in ways that benefit the community, including for recreational purposes;
- (g) anything else likely to complement or enhance a function mentioned in paragraphs (a) to (f);
- (h) another function conferred under an Act.

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## **11 Functions to be carried out commercially**

- (1) The water grid manager must, as far as practicable, carry out its functions in a way that is consistent with sound commercial principles.
- (2) A water entity other than the water grid manager must carry out its functions as a commercial enterprise.
- (3) Subsection (2) does not apply to a water entity to the extent it is required under this Act to perform a community service obligation other than as a commercial enterprise.

The reference in s 9(2) to “operational and strategic plans” picked up provisions in Ch 2, Pt 4, “Reporting and accountability” and specifically the provision for such plans in Div 4 of Pt 4.

41 Chapter 2, Part 2 of the Restructuring Act (encompassing ss 14-26) dealt with the appointment and membership of the boards of the entities; Part 3 dealt with senior executives. Each new water entity had a board which was “responsible for the way the entity performs its functions and exercises its powers”: s 15(1).

A board was to consist of no fewer than two, nor more than five, members appointed by the “responsible Ministers”. The chairperson and deputy chairperson were appointed by the responsible Ministers (ss 17 and 18), who might also end the appointment of a person “at any time” for any reason or none: s 19(4). (The term “responsible Ministers” was defined to mean both “the Minister administering this Act” and “the Minister administering the entity.”<sup>19</sup>)

42 Chapter 2, Part 4 recognised that a new water entity is a statutory body under the *Financial Accountability Act 2009* (Qld): s 34(1)(a). Part 4 of the Restructuring Act dealt with “reporting and accountability”. Division 1 provided that each new water entity was a statutory body under the *Financial Accountability Act* and under the *Statutory Bodies Financial Arrangements Act 1982* (Qld), and was a unit of public administration under the *Crimes and Misconduct Act 2001* (Qld). Division 2 imposed obligations to report to the responsible Ministers. Division 3 provided for annual reports to be prepared in accordance with the *Financial Accountability Act*. Relevantly for present purposes, Div 4 provided for “Strategic and operational plans”.

43 Division 4 was comprised of ss 44-51. Section 44 recognised that the requirements of the Division overlapped with those of the *Financial Accountability Act*. Section 45 provided:

**45 Draft strategic and operational plans**

- (1) Before 31 March each year, a new water entity’s board must prepare, and submit to the responsible Ministers for their agreement, a draft strategic plan and a draft operational plan for the entity for the next financial year.
- (2) The board and the responsible Ministers must try to reach agreement on the draft plans as soon as possible and, in any event, not later than the start of the financial year.

44 Section 47 recognised that agreement between the responsible Ministers and the board might not be reached before the start of a financial year, in which

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<sup>19</sup> Restructuring Act, Sch 3 (Dictionary), **responsible Ministers**.

case a draft plan was taken to be the entity's strategic or operational plan, until s 48 came into effect. That provision read as follows:

**48 Strategic or operational plan on agreement**

When the draft strategic or operational plan has been agreed to in writing by the responsible Ministers, it becomes the entity's strategic or operational plan for the relevant financial year.

45 Section 49 required that the entity "must comply with its strategic and operational plans for a financial year", although there was power to modify a plan: s 50. Finally, s 51 provided for the contents of an operational plan (though not a strategic plan):

**51 Content of operational plan**

A new water entity's operational plan for a financial year must include—

- (a) the entity's objectives; and
- (b) the entity's capital structure; and
- (c) an outline of the following matters—
  - (i) the nature and scope of the activities proposed to be undertaken by the entity during the financial year;
  - (ii) the entity's main undertakings for the financial year;
  - (iii) an outline of the borrowings made or proposed to be made by the entity;
  - (iv) an outline of the entity's policies for minimising or managing any risk of investments and borrowings that may adversely affect its financial stability; and
- (d) for a new water entity other than the water grid manager, an outline of the following matters—
  - (i) the major infrastructure investments proposed to be undertaken by the entity during the financial year;
  - (ii) an outline of the entity's policies relating to the recreational use of the entity's premises and other infrastructure; and
- (e) the matters required under section 57.

- 46 Every financial year a new water entity other than the water grid manager (not being a commercial enterprise and not seeking to make a profit) must pay to the State an “annual return” in an amount determined by the Minister but not exceeding its estimated net profit for that year: ss 52-54.
- 47 Chapter 2, Pt 6 envisaged that a responsible Minister might give a direction in the public interest which was not in the entity’s commercial interests and which was designated a “community service obligation”: s 56. Such obligations were to be set out in the operational plan: s 57(3). Sections 58-63 gave the responsible Minister a degree of direct control over the operations of a new water entity – most notably, s 61 permitted the Minister to give the board of an entity a written direction “in relation to the entity” where, “because of exceptional circumstances”, it was “in the public interest” to do so. To that extent, the obligation to carry out functions commercially (s 11) and the freedom from direction by the government (s 63) were partly qualified. Under Part 9, when a new water entity expires, 99 years after its creation, the State is to be its successor: s 64. The entity was not liable to pay specified State taxes: s 81.
- 48 Chapter 3 Part 4 dealt with matters incidental to the application to the new water entities of the *Water Act 2000* (Qld) (*Water Act*) and the *Water Supply (Safety and Reliability) Act 2008* (Qld) (*Water Supply Act*). Sections 72 and 73 provided that each entity other than the water grid manager was “a water service provider” and was to be registered on the register of water and sewerage service providers required to be kept by “the regulator” under the *Water Supply Act*, s 13, although the ordinary procedures governing applications for registration<sup>20</sup> did not apply to the new water entities. For the most part, however, Seqwater’s operation of Somerset and Wivenhoe was authorised and regulated by the unqualified operation of those Acts.
- 49 Returning to the terms of s 9(2), it may be noted that there was no express reference to the flood mitigation functions of the dams. However, the term “water activities” in s 9(2)(a) was defined in the Dictionary (Sch 3) to mean

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<sup>20</sup> See *Water Supply Act*, ss 21, 22.



activities mentioned in the definition of the same term in the *Water Act*. That definition was in the following terms:

**water activity**, for a water authority, includes an activity for the following—

- (a) water conservation;
- (b) water supply;
- (c) irrigation;
- (d) drainage, including stormwater drainage;
- (e) flood prevention;
- (f) floodwater control;
- (g) underground water supply improvement or replenishment;
- (h) sewerage;
- (i) anything else dealing with water management.

Accordingly, the function of carrying out water activities included activities for flood prevention and floodwater control.

(2) *Water Act and Water Supply Act*

50 The *Water Act*, s 19 stated that “[a]ll rights to the use, flow and control of all water in Queensland are vested in the State”. It is an offence for a person to “interfere with water” unless authorised to do so under that Act or a similar law of another state or territory: s 808(2). However, by s 107A(1) the holder of a “resource operations licence” is authorised “to interfere with the flow of water to the extent necessary to operate the water infrastructure to which the licence applies.”

51 The *Water Act*, s 38 permitted the relevant Minister to prepare a “water resource plan” for any part of Queensland, for purposes which might include “defin[ing] the availability of water for any purpose” and “provid[ing] a framework for sustainably managing water and the taking of water”. After the consultation process set out in ss 39-49A, including the preparation and publication of a draft plan, the Minister might prepare a final water resource plan, which would have effect when approved by the Governor in Council: s 50. Section 95 then permitted the chief executive of the relevant department to prepare a “resource operations plan to implement a water resource plan for any water in [all or part of] the plan area”. A draft resource operations plan, which would become a final resource operations plan through the operation of s 103, was to (among

other things) “identify any water infrastructure to which the draft plan is intended to apply and how it will be operated”: s 98(1). Resource operations licences were to be granted by the chief executive, in accordance with the resource operations plan, on the day the plan comes into effect: s 107. If the plan set out a process for the granting of licences to meet “future water requirements”, licences might also be granted in accordance with that process: s 108. A resource operation licence could be held by the owner of the water infrastructure to which the licence applied or, if the owner were a subsidiary, its parent company: s 107A(3).

- 52 Seqwater held a resource operations licence for the Stanley River Scheme under the Moreton Resource Operations Plan (Operations Plan), which implemented the Water Resource (Moreton) Plan 2007. The licence relevantly provided:

**“AUTHORITY TO INTERFERE**

The licence authorises the licence holder to interfere with the flow of water in the Stanley River Water Supply Scheme, *as detailed in the Plan – Chapter 5 – Central Brisbane River and Stanley River Water Supply Schemes*, to the extent necessary to operate the water infrastructure to which the licence applies.

**WATER INFRASTRUCTURE**

The water infrastructure to which the licence applies is detailed in the Plan Attachment 5 – Central Brisbane River and Stanley River Water Supply Schemes.” (emphasis added)

- 53 Attachment 5 to the Operations Plan described Wivenhoe and Somerset Dams. Chapter 5 was largely concerned with water allocation and water sharing rules in the Central Brisbane River and Stanley River Water Supply Schemes, but it also contained s 72, which set minimum operating levels for infrastructure in the schemes and provided that releases could not be made from that infrastructure unless “necessary” to “meet minimum flow rates specified in section 75” or “supply downstream demand”. There was no reference to releases for flood mitigation purposes but neither party suggested that they were not necessary for either purpose, or that Seqwater was in breach of that condition. Seqwater’s position was that s 72 did not apply to water above the FSL of the dams.

- 54 There is a question whether the phrase “as detailed in the Plan – Chapter 5 – Central Brisbane River and Stanley River Water Supply Schemes” modified “to interfere with the flow of water”, in which case the grant authorised interference in the manner detailed in that chapter, or whether it merely described “the Stanley River Water Supply Scheme”. The better view may be that it did the latter. Subject to condition 3, condition 1 of the licence required the holder to comply “with the operating arrangements and supply requirements detailed in the Plan Chapter 5”. Condition 3 applied the “transitional arrangements” in schedule 1 of the licence in the event Seqwater was unable to comply with the requirements of the plan on the day the plan commenced. The transitional arrangements relevantly required Seqwater to comply with any “interim program” approved by the chief executive under s 13 of the plan. None of that is consistent with the clause beginning “as detailed” itself imposing an unqualified condition on the authority of the licence holder. That result would also sit awkwardly with the provisions of the *Water Act* concerning the imposition of licence conditions (ss 109, 110) and the consequences for licence holders of noncompliance: ss 119, 813.
- 55 In the event, Seqwater was unable to comply with the requirements of the plan, including s 72, and an interim program was approved. The interim program stated that, despite s 72, Seqwater would “continue to make releases from infrastructure for ... flood mitigation”. That part of the program had an indefinite duration and remained in effect in January 2011. It follows that by its licence Seqwater was authorised to interfere with the flow of water to the extent necessary to operate the dams, including for flood mitigation purposes, and that authorisation was not conditioned by s 72.
- 56 The provisions of the Water Supply Act relevant to flood mitigation were carved out of the *Water Act* by the enactment of the former. They were relevantly as follows. Section 370(1) provided that the owner of a dam might be nominated by regulation “as an owner who must prepare a manual (a flood mitigation manual) of operational procedures for flood mitigation for the dam”. As the explanatory note to the Water Supply (Safety and Reliability) Bill 2008 explained, “a dam nominated in the regulation will be a dam which was

constructed for the purpose of flood mitigation”, and a flood mitigation manual “ensures that such dams make controlled releases of water for flood mitigation purposes in accordance with pre-agreed conditions”. Responsibility for approving and, if necessary, amending the manual rested with the chief executive, who was empowered to consult with an “advisory council” before doing so: ss 371, 372. Unlike the *Brisbane and Area Water Board Act 1979* (Qld), which expressly required the Water Board (the former owner and operator of Wivenhoe and Somerset Dams) to prepare *and follow* flood mitigation manuals,<sup>21</sup> the Water Supply Act did not expressly require an owner or operator of a dam to comply with its flood mitigation manual. However, s 374(2) provided that the owner and operator, and its employees and agents, would not “incur civil liability for an act done, or omission made, honestly and without negligence in observing the [manual’s] procedures”. Where that immunity was engaged, “the liability attaches instead to the State”: s 374(3).

57 It appears that at the time the relevant version of the manual was approved there was no regulation in force pursuant to Water Supply Act, s 370 requiring Seqwater to produce a flood mitigation manual. Section 589 of the Water Supply Act did not give continuing effect to subordinate legislation made under the equivalent provisions of the *Water Act* (relevantly the former s 496, in the same terms as s 370). It is therefore not clear whether Seqwater was actually required to produce a manual for approval, but in any event there is no question that the relevant version of the manual was in fact approved under the Water Supply Act, s 371.

58 Against the background of this statutory scheme, it is convenient to turn to the defence pleaded by Seqwater invoking s 36 of the *Civil Liability Act*: the rejection by the primary judge of this “defence” being the first ground of the appeal.

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<sup>21</sup> *Rodriguez (22)*, Ch 2 [70]-[71].

## 7. Civil Liability Act – s 36 (Ground 1)

### (1) Statutory provisions – Civil Liability Act

59 Section 36 of the *Civil Liability Act* appears in Ch 2, Pt 3, headed “Liability of public and other authorities and volunteers”.<sup>22</sup> It contains two brief definitions relating specifically to Division 1 of Pt 3. They are as follows:

#### 34 Definitions for div 1

In this division—

**function** includes power.

**public or other authority** means—

- (a) the Crown (within the meaning of the *Crown Proceedings Act 1980*); or
- (b) a local government; or
- (c) any public authority constituted under an Act.

60 Although the primary judge put to one side the operation of s 35, it is convenient to set the provision out at this stage:

#### 35 Principles concerning resources, responsibilities etc. of public or other authorities

The following principles apply to a proceeding in deciding whether a public or other authority has a duty or has breached a duty—

- (a) the functions required to be exercised by the authority are limited by the financial and other resources that are reasonably available to the authority for the purpose of exercising the functions;
- (b) the general allocation of financial or other resources by the authority is not open to challenge;
- (c) the functions required to be exercised by the authority are to be decided by reference to the broad range of its activities (and not merely by reference to the matter to which the proceeding relates);
- (d) the authority may rely on evidence of its compliance with its general procedures and any applicable standards for the

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<sup>22</sup> The relevant provisions remain unchanged.

exercise of its functions as evidence of the proper exercise of its functions in the matter to which the proceeding relates.

61 Section 35 adopted “principles” to be applied in determining whether a public or other authority has breached a duty; at the very least, the principles are relevant as part of the statutory context in which s 36 is located. In particular, s 35 expressly recognised that an authority may allocate financial and other resources to the exercise of particular functions, that the functions are to be “decided” by reference to “the broad range of its activities”, and that an authority may be expected to act in compliance with general procedures and standards.

62 Section 37, being the final section in Div 1, reads as follows:

**37 Restriction on liability of public or other authorities with functions of road authorities**

- (1) A public or other authority is not liable in any legal proceeding for any failure by the authority in relation to any function it has as a road authority—
  - (a) to repair a road or to keep a road in repair; or
  - (b) to inspect a road for the purpose of deciding the need to repair the road or to keep the road in repair.
- (2) Subsection (1) does not apply if at the time of the alleged failure the authority had actual knowledge of the particular risk the materialisation of which resulted in the harm.
- (3) In this section—

**road** see the *Transport Operations (Road Use Management) Act 1995*, schedule 4.

**road authority** means the entity responsible for carrying out any road work.

63 This provision is of more limited relevance, but it illustrates the need to have regard to the knowledge of the authority of particular risks, the materialisation of which may give rise to harm and, at least implicitly, to the need for principles of attribution to determine the scope and extent of such knowledge.

64 Against this contextual material, the operative provision relied upon by Seqwater was s 36, which provides:

**36 Proceedings against public or other authorities based on breach of statutory duty**

- (1) This section applies to a proceeding that is based on an alleged wrongful exercise of or failure to exercise a function of a public or other authority.
- (2) For the purposes of the proceeding, an act or omission of the authority does not constitute a wrongful exercise or failure unless the act or omission was in the circumstances so unreasonable that no public or other authority having the functions of the authority in question could properly consider the act or omission to be a reasonable exercise of its functions.

(2) *Breach of statutory duty – Rodriguez’ contention*

65 The primary judge commenced by dealing with an issue raised by Rodriguez, namely that s 36 was confined to cases where the alleged liability was based on a cause of action for breach of statutory duty.<sup>23</sup> In support of that contention, Rodriguez had relied upon a judgment of Dalton J in *Hamcor Pty Ltd v Queensland*.<sup>24</sup> *Hamcor* had upheld such a limited operation of s 36; Seqwater contended that *Hamcor* was wrongly decided, a submission which the primary judge accepted.<sup>25</sup> (*Hamcor* was appealed but the operation of s 36 was not addressed as the judge’s finding as to the operation of s 36 was not in fact dispositive.<sup>26</sup>) On this appeal, Rodriguez filed a notice of contention re-agitating its submission below that *Hamcor* had been correct on this point, and that, as the relevant claim against Seqwater was in common law negligence (not for breach of a statutory duty carrying the remedy of damages for loss caused to an individual by the breach), s 36 was not engaged.

66 In rejecting the reasoning of Dalton J, the primary judge noted that she had applied a rule of construction derived from the judgment of Kitto J in *Board of Fire Commissioners (NSW) v Ardouin*.<sup>27</sup> Thus Dalton J had stated:

“[196] Section 36 is a provision which in my view (see below) drastically reduces the rights of persons to a remedy by very significantly lowering

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<sup>23</sup> *Rodriguez (22)*, Ch 11 [199].

<sup>24</sup> [2014] QSC 224 (“*Hamcor*”).

<sup>25</sup> *Rodriguez (22)*, Ch 11 [203].

<sup>26</sup> *Hamcor Pty Ltd v State of Queensland* [2016] 1 Qd R 271; [2015] QCA 183.

<sup>27</sup> (1961) 109 CLR 105 at 116; [1961] HCA 71.

the standard of care owed by public or other authorities. It thus attracts the principle described by Kitto J in *Ardouin*:

‘Section 46 operates, then, to derogate, in a manner potentially most serious, from the rights of individuals; and a presumption therefore arises that the Legislature, in enacting it, has chosen its words with complete precision, not intending that such an immunity, granted in the general interest but at the cost of individuals, should be carried further than a jealous interpretation will allow.’ – p 116.”

67 Although this passage followed her conclusion, it was apparent that Dalton J applied a “jealous interpretation” to the words of s 36. Noting that the heading to the section referred to proceedings against public or other authorities “based on breach of statutory duty”, she read down the operative terminology (which does not refer to duty) as limited by the reference to breach of statutory duty in the heading. Justice Dalton stated:<sup>28</sup>

“After using that phrase in the heading, the section does not use the words ‘duty’ or ‘breach of duty’ again. Again this seems a deliberate choice not to use the words which are defined to include tortious duties.”

68 Whilst the heading forms part of the statute,<sup>29</sup> and can be relied upon in construing the operative provision, the manner in which it was applied is not persuasive. The term “duty” is defined in the Dictionary to the *Civil Liability Act* to mean a duty of care “in tort”, “under contract”, or another duty under statute or otherwise that is “concurrent with a duty of care in tort or under contract”. The fact that the defined term “duty” is not used in s 36 suggests that the section was not limited to any particular cause of action. As the primary judge observed, “the definition of ‘function’ in s 34 is not confined to a ‘duty’.”<sup>30</sup> Further, the phrase “breach of statutory duty” used in the heading is at best a paraphrase of the third limb of the definition of duty, the meaning of which is not without its own difficulties. Finally, s 36(1) makes explicit provision for the application of the section, and does so by reference to “function” rather than the type of duty which is alleged to have been breached.

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<sup>28</sup> *Hamcor* at [195].

<sup>29</sup> *Acts Interpretation Act 1954* (Qld), s 35C(1).

<sup>30</sup> *Rodriguez (22)*, Ch 11 [203].



69 The better view is that s 36 should not be read down as applicable only to a proceeding in which the cause of action is a breach of statutory duty. The reasoning of the primary judge was correct.

70 It is also doubtful that the principle of statutory interpretation adopted by Kitto J in *Ardouin* provides assistance in this case. The statutory provision in issue in *Ardouin* was s 46 of the *Fire Brigades Act 1909-1956* (NSW) which provided:

46 The board, the chief officer, or an officer of the board, exercising any powers conferred by this Act or the by-laws, shall not be liable for any damage caused in the bona fide exercise of such powers.

The claim the subject of those proceedings was one for damages by an infant who was injured by a fire brigade vehicle on a public street. The driver was found to be negligent. Dixon CJ stated at 109:

“When s 46 speaks of the bona fide exercise of the Board's powers it appears to me to be referring primarily to the exercise of powers which of their nature will involve interferences with persons or property. ... [I]t is not, however, expressed in terms which make it applicable to the doing of things in the course of performing the functions of the Board, which are of an ordinary character involving no invasion of private rights and requiring no special authority.”

71 Taylor J stated:<sup>31</sup>

“Much of the difficulty in the case results from the somewhat confused language of s 46. In terms it protects the Board against claims for damages occasioned by the exercise of the powers conferred upon it by the Act or the by-laws. But, according to one suggestion, it may be said, literally, to confine the area of protection to the bona fide exercise of such powers. This, however, is a matter of words only for, in the absence of bona fides, the purported exercise of any such power would not constitute an exercise of the power at all. At the most it would be nothing more than a pretended exercise. Again, the Board owes its existence solely to the statute and every power which it possesses may, in one sense, be said to be conferred by the statute. But there is a significant distinction between its general authority and capacity to function as a statutory body and the special powers conferred upon it by the Act in relation to the prevention and control of fires.”

Similar reasoning was adopted by Windeyer J.<sup>32</sup>

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<sup>31</sup> *Ardouin* at 121.

<sup>32</sup> *Ardouin* at 125-127.

72 In short, too much weight should not be given to the language of Kitto J presuming that words were chosen with “complete precision” in circumstances where all members of the Court complained of poor drafting. In identifying the “strict meaning” that should be given to the immunity, Kitto J stated in language reflected in the other judgments:<sup>33</sup>

“In my opinion the meaning is that the immunity attaches in respect only of damage resulting from an act which, if it had not been negligent, would have been the very thing, or an integral part of or step in the very thing, which the provisions of the Act other than s 46 or the by-laws gave power in the circumstances to do, as distinguished from an act which was merely incidental to, or done by the way in the course of, the exercise of a power.”

73 That distinction drawn in *Ardouin* may readily be applied to s 36. Thus, Seqwater would not obtain the protection of s 36 if a flood operations engineer, making an urgent trip in his work vehicle to undertake flood control work, had an accident as a result of negligent driving. On the other hand, a decision to release or not release water, clearly a power conferred on the authority which was capable of exercise only by a body having the necessary statutory function, would attract the protection. The powers in issue were not those which must generally attach to a corporation or authority as a result of its institutional existence. Rather, the powers in question fell squarely within those accorded protection under *Ardouin*. These were undoubtedly functions of the authority conferred for the core purposes for which it was established.

(3) *Exercise of functions*

74 The judge’s determination that s 36 was not engaged relied on two propositions. The first involved acceptance of Rodriguez’ submission that the reference to “functions” in s 36 did not apply to any statutory functions of Seqwater. In particular, the primary judge noted that the chapeau to s 9(2) of the Restructuring Act, conferring functions on water entities, referred to “the following functions to the extent they are consistent with its operational and

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<sup>33</sup> *Ardouin* at 117.

strategic plans”. He held in Ch 2 that as Seqwater had been unable to produce any such plans it had not established that s 9(2) was engaged:

“[14] I accept that the conferral of functions engaged by s 9(2) of the *Restructuring Act* is conditioned on the existence of an operational or strategic plan, as defined, relevant to the particular activity. If there is no such plan then it cannot be determined that a particular function is conferred to any ‘extent’. This is in contrast to a provision that confers a function subject to it being not inconsistent with any operational or strategic plan. In this case, no such plan was tendered and both relevant parties could not locate a plan ‘in force’. The party seeking to invoke s 9(2) was Seqwater, principally as an aspect of its reliance on s 36 of the *Civil Liability Act 2003* (Qld).<sup>34</sup> Given the above concession, I am satisfied that no relevant operational or strategic plan was in existence at the time of the January 2011 Flood Event. It follows that I am not satisfied that, in carrying out flood operations and flood mitigation, Seqwater was carrying out or performing any function conferred on it by s 9(2) of the *Restructuring Act*.”

For the reasons which follow, this reasoning should not be accepted.

- 75 As discussed above, Seqwater was an authority established by statute, namely the *Restructuring Act*, which established four new water entities. The subsequent provisions of the Act applied generically to all new water entities, except where otherwise indicated. Relevantly for present purposes, the powers of each were defined in s 7, set out at [39] above. Further, the functions of the new entities were generically conferred under s 9, set out at [40] above. They included, by reference to the definition of “water activities” in the *Water Act*, flood prevention and floodwater control. They also included water supply services.
- 76 Although the primary judge held that s 9(2) did not confer any functions on Seqwater, that did not leave Seqwater bereft of relevant functions; rather the judge held it was able to conduct activities in relation to the operation of the dam resulting from its ownership of the dam. As discussed above, it held a resource operations licence which authorised it to interfere with the flow of water in the rivers for flood mitigation purposes. The whole case against

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<sup>34</sup> Seqwater’s amended defence; see for example, par 361(c).

Seqwater assumed it had such a function, and that it was required to exercise its powers in accordance with a flood mitigation manual.

- 77 The non-engagement of s 9(2) would not necessarily have provided a basis for excluding the operation of s 36 with respect to Seqwater. Even if the functions referred to in s 36 must be those derived from statute, not being powers available to any person in the exercise of ordinary activities, it is nevertheless apparent that the functions exercised by Seqwater were dependent upon the statutory creation of Seqwater as the owner of the dam. However, the reasoning that no functions were conferred on Seqwater under s 9(2) should also be addressed.
- 78 The chapeau to s 9(2) conferred functions on each new water entity created by the Act, “to the extent they are consistent with its operational and strategic plans”. The primary judge found that Seqwater had neither a strategic plan nor an operational plan in January 2011. Although Seqwater challenged that finding on the appeal, it produced no evidence to support a conclusion that such a plan had existed. However, it does not matter whether that finding of the primary judge is accepted: the question is what effect that finding had in relation to the operation of Seqwater and, in particular, the conferral of functions under s 9(2).
- 79 Rodriguez’ construction of s 9(2) turned on the proposition that the identified functions could only exist if “consistent with” operational and strategic plans and, therefore, if the entity had such plans. Only once the entity had such plans, and only during the period in which it had such plans, did it have the identified functions. If the provision had used the phrase “to the extent they are not inconsistent with” the plans, it would be understood that the functions were held absent inconsistency. That criterion could be satisfied in the absence of plans, but to confer functions only to the extent they are consistent with plans would require the existence of plans. Thus it was submitted, “consistent with” does not carry the same connotation as “not inconsistent with”.

- 80 The underlying syntax of this construction may be accepted; however, the construction should not be accepted if the effect is to restrict the activities and operations of the entity so as to deprive it of its role as defined by the Restructuring Act.
- 81 Rodriguez, in seeking to uphold the construction which negated the existence of such functions, noted that the entity would still have the ordinary powers of “an individual” pursuant to s 7. However, those powers were not at large. They were “subject to any limitations under an Act”, which must include the Restructuring Act: s 7(3). Thus, although Seqwater may have had the powers of an owner of land, it did not follow that it could use or manage the land in any way that it chose. More importantly, the significance of the functions conferred by s 9(2) must be viewed within the statutory and regulatory framework for the management of the water supply of south-east Queensland and for flood mitigation, particularly with respect to the residents of Brisbane and surrounding areas. To construe s 9(2) as not conferring any function on Seqwater unless it was, at any point in time, in compliance with the requirements of Pt 4 in respect of operational and strategic plans, would be to subvert the statutory scheme. There was no provision stating that consequence. That consequence cannot have been contemplated by the Parliament; there is nothing in the legislation from which it is possible to infer any such unexpressed intention. Established principles of statutory interpretation set out by *Project Blue Sky*<sup>35</sup> preclude the inference of such a consequence.
- 82 On any view, Seqwater in fact undertook its flood mitigation functions by establishing a Flood Operations Centre and exercising its powers to release water in a controlled manner. In doing so it was, on Rodriguez’ own case, subject to a duty to apply the Flood Control Manual according to its terms. The Manual, discussed in detail below, imposed strategies for the operation of Somerset and Wivenhoe Dams. It is not possible to read the reference to a

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<sup>35</sup> *Project Blue Sky Inc v Australian Broadcasting Authority* (1998) 194 CLR 355; [1998] HCA 28.

“function” in s 36 as not encompassing the flood mitigation activities undertaken in January 2011.

(4) *Vicarious liability*

83 In rejecting Seqwater’s reliance on s 36, the primary judge accepted a second contention put forward by Rodriguez, expressed in the following terms:

“[205] ... Unlike [s 37 and s 16(1) of the *Civil Liability Act*], s 36(2) does not address the ‘liability’ of the public authority. Instead, it is directed to a narrower topic[,] namely, whether the public authority’s acts or omissions were ‘wrongful’. Thus in a case of ‘true vicarious liability’ such as the present, where the (alleged) public authority is being attributed with the ‘liability’ of an employed flood engineer, s 36(2) has no application. ... As s 36(2) only deals with the wrongful acts of such authorities, it has no relevance to any assessment of whether any of the *flood engineers’* acts or omissions were ‘wrongful’, that is a breach of any duty owed by them. If their acts or omissions are found to be wrongful, then any ‘liability’ of the flood engineer is attributed to ... Seqwater ..., independent of s 36 and irrespective of whether any of them constituted a ‘public authority’ or not.” (Emphasis in original.)

84 The words “true vicarious liability” were said to have been taken from Rodriguez’ submissions, but had earlier<sup>36</sup> been sourced to the judgment of Fullagar J in *Darling Island Stevedoring and Lighterage Co v Long*.<sup>37</sup> Generally speaking, the cases in which a vicarious liability is imposed on someone who is not the immediate wrongdoer depends on the relationship between the two parties. Thus vicarious liability may be imposed on an employer for the conduct of an employee. However, other relationships, such as that of a principal and independent contractor, may not give rise to vicarious liability under the general law. That situation may be varied by statute.<sup>38</sup> Further, there are circumstances where the general law imposes what is described as a “non-delegable duty” on a particular party, which, it has been said, “enables a plaintiff to outflank the general principle that a defendant is not vicariously responsible for the negligence of an independent contractor.”<sup>39</sup>

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<sup>36</sup> *Rodriguez (22)*, Ch 11 [191].

<sup>37</sup> (1957) 97 CLR 36 at 57; [1957] HCA 26.

<sup>38</sup> For example, see *Law Reform (Vicarious Liability) Act 1983* (NSW), s 10.

<sup>39</sup> *Leichhardt Municipal Council v Montgomery* (2007) 230 CLR 22; [2007] HCA 6 at [6] (Gleeson CJ).

85 Fullagar J in *Darling Island Stevedoring* stated:<sup>40</sup>

“The liability is a true vicarious liability: that is to say, the master is liable not for a breach of a duty resting on him and broken by him but for a breach of duty resting on another and broken by another.”

86 In other words, the liability of the employer depends on the wrongful act of the employee. In contrast, Kitto J in the same case adopted the “master’s tort” theory of vicarious liability which imputed to the employer the acts of the employee, but not the liability of the employee, thus requiring a breach of duty on the part of the employer.<sup>41</sup>

87 Kitto J explained that the concept of “vicarious liability” was coined by Pollock in 1877 to describe liability for the act of another, not for the wrong or liability of another.<sup>42</sup> Kitto J explained that understanding in the following terms:<sup>43</sup>

“The master’s liability, when it exists, is not a liability substituted for that of the servant. It exists, I think, not because the servant is liable, but because of what the servant has done. It is a separate and independent liability, resulting from attributing to the master the conduct of the servant, with all its objective qualities, but not with the quality of wrongfulness which, in an action against the servant, it may be held to have because of considerations personal to the servant. The master ‘is to answer for the act as if it were his own’ .... He is not to answer for the servant’s liability, but for his act; and to say that one man must ‘answer’ for another’s act implies that it was a wrongful act for the former to do.”

88 The approach of Fullagar J to the concept of vicarious liability was accepted as correct in *Hollis v Vabu Pty Ltd*,<sup>44</sup> and later affirmed in *Prince Alfred College Inc v ADC*.<sup>45</sup> However, it is not necessary to rely on that reasoning for present purposes.

89 Liability based on the tort of the employee may be understood as an expansion of the principle stated by Kitto J, not a denial of it. As explained by the Full

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<sup>40</sup> *Darling Island Stevedoring* at 57.

<sup>41</sup> *Darling Island Stevedoring* at 58 (Taylor J agreeing at 66).

<sup>42</sup> *Darling Island Stevedoring* at 60 (Kitto J).

<sup>43</sup> *Darling Island Stevedoring* at 61.

<sup>44</sup> (2001) 207 CLR 21; [2001] HCA 44 at [34].

<sup>45</sup> (2016) 258 CLR 134; [2016] HCA 37 at [39].

Court of the Federal Court (Davies, Gleeson and Edelman JJ) in *Pioneer Mortgage Services Pty Ltd v Columbus Capital Pty Ltd*:<sup>46</sup>

“[49] If ‘vicarious liability’ had been confined to Pollock’s intended meaning as a liability for the attributed acts of another then the rules might simply have been based upon those of the law of agency which are concerned with attribution of one person’s conduct to another. The attribution of acts of one person to another by the rules of agency is well known. Indeed, those rules are indispensable for companies because a company ‘cannot act in its own person for it has no person ... So it must of necessity act by directors, managers, or other agents’.<sup>47</sup>”

90 In its defence, Seqwater pleaded reliance on s 36 in relation to each allegation of breach of duty. Accordingly, the primary judge returned to this question in Ch 11, in dealing with standard of care:

“[205] Nevertheless, when regard is had to how, in light of the Court’s findings to this point, the case against the defendants is ‘based’, then it follows that the section is not engaged. Section 36(2) stands in contrast to some of the other provisions of the *CLA* (Qld)<sup>48</sup> that provide that, in various circumstances, a person or entity is not ‘liable’, such as s 37. Similarly s 16(1) of the *CLA* (Qld) provides that a ‘person is *not liable* in negligence for harm suffered’ as a result of the materialisation of an inherent risk. Unlike those provisions, s36(2) does not address the ‘liability’ of the public authority. Instead, it is directed to a narrower topic namely, whether the public authority’s acts or omissions were ‘wrongful’. Thus in a case of ‘true vicarious liability’ such as the present, where the (alleged) public authority is being attributed with the ‘liability’ of an employed flood engineer, s 36(2) has no application.<sup>49</sup> On any view of the definitions in s 34, none of the flood engineers was a ‘public or other authority’. As s 36(2) only deals with the wrongful acts of such authorities, it has no relevance to any assessment of whether any of the *flood engineers’* acts or omissions were ‘wrongful’, that is a breach of any duty owed by them. If their acts or omissions are found to be wrongful, then any ‘liability’ of the flood engineer is attributed to SunWater, Seqwater and the State as the case may be, independent of s 36 and irrespective of whether any of them constituted a ‘public authority’ or not. The circumstance that an act or omission of a flood engineer who owes a duty of care in their own right might also be an act or omission of a public authority through principles of agency is irrelevant because, even if by operation of s 36(2) that act or omission qua the public authority was not ‘wrongful’, the vicarious ‘liability’ of the flood engineer would still be attributed to their employer.”

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<sup>46</sup> (2016) 250 FCR 136; [2016] FCAFC 78.

<sup>47</sup> *O'Brien v Dawson* (1942) 66 CLR 18 at 32 (Starke J); see also *Ferguson v Wilson* (1866) LR 2 Ch App 77 at 89 (Sir HM Cairns LJ).

<sup>48</sup> And the *CLA* (NSW).

<sup>49</sup> As submitted by the plaintiff: Tcpt pp 9428(84)-9429(23).



- 91 The foregoing explanation of the judge’s reasoning must be applied to the functions of Seqwater. Although the analysis of the functions was not limited to determining whether s 36 was engaged, it was applied in this context. It is not entirely clear how the analysis fitted into the approach to s 36. On one view, it was necessary to determine the functions of Seqwater which were engaged in the present case in order to determine how s 36 operated with respect to the wrongful exercise of those functions. Thus, Rodriguez’ case appeared to be that the statement of functions in s 9(2) did not operate, so that the conduct of Seqwater was limited to the “Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam”, a document which was required to be applied by the owner of the dams, namely Seqwater.
- 92 It is possible that the description of vicarious liability as “true vicarious liability” was intended to distinguish between the liability of an employer and other circumstances of vicarious liability. No doubt it is true that liability may be imposed on one party for a particular purpose, but not for other purposes. However, in the present context the significance of the distinction is not apparent. Rather, the judge’s reasoning set out at [83] above sought to contrast the language in s 16(1) of the *Civil Liability Act*, stating that “[a] person is not liable in negligence for harm suffered by another person as a result of a materialisation of an inherent risk”, with the language of s 36 which does not refer to absence of liability. Thus s 36 was said to address a “narrower topic”, namely the acts and omissions of the authority, not its liability.
- 93 Finally, the primary judge also considered the operation of s 22 of the *Civil Liability Act* which provides as follows:

**22 Standard of care for professionals**

- (1) A professional does not breach a duty arising from the provision of a professional service if it is established that the professional acted in a way that (at the time the service was provided) was widely accepted by peer professional opinion by a significant number of respected practitioners in the field as competent professional practice.

- (2) However, peer professional opinion can not be relied on for the purposes of this section if the court considers that the opinion is irrational or contrary to a written law.
- (3) The fact that there are differing peer professional opinions widely accepted by a significant number of respected practitioners in the field concerning a matter does not prevent any 1 or more (or all) of the opinions being relied on for the purposes of this section.
- (4) Peer professional opinion does not have to be universally accepted to be considered widely accepted.
- (5) This section does not apply to liability arising in connection with the giving of (or the failure to give) a warning, advice or other information, in relation to the risk of harm to a person, that is associated with the provision by a professional of a professional service.

94 With respect to this provision, the primary judge reasoned as follows:

“[206] ... It is clear that s 22 of the *CLA* (Qld) applies to flood engineers in circumstances where neither Seqwater nor SunWater [is] a ‘professional’ and could not deploy s 22 in their own right. If s 22 was to personally excuse a flood engineer for a breach of duty, then no vicarious liability could be attributed to Seqwater (or SunWater).”

95 However, to say of a particular act or omission that it is not wrongful must entail the conclusion that the responsible authority will not be liable for that act or omission. Accordingly, to describe an act as “not wrongful” does not appear to have any different effect from describing the authority as “not liable” for any harm caused. The point of distinction must therefore be the fact that the subject-matter of consideration is the act, rather than liability. Thus vicarious liability is the liability of the authority, but the wrongful act is not, on this supposition, the act of the authority. It is possible that this reflects the distinction between the servant’s tort theory and the master’s tort theory noted above. Nevertheless, this description of the underlying philosophy of vicarious liability did not assist the plaintiff in the present case, for three reasons.

96 First, the primary judge held that Seqwater owed a duty of care to the plaintiff. Thus all that needed to be attributed to Seqwater were the acts and omissions of its employees, which would have given rise to a breach of duty on its part if they were wrongful.

- 97 Secondly, for the purposes of s 36(1) it is clear that the proceeding instituted by the plaintiff against Seqwater was based on an alleged wrongful exercise of the flood mitigation function of Seqwater. The term “is based on” does not identify a specific cause of action, nor necessary elements of a tort, but is wide enough to incorporate factual allegations which, if established, would demonstrate liability on the part of Seqwater. Those actions included the acts or omissions of its employees undertaking flood mitigation operations.
- 98 Thirdly, the term “public or other authority” includes “the Crown” and “a local government” as well as any other public authority constituted under an Act. Each of those limbs identifies a juristic entity which must act through the agency of others. Section 36(1) therefore assumes a wrongful exercise or failure to exercise a function by one of those bodies, which will perforce be undertaken through the acts or agency of a real person. To remove from the scope of its protective operation the concept of wrongfulness as applicable to the acts or omissions of those through whom an authority must operate would be to remove such a large area of potential operation of the section as to subvert its apparent purpose.
- 99 The primary judge considered that the negligence of the flood engineer would be attributed to the employer (Seqwater), so as to render Seqwater liable, but that s 36(2) would not be engaged because the act or omission of the flood engineer was not the act or omission of Seqwater or, perhaps, it was the act or omission of Seqwater but was not a wrongful act or omission of Seqwater.
- 100 On either view, there is an element of circularity in this reasoning. The finding that Seqwater owed a duty of care with respect to flood mitigation and that the acts of the flood engineers employed by it were to be attributed to it should have led, even on the master’s tort theory, to liability on the part of Seqwater for breach of its own duty. In other words, the acts constituted potentially wrongful conduct of Seqwater, so as to engage s 36(1). The concern underlying the master’s tort theory was that it imposed liability without fault, because the master did not owe a duty which was breached; that concern is absent in the case of an authority acting through agents.

101 Further, whether the judge’s reliance on s 22 accurately stated either the effect of s 22 or the scope of vicarious liability is by no means clear. If a public authority can only exercise a function through the medium of trained professionals, it might be surprising if the standard of care applied to it differed from that applied to its agents. However, if that which is attributed pursuant to vicarious liability is the wrongful conduct of the employee, then Seqwater would be liable if the engineer’s conduct is wrongful, and will not be liable if the engineer’s conduct is not wrongful. It is not clear what significance the operation of s 22 might otherwise have in considering the engagement of s 36. A more difficult question might arise were the flood engineer liable despite the element of protection granted by s 22, but Seqwater was not because it obtains the higher standard of protection provided by s 36(2). However, that possible anomaly does not arise because the engineers were not sued.

102 Assuming that the functions of Seqwater included flood prevention and floodwater control, Seqwater was obliged to carry out those functions, having regard to the interests of Rodriguez and others with downstream interests in avoiding inundation. It employed professional engineers as its agents to carry out those functions. If the functions were carried out negligently, according to general law principles, Seqwater would be liable. However, the standard of care would be that identified in s 36(2). The contrary reasoning of the primary judge in this regard should not be accepted.

(5) *“public or other authority”*

103 The primary judge held that s 36 was not engaged without reaching a conclusion as to whether Seqwater was “a public or other authority”. However, both because it is not easy to isolate particular aspects of the operation of s 36 without some risk to the proper construction of the section as a whole, and because Rodriguez sought to re-agitate the issue on appeal, it is necessary to explain why this element in s 36(1) is satisfied in relation to Seqwater.

104 The primary judge noted that there was “a substantial dispute” as to whether Seqwater was a public authority,<sup>50</sup> referring to the discussion of when a body may be a public authority in *Re Anti-Cancer Council (Vic); Ex parte State Public Services Federation*<sup>51</sup> and, through the discussion in that case, principles identified in *Renmark Hotel Inc v Federal Commissioner of Taxation*.<sup>52</sup> The judge’s conclusion was expressed in the following terms:

“[214] It is not necessary to determine whether, in light of the other statutes that address Seqwater’s activities, Seqwater is a ‘public authority’ per se. Instead, it suffices to state that, in light of the finding that s 9(2) of the *Restructuring Act* was not engaged, then it follows that however the plaintiff’s case against Seqwater is characterised, it is not ‘based on’ an alleged ‘wrongful exercise of or failure to exercise a function of a public or other authority’.”

105 The basis of the final observations was found in the earlier conclusion that the statutory functions of Seqwater “do not include flood mitigation and the conferral of permission to interfere with the flow of water and operate the dams cannot therefore be ancillary to any such function”.<sup>53</sup> The final observations reflected that reasoning. As noted above, that reasoning has been rejected.

106 The application of s 36 is satisfied to the extent that the proceeding brought by Rodriguez was “based on” an alleged wrongful exercise of, or failure to exercise, a “function” of a public authority. Contrary to Rodriguez’ submissions, in determining when and at what rates to release water from each of the dams, Seqwater was exercising a relevant function under s 9(2), namely carrying out water activities, and was doing so under its statutory licence. It follows that, contrary to the plaintiff’s second submission, the function was a function “of” Seqwater.

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<sup>50</sup> *Rodriguez (22)*, Ch 11 [208].

<sup>51</sup> (1992) 175 CLR 442; [1992] HCA 53.

<sup>52</sup> (1949) 79 CLR 10; [1949] HCA 7.

<sup>53</sup> *Rodriguez (22)*, Ch 11 [213].

- 107 The third challenge raised by Rodriguez relied on the contention that Seqwater was not a public authority. The primary judge referred to a statement from the judgment of Mason CJ, Brennan and Gaudron JJ in *Re Anti-Cancer Council*.<sup>54</sup>

“The question whether a body is a public authority is one of fact and degree which often requires a balancing of the various features of the body concerned. In that process, it may be decisive that private individuals have a financial interest in its profits or assets, or that its public functions are merely incidental to its private pursuits. Or it may be important that its powers derive from a private or non-statutory source, although that consideration is not necessarily decisive.

In *Renmark Hotel* ..., Rich J, at first instance, said that for a body to be a public authority ‘it should carry on some undertaking of a public nature for the benefit of the community or of some section or geographical division of the community and that it should have some governmental authority to do so’. His Honour’s decision was upheld on appeal, emphasis being given to the need for ‘public functions’, ‘duties to be exercised for public objects’ or ‘power ... to act on behalf of the public or the State’. However, this last feature would seem to indicate a body of the kind that is usually identified as a State or public instrumentality.”

- 108 *Re Anti-Cancer Council* concerned an attempt by a public service union to require the Industrial Relations Commission to entertain an industrial dispute between the union and the Council. The Commission had jurisdiction if the employees of the Council were “employed in any State instrumentality or other undertaking carried on by public authorities ... under any State charter, statute, enactment or proclamation of the State of Victoria.” The High Court held that the Council, while not a State instrumentality, had a sufficient public aspect to constitute it a corporation within the terminology set out above and carried on activities under a State statute. Different statutory contexts will give rise to different characterisations of particular bodies. However, as in the case of *Re Anti-Cancer Council*, it is clear that a public authority for the purposes of s 36(2) need not be the State or an emanation of the State.

- 109 The importance of context is demonstrated by recent cases in the United Kingdom. Much of the relevant case law in the United Kingdom has been directed to the question whether a particular body falls within the terms of s 6(3) of the *Human Rights Act 1998* (UK) which makes it unlawful for a public

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<sup>54</sup> *Re Anti-Cancer Council* at 450-451.

authority to act in a way which is incompatible with the European Convention on Human Rights. For that purpose, a public authority is defined to include a court or tribunal, and “any person certain of whose functions are functions of a public nature”. In applying that criterion, the courts have distinguished bodies which are “governmental in a broad sense of that expression”,<sup>55</sup> or the functions of which are treated as public, from those “hybrid” bodies which have both public and private functions. Of the latter Lord Nicholls stated in *Aston Cantlow*:

“[12] What, then, is the touchstone to be used in deciding whether a function is public for this purpose? Clearly there is no single test of universal application. There cannot be, given the diverse nature of governmental functions and the variety of means by which these functions are discharged today. Factors to be taken into account include the extent to which in carrying out the relevant function the body is publicly funded, or is exercising statutory powers, or is taking the place of central government or local authorities, or is providing a public service.”

110 Similar criteria will be applied in considering whether an authority is a “public authority”. However, to determine that a body is governed by human rights principles will not necessarily determine whether, in another case, the same body will be subject to judicial review, or whether it is entitled to protection from liability in tort.<sup>56</sup>

111 There has been a debate as to whether a non-statutory, non-governmental body exercising “public functions” may be subject to judicial review. The focus of debate has been the decision of the English Court of Appeal in *R v Panel on Take-overs and Mergers; Ex parte Datafin Plc.*<sup>57</sup> This Court has doubted that judicial review is available with respect to decisions of “private bodies which do not exercise functions conferred by government, whether under statute or otherwise”.<sup>58</sup> In *NEAT Domestic Trading Pty Ltd v AWB Ltd*,<sup>59</sup> the High Court held that a privately operated corporation with power to veto exports of wheat did not exercise authority “under an enactment” for the purposes of the

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<sup>55</sup> *Aston Cantlow and Wilmcote with Billesley Parochial Church Council v Wallbank* [2004] 1 AC 546 at [7] (Lord Nicholls).

<sup>56</sup> P Craig, *Administrative Law* (8<sup>th</sup> ed, 2016, Sweet & Maxwell), [20-023]–[20-027].

<sup>57</sup> [1987] 1 QB 815.

<sup>58</sup> *Chase Oyster Bar Pty Ltd v Hamo Industries Pty Ltd* (2010) 78 NSWLR 393 at [81]; [2010] NSWCA 190.

<sup>59</sup> (2003) 216 CLR 277; [2003] HCA 35.

*Administrative Decisions (Judicial Review) Act 1977* (Cth) when refusing approval to a competitor. The majority held that the relevant statute did not prevent the company giving preference to its own commercial interests over the interests of an applicant.<sup>60</sup> The issue need not be addressed further as the question is not one of the availability of judicial review, nor is the juristic nature of Seqwater, or its functions, comparable with the corporate nature of AWB and its functions.

112 In the course of oral submissions on the appeal, Rodriguez drew attention to two decisions of this Court dealing with the application of s 43A of the *Civil Liability Act 2002* (NSW). Because there are aspects of that section which differ from s 36 of the Queensland Act, it is convenient to set the section out in full:

**43A Proceedings against public or other authorities for the exercise of special statutory powers**

- (1) This section applies to proceedings for civil liability to which this Part applies to the extent that the liability is based on a public or other authority's exercise of, or failure to exercise, a special statutory power conferred on the authority.
- (2) A **special statutory power** is a power—
  - (a) that is conferred by or under a statute, and
  - (b) that is of a kind that persons generally are not authorised to exercise without specific statutory authority.
- (3) For the purposes of any such proceedings, any act or omission involving an exercise of, or failure to exercise, a special statutory power does not give rise to civil liability unless the act or omission was in the circumstances so unreasonable that no authority having the special statutory power in question could properly consider the act or omission to be a reasonable exercise of, or failure to exercise, its power.
- (4) In the case of a special statutory power of a public or other authority to prohibit or regulate an activity, this section applies in addition to section 44.

113 The significant variation for present purposes is that s 43A, unlike s 36, is limited to the exercise of or failure to exercise a “special statutory power”, a term which is defined in s 43A(2). On its face, there is no such limitation to be

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<sup>60</sup> *NEAT Domestic* at [59] (McHugh, Hayne and Callinan JJ).



found in s 36. However, if s 36 is read down so that it only applies with respect to the kinds of power identified in s 43A(2)(b), the difference may be one of little moment. As noted above, in *Board of Fire Commissioners v Ardouin* the High Court limited the scope of a protective provision to conduct for which the statutory authority was required, being authority which did not inhere in the creation of a corporate personality.

114 In *Puntoriero v Water Administration Ministerial Corporation*,<sup>61</sup> a potato farmer sued the Water Corporation in negligence for the supply of contaminated water which had allegedly damaged his potato crop. The question was whether a protective clause in the *Water Administration Act 1986* (NSW) excluded liability for loss or damage suffered as a consequence of the exercise of a function, including the release of water, if the function were exercised in good faith and for the purposes of executing the Act.<sup>62</sup> The Court held that the protective provision did not apply because, as explained by Gleeson CJ and Gummow J, “[t]he supply of water by the Corporation to the appellants was not the exercise of a function which of its nature involved [interference with persons or property].”<sup>63</sup> As further explained by McHugh J:

“[35] It is one thing to read provisions such as s 19, expressed in general language, as intended to protect a government authority from actions in respect of conduct which might be unlawful even when carried out without negligence. Thus, the release of water or entry on to property may be unlawful and tortious because some statutory condition of its exercise was not fulfilled or because it was void for breach of a principle of administrative law. Understandably, the legislature might wish to protect the authority from actions which the statute would otherwise have authorised. It is another matter to read such provisions as protecting [from] ordinary actions for breach of contract or negligence where the actions can be carried out without the need for specific legislative authority.”

115 It will be necessary to return to the application of these principles for another purpose; the present purpose is simply to note that the significant constraint in

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<sup>61</sup> (1999) 199 CLR 575; [1999] HCA 45.

<sup>62</sup> *Puntoriero* at [12].

<sup>63</sup> *Puntoriero* at [18] applying a test articulated by Dixon CJ in *Ardouin* at 109.

s 43A, referring to exercises of special statutory powers, may also impliedly limit the operation of s 36.

- 116 While some degree of broad guidance may be obtained from the authorities, the relevant criteria will need to be determined in the context of the specific authority under consideration. For present purposes there are two statutes in question, namely the Restructuring Act (from which the institutional nature of Seqwater is to be derived) and the *Civil Liability Act* (providing a degree of protection from suits in tort). Whether Seqwater constituted a public authority depends on an analysis of its constituting legislation, namely the Restructuring Act. As has been noted, its title “The Queensland Bulk Water Supply Authority” appears to engage the term “authority” as found in the *Civil Liability Act*. As an entity which can sue and be sued, it has legal personality and, as found by the primary judge, it owed a duty of care to the plaintiff.
- 117 It is aptly described as a “public authority” because it is established under statute, has the functions and powers conferred by the statute, has no corporators or individuals who would benefit from the exercise of its powers as members of a corporate body, is responsible for the supply of water and other services relating to the water industry and is run by a board appointed by the responsible Ministers. Although the characterisation of Seqwater is required for the purposes of the *Civil Liability Act*, the language of that Act in s 34(c), referring to “any public authority constituted under an Act”, cannot be read down so as to exclude a body having the characteristics of Seqwater.
- 118 Rodriguez submitted that Seqwater’s obligation to undertake its functions “as a commercial enterprise” demonstrated it was not a public authority. That obligation presumably means that it must charge for the supply of water at a rate likely to cover the cost of supply and return an appropriate profit, although the actual exercise of those powers will be subject to the strategic and operational plans required to be approved by the responsible Ministers. That is merely an application of the “user pays” principle, which is commonplace in the provision of public services.

- 119 Rodriguez further submitted that the effect of s 11(2), together with the requirement in s 54(1) that Seqwater provide an estimate of its “net profit” for each financial year, demonstrated that Seqwater was intended “to operate as a profit oriented trading enterprise” a factor which, it submitted, was relevantly decisive.<sup>64</sup> However, the facts that it was not described as a corporation, had no shareholders, reported net profit pursuant to a statutory definition of that phrase, and pursuant to accounting standards applicable to an entity under the *Financial Accountability Act*, and was to report to the responsible Ministers, belie the proposed characterisation. If it carried out its functions so as to return a profit, the sole beneficiary was the State’s Consolidated Revenue. This factor did not demonstrate it was not acting as a public authority, but rather the reverse.
- 120 The functions of Seqwater demonstrate beyond real doubt that its dominant purpose was to supply water and regulate the flow of waters out of the dams for the benefit of residents and businesses in south-east Queensland. As the primary judge correctly stated,<sup>65</sup> the fact that it was required to carry out its functions “as a commercial enterprise”<sup>66</sup> did not prevent the functions being those of a public authority and carried out for the benefit of the public or a section of the public.
- 121 The term “public authority”, as used in s 36, is not defined. Accordingly, it should be understood in the context of the regulation of water supply and flood control set out above. These considerations demonstrate that Seqwater was a public authority within the meaning of that term in s 34, and therefore in s 36 of the *Civil Liability Act*.
- 122 The primary judge was in error in failing to find that s 36 was engaged with respect to the claim in negligence against Seqwater. Ground 1 in Seqwater’s notice of appeal must be upheld.

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<sup>64</sup> Rodriguez’ written submissions, 18 December 2020, par 40.

<sup>65</sup> *Rodriguez (22)*, Ch 11 [213].

<sup>66</sup> *Restructuring Act*, s 11(2).

(6) *Application of s 36 – Identification of standard*

123 Once it is established that s 36 applied to the proceeding brought by Rodriguez against Seqwater, it was necessary for Rodriguez to establish that the exercise, or failure to exercise, the relevant function constituted an “act or omission [which] was in the circumstances so unreasonable that no public or other authority having the functions of the authority in question could properly consider the act or omission to be a reasonable exercise of its functions”, pursuant to s 36(2). That provision sets a standard for determining whether any act or omission was wrongful. Such provisions have also been characterised as conferring a “qualified immunity”;<sup>67</sup> however, that term suggests the provision operates as a defence, which may be misleading. Rather, in a claim based on negligence, s 36(2) sets the standard to be applied by the Court in determining whether there has been a breach of the authority’s duty of care.

124 The statutory history supports the conclusion that s 36(2) adopts the language of *Wednesbury* unreasonableness, being the level of unreasonableness required to invalidate a discretionary action of a government authority.<sup>68</sup> However, to source the language of s 36(2) to a ground of judicial review provides no definitive answer to the question as to how precisely the lowered standard is to be understood and applied. There are several points to be made in this regard.

125 First, if the same question is to be asked in assessing a claim in negligence against the authority as would be asked in proceedings for judicial review, one would need to assess whether the act or omission was an invalid exercise of a discretionary power. It was this point which led to discussion of the English cases referred to in *Curtis v Harden Shire Council*<sup>69</sup> at [265]-[272]. However, the focus of Lord Hoffmann’s reasoning in *Stovin v Wise*,<sup>70</sup> from which the

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<sup>67</sup> *Roads and Maritime Services v Grant* [2015] NSWCA 138; (2015) 70 MVR 520 at [57]; *Bankstown City Council v Zraika*; *Roads and Maritime Services v Zraika* (2016) 94 NSWLR 159; [2016] NSWCA 51 at [109].

<sup>68</sup> See *Associated Provincial Picture Houses Ltd v Wednesbury Corporation* [1948] 1 KB 223.

<sup>69</sup> (2014) 88 NSWLR 10; [2014] NSWCA 314 at [257]-[260].

<sup>70</sup> [1996] AC 923.

language of s 36(2) appears to have been drawn, was on whether the local authority owed a duty to take action. There is a risk of confusion inherent in the use of the term “duty” in this context. In administrative law, a distinction is drawn between a power to act (which contains an element of discretion) and a duty to act (which creates an obligation). In some circumstances the conferral of a power may be coupled with a duty to exercise the power, at least in particular circumstances. In principle, this use of the term “duty” is distinct from the common law concept of a duty of care, breach of which may give rise to a liability in damages. The latter can arise regardless of the validity of the act or omission in question. Rather, as explained by Mason J in *Sutherland Shire Council v Heyman*<sup>71</sup> the general law may impose a duty of care in the exercise of a power. The circumstances in which this will occur were identified by McHugh J in *Crimmins v Stevedoring Industry Finance Committee*<sup>72</sup> in the following terms:

“[79] Common law courts have long been cautious in imposing *affirmative* common law duties of care on statutory authorities. Public authorities are often charged with responsibility for a number of statutory objects and given an array of powers to accomplish them. Performing their functions with limited budgetary resources often requires the making of difficult policy choices and discretionary judgments. Negligence law is often an inapposite vehicle for examining those choices and judgments. Situations which might call for the imposition of a duty of care where a private individual was concerned may not call for one where a statutory authority is involved. This does not mean that statutory authorities are above the law. But it does mean that there may be special factors applicable to a statutory authority which negative a duty of care that a private individual would owe in apparently similar circumstances. In many cases involving routine events, the statutory authority will be in no different position from ordinary citizens. But where the authority is alleged to have failed to exercise a power or function, more difficult questions arise.”

126 After referring to *Stovin v Wise*,<sup>73</sup> McHugh J continued in *Crimmins*:

“[82] With great respect to the learned judges who have expressed these views, I am unable to accept that determination of a duty of care should depend on public law concepts. Public law concepts of duty and private law notions of duty are informed by differing rationales. On the current state of the authorities, the negligent exercise of a statutory power is

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<sup>71</sup> (1985) 157 CLR 424 at 459-460; [1985] HCA 41.

<sup>72</sup> (1999) 200 CLR 1; [1999] HCA 59.

<sup>73</sup> [1996] AC 923.

not immune from liability simply because it was within power, nor is it actionable in negligence simply because it is ultra vires. In *Heyman*, Mason J rejected the view that mandamus could be 'regarded as a foundation for imposing ... a duty of care on the public authority in relation to the exercise of [a] power. Mandamus will compel proper consideration by the authority of its discretion, but that is all'<sup>74</sup>.

[83] The concerns regarding the decision-making and exercise of power by statutory authorities can be met otherwise than by directly incorporating public law tests into negligence. Mr John Doyle QC (as he then was) has argued,<sup>75</sup> correctly in my opinion, that there 'is no reason why a valid decision cannot be subject to a duty of care, and no reason why an invalid decision should more readily attract a duty of care'."

127 As a matter of statutory construction, the general law principle may be displaced: that is, the statute may evince an intention that a particular authority is not to be subject to a general law duty of care in carrying out (or failing to carry out) its statutory functions. Whether Seqwater was subject to a general law duty of care was an issue at trial, but no longer is. By abandoning grounds 4 and 5, Seqwater accepted that it was required to exercise due care in carrying out (or failing to carry out) its functions in relation to flood mitigation and the release of water from the dams.

128 There is a third sense in which the concept of duty is used. By way of extrapolation of the general law, a statute conferring a power may impose an obligation, breach of which carries a liability in damages, independently of the common law tort of negligence. Rodriguez did not allege that such a cause of action for breach of statutory duty arose in the present case.

129 The observations of McHugh J in *Crimmins* at [82], three years before the first *Civil Liability Act*, must now be qualified by the widespread existence of provisions such as s 36.<sup>76</sup> In any event, despite the differing rationales, the dichotomy between private law and public law notions of duty was never so

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<sup>74</sup> *Heyman* (1985) 157 CLR 424 at 465.

<sup>75</sup> Doyle, "Tort Liability for the Exercise of Statutory Powers", in Finn (ed), *Essays on Torts* (1989) 203, at pp 235-236.

<sup>76</sup> As in force in 2011, the equivalent provisions were as follows: *Civil Liability Act 2002* (NSW), s 43 (breach of statutory duty), s 43A (special statutory powers); *Civil Law (Wrongs) Act 2002* (ACT), s 111 (breach of statutory duty); *Wrongs Act 1958* (Vic), s 84 (breach of statutory duty); *Civil Liability Act 2002* (WA), s 5Y (breach of statutory duty), s 5X (policy defence); *Civil Liability Act 2002* (Tas), s 40 (breach of statutory duty). (There is no equivalent provision in the *Civil Liability Act 1936* (SA), nor in the *Personal Injuries (Liabilities and Damages) Act 2003* (NT)).

clear or universal as suggested in *Crimmins*. A duty imposed by statute not to mislead or deceive in trade or commerce is an example. Thus, if the general law imposes an obligation to pay damages to those injured by the failure of a public authority to take a particular act, or to act in a particular manner, it may be said that the law imposes a duty to act, or to act in the prescribed manner. At that point, the distinction between the private law and public law concepts of duty is at least diminished. The point is illustrated by the summary in the judgment of Gibbs CJ in *Heyman* at 445:

“Once it is accepted, as it must be, that the ordinary principles of the law of negligence apply to public authorities, it follows that they are liable for damage caused by a negligent failure to act when they are under a duty to act, or for a negligent failure to consider whether to exercise a power conferred on them with the intention that it should be exercised if and when the public interest requires it.

Where a public authority has decided to exercise a power, and has done so negligently, a person who has acted in reliance on what the public authority has done may have no difficulty in proving that the damage which he has suffered has been caused by the negligence. Where the damage has resulted from a negligent failure to act there may be greater difficulty in proving causation.”

130 Mason J stated in *Heyman* at 459-460:

“Generally speaking, a public authority which is under no statutory obligation to exercise a power comes under no common law duty of care to do so ... But an authority may by its conduct place itself in such a position that it attracts a duty of care which calls for exercise of the power. A common illustration is provided by the cases in which an authority in the exercise of its functions has created a danger, thereby subjecting itself to a duty of care for the safety of others which must be discharged by an exercise of its statutory powers or by giving a warning ....”

131 It may be said that where the court has concluded there is a duty to exercise reasonable care by acting, or by acting in a particular way, the public authority is subject to a duty to take such action. However, the language of manifest unreasonableness operates, in public law, by reference to a discretionary power in circumstances where the *court* has no power to determine whether the power should or should not have been exercised, but only to decide whether the authority acted within the legal limits of its discretion in acting as it did. In accordance with public law principle, a decision of an administrative agency will be set aside if it has acted in a way which the law does not permit, a question

which is to be determined by the court. The exercise of an available power, where choices must be made, is not for the court, but only for the authority, so long as it remains within the bounds of lawfully available choice. On that view, the effect of a provision such as s 36(2) is to remove from the court the power to determine what is and is not a breach of the duty of care, that is to determine what precautions a reasonable authority would have taken in the circumstances, thus limiting the court to the question whether the step actually taken or not taken by the authority fell outside the range of choice available as a matter of law. It has been said that, “the approach resembled the test for apprehended bias, in that rather than assessing reasonableness for itself, the court was required to ‘view the matter through the eyes of a responsible public authority’.”<sup>77</sup>

- 132 The point of distinction is described in administrative law terms as the difference between review for legal error and review on the merits. As explained by Brennan J in *Attorney-General for the State of New South Wales v Quin*:<sup>78</sup>

“The duty and jurisdiction of the court to review administrative action do not go beyond the declaration and enforcing of the law which determines the limits and governs the exercise of the repository's power. If, in so doing, the court avoids administrative injustice or error, so be it; but the court has no jurisdiction simply to cure administrative injustice or error. The merits of administrative action, to the extent that they can be distinguished from legality, are for the repository of the relevant power and, subject to political control, for the repository alone.

...

There is one limitation, ‘*Wednesbury* unreasonableness’ ... which may appear to open the gate to judicial review of the merits of a decision or action taken within power. Properly applied, *Wednesbury* unreasonableness leaves the merits of a decision or action unaffected unless the decision or action is such as to amount to an abuse of power.... Acting on the implied intention of the legislature that a power be exercised reasonably, the court holds invalid a purported exercise of the power which is so unreasonable that no reasonable repository of the power could have taken the impugned decision or action.”

- 133 Often, in the absence of reasons, the approach to unreasonableness amounting in the words of Brennan J to “an abuse of power” will follow from an

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<sup>77</sup> *Zraika* at [110] (Leeming JA), quoting *Curtis* at [6] (Bathurst CJ), [224] (Beazley P); [278] (Basten JA).

<sup>78</sup> (1990) 170 CLR 1 at 35-36; [1990] HCA 21.



analysis of the kind applied by Dixon J to the Commissioner of Taxation in *Avon Downs Pty Ltd v Federal Commissioner of Taxation*:<sup>79</sup>

“If the result appears to be unreasonable on the supposition that he addressed himself to the right question, correctly applied the rules of law and took into account all the relevant considerations and no irrelevant considerations, then it may be a proper inference that it is a false supposition. It is not necessary that you should be sure of the precise particular in which he has gone wrong. It is enough that you can see that in some way he must have failed in the discharge of his exact function according to law.”

134 Applying these principles, the distinction between the general approach to breach of duty under s 9 of the *Civil Liability Act* and that applicable to a public authority to which s 36 applies may be identified as follows: under s 9 it is for the court to determine whether, on the evidence before it, it is satisfied that the defendant failed to take precautions against a risk of harm which a reasonable person in its position would have taken; under s 36, the court must be satisfied that the authority, acting on its understanding of the relevant circumstances and applicable law, adopted an approach to the exercise of its functions which fell outside the range of reasonably available options. Following the observation in *Curtis*, counsel for Seqwater drew an analogy with a challenge based on a reasonable apprehension of bias, where the question is not whether the court has an apprehension of prejudgment, but whether the court is satisfied that a fair-minded observer with knowledge of the relevant facts might have such an apprehension.<sup>80</sup> Although the analogy should not be pressed too far, it provides an illustration of the different roles that the court undertakes.

135 There is no assistance to be obtained by paraphrasing the statutory language, but there are two aspects of the language which warrant clarification. The court in *Curtis* adopted the following propositions:

“[277] The final clause sets a standard. The standard is an act or omission that is ‘so unreasonable’ that *no* authority could ‘properly consider the act or omission to be reasonable’. This is a curious form of expression: it is not that the act be so unreasonable that no reasonable authority could do the act, but it may perhaps be assumed that the reference to ‘no authority’ is a reference to ‘no authority acting reasonably’. That

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<sup>79</sup> (1949) 78 CLR 353 at 360; [1949] HCA 26.

<sup>80</sup> CA tcpt, 27/05/2021, p 837(10).

conclusion is supported by the reference to an authority which 'could properly consider' the act to be reasonable. That reading should be accepted.

[278] The other awkwardness of expression is that the court is required to consider not whether it considers the act (to paraphrase) grossly unreasonable, but rather whether no authority properly considering the matter could consider it to be reasonable. This test has two aspects. First, the identification of the body to be satisfied as to the proper characterisation of the act or omission is not the court but another public authority. ...

[279] The second aspect of the statutory language is that the state of mind of the authority is not identified as one which it would or should hold, but rather one which no authority could hold. In other words, it envisages a range of opinions as to what might constitute a reasonable act or reasonable failure to act, but asks if no public authority properly considering the issue could place it within that range."

136 There has been little consideration of equivalent language in other jurisdictions, but in a case involving smoke from a controlled burn of land in a national park which ruined a nearby grape crop, McLure P stated (Buss JA agreeing):<sup>81</sup>

"[114] Having regard to the nature of the alleged negligent breach relied on by the appellants, it is unnecessary to address their grounds of appeal relating to s 5W(d) and s 5X of the [*Civil Liability Act 2002 (WA)*]. It is sufficient for present purposes to note that for practical purposes s 5X operates so as to significantly alter the otherwise applicable standard of care at common law. The statutory standard is the *Wednesbury* test of reasonableness .... It is wrong to equate that standard with the general law standard of care in negligence. There is no arguable foundation for a claim that the decision to proceed with the prescribed burn in this case was so unreasonable that no reasonable public body or officer in the respondents' position could have made it."

137 McLure P was correct to avoid a paraphrase or substitution of the statutory language with other words. In particular, it would invite error to reformulate the statute by reference to subsequent explanations by the High Court of the unreasonableness standard in administrative law cases. Further, some concepts commonly used in the law do not lend themselves to exegesis: an example is the standard of proof in a criminal trial, beyond reasonable doubt. However, what can be done by way of clarification is to note the context in which the standard will be applied. Thus, where a person suffers injury caused by the

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<sup>81</sup> *Southern Properties (WA) Pty Ltd v Executive Director of the Department of Conservation and Land Management* (2012) 42 WAR 287; [2012] WASCA 79.

conduct of another, it may appear on the evidence that the impugned conduct falls into one of the following categories, viewed prospectively:

- (i) conduct which was the preferred or correct course although harm may have been foreseeable;
- (ii) conduct which was not unreasonable, although it involved an error of judgment and some would have avoided it;
- (iii) conduct which, in the Court's view, a reasonable person taking appropriate precautions would not have done, and
- (iv) the exercise of a power which is so unreasonable that the Court cannot envisage any person in that position considering it to be a reasonable exercise of the power.

138 Each category may need reformulation where the complaint is of a failure to act. There are situations where morality and the law take different courses and the law does not impose a duty to act. However, that did not arise in this case. The purpose of the powers conferred on Seqwater to operate the dams involved management of the water supply for south-east Queensland and flood mitigation on the Brisbane River. It had only one tool to achieve both purposes, that was turning the tap on or off at the dams. No question of distinguishing which acts from omissions affected its legal responsibility.

139 Viewed in this way, one can see a progression in terms of culpability: categories (i) and (ii) do not engage tortious liability in negligence in accordance with s 9 of the *Civil Liability Act*; (iii) engages liability under s 9, and (iv) alone will engage liability under s 36(2). Thus the schema suggested above reflects a scale of increasing culpability. As McClure P said, (iv) imposes a higher burden on the plaintiff than does (iii). Lack of reasonable care, assessed in accordance with s 9, does not demonstrate liability where s 36(2) is engaged.

140 This exercise reflects the observations of Gleeson CJ in *Plaintiff S157/2002 v Commonwealth of Australia*,<sup>82</sup> dealing with the basis of judicial review in the face of a privative clause:

“[13] The concept of ‘manifest’ defect in jurisdiction, or ‘manifest’ fraud, has entered into the taxonomy of error in this field of discourse. The idea that there are degrees of error, or that obviousness should make a difference between one kind of fraud and another, is not always easy to grasp. But it plays a significant part in other forms of judicial review. For example, the principles according to which a court of appeal may interfere with a primary judge’s findings of fact, or exercise of discretion, are expressed in terms such as ‘palpably misused [an] advantage’, ‘glaringly improbable’, ‘inconsistent with facts incontrovertibly established’, and ‘plainly unjust’. Unless adjectives such as ‘palpable’, ‘incontrovertible’, ‘plain’, or ‘manifest’ are used only for rhetorical effect, then in the context of review of decision-making, whether judicial or administrative, they convey an idea that there are degrees of strictness of scrutiny to which decisions may be subjected. Such an idea is influential in ordinary appellate judicial review, and it is hardly surprising to see it engaged in the related area of judicial review of administrative action.”

Thus, the standard of *Wednesbury* unreasonableness may use language having rhetorical effect, but it also conveys a standard of legal scrutiny.

141 Because the primary judge did not apply the s 36(2) standard in assessing Seqwater’s conduct, it will be necessary for this Court to consider that exercise. However, in the absence of any notice of contention, the extent to which this Court can make findings is limited. The limitations are discussed in part 18 below. That will attract further questions, including as to the appropriate identification of the relevant “act or omission”, whether singular or plural, for the purposes of s 36(2). Such matters are conveniently addressed in the factual context in which they arise. Ground 1 of Seqwater’s appeal should be upheld.

## **8. Vicarious Liability (ground 2)**

142 The second ground of appeal challenged the finding of the primary judge that Seqwater was vicariously liable for the conduct of its employees, Mr Malone and Mr Tibaldi, in conducting flood operations in January 2011. The ground was somewhat incoherent. It was said to arise only if s 36 of the *Civil Liability*

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<sup>82</sup> (2003) 211 CLR 476; [2003] HCA 2 (footnote omitted).

Act was not engaged. If s 36 were engaged, it could only be because the engineers were acting as the agency through which Seqwater undertook its flood mitigation functions. Whether it was vicariously liable for their conduct had nothing to do with the operation of s 36. Nor was there any coherent explanation as to why, as its employees, it would not be liable for negligent conduct in the course of the carrying on their duties as employees. In any event, as it has been held that s 36 is engaged in the present case, the ground is not relied upon and nothing further need be said about it.

## **9. Negligence – Overview**

143 Because the wrong standard was applied, findings of breach of duty will need to be reconsidered. To the extent such an exercise is available, pursuant to Rodriguez’ limited notice of contention, it is convenient first to address the basis on which numerous breaches of duty were found.

144 The plaintiff’s case at trial turned squarely on acceptance of the expert evidence of Dr Christensen, a civil and environmental engineer with 32 years of experience in hydrology, dams, flood control and hydraulic modelling. His expertise was properly accepted by the primary judge. His evidence was contained within a number of reports and he spent some 22 days in the witness box. Dr Christensen produced no fewer than 10 “simulations” setting out flood operations which, in his view, a reasonably competent flood engineer “would or must” have pursued, but based upon various assumptions and with varying temporal elements. Although there was much disputation over Dr Christensen’s methodology, some of these issues were resolved at an interlocutory stage and errors corrected. As to matters of substance, the primary judge accepted Dr Christensen’s evidence on a number of outstanding matters which are no longer in dispute.

145 The case in negligence resolved itself into two main parts. The first was based on an assumption that the engineers were negligent in terminating the December 2010 Flood Event and closing down the flood operations centre on 2 January 2011, at a point when the level of Wivenhoe had returned to 67.1m,

but there was further rain forecast. On the assumption that the flood operations centre should have remained open, Dr Christensen modelled the preferred operation thereafter in what was known as “simulation C”. That simulation involved anticipating future rainfall and dropping the level of the dam significantly below FSL (67m). Whether that course was available in conformity with the Manual was a major issue in the proceedings. The primary judge ruled that that course was available, a ruling challenged on the appeal by grounds 12 and 13.

146 The second part turned on Seqwater’s proposition that the flood engineers were not negligent in closing down the flood operations centre which had operated during late December. In that event, Rodriguez accepted that a further flood event, with accompanying releases, could not commence, in accordance with the Manual, until the dam level rose above 67.25m. A second flood event was declared at 07:00 on 6 January 2011. At 21:00 a “gate operation strategy” was developed during that day and releases commenced in the late afternoon of 7 January. Dr Christensen prepared two simulations, accepted by the primary judge, namely simulations F and H, each of which commenced on 8 January 2011 and which did not differ materially.

147 In Ch 1 the primary judge identified the key issues in Rodriguez’ case in the following terms:

“[28] Although the plaintiff made many complaints about the flood engineers’ approach to releases, three related complaints predominated. The first was that, in determining the amount of water to release, the flood engineers only based their releases on an estimate of inflows determined by rain that had already fallen, so called ‘rain on the ground’, and thus effectively ignored rain that was forecast. The second was that the flood engineers wrongly prioritised avoiding the inundation of the bridges ... at the expense of avoiding or minimising the risk of urban inundation. The third was that, while not considering any estimate of inflows based on forecasts in deciding to make releases, the flood engineers simultaneously modelled making releases for many days into the future which necessarily assumed that rain would not fall in significant amounts downstream of the dams and thus permit the releases to be made.”

148 There were elements of professional judgment required of the flood engineers in various aspects of the assessments to be made as to appropriate releases

from the dams. It followed that the acceptance of an appropriate simulation by way of a reasonable counterfactual did not necessarily establish that what the engineers in fact did was unreasonable. Three of the four flood engineers (Messrs Ayre, Malone and Tibaldi, but not Ruffini) gave evidence as to what they believed they were doing and were entitled to do at each of a number of relevant times when they were on duty. The judge did not accept much of that evidence, treating it as self-justifying reconstructions in circumstances where, at least to an extent, the engineers accepted that they had no recollection of actual thought processes, other than those recorded in situation reports and retained copies of computer modelling runs.

149 However, even applying the s 9 standard of reasonable care, Rodriquez' case in negligence needed to be assessed objectively by reference to what the engineers in fact did, rather than any memory or reconstruction of underlying thought processes. Their conduct was to be assessed objectively by reference to what they knew or ought to have known at the relevant times.

150 The point of distinction may be illustrated by way of an example. The primary judge found that the engineers should have made releases from Wivenhoe Dam based on anticipated rainfall as predicted by four-day forecasts issued by the Bureau of Meteorology. If, as appears to have been the case on some days, releases were not made, the question is not so much why the engineers did not do so, but rather what the consequences would have been for ongoing flood operations had they done so. In not having regard to the 4-day forecasts, if that be the case, an engineer was deprived of information which was available and should have been taken into account. Whether the use or failure to use forecasts constituted a breach of duty did not turn on the engineers' actual recollected thought processes.

151 The finding that the engineers did not take reasonable care by not taking account of the four-day forecasts in determining releases did not fix upon any failure to use those forecasts in a way expressly required by the Manual. Rather, as found, it involved a failure to construe the Manual in a way which required that forecasts be taken into account, leaving to the flood engineers the

task of determining the weight and significance that the available forecasts were to be given in the determination of strategies and water releases. Thus it was necessary to focus on the conduct of the flood engineers. It may have been unreasonable to read the Manual as not requiring that the forecasts be taken into account; alternatively, it may have been reasonable to read the Manual as not requiring that the forecasts be used in any particular way, but thereafter unreasonable to have given them little or no weight. Ultimately, what was to be established was not that Dr Christensen's simulated flood operations were reasonable, but that no reasonably competent flood engineer in the actual circumstances facing the engineers could have acted otherwise.

152 Further, as will appear below, it is important to identify the precise acts or omissions which constituted the alleged negligence. For example, if Rodriguez failed to establish that ending the flood operations on 2 January was negligent, then the failure to take various steps which Dr Christensen's simulation C mandated between 2 January and 6 January cannot have been negligent. That latter proposition was accepted by the respondent during the appeal.<sup>83</sup> In circumstances where simulation C was not engaged, the next relevant counterfactual simulations (F and H) did not commence until 00:00 on 8 January. Similarly, if releases which commenced on 10 January and inevitably caused inundation of urban areas were necessary to save the dam structure, those acts were not negligent. Rather, the negligence might, on that scenario, be found in the failure to release larger amounts, not causing inundation, or causing less inundation, at an earlier point in time, namely on 8 and 9 January.

153 Because the standard of appropriate conduct was found to be governed by the Manual, a finding which is not challenged, it is convenient to turn first to the proper construction of the Manual and how it applied at various times.

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<sup>83</sup> CA tcpt, p 533(15)-(18).



## 10. Flood Operations Manual

(1) *An overview*

154 In *Rodriguez (22)* Ch 3, the primary judge dealt with the Flood Operations Manual and the Flood Procedure Manual. The latter is not presently material. Of the former the judge said, “[t]he significance of the Manual to these proceedings cannot be overstated”: [2]. After setting out the content of the Manual section by section, the judge then turned to its construction, which commenced with the heading “Interpretative Approach and Reasonable Interpretations”. He noted:

“[112] Many of the expert witnesses in the fields of hydrology, flood forecasting, dam operations and dam engineering gave evidence concerning the proper construction of the Manual. Some of those witnesses had experience in the drafting of manuals for the operation of dams with a flood mitigation objective and the remainder had at least reviewed them in the course of their professional practice.”

155 The difference encapsulated within this heading was most clearly identified in the following passage:

“[116] In addition, there was a debate in the submissions as to whether the Manual should be interpreted as an ‘engineer’s manual’ or a ‘legal document’ and whether there was any difference of substance between the two.<sup>84</sup> I did not find the attempt to draw a distinction between the two helpful. It can be accepted that its principal audience is flood engineers. However, the Manual is also a document the breach of which has legal consequences. In relation to the latter and leaving aside the relationship between the terms of the Manual and the content of any duty of care owed by the flood engineers, a finding by a Court that there was failure to ‘observe the operational procedures’ in the Manual removes any protection that otherwise might be afforded by s 374(2) of the [Water Supply Act].”

156 It will be necessary to consider the effect of s 374 of the Water Supply Act in seeking to understand the legal significance of the Manual. Before turning to that issue it is convenient to set out the submissions of the parties, as identified by the primary judge, as they were in substance adhered to in the course of the

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<sup>84</sup> See, for example, State’s written submissions at par 11 and SunWater’s written submissions at par 2591.

appeal. Under the heading “Strict or Reasonable Interpretation?”, the primary judge set out those contentions as follows:

“[124] The plaintiff contended that, because it was common ground amongst all the experts that a reasonably competent flood engineer would be obliged to follow the Manual (see [2]), then that meant that ‘an engineer who fail[ed] to adhere to the requirements of the relevant manual, properly construed, has necessarily failed to act reasonably’.<sup>85</sup> The plaintiff also contended that ‘the Manual can only be regarded as an objective standard against which the conduct of the Flood Engineers is to be measured’ and that it follows that ... ‘the Court must first determine what that objective standard is and, having done so, must implicitly find that any other purported standard is unreasonable’.<sup>86</sup>

[125] Seqwater and SunWater contended that, even if the construction of the Manual adopted by the flood engineers was erroneous, their constructions fell within a range of reasonable constructions, such that operating in accordance with those constructions was not negligent.<sup>87</sup> SunWater contended that the relevant question is not the ‘proper’ or ‘correct’ construction of the Manual but whether ‘it was reasonably open to the Flood Engineers to interpret it in the way they did’.<sup>88</sup> Seqwater framed the inquiry in similar terms.<sup>89</sup> They also submitted that, because s 9(1)(c) of the *Civil Liability Act*... requires an assessment of the precautions that a reasonable person ‘in the position of’ the defendant would have taken, the reasonableness of the Flood Engineers’ constructions is to be assessed having regard to the Flood Engineers’ own knowledge and experience. They submitted that the assessment of what is reasonable must take into account the flood engineers’ subjective state of mind based on their own experience in operating the dams previously and their involvement in the process of drafting Revision 7 of the Manual.<sup>90</sup>”

157 The judge both resolved the question posed by the submissions of the respective parties, and disavowed the need to resolve the question. He stated first:

“[126] I accept that, in light of the legislative significance of the Manual and the unanimity of views amongst the experts, ... the Manual is, as the plaintiff contends, an ‘objective standard against which the conduct of the Flood Engineers is to be measured’. However, I do not accept that any departure from the Manual necessarily establishes that the flood engineer has failed to act in accordance with the standard expected of a reasonably competent flood engineer. The Manual is not a vehicle for imposing strict liability. Thus, if in some material respect, the flood

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<sup>85</sup> Plaintiff’s written submissions at par 388.

<sup>86</sup> Plaintiff’s written submissions at par 389.

<sup>87</sup> Seqwater’s submissions at pars 595-605, 644-645; SunWater’s submissions at pars 208-209.

<sup>88</sup> SunWater’s submissions at par 209.

<sup>89</sup> Seqwater’s submissions at pars 641-647.

<sup>90</sup> Seqwater’s submissions at pars 644-646; 665-671; SunWater’s submissions at pars 212-213.

engineers acted on a good faith interpretation of some part of the Manual that I consider was reasonably open but ultimately incorrect, then that *may not* amount to a breach of any duty of care that they owed.”

158 The judge then eschewed the significance of this resolution of the debate:

“[127] However, in the end result, this debate, including any debate over the scope of s 9(1)(c) of the *CLA* (Qld) and whether it could include some belief formed by a flood engineer during the 2009 review, does not arise on my findings. Even though Messrs Malone, Tibaldi and Ayre sought to explain in their evidence what their understanding of the disputed aspects of the Manual was, ultimately it was to no avail because (i) I am not persuaded that was their understanding during the flood event;<sup>91</sup> (ii) I am not persuaded they gave effect to any such understanding during the flood event,<sup>92</sup> and (iii) otherwise, the relevant understanding involved an unreasonable construction of the Manual.<sup>93</sup> In the end result, there was not a single instance where I was persuaded that any of the flood engineers took any impugned action during the January 2011 Flood Event based on a mistaken but reasonably held belief about the Manual’s requirements.

[128] The evidence in relation to the flood engineers’ subjective understanding of the contentious aspects of the Manual is addressed in the balance of this Chapter, as well as in Chapters 4 to 7. In short, Mr Malone ultimately accepted that he had no recollection of how he interpreted and applied the Manual during the January 2011 Flood Event.<sup>94</sup> Mr Tibaldi’s evidence was to similar effect<sup>95</sup> and, in any event, I found his evidence was generally unreliable.<sup>96</sup> Mr Ayre, however, maintained that the interpretation of the Manual set out in his affidavits represented his belief during the January 2011 Flood Event.<sup>97</sup> However, I also found his evidence unreliable. With both Mr Ayre and Mr Tibaldi I did not accept their evidence on a contested matter unless it was corroborated by independent evidence.<sup>98</sup>

[129] Otherwise, I address the reasonableness of each of the asserted constructions in the balance of this chapter and Chapter 5 which concerns releases below FSL.”

159 Each of the briefly stated conclusions was footnoted by reference to relevant sections of other chapters in which reasons were given for the particular findings. However, one consequence of the judge eschewing the need to

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<sup>91</sup> See Ch 5 [141], [157], [166]; Ch 7 [452], [460]-[461].

<sup>92</sup> See for example Ch 7 [457]-[459].

<sup>93</sup> See below and Ch 5 [167]-[177].

<sup>94</sup> Tcpt p 5353(36) (Malone); Ch 7 [454].

<sup>95</sup> Tcpt p 6445(9) (Tibaldi).

<sup>96</sup> See Ch 7, sec 7.16.

<sup>97</sup> Tcpt p 7985(26) (Ayre).

<sup>98</sup> See Ch 7, sec 7.16.

determine which was the correct approach to the construction of the Manual was that no specific ground of appeal addressed the conclusion set out at [126]. Rather, in the section of the notice of appeal dealing with “Manual Construction” (and encompassing grounds 6-15) the appellant contended in a chapeau covering each of the grounds:

“The primary judge erred in construing, and or alternatively in holding that a reasonably competent engineer in the position of the flood engineers during the January 2011 Flood Event would have construed, the Manual on the basis”

of the identified grounds relating to specific provisions in the Manual. On this approach the subjective explanations given by the employees of Seqwater and the other two defendants were of limited consequence, and the fact that they did not remember their states of mind several years earlier was beside the point. It was sufficient for the appellant’s purposes that the acts and omissions of the flood engineers were known and could be assessed objectively against the Manual, properly construed, whether that depended on the Court’s view of how the Manual should be construed or on how a reasonable flood engineer in the position of those who conducted the flood operations would have construed it. On that approach, and applying the standard prescribed by s 36(2), it is open to this Court to reconsider whether and in what respects negligence had been established. Indeed, subject to the adoption of an inappropriate standard, that exercise was expressly undertaken by the primary judge, as explained in [129].

(2) *The purposes of Wivenhoe Dam and Somerset Dam*

160 As noted above, the geography of Ipswich, Brisbane and the Brisbane River means that there is a risk of floods, sufficient to justify spending millions of dollars constructing and maintaining Somerset and Wivenhoe Dams. The dams were built in such a way that if waters rise close to or exceeding the dam crest, there is a chance the structure will fail. That would cause catastrophic flooding in Brisbane and Ipswich.

161 One purpose of both dams was to mitigate flooding – which is to say, speaking generally, to lower the peak of any flood. This is achieved by temporarily storing flood waters, and releasing them over a longer period of time, so that the peak

outflow from the dam is less than the peak flow of floodwaters in the absence of the dam. All the water that flows into the dam catchments must, sooner or later, be released; the flood mitigation purpose is achieved by altering the timing of that release.

162 Although the litigation emphasised the dams' flood mitigation purpose, the dams also served the purpose of supplying water to Brisbane and south-east Queensland. This may be seen in the title of the report presented to the Queensland Parliament in 1934 by the Special Committee which was "appointed to Investigate and Report upon Brisbane Water Supply and Flood Prevention" as well as in the term "Full Supply Level" which is basic to the operation of Wivenhoe Dam in particular.

163 Those two principal purposes are opposed to each other. Each dam has a finite capacity to hold water (it will be explained below why the capacity of Wivenhoe is slightly over 2,655,000MI). That capacity can be used to store water for consumption. Alternatively, the dam may be kept empty, available for the temporary storage of flood waters. Maximising water storage would lead the dam to be kept as full as possible for as much time as possible. Maximising the dam's capacity for flood mitigation would cause the dam to be left empty for as much time as possible.

164 Those basic considerations entail the following consequences.

- (1) First, and above all else, each dam must be managed to prevent a catastrophic structural failure.
- (2) Secondly, so long as there is no threat to the structural integrity of the dam, the main flood mitigation purpose is to prevent urban inundation downstream.
- (3) Thirdly, there must be some mechanism for regulating the compromise between the dam's water storage purpose and its flood mitigation purpose.

165 It will be seen below that the Manual reflects those basal considerations. For the most part, it is convenient to focus upon the larger, downstream Wivenhoe Dam.

(3) *Background to the Manual*

166 Construction of Wivenhoe occurred pursuant to the *Wivenhoe Dam and Hydro-Electric Works Act 1979* (Qld) (“Wivenhoe Act”), following severe flooding in 1974. When completed, the land which was “part of or relevant to” the project was vested in the Brisbane and Area Water Board (a body corporate created by s 9 of the *Brisbane and Area Water Board Act 1979* (Qld)).

167 Section 32 of the Wivenhoe Act mandated the preparation of “a manual of operational procedures in relation to each reservoir ... for the purpose of flood mitigation pending completion of the Wivenhoe dam project”. The manual was not effective until approved by the relevant Minister: s 33(1). Section 34 and 35 gave defences. Section 34 seems to have been limited to the construction phase of the project, but it provided that “[n]o person shall be held liable for damages claimed in respect of loss or injury alleged to arise from (a) the carrying out of flood mitigation procedures in accordance with the approved manual (as amended to the material time) prepared under section 32”. Section 35 provided that, inter alia, Brisbane and Area Water Board “shall not be liable, absolutely or vicariously (a) for flooding or sending water upon any land by reason of the construction or provision of any works, being part of the Wivenhoe dam project ... unless it be shown that the flooding [or] sending of water ... is due to or arose out of the negligence of such of them as would, but for this section, be so liable”.

168 The *Brisbane and Area Water Board Act 1979* (Qld) required the preparation of a manual of operational procedures, and expressly preserved the operation of the manual prepared under the Wivenhoe Act until that manual had ceased to be effective: s 106(2)(b). Sections 107 and 108 were as follows:

107. **Board bound by manual.** The operational procedures to be adopted by the Board in respect of each reservoir under its control for the purpose of flood

mitigation shall be as provided by the manual prepared under section 106 in relation to that reservoir as duly amended at the material time and such manual, as duly amended at the material time, shall be observed by the Board and its employees.

**108. Minister, Board not liable for flood damage.** The Minister, the Board and an employee of the Board shall not be liable for damages claimed in respect of loss or injury alleged to arise from-

(a) the carrying out of flood mitigation procedures of the Board if such procedures were carried out under the general direction of a suitably qualified and experienced engineer in accordance with the operational procedures specified by the relevant manual prepared under section 106; or

(b) the inaccuracy of information released on behalf of the Board or by an employee of the Board concerning anticipated flooding or the anticipated levels of flooding.

(4) *Legal status of Manual*

169 In broad terms, there were two available views of the legal status of the Manual. On the one hand, it could be seen as imposing legally enforceable obligations on the flood engineers; on the other hand, it could be seen as a set of guidelines or best practices, with limited legal significance. The latter characterisation is sometimes identified as “soft law”.<sup>99</sup> That is not to say the terms of the Manual were without legal significance, but only that its statements did not mandate action or prohibit other action. Such documents take many forms: for example where large numbers of decisions are to be made on a daily basis (such as claims for social welfare benefits), a manual may seek to create consistency in decision-making; where decisions are to be made hurriedly and without time for reflection (such as use of firearms by police) a manual may provide guidance in advance as to when a particular course of action is appropriate. The Flood Operations Manual fell into a different category. Although it may have been expected that it would be applied only in rare circumstances and where there was ample time for reflection and consideration, it provided a list of priorities, and strategies to effect those priorities. Its terms were in part prescriptive and in part guided the exercise of professional judgment.

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<sup>99</sup> See G Weeks, *Soft Law and Public Authorities* (Hart Publishing, 2016); R Creyke and J McMillan, “Soft Law versus Hard Law” in Pearson, Harlow and Taggart (eds) *Administrative Law in a Changing State: Essays in Honour of Mark Aronson* (Hart Publishing, 2008).

170 The primary judge stated in opening that:<sup>100</sup>

“The Manual did not have the force of law, save that certain parts of it relating to the gate operating procedures at Wivenhoe Dam and Somerset Dam had effect as conditions of a development consent.”

However, that statement conceals a more complex situation. The Manual itself stated that it was prepared as a “Flood Mitigation Manual” in accordance with Ch 4, Pt 2 of the Water Supply Act. The first provision in Ch 4, Pt 2, is s 370 which read as follows:

**370 Owners of particular dams must prepare flood mitigation manual**

- (1) A regulation may nominate an owner of a dam as an owner who must prepare a manual (a ***flood mitigation manual***) of operational procedures for flood mitigation for the dam.
- (2) The regulation must nominate the day by which the owner must comply with section 371(1).

171 No regulation of the kind identified in s 370(1) was relied upon. Rather, the legal status of the Manual appeared to depend upon a series of transitional provisions as noted in part 6 above. Of immediate relevance, s 613 of the Water Supply Act provided that a flood mitigation manual approved under s 497 of the *Water Act* and in force immediately before the commencement of the Water Supply Act, was taken to be a flood mitigation Manual approved under s 371.<sup>101</sup> The revision of the Manual in force in January 2011 had been approved by the chief executive on 22 December 2009, such approval taking place by notice in the Gazette, published on 22 January 2010, pursuant to s 371(2) of the Water Supply Act. The approval was stated to be for a period of five years.<sup>102</sup>

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<sup>100</sup> *Rodriguez (22)*, Ch 1 [46]; Ch 2 [28].

<sup>101</sup> Earlier versions of the manual, up to and including Revision 3 (August 1998) were created under s 106(1) of the *South East Queensland Water Board Act 1979* (Qld); upon the repeal of that Act in 1999, flood mitigation manuals were prepared pursuant to s 215F(1) of the *Water Resources Act 1989* (Qld), existing manuals being taken to be manuals under that provision pursuant to s 215Y(2). Revision 4 of the manual (September 2002) stated that it was created in accordance with ss 496-500 of the *Water Act 2000* (Qld), which also had a transitional provision for existing manuals, s 1071.

<sup>102</sup> Qld Govt Gazette, vol 353, no 15 published 22 January 2010.



172 Otherwise, Ch 4, Pt 2 of the Water Supply Act, headed “Flood mitigation”, provided only for amendment of the Manual and for regular reviews. The final section, s 374 read as follows:

**374 Protection from liability for complying with flood mitigation manual**

- (1) The chief executive or a member of the council does not incur civil liability for an act done, or omission made, honestly and without negligence under this part.
- (2) An owner of a dam who observes the operational procedures in a flood mitigation manual, approved by the chief executive, for the dam does not incur civil liability for an act done, or omission made, honestly and without negligence in observing the procedures.
- (3) If subsection (1) or (2) prevents civil liability attaching to a person, the liability attaches instead to the State.
- (4) In this section—  
**owner**, of a dam, includes—
  - (a) the operator of the dam; or
  - (b) a director of the owner or operator of the dam; or
  - (c) an employee of the owner or operator of the dam; or
  - (d) an agent of the owner or operator of the dam.

173 Seqwater was entitled to the protection conferred by s 374(2), which, if engaged, would have transferred liability to the State. It would be engaged only if Seqwater acted “honestly and without negligence in observing the procedures” set out in the Manual. However, the dual requirement of both honesty and absence of negligence resulted in limited consideration being given to the operation of this provision. As noted above, the primary judge held that s 36(2) of the *Civil Liability Act* was not engaged in the present case; however, on the basis that it was engaged, the standard to be applied in determining whether Seqwater was negligent in observing the procedures in the Manual should have been the standard of *Wednesbury* unreasonableness identified in that provision. As the only relevant cause of action turned on the existence of negligence, there was no liability to attach to the State in the event

that Seqwater obtained protection under s 374(2) because negligence was not established.

174 For present purposes, s 374 is material because the primary judge relied upon it as a basis for conferring on the Manual a legal status requiring that it be given the construction properly to be accorded to a legal document. However, the preferable course is to identify the legal status of the document without regard to its consequences. That invites attention first to whether “as an instrument” it falls within the terms of the *Statutory Instruments Act 1992* (Qld). A statutory instrument is one identified in s 7 of that Act:

**7 Meaning of *statutory instrument***

- (1) A statutory instrument is an instrument that satisfies subsections (2) and (3).
- (2) The instrument must be made under—
  - (a) an Act; or
  - (b) another statutory instrument; or
  - (c) power conferred by an Act or statutory instrument and also under power conferred otherwise by law.

*Example of paragraph (c)—*

an instrument made partly under an express or implied statutory power and partly under the Royal Prerogative

- (3) The instrument must be of 1 of the following types—
  - a regulation
  - an order in council
  - a rule
  - a local law
  - a by-law
  - an ordinance
  - a subordinate local law
  - a statute
  - a proclamation
  - a notification of a public nature
  - a standard of a public nature
  - a guideline of a public nature
  - another instrument of a public nature by which the entity making the instrument unilaterally affects a right or liability of another entity.

- (4) However, to remove doubt, an Executive Council minute is not itself a statutory instrument.

175 It is far from clear that the Manual fell within any of the particular categories listed in s 7(2), and no attention was paid to this issue in the course of the appeal. The section is to be construed in accordance with the *Acts Interpretation Act 1954* (Qld). Section 2 of the *Acts Interpretation Act* says that it applies to “all Acts”; it is arguable, though again not beyond doubt, that the reference to an “Act” in the *Acts Interpretation Act* includes a reference to a statutory instrument: s 7(1).

176 In any event, similar principles should apply to determining the intended scope and operation of the Manual whatever its precise legal status. Two factors suggest how a court should approach the construction of the Manual. First, the sole audience for the Manual was the group of flood engineers who would be operating the dams during a “flood event”. Secondly, as the evidence revealed, the Manual was drafted by the flood engineers, with the involvement of officers from the Department of Environment and Natural Resources. The Chief Executive of the Department was required to approve the final document. The manner of formulation is apparent from some of the language in the Manual, examples of which will be considered below.

(5) *Overview of contents*

177 The Manual is an 86-page document. It describes itself as “Revision 7” and is dated November 2009. The primary judge dealt extensively with earlier revisions of the document, mostly in Chapter 4, especially insofar as they treated the role of forecast rainfall differently, but consideration of them may be deferred for present purposes.

178 Notice of the approval of the revision of the Manual in place in January 2011 was published a year earlier in the Queensland Government Gazette.<sup>103</sup>

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<sup>103</sup> See fn 102 above.

179 The primary judge said, correctly, that “the parties were in sharp dispute about a vast number of issues concerning the construction and application of the Manual”, but that about the only matter as to which the parties were agreed was “the necessity for flood engineers to follow the Manual during flood operations save for the possibility of following its own procedures for departure from its requirements when the safety of the dams is threatened”: Ch 3 [2]. His Honour gave a lengthy description of the manual over some 37 pages in Ch 3 [5]-[101]. This was followed by a much longer analysis of the disputed provisions. In light of the narrowing of issues on appeal, a substantially shorter description will suffice.

180 The Manual was replete with grammatical and syntactical glitches. Capitalisation was haphazard. The passages reproduced below are verbatim, with errors left uncorrected (and not marked “sic”). That is not said as a significant criticism. The drafting was by engineers, who were evidently and understandably much more focused upon its substance than its form.

181 The first 50 pages of the Manual (putting to one side preliminary pages dealing with the history of revisions and the table of contents) comprises 10 sections. These are followed by 36 pages comprising 11 appendices.

(a) *Section 1*

182 The Preface is best reproduced in full:

**“1.1 Preface**

Given their potential significant impact on downstream populations, it is imperative that Wivenhoe and Somerset Dams be operated during flood events in accordance with clearly defined procedures to minimise impacts to life and property. This manual outlines these procedures and is an approved Flood Mitigation Manual under Water Supply Act 2008.

The Manual in its current form was developed in 1992 and the basis of this document was a manual written in 1968 covering flood operations at Somerset Dam (Wivenhoe Dam was completed in 1984). Six revisions of the Manual have occurred since 1992 to account for updates to the Flood Alert Network and the Real Time Flood Models, the construction of an Auxiliary Spillway at Wivenhoe Dam in 2005 and to account for institutional and legislative changes.

The primary objectives of the procedures contained in this Manual are essentially the same as those contained in previous Manual versions. These objectives in order of importance are:

- Ensure the structural safety of the dams;
- Provide optimum protection of urbanised areas from inundation;
- Minimise disruption to rural life in the valleys of the Brisbane and Stanley Rivers;
- Retain the storage at Full Supply Level at the conclusion of the Flood Event.
- Minimise impacts to riparian flora and fauna during the drain down phase of the Flood Event.

In meeting these objectives, the dams must be operated to account for the potential effects of closely spaced Flood Events. Accordingly, normal procedures require stored floodwaters to be emptied from the dams within seven days of the flood event peak passing through the dam.

Wivenhoe Dam and Somerset Dam are operated in conjunction so as to maximise the overall flood mitigation capabilities of the two dams. The procedures outlined in this Manual are based on the operation of the dams in tandem.”

183 It will be seen that section 1.1 of the Manual (i) stated that compliance with the Manual is mandatory, (ii) identified in descending order of importance five specified objectives, and (iii) contemplated relatively rapid (7 days) discharge of floodwaters.

184 Section 1.2 of the Manual defined twenty terms, including:

- (1) “Flood Event” is “a situation where the Duty Flood Operations Engineer expects the water level in either of the Dams to exceed the Full Supply Level”;
- (2) “FSL” or “Full Supply Level” means “the level of the water surface when the reservoir is at maximum operating level, excluding period of flood discharge”;
- (3) “Flood Operations Engineer” means “a person designated to direct flood operations at the dams in accordance with Section 2.4 of this Manual”;

- (4) “Senior Flood Operations Engineer” means “a person designated in accordance with Section 2.3 of this Manual under whose general direction the procedures in this Manual must be carried out”, and
- (5) “Duty Flood Operations Engineer” means “the Senior Flood Operations Engineer or Flood Operations Engineer rostered on duty to be in charge of Flood Operations at the dams”.

185 Section 1.7 provided that the Manual contained the operational procedures for Wivenhoe Dam and Somerset Dam for the purposes of flood mitigation and must be used for the operation of the dams during flood events. Section 1.5 stated that operating in accordance with the procedures in the Manual “shall give the protection from liability” provided by s 374 of the Water Supply Act.

*(b) Sections 2-7*

186 Section 2, titled “Direction of Operations”, dealt with the roles of Duty Flood Operations Engineer and Senior Flood Operations Engineer, which was a live issue between the defendants at trial (turning principally on the fact that Mr Ayre, an employee of SunWater, was the Senior Flood Operations Engineer) but was given less significance on appeal. Section 2.8 made provision for how the procedures in the Manual might be departed from (essentially, requiring the Senior Floor Operations Engineer to attempt to contact the Chairperson of Seqwater and the Director General of the Department of Environment and Resource Management). It was common ground that those steps were not taken in January 2011, although at one stage there was contemplation that they might be taken.

187 Section 3, titled “Flood Mitigation Objectives”, identified five objectives explicitly listed in descending order in identical terms as found in section 1, including the paragraph immediately following the list. The section then stated:

“Additionally, the auxiliary spillway constructed at Wivenhoe Dam in 2005 incorporates fuse plugs. Triggering of a fuse plug will increase flood levels downstream. Where possible, gate operations at both Wivenhoe and Somerset Dams should be formulated to prevent operation of the fuse plug.

This potential scenario is possible only when the forecast peak water level for Wivenhoe Dam just exceeds the trigger level for the fuse plugs and sufficient time is available to alter releases.”

188 The last two sentences reproduced above are consistent only with the “forecast peak water level” being a reference to the *actual* forecast peak level during a flood, rather than a forecast peak which would occur if all of the gates were closed for the remainder of the flood event.

189 Some explanation of each objective was given in sections 3.2–3.6. The catastrophic consequences of the structural failure of a dam were emphasised in section 3.2, and their structural safety “must be the first consideration” in flood mitigation operations. Section 3.3 stated:

“The prime purpose of incorporating flood mitigation measures into Wivenhoe Dam and Somerset Dam is to reduce flooding in the urban areas of the flood plains below Wivenhoe Dam. The peak flows of floods emanating from the upper catchments of Brisbane and Stanley Rivers can be reduced by controlling flood releases from the dams, while taking into account flooding derived from the lower Brisbane River catchments.”

190 Sections 3.3-3.6 dealt with lower level objectives, including (in section 3.5) the desirability of the dams being full for water supply purposes following a flood event, and (in section 3.6) the requirement to give consideration during the drain down phase to minimising impacts on flora and fauna and, in particular, “strategies aimed at reducing fish deaths in the vicinity of the dam walls are to be instigated, provided such procedures do not adversely impact on other flood mitigation objectives.” (It will be seen that one aspect of flood operations on 2 January 2011, which the primary judge found to be a breach of duty, was the closing of the gates so as to enable volunteers to seek to return fish into the dam.)

191 Section 4 identified four magnitudes of flooding: minor, moderate, major and extreme.

192 Section 5, titled “Flood Monitoring and Forecasting System”, was mostly directed to the system of field stations within the within the five main catchments above and below the dams (see [25] above) which sent rainfall and river heights

to the Flood Operations Centre. It identified the Real Time Flood Model (or RTFM) which was to be used to “estimate likely dam inflows and evaluate a range of possible inflow scenarios based on forecast and potential rainfall in the dam catchments”.

193 Section 6 dealt with Communications, both between statutory agencies and with the public. Section 7 dealt with the review of the Manual.

(c) *Section 8*

194 All sections have hitherto been short documents of no more than three pages. Section 8 was titled “Wivenhoe Dam Operations” and was 18 pages long. It was the largest section by far in the Manual. Most of the contested questions of construction or interpretation arose from this section. (The 18 pages of section 8 are reproduced as Appendix A to this judgment, but key aspects are noted below.)

195 Section 8.1 included the following paragraph:

“The reservoir volume above FSL of EL 67.0 is available as temporary flood storage. How much of the available flood storage compartment is utilised, will depend on the initial reservoir level below FSL, the magnitude of the flood being regulated and the procedures adopted.”

196 Section 8.2 dealt with the two main ways (“Radial Gates and an Auxiliary Spillway”) in which water might be released during a flood event. The radial gates were controlled by the Flood Operations Engineer. Their arrangement is shown diagrammatically in Appendix A, Manual p 20.

197 The Auxiliary Spillway comprises three plugs which are designed to fail shortly after the water height exceeds 75.7, 76.2 and 76.7m, and thereafter to release substantial flows of water in an uncontrolled way down three separate spillways until the depth returns to 67m. This is quite different from the operation of the radial gates. The release down each spillway cannot be altered, and is determined by the width of the spillway, as shown in the spillway rating table (taken from Appendix C of the Manual):



## WIVENHOE DAM AUXILIARY SPILLWAY RATING TABLE

Storage Level	Spillway Discharge			
	Central Bay (34m wide)	Right Side Bay (64.5m wide)	Left Side Bay (65.5m wide)	All Bays
m AHD	m <sup>3</sup> /s	m <sup>3</sup> /s	m <sup>3</sup> /s	m <sup>3</sup> /s
67	0	0	0	0
68	75	142	144	361
69	212	401	408	1,020
70	385	731	742	1,858
71	590	1,120	1,137	2,847
72	821	1,558	1,582	3,961
74	1,329	2,521	2,560	6,409
76	1,873	3,553	3,608	9,033
78	2,468	4,683	4,755	11,907
80	3,092	5,865	5,956	14,913

198 Thus if the water reaches 76m and the first spillway plug is eroded, then the entire flood capacity of the dam – the volume of water between 67m and 75.5m (1,160,000MI) – will be released down the first spillway, starting at a rate of around 1873m<sup>3</sup>/s, and thereafter reducing as the water level is lowered. If the water level reaches 76.5m and the second spillway plug is eroded as well, then the same will occur, save that this time the water will be released down two spillways, starting at a rate of in excess of 5400m<sup>3</sup>/s – which will of itself, irrespective of the other water being released from the radial gates at Wivenhoe not to mention the waters in the Lockyer and Bremer, cause damaging floods to urban areas of Ipswich and Brisbane. Potentially worse than that, until the fuse plug embankment is restored, the dam would have no flood storage capacity for any future flood event.

199 The significance of the foregoing is threefold.

- (1) The balance of the section was directed to the aspects of releasing water which *were* in the control of the Flood Operations Engineer, namely, the five radial gates.

- (2) The fuse plugs and the auxiliary spillways introduce a further basal objective in flood operations, which is to prevent the water level from exceeding 75.7m and thereby prevent the destruction of the first fuse plug and at higher levels the second and third plugs, which could cause urban inundation, and which would, until the plug or plugs were restored, reduce the flood storage capacity of Wivenhoe to zero.
- (3) Consequently, although the dam is capable of storing water up to 80m, once the height exceeds 75.7m and the fuse plugs are eroded, the only way the water height will exceed that level is if inflows exceed the releases down the spillways. That is possible (during the rain events of January 2011, inflows exceeded 10,000m<sup>3</sup>/s on two separate occasions) but even if that occurs, there will continue to be uncontrollable releases down one or more spillways until FSL is reached. That in turn means that although Appendix C described the flood capacity of Wivenhoe Dam as 1,980,000MI at a depth of 80m, a more significant level is 75.5m (20cm below the level at which the first fuse plug will erode). The flood capacity at 75.5m is only 1,160,000MI.

200 Section 8.3, headed “Initial Flood Control Action”, provided:

“Once a Flood Event is declared, an assessment is to be made of the magnitude of the Flood Event, including:

- A prediction of the maximum storage levels in Wivenhoe and Somerset Dams.
- A prediction of the peak flow rate at the Lowood Gauge excluding Wivenhoe Dam releases.
- A prediction of the peak flow rate at the Moggill Gauge excluding Wivenhoe Dam releases.

The spillway gates are not to be opened for flood control purposes prior to the reservoir level exceeding EL 67.25.”

201 Section 8.4, headed “Flood Operations Strategies”, identified four “strategies” for Wivenhoe known as W1, W2, W3, and W4. The strategies were “based on the Flood Objectives” of the Manual, and the five objectives from section 3 were

repeated, once again in descending order of importance. The section reiterated that:

“Within any strategy, consideration is always given to these objectives in this order, when making decisions on dam releases.”

202 The section continued:

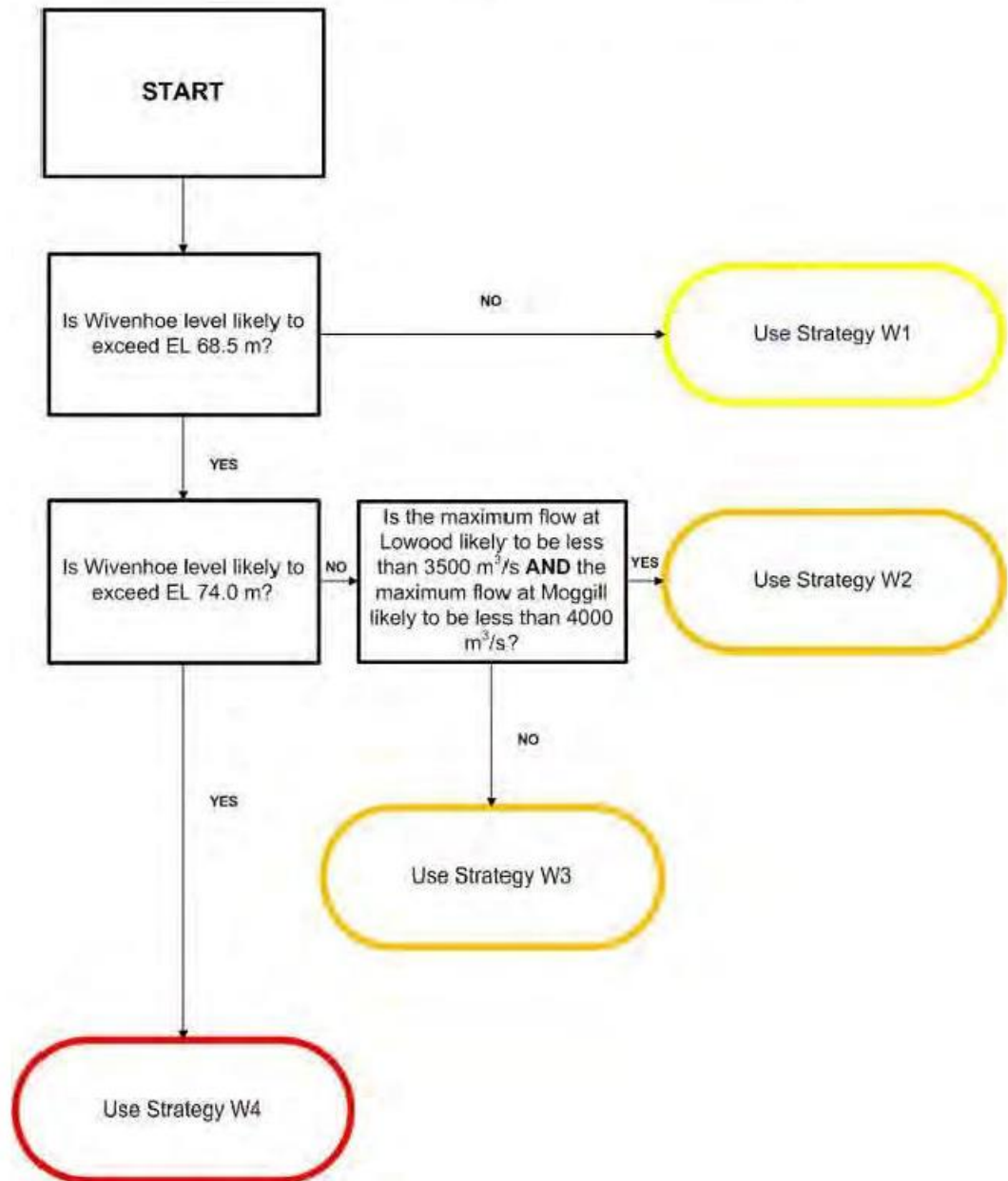
“The strategy chosen at any point in time will depend on the actual levels in the dams and the following predictions, which are to be made using the best forecast rainfall and stream flow information available at the time:

- Maximum storage levels in Wivenhoe and Somerset Dams.
- Peak flow rate at the Lowood Gauge (excluding Wivenhoe Dam releases).
- Peak flow rate at the Moggill Gauge (excluding Wivenhoe Dam releases).

Strategies are likely to change during a flood event as forecasts change and rain is received in the catchments. It is not possible to predict the range of strategies that will be used during the course of a flood event at the commencement of the event. Strategies are changed in response to changing rainfall forecasts and stream flow conditions to maximise the flood mitigation benefits of the dams.

When determining dam outflows within all strategies, peak outflow should generally not exceed peak inflow. A flowchart showing how best to select the appropriate strategy to use at any point in time is shown below:

### WIVENHOE FLOOD STRATEGY FLOW CHART



203 (A slightly different table was reproduced in *Rodriguez (22) Ch 3 [39]*. That appears to have been taken from a draft which was circulated in around September 2009 prior to the finalisation of the Manual and this superseded flowchart is also reproduced at *Rodriguez (22) Ch 4 [121]*). The table is the same, save that in the orange and red ovals are the words “Use Strategies W1 and W2 as appropriate”, “Use Strategies W1 and W3 as appropriate” and “Use Strategies W1, W3 and W4 as appropriate”. The rejection of those words in the

Manual in its final form is of some slight significance in understanding the way each strategy operates. It was discussed by the primary judge at *Rodriguez* (22) Ch 4 [107]-[137].)

204 Pausing there, two important things may be noted:

(1) First, the choice of strategy depended on the likely level in Wivenhoe Dam, as well as (in the case of W2 and W3) the likely maximum downstream flows at Lowood and Moggill.

(2) Secondly, it is clear that the strategy once selected was not fixed for the duration of the flood event. Rather, the strategy which was selected might change from time to time depending on the up to date predictions of water levels and downstream flows. That was the force of the paragraph reproduced above commencing “Strategies are likely to change during a flood event ...”.

205 Contrary to Seqwater’s submissions at trial, it is tolerably clear that the estimation of the likely level of water in Wivenhoe Dam is to be informed by rainfall forecasts. This is clear from the words “which are to be made using the best forecast rainfall and stream flow information available at the time” and “[s]trategies are changed in response to changing rainfall forecasts”. It is reinforced by many other references to rainfall forecasts and predictions in the Manual, discussed further below.

206 Contrary to Rodriguez’ submissions and the construction adopted by the primary judge, it seems unlikely that the criterion separating the choice between strategies W2 and W3, which turns on the maximum flows at Lowood and Moggill, is to be assessed on the assumption that no water is being released from Wivenhoe. That does not make sense. The flow rates of 3500m<sup>3</sup>/s and 4000m<sup>3</sup>/s represent actual flow rates in the real world. They have been chosen because they represent thresholds above which there will be inundation of urban areas. No sensible purpose would be achieved by basing operational decisions during a flood event upon whether the critical flow rates at Lowood

and Moggill would be exceeded if one assumed, almost certainly contrary to the fact, that no water was being released from Wivenhoe.

207 The ensuing seven pages of the Manual identified each of the strategies, including substrategies W1A, W1B, W1C, W1D and W1E (within W1), and W4A and W4B (within W4). Each strategy commenced with a boxed heading in larger typeface identifying the “Primary Consideration” of that strategy. These are:

“Strategy W1 – the Primary Consideration is Minimising Disruption to Downstream Rural Life”

“Strategy W2 is a Transition Strategy where the primary consideration changes from Minimising Impact to Downstream rural life to Protecting Urban Areas from Inundation”

“Strategy W3 – The primary consideration is Protecting Urban Areas from Inundation”

“Strategy W4 – The primary consideration is Protecting the Structural Safety of the Dam”

208 Each strategy had “conditions” in a separate box and in bold typeface. Some of the “conditions” are requirements for the particular strategy to be applicable (notably, the predicted water level in the dam and to that extent reflecting the information in the flow chart). Other “conditions” described the operation of the strategy itself, including the maximum release rate and the purpose. Each repeated the substance of the “primary consideration” which had already been mentioned a few lines earlier in the document.

209 Each strategy then contained a sentence commencing “The intent of [the relevant strategy]”, as follows:

(1) “The intent of Strategy W1 is to not to submerge the bridges downstream of the dam prematurely (see Appendix I).”

(2) “The intent of Strategy W2 is limit the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill, while

remaining within the upper limit of non-damaging floods at Lowood (3,500m<sup>3</sup>/s).”

- (3) “The intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000m<sup>3</sup>/s, noting that 4000m<sup>3</sup>/s at Moggill is the upper limit of non-damaging floods downstream.”
- (4) “The intent of Strategy W4 is to ensure the safety of the dam while limiting downstream impacts as much as possible.”

(We return below to the meaning of the “intents” of strategies W2 and W3.)

210 The substrategies within W1 and W4 all reflected considerations of infrastructure. The five substrategies W1A – W1E all turned on water levels in the Dam (67.25, 67.5, 67.75, 68 and 68.25) and maximum releases, of 110m<sup>3</sup>/s, 380m<sup>3</sup>/s, 500m<sup>3</sup>/s, and 1900m<sup>3</sup>/s. The latter were determined by the levels at which downstream bridges could be kept open. Within the substrategies there was further detail, based on the combination of flows from Wivenhoe Dam and Lockyer Creek, which were intended to keep specified bridges open.

211 Similarly, the distinction between strategy W4A and W4B turned on whether the lake level would exceed 75.5m, and thereby trigger the first bay of the fuse plug. There is some slight significance in the drafting of these substrategies. W4A is expressed to apply when “Lake Level between 74.0 and 75.5m AHD” and W4B when “Lake Level greater than 75.5m AHD”. However, it is reasonably clear that both levels are *predicted* maximum levels. That is because strategy W4B was primarily directed to minimising the possibility of fuse plug initiation. It dealt in terms with a scenario described as “Potential to keep lake level below EL 75.5 by early opening of the gates and/or varying the operational procedure at Somerset”. The details of the substrategy do not matter; its significance is that, despite the apparent reference to the *actual* lake level being above 75.5m, the document only makes sense if that is understood as a reference to a prediction that levels may in the future exceed 75.5m.

212 The description of strategy W1 concluded with the words in bold and large typeface:

“If the level reaches EL 68.5m in Wivenhoe Dam, switch to Strategy W2 or W3 as appropriate”.

This invoked an actual level.

213 Section 8.5, headed “Gate Closing Strategies”, was a short section of some importance to the findings of breach on 2, 3, 4 and 5 January, and will be dealt with when dealing with the grounds of appeal challenging the judge’s findings relating to the steps taken on those days.

214 Section 8.6, headed “Gate Operation Sequences”, explained over slightly more than five pages the way in which the five radial gates were to be opened. Save in extreme flood events, the section stated that the gates were to be opened in 50cm increments, one at a time, so that the middle gate (gate 3) was opened earliest and the gates at the edges (gates 1 and 5) were opened last. The intention is for “Flow in spillway to be as symmetrical as possible”. Some details of this section are relevant to particular submissions, but these may be deferred for present purposes.

215 Sections 8.7 and 8.8 are short paragraphs dealing with modifications to the gate openings during and after the triggering of a fuse plug.

*(d) Sections 9 and 10 and the Appendices*

216 Section 9 of the Manual dealt with “Somerset Dam Operations”. This is relevant to grounds 14 and 15, but its details are best deferred until those grounds are addressed. It followed the same general structure as section 8, including a “Somerset Flood Strategy Flow Chart” enabling the choice of one of strategies S1, S2 and S3, each of which had “conditions” and a statement of intent.

217 Section 10 dealt with Emergency Flood Operations, including the possibility of loss of power and/or communications. It included table 10.2 which identified water levels, gate openings and the flow rate of water discharged, described as



the “radial gate opening sequence”. In substance, it involved a progressive opening of gates, starting when the water depth is 67.5m when the first increment of gate 3 is opened (releasing 50m<sup>3</sup>/s) continuing to a depth of 75.3m when all five gates are fully open and 10,160m<sup>3</sup>/s is released.

218 Appendix C, the most important of the appendices for present purposes, included the following table:

**APPENDIX C  
WIVENHOE DAM TECHNICAL DATA**

STORAGE AND UNCONTROLLED GATE DISCHARGES						
Storage Level	Storage Capacity	Flood Capacity	Net Inflow per 1mm rise per hour	Discharge per Regulator	Discharge per Spillway Bay	Maximum Available Discharge
(1)	(2)	(3)	(4)	(5)	(6)	(7)
m AHD	x10 <sup>3</sup> ML	10 <sup>6</sup> m <sup>3</sup>	m <sup>3</sup> /s	m <sup>3</sup> /s	m <sup>3</sup> /s	m <sup>3</sup> /s
57.0	414	-	11.1	24.9	0	50
57.5	453	-	12.0	25.2	4	69
58.0	466	-	13.0	25.4	15	128
58.5	494	-	13.9	25.7	32	211
59.0	523	-	14.8	25.9	53	316
59.5	553	-	15.8	26.2	77	439
60.0	584	-	16.7	26.4	105	579
60.5	616	-	17.6	26.6	136	735
61.0	649	-	18.6	26.9	170	905
61.5	683	-	19.5	27.1	207	1,090
62.0	719	-	20.5	27.3	246	1,290
62.5	756	-	21.3	27.5	288	1,495
63.0	795	-	22.3	27.8	333	1,720
63.5	835	-	23.3	28.0	379	1,950
64.0	877	-	24.2	28.2	428	2,195
64.5	920	-	25.1	28.4	479	2,450
65.0	965	-	26.1	28.7	532	2,720
65.5	1,012	-	27.0	28.9	587	2,995
66.0	1,061	-	27.9	29.1	645	3,280
66.5	1,112	-	28.9	29.3	704	3,580
67.0	1,165	0	29.8	29.5	765	3,885
67.5	1,220	56	30.7	29.7	828	4,200
68.0	1,276	112	31.7	29.9	893	4,525
68.5	1,334	171	32.6	30.1	959	4,860
69.0	1,393	230	33.5	30.3	1,028	5,200

Storage Level	Storage Capacity	Flood Capacity (3)	Net Inflow per 1mm rise per hour (2)	Discharge per Regulator (1)	Discharge per Spillway Bay (1)	Maximum Available Discharge
m AHD	x10 <sup>3</sup> ML	10 <sup>6</sup> m <sup>3</sup>	m <sup>3</sup> /s	m <sup>3</sup> /s	m <sup>3</sup> /s	m <sup>3</sup> /s
69.5	1,454	290	34.5	30.5	1,098	5,550
70.0	1,517	350	35.4	30.7	1,170	5,910
70.5	1,581	418	36.3	30.9	1,244	6,280
71.0	1,647	485	37.3	31.1	1,319	6,660
71.5	1,714	550	38.2	31.3	1,396	7,040
72.0	1,783	615	39.1	31.5	1,474	7,430
72.5	1,854	683	40.1	31.7	1,554	7,840
73.0	1,926	750	41.0	31.9	1,636	8,240
73.5	2,000	830	41.9	32.1	1,719	8,660
74.0	2,076	910	42.9	32.3	1,804	9,080
74.5	2,153	995	43.8	32.5	1,890	9,520
75.0	2,232	1,080	44.7	32.7	1,978	9,960
75.5	2,313	1,160	45.7	32.9	2,067	10,400
76.0 (4)	2,395	1,240	46.6	33.1	2,158	10,860
76.5	2,480	1,258	47.6	33.3	2,250	11,320
77.0	2,566	1,420	48.5	33.4	2,343	11,780
77.5	2,655	1,500	49.4	36.6	2,438	12,260
78.0	2,746	1,580	50.4	33.8	2,535	12,740
78.5	2,839	1,680	51.3	34.0	2,632	13,230
79.0	2,934	1,780	52.2	34.2	2,700	13,500
79.5	3,032	1,880	54.4	34.4	2,700	13,500
80.0	3,132	1,980	55.6	34.6	2,700	13,500

- (1) This is the maximum discharge of an individual spillway bay or regulator. Total discharge is calculated by adding the contributions of each gate or regulator. There are two (2) regulators to five (5) spillway bays.
- (2) This assumes that all gates and sluices are closed. Discharges through the spillway have to be added to the above figures to calculate the actual inflow into the reservoir.
- (3) The temporary storage above normal Full Supply Level of EL 67.0.
- (4) The first fuse plug is designed to trigger at EL75.7. Above this level, fuse plug flows from Table E.3 need to be added to give the full outflow.

219 It will be seen that water levels between 57m and 80m (in 50cm intervals) are correlated with storage capacity and flood capacity.

- (1) Storage capacity commences at 414,000ML at 57m, rising to 3,132,000ML at 80m. At 67m, the storage capacity is 1,165,000ML.
- (2) Flood storage capacity is left blank at heights of 57m – 66.5m, is stated to be “0” at 67m, and thereafter rises to 1,980,000ML at 80m.

220 One aspect of the construction of the Manual turned upon the absence of entries in the column for “Flood Capacity” at depths below 67m; this was said to support a construction which precluded discharging flood water so as to reduce the dam level below 67m, an issue discussed below. For present purposes, it suffices to observe that the Manual identified the storage capacity of Wivenhoe Dam as 3,132,000MI, of which 1,980,000MI is “Flood Capacity”. (Of course, if water levels reached 80m, or anything above 75.7m, it was expected that one or more of the fuse plugs would be eroded.)

(6) *Key considerations*

221 The parties debated a “vast” (to use the language of the primary judge) number of issues of construction of the Manual. His Honour dealt with these with care and over literally hundreds of paragraphs. It was necessary to do so because issues of construction bore upon the assumptions underlying the simulations modelled by Dr Christensen, as well as the assessment of breach of duty.

222 As noted at the outset, this appeal raises many fewer issues than were presented to the primary judge. It is convenient to identify relevant principles before turning to the issues raised by specific grounds of appeal.

223 First, the need for “clearly defined procedures” in a flood event is explicitly stated in the Manual’s opening paragraph. It was obviously undesirable for flood operations engineers to be debating the meaning of the Manual during a flood event. While there is room for argument on a number of issues, that debate should not obscure the fact that some things are fundamental and beyond argument.

224 Secondly, the Manual was, as Seqwater submitted and Rodriguez did not deny, “a practical document addressed to engineers, not lawyers”. It falls within the principle that “documents addressed to practical people skilled in the particular trade or industry” ought “to be construed in light of practical considerations, rather than by a meticulous comparison of the language of their various

provisions such as might be appropriate in construing sections of an act of Parliament”.<sup>104</sup>

225 Thirdly, that approach accords with orthodox approaches to construction. Very commonly, contracts, wills, deeds or other legal documents give rise to a host of difficulties, not all of which need to be resolved in order to determine the particular dispute arising in litigation. The point was made in this Court, in a contractual context, in *Zhang v ROC Services (NSW) Pty Ltd*<sup>105</sup> by reference to Professor Carter’s work:<sup>106</sup>

“[83] It is also obvious that, in engaging in construction, a court does not always determine the full scope of the words at issue. All that is required is a solution to a particular problem or set of problems. The only relevant purpose lies in resolving the particular dispute”.

So too here.

226 The Manual identified four key volumes of water in the dam by reference to water levels plus a range of flow rates at Lowood and Moggill. The procedures contained in the Manual depended upon those integers relating to conditions in the real world.

227 The water levels of 74m and 68.5m referred to predictions used to identify the primary objective and the particular strategy to be deployed. If predicted dam levels were to exceed 74m, then the primary objective was to preserve the dam. If predicted dam levels exceeded 68.5m, then the primary objective was to prevent urban inundation. If the predicted dam levels were lower, then subordinate flood mitigation objectives (such as preserving the downstream bridges) came to the forefront.

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<sup>104</sup> *Gill v Donald Humberstone & Co Ltd* [1963] 1 WLR 929 at 933-934; *Queensland v Masson* [2020] HCA 28; 94 ALJR 785 at [95].

<sup>105</sup> (2016) 93 NSWLR 561; [2016] NSWCA 370.

<sup>106</sup> J Carter, *The Construction of Commercial Contracts* (Hart Publishing, 2013), p 11.

228 So much is clear from, inter alia:

- (1) the reiterated hierarchy of objectives in descending order of importance;
- (2) the flow chart reproduced above guiding decision making;
- (3) the existence of four strategies, reflecting different primary considerations, delineated by water levels in the dam and flow rates downstream;
- (4) the heavy emphasis of the “primary consideration” of each strategy and its intent; and
- (5) the bold mandatory words at the end of the description of strategy W1 “If the level reaches EL68.5 m AHD in Wivenhoe Dam, switch to Strategy W2 or W3 as appropriate”.

229 Further, bearing in mind the Manual’s purpose, and the textual inconsistencies and infelicities, it is convenient to step back from the detail and appreciate that the Manual contained “operational procedures” for the operation of two dams during flood events, noting that all that a flood engineer could do was to make decisions when and at what rate to release water. The Manual gave a structure to the exercise of the only power the flood engineers had.

230 The flood mitigation purpose of the dams was to reduce the *flow rates* into downstream areas. It was the rate, rather than the absolute volume, which would cause damage (given enough time, an indeterminably large volume of water will proceed downstream; a flood (by definition) is a large amount of water in a relatively small timeframe). However, the role of the dam as infrastructure for the purpose of flood mitigation also turned on *volume*; it permitted flood waters *temporarily* to be stored and later to be released, thereby reducing the maximum flow rate. Concepts within the Manual, such as “peak outflow” and “peak inflow” reflect the significance of flow rates.

231 Plainly it would be catastrophic were the dam to fail; hence W4. But, subject to preserving the integrity of the dam, the most significant consideration, which was reflected throughout the Manual, was the desirability of reducing the inundation of urbanised areas. That was because a larger number of people would be affected and greater damage would be suffered than by the inundation of less densely inhabited rural areas and rural infrastructure such as the low level downstream bridges. Indeed, the critical distinction between strategies W2 and W3 on the one hand and W4 on the other turned on the maximum release of 4000m<sup>3</sup>/s at Moggill. As explained in bold under strategy W3:

“The intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s, noting that 4000 m<sup>3</sup>/s at Moggill is the upper limit of non-damaging floods downstream.”

That was supported by extrinsic materials, showing a known rapid escalation of total damage caused by floods for flow rates in excess of 4,000m<sup>3</sup>/s.

232 If the predicted maximum dam level exceeded 68.5m but not 74m, then there was sufficient risk that further inflows would result in urban inundation that the key objective became taking steps to prevent urban inundation. If the predicted maximum dam level were to exceed 74m, there would be sufficient risk of further inflows which may cause structural collapse to conclude that the key objective would be to preserve the dam. That meant taking steps which would probably cause hundreds of millions of dollars of damage to Ipswich and Brisbane, so as to minimise the catastrophic risk of a structural collapse of the dam (which would cause even greater loss).

233 Essentially, the procedure described in the Manual involved the engineers predicting as best they could what the likely maximum amount of water was going to be. Then, appreciating that inflows might exceed that prediction, they were to regulate outflows by reference to the primary consideration as identified by the Manual. That is to say, the Manual answered the basic question a flood engineer must ask during a flood event:

“Given the likely maximum amount of water in this dam, should I be focussing on protecting the dam structure, or should I focus on protecting urban infrastructure, or may I merely focus on protecting downstream bridges?”

(7) *Degrees of tolerance*

234 The importance of degrees of tolerance may be seen in a number of ways.

- (1) To commence with an extreme example, it is plain that water levels could not be measured to the nearest millimetre (the levels were derived by observation) from a gauge at a distance which was not measured in centimetres, but in decimetres, and required a deal of interpolation; on occasion the water level at the gauge may be affected by wind or waves.
- (2) More importantly, the Manual fairly consistently identified different strategies, and different sub-strategies and other decisions, by reference to increments of dam levels of 25cm. No decision or criterion in the Manual turns on a dam level at any finer gradation (such as +/- 5cm or +/- 10cm).
- (3) Further, the fact that the Manual is relatively indifferent to dam heights within a 25cm range is reflected in the provision that, notwithstanding that a flood event commences when a flood engineer is of the opinion that the dam level will exceed FSL, gates are not to be opened unless the dam level exceeds 67.25m. Yet, if the dam is at FSL, there is no expectation that an engineer would declare a flood event every time it rains and the water level goes to 67.05m; indeed, there could be little point in declaring a flood event unless the level was at, or expected shortly to reach, 67.25m before which the Manual prohibited opening a gate.
- (4) A striking indication of the relative lack of precision in water levels for the purposes of making decisions or determining criteria for the Manual is the fact that not only the FSL, but two critical levels, 68.5m and 74m, are expressed in whole or half numbers of metres. (That is to say, Strategy W4 obtained at a threshold of 74.0m, not 73.75m or 74.25m, and

Strategy W3 applied at a threshold of 68.5m, not 68.25 or 68.75, let alone smaller variations.)

235 The issue of tolerances will be directly relevant in considering the breach found to have occurred on 2 January 2011, when the flood engineers terminated the December flood event while Wivenhoe was at 67.1m, 10cm above FSL.

236 The most important issues in the appeal concerning the Manual resolve to:

(1) how was the predicted maximum water level to be determined in a flood event (in particular, should regard have been had to future releases, and to forecast rain and, if so, qualitatively or quantitatively)? This issue incorporates a temporal horizon and varying degrees of uncertainty.

(2) when (if at all) may flood releases reduce the water level to below AHD 67m?

(3) when does a flood event end?

It is convenient to turn next to an aspect of (1), a central assumption underlying critical findings of breach, namely whether the predicted maximum water level is to be determined by ignoring likely or even current releases.

## 11. The “no release” assumption – (ground 8)

237 The primary judge addressed the “no release” assumption extensively, over some ten pages of reasoning: *Rodriguez (22)*, Ch 3 [201]-[237]. The issue is whether the references to “maximum storage levels” in sections 8.3 and 8.4, the determination of “likely levels” in the flow chart and the “predicted” levels in the “conditions” of each strategy were determined by assuming no releases from the dam were made.

(1) *Significance of the no release assumption*

238 The adoption of the no release assumption could make a major difference to the identification of the appropriate strategy for managing flood operations.



Essentially this was because the floodgates were capable of releasing a very large amount of water in a relatively short period of time. In order to appreciate the force of this, it is essential to be able to relate flow rates, typically measured in  $\text{m}^3/\text{s}$ , to volumes of water, which are usually measured in megalitres (MI).

239 A cubic metre of water is 1000 litres. Hence 1000 cubic metres of water is 1MI, and  $1000\text{m}^3/\text{s}$  is a flow rate involving one megalitre every second, which is the same as saying 3600 megalitres every hour. A convenient rule to convert  $\text{m}^3/\text{s}$  into megalitres per hour, is to multiply by 3.6.

240 Suppose during a flood event the gates are opened so that  $3,000\text{m}^3/\text{s}$  is being released (this might be consistent with strategy W3 to keep the flow at Moggill less than  $4,000\text{m}^3/\text{s}$  if the flows from Lockyer and Bremer are below  $1000\text{m}^3/\text{s}$ ).  $3,000\text{m}^3/\text{s}$  is  $3\text{MI}/\text{s} = 10,800\text{MI}/\text{h}$ . Over a 24hr period, that equates to  $24 \times 10,800\text{MI}$ , or  $259,200\text{MI}$ , which is considerably more than 10% of the absolute flood storage capacity of the dam, and a little over 22% of the flood storage capacity of the dam at 75.5m. If the dam were at 75.5m,  $259,200\text{MI}$  represents a depth of slightly more than 1.5m, and its release would lower water levels by about 1.5m to slightly less than 74m. (Appendix C states that flood capacity at 75.5m is  $1,160,000\text{MI}$  and flood capacity at 74m is  $910,000\text{MI}$ ; the difference of  $250,000\text{MI}$  is only slightly less than  $259,200\text{MI}$ .) This calculation puts inflows to one side and in this respect is artificial, because if  $3000\text{m}^3/\text{s}$  were being released, it may be expected that there would be substantial inflows. However, the point of the example is to indicate how quickly significant flood storage capacity can be made available, even at levels of release which do not by themselves involve inundation of urban areas.

241 The “no release” assumption is also, in a sense, counterintuitive. It applies during a flood event. Yet that is precisely the time when one would expect the radial gates to be open, releasing hundreds or thousands of cubic metres of water every second.

242 Another way of appreciating the significance of the no release assumption is that if (as occurred throughout most of 8 and 9 January) water were being

released at around 1300m<sup>3</sup>/s, then applying the no release assumption over a 24hr period equates to inflating the amount of water in the dam by 24 x 3.6 x 1,300 = 112,320MI. If the water level was 68.5m, then that equates to almost an additional metre of water in the dam. (Appendix C states that flood capacity at 68.5m is 171,000MI and flood capacity at 69.5m is 290,000MI; the difference of 119,000MI is only slightly more than 112,320MI, and thus the latter corresponds to an increase from 68.5m to almost 69.5m.)

243 Finally, if the no release assumption is applied for periods longer than 24 hours, then its impact is correspondingly greater. The primary judge found that the flood engineers had to apply the 4-day PME rainfall forecasts, which involved inflows of water into the dam over 4 (or more accurately 5 or 6) days, and so the effect of the assumption is to quadruple (or more than quadruple) the volume of water which is treated as if it had not been released.

244 None of the foregoing is to deny the difficulties created by sudden, extreme rainfall events. The peak inflows into Wivenhoe in January 2011 were in excess of 10,000m<sup>3</sup>/s on two separate days, and there was a 13 hour period throughout which inflows exceeded 5,000m<sup>3</sup>/s. If rain is causing inflows of, say 8,000m<sup>3</sup>/s, and it is desired to keep outflows to, say, 3,000m<sup>3</sup>/s to avoid downstream urban inundation, then it is necessary to have the capacity to store, temporarily, 5000m<sup>3</sup>/s of water – which is 18,000MI of water every hour.

245 The parties, rightly, regarded the “no release” assumption as a critical element of the reasoning of the primary judge. They devoted substantial written submissions to it and senior counsel for Rodriguez addressed it at length on the first day of his oral submissions, returning to it more briefly on the following day.<sup>107</sup>

(2) *Reasoning of primary judge*

246 The primary judge first addressed section 8.3, and noted that none of the defendants addressed this aspect of the Manual in their submissions. His

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<sup>107</sup> CA tcpt, pp 412-426; 507-508.

Honour said that it was “self-evident” that the initial assessment of predicted flood flows should be undertaken without regard to releases. That accorded with what Mr Ayre said was commonly done, and Mr Malone’s actual first RTFM on 6 January 2011. His Honour relied on Mr Pokarier’s evidence to the contrary as an aspect which “significantly undermined my preparedness to accept the various opinions he expressed on the Manual”: at Ch 3 [203].

- 247 Turning to section 8.4, the primary judge recorded four submissions made by the plaintiff: (i) consistency of approach between sections 8.3 and 8.4; (ii) consistency with determining the “maximum” storage level, on a “conservative” basis; (iii) maximising the flood mitigation potential of the dam, by telling the flood engineers whether the dam is capable of storing the whole flood without releases, and (iv) better achieving the objective of W3 and W4, noting that those strategies did not dictate any minimum rates of release.
- 248 The primary judge identified three reasons advanced by the defendants: (i) the absence of any express reference to the no release assumption coupled with the expressed exclusion of Wivenhoe Dam releases in two bullet points at the beginning of section 8.4; (ii) the reference in the flowchart to the “likely” level of the dam, which “must include the proposed releases by the adoption of an iterative modelling process”, without which the “likely” lake levels would be distorted, and (iii) “the almost uniform chorus of evidence, other than Dr Christensen, to the effect that ‘no release’ modelling is unheard of in the field of flood operations whereas iterative modelling is commonplace”.
- 249 The primary judge thereafter summarised the evidence of the witnesses: Ch 3 [210]-[220]. The summary included his Honour’s criticisms of aspects of their evidence, which need not be addressed here. His Honour’s reasoning on this point is elaborate: Ch 3 [221]-[237]. His Honour regarded a water control manual which used predicted water levels to select strategies as “relatively unique”, and reiterated that at least some modelling based on the no release assumption was in fact undertaken and was presumably regarded as having utility.

250 Concerning the references to “predicted maximum storage level” and “likely” storage level, his Honour said at [223]:

“the requirement that the storage level in Wivenhoe Dam be determined without considering releases is consistent with the requirement that it is the ‘maximum’ storage level to be ascertained. By definition, the ‘maximum’ level is reached if there are no releases. This approach is also consistent with the other two predictions referred to in section 8.4 which expressly require assessments of downstream flows without regard to Wivenhoe Dam releases.”

251 However, the principal reason advanced by the primary judge was the problem of “circularity” if the no release assumption were not adopted, stating:

“[224] The principal, and insurmountable, difficulty with the defendants’ proposed construction is the circularity that inures in having release constraints determined by strategies, determining strategies by reference to maximum storage levels and determining maximum storage levels by reference to proposed releases. The circularity was acknowledged by Mr Malone,<sup>108</sup> Mr Tibaldi<sup>109</sup> and Mr Pokarier.<sup>110</sup> Mr Malone accepted that the use of proposed releases resulted in “*great difficulty*” in determining strategies.<sup>111</sup> Contrary to the defendants’ submissions, the circularity is not overcome by storage routing or iterative modelling. In fact, it yields absurdities and, as submitted by the plaintiff, ultimately undermines the objectives of the Manual. To utilise proposed releases in the determination of the maximum storage levels would, as the plaintiff submitted, ultimately make the ‘selection of strategy dependent [on] the subjective decisions of the engineer, not the objective circumstances affecting the dams’.<sup>112</sup> This is so because, as Mr Ickert acknowledged, in modelling proposed releases over the anticipated period of the flood event different flood engineers acting reasonably might utilise different release plans and thus yield different maximum heights. None of the defendants’ submissions grappled with this difficulty. The discussion in Chapter 6 of the various gate operations spreadsheets produced by RTFM runs conducted by the flood engineers during the January 2011 Flood Event illustrates the effect upon maximum height levels of modelling differing release strategies.

[225] By way of illustration of the problem with predicting maximum storage levels by modelling releases, the plaintiff instanced the example of an engineer who was “relatively unconcerned” by a flood, who determined not to make any releases or only low releases thereby generating a higher maximum storage level and contrasted that with another engineer who determined to make larger releases but would be constrained from doing so because their modelling yielded lower

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<sup>108</sup> Tcpt 4961 (21); see also tcpt 4978 (2).

<sup>109</sup> Tcpt 5802 (19).

<sup>110</sup> Tcpt 6881 (17)-(36).

<sup>111</sup> Tcpt 4960 (2).

<sup>112</sup> Plaintiff subs at [474].

maximum storage levels and thus a lower strategy. The better approach would be for the application of the Manual to place two flood engineers facing the same circumstances in the same strategy with the same constraints and then allowing them to exercise judgment within that strategy. As noted, Mr Ickert agreed that a reasonable engineer ‘*would not interpret the [M]anual in a way that would give rise to the possibility that different strategies may be applicable at the same time and in the same circumstances by reason of different future release decisions*’.<sup>113</sup> To the extent that it is relevant, the history of the drafting of the Manual reveals that a proposal for the flood engineers to choose the strategy they would operate in below a predicted height of EL 74.0m AHD was rejected (see Chapter 4 at [129].”

252 The primary judge considered that a further problem with modelling maximum storage levels based on releases was that it introduced much more uncertainty, because, over the future covered by the modelling, the gate operations would change and could not be reliably predicted. His Honour said that the flash flooding which occurred in the Lockyer Valley on 10 January 2011 supported the no release assumption, because if dam operations had been determined using that assumption, then a flood engineer “would be in a better position to act to cease releases if circumstances require it”.

253 The judge rejected the defendants’ submission based on the references to “likely” in the flow chart:

“[228] ... The use of the phrase ‘likely’ in that flow chart simply reflects the uncertainties in making a prediction as to maximum storage levels and requires that the flood engineers determine the ‘likely’ maximum storage level without releases. It is not meant to require some assessment of the outcome of flood operations conducted within the strategies that it is directing the flood engineer to adopt. Put another way, the questions in the flow chart as to whether Wivenhoe Dam is ‘likely to exceed’ a specified level are in effect asking whether, in the absence of releases, the dam is likely to exceed a specified level. If it were read any different way then the circularity described above and all its problems would be evident.”

254 His Honour gave specific attention to the box in the flowchart which referred to maximum flows at Lowood and Moggill, stating at [229] that “[i]t can be accepted that this requires that consideration be given to outflow levels from Wivenhoe Dam”. However, he continued:

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<sup>113</sup> Tcpt p 8258(29).

“[230] ... The flow chart makes it clear that a determination of the likely level of the dam is separate from and anterior to any assessment of the maximum flow rate at Lowood and Moggill. The discussion of W2 and W3 in the Manual is consistent with this. To assess predicted maximum storage levels or likely storage levels by reference to an assessment of downstream flows that include Wivenhoe Dam releases would introduce unnecessary and illogical circular reasoning into the application of the Manual.”

255 The primary judge concluded this section of his reasoning by noting five further matters.

- (1) First, his Honour recorded “evidence” adduced by the defendants to the effect that adopting a no release assumption would lead to W4 being adopted whenever inflows were expected to exceed 910,000MI. His Honour said that many flood events had inflows of less than 1,000,000MI, and that this did not suggest that “the adoption of no release volumes would repeatedly and unnecessarily place flood operations into W4”: at [232].
- (2) Secondly, his Honour said that “just because the Manual requires an assessment to be undertaken on a no release basis does not mean that the flood operations engineers were precluded from modelling gate operations to determine the release rate and the likely height of the dams that would result if certain release rates were adopted”: at [233]. This led to the following analysis, based on the fact that all of the higher order objectives required consideration to be given to lower order objectives, his Honour saying:

“[233] In some cases, perhaps many, the adoption of the no release assumption to choose strategies will not yield any different outcome in terms of releases from the selection of strategy based on a modelled process derived from an iterative process where the first iteration had no releases. This is so because all of the higher order objectives require that consideration be given to lower order objectives. Thus it is quite conceivable, but not inevitable, that a flood engineer who determines that W3 is engaged based on a no release assumption may nevertheless decide to, say, keep Kholo bridge open by limiting flows to, say, 530m<sup>3</sup>/s and another flood engineer might through iterative modelling determine a predicted maximum height of between EL 67.75m AHD and EL 68.0m AHD using releases at a

maximum rate of 530m<sup>3</sup>/s and thus find themselves in W1D. The only difference between the two is that, subject to the matter addressed next, the former has the capacity to increase release rates whereas the latter does not.”

- (3) The third point was that the consequence of a no release assumption was that the predicted maximum depended on the chosen forecast period. His Honour said that while this introduced an element of subjectivity into the determination of strategy it did not involve the circular reasoning that considering outflows must, and was a matter for engineering judgment: at [234].
- (4) The fourth point was a minor criticism based on one of Dr Christensen’s simulations: at [235].
- (5) The fifth point reiterated an earlier point in response to a criticism that the no release assumption was unrealistic and incorrect, inter alia, in circumstances where releases were currently being made. His Honour said:

“[236] ... At the risk of repetition, the significance of those factors concerns the determination of the appropriate release rate. The use of no release modelling is directed to the determination of strategy which in turn determines release limits and the relevant priorities. Until the prevailing release limits and priorities are determined the various steps pointed to by Seqwater cannot be properly planned for.”

256 The following exchange in the parties’ written submissions encapsulated the essence of the debate. Seqwater submitted:<sup>114</sup>

“[T]he consequences of the primary judge’s construction are to skew the Manual towards operating at higher strategies, and to effectively denude Strategy W1 of any meaningful operation. Assuming Wivenhoe Dam was at FSL, adopting a no release assumption the volume of water required over the prediction period to trigger Strategy W2 or W3 was only 168,577 ML, equivalent to only 24 mm of runoff during that period across the catchment area. A 30 mm rainfall event *in a single hour* was about a 1 in 1 (i.e. on average once a year) event in South East Queensland (trial tcpt 6879 (3)-(6) (Pokarier)). When considered over the 4-day prediction period selected by the primary judge, it is apparent that Strategy W1 would rarely, if ever, be adopted. Nor would W2,

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<sup>114</sup> Written submissions, 21 July 2020, par 3.42.

because W2 is a transition strategy between W1 and W3. For practical purposes on the no release assumption, the flood engineers would generally be operating at least in W3. This is contrary to Section 8.5 of the Manual, which contemplates an agile shifting between strategies to meet precise contingencies as and when they arise.”

257 Rodriguez' response was as follows:

“[232] Seqwater’s ultimate submission is that the primary judge’s construction would result in higher strategies being engaged more often (Seq AS [3.42]). In making that submission, Seqwater’s ignores the concessions made by Mr Pokarier in respect of the evidence it relies upon which call its numbers into question [trial tcpt pp 6896 (30) – 6899 (47); 6911 (31)– 6913 (43)]. Even if Seqwater’s proposition were correct, however, there is no reason to believe that that is inconsistent with the Manual. It is to be recalled that the objectives of the Manual are stated in priority order, that those objectives correspond to the strategies, but that lower level objectives are considered even when making release decisions in higher strategies (Ch 3 [233]). It is also significant that there is no minimum required release in any strategy .... As the primary judge recognised, the result is that the selection of a higher strategy does not necessitate a higher release, but it does afford the flood engineer the flexibility to increase releases to serve the higher objectives in the Manual where necessary (Ch 3 [233]). This does not denude Strategy W1 of meaningful operation (Seq AS [3.42]); it merely limits W1 to circumstances where there is not a threat of urban inundation. That is consistent with the objectives of the Manual.”

258 In oral address on this ground of appeal, Mr Sexton candidly addressed the most obvious difficulty confronting acceptance of this aspect of the primary judge’s reasoning:<sup>115</sup>

“Certainly, at first impression, it seems sensible, if you are making releases, that you would take whatever at least those releases were into account when predicting what the dam levels will be. But it makes more sense, in terms of giving flood engineers the capacity to exercise their professional judgment, if you start with the actual lake level at any point in time and, as the very first step, work out what the predicted lake level will be based on forecast rain if there are no releases, and then, based on a number of other factors, make a decision about what releases you will make.”

259 He concluded:

“[Y]ou want to know what will happen if nothing is done and, knowing that, you then, based on a number of other factors, make decisions about what your release rates are.

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<sup>115</sup> CA tcpt, p 419(20)-(30).



Contrary to Mr Stoljar's assertion, even if it be correct that that somehow skews to higher strategies, it doesn't necessarily mean that you make higher releases or do anything else that's different. What it does mean, because you have skewed to a higher strategy, is that you have more flexibility.”

(3) *Consideration*

260 Although styled as a question of construction, the “no release assumption” is better seen as answering the question “what is involved in the fundamental integer in the operational procedures”, namely, *predicting* the extent of the flood event from the perspective of the flood storage capacity of Wivenhoe Dam. Obviously, it is necessary to predict the volume of water flowing into the Dam. But does one disregard outflows (and thus simply assess the maximum *volume* of water likely to flow into the Dam) or does one take into account outflows so as to gain an understanding of the maximum volume of water in the dam throughout the flood event?

261 In a sense, the inquiry is rather artificial. The Manual proceeds on the basis that there will be an initial assessment (section 8.3) followed by an iterative reassessment of strategy continuously throughout the flood event (section 8.4). The repeated application of section 8.4 reflects the fact that conditions are apt to change throughout the flood event. Predicted rain may or may not fall, the weather forecast may change, and downstream flows may rise or fall depending on conditions in Lockyer Creek and Bremer River. For those reasons alone, it was necessary constantly to review the decisions which have been made to release water in light of conditions which may have changed subsequently.

262 However, the consequence of the procedure being iterative is that at all times, save at the commencement of the flood event, the procedure will unavoidably be derived in part from outflows that have occurred during the flood event to date. That is saying no more than that the height of the water in the Dam at say 16:00 on day 1 of a flood event is a consequence in part of the decision made at 15:00 to open the flood gates so as to release water at a certain rate. The repeated operation of section 8.4 must take as one of its inputs the result achieved by previous decisions made following the procedure in section 8.4. That is saying no more and no less than that the procedure is iterative.

263 The correctness of the “no release assumption” therefore resolves to this question: During each iteration of the procedure in section 8.4, does one disregard all continuing and *future* outflows, although necessarily making a decision based on the outflows which have already occurred during the flood event? The Manual does not explicitly answer this question, and arguably better guidance as to how it would be construed by a flood engineer in the position of Messrs Ayre, Malone, Tibaldi and Ruffini may be gained from its purpose rather than the text of the Manual. However, both text and purpose point against the no release assumption, and it is convenient to commence with the text.

(a) *Textual considerations*

264 The Manual’s text points against the no release assumption. There is nothing expressly requiring future outflows to be ignored when determining the predicted maximum height and storage level. It is natural to approach the Manual on the basis that the predictions are real, rather than counterfactual. Dam levels turn on inflows and outflows (other processes such as evaporation were ignored). Why would one look into the relatively certain future of rain on the ground and the less certain future of predicted rainfalls, but ignore something squarely within the flood engineers’ control, namely, outflows? The natural meaning of the Manual when it asks, repeatedly throughout a flood event, about the maximum level at Wivenhoe, and whether the “Wivenhoe Storage Level [is] predicted to be” less than 68.5m, or between 68.5m and 74m, or to exceed 74m, is that it is asking a question of the predicted *actual* level of water in the dam. This will take into account such releases as have occurred, and those which are in fact being made at that time. There is no relevant certainty to be achieved by assuming that on-going releases cease.

265 The procedures in section 8.4 of the Manual involving predicted water heights are to be invoked iteratively and repeatedly *during a flood event*. That is to say, at the very time when the no release assumption is to be applied, the flood gates are apt to be open and releasing hundreds or thousands of cubic metres of water every second. The no release assumption asks one to assume that at

all times during the flood event, all gates are closed. That is a profoundly counterfactual assumption.

266 Further, the Manual *requires* peak flows rates at Lowood and Moggill to be predicted “excluding Wivenhoe Dam releases”. Those words are unnecessary if the modelling is to occur on the no release assumption, but understandable if the general approach is to predict the future making allowance for releases.

267 Still further, there is the decision-making described in the flow chart. As the primary judge acknowledged, the box which determines W2 or W3 necessarily involves including releases. It is a remarkable outcome that, on the construction upheld by the primary judge, the boxes on the same table which identify the two anterior choices to be made in determining strategy, are made on a different basis, namely, assuming that no releases are made. That is to say, in order to apply the flow chart under the no release assumption, the flood engineer must ask whether the Wivenhoe level is likely to exceed 68.5m and 74m on the assumption no water whatsoever is released, and if it will not exceed 68.5m or if it will exceed 74m, then strategies W1 or W4 apply. However, if the level is between 68.5m and 74m, then the flood engineer must now have regard to releases, and ask what the likely peak flows at Lowood and Moggill will be.

268 This is not merely a remarkable approach given the absence of textual justification on the face of the Manual; it is one which would require the flood engineer to use *different* model runs in order to resolve different decision points within the *one* flowchart. The RTFM would have to be applied without releases in order to determine predicted dam level. If the result were somewhere between 68.5m and 74m, then the model would have to be run again, this time putting in place releases, so as to determine the maximum flows at Lowood and Moggill.

269 This leads to contradictions. Suppose during a flood event the dam is close to FSL. Section 8.4 requires one to ask whether the Wivenhoe level is likely to exceed 68.5m. This will occur if 171,000ML of water flows in, if the no release

assumption is adopted. According to the primary judge, a flood engineer is required to consider inflows over (at least) a four day period. But over the same four day period, if water is being released at, say,  $380\text{m}^3/\text{s}$ , then slightly more than 131,000MI ( $4 \times 24 \times 3600 \times 0.380\text{MI}/\text{s}$ ) will be released, in which case the *net* inflow of less than 40,000MI would cause the dam level to rise less than 50cm (Appendix C shows there is 56,000MI of flood capacity between 67m and 67.5m). The significance of this is that once releases are taken into account – as they concededly must be to determine between W2 and W3 – one remains firmly in W1. That is to say, making the no release assumption not only counterfactually disregards the  $380\text{m}^3/\text{s}$  which is presently being released; it is the no release assumption which forces the flood engineer to ask which of W2 or W3 is applicable, in circumstances where the actual Dam level is expected not to exceed 68.5m, and having reached that point in the decision tree, in order to determine which of W2 or W3 applies, one is forced to disapply the no release assumption.

270 The attempted response to the contradiction was that while a higher strategy may be invoked, it does not mean that higher release rates are mandated. The response is not persuasive. While strategy W3 or W4 might be engaged, there was, according to the primary judge and the first respondent, nonetheless ample discretion to have outflows of much less than  $4000\text{m}^3/\text{s}$ . But this dilutes the effectiveness of the Manual as a tool. A sensible construction of the Manual produces a result which clearly identifies what at any time ought to be the flood engineers' top priority.

271 In order to explain why that is so, it is helpful to consider the Manual's purpose.

*(b) Purposive considerations*

272 The purpose of the Manual is, first and foremost, to have "clearly defined procedures" to guide flood engineers during a flood event. A flood engineer needs to know, at any given time, what ought to be the "primary consideration" on the basis of which decisions to release water are made. Is it to protect the

structural integrity of the dam? Is it to protect Brisbane and Ipswich from inundation? Or is it merely to keep open some bridges?

- 273 The answers to those questions are determined by aspects of the physical structure of the dam, and in particular, the empirical fact that if the actual water level exceeds 75.7m, the first fuse plug will erode, leading to the loss of all water down to 67m. It is of the utmost significance therefore to consider whether the *actual* water level is likely to exceed 75.7m because of a physical event which will take place in the real world. It is of very little significance if over a 4 or 8 day period, the *hypothetical* level of water in the dam will exceed 75.7m if one pretended that the gates were closed, when in fact they are releasing hundreds or thousands of cubic metres of water each second.
- 274 The Manual mandates that the primary consideration shifts from preventing urban inundation to protecting the structural safety of the dam when the dam is predicted to exceed 74m, because 74m is close to 75.7m. If the water level in fact (ie allowing for releases) is predicted to exceed 74m, then there is relatively little flood storage capacity before the first fuse plug erodes; in those circumstances it is natural to focus efforts on protecting the dam. It makes much less sense to ask the hypothetical question demanded by the no release assumption, namely, if we pretended the gates were closed, is the dam level predicted to exceed 74m over the next 4 days? If the answer is “yes”, then that does not say much about the real risk of the water level exceeding 74m or even 75.7m. One could not determine the real risk without regard to how much water was presently being released.
- 275 On an approach which includes the no release assumption, the situation posited above is resolved by further steps, to the effect that: “Even though the no release assumption takes me into W4, I can see in truth that there is really very little risk to the dam structure, so I can continue with smaller releases of less than 3500m<sup>3</sup>/s so as to avoid inundating Brisbane and Ipswich, in accordance with the precept that regard is had to lower order objectives”. That is so. But it amounts to a material detraction from the Manual’s purpose.

- 276 The primary judge proceeded on the basis that the rules dictated by the Manual were to be evaluated without regard to future outflows which were contemplated or indeed in some cases mandated by the Manual itself. That had the consequence that decisions were to be taken on a “worst case scenario”. It is inevitable that if dam outflows are ignored, then predicted dam levels will be greater. Further, if dam outflows are ignored, then the further ahead in time one predicts, the greater the dam level will be. If an 8-day PME were used and outflows ignored, the maximum level in the dam will inevitably occur on day 9 or 10 (after the rain predicted to fall in the catchment on all days including day 8 has found its way into the dam). That might be an available construction, but it is one which is contrary to the fundamental purpose. If one thing is clear, water should not be released from Wivenhoe at a rate greater than 4000m<sup>3</sup>/s unless any other course were unreasonably risky. But the construction favoured by the primary judge would lead to W4 being engaged if, say, over a five-day period dam levels were predicted to exceed 74.00m AHD *without regard to outflows* but over the same period dam levels would only rise to 73.5m AHD if outflows were taken into account.
- 277 Take for example a flood event when the water level is at 68m, and the flood gates are releasing 500m<sup>3</sup>/s. Assuming that the predicted inflows over the next four days are of 500m<sup>3</sup>/s, followed by dry conditions, that is an inflow of some 172,000 megalitres over the four days. But while those inflows match the existing 500m<sup>3</sup>/s outflows, the water level in the dam will not move a centimetre. A sensible operation of the Manual would reach the conclusion that at all times strategy W1 should be applied, with attention being given to preserving the downstream bridges. Yet if the no release assumption is applied, the strategy is W2, and the flood engineers are required to have as their primary consideration the prevention of urban inundation. Why should that be so, in circumstances where there is no suggestion of any risk of urban inundation? It is no answer to that conclusion to point to the fact that even within W2, regard must be had to lower order objectives. An assumption which causes one to be placed into a strategy which has as its primary consideration the prevention of urban inundation when there is no risk of urban inundation is, it may be inferred, a false assumption.

278 In short, the no release assumption inevitably pushes the flood engineers towards higher strategies. They are pushed into W2 or W3 whenever 910,000MI is predicted to fall in the catchment over the period of time being considered. But on the approach adopted by the primary judge and defended by Rodriguez it is said that nonetheless, low levels of water release may be made if it is clear that there is no risk of inundating Brisbane or Ipswich. That approach substantially adds to the contestability of the processes incorporated in the Manual. It also undermines the heavy insistence in the Manual on the “primary consideration” which comes into play when any particular strategy is engaged.

(c) *Circularity*

279 This gives rise to an element of circularity. The primary judge regarded this as inimical to an approach which took into account releases. But why is that so? The debate at trial concerning circularity appears to have proceeded on the assumption that a construction involving recursion or self-reference or “circularity” was, for that reason, not merely a factor tending against its acceptance, but fatal: the reverse is true. Such reasoning seems to put to one side the very iterative aspect of the process delineated in the Manual.

280 It was common ground that the “Flood Operations Strategies” in section 8.4 were to be operated iteratively. That is to say, the decisions to be made during a flood event would vary depending upon the circumstances which might well change throughout that event (including rising dam levels, inflow levels and downstream flows). It is of the essence of an iterative procedure that it is circular or self-referential. The inputs of subsequent applications of the procedure include the output of an earlier application. Thus the operation of section 8.4 at 16:00 turns in part upon the effect of the decisions made following the operation of section 8.4 at 15:00.

281 As the primary judge emphasised, this gave rise to questions of discretion and judgment. By proceeding on the basis that the future releases were relatively high, a flood engineer might remain in a lower strategy. The primary judge

relied on this consideration as a factor in favour of the no release assumption. We disagree. First, if releases of, say, 1500m<sup>3</sup>/s enable strategy W1 to be maintained, why is that a bad thing? Secondly, there are important questions of judgment involved at all stages, including the length of the forecast period selected. Thirdly, if the no release assumption led to a higher level strategy being selected, but when releases of 1500m<sup>3</sup>/s were applied, it appeared that the primary considerations of avoiding urban inundation or protecting the dam structure could be met, then on the approach adopted by the primary judge, it would be open to the flood engineers to keep releases at W1. That simply shifts the element of discretion into the decision as to how wide to open the flood gates, and diminishes the effect of being in a particular strategy.

*(d) Other considerations*

- 282 Rodriguez placed weight on the fact that section 8.3 did not involve taking releases into account. Whilst the premise is correct, limited weight should be given to section 8.3, which is only ever applied once, at the commencement of a flood event when the floodgates are closed, in construing section 8.4, which is to be applied repeatedly throughout the duration of the flood event.
- 283 It is also far from clear how much weight should be given to earlier drafts of the Manual. However, it will be seen that the approach adopted by the primary judge resembled an earlier version of the flow chart (in fact, the one erroneously reproduced in Chapter 3) which explicitly left lower level strategies in play even if W3 or W4 were engaged. But that form of the flowchart was rejected in the final version of the Manual.
- 284 The extent to which regard may be had to the operation of flood mitigation systems in other dams for the purpose of understanding the procedures in the Manual is also unclear. But this does inform a related issue, namely, whether the flood engineers acted reasonably in applying the Manual on the basis which did not involve ignoring future releases. The evidence was clear that none of the witnesses, including Dr Christensen, had ever encountered a flood



mitigation system which required engineers to disregard the effect of releases of water.

(e) *Conclusion*

285 Ground 8 is made out. The operation of section 8.4 of the Manual during a flood event did not require the engineers to assume that no water would be released from the Dam. Moreover, it was not unreasonable for the flood engineers to apply section 8.4 of the Manual having regard to the water which was in fact being released from the dam.

286 This conclusion has an important consequence: Dr Christensen's identification of strategy at various points in time turned on an application of the "no release" assumption. This assumption underlay all his simulations; while alternatives were considered in relation to other assumptions, no simulation modelled the iterative process. In particular, it underlay simulations C and F accepted by the primary judge as modelling reasonable strategies. Consequently, it underlay the findings that the engineers failed to follow the Manual and maintained strategies which were not engaged.

**12. "Best available forecasts" – (grounds 6, 7)**

(1) *The grounds*

287 Grounds 6 and 7 in Seqwater's appeal were expressed to be in the alternative. The drafting is awkward because there was a chapeau to all of grounds 6 to 15 which also contained alternative approaches and applied to each individual ground. The manner in which the Manual should be approached has been discussed in part 10 above. There is no need to say more about the formulation of the chapeau, beyond noting that how a flood engineer should reasonably have construed the Manual is antecedent to any question of breach. It poses a different question from how the flood engineers in fact construed the Manual, or if they construed it at all. The pleaded grounds of negligence alleged that the actions of the flood engineers were in breach of their duty of care to the plaintiff and members of the represented class. These issues will be addressed below: for present purposes, it is sufficient to note that some of the aspects of

the operation of the Manual which are covered by grounds 6-15 need not be resolved unless they are directly engaged in the analysis of breach. Unlike the “no release” assumption, that is not self-evidently so with respect to grounds 6 and 7.

288 Bearing those matters in mind, it is convenient to set out the terms in which the alleged errors are expressed in grounds 6 and 7:

**“Manual Construction**

The primary judge erred in construing, and or alternatively in holding that a reasonably competent engineer in the position of the flood engineers during the January 2011 Flood Event would have construed, the Manual on [specified bases],

6 that sections 8.4 and 9.3 of the Manual required them to use forecast rainfall quantitatively in RTFM modelling in making the predictions required for the purposes of strategy selection and in making releases ([Ch] 3 [176], [254]);

7 in the alternative to Ground 6, if sections 8.4 and 9.3 of the Manual did require them to use forecast rainfall quantitatively in RTFM modelling in making the predictions required for the purposes of strategy selection and in making releases, that the best forecast rainfall was the 4-day Probability Matched Ensemble (PME) forecasts rather than the Quantitative Precipitation Forecasts (QPFs) and that the flood engineers were required to use the 4-day PME forecasts ([Ch] 3 [176], [254]; [Ch] 9 [102], [128]-[129])”.

289 The reference to “them” in these grounds is a reference to the four flood engineers involved in the operations in January 2011. The reference to “RTFM modelling” in ground 6 may be identified by reference to section 5.1 of the Manual:

**“5.1 General**

A real time flood monitoring and forecasting system has been established in the dam catchments. This system employs radio telemetry to collect, transmit and receive rainfall and stream flow information. The system consists of more than 100 field stations that automatically record rainfall and/or river heights at selected locations in the dam catchments. Some of the field stations are owned by Seqwater with the remainder belonging to other agencies.

The rainfall and river height data is transmitted to Seqwater’s Flood Operations Centre in real time. Once received in the Flood Operations Centre, the data is processed using a Real Time Flood Model (RTFM) to estimate likely dam inflows and evaluate a range of possible inflow scenarios based on forecast

and potential rainfall in the dam catchments. The RTFM is a suite of hydrologic and hydraulic computer programs that utilise the real time data to assist in the operation of the dams during flood events. Seqwater is responsible for providing and maintaining the RTFM and for ensuring that sufficient data is available to allow proper operation of the RTFM during a Flood Event.”

290 Sections 8.4 and 9.3 referred to flood operations strategies for Wivenhoe and Somerset Dams respectively. Section 8.4 established some general propositions before setting out the relevant strategies for the operation of Wivenhoe. The relevant text is set out at [202] above. Similar language was used at section 9.3 in relation to Somerset.

291 There is no doubt that the phrase “best ... stream flow information” identified information as to rain which had fallen in the catchment and the system for measuring rainfall and stream flow referred to in the first paragraph of section 5.1 set out above. It is also clear that the phrase “best forecast rainfall” referred to rainfall forecasts as provided by the Bureau of Meteorology from time to time. Predictions as to dam levels and flow rates were to be made on the basis of that information. Further, section 5.1 referred to real time flood monitoring and modelling system used to estimate dam inflows and evaluate a range of possible inflow scenarios which, in each case, were to be “based on forecast and potential rainfall in the dam catchments.”

(2) *Ground 6 – quantitative use*

292 In the two passages in the judgment referred to in ground 6, the judge concluded that the relevant modelling was required to take into account predicted rainfall based on forecasts, and was not limited to measurements derived from “rain on the ground”. That conclusion was correct.

293 On the appeal, Seqwater contended that a distinction was to be drawn between (i) using best forecast rainfall in modelling exercises which were to be the basis of decisions as to water releases, “in a quantitative sense” and (ii) using forecasts of rainfall “only in a qualitative way” and “in a general sense”, leaving room for judgment by the flood engineers as to the quantitative determination of releases at particular times. Seqwater contended for the latter approach.

However, as will be explained more fully below, while a computer program may produce a precise numerical outcome, the use to which that figure can be put will depend upon elements of uncertainty in the information used. At no stage did the primary judge deny that there was scope for judgment to be exercised on the part of the engineers. Indeed, as Seqwater acknowledged in its written submissions, the judge expressly stated in Ch 3:

[258] It can be accepted that the Manual leaves room for the exercise of engineering judgment in determining how forecasts are to be used in making release decisions. Nevertheless, the strong indications are that it must be some form of quantitative use even if it is not the form of quantitative use described by Seqwater. The ultimate objective of flood operations is to return the dam to, or close to, FSL in accordance with sections 8.5 and 9.4 while respecting the flood objectives and their order of priorities in the meantime.

[259] At any instant, the starting point for the flood engineer in determining releases is the relevant strategy and that will have been determined by a predicted maximum height, and in some cases a prediction of downstream flows, both of which were arrived at by a calculation that utilised rainfall forecasts, ie, a form of 'quantitative' use of forecasts. The strategy chosen directs attention to the relevant objective(s) and specifies the maximum flow rate. A consideration of that strategy, the forecast(s), the predicted height (and associated inflow volume) and the other parts of the Manual will provide the flood engineer with at least initial guidance as to the amount of water to be evacuated to return the dam to FSL, or possibly below, and at least the maximum time frame over which that should occur. Depending on the forecast, in many cases that will yield a different amount of water to be evacuated than an approach which derived a predicted maximum height from a rain on the ground assessment (or an approach which aims to evacuate the current amount of water above FSL and an estimate of inflow derived from a rain on the ground assessment).

[260] The end point is that the flood engineer will make a decision to open a certain number of gates and release a specified volume of water at specified times. Between obtaining that initial guidance and making that release decision, there are a number of other factors that must be considered, including lower level objectives, the state of downstream flows and the current height of the dam. The weighing up of these matters will involve an exercise of engineering judgment. A consideration of those factors may or may not result in a release decision that meets Seqwater's definition of a quantitative use, namely the release of 'a volume of water calculated by reference to estimated inflows from the rain that is forecast to fall above the dams'.<sup>116</sup> However, given at least the initial role that must be played by forecasts, it is difficult to see how any such 'use' of forecasts could be described

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<sup>116</sup> Seqwater's submissions at par 715(b).

as anything other than ‘quantitative’ (even if not ‘quantitative’ in the sense described by Seqwater).”

294 These conclusions were essentially beyond challenge. Indeed, in addressing ground 6, Seqwater focused upon two entirely separate questions, namely (i) whether the flood engineers in fact acted in conformity with the Manual and (ii) whether the judge was ultimately right in concluding that, assuming the relevant circumstances and strategies, any reasonably competent flood engineer would have made releases in accordance with one of Dr Christensen’s simulations C, F or H. These questions were not dictated by the findings challenged in ground 6, which must be rejected.

(3) *Ground 7 – “best forecast rainfall”*

295 Much attention was devoted in the course of the trial to the meaning of the phrase “best forecast rainfall” used in sections 8.4 and 9.3 of the Manual. However, arguably the only significant word in this phrase was the word “forecast”, which could not refer to rain which had already fallen. Beyond the conclusion that the flood engineers were required to take into account forecasts of rain, and not merely predictions of dam levels and inflows based on rain on the ground, there was little more to be derived from semantic analysis. The primary judge correctly found that the engineers were required to determine strategies and releases having regard to forecast rainfall; their real time modelling programs permitted this.

296 Forecasting rainfall will involve three main parameters, namely timing, location and volume. What forecast is “best” will depend upon the purpose for which the forecast is used. Forecasts of the immediate future (24 hours) were more likely to be accurate in each respect than longer term forecasts. Broadly speaking, a 4-day forecast was more likely to be accurate than an 8-day forecast. However, the purpose of flood mitigation is to store the inflow from heavy rainfall and release it over a longer period of time, thus reducing peak flows in the river system. When dam storage is limited, there will be benefit in relying upon forecasts extending beyond 24 hours. On the other hand, there will be a time lag between the rain falling and the dam level rising, except for

rain falling directly into the dam. A 24-hour rainfall forecast may give the flood engineer up to 48 hours within which to deal with the inflows. (Rain falling late in the period could take up to 15 hours to reach the dam.)

- 297 The time chart for flows in the Brisbane River, agreed as a “rough guide”,<sup>117</sup> showed flows from the upper reaches of the catchment into Somerset or Wivenhoe as ranging from 12.5-15 hours; from Wivenhoe to Moggill gauge as 16 hours and from Moggill gauge to City gauge in Brisbane as 10 hours.
- 298 Of critical importance for the flood engineers was the location at which the rain was expected to fall. As noted above, approximately half the Brisbane River catchment was below Wivenhoe. Rain falling below the dam would not provide flows into the dam, but it would increase flows into the Brisbane River above Moggill and thus limit the volume which could be released from Wivenhoe without causing inundation in Brisbane. Again, there were delays between cause and effect: a release from Wivenhoe would take 16 hours to reach Moggill, and similar delays would occur for rain falling in the Lockyer and Bremer catchments. The longer the term of the forecast, the greater the level of uncertainty with respect to how much rain would fall, precisely where it would fall and when it would fall. Degrees of uncertainty were reflected in the forecasts themselves using ranges for the amount of rainfall; the forecasts in 2011 did not provide degrees of probability.
- 299 The Bureau of Meteorology provided forecasts in two main forms. The quantitative precipitation forecasts (QPFs) were rainfall predictions for a particular location or region covering a 24 hour period: Ch 2 [135]-[136]. QPFs were issued twice daily for 24 hours to 09:00 and 15:00 on the following day. They were specific to the Somerset and Wivenhoe catchments and were issued approximately one hour into the 24-hour period. They were provided by means of an email to the Flood Operations Centre and forecast the “catchment average rainfall” for the 24-hour period, in the form “30-50mm”. The Bureau also produced “Probability Matched Ensembles” (PMEs) based on an

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<sup>117</sup> *Rodriguez (22)*, Ch 2 [82], fig 2-6.

amalgamation of forecasts by national meteorological services from different parts of the world. The PME forecasts were made available on a daily basis and for a forecast period commencing at 22:00. They were issued in three tranches, the first for the period commencing at 22:00 were issued at 18:00, the second at 00:00 and the third at 06:00 on the following morning. The PMEs were identified by their “base time”, being the time at which the data used in the forecast became available. A base time represented as 00UTC (that is 00:00 Universal Coordinated Time, formerly Greenwich Mean Time) was 10:00 Australian Eastern Standard Time; the 1200UTC equated to 22:00 AEST. The primary judge further explained in Ch 2:

“[127] It was not in dispute that the one-day, four-day and eight-day PME forecasts with a base time of 10.00pm (ie, 1200UTC) were available to the flood engineers (and the public) at around 6.00am the next morning. Thus, for example, at 6.00am on 4 January 2011 there was available to the flood engineers one-day, four-day and eight-day PME forecasts with a base time of 10.00pm on 3 January 2011 (ie, 1200UTC). Those forecasts concerned the relevant periods of time that commenced at 10.00pm on 3 January 2011, ie, the base time and the start of the period over which rainfall was forecast coincided, but the forecasts were issued around eight hours after that period commenced.

[128] It was also not in dispute that the one-day PME forecasts with a base time of 10.00am (ie, 00UTC) were available from 6.00pm on the same day. For example, a one-day 00UTC PME forecast concerning rainfall in the period from 10.00pm on 4 January 2011 to 10.00pm on 5 January 2011 was available on the BoM website at 6.00pm on 4 January 2011. Although it was a 24-hour forecast, the base time for that forecast was 10.00am on 4 January 2011 (ie, 00UTC 4 January 2011).”

300 Professor Michael Manton, an eminent Australian meteorologist, noted that the service had been established by the Bureau in August 2009 and upgraded in November 2010. The result, published on the Bureau of Meteorology website, was in the form of a colour chart for the whole of Australia. The programming provided for estimates of rainfall to be made at grid points 50km apart. Each block of colour therefore represented an area of 2,500km<sup>2</sup>. The colour blocks themselves involved varying levels of precision along a scale 0-1mm, 1-5mm, ... 25-50mm, 50-100mm ... 200-300mm, 300-400mm and over 400mm. The PMEs were made available for 1-day, 4-day and 8-day periods. The QPF was based on the first day of the PME forecast.

301 The most complete analysis of rainfall records and their reliability was a report by Professor Manton, who also gave oral evidence and whose evidence was generally accepted by the primary judge. Professor Manton considered that forecasts were too unreliable to have a significant role to play in the identification of strategies and water releases. He did, however, accept that the 1-day QPFs and the 4-day PME's constituted available rainfall forecasts which should have been taken into account. A summary of the information available from these sources was provided by the judge in Ch 6 in the following table:

**Table 6-1: Inflows, forecasts and rainfall depths for the January 2011 Flood Event**

<b>Date/ Time</b>	<b>Wivenhoe Level (m, AHD)</b>	<b>WD Inflows (m<sup>3</sup>/s)</b>	<b>WD Outflows (m<sup>3</sup>/s)</b>	<b>Rainfall received (mm)</b>	<b>QPF – 1 day forecast (mm)</b>	<b>4 day PME (mm)</b>	<b>8 day PME (mm)</b>
<b>2 Jan</b> 11.00am	67.10	143	112	Som:0 UB:1 MB:0	Less than 5 to 10	1 to 10	15 to 25
<b>3 Jan</b> 11.00am	67.16	78	50	Som:10 UB:4 MB:2	5 to 10	50 to 100	75 to 150
<b>4 Jan</b> 11.00am	67.18	44	50	Som:0 UB:0 MB:0	10 to 20	75 to 150	90 to 150
<b>5 Jan</b> 11.00am	67.24	24	50	Som:19 UB:29 MB:17	20 to 30	50 to 100	100 to 150
<b>6 Jan</b> 11.00am	67.34	177	50	Som:38 UB:38 MB:34	30 to 50	50 to 125	100 to 200
<b>7 Jan</b> 11.00am	67.81	2225	50	Som:28 UB:24 MB:25	20 to 30	50 to 150	100 to 320
<b>8 Jan</b> 11.00am	68.59	1399	1085	Som:53 UB:22 MB:11	30 to 50	100 to 300	100 to 320
<b>9 Jan</b> 11.00am	68.54	1646	1332	Som:210 UB:124 MB:126	40 to 60	75 to 300	100 to 400
<b>10 Jan</b> 11.00am	71.95	8059	2044	Som:103 UB:103 MB:150	50 to 100	75 to 225	75 to 225
<b>10 Jan</b> 10.00pm	73.17	4488	2705				
<b>11 Jan</b> 10.00am	74.10	9606	3533	Som:122 UB:14 MB:121	In excess of 100	40 to 120	40 to 120
<b>11 Jan</b> 7.00pm	74.97	6876	7464				
<b>12 Jan</b>	74.78	2510	2547	Som:5 UB:2 MB:2	10	10 to 50	25 to 50



302 Ground 7 challenged the conclusion that the flood engineers were required to use the 4-day PME forecasts, rather than the QPFs. The ground was ineptly drawn: the judge did not suggest that the QPFs were excluded. Rather, he concluded that by themselves they did not have an adequate time horizon to permit proper flood mitigation operations.

303 The passage in Ch 9 of the judgment which most clearly set out the methodology accepted by the primary judge, with which ground 7 took issue, was as follows (cross-references omitted):

“[128] I accept that the QPF was clearly the most accurate of the forecast products available but I am also satisfied that the four-day PME showed sufficient skill to warrant, and indeed require, its use in flood operations, including for determining the maximum storage capacity of the dam for the purpose of selecting strategy. As discussed in Chapter 3, as Mr Malone accepted and as Dr Christensen repeatedly explained in his evidence, which I accept, given the size and characteristics of the upstream catchments, the 24-hour forecast period provided by a QPF is too short a planning period to make decisions about dam operations sufficient to maximise its flood storage capacity. None of the defendants [was] able to address that contention. However, the material available concerning the eight-day PME is such that I am not satisfied that its use was mandated in determining the maximum storage level of the dams for the purposes of the Manual, even allowing for Dr Christensen’s explanation for its use.

[129] Consistent with the analysis in Chapter 3, I am also satisfied that predicted inflow volumes had to be ‘used’ in setting releases. In particular, at the very least, such ‘use’ had to involve the preparation of the volumetric estimate to determine the maximum storage capacity to select strategy and the employment of that estimate as an integer or input in the decision-making process about releases. In light of the findings in Chapter 10 concerning SIM A and SIM E, it is not necessary to go further and determine whether the required use was in the ‘quantitative’ sense described by Seqwater, namely, as leading to the release of a ‘volume of water calculated by reference to estimated inflows from the rain that is forecast to fall above the dams’.”

(The term “skill” in this context was that used by meteorologists to identify the accuracy of their forecasting.)

304 Although the written submissions for Seqwater took issue with the evidential basis of the judge’s approach, there was ample evidence to support the findings set out above. The challenge focused on Dr Christensen’s use of the 4-day (and indeed the 8-day) forecasts in formulating simulations C and F, albeit

differently in relation to each simulation (as to which see [421] and [422] below). The primary judge having accepted those simulations as reasonable, it was seen to be necessary, first, to attack each aspect of the methodology adopted by Dr Christensen and, secondly, to deny that such forecasts could lead to “quantitative” conclusions as to the appropriate strategy or the level of releases, because it was not demonstrated that the engineers had in fact made decisions on that basis.

305 These challenges were either misconceived or unhelpful. For reasons separately set out, the use by Dr Christensen of a “no release” assumption in devising appropriate strategies and his approach in releasing water below the FSLs for each dam were not approaches required of a reasonably competent flood operations engineer in the circumstances. In other respects, Dr Christensen’s modelling was transparent and reasonable.

306 As to the second matter, there was evidence that the flood engineers did in fact have regard to the 4-day forecasts prepared by the Bureau. Whether they had sufficient regard to them was another question. However, as Rodriguez correctly submitted, that question could not be answered by positing a qualitative/quantitative dichotomy on the possible uses of rainfall forecasts. Rather, the proper course was to determine whether on the information available, and having regard to levels of uncertainty inherent in the forecasting, the steps taken by the flood engineers were reasonable in all the circumstances. As will be discussed shortly, the critical question was whether the engineers gave sufficient and appropriate weight to the 4-day forecasts provided on 7, 8 and 9 January 2011.

307 Ground 7 should be rejected.

308 Because the information derived from the rainfall forecasts informed much of the reasoning as to the breaches of duty, it is convenient to set out the basic information here.

(4) *Rainfall forecasts over time*

- 309 Based on the principles set by the Manual, and acceptance that best available forecasts included 4-day PME, it is convenient (albeit at the cost of some repetition) to set out what the engineers knew or ought to have known from 5 January 2011.
- 310 Although insignificant rain fell on 2 and 3 January, from 18:00 on 2 January the 4-day PME (applicable from 22:00 hours onward) forecast 50-100mm above Wivenhoe and a similar (25-100mm) below the dam. Accordingly, that prediction related to 3-6 January. However, the 1-day PME indicated insignificant rain above the dam, from which it could be inferred that the heavier falls were due over 4, 5 and 6 January. By 18:00 on 3 January, no rain had fallen, but the 4-day PME was raised to 75-150mm. The 8-day PME had the same maximum but a range from 90-150mm. From that it could be inferred that the bulk of the rain was expected in the period of 4-7 January. Although the 1-day PME applicable to 4 January had predicted 5-15mm, in fact no significant rain fell on that day. The PME issued at 18:00 on 4 January had a similar estimate of 5-15mm for the following day, and maintained the 4-day PME at 50-110mm. At 16:00 on 5 January the 1-day PME was still 5-15mm and the 4-day PME above the dam was 50-125mm. (The 8-day PME issued on 5 January had risen to 100-200mm.)
- 311 Mr Malone prepared an analysis of observed rainfall for the period from 2 December 2010–20 January 2011 based on gauges in particular catchments and averaging the recorded rainfall across those catchments. There were three major catchments, the largest being Upper Brisbane (4,244km<sup>2</sup>), the area immediately surrounding Wivenhoe Dam, known as “Middle Brisbane” (1,429km<sup>2</sup>), and the catchment for Somerset (1,328km<sup>2</sup>). Mr Malone’s observed rainfall figures were set out in column 5 (“Rainfall received”) of Table 6-1 at [301] above.
- 312 The primary judge set out in Table 9-2 the range of 4-day PME estimates for the period 1-11 January 2011:

**Table 9-2: Four-Day 00UTC PME Estimates**

Date / Midnight	Christensen	State Range	Manton	Pokarier	Nathan	Giles	Range
1 Jan	10-25		11				
2 Jan	6 (2-10)	1-10 (5)	4	5		5	4-6
3 Jan	75 (50-100)	50-100 (75)	56	75	59	67	56-75
4 Jan	116 (75-150)	50-150 (100)	97	104.7	97	95	95-116
5 Jan	75 (50-100)	25-100 (62.5)	83	75	83	61	61-83
6 Jan	88 (50-125)	25-150 (87.5)	76	84.5	76	83	76-88
7 Jan	100 (50-150)	25-150 (87.5)	74	84.5	65	84	74-100
8 Jan	200 (100-300)	50-300 (175)	156	159.5	151	155	151-200
9 Jan	188 (75-300)	50-300 (175)	184	159.5	179	161	161-188
10 Jan	150 (75-225)	50-200 (125)	157		153	122	122-157
11 Jan	80 (40-120)	25-100 (62.5)	56		54	56	54-80
12 Jan	30 (10-50)	5-25	12		8		

313 The first column represented the forecast for the 4-day period from 22:00 the evening before; for example, the first entry represented the period from 22:00 on 31 December 2010 to 22:00 on 4 January 2011. The ranges used by Dr Christensen and the State varied depending upon how one read the large scale contour maps with coloured patterns, discussed above. The range given in the right-hand column is the range of figures in fact adopted by the various witnesses. With one exception (5 January), Dr Christensen’s accepted value was the highest in every case. However, in Ch 9 the judge reached a conclusion in these terms:

“[159] Seventh, allowing for these matters, I have reviewed the depths based on the four-day PME forecasts set out in Table 9-2 above. I do not regard any of the estimates, including Dr Christensen’s, as outliers. Bearing in mind the caution to be exercised, I am satisfied a reasonably competent flood engineer reviewing the maps could select either of the ranges nominated by Dr Christensen or the State. If the reasonably competent flood engineer did not have the geo-referencing ability of the other experts then they would at least commence by taking the middle of (either of) those ranges. They might have attempted to examine the forecasts more closely to ascertain more precise figures for the sub-catchments. However, depending on their approach to flood operations, such an engineer should be very reluctant to adopt a lower catchment wide average from such a process given the disproportionate risks that follow from underestimating inflow and the uncertainties associated with the PME forecasts (especially in large rainfall events). If anything, the reasonably competent flood engineer would select rainfall depths above that average. In Dr Christensen’s

simulations the significant four-day forecasts are for the period of 3 to 7 January 2011 as he operates in draindown on 2 January 2011 and all possible forecast interpretations on and after 8 January 2011 are extremely dire. The range of interpretations in that period is relatively narrow especially as between Dr Christensen and the State. The result is that I am satisfied that Dr Christensen's selected rainfall depths from the forecasts are reasonable although they tend on the high side of a relatively narrow range."

314 The next stage was to estimate inflows based on those figures. The table used by the judge (Ch 9 [235]) was as follows:

**Table 9-6: Range of 4-Day Volumetric Estimates  
Revised 4 day Inflow Volumes**

Forecast Date/time	Christensen ROG inflow (ML)	Giles ROG inflow (ML)	Christensen (ML)	Giles (adjusting to his corrected figures for LDE) (ML)	Giles (using Giles' rainfall depths and flood engineers' loss rates) (ML)
2 Jan 00:00	30,000	20,000	33,000	30,000	20,000
3 Jan 00:00	25,000	11,000	361,000	328,000	175,000
4 Jan 00:00	29,000	6,000	517,000	501,000	250,000
5 Jan 00:00	14,000	4,000	364,000	329,585	111,000
6 Jan 00:00	79,000	29,000	460,000	414,500	138,000
7 Jan 00:00	155,000	124,000	608,000	547,000	203,000
8 Jan 00:00	168,000	159,000	1,048,000	934,954	468,000
9 Jan 00:00	79,000	75,000	886,000	782,000	622,000
10 Jan 00:00	615,000	593,000	1,288,000	1,199,500	988,000
11 Jan 00:00	343,000	328,000	683,000	639,840	447,000
12 Jan 00:00		N/A	431,000	NA	N/A

The judge preferred Dr Christensen's ROG inflow volumes in the second column to Mr Giles' figures in the third column, but accepted as reasonable the inflow volume estimates prepared by Mr Giles appearing in the fifth column.

315 Taking the inflow figures for 10 January of some 1,200,000ML, which incorporated both rain that had fallen and rain forecast to fall over the next four

days from 22:00 the previous night, and noting that at 22:00 on 9 January Wivenhoe was at 69.44m, it appears that the storage capacity at that time was approximately 1,450,000MI. The addition of a further 1,200,000MI would lift the total to 2,650,000MI, and the dam level to about 77.5m, assuming that no releases were made in the meantime. That level would be well beyond the trigger for the third fuse plug. To prevent the level exceeding 74m it would be necessary to release 600,000MI; to achieve that would require releasing water at a rate of 1,750m<sup>3</sup>/s for four days, starting immediately. The effect of such releases would need to have been assessed having regard to the expected peak flows at Lockyer Creek and the Bremer River.

**13. Releases below Full Supply Level (FSL) – (grounds 12, 13)**

316 The primary judge concluded, at Ch 5 [168], that the Manual did not prohibit releases of water below FSL during flood operations, and that in certain circumstances, such releases should be made. Ground 12 of Seqwater's appeal challenged that finding. Ground 13 challenged a further finding, at Ch 10 [178], that releases should have been made in the first week of January based on predicted rainfall, rather than rain which had already fallen in the catchment.

317 These grounds attracted extensive written submissions. However, the significance of these grounds is quite limited. They turn on simulation C, which was advanced by Dr Christensen and which formed a basis of the analysis of breach and causation in relation to the first week. Under this simulation, Dr Christensen maintained that a flood engineer in the position of those operating Wivenhoe Dam in the first week of January 2011 would have left the gates open for the whole of that week, so as to release some 300 or 400m<sup>3</sup>/s until the evening of 5 January 2011, and thereafter at considerably greater rates. Relevantly for the purposes of these grounds, the effect was to reduce dam levels well below 67m, indeed to as low as 63.79m, by 13:00 on 9 January.

318 None of this arises if there were no breach of duty in the flood engineers determining that the December flood event concluded on the morning of

2 January 2011, when the dam level was 67.1m. Rodriguez accepted that the Manual did not permit opening the gates in a new flood event until dam levels rose to 67.25m, in accordance with the command in section 8.3 (“The spillway gates are not to be opened for flood control purposes prior to the reservoir level exceeding EL 67.25”). Accordingly, the starting point and an essential premise of simulation C was that a reasonably competent flood engineer would not have brought the December Flood Event to an end. For the reasons given below in part 19(3), that premise is not made out.

319 In any event, even if the flood event continued, we respectfully disagree with the conclusion reached by the primary judge that the flood engineers were *obliged* to make substantial releases. That conclusion was expressed at Ch 5 in the following terms:

“[168] ... A reasonably competent flood engineer reading the Manual would recognise the matters noted in section 3.3.6 of Chapter 3 [of the judgment], namely, the importance of the flood objectives and their order of priority, the requirement to use predicted levels to determine strategies and to make those predictions based on stream flow information and rainfall forecasts. Once they appreciated those matters, and acknowledged that section 8.3 was only an initial constraint, then such an engineer would recognise that releases below FSL during flood operations were not prohibited by the Manual. Instead, they would realise that they should be undertaken when necessary to give effect to the Manual’s objectives and strategies, bearing in mind that there should be no reason why the dam would not return to FSL at the end of the flood event (section 3.5).”

320 The Manual conferred a discretion when dam levels were at 67.1m. It was open to the flood engineers to form the view, on 2 January 2011, that it was not necessary to return to FSL by 3 January 2011, and to shut the gates, leaving only the release of around 50m<sup>3</sup>/s from the regulators.

321 Further, if that be wrong, and if, in accordance with Dr Christensen’s simulation C releases of some 470m<sup>3</sup>/s continued throughout 2 January 2011, according to Dr Christensen, the water level would reach 67.05m at 16:00 on 2 January 2011 and 67.0m at 02:00 on 3 January 2011. The QPF forecast available at 10:00 on 2 January 2011 was for less than 5mm of rain in the next 24 hours and that at 16:00 for 5-10mm. The 4-day PME forecast showed less than

10mm, with most of that predicted to fall on the fourth day. It is true that the 8-day PME forecast predicted heavier rain towards the conclusion of that extended period.

322 A flood engineer was not *required* in those circumstances to continue the flood event, and to release water so that the level fell below 67m. Even on a literal approach which has no regard to the degrees of tolerance inherent in the measurements of dam levels in the Manual,<sup>118</sup> on the afternoon of 2 January 2011 it was open to an engineer to determine that the December flood event had ended sometime after 16:00, when the next day's QPF forecast was available, and with dam levels at around 67.05m. This would accord with the statements in the Manual that, "[t]here is no reason why the dams should not be full following a Flood Event".

323 For those reasons, grounds 12 and 13 do not arise. However, if we are wrong about the absence of breach in determining that the December flood event ended on the morning of 2 January 2011, these grounds are made out. They preclude a finding of negligence (even on the ordinary standard) on the part of the engineers in failing to continue to reduce the level of Wivenhoe below FSL.

324 This conclusion would remove the basis for the plaintiff's reliance on Dr Christensen's simulation C; it leaves available reliance on simulation F.

#### **14. Strategy W4 – (ground 9)**

325 The error identified in ground 9 was that "Strategy W4 was required to be implemented by a predicted storage level above 74.0m AHD but as not requiring an increase in releases until the lake level at Wivenhoe Dam actually reached 74.0m AHD".

326 The practical significance of Strategy W4 has been addressed above in considering the "no release" assumption. If the level of the dam were still rising, despite releases occurring in accordance with Strategy W3 (so as to avoid

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<sup>118</sup> See part 10(7) above, [234]-[236].



inundation in Brisbane and Ipswich) and continuing heavy inflows were expected, then Strategy W4 was engaged because, once the actual level passed 74.0m, it was getting dangerously close to the point at which the first fuse plug would begin to erode.

327 The challenged passage in Ch 3 of the primary judge's reasoning was as follows:

“[318] Second, it also follows from the above that Strategy W4 is engaged by a predicted storage level above EL 74.0m AHD and not an actual storage level. This follows from the statement in the conditions box and the flowchart. The reference to the ‘strategy normally com[ing] into effect when the water level in Wivenhoe Dam reaches 74.0m’ is a reference to that part of the strategy that effectively mandates large releases to arrest rising water levels that threaten dam safety. It further follows that when Strategy W4 is only engaged by a predicted height above EL 74.0m AHD, there is no requirement to keep opening gates to address the rising water levels and the requirement to consider lower level objectives in their order of importance, in addition to dam safety, is fully engaged although the flood engineer is no longer limited to maximum releases of 4000m<sup>3</sup>/s. As discussed in Chapter 7,<sup>119</sup> that may mean that a transition from W3 to W4 based on a prediction does not necessarily lead to an immediate increase in releases.”

328 Seqwater submitted that, “[g]iven the risk to the safety of the dam, it would be entirely anomalous to suggest that the dam could be in W4 but no additional steps need be taken to decrease the level of the dam.” The point appears to have been that once the engineers were operating under W4 and not W3, they were free of the requirement of W3 that releases should be at a level below that which would result in 4,000m<sup>3</sup>/s at Moggill. (Above that level, significant inundation is expected in Brisbane and Ipswich.) However, W4 does not in terms require that a higher level of releases be made and the impact of “rapidly increasing discharge” should be considered. Given Seqwater’s insistence in other circumstances on the uncertainty of 4-day forecasting and the unpredictability of rainfall and therefore continuing inflows into the dam, it is curious that a reading of the Manual which conferred greater flexibility and discretion was resisted at this point. In any event, it is even less clear that this has any practical consequence. The sole purpose of the submission appeared

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<sup>119</sup> At [108] to [109].

to be that although, on the judge's finding, Strategy W4 was engaged on 8-11 January, yet on each of those days simulation F "involved operations to *increase* the level of the dam ...." Therefore, it was submitted, simulation F did not represent action expected of a reasonably competent flood engineer operating consistently with the Manual.

329 It follows from this submission that once Strategy W4 is engaged, releases must immediately be undertaken to prevent the level of the dam increasing. However, there is nothing in the language of the Manual which requires such a conclusion. The two substrategies under W4 distinguish between circumstances where the level is expected to exceed 75.5m (and initiate the first fuse plug), and where it is not. It is difficult to understand why a flood engineer faced with an actual dam level of 73.5m and rising, but with inflows likely to take the level to 74.5m but no further rain in sight, would be acting unreasonably in allowing the level to rise.

330 The proposed reading of the Manual does not render the conduct in simulation F necessarily unreasonable. That question will be considered in its terms in due course. Ground 9 should be rejected.

**15. "Peak inflow" – (grounds 10, 11)**

331 Under the general heading "Flood Operations Strategies", the Manual provided, as discussed above, that a choice of strategy will depend upon "the best forecast rainfall and streamflow information available at the time", and noted that strategies may change "in response to changing rainfall forecasts and streamflow conditions to maximise the flood mitigation benefits of the dams." Critically for present purposes, the Manual then stated:

"When determining dam outflows within all strategies, peak outflow should generally not exceed peak inflow."

332 The controversy surrounding the meaning of this last sentence turned on whether the Manual permitted a flood engineer to lower the dam level, and thus increase storage capacity, in advance of heavy rainfall. If "peak inflow" were

restricted to the peak inflow experienced at a point in time prior to the heaviest predicted rainfall, it might be possible to slow the rising dam level, but, unless there had already been very heavy rainfall, a significant reduction in the dam levels would not be possible. At trial, the defendants contended that peak inflow should not depend upon predictions of rainfall which might not come to fruition. The general purpose of flood mitigation was to reduce the peak levels of flow in the river, not to exacerbate them. To rely on uncertain predictions by pre-releasing significant volumes of water might well exacerbate, rather than mitigate, the flood.

333 The judge rejected that approach on two bases. First, the Manual, and indeed section 8.4, read as a whole, expressly required that the choice between strategies, with expected outflows, required that regard be had to rainfall forecasts. Accordingly, the risk of exacerbating flooding was to be offset by the potential benefits of increasing flood storage so as to reduce the peak flows resulting from predicted rainfall. Reliance on predicted rainfall, and therefore predicted peak inflow, could be accommodated by the language that peak outflow should “generally” not exceed peak inflow: Ch 3 [282], [284].

334 The judge’s conclusion in Ch 3, challenged by grounds 10 and 11 of Seqwater’s appeal was as follows:

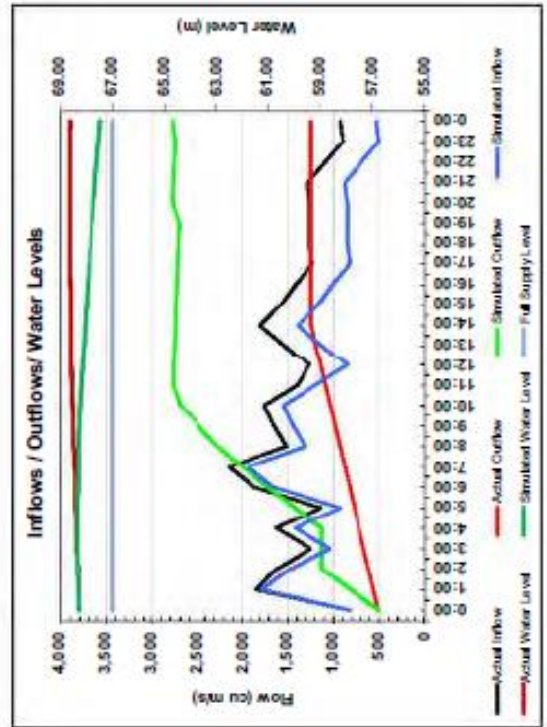
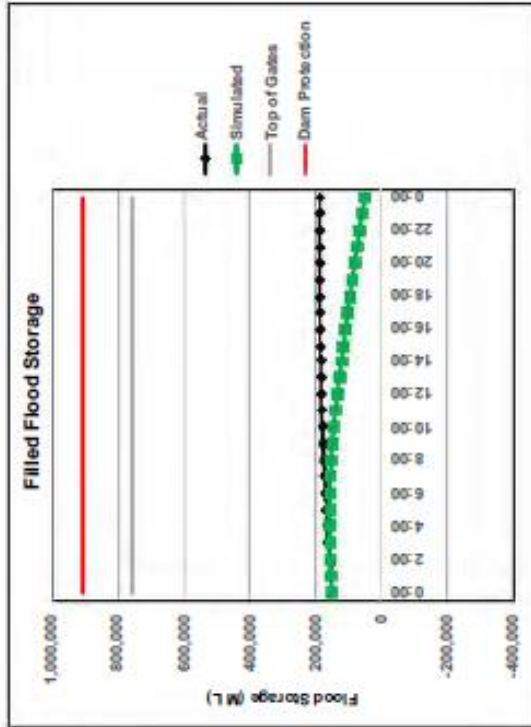
“[285] Accordingly, I am satisfied that the reference to ‘peak inflow’ in the concluding words on page 23 of the Manual is to the ‘peak inflow’ across the relevant flood event, the determination of which will require consideration of predicted peaks using rainfall forecasts and not just the peak inflows already experienced. As I do not accept that a flood engineer could reasonably construe the Manual as not mandating the use of forecasts and could otherwise overlook the significance of the order of priority of the objectives in the Manual, I do not accept the contrary view was reasonably open to a flood engineer.”

The primary judge returned to this issue in considering criticisms of Dr Christensen’s simulations.

335 The significance of the point may be illustrated by reference to charts showing the actual operations of Wivenhoe and the operation proposed by Dr Christensen under simulation F.

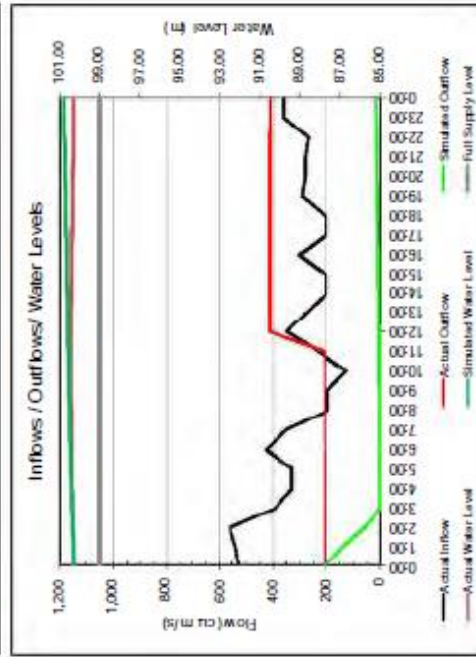
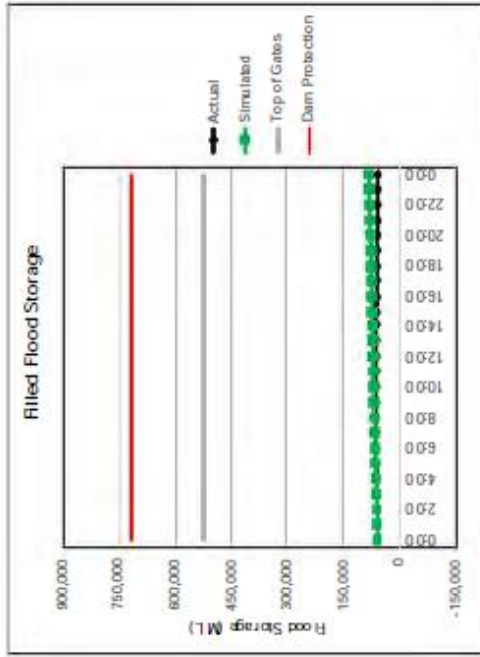
Wivenhoe Dam 2010-11 Flood Operation/Simulation Analysis - Simulation F  
January 8

Time	Actual Operation			Simulated Operation			
	Lake Level m AHD	Total Inflow m <sup>3</sup> /s	Total Outflow m <sup>3</sup> /s	Lake Level m AHD	Storage Volume ML	Total Inflow m <sup>3</sup> /s	Total Outflow m <sup>3</sup> /s
Strategy	W1C to W1E			W4B			
1/08/2011 0:00	68.32	1312862	818	68.32	1312862	818	502
1/08/2011 1:00	68.34	1315190	1841	68.34	1315169	1779	814
1/08/2011 2:00	68.35	1316354	1624	68.36	1317546	1480	1124
1/08/2011 3:00	68.41	1323339	1246	68.36	1318032	1040	1125
1/08/2011 4:00	68.41	1323339	1622	68.37	1318400	1416	1126
1/08/2011 5:00	68.45	1327995	1135	68.36	1318035	929	1422
1/08/2011 6:00	68.46	1329159	1867	68.36	1317052	1660	1713
1/08/2011 7:00	68.48	1331487	2144	68.35	1316858	1937	1992
1/08/2011 8:00	68.52	1336176	1515	68.34	1315038	1309	2265
1/08/2011 9:00	68.55	1339718	1649	68.31	1311449	1444	2482
1/08/2011 10:00	68.56	1340899	1755	68.27	1307526	1550	2691
1/08/2011 11:00	68.59	1344441	1399	68.23	1302635	1194	2770
1/08/2011 12:00	68.60	1345622	1260	68.18	1296353	850	2764
1/08/2011 13:00	68.61	1346802	1530	68.12	1289985	1121	2756
1/08/2011 14:00	68.61	1346802	1799	68.07	1284580	1391	2747
1/08/2011 15:00	68.63	1349164	1581	68.03	1279318	1174	2740
1/08/2011 16:00	68.64	1350345	1418	67.98	1273399	1012	2734
1/08/2011 17:00	68.65	1351525	1227	67.92	1266872	822	2726
1/08/2011 18:00	68.65	1351525	1255	67.86	1260086	851	2717
1/08/2011 19:00	68.65	1351525	1255	67.80	1253385	852	2708
1/08/2011 20:00	68.65	1351525	1255	67.74	1246576	853	2780
1/08/2011 21:00	68.65	1351525	1282	67.68	1239708	882	2770
1/08/2011 22:00	68.65	1351525	1091	67.62	1232588	693	2760
1/08/2011 23:00	68.65	1351525	899	67.54	1224819	502	2750
1/09/2011 0:00	68.64	1350345	926	67.47	1216727	531	2778
Totals (ML)		35,428	127,415		-99,610	101,116	200,726
Change (ML)							



Somerset Dam 2010-11 Flood Operation/Simulation Analysis - Simulation F  
January 8

Time	Actual Operation			Simulated Operation		
	Lake Level m AHD	Storage Volume ML	Total Inflow m <sup>3</sup> /s	Lake Level m AHD	Storage Volume ML	Total Inflow m <sup>3</sup> /s
Strategy	S2	S3				
10/8/2011 0:00	100.31	438408	526	100.31	438408	526
10/8/2011 1:00	100.34	439639	538	100.34	439693	538
10/8/2011 2:00	100.36	440794	560	100.37	441298	560
10/8/2011 3:00	100.39	442225	394	100.40	442904	394
10/8/2011 4:00	100.41	443180	328	100.43	444204	328
10/8/2011 5:00	100.42	443657	328	100.46	445384	328
10/8/2011 6:00	100.43	444134	427	100.48	446743	427
10/8/2011 7:00	100.44	444611	350	100.51	448141	350
10/8/2011 8:00	100.46	445565	196	100.53	449122	196
10/8/2011 9:00	100.46	445565	196	100.55	449823	196
10/8/2011 10:00	100.46	445565	129	100.56	450401	129
10/8/2011 11:00	100.45	445088	229	100.57	451038	229
10/8/2011 12:00	100.45	445088	347	100.59	452065	347
10/8/2011 1:00	100.45	445088	281	100.62	453183	281
10/8/2011 2:00	100.44	444611	203	100.63	454038	203
10/8/2011 3:00	100.43	444134	203	100.65	454750	203
10/8/2011 4:00	100.41	443180	302	100.67	455636	302
10/8/2011 5:00	100.40	442702	203	100.69	456520	203
10/8/2011 6:00	100.39	442225	203	100.70	457221	203
10/8/2011 7:00	100.37	441271	291	100.72	458077	291
10/8/2011 8:00	100.36	440794	280	100.74	459068	280
10/8/2011 9:00	100.35	440317	280	100.76	460035	280
10/8/2011 10:00	100.34	439839	269	100.78	460977	269
10/8/2011 11:00	100.33	439362	357	100.80	462052	357
10/8/2011 12:00	100.32	438885	357	100.82	463280	357
Totals (ML)		-238	27,997		26,061	27,997
Change (ML)			28,235			1,936



336 As appears from the columns headed “Actual Operation”, the peak inflow (at 07:00) on January 8 was 2,144m<sup>3</sup>/s, and the highest level of outflow was

1,242m<sup>3</sup>/s. By contrast, the peak inflow under simulation F was 1,937m<sup>3</sup>/s, also reached briefly at 07:00; at that point the outflow started to exceed the inflow, and continued to exceed it for the rest of the day, the final reading providing an outflow some five times greater than the inflow. The result was a net outflow over 24 hours of 100,000MI as compared with an actual increase in volume of 35,000MI. (The inflows under the simulated operation were lower than the actual inflows because Dr Christensen reduced outflows from Somerset Dam by some 26,000MI.)

337 In fact, Wivenhoe recorded an inflow at 08:00 on 10 January of 10,100m<sup>3</sup>/s and a peak inflow at 13:00 on 11 January at 11,600m<sup>3</sup>/s. The peak outflow was 7,460m<sup>3</sup>/s on 11 January at 19:00.

338 Although the calculations appear not to have been undertaken on this basis, given the purpose of mitigating flooding in the Brisbane River below Wivenhoe, the peak inflow at any point in time should have covered both the Wivenhoe and Somerset catchments. So as not to double count (outflow from Somerset being included in inflow into Wivenhoe), the calculation should have been undertaken on the basis of a net inflow into Somerset. (That figure could be negative if the outflow from Somerset into Wivenhoe exceeded the inflow into Somerset.) Further, although the focus in attempting to understand the general proposition articulated in the Manual was on prediction of inflows, little attention appears to have been given to concept of “peak outflow”, nor as to possible temporal elements. The assumption based on an actual “peak inflow” appears to have been that the releases could not rise above that peak at any time. However, having regard to temporal factors, if the peak inflow at any point permitted outflows which caused significant flooding downstream, to continue those outflows for a significantly longer period than the peak of the inflows might equally be thought inconsistent with the objective of flood mitigation.

339 Seqwater submitted that because the Manual was at least unclear as to what was intended, a range of opinions was available. As the primary judge noted, three understandings were advanced, namely (i) peak inflow up to the point in time where releases were being made; (ii) the higher of the peak inflow up to

that point in time and a predicted inflow based on rain on the ground, and (iii) peak inflow based on the best forecast of future rainfall and streamflow information. Each construction being accepted by several witnesses, other than (iii) which was supported only by Dr Christensen, Seqwater submitted that the judge had been wrong to conclude that a flood engineer could reasonably construe the Manual only as mandating the use of the best available forecast of rainfall in determining “peak inflow”.

340 The judge accepted Dr Christensen’s view because, whilst Dr Christensen accepted the general principle or guideline that flood mitigation should not exacerbate the level of flooding by releasing water at a higher level than the peak of the natural flow of the river, he understood the Manual to allow for the risk of departure from that principle by use of predicted rainfall. There were benefits to be achieved by taking that course.

341 The reasoning of the primary judge that the Manual permitted, and may have required, use of rainfall predictions in considering in advance what would be the “peak inflow” during the flood event should be accepted. Nevertheless to take the further step of concluding that such a reading was not only reasonable, but was the only reasonable reading of the Manual was open to challenge. The views of the flood engineers themselves, as conveyed by their evidence, were not readily dismissed as a retrospective justification of the conduct undertaken during the flood event. The actual conduct tended to confirm that they held such views at the time of the January flood. The primary judge did not find otherwise. However, whether or not one could say that the alternative constructions of the Manual were unreasonable, it is not possible to describe them as constructions which no reasonable flood engineer could have adopted in the circumstances.

342 Grounds 10 and 11 should, to that extent, be upheld, although only as addressed in the written submissions, and not as formulated in the notice of appeal. That more limited finding is, however, sufficient in circumstances where the Court is satisfied that the standard provided by s 36(2) of the *Civil Liability Act* is engaged.

## 16. Operation of Somerset Dam – (grounds 14, 15)

### (1) Background

343 Somerset Dam is located on the Stanley River which flows from the ranges north of Wivenhoe in a south-westerly to southerly direction until it joins the Brisbane River. Somerset Dam long pre-dated Wivenhoe, construction having been commenced before but only completed in 1953. The dam was commissioned in 1956. Further, the structure of the dam differed in significant respects from that of Wivenhoe. It had a fixed crest at 100.45m AHD on which were situated eight radial crest gates, giving a total crest level at 107.45m with the gates shut. The crest operated as a spillway with a width of 135.33m. In a flood event, the crest gates could be raised so that the water simply flowed over the crest: unlike Wivenhoe, overtopping was an intended operation in times of flood, and did not threaten the structure of the dam.

344 Water could also be released through eight sluice gates (and four smaller regulators) which are low down in the dam wall and well below the Full Supply Level (99m). The discharge from the regulators and the sluices increased significantly as the dam level increased. Thus, as revealed in Appendix D to the Manual, the discharge per sluice at 90.0m was 163m<sup>3</sup>/s, whereas at 105.0m, the discharge was 223m<sup>3</sup>/s. There was no significant discharge from the crest gates until the dam level reached 101.0m, at which stage the total discharge was a very light 32m<sup>3</sup>/s across the whole spillway. By the time the level reached 105m, the spillway discharge was 1,212m<sup>3</sup>/s. It became the dominant partner when the level was between 106m and 106.5m.

345 At 00:00 on 2 January, the lake level was at 99.07m, that is some 7cm above FSL. At that stage there was a minimal outflow of 34m<sup>3</sup>/s. The inflow was, for most of 2 January, approximately twice the level of the outflow. As a result, by 00:00 on 3 January the dam level had risen to 99.17m. Subject to some variations, it rose slowly over the next four days, to reach 99.52m at 00:00 on 7 January. After significant inflows on 7 January the level reached 100.01m at 16:00 on that day, and the sluice gates were partly opened. However, the dam level continued to rise slowly to 100.46m at 08:00 on 8 January. By 09:00 on



9 January the level had fallen slightly to 100.28m, at which stage the inflows exceeded 1027m<sup>3</sup>/s.

- 346 The Manual identified the broad flood operation strategies for Somerset as follows:

### **“9.3 Flood Operation Strategies**

There are three strategies used when operating Somerset Dam during a flood event as outlined below. These strategies are based on the Flood Objectives of this manual. The strategy chosen at any point in time will depend on predictions of the maximum storage levels in Wivenhoe and Somerset Dams which are to be made using the best forecast rainfall and stream flow information available at the time.

Strategies are likely to change during a flood event as forecasts change and rain is received in the catchments. It is not possible to predict the range of strategies that will be used during the course of a flood event at the commencement of the event. Strategies are changed in response to changing rainfall forecasts and stream flow conditions to maximise the flood mitigation benefits of the dams.”

- 347 The Somerset flood strategy flow chart was devised by reference to predicted levels in Wivenhoe. First, if Wivenhoe were not likely to exceed its FSL, Strategy S1 was to be adopted; if Wivenhoe were likely to exceed its FSL but initiation of the fuse plugs were not likely, Strategy S2 was to be adopted. If fuse plug initiation were likely, the prescribed strategy was S3.

- 348 The focus of Strategy S1 was to minimise impact on rural life upstream from the dam and was to apply where Somerset was expected to exceed its FSL (99.0m) and Wivenhoe Dam was not expected to reach 67.0m (its FSL) during the course of the flood event. Because in early January Wivenhoe was always at or above 67.0m, S1 was not engaged at any stage. However, it is convenient to note the direction contained in S1, namely:

“The crest gates at Somerset Dam are raised to enable uncontrolled discharge. The Regulator Valves and Sluice gates are to be used to maintain the level in Somerset dam below EL 102.0 (deck level of Mary Smokes Bridge). The release rate from Somerset Dam is not to exceed the peak inflow into the dam.”

(Mary Smokes Bridge was upstream from the dam.)

349 Strategy S3 envisaged possible fuse plug initiation at Wivenhoe, which, for reasons discussed above, was not likely either on 2 January or 8 January 2011. Strategy S3 may, for present purposes, be disregarded. Accordingly, the relevant strategy at material times was S2. The purpose of that strategy was to “[m]inimise impacts below Wivenhoe Dam”, according to the title of the strategy. However, after setting out the conditions noted above, the strategy continued, in bold typeface:

**“The intent of this strategy is to maximise the benefits of the flood storage capabilities of the dam while protecting the structural safety of both dams. The table below contains the operating conditions and actions for Strategy S2.”**

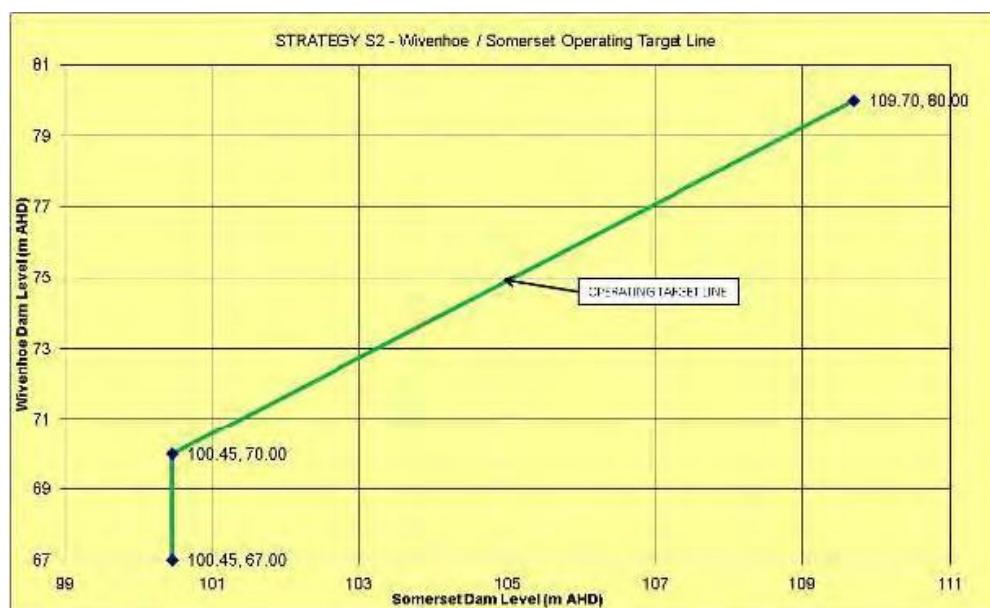
350 The box containing appropriate actions was divided into four parts. The three relevant parts were as follows:

CONDITION	ACTION
Wivenhoe rising and Somerset level below EL 100.45.	The crest gates are raised to enable uncontrolled discharge. The low level regulators and sluices are generally kept closed.
Wivenhoe rising and Somerset level above EL 100.45.	The crest gates are raised to enable uncontrolled discharge. Operations are to target a correlation of water levels in Somerset Dam and Wivenhoe Dam as set out in the graph below. The operations target line shown on this graph is to generally be followed as the flood event progresses. The release rate from Somerset Dam is generally not to exceed the peak inflow into the dam.
Wivenhoe falling and Somerset level above EL 100.45	The opening of the regulators and sluices generally should not cause Wivenhoe Dam to rise significantly. The release rate from Somerset Dam is generally not to exceed the peak inflow into the dam.

351 The third part was not engaged because at no relevant time was Wivenhoe falling, and a fourth part (also not engaged) concerned a flood event which emanated mainly from the Stanley River catchment without significant runoff from the Upper Brisbane Catchment (which fed directly into Wivenhoe). However, in each of the second, third and fourth boxes, the same constraint was noted, namely that the release rate was “generally not to exceed the peak inflow”.

352 As the conditions disclosed, the critical level in relation to Somerset was 100.45m, which was the fixed crest of the spillway, and the bottom of the crest gates. Even with the crest gates raised, and Somerset below that level, there would be no outflow if the regulators and sluice gates were closed. Once the level exceeded 100.45m, with the crest gates raised, there would be an “uncontrolled discharge”, although the volume would be small unless the level continued to rise. Strategy S2 was silent as to whether the regulators and sluices may be opened, in contrast to the requirement that they were “generally kept closed” when the level was below 100.45m. However, the fourth part expressly stated that the valves and sluice gates were to be used to maintain the level below 102.0m, even while the crest gates were raised, the purpose being to protect the upstream bridge.

353 Between 2 January and 6 January, as noted above, the level of Somerset was at all times below 100.45m. With the regulators and sluices closed, there would be no outflow into Wivenhoe. Further, the “operations target line” would not be engaged. However, because Somerset later rose above 100.45m, the engineers had regard to the operating target line and the relevant part of the Manual should therefore be set out.



Notes:

- The Operating Target Line was selected following an optimisation study. The Target Line was selected based on the following factors:
  - o Equal minimisation of flood level peaks in both dams in relation to their associated dam failure levels.
  - o Minimisation of flows in the Brisbane River downstream of Wivenhoe Dam.
  - o Consideration of the time needed at the onset of a Flood Event to properly assess the magnitude of the event and the likely impacts, so that the likely optimal strategy to maximise the Flood Mitigation benefits of the storages can be selected.
- The levels of 109.70m AHD and 80.00m AHD represent the likely failure level for Somerset Dam and the level at the top of the Wivenhoe Dam Wave Wall respectively. Note that the failure level of 109.70m AHD for Somerset Dam assumes all radial gates are fully open and this failure level will be reduced if this cannot be achieved.
- The target point on the operating target line at any point in time is based on the maximum storage levels in Wivenhoe and Somerset Dams using the best forecast rainfall and stream flow information available at the time.
- Gate operations will enable the movement of the duty point towards the target line in a progressive manner. It will not necessarily be possible to adjust the duty point directly towards the target line in a single gate operation.

354 The operating target line apparently allows for the level of the dam to increase to 109.7m which is treated as the “likely failure level”. The notes state that this level is only achieved when the crest gates are fully open; it may be inferred that the top of the radial crest gates will rise to that level when open. Thus the failure level is reduced if full opening cannot be achieved.

355 The issue in dispute between the parties turned on the fact that the flood engineers opened the sluice gates in increments after the level at Somerset reached 100.06m, before the beginning of the target line at 100.45m. Thereafter, the level of the dam steadily rose (inflows exceeding outflows) until 06:00 on 12 January when the level peaked at 105.11m. At that stage Wivenhoe was at 74.77m, a little below its peak on 11 January (74.97m).

(2) *Issues at trial*

- 356 A significant issue at the trial was whether the statement in the first part of strategy S2 (with Wivenhoe rising and Somerset below 100.45) that regulators and sluices “are generally kept closed” involved a general prohibition or merely a guideline. The plaintiff’s case in this regard was somewhat obscure. Dr Christensen in simulation C would have opened the sluice gates when the lake level was at 99.07m (on 2 January) so as to release 200m<sup>3</sup>/s for approximately 24 hours from 2-3 January and then would have recommenced releases in excess of 130m<sup>3</sup>/s on 5 January. The effect of these releases would have been to lower the dam level below FSL and maintain it below FSL until 17:00 on 9 January, when the actual level was 101.14m, some 2m above FSL.
- 357 For reasons set out above, there was no negligence on the part of the flood engineers in failing to reduce the levels in either dam below FSL. Accordingly, the steps taken in that regard by Dr Christensen were not those required for the reasonable operation of Somerset Dam in the interests of downstream residents.
- 358 More importantly, if Dr Christensen considered it permissible under S2 to use the sluice gates to lower the dam level, it is unclear on what basis the plaintiff argued that use of the sluice gates during that period was not open to the flood engineers acting reasonably.
- 359 The gravamen of Rodriguez’ case appears to have been that the flood engineers belatedly released too great a volume of water, thus increasing the level at Wivenhoe with consequences for the level of releases required from that dam. However, there were two answers to that case. The first was that higher levels of outflow were required in order to achieve a similar dam level when the heavy rains came as was achieved under Dr Christensen’s models. If there were no negligence in the flood engineers starting with a higher dam level (because they did not drop the level below FSL) there was no obvious negligence in their higher discharges at a later point in time which were a necessary consequence of the higher starting level.

360 Secondly, that the higher discharges were achieved by opening sluice gates could not be the subject of complaint in circumstances where Dr Christensen considered that an appropriate course. No other witness supported negligence in this respect.

361 On the assumption that, as discussed above, there was no negligence in terminating the flood event on 2 January, the question of releases from Somerset, in accordance with Strategy S2, could not arise until the further flood event was declared on 6 January 2011.

362 Dr Christensen’s simulation F, commencing at 00:00 on 8 January, started with the actual lake level at 100.31m. His description of the strategy adopted was, “[b]egin operation under S3 strategy, constrained to keep gates open”. He presumably felt so constrained because Strategy S3 proposed steps “[i]n addition to the operating protocols used in Strategy S2” which, as noted above, required the crest gates to be raised, even where the dam level was below 100.45m. However, despite the fact that the dam level had exceeded 100.45m by 05:00 on 8 January, Dr Christensen worked on the assumption that there was no measurable outflow for the rest of the day (459MI). With an inflow of 28,000MI, the dam level rose to 100.82m at midnight.

(3) *Issues on appeal*

363 Grounds 14 and 15 read as follows:

“The primary judge erred in construing, and or alternatively in holding that a reasonably competent engineer in the position of the flood engineers during the January 2011 Flood Event would have construed, the Manual on the basis:

...

14 that the first box in Strategy S2 in section 9.3 of the Manual does not amount to a general prohibition to keep the low-level regulators and sluices closed when Wivenhoe Dam is rising and Somerset Dam is below 100.45m AHD ([Ch] 9 [365]); and

15 that the Manual does not necessarily require the conduct of flood operations along the Operating Target Line in section 9.3 of the Manual and instead, the Manual allows flood operations in a way that materially deviates from the Operating Target Line ([Ch] 3 [88]-[89], ...; [Ch] 7 [383] ...; [Ch] 8 [118]-[131]...; [Ch] 9 [360]-[363] ... [Ch] 10 [40] ...).”

- 364 Although these grounds took issue with the reasoning of the primary judge in accepting Dr Christensen's approach in respect of simulations C and F, there is substance in Rodriguez' submission that the issue goes to causation only. There appears to be no relevant finding that the engineers were negligent in their operation of Somerset Dam on 8 January. While the judge noted the pleaded allegation that the reasonably prudent flood engineer should, on 8 January 2011, "have implemented and maintained Strategy S3 at Somerset Dam" and "would not have substantially increased the rate of inflow from Somerset Dam without implementing a corresponding increase in the rate of outflow from Wivenhoe Dam",<sup>120</sup> the judge nevertheless found a breach in the broader terms that the engineers should have caused Wivenhoe to release water at rates exceeding the inflows: Ch 12 [156]-[157]. There was a finding that Mr Malone was negligent in failing to release water from Somerset at a rate exceeding inflows;<sup>121</sup> Somerset was 7cm above its FSL at the start of 2 January, but net inflows were a mere 30m<sup>3</sup>/s on average that day. The specific allegations in pars 211(c) and (e) of the statement of claim were rejected.
- 365 In substance simulation F sought to reduce outflows on 8 January to allow the water level in Somerset Dam to rise, but the result was to require greater releases in later days, as indeed simulation F permitted. The primary judge accepted Dr Christensen's explanation that this approach was beneficial, but it is by no means clear why that was so. By allowing the dam level to rise above 105m on 10 and 11 January, as opposed to the engineers' height of about 103m, Dr Christensen was able to maintain outflows well below those in fact released up until 07:00 on 11 January when the engineers significantly reduced outflows and Dr Christensen started to increase them. Accepting that Dr Christensen's approach, commencing on 8 January, was reasonable in the circumstances, it does not follow that the operations by the engineers were unreasonable. In terms of causation, no attempt was made in this Court to explain how and to what extent the adoption of simulation F would have

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<sup>120</sup> *Rodriguez (22)*, Ch 12 [145], par 288 (c) and (e) of the statement of claim.

<sup>121</sup> *Rodriguez (22)*, Ch 12 [67], referring to the pleading at par 211(e) set out at Ch 12 [21].

lessened the releases from Wivenhoe, with consequential benefits for downstream flows.

366 In broad terms, Dr Christensen's course of action depended on the fact that, although conditions were benign on 8 January, the 4-day forecasts predicted heavy rain to come. His proposal was to lower the level of Wivenhoe as far as possible without causing downstream inundation prior to the inflows from the heavy rain, and maintain as much rain as possible in Somerset, to be released after the rain (and presumably peak inflows) had passed. This strategy appeared to be based on a degree of speculation as to when the rain would fall in the Somerset catchment as compared with the Wivenhoe catchment and when levels would peak in each dam. Avoiding hindsight, that was similar to the problem in predicting whether the heaviest rain would fall closer to the coast, and below Wivenhoe but in the Lockyer and Bremer catchments, or would fall above the dams. However, as a matter of practice, and as reflected in the pleadings, the overall question was how to flatten the releases from Wivenhoe so that they took place over a longer period and thus achieved a lower peak downstream.

367 The primary judge found a breach of duty on the part of Mr Malone on 9 January in failing to ensure that the rate of outflow from Wivenhoe "substantially exceeded the rate of outflow from Somerset": Ch 12 [181]. Again, the degree of particularity in the pleading of breaches created artificiality in the assessments of breach which distracted attention from the overall picture. Thus, during the high inflow periods of 9 and 10 January, 82% of the inflow to Wivenhoe came from the catchments above the dam, other than Somerset, and only 18% of the inflow came from Somerset. If there should have been further releases from Wivenhoe at or before that time, that was because other inflows caused the bulk of the rise in the dam level. While it is true to an extent that the inflow from Somerset was controllable, to treat the Wivenhoe releases as entirely referable to the Somerset inflow, in order to calculate how much should be attributed to other inflows was not an informative exercise.



368 Further, the exercise did not have regard to the operating target line which was designed to determine the basis on which releases should be made. Its purpose was expressly stated to be to minimise the flood peaks in both dams having regard to their storage capacities, and to minimise flows downstream of Wivenhoe.<sup>122</sup> Although the target line was specified under Strategy S2, it was only appropriate to move into Strategy S3 when the structural safety of Wivenhoe was under threat. That permitted temporary departure from S2. Whether fuse plug initiation at Wivenhoe was ever expected depended on whether releases from Wivenhoe were being considered.

369 At *Rodriguez (22)*, Ch 10 [37], the judge mapped the actual levels of the dams and the levels proposed under simulation F, against the operating target line. The actual dam levels achieved by the engineers were at all stages between 8 and 12 January significantly closer to the operating target line than those proposed under simulation F. The judge addressed the criticism that this was a departure from the requirement of the Manual in the following terms:

“[40] I have already found that the relevant part of S2 that engages the Operating Target Line is not invoked unless both Wivenhoe Dam is rising and Somerset is above the level of EL 100.45m AHD.<sup>123</sup> Under SIM F and SIM H, that point was not reached until around 4.00pm on 9 January 2011 when Somerset Dam would have been at EL 102.14m AHD.<sup>124</sup> At that point, both rain on the ground inflows and forecast inflows for both dams were increasing. As noted, the provisions in the Manual concerning the Operating Target Line allow temporary movement away from the target line. As the simulated inflows into Somerset Dam increased, the rate of uncontrolled spillage from Somerset Dam above EL 100.45m AHD would have increased rapidly, causing the line to angle upwards as it did. In those circumstances, I am satisfied that a reasonably competent flood engineer would continue to store water in Somerset Dam via keeping the sluice gates closed in the knowledge that uncontrolled spillage above EL 100.45m AHD would align dam levels with the Operating Target Line as the flood event progressed.”

370 While it was true that one of the conditions in S2 was not engaged until Wivenhoe was rising, Wivenhoe had in fact been rising gently from 2 January until 8 January, with the largest inflow on 7 January. For a period on 8 January

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<sup>122</sup> See [353] above.

<sup>123</sup> Manual at 40.

<sup>124</sup> Simulation Analysis, EXP.ROD.015.0461 at .0931 to .0932, .0938.

the outflows exceeded the inflows, but unless the engineers were expected to shift from one strategy to another and back again over a matter of a few hours, that was a minor point which could not entail negligence. The rest of the explanation was a justification for permitting the actual levels to move away from the target line: that course may have been justified, but it did not demonstrate that by adhering to the target line more strictly than Dr Christensen did the engineers were therefore negligent. One might have anticipated the reverse conclusion, consistently with other findings in relation to departures from the Manual. It is sufficient to conclude that there was no basis for a finding of negligence (on the ordinary standard) with respect to the manner in which the engineers operated Somerset releases between 8 and 12 January 2011.

371 In dealing with questions of liability, it may be correct that grounds 14 and 15 are immaterial and may be disregarded. However, the findings of negligence based on them cannot be sustained; it follows that the findings cannot be upheld on the s 36(2) standard. To the extent that they form part of the underpinning to the finding of negligence on the part of Mr Malone in the operation of releases from Somerset on 9 January, grounds 14 and 15 should be upheld.

#### 17. Role of Senior Flood Operations engineer – (ground 3)

372 Ground 3 took issue with the judge’s conclusion that the Manual conferred on the Senior Flood Operations Engineer a position in a hierarchy above that of the Duty Flood Operations engineers for only a limited purpose. Ground 3 stated:

“The primary judge erred in holding that:

...

3 pursuant to Revision 7 of the Manual of Operational Procedures for Flood Mitigation at Wivenhoe Dam and Somerset Dam (**Manual**), the role of the senior flood operations engineer (**SFOE**) was limited simply to setting an overall or general strategy and that the duty flood operations engineer (**FOE**) was required to act independently of the strategy set by, and any instructions of, the SFOE ([Ch] 3[324]-[326] ...).”

373 The existence of the suggested hierarchy arose from both the use of the title “Senior” and the specific provisions in sections 2.3 and 2.4 of the Manual. Section 2.3 required the nomination of a suitably qualified person by Seqwater, to be approved by the Chief Executive, and continued:

“When rostered on duty during a Flood Event, the responsibilities of the Senior Flood Engineer are as follows:

- Set the overall strategy for management of the Flood Event in accordance with the objectives of this Manual.
- Provide instructions to site staff to make releases of water from the Dams during Flood Events that are in accordance with this Manual.
- Apply reasonable discretion in managing a Flood Event as described in Section 2.8.

Seqwater must ensure that an adequate number of Senior Flood Operations Engineers are available to manage all Flood Events.”

374 Section 2.4 dealt with the responsibilities of flood operations engineers and required that, when rostered on duty, they were to “[d]irect the operation of the dams during a flood event in accordance with the general strategy determined by the Senior Flood Operations Engineer” and were to “[f]ollow any direction from the Senior Flood Operations Engineer in relation to applying reasonable discretion in managing a flood event as described in Section 2.8.” Section 2.8, headed “Reasonable Discretion”, commenced as follows:

“If in the opinion of the Senior Flood Operations Engineer, it is necessary to depart from the procedures set out in this Manual to meet the flood mitigation objectives set out in Section 3, the Senior Flood Operations Engineer is authorised to adopt such other procedures as considered necessary ....”

That step was conditioned upon the Senior Flood Operations Engineer taking steps to consult with the Chairperson of Seqwater and the Director General of the Department.

375 The senior flood engineer during the January flood event was Mr Ayre, who was employed by SunWater. The judge noted that Seqwater and the State each sought to “deflect any or some responsibility they may have for their

conduct of flood operations by asserting that they were acting in accordance with Mr Ayre's direction": Ch 3 [319].

- 376 To the extent that there was some departure from the procedures under the Manual, that could only have followed from an exercise of discretion by Mr Ayre. The primary judge saw some difficulty in the suggestion that a general or overall strategy could be set at the outset of a flood event which would require flood engineers to act contrary to the requirements of the Manual as events unfolded: Ch 3 [324]-[327]. Seqwater challenged this reasoning.
- 377 The primary judge returned to the question of Mr Ayre's authority in other contexts. Thus, the judge found that Mr Malone's rainfall analysis failed to provide "any justification for any failure to continue the flood event or declare a new flood event during the period 3 to 5 January 2011": Ch 6 [143]. He then noted a submission that Mr Ayre had authority to "direct Mr Malone to continue the flood event from 2 January 2011 or declare a flood event himself." However, the judge accepted the submission of SunWater that Mr Ayre had no such authority: Ch 6 [144]. The judge read the powers conferred on the senior flood engineer by section 2.3 as only available when that engineer is "rostered on duty during a Flood Event." Thus the senior flood engineer had no power to direct Mr Malone not to terminate the December flood event whilst it was still ongoing, unless he was at that moment rostered on duty himself.
- 378 That might be thought a surprising conclusion. At an earlier point, the judge had noted that cl 2.2 of the Manual stated that a senior flood operations engineer is designated "to be in charge of Flood Operations at all times *during a Flood Event*": Ch 6 [145]. In fact, Mr Ayre was himself on duty on the evening of 1 January 2011 and the morning of 2 January 2011, and, as the judge observed, had "the capacity to take action to have the flood operations engineer rostered on duty comply with the Manual": Ch 6 [67]. The finding that Mr Ayre "joined in the consensus to end flood operations", was not a finding which denied the senior flood operations engineer the power and authority to direct a different outcome.

379 The issue is, however, primarily relevant to the application of s 36(2) and apportionment of liability for damages, which are addressed below. Mr Ayre's employer, SunWater, took no relevant part in the appeal and it is neither necessary nor appropriate to make findings beyond those necessary to dispose of the issues which remain alive on the appeal between Seqwater and Rodriguez.

**18. Breaches of duty – Rodriguez' application to rely on s 36(2)**

(1) *Identifying the issues*

380 The important conclusions from the foregoing analysis are that:

- (1) the standard of negligence by which Seqwater's liability should have been tested was that provided by s 36(2) of the *Civil Liability Act*; and
- (2) there was no breach of duty on the part of Seqwater's flood engineers in:
  - (a) not reducing dam levels below FSL; and
  - (b) not determining the appropriate strategy on the basis of a "no release" assumption.

The consequence of these conclusions is that critical findings of breach must be set aside, unless they can be upheld on the s 36(2) standard. In the absence of a notice of contention, supported by appropriately detailed submissions, such an alternative basis of liability could not be addressed, in fairness to the appellant.

381 On the second last day of the hearing, the Court granted Rodriguez leave to contend that "the acts or omissions found by the primary judge to constitute breaches of duty for which the appellant was liable were, in the circumstances, so unreasonable that no public or other authority having the functions of [Seqwater] could properly consider those acts or omissions to be a reasonable

exercise of its functions for the purposes of s 36(2)".<sup>125</sup> The Court's reasons for making that order follow. It then remains necessary to consider the acts or omissions found by the primary judge to constitute breaches of duty for which Seqwater was liable, because it was those acts and omissions to which Rodriguez' contention 3 was directed. As will appear, they did not include Mr Malone's alleged breaches of duty on 2 January in bringing the December Flood Event to an end and by failing on 3, 4 and 5 January to declare a further flood event and make releases to reduce the level of Wivenhoe below FSL.

(2) *Rodriguez' application to rely on s 36(2)*

382 The primary judge determined that s 36 did not apply, and refrained from determining whether, if he were wrong about that, the flood engineers' acts or omissions were so unreasonable that no public or other authority having the functions of Seqwater could properly consider them to be a reasonable exercise of its functions: Ch 1 [88].

383 At the forefront of Seqwater's appeal was its challenge to the determination that s 36 was inapplicable. This was the first ground of its notice of appeal. Seqwater's written submissions in support of its appeal were dated 22 June 2020, 11 months before the hearing. Seqwater maintained at the outset of those submissions that not only did s 36 apply, but further that "the first respondent never sought to plead, nor run, a case against Seqwater based on this higher standard [namely, that imposed by s 36(2)]" (par 1.16). That was developed at the conclusion of Seqwater's submissions on ground 1:

"Section 36 identifies the standard to be applied in determining whether there was a breach of any relevant duty of care. The first respondent's case below was simply that s 36 of the CLA was not engaged; the first respondent did not plead, or attempt to prove, an alternative case to the effect that if, contrary to its primary position, s 36 was engaged the relevant standard had been met. Since for the reasons set out above s 36 did apply to the proceedings below, it follows that the case against Seqwater fails in its entirety." (footnotes omitted).

384 Rodriguez' written submissions of 144 pages were dated 18 December 2020. Rodriguez sought to defend the primary judge's reasons on the question of the

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<sup>125</sup> Notice of contention, par 3.

applicability of s 36, save that it challenged the judge’s conclusion that the section was not confined to claims for breach of statutory duty, and advanced reasons additional to those on which his Honour had relied. Rodriguez also maintained a fallback submission:

“Finally, even if s 36 applies, the evidence before the primary judge overwhelmingly suggests that the requisite standard in s 36(2) is satisfied.”

385 That submission was developed at pars 46-50 of its written submissions, which should be reproduced in their entirety in light of the Court’s ruling on 28 May 2021 on the notice of contention:<sup>126</sup>

“46 Even if, contrary to the above submissions, it is held that s 36(1) does apply in present circumstances, the Flood Engineers’ conduct, which on this view would be attributable to Seqwater, nonetheless constituted a wrongful exercise or failure to exercise Seqwater’s functions. For the reasons that follow, the Flood Engineers’ conduct was so unreasonable that no public or other authority having Seqwater’s functions could have properly considered that conduct to be a reasonable exercise of its functions.<sup>127</sup>

47 It is incontrovertible that the Flood Engineers were required to follow the Manual. As the primary judge relevantly found (Ch 3 [2]; Ch 1 [47]):

‘[a]bout the only matter that all the experts across a variety of disciplines agreed upon was the necessity for flood engineers to follow the Manual during flood operations save for the possibility of following its own procedures for departure from its requirements when the safety of the dams is threatened.’

48 Yet, in flagrant contradiction to the Manual:

- a) Mr Malone failed to continue the existing Flood Event or declare a new Flood Event between 2 and 6 January 2011 (Ch 1 [61]; Ch 6[52]-[81]);
- b) the Flood Engineers sought to avoid bridge closures at the “expense of guarding against the risk of urban inundation” (Ch 1 [62]; Ch 6 [211], [255]-[267]);
- c) to the extent that the Flood Engineers were following any flood strategy for Wivenhoe Dam, it was Strategy W1 when it ought to have been Strategy W3 (Ch 1 [64]; Ch 7 [94]-[105], [210], [254]-[260]);

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<sup>126</sup> The abbreviations have been changed to accord with the formula noted in [3] above.

<sup>127</sup> Submissions to this effect were made before the primary judge: trial tcpt 75(46)-76(4); 9429(10)-9430(4); and 9439(6)-(17).

- d) the Flood Engineers operated on the basis that over-the-floor flooding level would result from combined flows at Moggill of 3,500m<sup>3</sup>/s when the relevant level in the Manual was 4,000m<sup>3</sup>/s (Ch 1 [65]; Ch 7 [328]-[336]);
  - e) the Flood Engineers did not determine the applicable flood strategy based on a predicted storage level of the dams, let alone a predicted storage level where the prediction was based, in part, on the best available rainfall forecast information available (Ch 1 [66]); and
  - f) the Flood Engineers adopted an approach that underestimated the amount of water that needed to be evacuated and overestimated the capacity of the dams to release water beyond a 12-15 hour period (Ch 1 [67]; Ch 7 [469]-[470]).
- 49 One of the primary judge's overarching observations was that the above failings of the Flood Engineers did not concern decisions that they had made in the heat of the moment. Instead, the primary judge expressly noted that the identified failings derived from (Ch 1 [68]):

‘a failure of approach, specifically a failure to follow the very Manual [the Flood Engineers] had drafted or participated in drafting almost 18 months previously’.

It may be added that the relevant failure was not limited to a departure from the Manual in some singular and limited respect. The Flood Engineers persistently failed to apply numerous provisions of the Manual, including its most basic requirement of continuing (or declaring) a Flood Event when the circumstances plainly required it.

- 50 In these circumstances, where the evidence established that the ‘fundamental requirement of a flood engineer was to follow the relevant water control manual during flood operations’ (Ch 11 [232]), the conclusion follows that the failure of the flood engineers to follow the Manual was so unreasonable that no public or other authority having Seqwater's functions could have properly considered that conduct to be a reasonable exercise of its functions. The conduct, to the extent that it can be attributed to Seqwater, constituted a wrongful exercise or failure to exercise Seqwater's functions.”

386 As the primary judge refrained from making a finding in relation to the standard set by s 36(2), Rodriguez' fallback submission contended that the judgment should be affirmed on a ground which was not part of his Honour's reasons. On any view, this was a matter for a notice of contention. Rodriguez made no submission to the contrary. UCPR r 51.40(1) provides:

**Notices of contention**

- (1) A respondent who wishes to contend that the decision below should be affirmed on grounds other than those relied on by the court below, but



does not seek a discharge or variation of any part of the orders of the court below:

- (a) need not file a notice of cross-appeal, and
- (b) must, within 28 days after service on the respondent of the notice of appeal, file and serve on each interested party notice of that contention stating briefly, but specifically, the grounds relied on.

387 The notice of contention should have been supplied by late July 2020. It was a point of substance, especially in an appeal of this magnitude, given that it involved further fact-finding, which in turn would potentially involve consideration of the evidence bearing upon breach. The directions governing the preparation of these appeals for hearings required the parties to include in physical appeal books those documents to which reference was made or was expected to be made in written or oral submissions, supplemented by other documents to be made available electronically. The result was that only a tiny fraction of the material tendered at trial and addressed at the hearings (the transcript was some 10,000 pages) was reproduced in the physical appeal books, and the appeal was largely conducted on the basis of the physical appeal books (although documents which had been tendered at trial but not reproduced in the physical appeal books were available electronically and from time to time relied upon). It is unrealistic for any practitioner to be able to remember in 2021 the entirety of the evidence of a very lengthy trial that stretched from 2017 to 2019, and occupied most of 2018; hence the significance of the selection of a small minority of documents for inclusion in the physical appeal books (which, even so, were somewhat more than 5,000 pages). Those considerations strengthen the importance of compliance with the rules in identifying the issues for determination on appeal.

388 Seqwater's submissions in reply were dated 9 April 2021, which is to say, five weeks before the hearing. Seqwater complained that two of Rodriguez' submissions should not be entertained without a notice of contention, but did not make that complaint about what was put forward in relation to s 36(2). Instead, Seqwater made the following submission:

**“Application of s 36.** The argument that s 36(2) was satisfied on the evidence was not pleaded by the first respondent. The first respondent served no evidence directed to the question posed by s 36. It was not addressed in the first respondent’s written closing submissions of some 500 pages. To suggest (RWS [46], n 32) that an unpleaded point was run below because it was fleetingly mentioned in passing in oral opening submissions, and then mentioned again briefly almost 10,000 pages of transcript later in oral closing submissions, must be rejected. Unsurprisingly, the primary judge did not consider or even [advert] to whether s 36(2) was satisfied on the evidence, let alone make a finding to that effect (in reasons that the first respondent describes as a ‘scrupulous and fair consideration and synthesis of all the submissions of all parties’ (RWS [2])). The argument cannot be now run on appeal. Even if it could be run, it would require the Court to engage in an extensive factual enquiry more involved than the two paragraphs advanced by the first respondent.

Further, the only basis for the submission is non-compliance with the Manual. Even if it was not complied with – which Seqwater challenges – that could not demonstrate *Wednesbury* unreasonableness. Compliance with the Manual would exonerate Seqwater from liability: *Safety and Reliability Act*, s 374(2) .... Noncompliance does not of itself demonstrate negligence, let alone *Wednesbury* unreasonableness.”

389 A footnote referred to *Suttor v Gundowda Pty Ltd*<sup>128</sup> and *Coulton v Holcombe*.<sup>129</sup>

The references to the opening and closing submissions were to the transcript references footnoted in Rodriguez’ submissions. They were fairly described as “fleeting” and “brief”. The point was mentioned but left undeveloped.

390 So far as is apparent from the materials available to this Court, there were no subsequent communications between the parties concerning s 36(2).

391 In opening the appeal on 17 May 2021, senior counsel for Seqwater maintained that reliance on the acts and omissions being unreasonable within the meaning of s 36(2) was a point which “needs to be pleaded if it is going to be run”<sup>130</sup> and continued after reference was made to brief references in opening and closing submissions:

“The judge, despite a judgment of some 1500 or 1600 pages, doesn’t advert to that matter, because it simply wasn’t pleaded, and if it was raised at all, it was in [a] very peripheral way ...”<sup>131</sup>

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<sup>128</sup> (1950) 81 CLR 418; [1950] HCA 35.

<sup>129</sup> (1986) 162 CLR 1; [1986] HCA 33.

<sup>130</sup> CA tcpt, 17/5/21, p 66(1).

<sup>131</sup> CA tcpt, p 78(30).

392 Ten days later, on 27 May 2021, the second last day of the hearing, at the conclusion of all other aspects of the appeal and the cross-appeal, senior counsel for Rodriguez applied for leave to rely on a notice of contention. The first two paragraphs maintained that the primary judge should have found that s 36 did not apply, because the proceeding was not based on the alleged wrongful exercise of a function of a public authority, or because the section only applied to breach of statutory duty. Seqwater consented to Rodriguez being able to advance those submissions.

393 The third paragraph of Rodriguez' notice of contention was:

“3 The primary judge should have:

- (a) found that, to the extent that this proceeding was based on an alleged wrongful exercise of or failure to exercise a function of a public or other authority for purposes of s 36(1) of the CLA, the acts or omissions found by the primary judge to constitute breaches of duty for which the Appellant was liable were, in the circumstances, so unreasonable that no public or other authority have the functions of the Appellant could properly consider those acts or omissions to be a reasonable exercise of its functions for purposes of section 36(2) of the CLA; and
- (b) answered Common Question 11, 'Yes' (Ch 15[13]).”

394 Seqwater opposed Rodriguez being granted leave to rely on the third paragraph of its notice of contention. It asked this Court to refuse the application, on two bases:<sup>132</sup>

“The first is that the respondent would not be permitted to agitate this issue on appeal in any event; the second is, even if, somehow, this point is available to be agitated in the appeal, given the circumstances in which this notice of contention has been filed or has been sought to be filed, your Honours would not grant that leave.”

395 The parties' submissions thereafter will be summarised below. At the commencement of the following day, this Court proposed the following ruling:

- “1. By consent, grant leave to the first respondent to rely on paragraphs 1 and 2 of its notice of contention dated 27 May 2021.

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<sup>132</sup> CA tcpt, p 829(5)-(10).

2. Grant leave to the first respondent to rely on paragraph 3 of its notice of contention, on the basis that:
  - (a) the first respondent's submissions in support are confined to those that have been made in writing at paragraphs 46-50 excluding 48(a) of its written submissions dated 18 December 2020;
  - (b) the contention does not involve the Court making any findings of primary fact additional to those made by the primary judge, but rather involves an evaluation of the conduct of the Flood Engineers in light of the circumstances which they faced;
  - (c) the conduct of the Flood Engineers relevant to the contention is that identified in paragraph 48(b)-(f), in the circumstances identified in paragraph 49 of the written submissions dated 18 December 2020."

396 Noting that that was an intermediate approach, the Court invited the parties to review the ruling during the course of the day, and granted them leave to advise of any concerns. At the conclusion of the hearing (and after the luncheon adjournment), both sides confirmed they did not wish to be heard further about the ruling on the notice of contention.

(3) *Reasons for ruling on notice of contention*

397 Our reasons for that ruling, which involved a rejection of both of Seqwater's submissions in opposition to the late filing of the notice, but also the imposition of a term restricting the use which Rodriguez could make of the notice, confined by reference to the written submissions, were as follows.

(a) *Section 36(2) was in issue at trial*

398 It was strictly correct for Seqwater to submit that Rodriguez had not pleaded s 36(2). But that reflected the unusual course taken by the pleadings.

399 Throughout its defence, Seqwater had invoked s 36, alleging not merely that it applied, but going further and alleging that "the Flood Engineers' acts and omissions were not so unreasonable that no public authority having Seqwater's functions could properly consider those acts or omissions to be a reasonable exercise of its functions" and accordingly by s 36 those acts and omissions were

not wrongful: see pars 299(c)(i) and (ii) in answer to the allegations of breach on 2 January 2011; later paragraphs adopted the same form.

400 It may very well have been, strictly speaking, unnecessary for Seqwater to allege the negative proposition that the acts were not sufficiently unreasonable, but for the plaintiff to contend that the case fell within the qualification or exception. Where it applies, s 36 sets the standard of care against which the defendant's acts or omissions fall to be assessed. That is the force of providing that the authority's acts or omissions are not a wrongful exercise or failure to exercise unless the unreasonableness standard has been made out. Accordingly, it might be thought that it was for Seqwater to plead that s 36 applied to the proceeding, but thereafter it was for Rodriguez to make out a breach of the unreasonableness standard, rather than for Seqwater to allege that its conduct had not been unreasonable within the meaning of s 36(2).

401 This background discloses a shortcoming in the way the issue was fought at trial. Had Rodriguez positively alleged that the flood engineers had been unreasonable within the meaning of s 36(2), the allegation would likely have been accompanied by particulars. Because Seqwater asserted the negative, and Rodriguez merely denied that assertion, no such particulars were provided. As Seqwater put it:<sup>133</sup>

“A bare denial in a reply, in our submission, does not articulate any sort of positive case to the effect that no public authority in Seqwater's position, or having its functions, could properly consider the act to be a reasonable exercise of its functions.”

402 Little weight should be placed on the absence of particulars of the denial in Rodriguez' reply. Where a denial involves in substance the setting up of a positive case, particulars may be ordered, as Kitto J explained in *George v Federal Commissioner of Taxation*.<sup>134</sup> In turn, Aickin J stated that there were “many situations in which the party who gives a general denial to the pleading of the party on whom the onus rests may none the less be required to give particulars if the general denial really involves some positive allegation”, and

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<sup>133</sup> CA tcpt, p 829(35)-(40).

<sup>134</sup> (1952) 86 CLR 183 at 190; [1952] HCA 21.

that this general principle was well established: *Bailey v Federal Commissioner of Taxation*.<sup>135</sup> Whether or not Seqwater requested particulars of the denial is not clear from the materials available to this Court.

403 It is unnecessary to express a concluded view as to whether, if s 36 applied, it was for Rodriguez to allege unreasonableness. What matters is that by its reply, Rodriguez denied each of Seqwater’s allegations invoking s 36(2). It follows that whether the acts or omissions of the flood engineers for which Seqwater was vicariously liable were unreasonable within the meaning of s 36(2) was in issue on the pleadings.

404 As much was confirmed by common questions 11 and 14(b), which were the subject of orders made on 14 September 2018. These were not initially relied upon by Rodriguez, but were raised by members of the Court during the application to rely on the notice of contention. Each question asked the primary judge to answer whether, inter alia, Seqwater had acted in a way that was so unreasonable that no authority having the function or power in question could properly consider the acts or omissions to be a reasonable exercise of the function or power within the meaning of s 36(2). Towards the end of the trial, each of Seqwater and Rodriguez supplied submissions as to the answers each favoured. The primary judge, consistently with his reasons, answered those questions by noting that they did not arise. But the foregoing makes it plain that the issue was live on the pleadings and treated as such throughout the trial.

405 For those reasons, we rejected Seqwater’s submission that the notice of contention raised a fresh point that could not be raised in this Court.

*(b) Reliance on schedule of findings*

406 Seqwater submitted that it was unfair for Rodriguez to seek to make out a case of unreasonableness falling within the exception to s 36(2) because “the factual inquiry would be quite extensive to try to understand what evidence, in the mass

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<sup>135</sup> (1977) 136 CLR 214 at 228; [1977] HCA 11.

of material, could be relevant” to the issue.<sup>136</sup> The same point had been advanced in Seqwater’s written submissions in reply. Seqwater emphasised that the question of breach was “absolutely central”<sup>137</sup> to any plaintiff’s case, and thus the applicable standard was one to be addressed at the forefront of the case.

407 Rodriguez pointed to a schedule of 38 extracts from the judgment entitled “Rodriguez’ Schedule of findings from the liability judgment – s 36(2)” which Seqwater’s counsel stated<sup>138</sup> was supplied on the morning of the ninth day of the appeal. The document included assessments by the primary judge that the flood engineers had advanced constructions of the Manual and conducted flood operations which were “completely untenable”, “unreasonable” and indeed “entirely unreasonable” and “completely unreasonable”. Seqwater complained that some of these passages were directed to events of 2-5 January, some were directed to Mr Ruffini, some were directed to points taken by Seqwater in the litigation rather than acts or omissions of flood engineers, and many were not connected (or, at least, were not obviously connected) with any particular breach of duty. The submission concluded:<sup>139</sup>

“In our respectful submission, if this document was going to be relied upon, it should have been supplied at some far earlier point and these issues could have been ventilated and worked out. We should not be in a position on the afternoon of the ninth day endeavouring to deal with this document. Our friends had every opportunity to raise every point and did raise every point in a very lengthy trial below. They had the indulgence - we all had the indulgence - of lengthy submissions to articulate our points. In our respectful submission, a notice of contention and the raising of the points in this schedule of findings should not be permitted at this late stage.”

408 The larger point is that the force Rodriguez sought to attribute to those passages was inapt. The primary judge had explicitly declined to determine the issue presented on the pleadings by s 36(2), formalising that in his answers to two of the common questions. The occasional rhetorical flourish in a very long judgment, made in different contexts, does not translate into a finding for the

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<sup>136</sup> CA tcpt, p 838(1).

<sup>137</sup> CA tcpt, p 839(15).

<sup>138</sup> CA tcpt, p 839(35).

<sup>139</sup> CA tcpt, p 843(16)-(27).

purposes of s 36(2), being an issue which the primary judge declined to determine.

409 The parties distinguished the written submissions on s 36(2) which had been supplied months before the hearing, and the schedule provided on the ninth day of the appeal. Thus Mr Sexton said “[m]y learned friends’ contention that he shouldn’t now have to deal with that schedule is an argument that he could have raised anyway, and if it’s a valid complaint, then your Honours would not receive that schedule. But that doesn’t go to whether or not a notice of contention should be filed.”<sup>140</sup>

(c) *Conditional grant of leave*

410 In those circumstances, Rodriguez was permitted to advance its contention that s 36(2) was satisfied in accordance with its written submissions on that point (which have been reproduced above). However, it would have been unfair to permit Rodriguez to advance, on the ninth day of appeal in support of a belated notice of contention, submissions which went beyond that which had been advanced in writing. Rodriguez had had some 10 months to supply a notice of contention and any further submissions. It had had 5 weeks before the appeal was heard, and the previous 8 days of the appeal, to formulate with any greater precision how it sought to advance the point. It was squarely on notice of Seqwater’s objections to the point being run at all having regard to the paucity of submissions on the point at trial.

411 This is a very large appeal. Nonetheless ss 56 and 58 of the *Civil Procedure Act 2005* (NSW) apply, and in determining whether to permit Rodriguez to rely on a very late notice of contention, and if so on what terms, this Court is required to give effect to the overriding purpose of facilitating the just, quick and cheap resolution of the real issues in the proceedings, having regard to the dictates of justice, pursuant to s 58.

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<sup>140</sup> CA tcpt, p 853(14)-(20).



412 The order made by the Court granting leave to file the notice of contention on terms recognised that while it was not appropriate to forbid Rodriguez from pursuing a submission which had been advanced some 5 months prior to the hearing, and which had been met in writing by Seqwater on its merits, it was also not appropriate to permit Rodriguez to expand beyond that submission to findings which had not been made by the primary judge, or by reference to a schedule provided belatedly which failed to articulate the basis on which the new finding was sought to be made. We accepted Seqwater's submission that permitting the latter course, by reference to the schedule of passages from the main judgment which was supplied on the second last day of the hearing, had real scope to give rise to prejudice, in terms of prolonging the hearing of the appeal, in circumstances where there was no explanation proffered as to why Rodriguez, being squarely on notice of the issue for months, had only raised the matter at the conclusion of the hearing. However, we did not understand that Rodriguez otherwise wished to elaborate upon its written submissions. (Its oral submissions in support of the substance of the s 36(2) point, as opposed to being granted an extension of time to file the notice of contention, did not go beyond what was put in writing.<sup>141</sup>) That may well have been because the written submissions encapsulated the high point of what could be advanced on this issue.

413 The limitations accompanying the grant of leave extended also to the legal basis on which Rodriguez sought to advance its case. During oral argument, senior counsel for Rodriguez maintained that the test was objective, and did not turn on the way the flood engineers had been cross-examined.

“MR SEXTON: ... The question posed by section 36 in this case is entirely about the acts and omissions of the flood engineers, and there was considerable evidence about that which was available, as I say, to be characterised one way or the other.

BASTEN JA: Is that evidence which can be determined as it were on an objective basis, namely, what they actually did or didn't do, or does it depend to any extent on how they perceived their activities and therefore their subjective intentions? I ask that because, certainly if it is the latter, I'm not sure

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<sup>141</sup> CA tcpt, 27/5/21, p 825(1)-(46).

about the former, we might need to know how Mr Malone, for example, was cross-examined on particular topics and what answers he gave.

MR SEXTON: Your Honour, as to the first question, in my submission, it is objective, because ultimately, as your Honour observed in *Curtis*, it is a question for the court to decide whether a different type of authority, either acting sensibly or reasonably, can come to a particular conclusion.”

The significance of this exchange will be addressed below.

*(d) Submissions in support of contention*

414 The submissions advanced in support of Rodriguez’ notice of contention covered the entirety of the period 2-10 January 2011. As already noted, the complaint that Mr Malone had unreasonably failed to declare a new flood event was withdrawn: it was untenable. It was not unreasonable for Mr Malone to accede to Mr Ayre’s decision to bring the December flood event to an end on the morning of 2 January 2011. Once that is accepted, nothing turns on what happened over the ensuing three days. Nevertheless we propose to deal with the challenges to the findings as to breaches of Mr Malone’s duty of care as a reasonably competent flood engineer during the period 2 to 5 January. They remain relevant to the finding that any reasonably competent flood engineer commencing operations at midnight on 2 January 2011 would have, at a minimum, made flood releases substantially in accordance with simulation C. That finding is the subject of the specific challenges made by grounds 16, 17 and 18. However if the challenges made to the primary judge’s findings with respect to breaches on 2-5 January are upheld, that overarching finding (applying simulation C) would no longer be correct and accordingly cease to be relevant as a counterfactual in any causation or damages analysis.

**19 Simulations C, F and H (grounds 16-21); breaches on 2-5 January 2011 (grounds 22, 23(a))**

*(1) Overview*

415 Success for Rodriguez ultimately involved it establishing negligence on the part of the flood engineers (for present purposes the issues raised by s 36(2) are put to one side) which resulted in levels of inundation of significant areas of Brisbane and Ipswich which either would not have occurred or would not have

occurred to the extent experienced. That in turn required that Rodriguez formulate 'counterfactual' flood release operations against which the outcomes of the engineers' alleged negligent operations could be assessed. The strategies adopted at the commencement of the counterfactual had to correspond with the alleged non-negligent flood operations relied on in Rodriguez' breach case. Eventually (by Dr Christensen's response report of July 2017) 10 simulations (identified by the letters A to J) were proposed, adopting various start times and assumptions as to the conduct of the flood operations: Ch 8 [135]-[167].

416 It is convenient to deal with grounds 16-21 together. They are not easy to paraphrase and may best be set out in full as follows:

#### **"Findings Concerning Simulations C, F and H**

The primary judge erred in holding that a reasonably competent engineer in the position of the flood engineers during the January 2011 Flood Event who inherited the circumstances prevailing at midnight:

- 16 on 2 January 2011 would have, at a minimum, made releases substantially in accordance with Simulation C up to and including 9 January 2011 and releases substantially in accordance with the simulation thereafter (Ch 10 [188]), since the form of the simulation as varied by the primary judge fell outside the first respondent's pleaded case;
- 17 on 2 January 2011 would have, at a minimum, made releases substantially in accordance with Simulation C up to and including 9 January and release substantially in accordance with the simulation thereafter (Ch 10 [188]), since the primary judge rejected that the reasonably competent engineer would have made the releases required by Simulation C on 6 January (Ch 10 [153], [154]);
- 18 on 2 January 2011 would have, at a minimum, made releases substantially in accordance with Simulation C up to and including 9 January and releases substantially in accordance with the simulation thereafter (Ch 10 [188]), since the primary judge rejected material aspects of Dr Christensen's methodology underpinning the releases in Simulation C and, instead, adopted a materially different methodology which was unsupported by evidence;
- 19 on 8 January 2011 would have made releases substantially in accordance with Simulation F and Simulation H as varied by Table 18 to Mr Ickert's Response Report dated 30 November 2017 (**Ickert variations**) (Ch 10 [56]), since those simulation as so varied fell outside the first respondent's pleaded case;

- 20 on 8 January 2011 would have made releases substantially in accordance with Simulation F and Simulation H as varied by the Ickert variations (Ch 10 [56]) since the primary judge made no finding that a reasonably competent engineer **would have** made the Ickert variations; and
- 21 on 2 or alternatively 8 January 2011 would in the premises of one or more of Grounds 6-15 have carried out flood operations in a manner represented by any of Simulations C, F or H (Ch 10 [18], [23], [27], [56], [93], [108], [154], [170], [188]).”

417 Grounds 16, 17 and 18 were each directed to the judge’s finding that from midnight on 2 January 2011 releases should have been made substantially in accordance with simulation C. Further, that course was said to have been required up to 9 January 2011. Grounds 19 and 20 addressed the similar, but differently qualified, finding in relation to simulations F and H. The qualification was that the releases were to be as varied by Mr Ickert’s response report. Ground 21 challenged each of those findings in the event that any of Seqwater’s challenges to the interpretation and application of the Manual were upheld which affected simulations C, F or H. It follows from our conclusion that ground 8 is made out that the release strategies and decisions based on these counterfactuals cannot be sustained because each depended on the “no release” assumption.

418 Ground 22 challenged the finding that there was a breach of duty in terminating the flood event on 2 January 2011, and ground 23(a) the findings that Mr Malone breached his duty of care on 3, 4 and 5 January “by failing to continue or commence flood operations contrary to the Manual, failing to adopt strategy W3 and not making releases substantially [exceeding] the rate of inflows, being at a minimum of the release rates in Simulation C”.

419 The following challenges are addressed below:

- (1) to the overarching findings made as to simulations C, F and H (grounds 16 to 20);

(2) to the findings of breach of duty on 2 January 2011 in bringing the December Flood Event to an end and failing to make further substantial releases (ground 22); and

(3) to the findings of breaches by Mr Malone on 3, 4 and 5 January 2011 by failing to make releases to reduce the dam level and to declare a further flood event (ground 23(a)).

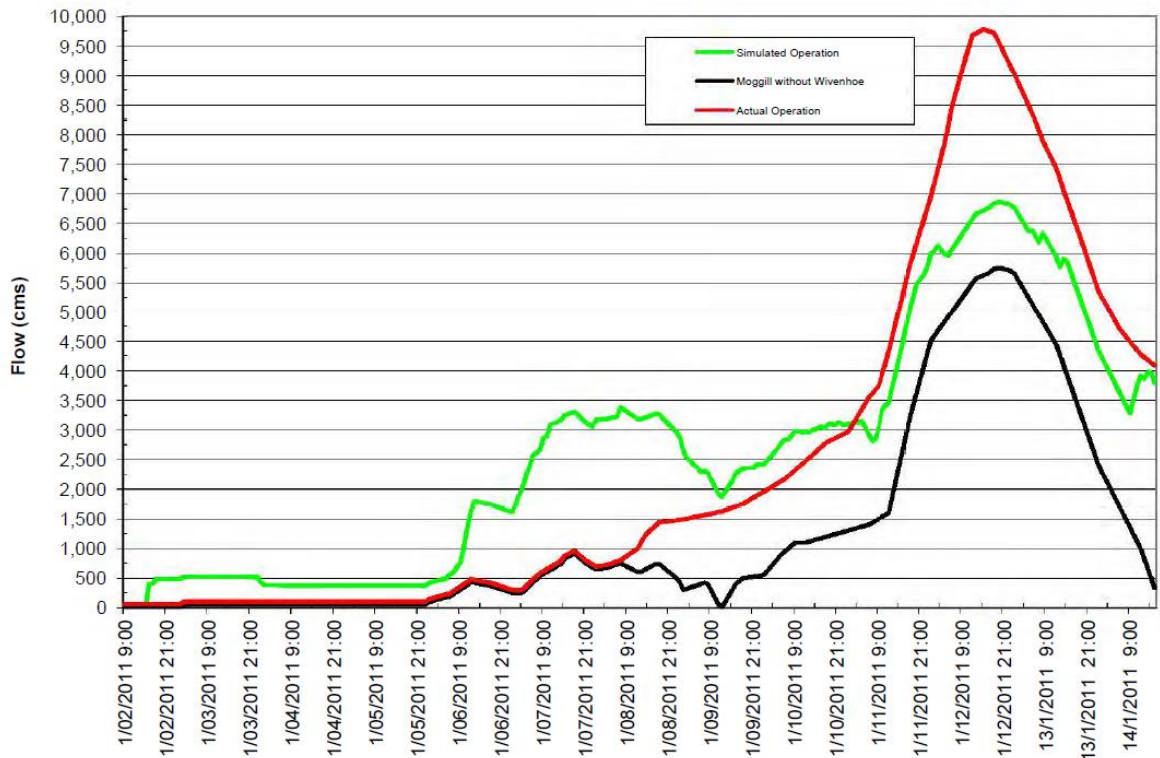
(2) *Challenges to overarching findings as to simulations C, F and H (grounds 16-20)*

(a) *Simulation C*

420 Simulation C commenced at 00:00 on 2 January. Strategies were selected based on 24-hour QPF forecasts and a no release assumption. Longer term rainfall forecasts were used for “situational awareness”. During the flood event the Somerset crest gates remained open and the level of each dam could drop below FSL: Ch 8 [146]-[149].

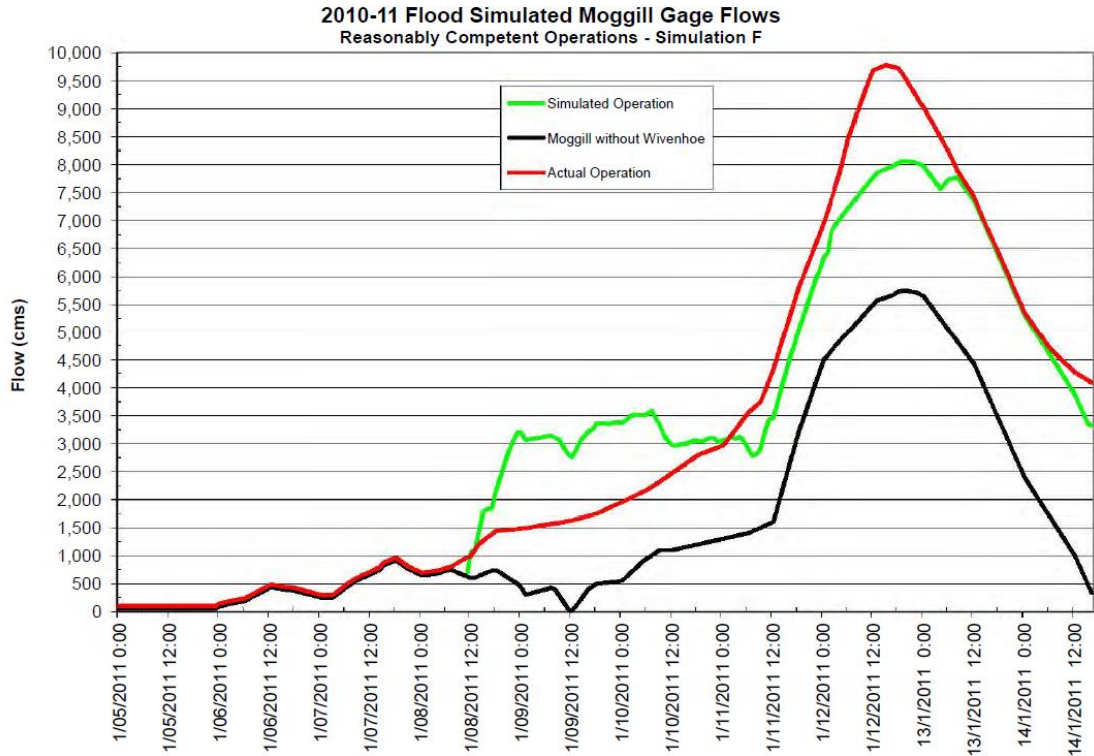
421 The objective of simulation C was to create flood storage capacity below Wivenhoe’s FSL of 67m and to do so by releases which closed all of the downstream bridges by the end of 6 January. The differences between the simulated and actual releases measured by flow rates at Moggill are shown on the following graph. By 06:00 on 10 January the simulated releases created additional storage capacity in the two dams of about 560,000MI. That additional storage permitted later releases at significantly lower rates than those in fact made, is shown by the higher peak of the actual operation (red line) compared with the simulated operation (green line).

2010-11 Flood Simulated Moggill Gage Flows  
Reasonably Competent Operations - Simulation C



(b) Simulations F and H

422 Simulations F and H commenced on 8 January 2011. Simulation F used eight-day forecasts to determine strategy and four-day forecasts to determine releases and assumed that the Somerset crest gates had to remain open during a flood event: Ch 8 [159], 10 [5]. Simulation H, on the other hand, used 24-hour QPF forecasts to select strategy and assumed the Somerset crest gates had to remain closed: Ch 8 [162], 10 [5]. However, in the result, each proposed the same releases: Ch 10 [6]. The differences measured at Moggill between actual releases and those provided for by simulations F and H are shown in the graph below:



The simulated flows rose higher than those under simulation C because the starting point was a higher dam level.

423 In the period from 8 January Rodriguez contended that the engineers should have made releases at levels which when combined with the natural flows at Moggill did not exceed  $4000\text{m}^3/\text{s}$ . That continued until the morning of 11 January when it became apparent that those flows could not be kept below  $4000\text{m}^3/\text{s}$  because of the level of water in Wivenhoe. At Somerset the sluice gates were closed to store as much water as possible until midnight on 14 January: Ch 8 [160]. By 06:00 on 10 January the simulated releases created additional storage of about 190,000MI, again permitting later releases at lower rates.

(c) *Disposition: grounds 16, 17 and 18*

424 Each of grounds 16, 17 and 18 attributed significance to the finding as to simulation C which it did not have. There was no finding of breach directed to the period addressed by simulation C. With two exceptions, the allegations of

breach were made by reference to each engineer's conduct on a particular calendar day in the period from 2 to 11 January. (The exceptions were the three-day period from 3 to 5 January and the two-day period of 10 and 11 January.) Each of the pleaded allegations necessarily addressed the actual and forecast rainfall and dam levels that existed during that day. To the extent that in the first days of the simulation the modelled conditions were the same or very similar to those which existed in fact, the challenges made by grounds 22 and 23(a) indirectly address the substance of his Honour's findings with respect to the early part of simulation C. However, the grounds do not challenge the overarching finding on that basis.

425 The primary judge observed in Ch 12, in response to Seqwater's submission that Rodriguez' case on breach had to establish that on each and every day of the flood event the relevant engineer failed to act in accordance with one or more of the simulations:

“[39] That is not required by the text of the pleading and is otherwise an impossibility as time marched on and as the modelled levels in the simulations and those confronted by each relevant flood engineer diverged. Instead, it was open to the plaintiff to submit by reference to the pleaded sub-paragraphs of the 5ASOC what was required by each flood engineer at each relevant point during the January 2011 Flood Event, ie, what must have been done in those circumstances ... It was also open on the pleading for the plaintiff to submit, as it did, that the approach of Dr Christensen informs the analysis of what would have been done by a flood engineer from time to time during the flood event, especially in circumstances where I have made a finding of what was required of a reasonably competent flood engineer commencing on 2 January 2011 (ie, SIM C) and 8 January 2011 (ie, SIM F and SIM H). Leaving aside the appropriate forecast period that should be used to select strategy, the methodology of each of SIM F and SIM H is not relevantly different to SIM C. The only substantive difference is the start date. Provided that the findings on breach are consistent with the finding in relation to those simulations, which they are, the latter can then be used as the basis for the causation inquiry conducted in the next Chapter.”

(The abbreviation “5ASOC” referred to the plaintiff's Fifth Amended Statement of Claim filed on 29 September 2017.)

426 As the primary judge recorded in this last observation, the principal significance of each of the challenged findings was that it provided a basis for Rodriguez'



causation and damages case in the event the engineers were found to have been negligent on 2 January, and perhaps in the period to 5 January. That case was that, but for such negligence, the flood operations would have been conducted in accordance with simulation C. Dr Altinakar's modelling based on that simulation was then relied on as estimating the level of flooding that would have occurred if the outflows from Wivenhoe were made in accordance with simulation C, as distinct from those which in fact occurred: Ch 13 [2]. It follows that ground 16 should be dismissed on the basis that the overarching finding concerning simulation C was not outside Rodriguez' pleaded (breach) case.

427 Grounds 17 and 18 addressed the substance of that finding as directed to a damages counterfactual contended for in Rodriguez' case. Ground 17 does no more than point out that in a minor respect his Honour's finding departed from the releases that the reasonably competent engineer operating in simulation C "would have made". However, that departure did not have the consequence that the releases proposed were no longer "substantially in accordance with" simulation C. Accordingly ground 17 should be dismissed.

428 Addressing ground 18, the judge's conclusion that the inundation of the two remaining bridges on 6 January should be delayed by about 12 hours did not adopt "a materially different methodology [from that of Dr Christensen] which was unsupported by evidence". Whether Dr Christensen's methodology and opinion were justified is a different question, and, in relation to the challenged findings of breach on 6 and 7 January, is dealt with below. His Honour concluded that the one respect in which his findings, as to what a reasonably competent flood engineer "must have decided", departed from simulation C was not material for the use of that simulation in a damages counterfactual: Ch 10 [152], [153]. That conclusion was in part justified by the analysis set out in appendix G to his reasons: Ch 10 [155]-[160].

429 Ultimately, as the primary judge explained in Ch 10:

"[168] This analysis is not undertaken to postulate an alternative simulation to simulation C. Instead, it has been undertaken to address whether, even if I was not satisfied that a reasonably competent flood engineer must

have decided to inundate the remaining bridges on 6 January 2011, that would invalidate the conclusion that a reasonably competent flood engineer should have undertaken flood operations substantially in accordance with SIM C. If, as part of that inquiry, I am not satisfied that a reasonably competent flood engineer must have inundated the bridges at a particular time but am satisfied they must have done so later and am also satisfied that any such delay was not material to the outflows in the simulation overall, especially on 11 and 12 January 2011, then the simulation will not have been invalidated. I am so satisfied.”

430 Ground 18 is not made out.

*(d) Disposition: grounds 19 and 20*

431 The same analysis applies to ground 19 which, like ground 16, contended that, by reason of acceptance of variations to Dr Christensen’s releases proposed by Mr Ickert, simulations F and H were outside Rodriguez’ pleaded case.

432 The variations proposed by Mr Ickert involved accepting that on the evening of 11 January a reasonably competent flood engineer could have continued gate openings as the level of Wivenhoe dam was above 74m. The consequence of adopting Mr Ickert’s variations was that slightly more water was released from Wivenhoe than was otherwise provided by simulations F and H. The outcome was, favourably to Seqwater, that the revised simulated flood operations on 11 January were broadly similar to the flood engineers’ actual operations: Ch 9 [333]. Mr Ickert’s variations were subsequently taken into account by Dr Altinakar in his modelling; the varied counterfactual described by the primary judge was not “invalidated” for that reason. Whether the methodology and reasoning underlying it was justified was not addressed by ground 19, which should be dismissed.

433 Ground 20 contended that these simulations were not available because the primary judge made no finding that a reasonably competent engineer would have made the Ickert variations. That is not so. It was sufficient to justify the use of the varied simulated flood operations as a damages counterfactual that the primary judge found that there were two approaches which a reasonably competent flood engineer might have taken. That is the effect of his Honour’s

finding that Seqwater was entitled to the benefit of the “most favourable” conduct consistent with competent operations. Ground 20 is not made out.

(e) *Disposition: ground 21*

434 Ground 21 turned on favourable outcomes in relation to one or more of grounds 6 to 15 as resulting in his Honour’s findings as to these counterfactuals being rejected. This ground is made out because Dr Christensen’s strategies adopted in each of simulations C, F and H turned on a “no release” assumption.

(3) *Breach of duty: 2 January (ground 22)*

435 Ground 22 challenged the finding that there was a breach of duty in terminating the flood operations on 2 January 2011. Over the period 2, 3, 4 and 5 January 2011, Wivenhoe water levels ranged between 67.1m and 67.28m. They were below 67.25m until midday on 5 January 2011, when they rose from 67.25m to 67.28m over the last 12 hours of 5 January. Thus, if there were no breach of duty in declaring the December Flood Event at an end at 09:00 on 2 January 2011, then there could be no breach of duty in not making further releases until midday on 5 January. At least that is so unless it were not only permissible but necessary, in order to avoid later flood damage, to disregard the Manual’s instruction not to open the flood gates in a new flood event until the dam level exceeded 67.25m. Rodriguez made no such submission. In this circumstance it is convenient to note the judge’s findings in relation to the four-day period 2-5 January 2011.

(a) *Findings of primary judge*

436 In Ch 12, the primary judge made the following findings of breach. On 2 January 2011, proper compliance with the Manual required that the flood event continue, not just until dam levels reached FSL, but so as “to continue to bring the water level below FSL such that it was less than the one day ‘no release’ rise”: Ch 12 [64], Ch 10 [80]. The relevant risk was identified thus: “absent ongoing releases from Somerset Dam and Wivenhoe Dam, there would be insufficient flood storage capacity in Lake Somerset and Lake Wivenhoe to

prevent urban flooding downstream of Wivenhoe Dam should further rainfall occur in accordance with, or in excess of the BoM forecasts”. This risk was based on two materially identical formulations in the pleadings, set out at Ch 12 [53]. The judge did not accept that “if rainfall occurred ‘in accordance with’ the forecasts then the risk pleaded ... arose”. Rather, he relied on the possibility that rain might fall in excess of the forecast, in light of the La Niña seasonal conditions, the fact that summer was far from over, the widespread flooding that had already been experienced and the immediate past experience which pointed to the real possibility of higher rainfall of the necessary order falling on a saturated catchment. Based on that possibility, his Honour accepted that there was a risk, as pleaded, namely, the chance that rainfall *in excess of* predictions might cause there to be a need for additional flood storage capacity in the future, in order to prevent substantial releases (sufficient to inundate urban areas) made necessary because of the prospect of dam levels in excess of 74m: Ch 12 [57]. This risk was held to be foreseeable and not insubstantial.

437 The precautions which should have been taken against that risk were, according to the primary judge, a drain-down intended to achieve a dam level of 66.5m, which would represent an additional 53,000ML of storage being made available, and which reflected the forecast one-day inflows. His Honour’s assessment of breach in Ch 12 included the following:

“[64] ... It follows from the analysis in Chapter 10 that gate operations should have continued at a rate of release that was at least that which was modelled in SIM C (which exceeded inflows). Even though on this day the identified risk is only just ‘not insignificant’, the ‘reasonable person’ in the flood engineer’s position would have taken those precautions to ensure that flood storage was evacuated before flood operations ended and another flood might have commenced (CLA, s 9(1)(c)). Although the probability that harm would occur if care in the form of those precautions was not taken was not high (s 9(2)(a)), as the amount of flood storage space freed up on 2 January 2011 by continuing releases might have only been modest and made up on following days, the Manual contemplates that over the course of a flood event a failure to make such releases when downstream conditions permit can accumulate to compromise flood operations as an event worsens. The failure of the flood engineers to make any releases before the afternoon of 7 January 2011 bears that out. A difference in water levels of between say 15,000ML and 53,000ML can, depending on the timing of upstream and downstream flows, assume significance at elevation levels that climb well above EL 74.0m AHD. The likely seriousness of

harm if the risk materialises is very significant and increases exponentially as water climbs above EL 74.0m AHD (s 9(2)(b)). It is partly for that reason why the Manual itself declares that its procedures must be complied with.”

438 Against those considerations, the burden of making additional releases was relatively slight, given that the low-lying bridges were already inundated. The judge concluded:

“[67] I am satisfied that on 2 January 2011 Mr Malone breached his duty of care in ending flood operations contrary to the Manual (5ASOC [211(a)]), ceasing gate operations (5ASOC [211(b)]), not making releases at rates substantially in excess of inflows (5ASOC [211(e)]) and not making releases until dam levels were not likely to exceed their respective FSLs by the one day inflow estimate (5ASOC [211(h)]). The balance of the allegations of breach on that day are rejected.”

439 It is convenient to note the reasoning with respect to the following three days, before returning to the question of breach in terminating the December Flood Event on 2 January. On 3 January 2011, there was little if any rain; inflows were still occurring from earlier rainfall, and the 4-day and 8-day PME forecasts predicted substantial rain for 6 January (up to 150mm). The 8-day PME forecast no significant rain beyond that time. The primary judge said:

“[72] ... [U]sing Mr Malone’s estimate of the catchment performance during the Late December Flood Event, around 200mm of rain would generate enough runoff to fill Wivenhoe Dam to EL 74.0m AHD without releases.

[73] ... [I]f the reference to ‘flood storage capacity’ [in the plaintiff’s pleading] is meant to be storage up to EL 74.0m AHD, being the point when forced outflows would commence, then the predicted rainfall over the four day period was of itself not able to necessitate a level of releases in volume that *would* cause urban flooding downstream of Wivenhoe Dam. However, it was not far off and either a deterioration in that forecast, or the falling of significant rain beyond the four day forecast, could cause that to occur.”

440 Although this assessment was premised on a calculation of inflows without releases, the primary judge was alert to the capacity to make releases before the rain fell, but regarded that as not undermining the existence of a foreseeable and not insignificant risk. His Honour referred to his reasoning in Ch 6 in the following terms:

“[137] As noted, Mr Malone suggested that he derived extra comfort from the knowledge that releases would be made in the period while much of the rain was falling. To similar effect, both Seqwater and SunWater submitted that considering the possibility of 160mm of runoff rain being received ignores the timeframe over which it would runoff and that invariable [inevitably?] releases would be made in the interim. However, this overlooks the potential that, if that rain fell upstream, then similar or even greater amounts could fall downstream and thus downstream flows could inhibit those releases or exacerbate their effect. This is borne out by the subsequent failure of the flood engineers to make any releases until the afternoon of 7 January 2011. SunWater also submitted that this aspect of the analysis assumes that releases are made on the basis of four day PMEs, a matter hotly in dispute (but which I accept). However, it does not. This aspect of the analysis is considering the potential justifications for not following the Manual and declaring a flood event (or continuing one).”

The judge added that the impugned reasoning of the flood engineers depended upon downstream flows not impeding later releases and “overlooked the fact that the forecasts suggested that there was a better opportunity to respond immediately rather than later”: Ch 12 [74].

441 The judge found that “the releases in Simulation C set the minimum bound on what was required on these days” (Ch 12 [85]) and held:

“[89] I am satisfied that on 3 January 2011 Mr Malone breached his duty of care in failing to continue or commence flood operations contrary to the Manual (5ASOC [228(a)] and [228(b)]), failing to adopt Strategy W3 and not making releases of rates from Wivenhoe Dam which substantially exceeded the rate of inflows on that day (5ASOC [228(c) and (e)]). The balance of the allegations of breach are rejected.”

442 The primary judge addressed 4 and 5 January more concisely and made materially identical findings in relation to 4 and 5 January, at Ch 12 [94] and [102].

443 With respect to Ch 6 [137] set out at [440] above, and the findings of breach on the later days, two things may be noted.

(1) Although there were four breaches found, in substance they were twofold: (i) bringing the December Flood Event to an end, and (ii) not making substantial releases so as to bring Wivenhoe sufficiently below FSL to accommodate the one-day inflow estimate. The second and third

findings of breach say nothing that is not within the scope of the fourth finding of breach.

- (2) If the first finding of breach is in error, the balance falls away, because the dam level was less than 67.25m throughout this period.

Although the findings were all expressed in terms of “failing to continue or commence flood operations contrary to the Manual”, that phraseology tended to obscure the differing bases of each limb. The judge did not separately address the possibility of error in the finding of breach of duty in terminating the December Flood Event.

*(b) Terminating December Flood Event*

444 The primary judge found that the December Flood Event should not have been brought to an end at 09:00 on 2 January 2011. After that point, and until the afternoon of 7 January, the regulators were open, releasing some 50m<sup>3</sup>/s, while the level of water in the dam was at 67.1m, rising to 67.15m by 06:00 on 3 January, 67.2m by 10:00 on 4 January, 67.25m by midday on 5 January and 67.3m at 03:00 on 6 January.

445 The primary judge found that “[g]iven the terms of the Manual, the flood engineers had no choice but to continue the flood event on 2 January 2011”: Ch 10 [78]. That conclusion was based on the proposition that a flood event only ends when FSL is reached, and on 2 January 2011, the dam level was 10cm above FSL. That being a fair reading is confirmed by the balance of the paragraph:

“[78] ... The provisions of the Manual that address draindown and the conclusion of a flood event are directed to freeing up flood storage space before the onset of another flood event. Given the volatility of the weather in Brisbane at that time of year, what was known about the La Niña event, the state of the catchment, and the high runoff experienced in late December, such a draindown was necessary. According to the Manual, at the very least, a draindown to FSL should have been completed by 4.00pm on 3 January 2011 at the latest, that being seven days after the peak inflow during the Late December Flood Event.” (Footnotes omitted)

- 446 On the morning of 2 January 2011, when the dam level was 67.1m, there were some 11,000MI in excess of FSL. Another way of putting that is that around 99.5% of the total flood capacity, or more significantly 99% of the flood capacity at 75.5m (1,160,000MI), as stated in Appendix C of the Manual, remained available. As noted in discussing degrees of tolerance in part 10(7) above, the Manual did not specify levels to the nearest centimetre. Indeed, there is difficulty in measuring levels to the nearest centimetre. The evidence disclosed that the monitoring equipment showed a variation of +/- 2cm.
- 447 The level of tolerance is not determined merely by the inevitable inaccuracy of measurement. The Manual proceeds much more approximately, making decisions based on +/- 25cm. No strategy in the Manual turns on a water level increment of less than 25cm. Another way of seeing this is that if the dam is at FSL, there is not a flood event every time it rains and the engineers expect the water level to rise to 67.05m, still less to 67.02m or 67.01m.
- 448 Mr Malone's view was that Wivenhoe Dam was effectively, or for practical purposes, at FSL when, at 08:00 on 2 January 2011, it had reached 67.1m and the last gate was completely closed (leaving outflows limited to the two open regulators). The primary judge disagreed on the basis that the Manual required levels to reduce to FSL at the end of the flood event. The judgment did not suggest that any express attention was given during the trial to the notion of tolerance in relation to measurements of water levels in the dams; nor did the parties' written submissions in this Court address that concept. Rather, the primary judge concluded that "when sections 8.5 and 9.4 are read together with section 2.2, it follows that a flood event cannot end while either dam remains above FSL." Furthermore, he found that "[a]ny contrary view is unreasonable": Ch 3 [142].
- 449 Mr Malone's decision to terminate the flood event on 2 January was driven by two considerations. The first was his view that the dam was effectively at FSL; the second was his concern to allow volunteers to rescue lung fish from the pond at the base of the spillway when the volunteers would be available, namely on the weekend. The second factor was undoubtedly a reasonable



consideration in terms of the objectives identified in the Manual (though it was a low level objective); the first factor, regarding the reasonableness of the conclusion that releases had reduced the water level to FSL, involving as it must a notion of tolerances for small variations, will be addressed below. It is convenient first to consider what was involved in terminating a flood event.

450 In this context, “Flood Event” does not simply refer to the objective circumstance that there is a flood, but rather is a defined term in the Manual and means “a situation where the Deputy Flood Operations Engineer expects the water level in either of the Dams to exceed the Full Supply Level”. The practical consequence of the engineer forming that view is that steps are taken to establish a flood operations centre, which has a physical location in Brisbane and involves the allocation of staff and resources. It demands no necessary or immediate action with respect to releases of water from the dams, which, as noted above, cannot commence with respect to Wivenhoe until it reaches a level of 67.25m.

451 As the primary judge correctly observed, the Manual does not expressly identify when a flood event ceases: Ch 3 [139]. For example, although section 8.5 of the Manual states that “final gate closure should occur when the lake level has returned to Full Supply Level”, it does not state that that is the end of the flood event.

452 The primary judge rejected the proposition that a flood event should terminate when the water level reached FSL, and the gates were closed, because the situation could involve a continuing (or new) expectation on the part of the flood engineers that the water level will exceed FSL. In that case, it would be necessary for the engineers immediately to declare a further flood event: Ch 3 [140]. The judge continued, “in such a scenario ... the gates at Wivenhoe Dam might be closed but the flood event would not cease until the flood engineer no longer expected FSL to be exceeded having regard to actual and predicted weather.” On that approach, Mr Malone could properly have directed “final gate closure”, in accordance with section 8.5, to minimise the stranding of fish downstream, without terminating the flood event.

- 453 One reason for adopting this construction of the Manual was that it would permit reopening of the spillway gates for flood control purposes before the level exceeded 67.25m, despite the express prohibition on opening gates contained in section 8.3. However, the prohibition was not contingent on the declaration of a flood event, but rather on the fact of the gates being closed. The administrative steps accompanying that action would have been understood by the engineers and did not need to be spelled out in the Manual.
- 454 As explained above, in dealing with the proper approach to the Manual, the primary judge appears to have accepted that, being a document prepared by and addressed to flood engineers, it should be construed accordingly, and not as a legal document. On that approach, it may not matter when precisely a flood event terminates or is terminated. What matters is whether, once the gates are closed, the prohibition against reopening until the level exceeds 67.25m is met. However, in a practical sense, final gate closure may terminate the flood event, in which case it would be expected that the flood operations centre would be closed by the flood engineer then on duty.
- 455 The question is whether negligence was established on the part of the flood engineers in achieving a final gate closure on 2 January 2011. For reasons elaborated on below, the answer to that question is, no. First, for practical purposes, a reasonable flood engineer was entitled to treat the level of Wivenhoe as at FSL; secondly, the relevant weather forecasts at that time did not predict heavy rainfall which would lead to an expectation that FSL would be exceeded in a practical sense. At least, it was not demonstrated that an engineer who held such a view was acting unreasonably.
- 456 Relevant to the levels of tolerance in the draining to FSL, section 8.5 addressed the position which obtained on 2 January 2011:

“The aim should always be to empty stored floodwaters stored above EL 67.0m within seven days after the flood peak has passed through the dams. However, provided a favourable weather outlook is available, this requirement can be relaxed for the volume between EL 67.0m and EL 67.5m, to obtain positive environmental benefits.

...

To minimise the stranding of fish downstream of the dam, final closure sequences should consider Seqwater policies relating to fish protection at the dam.”

457 The Manual thus explicitly relaxed the requirement to empty stored flood waters within seven days, so long as the height was less than 50cm above FSL. The Manual contemplated that there are environmental benefits in water *not* being released through the floodgates, including dealing with stranded lung fish, and that in circumstances where the water level is within 50cm of FSL, the flood engineers had a discretion to delay releases. There was a favourable weather outlook on 2 January 2011; less than 5mm of rainfall was forecast for the 24 hours ending 09:00 Monday, and the 4-day PME forecast 2-10mm.

458 Those considerations made it not unreasonable for a flood engineer to form the view that the dam had, by the morning of 2 January 2011, returned to FSL, although in fact it was at 67.1m, rather than 67.0m.

459 But let it be assumed, favourably to Rodriguez, that the flood event should not have come to an end at 09:00 on 2 January 2011. Dr Christensen was of the view that rather than lowering the gates from midnight on 2 January 2011, they should have been slightly increased to 30 increments, with the result that 470m<sup>3</sup>/s was to be released from 02:00 that morning for the next 30 hours. Had that occurred, simulation C predicted that by 16:00 on 2 January 2011, the level would have reached 67.05m, with 67.02m being reached at 23:00 on 2 January 2011, and 67.0m being reached at 02:00 on 3 January 2011. Dr Christensen would then have reduced dam levels below FSL. But on the afternoon of 2 January 2011, with levels at 67.05m and falling, there is no reason why it would not have been reasonable to commence closing the gates with a view to their being completely shut over the next 6 hours with the dam levels being only a few centimetres above FSL. Certainly such conduct was not so unreasonable that no competent flood engineer could have adopted it.

460 Thus there was no breach of duty in bringing the December Flood Event to an end at 09:00 on 2 January and closing the radial gates.

(c) *Failing to make further substantial releases*

- 461 It is not clear that the breaches on 2 January 2011 found by the primary judge were to be treated independently. In other words, it is not clear that if the engineers were not negligent in terminating the December Flood Event, they were nevertheless negligent in not making further releases. The purpose of keeping the December Flood Event open was to make further releases; there was no express finding that they were entitled to continue to release water below FSL except during a flood event. The Manual made no express provision for releases except during a flood event; the powers to release water were conditioned by the phrase “during a flood event”: Manual, sections 2.2, 2.3, 2.4, 5.2, 6.2, 8.2, 8.3 (first sentence). The better view may be that the finding of breach of a duty to make further releases fell away if the event were terminated without breach. That would mean the failure to make further substantial releases on 2 January was a consequence of the wrongful termination and, if it caused loss, the loss was a consequence of the breach. There was no separate breach.
- 462 Against the possibilities that (i) there was power to continue to release water although the December Flood Event had been terminated without breach, and (ii) the primary judge had found an additional independent breach, the circumstances facing the engineers on 2 January will be explored further.
- 463 The information available to the flood engineers on 2 January 2011 was that water was still flowing into the dam at rates which were around triple the 50m<sup>3</sup>/s being released by the regulators, and that the catchment was wet (“saturated”) and might be expected to produce greater run-off from further rain than would otherwise be the case. However, weather conditions for the next few days were relatively benign compared to the flooding of late December. The 1-day QPF was for less than 5-10mm of rain. The 4-day PME was for 1-10mm of rain. Even the 8-day PME was for 15-25mm of rain.
- 464 It is one thing to make releases which would allow dam levels to go below 67m against the certainty of future inflows from rain on the ground, or the immediate

prospect of heavy rain, even if that rain has not fallen and might never fall in the catchment. But we do not agree that a flood engineer acted beyond the range of reasonable discretion in not making further substantial releases of Brisbane's drinking water when the outlook was as favourable as it was on 2 January 2011.

465 The primary judge accepted Rodriguez' submission that an additional 53,000MI was "potentially material to creating sufficient storage space to address the contingency of a second flood". We do not agree.

466 The flood capacity of Wivenhoe Dam was stated in the Manual to be 1,980,000MI (at a depth of 80m). Even if one puts that to one side and identifies the flood capacity of 1,160,000MI at a depth of 75.5m, that is *vastly* more than the 53,000MI which was regarded as material. 53,000MI is less than 3% of the total flood capacity, and less than 5% of the effective flood capacity (after which one or more fuse plugs would be eroded). In many areas of measurement and in many areas of statistics, variations of less than 5% are not regarded as significant.

467 Another way of exposing the limited significance of the additional 53,000MI of capacity is to note that it reflected a saving of around 30cm by the time dam levels reached 74m or 75m.

468 The question is whether the failure to release 53,000MI on 2 January 2011 was so unreasonable that no dam operator in Seqwater's position could properly consider the failure to be reasonable. There is no substance in the contention that there was an urgent need to do so; the issue was whether possible rainfall in the order of a week in the future might give rise to a risk of dam levels exceeding 74m. In those circumstances, it is necessary to ask a question which appears not to have been addressed at trial, namely, how readily might 53,000MI be released if it were necessary to do so? That question is not difficult to answer. A release of 3,000m<sup>3</sup>/s equates to 10,800 MI/hr. Thus the 53,000MI of additional capacity could be achieved by releases at 3,000m<sup>3</sup>/s for fewer than five hours; a rate of 2,500m<sup>3</sup>/s would take a little under six hours to release 53,000MI. (In the real world it would take time to achieve 25 increments of

radial gate opening. Further, if downstream rates at Lowood and Moggill were high, or if it were necessary to protect bridges, then a lower release rate might be required.)

469 The point of the example is that the 53,000MI of additional capacity on which the finding of the primary judge turned was simply not material in the scheme of things. On the weather predictions, the flood engineers had *days* ahead of them to achieve the additional water capacity, held to have been what a reasonable flood engineer would have put in place on 2 January 2011.

470 The foregoing adopts the upper end of the finding that 15,000-53,000MI could be significant. As 15,000MI is less than a third of 53,000MI, it is correspondingly less significant; it is released in fewer than 90 minutes at a rate of 3,000m<sup>3</sup>/s; is less than 1% of the flood storage capacity and corresponds to less than 10cm of depth when the dam is at 74m.

471 None of the above is to deprecate the significance of 53,000MI, or even 15,000MI, at the height of a flood. That additional capacity could, as the primary judge noted, be highly significant. It could make the difference between the fuse plug being eroded and not being eroded. But the fact that 53,000MI (or 15,000MI) would have significance several days later could only justify releasing that amount of water on 2 January if it were difficult or impossible to do so in the days that followed, when the need to do so became apparent.

472 We do not accept that it was unreasonable for a flood engineer to have failed to make substantial releases on 2 January 2011 so as to achieve an additional 53,000MI of flood storage capacity against the possibility a week or more in the future that 53,000MI might prove material. It follows that it could not be said that there was a breach of the lower standard prescribed by s 36(2) of the *Civil Liability Act*.

473 There was no breach of duty by Mr Malone on 2 January 2011. Ground 22 is made out.

(4) *Breaches of duty: 3, 4 and 5 January (ground 23(a))*

(a) *Failure to reduce dam level*

474 On the basis that there was no breach of duty on 2 January, the pleaded breaches thereafter of failing to release water substantially in accordance with simulation C are not engaged. However, the point of principle was that releases had to be sufficient to reduce the dam level and therefore exceed the actual or predicted inflows over those days.

475 These breaches cannot be sustained. First, the Manual only permitted opening the radial gates if a new flood event were declared: because, until the afternoon of 5 January, the water level was below 67.25m, these breaches depended upon the first aspect of the breach found on 2 January, namely that it was negligent to terminate the December flood event. Secondly, the same considerations identified above stand in the way of a conclusion that a reasonable flood engineer should have caused substantial releases, below FSL on those days, in the face of predicted rain and the prohibition on lowering the dam level below FSL, discussed above.

(b) *Failure to declare a further flood event*

476 There was nothing unreasonable in declining to declare a flood event where there was no expectation of opening a gate, and indeed no ability to do so because of the prohibition on opening gates unless 67.25m is exceeded. Indeed, it may well be unreasonable to declare a flood event, which entails mobilising the resources of a flood operations centre in Brisbane, until that level has been exceeded, or such a rise is imminent.

477 It was not unreasonable for the flood engineers not to expect that further rains would cause the level to rise above FSL to an appreciable extent. Although not articulated as involving a degree of tolerance, the primary judge did address Mr Malone's evidence that an engineer had a discretion not to declare a flood event unless he expected the water level of one of the dams to exceed FSL and to engage the power to make releases by opening the gates. The judge dismissed that view as "completely untenable": Ch 3 [144].

478 The evidence of Mr Malone was more nuanced than was acknowledged by this finding. It was not, as the primary judge described it, a question as to whether or not there was a “discretion” to declare a flood event; the evidence was rather that there was an element of professional judgment involved. The cross-examination of Mr Malone commenced with the proposition that a “flood event” as defined in the Manual “is a situation”.<sup>142</sup> The cross-examiner continued:

“Q. Where there's an expectation; correct?

A. There's an expectation, yes.

Q. And the expectation was for the water level in either dam to exceed full supply level?

A. I don't think that definition is fully descriptive of the actual situation. There are other clauses in the manual which more fully describe a flood situation.

Q. What are they?

A. For example, section 8.3, on page 22. It says:

*The spillway gates are not to be opened for flood control purposes prior to the reservoir level exceeding EL 67.25.*

The other thing that I would like to draw your attention to is in 1.3. The purpose of the manual is to recognise the limitations on it being able to obtain accurate forecasts of rainfall during flood events, accurately estimate flood runoff within the dam catchments, amongst other things, and the last one is to provide resources in a cost-effective manner.

So when the dam was above 67, and I wasn't expecting it to reach 67.25 until some days later, to me, that was also dependent on obtaining accurate forecasts and also the appropriate use of resources in a cost-effective manner.

So if I had mobilised early on the 2nd or the 3rd or the 4th, I would have had people sitting around in the FOC for 24 hours per day; I would have had dam operators sitting there 24 hours per day, doing nothing until the dam reached 67.25. So my understanding of the words ‘flood event’ is that, in a practical sense, it is a situation where the dam operations engineer expects the water level of either dam to exceed full supply level and to make gated releases.

Q. You read into the definition of ‘flood event’, at the end of it, the words ‘and to make gate releases’?

A. Yes.

Q. That's not what it says, is it?

A. It's not what it says, but I'm a practical flood engineer.

HIS HONOUR: Q. Mr Malone, does that also apply to 2.2 on page 5, the third dot point?

A. That would be consistent with the definition in the glossary.

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<sup>142</sup> Tcpt p 4753(20).



Q. But you read that as being subject to a requirement that the dam level in fact exceed 67?

A. 67, yes. That's above full supply level. It makes it –

HIS HONOUR: Just wait for Mr Sexton's question.

MR SEXTON: Q. If you go back to 8.3, Mr Malone, the opening words of that section are 'Once a Flood Event is declared'. Do you see that?

A. Yes.

Q. The sentence you pointed to on page 22, that the spillway gates are not to be opened for flood control purposes, only applies after a flood event has been declared, doesn't it?

A. That's correct.”

479 Section 8.3 has been set out above: it contains two propositions, one commencing “[o]nce a Flood Event is declared”, followed by three bullet points, the second sentence having no such limitation in the opening words. Rather, the prohibition against opening the gates is concerned with the purpose of “flood control”. Accordingly, if the expectation held by the flood engineer was merely that Wivenhoe would rise to 67.2m, the sole purpose of declaring a flood event would be to open the flood operations centre and monitor events, in circumstances where there may be no expectation of any rainfall beyond that which was expected to give rise to a level of 67.2m. Without any releases except those small amounts through the open regulators, in fact Wivenhoe did not exceed 67.25m for the whole of 2, 3 and 4 January.

480 It may also be noted that there was reference in the course of the cross-examination to the third bullet point in section 2.2 which, with the chapeau, read as follows:

“For the purposes of operation of the dams during Flood Events, Seqwater must ensure that:

...

- A Duty Flood Operations Engineer is on call at all times. The Duty Flood Operations Engineer must constantly review weather forecasts and catchment rainfall and must declare a Flood Event if the water level of either Wivenhoe or Somerset Dam is expected to exceed Full Supply Level as a result of prevailing or predicted weather conditions.”

481 This is at best awkward drafting; what Seqwater was required to ensure was that an engineer was on call at all times during a flood event. What followed from that proposition is obscure, if it be assumed that a flood event has already been declared. Given the lack of precision in the language adopted by the Manual, its potential incoherence, and what must undoubtedly be allowed by way of levels of tolerance in respect of measurements and professional decision-making, a flood engineer must have a significant margin for error before it would be appropriate to conclude that he had acted unreasonably.

482 There was a degree of incoherence in identifying a breach of duty where the dam level fell to 67.1m when the gates were shut, but not in permitting releases below 67.0m in the absence of any clear basis in the Manual for taking such a step. It is sufficient to say that on a strict interpretation of the Manual, no engineer could be found to act unreasonably in refusing to release water when the level of the dam was below 68.25m and a flood event had not been declared.

(c) *Disposition: ground 23(a)*

483 There was in fact no case run by the plaintiff that, if the December Flood Event was properly terminated on 2 January 2011, a further flood event should have been declared over the next three days. There were, no doubt, two reasons for adopting that course. First, until the water level in Wivenhoe exceeded 67.25m, there would have been no loss caused by the failure to take that step. Secondly, a further flood event was declared on the morning of 6 January 2011: it was the steps which were not taken promptly at that time which constituted the alternative basis of Rodriguez' case, based on simulations F and H, which commenced at 00:00 on 8 January.

484 With respect to the breaches of duty found to have occurred on 3, 4 and 5 January, the artificiality of pleading separate breaches on consecutive days has already been noted. If a process of making releases below FSL in anticipation of further rain should have been adopted, that conduct would have

provided consequential loss, but was dependent on the finding with respect to the termination of the December Flood Event.

485 There was no breach of duty by Mr Malone on 3, 4 or 5 January by failing to make releases or to declare a further flood event. Ground 23(a) is upheld.

## **20 Breaches on 6-10 January – (grounds 23(b), (c), 24, 25(a), (b))**

### *(1) Overview*

486 In oral argument Rodriguez accepted that although it had “pleaded separate breaches on separate days” against each of the engineers, the dam operations were a “continuum” and based on a consensus between the engineers so that it was necessary to address the decision making process on that basis.<sup>143</sup> The question which arose during the period from 6 to 9 January was whether the strategy formulated by Mr Ayre and Mr Malone (that is, delaying releases until the peak from Lockyer Creek had passed and then until the combined flows below Lowood inundated Mt Crosby Weir and Fernvale Bridges) could not be sustained.

487 Rodriguez’ case was that at some stage on 7 or 8 January the point was reached where the dam level was undoubtedly going to exceed 68.5m, engaging strategy W2 or W3 and requiring attention to the primary objective of protecting urban areas from inundation. In fact, no releases were made before 15:00 on 7 January and the objective of keeping those bridges open was not abandoned until the evening of 9 January. In the period from 8 January (the subject of simulations F and H) Rodriguez contended that the engineers should have made releases at levels which, when combined with the natural downstream flows, did not exceed 4000m<sup>3</sup>/s at Moggill, thereby creating storage capacity. On 11 January it was accepted that the object of the releases was to keep the combined flow at Moggill as low as possible (given that it would inevitably rise above 4000m<sup>3</sup>/s).

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<sup>143</sup> CA tcpt, 25/5/21, pp 589-590.

- 488 Grounds 23(b) and (c) challenged findings of breach of duty on the part of Mr Malone in his shifts on 6 and 7 January respectively. These findings turned on a failure to implement and maintain strategy W3 throughout those two days. The primary judge found that releases in the order of 1200 to 1400m<sup>3</sup>/s should have been made on 6 January and that, on 7 January, releases sufficient to inundate Mt Crosby Weir and Fernvale Bridges were required, being releases above 2000m<sup>3</sup>/s depending upon the predicted natural flow rate at Lowood.
- 489 Grounds 24, 25(a) and 25 (b) challenged findings of breach of duty on 8, 9 and 10 January respectively on the part of Mr Malone and Mr Tibaldi during their day or overnight shifts during that period.
- 490 It is also necessary to address Rodriguez' contention 3, and in particular pars 48(b)-(f) of its written submissions. Paragraph 48(b) dealt with 6 and 7 January; 48(c) addressed 7, 8 and 9 January (and perhaps also 6 January); 48(d) addressed releases on 10 January, while 48(e) and 48(f) were directed to the use of forecasts throughout that period. That contention is addressed in part 21 below.

(2) *Factual background*

491 The flood engineers on duty over this period were:

- 6 January – Mr Malone from 07:00 until 18:45 that evening;
- 6/7 January – Mr Ayre from 18:30 on 6 January until 07:00 on 7 January;
- 7 January – Mr Malone from 06:45 to 19:00 that evening;
- 7/8 January – Mr Ruffini from 18:45 on 7 January to 07:45 on 8 January;
- 8 January – Mr Ayre from 06:30 to 19:00 that evening;
- 8/9 January – Mr Tibaldi from 19:00 on 8 January to 07:00 on 9 January;
- 9 January – Mr Malone from 06.30 to 21:30 that evening;

- 9/10 January – Mr Ruffini and Mr Ayre from 19:00 and 19:30 on 9 January to 06:45 and 07:00 respectively on 10 January; and
- 10 January – Mr Malone and Mr Tibaldi from 07:00 to 19:00 that evening.

492 Because what ultimately matters is what the flood engineers did and omitted to do, it is convenient to set out the actual decisions to open or close the five radial gates over this period. What follows is taken from the tables in the January 2011 Flood Event Report at pp 154-159.

- There were no releases, save for some 50m<sup>3</sup>/s from the regulator and 13m<sup>3</sup>/s from the hydro-electric scheme, until 16:00 on the afternoon of 7 January 2011.
- From 15:00 on 7 January until 14:00 on 8 January, the radial gates were opened at the rate of one increment per hour, with the consequence that releases increased by approximately 50m<sup>3</sup>/s each hour, plateauing at around 1240m<sup>3</sup>/s.
- Thereafter this rate of release was largely maintained, save that at around 02:00 and 05:00 on 9 January, gates 3 and 1 were each opened a further increment, increasing the release rate to the order of 1340m<sup>3</sup>/s.
- Gate 5 was opened a further increment at noon on 9 January, increasing the release rate to around 1380m<sup>3</sup>/s.
- Between 01:00 and 08:00 on 10 January the gates were opened a further seven increments, once again at the rate of one increment per hour. By 07:00 the rate of release was 1875m<sup>3</sup>/s.
- By 09:00 on 10 January gate 5 was opened a further increment, resulting in a release rate of 2015m<sup>3</sup>/s.
- Between 15:00 and 20:00 on 10 January, the gates were opened a further 10 increments. At 20:00 the release rate was 2695m<sup>3</sup>/s.

493 The relevant directives for Wivenhoe Dam (up to 15:00 on 10 January) which resulted in those release activities were issued as follows:<sup>144</sup>

- Directive 1, issued by Mr Malone at midday on 7 January requiring seven 50cm openings of gate 3 from 15:00 until 21:00 that evening, when the release rate would be approximately 400m<sup>3</sup>/s.<sup>145</sup>
- Directive 2, issued by Mr Ruffini at 21:45 on 7 January, requiring a further seven increments of the outer gates (1, 2, 4 and 5) at a rate of one per hour commencing at 22:00.
- Directive 3 issued by Mr Ruffini at 04:50 on 8 January, directing a further four increments of gate one, three, four and five between 05:00 and 08:00.<sup>146</sup>
- Directive 4, issued by Mr Ayre at 08:15 on 8 January, directing a further six increments of the outer gates at a rate of one per hour between 09:00 and 14:00.<sup>147</sup>
- Directive 7 issued by Mr Malone on 9 January at 10.30, directing a further increment of gate 5 at 11:00.<sup>148</sup>
- Directive 8 issued by Mr Ruffini at 02:00 on 10 January, directing a further five increments of the outer gates between 02:00 and 06:00.<sup>149</sup>
- Directive 9 issued by Mr Ruffini at 06:30 on 10 January, directing a further five increments of the outer gates between 07:00 and 11:00.<sup>150</sup>
- Directive 10 issued by Mr Malone at 08:30 on 10 January replacing directive 9 and proposing gate openings only for the first three increments of the outer gates as proposed by that earlier directive.<sup>151</sup>
- Directive 11 issued by Mr Malone at 15:00 on 10 January directing a further 10 increments of the gates between 15:00 and 19:30; those increments included two increments initially proposed by directive 9.<sup>152</sup>

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<sup>144</sup> See January 2011 Flood Event Report, Appendix L pp 1-8.

<sup>145</sup> *Rodriguez (22)* Ch 6 [228].

<sup>146</sup> Flood Event Report, Appendix L.

<sup>147</sup> *Rodriguez (22)* Ch 7 [15].

<sup>148</sup> *Rodriguez (22)* Ch 7 [169].

<sup>149</sup> *Rodriguez (22)* Ch 7 [253].

<sup>150</sup> Flood Event Report, Appendix L.

<sup>151</sup> Flood Event Report, Appendix L.

<sup>152</sup> Flood Event Report, Appendix L.

494 Despite there being only one flood engineer on duty until the evening of 9 January, the Senior Flood Engineer (Mr Ayre) was in charge. The Manual designated him to be in charge, and his evidence (which appears to have been accepted by the primary judge) was that he was “at all times ... kept in the loop in relation to strategies and release rates”: Ch 6 [263]. Typically, gates were opened at the rate of one increment per hour, and it was obviously desirable to avoid sharp increases in release rates. The Manual provided:

“When dam outflows are less than 4,000 m<sup>3</sup>/s, rapid opening of the radial gates can cause undesirable rapid rises in downstream river levels. Accordingly, when dam outflows are less than 4,000 m<sup>3</sup>/s, the aim in opening radial gates is to operate the gates one at a time at intervals that will minimise adverse impacts on the river system”

495 Finally, the releases made at Wivenhoe had to take account of conditions at Lowood (two hours downstream) and Moggill (16 hours downstream). The natural flow rate at Lowood included flows from Lockyer Creek, and at Moggill included flows from the Bremer River. In the case of each of those tributaries the flow times from the upper reaches of their catchments to their confluences with the Brisbane River were up to 15 or 16 hours. Each of these time frames had to be taken into account in assessing future downstream natural flow rates when making releases from Wivenhoe.

496 What follows addresses only the findings of breach by Mr Malone or Mr Tibaldi. In the case of each shift the findings of breach are outlined and the relevant ground then addressed.

(3) *6 January – Mr Malone’s day shift (ground 23(b))*

(a) *Summary of shift*

497 Mr Malone’s shift at the Flood Operations Centre (FOC) on Thursday 6 January ran from about 07:00 to 18:30, when Mr Ayre started his overnight shift. At 07:42 Mr Malone emailed flood operations personnel, including the other flood engineers, mobilising staff for gate operations. Mr Malone’s reason for doing so was “Wednesday night’s rainfall and further totals up to 150mm expected during the next two days”. In the 24 hours to 09:00 on 6 January the average

rainfall in the dam catchments was 19mm (Somerset) and 26mm (Wivenhoe).<sup>153</sup> The forecasts referred to were the 1200UTC PME available at about 06:00: Ch 6 [155]. In his situation report issued just after 08:00, Mr Malone again referred to those forecasts “for the next 24 to 48 hours being for totals of up to 150mm in SE Qld”. The reference to “SE Qld” was a reference to a “vast area” above and below the dams which included, but was not limited to, the dam catchments and downstream Lockyer Creek and Bremer River catchments.

498 The morning and afternoon QPFs and 1-day PMEs predicted rainfall in the catchment areas above and below Wivenhoe Dam: *Rodriguez (22)* Ch 6. The morning QPF was for 30-50mm in the Somerset and Wivenhoe catchments for the 24-hour period from 09:00: Ch 7 [151], [152].

499 At 10:27 Mr Malone emailed Messrs Ayre, Ruffini and Tibaldi to update them on his operational strategy. The email set out by the judge at Ch 6 [159] read:

“Based upon rain to date, expecting about 70,000ML from upper Brisbane. Lockyer Ck peak of about 100m<sup>3</sup>/s Friday afternoon. This will take out Twin Bridges and nearly inundate Savages Crossing. Colleges Crossing could be taken out by a combined Lockyer and local runoff.

Current strategy is to keep Burton Bridge free. On this basis, we will commence opening Wivenhoe at 1800 Thursday [today] and ramp up to about 300m<sup>3</sup>/s by 22:00. This would limit mid Brisbane flows to just under 400m<sup>3</sup>/s (Burtons capacity 450m<sup>3</sup>/s). If rainfall increases and Lockyer and local runoff also increase, we can close/reduce Wivenhoe accordingly to ensure that that 450m<sup>3</sup>/s is not exceeded unless necessary.

Councils have been advised of this strategy and are contacting residents.”

500 At 06:00 the dam level was 67.31m; by midday it had risen to 67.34m, with inflows averaging around 250m<sup>3</sup>/s and outflows of 50m<sup>3</sup>/s via the regulators: Ch 6 [153]. Mr Malone’s first ROG model run at 12:00 predicted a natural peak flow rate at Lowood of 447m<sup>3</sup>/s early in the morning of 7 January which would have submerged Burtons Bridge without further rain. That run continued releases of 50m<sup>3</sup>/s and predicted a dam level of 68.2m sometime on 11

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<sup>153</sup> Mr Malone’s Observed Rainfall Analysis undertaken after flood event, adopted by primary judge at *Rodriguez (22)* Ch 6 [6].



January: Ch 6 [164]. At 12:14 on 6 January Mr Malone emailed the flood engineers advising that from 18:00 the gates would be opened progressively by five increments of 0.5m until 22:00 (about 250m<sup>3</sup>/s) with the aim of keeping Burtons Bridge open (its submergence flow rate being 450m<sup>3</sup>/s): Ch 6 [165]. Further openings would depend on forecast rain and Lockyer flows.

501 His 13:30 email revised that strategy, advising the engineers and others that “further heavy falls in the Lockyer” since 09:00 meant that the flow of water from Lockyer Creek could be as high as 600m<sup>3</sup>/s peaking on 8 January with the result that the gate openings would be delayed until the “Lockyer peak passes”: Ch 6 [165]. In his afternoon situation report issued at 14:54, Mr Malone reported “isolated heavy falls [of] up to 60mm in the Somerset and Wivenhoe catchments” with forecast totals in the next 24 to 48 hours of up to 100mm to fall in “SE Qld”. He repeated his expectation that a peak flow rate of 600m<sup>3</sup>/s was expected “from the Lockyer late Friday”. Allowing for the “flood levels in the lower Lockyer” to subside, he foreshadowed releases from Wivenhoe during 8 January “as high as 1500m<sup>3</sup>/s” and continuing “for a couple of days”: Ch 6 [167].

502 During the balance of his day shift, Mr Malone conducted further ROG modelling, two at 15:00 and one at 16:00: Ch 6 [168], [171]. Those at 15:00 did not assume any radial gate releases from Wivenhoe. The 16:00 model included releases starting at 16:00 on 7 January. The earlier model runs predicted progressively higher peak flow rates at Lowood (Lockyer Creek) and Moggill, the result of higher ROG inputs over time. The likely later of the two 15:00 models showed Wivenhoe Dam peaking at 68.51m at 11:00 on 11 January, on the basis of no releases. The 16:00 model which provided for releases from 16:00 on 7 January predicted a maximum dam level of 68.41m at 16:00 on 8 January.

503 The afternoon QPF was for 20-30mm of rain in the dam catchments in the 24 hours from 15:00. In his third situation report issued at 17:33, Mr Malone recorded that Wivenhoe was at 67.39m and “rising slowly”: Ch 6 [173]. He confirmed that the Wivenhoe gates would be opened “after the impact of

Lockyer flows on Burtons Bridge had been ascertained and flood levels in the lower Lockyer subside". It was "not expected" that there would be any adverse impacts upon Fernvale Bridge or Mt Crosby Weir Bridge. This report noted that the rain forecast "in SE Qld" for the next 24 to 48 hours was for "totals up to 100mm": Ch 6 [173].

504 The rate of inflows to Wivenhoe between 07:00 and 19:00 ranged from 152m<sup>3</sup>/s to 559m<sup>3</sup>/s, and the level of the dam rose from 67.31m to 67.41m, an increase in the storage volume of 10,985MI which could have been discharged in about three hours at a rate of 1000m<sup>3</sup>/s. During the same period the level of Somerset rose from 99.34m to 99.46m.

(b) *Findings of breach*

505 The primary judge concluded in Ch 12:

"[120] I am satisfied that on their respective shifts on 6 January each of Mr Malone and Mr Ayre breached his duty of care in failing to continue or commence flood operations and make releases (5ASOC [245(a) and [245(b)]], failing to implement and maintain Strategy W3 (5ASOC [245(c)]) and failing to make releases on 6 January 2011 at rates which substantially exceeded the rate of inflows on that day (5ASOC [245(e)]), specifically a rate that was at least above that necessary to inundate Kholo Bridge and in the order of 1200m<sup>3</sup>/s to 1400m<sup>3</sup>/s. The finding at [87] applies with equal force to 5ASOC [245(h)]. The balance of the allegations of breach for 6 January 2011 are rejected."

506 In so holding his Honour accepted Rodriguez' submission that strategy W3 was "required" and that if the flood engineers were operating in accordance with that strategy they would have commenced releases immediately and at significant rates: Ch 12 [116]. Rodriguez submitted that the making of such releases followed from that "correct selection of strategy". The primary judge quoted and accepted that submission: Ch 12 [111], [116]. There remained the large question as to whether a reasonably competent flood engineer operating in strategy W3 in the circumstances facing Mr Malone on the morning of 6 January "must" have made releases that "substantially exceeded the rate of inflows" and in the order of 1200m<sup>3</sup>/s to 1400m<sup>3</sup>/s.

507 Rodriguez submitted that if strategy W3 was engaged releases could not be delayed and “should have been made at rates substantially exceeding rates of inflow to create storage”. As to why such releases should have been made, Rodriguez contended:<sup>154</sup>

“... as the admissions referred to above by Messrs Malone and Ayre establish, the forecasts on 5 and 6 January plainly justified making releases to reduce the water levels in both Wivenhoe and Somerset. In particular, the chronology and the admissions establish that the forecasts required making releases from Wivenhoe because of the real possibility that the window to make non-damaging releases was closing as forecasts indicated that higher releases from Wivenhoe later in the event were likely to combine with downstream natural flows and cause damaging urban flooding.”

508 That submission did not contend that a reasonably competent flood engineer must have made releases between 1200m<sup>3</sup>/s and 1400m<sup>3</sup>/s; rather it relied on “admissions” as justifying the making of significant releases to reduce the water levels in the dams. The “admission” attributed to Mr Malone was that “if it was permissible to make releases on the rising limb of the hydrograph and to make releases below FSL, then the afternoon of 6 January 2011 would have been a ‘good time’ to do so”, without submerging Mt Crosby Weir or Fernvale Bridges.

509 In his analysis of simulation C – the declared or target strategy being to make releases from Wivenhoe to a level 2.5m below FSL<sup>155</sup> – the primary judge found that by 00:00 on 8 January “a reasonably competent flood engineer conducting flood operations in SIM C but using 4-day PME’s to determine strategy and releases” would have been obliged to close Fernvale Bridge and Mt Crosby Weir Bridge by making releases of around 1400m<sup>3</sup>/s: Ch 10 [154]. The primary judge described that finding as “consistent with” acceptance of Rodriguez’ submission at par 1167: Ch 12 [117].

510 The primary judge concluded that given “the identified risk” the reasonably competent flood engineer “would” have made releases between 1200 and 1400m<sup>3</sup>/s. That “risk” was that if releases did not commence immediately and at the rates contended for there would be insufficient flood storage capacity in

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<sup>154</sup> *Rodriguez (22)* Ch 12 [111], extracting Rodriguez’ submission at par 1167.

<sup>155</sup> *Rodriguez (22)* Ch 10 [120]-[121].

Wivenhoe “to store incoming flows should further rainfall occur in accordance with, or in excess of, that forecast” and that without such capacity subsequent releases would be necessary in volumes that would cause urban flooding downstream.<sup>156</sup> The primary judge found that the “effect of the forecasts was that the period of time in which to make releases without the potential to cause damage when combined with downstream flows was shortening”: Ch 12 [118].

511 The forecasts were the 1200UTC forecasts available at 06:00 on 6 January and the 00UTC forecasts available at 18:00 on 6 January. The former were for the four-day period commencing at 22:00 on the previous evening and the latter for the four-day period commencing at 22:00 on 6 January.<sup>157</sup> Those forecasts predicted that the highest rainfall would occur on 9, 10 and 11 January. Mr Malone’s evidence was that, having regard to the 4-day PMEs available to him, “the uncertainty over the location of where rain might fall warranted consideration of the realistic possibility that the forecast rain would fall upstream instead of, or together with, rainfall downstream”: Ch 6 [157].

512 Mr Malone accepted that this was a “clear possibility” that he “needed” to address. The judge summarised Mr Malone’s assessment of the likelihood of that possibility coming to pass (in Ch 6) as follows:

“[156] Mr Malone stated [addressing the PMEs available as at 06:00 on 6 January] that the heaviest rainfall was forecast offshore and to the south-east of the Brisbane River basin. He said that this ‘suggested to me that the higher rainfall was likely to be in the catchments downstream of Wivenhoe Dam rather than above the dam’. He identified the place of the highest rainfall as off the Queensland coast. He said that this ‘highlighted that rainfall with totals [of] up to 150mm per day was possible in South East Queensland but also highlighted the uncertainty as to when and where the highest rainfall was likely to occur’. Thus, he concluded that the ‘PME daily forecasts suggested that the higher totals would be in catchments other than Somerset and Wivenhoe Dams’.

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[158] In cross-examination, Mr Malone accepted that one possibility was that the rainfall of ‘up to or even more than 400mm’ could fall above the dam catchments, that it was a ‘clear possibility’ that there could be a

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<sup>156</sup> 5ASOC [243(a)].

<sup>157</sup> *Rodriguez* (22) Ch 2 [127], [128]; Ch 12 [220]; Ch 6 [172].

considerable amount of rain in the dam catchments over the next eight days, and that there was temporal and spatial uncertainty in connection with the rainfall forecasts in this regard.”

(c) *Disposition: ground 23(b)*

- 513 By ground 23(b) Seqwater challenged the finding that Mr Malone breached his duty of care on 6 January by “failing to continue or commence flood operations and make releases, failing to implement and maintain strategy W3, and failing to make releases at rates which substantially exceeded inflows, specifically a rate at least above that necessary to inundate Kholo Bridge in the order of 1200 to 1400m<sup>3</sup>/s”.
- 514 Seqwater’s principal submission was that the judge’s conclusion that strategy W3 should have been implemented was affected by errors in construing the Manual, with the result that the finding that releases in the order of 1200 to 1400m<sup>3</sup>/s should have been made was not supported by the evidence.
- 515 In oral argument, the errors in the construction of the Manual were identified as the adoption of the “no release” assumption in selecting the flood operations strategy, as well as the making of releases below FSL and use of the 4-day PME forecasts in determining the strategy.<sup>158</sup> Although not referred to, Mr Malone’s evidence also raised a question as to what the constraint in section 8.4 of the Manual that “peak outflow should generally not exceed peak inflow” conveyed and permitted.
- 516 In response, Rodriguez maintained the correctness of the primary judge’s adoption of the “no release” assumption and the use of 4-day PME forecasts or 1-day QPFs in determining strategy and gate releases.
- 517 The condition engaging strategies W2 and W3 was that the predicted level of Wivenhoe exceed 68.5m, but not 74m. If that condition were satisfied the strategy flowchart directed attention to the maximum (combined) flows at Lowood and Moggill. If those combined flows were likely to be less than 3500m<sup>3</sup>/s and 4000m<sup>3</sup>/s respectively, strategy W2 was engaged. Adopting the

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<sup>158</sup> CA tcpt, 20/5/21, pp 311-312.

“no release” assumption and using 24 hour or 4-day PME forecasts, the primary judge found that condition would have been satisfied. That much was conceded by Mr Malone: Ch 6 [194]. However, as accepted above, the Manual did not require adoption of that assumption in selecting a strategy. It was appropriate for any prediction of the dam level for that purpose to take into account the releases which a reasonably competent flood engineer would consider could be made over the period to which the prediction related. Except in one respect, the prediction or predictions that might have been made on that basis are not the subject of any findings.

518 The exception relates to his Honour’s finding that “with forecast” modelling of 24-hour rainfall would have yielded a predicted dam height greater than 68.5m “if conducted on either a no-release basis or [with] the gate releases suggested by” Mr Ayre’s model run at 21:00 on 6 January: Ch 6 [194]. That finding was based on a model run undertaken by Mr Malone, after the event, using data available at 18:00 on 7 January and otherwise making the assumptions in Mr Ayre’s 21:00 model. Those releases differed from the releases adopted by Mr Malone in his ROG model run at 16:00.

519 However, that evidence did not justify a finding that a reasonably competent flood engineer determining which strategy to apply and taking account of the QPF forecasts and 4-day PMEs *must* reasonably have concluded that the level of Wivenhoe was likely to exceed 68.5m, so as to engage strategy W2 or W3. In the absence of any contention that a reasonably competent flood engineer could only have predicted such a dam level (taking into account Mr Ayre’s modelled releases), Seqwater’s challenge to the finding that Mr Malone was “required” to act in accordance with strategy W3 is made out. It also follows that the challenge to the finding of breach in not making the releases contended for is also made out. If the predicted level of the dam had exceeded 68.5m, the question remained whether strategy W2 or W3 was to be applied. The Manual’s strategy flowchart suggested that strategy W2 was engaged if the combined maximum flow at Lowood was likely to be less than 3500m<sup>3</sup>/s and at Moggill less than 4000m<sup>3</sup>/s. Dr Christensen’s methodology suggested that in determining which strategy to apply, at least each day (if not more frequently),

the engineer should compute a flow hydrograph for Lowood and Moggill based on rain on the ground (best forecast stream flow) and 24-hour forecast (best forecast rainfall for this purpose).

520 Assuming that strategy W3, rather than W2, was engaged, the remaining question was whether a reasonably competent flood engineer in Mr Malone's position "must" have released water at rates above 1200m<sup>3</sup>/s. In addressing that question, the primary judge referred to his conclusion in the very different circumstances prevailing in simulation C.

521 The strategy in that counterfactual was to create flood storage space in Wivenhoe by reducing the dam level to 2.5m below FSL. Dr Christensen did not consider he was constrained from doing so or from making releases in excess of the peak inflow to the point in time when the releases were being made. It is not necessary to pursue this aspect of his Honour's finding because it only has relevance if strategy W3 were required to be implemented.

(4) *7 January – Mr Malone's day shift (ground 23(c))*

(a) *Summary of shift*

522 At 07:00 on Friday 7 January Wivenhoe Dam was at 67.68m, having increased from 67.41m at 19:00 on the previous evening. During that period total flow rates into Wivenhoe, including from Somerset, were as low as 355m<sup>3</sup>/s at 19:00 and as high as 1342m<sup>3</sup>/s at 05:00. No releases were made (other than those from the regulator and hydro). The flood engineers eventually commenced releases at 15:00 on 7 January, those releases increasing to 1239m<sup>3</sup>/s by 14:00 on 8 January.

523 At about 06:00 on 7 January the five 1-day 1200UTC PME forecasts for the period commencing 22:00 on 6 January became available. Mr Malone commenced his shift at 06:45, replacing Mr Ayre whose shift finished at 07:00. Mr Malone was later replaced by Mr Ruffini, whose first shift commenced at 18:45. The ROG model run by Mr Ayre at 21:00 the previous evening had assumed gate operations starting at 23:00 on 7 January, increasing to a peak

release rate of about 1225m<sup>3</sup>/s (gates opened to 24 increments) at 22:00 on 8 January. Mr Ayre's 06:06 situation report noted that there had been "significant" rain in the Lockyer Creek catchment and that the forecast for the next five days was for "totals between 100 and 200mm in SE Qld", which, given the "saturated condition of the catchments", was most likely to produce further runoff: Ch 6 [219]. During the handover from Mr Ayre, it was decided that Mr Malone would proceed with releases from Wivenhoe "after the peak had passed from Lockyer Creek": Ch 6 [226].

524 At 08:00 the Bureau of Meteorology advised that "SE Qld" could "expect some high rainfall totals over the next five days up to Tuesday with the largest predicted" for 9 and 10 January (being Sunday and Monday): Ch 6 [226]. An earlier email from the Bureau had referred to some "isolated major flooding in the Bremer River and Lockyer". Mr Malone's email sent to Seqwater staff at 08:04 was headed "Operating strategy over the next week" and provided:

"Advice from BoM indicates that SE Qld can expect some high rainfall totals over the next 5 days.

Friday: Rain at times 15-50mm with higher falls along the coast

Saturday [8 January]: Rain light at times 15-50mm with higher falls along the coast

Sunday [9 January]: Widespread rain with totals between 50-100mm

Monday [10 January]: Widespread rain again with totals between 50-100mm

Tuesday [11 January]: Rain easing with totals between 25-50mm

Given the saturated conditions of the dam catchments, significant volumes of inflows to our dams will be generated.

On this basis, the operating strategy for Somerset, Wivenhoe and North Pine needs to consider the current state of the storages and the project[ed] inflows."

525 Mr Malone concluded in relation to Wivenhoe that releases would be "ramp[ed] up" to about 1200m<sup>3</sup>/s later that day, noting that "given the high likelihood of significant inflows in the next week, this may be increased to 1500m<sup>3</sup>/s in order to drain the current temporarily stored flood waters as soon as possible". The result was said to be that all of the crossings downstream of Wivenhoe with the exception of Fernvale Bridge (submergence flow rate 2000m<sup>3</sup>/s) and Mt Crosby Weir Bridge (submergence flow rate 1900m<sup>3</sup>/s) would be adversely impacted. However at 11:13 Mr Malone advised that releases would commence at 15:00



“and be slowly increased to about 1200m<sup>3</sup>/s” by 14:00 on 8 January, and issued a directive for the opening of the radial gates by seven increments between 15:00 and 21:00 (estimated flow rate 400m<sup>3</sup>/s): Ch 6 [228].

526 By midday on 7 January the dam level was 67.88m. By 19:00 that level was 68.17m, the rates of inflow rising as high as 2225m<sup>3</sup>/s at 11:00 and fluctuating below that level and as low as 958m<sup>3</sup>/s at 19:00. Mr Malone ran at least two further ROG models, the first at midday and the second at 18:00. The gate operations adopted in the first were the same as those in Mr Ayre’s 21:00 run on 6 January, except that they started eight hours earlier at 15:00 on 7 January. This model predicted a maximum dam level of 68.32m and a combined maximum flow rate at Moggill of 1615m<sup>3</sup>/s at 14:00 on 8 January. The second ROG model run, at 18:00, extended the 24-increment release period from midday on 9 January to 00:00 on 11 January, a 36-hour period in which the PMEs forecast heavy rainfall: Ch 6 [238]. The predicted maximum level of Wivenhoe was 68.51m at 14:00 on 8 January.

527 At 18:00 on 7 January the level of Somerset was 100.11m. The inflow rate to Somerset (excluding outflows to Wivenhoe) since 07:00 had varied between 169m<sup>3</sup>/s and 879m<sup>3</sup>/s. At that time Mr Malone directed that the regulator be closed and one sluice gate opened. As a result the outflow from Somerset to Wivenhoe increased from 34m<sup>3</sup>/s to around 206m<sup>3</sup>/s.

528 Mr Malone’s situation report, also issued around 18:00, reported widespread rain since 09:00 throughout the Somerset and Wivenhoe catchments (20-40mm). Referring to the five 1-day PME forecasts received in the morning, he again noted that “significant inflows to Seqwater dams will be generated”, especially following the forecast rainfall on 9 and 10 January: Ch 6 [233]. In cross-examination Mr Malone accepted that if the rain forecast for those days (100mm, the question in cross-examination referring to that rainfall depth but not identifying where that rain might fall) eventuated “it might not be possible for Wivenhoe Dam to make releases on those days without combined flows at Moggill exceeding 4000m<sup>3</sup>/s”: Ch 6 [230].

529 At around 18:00 the 1-day 00UTC PME for the five days commencing 22:00 on 7 January became available. The four-day estimates issued at midnight and based on those PMEs were extracted by the primary judge at Table 9-2 which set out the forecast rainfall estimates of Rodriguez (Dr Christensen) and the State of Queensland: see [312] above. As to the rain forecast to fall on 8, 9 and 10 January, the primary judge recorded the different predictions proposed by Rodriguez and the State:

“[242] According to [Rodriguez], the PME for the 24 hour period to 10.00pm on 8 January 2011 predicted rainfall of between 10mm to 50mm, whereas according to the State, it predicted between 1mm to 25mm above the dam and between 5mm to 50mm below the dam. The one day PME for 9 January 2011 appeared to predict rainfall across the catchments above and below the dams of between 25mm and 150mm or 200mm. The PME for Monday 10 January 2011 appeared to predict rainfall of between 25mm and 100mm across the same area.”

530 The primary judge did not find that these PME forecasts, only available at around 18:00, should have been considered and acted upon by Mr Malone before the end of his shift at 19:00: Ch 6 [240].

531 Mr Ruffini issued directives during his overnight shift which progressively resulted in the gates being opened to 18 increments by 08:00 on 8 January (927m<sup>3</sup>/s). At 22:00 he ran a forecast rainfall (72-hour time period) model which used the same gate operations as Mr Malone’s 18:00 ROG run. That model predicted a dam level of 68.9m at 21:00 on 8 January: Ch 6 [247]. There were issues about the “competency” of this modelling run. The primary judge considered that “on the information available at the time it was said to be conducted” the model “yielded a serious underestimate of the likely inflows into Wivenhoe Dam from existing rainfall and rain forecast to fall over the following 72 hours”: Ch 6 [248]. He also found that by 00:00 on 8 January the likelihood of the storage level of 68.5m being exceeded was “overwhelming” given the height of the dam at that time (68.32m), the rainfall to date and the forecasts which had been received: Ch 6 [257]. However, this finding is of only indirect significance as Seqwater was not held to be responsible for Mr Ruffini’s conduct.

(b) *Findings of breach*

532 In Ch 12 the primary judge found that:

“[138] ... during his shift on 7 January 2011, Mr Malone breached his duty of care in failing to implement and maintain (at least) Strategy W3 (5ASOC [267(a) and (c)]), failing to commence releases prior to 3.00pm (5ASOC [267(b)]) and failing to cause Wivenhoe Dam to release water at rates exceeding the rate of inflow (5ASOC [245(f)].”

533 His Honour concluded that at some stage on 7 January the selection of strategy W3 was “required” regardless of whether the relevant prediction was made by reference to the 4-day PME’s or 1-day QPF’s: Ch 12 [131]. That was undoubtedly correct if a “no release” calculation were made. At 07:00 on 7 January the actual dam level was 67.68m. The estimated maximum inflow volume based on the 4-day 00UTC PME’s issued at 00:00 on 7 January was between 608,000MI (Dr Christensen) and 547,000MI (Mr Giles as corrected).<sup>159</sup> Looking at the position at 07:00 and assuming no releases, that inflow would have resulted in a dam level higher than 71m. A dam level exceeding 68.5m was also predicted (on a “no release” basis) if Mr Pokarier’s corrected 7 January morning QPF estimated inflow volume were used.<sup>160</sup>

534 The primary judge also found that the rain forecasts available on 7 January “either did demonstrate, or should have demonstrated, to each of Messrs Ayre, Malone and Ruffini the strong likelihood, bordering on certainty as the day progressed, that the storage level of Wivenhoe Dam” would exceed 68.5m: Ch 6 [256]. That finding was not in terms challenged. Nor could it be in the face of the 18:00 ROG model run by Mr Malone which predicted a maximum dam level of 68.5m. Whilst that run took into account ROG as at 18:00, it did not take account of the afternoon QPF which forecast 20 to 30mm of rain in the dam catchments in the 24 hours to 16:00 on 8 January: Ch 6 [214].

535 As to the rate at which water was “required” to be released, his Honour said in Ch 12:

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<sup>159</sup> See *Rodriguez (22)* Tables 9-2, 9-6 and Ch 9 [232], [233].

<sup>160</sup> *Rodriguez (22)* Table 9-8, Ch 9 [286].

[131] ... the implementation of Strategy W3 and the recognition of its priority of avoiding urban inundation required a substantial increase in releases. The findings in Chapter 10 concerning SIM C recognise that by midnight on 7 January 2011 at its modelled dam level, releases sufficient to inundate the remaining bridges were required to be made. That finding would apply with even greater force to the events that transpired given the actual levels of the dam exceeded the modelled level of SIM C on 7 January 2011 by approximately 2m or more. SIM C's modelled releases created storage space (ie, they exceeded the rate of inflow)."

536 The finding in Chapter 10 concerning simulation C is in terms a finding that "a reasonably competent flood engineer conducting flood operations in SIM C but using 4-day PME's to determine strategy and releases ... and acting in accordance with the Manual ... *would have been obliged*" to close the remaining two bridges by 00:00 on 8 January 2011: Ch 10 [154] (emphasis in original). The qualifier, "conducting flood operations in SIM C", should be noted. As at 00:00 on 7 January, the actual dam level was 1.77m higher than in simulation C (equivalent to additional storage volume in the simulation of 184,471MI). The judge separately (and more relevantly in the present context) held that a reasonably competent flood engineer operating in simulation F would have submerged the two bridges in the early morning of 8 January: Ch 10, [18], [144]. The factor identified as justifying the "substantial step" of inundating those bridges was "the likelihood of forced releases above 74m and downstream flows above 4000m<sup>3</sup>/s", which his Honour described as "very real" and as far outweighing "the inconvenience arising from their closure": Ch 12 [132]. That prospect had two elements. The first was the predicted level of the dam having regard to ROG and forecast rain, which in turn directed attention to inflow rates during the forecast period. The second directed attention to the predicted peak natural flows at Moggill, having regard to ROG and rain forecast in the Lockyer Creek and Bremer River catchments.

537 The primary judge considered the predicted level of the dam on the basis of information available to Mr Malone at 18:00 on 7 January, when the level of Wivenhoe was 68.12m: Ch 6 [265]. Mr Malone's situation report estimated the volume of ROG still to flow into the dam as 160,000MI. The remaining storage capacity between the actual dam level and 74m was 790,098MI, which Mr Malone estimated to be equivalent to 140mm excess or runoff rainfall. After

allowing for the 160,000MI ROG, the depth of rainfall necessary to produce the remaining inflow of 630,098MI was estimated to be between 145mm or 130mm, the former adopting Mr Malone's runoff ratio of 77%, and the latter adopting Dr Christensen's runoff ratio of 86%: Ch 6 [230], [265]. Taking the 4-day 00UTC PME forecast available at 00:00 on 8 January, the estimated average rainfall depth was 200mm taking Dr Christensen's range, and 175mm taking the State of Queensland's range: Table 9-2 at [312] above.

- 538 The primary judge held that "given the forecasts and the saturated catchment, the prospect of 140mm excess or runoff rainfall was very likely. In those circumstances there subsisted a serious and significant risk that *if sufficient releases were not made at that time*, releases would have to be made from above 74m later" (emphasis added): Ch 6 [266]. The finding as to the "likelihood ... [of] downstream flows above 4000m<sup>3</sup>/s"<sup>161</sup> appears to have been based, at least in part, on Mr Malone's acceptance in cross-examination that if the forecasts for 9 and 10 January "came to pass, it might not be possible for Wivenhoe dam to make releases on those days without combined flows at Moggill exceeding 4000m<sup>3</sup>/s".
- 539 Thus the judge's conclusion that, on the evening of 7 January, there was a "very real" likelihood of forced releases above 74m and downstream flows above 4000m<sup>3</sup>/s<sup>162</sup> depended on a number of possibilities coming to pass. They included the average of the forecast rain falling in the dam catchments over the four days, sufficient releases not being made from Wivenhoe in the three or four day period of that prediction,<sup>163</sup> and heavy rain in the downstream Lockyer Creek and Bremer River catchments resulting in significant natural flow rates at Lowood and Moggill.
- 540 From Mr Malone's perspective the forecasts on which the primary judge's analysis was based did not become available until 18:00. The 1200UTC PME forecasts which became available at 06:00 had been considered in Mr Malone's

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<sup>161</sup> *Rodriguez (22)* Ch 12 [132].

<sup>162</sup> *Rodriguez (22)* Ch 12 [132].

<sup>163</sup> *Rodriguez (22)* Ch 6 [266].

email of 08:04. The average forecast rainfall over the four-days was 100mm (Christensen) and 87.5mm (the State of Queensland), as set out in Table 9-2 at [312] above. Mr Malone's assessment on the morning of 7 January was that the coloured contour maps available on the BoM website suggested the highest falls were likely to be "very coastal" and downstream of Wivenhoe Dam: Ch 6 [221], [222], [226].

(c) *Disposition: ground 23(c)*

541 His Honour's findings in relation to this shift are challenged by ground 23(c). Seqwater made three submissions. First, it said that the primary judge's finding that strategy W3 was required to be implemented was based on a "no release" prediction as to the dam level. Secondly, it said that the finding that the flood engineers had to make releases which submerged the remaining two bridges presupposed that strategy W3 was engaged. Thirdly, it said that the evidence did not support the primary judge's conclusion as to the "likelihood" of forced releases above 74m and combined downstream flows above 4000m<sup>3</sup>/s, so as to justify the submerging of those bridges. This last submission challenged the judge's reliance on the 4-day PME forecasts which became available at 18:00 on 7 January (at the end of Mr Malone's shift). The relevant forecasts available to Mr Malone were those issued at 00:00 on 7 January, the averages of which were not sufficient to produce the further runoff rainfall required to cause the dam level to exceed 74m: see Table 9-2.

542 In response Rodriguez maintained that the selection of strategy was to be undertaken on a "no release" basis and supported the primary judge's findings as to the predicted level of the dam and rate of downstream flows by reference to the 4-day PMEs that became available at 18:00. That the upper range of those forecasts predicted twice as much rain as would have been required to take the dam above 74m on a "no release" basis, was said to support the conclusion that releases would not have prevented the dam from rising above 74m.

- 543 As to Seqwater's first submission, the primary judge's finding that strategy W3 was "required" on 7 January proceeded from the premise that the position on 7 January was "no different from that stated" for 6 January: Ch 12 [121]. For the reasons given in relation to 6 January, a finding that strategy W3 was engaged assumed "no releases" were made and was not required by the Manual.
- 544 However, his Honour's finding that "as the day progressed" the engineers should have chosen strategy W3 did not depend solely on a predicted dam level based on a "no release" assumption. Mr Malone's ROG model run at 18:00 predicted a level of Wivenhoe of 68.51m at 14:00 on 8 January. On the basis of that modelling and taking into account the five 1-day 00UTC PMEs available at 18:00, the evidence established by this time that the level of Wivenhoe was likely to exceed 68.5m, engaging strategy W2 or W3. However, those forecasts did not become available to Mr Malone before 18:00, or in sufficient time for him to undertake the analysis necessary to justify and require that decision.
- 545 It follows that whilst the evidence justified a finding that by the end of 7 January strategy W2 or W3 was engaged, it did not support the conclusion that a reasonably competent flood engineer in Mr Malone's position "must" have determined by the close of his shift that strategy W2 or W3 was engaged. It follows that the challenge to the findings of breach which are the subject of ground 23(c) should be upheld.
- 546 In reaching that conclusion it has been unnecessary to consider Seqwater's challenge to the primary judge's finding that by the evening of 7 January there was a "very real" likelihood of forced releases above 74m that would combine with downstream flows to produce flow rates above 4000m<sup>3</sup>/s, being a likelihood that should have been appreciated by any reasonably competent flood engineer.

(5) *8/9 January – Mr Tibaldi’s overnight shift (ground 24)*

(a) *Overview*

547 The primary judge found that on the evening of Saturday 8 January, during the first part of his overnight shift, Mr Tibaldi failed to take precautions that a reasonably competent flood engineer would have taken. As pleaded, those precautions were complying with the Manual, implementing and maintaining strategy W4 and causing Wivenhoe to release "at rates exceeding the rate of inflow": Ch 12 [157]. In the early morning part of his shift, Mr Tibaldi was found to be in breach in failing to comply with the Manual and implementing and maintaining strategy W4: Ch 12 [182]. No separate allegation was made that "on the morning of 9 January" he failed to make releases at rates exceeding the rate of inflow. Ground 24 addressed the separate findings made in relation to the evening and early morning parts of Mr Tibaldi's shift. However, before addressing Mr Tibaldi's shift, it is necessary to record, briefly, what happened during Mr Ayre's day shift.

(b) *Summary of Mr Ayre’s day shift*

548 In the 24 hours to 09:00 on 8 January, the average rainfall in the dam catchments was about 26mm.<sup>164</sup> Mr Ruffini's situation report issued at about 06:30 on 8 January noted that "no significant rain had fallen in the past 12 hours" and that the 4-day PME forecasts (available at 00:00 on 8 January) indicated "that SE Qld can expect further high rainfall totals over the next four days". The estimated rain forecast for the four days commencing 22:00 on 7 January was identical to the 5-day forecast from the previous day (set out at [524] above) except that for 8 January 5-50mm was forecast instead of 15-50mm: Ch 7 [5].

549 The report stated that by midday on 8 January it was proposed to "ramp up" releases to 1200m<sup>3</sup>/s and that this may have to be increased "given the high likelihood of significant inflows in the next week". This strategy was essentially

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<sup>164</sup> Mr Malone’s Observed Rainfall Analysis undertaken after the flood event and adopted by primary judge at *Rodriguez (22)* Ch 6 [6].



the same as that recorded by Mr Malone in his situation report issued on the previous evening: Ch 6 [234].

- 550 Mr Ayre signed on at 06:30. The level of Wivenhoe at 07:00 was 68.48m and by 08:00 it exceeded 68.50m (albeit by only 2cm). That occurred earlier (by 6 hours) than the maximum height (68.51m) predicted by Mr Malone's second ROG model run at 18:00 on 7 January. At 08:15 Mr Ayre directed that the gate openings be increased to 24 increments by 14:00, with an expected outflow of around 1200m<sup>3</sup>/s: Ch 7 [15].
- 551 Mr Ayre ran an ROG model at 09:00 which predicted a dam level of 68.64m at 21:00 that evening, assuming releases of 1252m<sup>3</sup>/s (24 increments) from 14:00 on 8 January which peaked at 1472m<sup>3</sup>/s (29 increments) at 01:00 on 10 January: Ch 7 [39]. Those releases were expected to result in combined flow rates at Moggill of around 1600m<sup>3</sup>/s, which would keep open the Mt Crosby Weir Bridge and Fernvale bridges: Ch 7 [39]. The natural peaks at Lowood and Moggill were shown as having already occurred.
- 552 Before 11:35 Mr Ayre directed that a second sluice gate at Somerset be opened. At that time the level of Somerset was 100.45m. As a result the outflow rate from Somerset to Wivenhoe increased from 207m<sup>3</sup>/s to 413m<sup>3</sup>/s. Over the period from midday on 8 January to 14:00 on 9 January the level of Somerset fell to 100.27m and then slowly increased to 100.47m. Mr Ayre's directive noted that Somerset was expected to peak at around 100.48m but was "still rising", requiring the implementation of strategy S2: Ch 7 [47]. In fact the inflow to Somerset increased dramatically between 09:00 on 9 January (1027m<sup>3</sup>/s) and 15:00 on that day (5352m<sup>3</sup>/s) after which the inflow fluctuated, but not below 2128m<sup>3</sup>/s until 15:00 on 10 January. At that time the dam level was 103.43m.
- 553 At 12:15 Mr Ayre issued an FOC status report. He noted that no significant rain had fallen in the dam catchments in the previous 18 hours,<sup>165</sup> and repeated the

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<sup>165</sup> In the 24 hours from 10:00 on 7 January around 25mm of rain fell in the dam catchments and in the 24 hours from 16:00 on 7 January about 6mm had fallen.

four-day forecasts summarised in Mr Ruffini's earlier situation report, noting that "SE Qld can expect further high rainfall totals over the next four days". His report continued in relation to Wivenhoe:

"At 1200 Saturday, Wivenhoe Dam was 68.60m AHD and rising steadily with all five gates open and releasing about 1,150 m<sup>3</sup>/s. River levels upstream of Wivenhoe Dam have peaked and are now receding. However the further inflows into the dam has led to elevated levels. It is intended to increase the release from Wivenhoe to 1,250m<sup>3</sup>/s by 14:00 on Saturday 08/01/2011. This will maintain flows of up to 1,600m<sup>3</sup>/s in the mid-Brisbane River throughout the afternoon.

Further assessments will be undertaken to determine releases above this level given the high likelihood of significant inflows in the new few days. The interaction with runoff from the Bremer River and Warrill Creek catchment will also be assessed to determine an appropriate release strategy. Projections based upon the forecast rainfalls suggest flows of up to 1,200m<sup>3</sup>/s will emanate from the Bremer River catchment."

554 In relation to "Impacts downstream of Wivenhoe", Mr Ayre stated:

"The projected release of 1,250m<sup>3</sup>/s and combined with Lockyer flows and local runoff will mean that all low level crossings downstream of Wivenhoe (Twin Bridges, Savages Crossing, Burtons Bridge, Kholo Bridge and Colleges Crossing) will be adversely impacted for several days. At this stage Fernvale and Mt Crosby Weir Bridge are not expected to be affected, but they could potentially be affected if the predicted rainfall totals eventuate and higher releases from Wivenhoe Dam are considered necessary."

555 At 15:00 Mr Malone emailed Mr Ayre referring to the four-day forecasts for "SE Qld" and noting that the "BoM estimates are now double these estimates for the next few days". No finding was made by the primary judge as to the forecasts to which Mr Malone may have been referring. Mr Ruffini's estimates were based on the 00UTC PME forecasts issued at 00:00 on 8 January and did not understate what they showed: Table 9-2 at [312] above.

556 Mr Ayre undertook two further model runs at around 15:00, one using ROG and the other the rainfall depths and loss rates for upstream catchments used by Mr Ruffini in his 72 hour model run at 22:00 on 7 January. As with Mr Ruffini's model, the primary judge concluded that Mr Ayre's modelling yielded a serious underestimate of the likely inflows based on ROG and forecast rain: Ch 7 [64]. The ROG model deferred the commencement of the gate opening sequence

from 24 to 29 increments by three hours, thereby extending the maximum discharge ( $1438\text{m}^3/\text{s}$ ) to 19:00 on 10 January: Ch 7 [66]. That model predicted a peak dam level of 68.66m at 20:00 on 8 January. In doing so it took no account of the forecasts of heavy rain continuing on 9 and 10 January.

557 Mr Ayre's evening situation report was issued shortly before 18:00: Ch 7 [68]. The afternoon QPF was for between 30 and 50mm of rain in the dam catchments for the 24 hours from 15:00 on 8 January. The report also referred to the PME forecasts for the next three days – 9 January (50 to 100mm), 10 January (50 to 150mm) and 11 January (25 to 50mm). The level of Wivenhoe was 68.65m “and rising slowly” and the “current gate operation strategy” was to maintain “flows of up to  $1600\text{m}^3/\text{s}$  in the mid-Brisbane River throughout the evening”.

558 Mr Ayre repeated the following comments from his earlier status report in his evening report – that river levels upstream of Wivenhoe “have peaked and are now receding”; that it was intended to maintain releases at  $1250\text{m}^3/\text{s}$  whilst keeping flows at no more than  $1600\text{m}^3/\text{s}$  at Moggill; that further assessments were required to determine releases above that level “given the high likelihood of significant inflows in the next few days”; and that this would in turn require an assessment of the runoff from the Bremer River to determine an appropriate release strategy. Finally, he referred to projections based on forecast rainfall which suggested that flows of up to  $1200\text{m}^3/\text{s}$  would “emanate” from the Bremer River catchment; and recorded that even if releases from Wivenhoe “may need to adversely impact” the remaining two bridges, they “will be maintained below  $3500\text{m}^3/\text{s}$ ”: Ch 7 [71].

559 In fact, in the 48 hours from 09:00 on 9 January to 09:00 on 11 January the average rainfall in the catchments to the dams was 313mm in the Somerset catchment, and 238mm in the Wivenhoe catchment. During the same period

the average rainfall in the Lockyer Creek and the Bremer River catchments was 169mm and 117mm respectively.<sup>166</sup>

(c) *Summary of Mr Tibaldi's overnight shift*

- 560 Mr Tibaldi had been on leave between 2 and 7 January and had only returned to Brisbane on 8 January. His overnight shift commenced at 19:00 that evening and concluded at 07:00 on 9 January. The findings did not suggest he did any model runs in the evening. He did however review the earlier 72-hour model run undertaken by Mr Ayre.
- 561 In the period from 19:00 until midnight on 8 January, the level of Wivenhoe remained around 68.65m, there being no significant difference between the flow rates into and out of the dam. In the period from 00:00 to 07:00 on 9 January, the dam level dropped from 68.64m to 68.57m. Directives were given to open the gates by two increments with the result that the Wivenhoe outflow rate increased from 1241m<sup>3</sup>/s (24 increments) at 00:00 to 1334m<sup>3</sup>/s (26 increments) at 07:00.
- 562 The 4-day 00UTC PME forecasts issued at 00:00 on 9 January estimated rainfall in the catchments above the dams in the range of 75-300mm (Dr Christensen) or 50-300mm (State of Queensland): Ch 9 [138], Table 9-2.
- 563 Mr Tibaldi's situation report issued at 06:15 on 9 January noted that some areas in the Somerset catchment had recorded falls exceeding 60mm "over the last two hours". The current gate strategy continued to be maintaining "flows of around 1600m<sup>3</sup>/s in the mid-Brisbane River": Ch 9 [138], Table 9-2.
- 564 At the end of his shift, Mr Tibaldi undertook an ROG model run which used the same gate openings as Mr Ayre's 8 January 15:00 run, except that it extended the maximum gate opening period (29 increments) to 00:00 on 12 January. That model predicted a dam level of 68.66m at 20:00 on 8 January, a peak release rate of 1493m<sup>3</sup>/s, and a maximum combined flow rate at Moggill during

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<sup>166</sup> Mr Malone's Observed Rainfall Analysis undertaken after flood event and adopted by the primary judge.

that peak release period of 1639m<sup>3</sup>/s: Ch 7 [151]. As in the earlier models, only one natural peak was predicted at Lowood and Moggill and in each case was shown as having occurred on the evening of 7 January.

(d) *Findings of breach*

565 In the period from 19:00 on 8 January to 00:00 on 9 January the primary judge found in Ch 12 in relation to Mr Tibaldi:

“[157] ... that in failing to implement Strategy W4 on 8 January 2011, and failing to make releases from Wivenhoe Dam that exceeded the rate of inflow, [he] breached [his] duty of care (5ASOC [288(a), (b) and (d)]).”

566 Addressing the remaining period from 00:00 to 07:00 on 9 January, the primary judge found in relation to Mr Tibaldi:

“[182] ...that, in failing on the balance of his shift on 9 January 2011 to implement W4, Mr Tibaldi breached his duty of care (5ASOC [307(a) and (b)]).”

567 The finding that the flood engineers were obliged to adopt strategy W4 was based on a prediction of the likely level of Wivenhoe made by reference to the 4-day 00UTC PME forecast available at 00:00 on 8 January. As has been noted, the average of that forecast was 200mm (Dr Christensen) and 175mm (the State of Queensland). The projected levels of the dam, assuming no releases during the relevant four-day period, were 75.82m (Dr Christensen) and 75.09m (Mr Giles (corrected)).<sup>167</sup>

568 The primary judge considered whether “proper modelling” using forecast rainfall depths would have predicted a dam level exceeding 74m. He first did so by reference to Mr Tibaldi's evidence as to his re-creation of the 72-hour model run of Mr Ayre undertaken at 15:00 on 8 January: Ch 7 [112]-[119]. The judge concluded that if modelling had been done using different forecasts of rain, “it is overwhelmingly likely that *either* the predicted level of Wivenhoe dam would have exceeded 74m or the strategy of maintaining Fernvale Bridge and Mt Crosby Weir Bridge open would have had to have been abandoned”

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<sup>167</sup> *Rodriguez (22)* Ch 9 [235], Table 9-6; Ch 12 [144]; Appendix E.

(emphasis added). That conclusion acknowledged two possible outcomes from the “proper modelling” exercise, one of which was that the reasonably competent flood engineer would (or must) have adopted release rates sufficient to submerge the two bridges. That would have avoided, at least at that point in time, a predicted dam level exceeding 74m. Accordingly his Honour’s observation is not consistent with a conclusion that, taking account of releases, any reasonably competent flood engineer must have predicted that the dam level would exceed 74m: Ch 7 [119].

569 The same reasoning explains the judge's qualified finding that Mr Ayre was obliged to select strategy W4 *if* his prediction as to the level of the dam involved “proper modelling” undertaken on the basis that releases would be kept below a level that kept the two remaining bridges open: Ch 7 [124]. In other words, in undertaking “with release” modelling, a reasonably competent flood engineer (at this time necessarily operating in strategy W3) would have submerged the two bridges, and on that basis not selected strategy W4 at that time. That conclusion is consistent with his Honour's observation that “even if strategy W4 was engaged, as opposed to W3” that would not have led to any immediate substantial difference in gate operations compared to the “proper implementation of strategy W3” which also required “the immediate inundation of the remaining bridges”: Ch 7 [124], Ch 12 [155].

570 In the result, the primary judge found that the “implementation” of strategy W4 required the making of releases that submerged the remaining bridges and “as high as possible” without the combined flows exceeding 4000m<sup>3</sup>/s at Moggill. In not making those releases in the period to 00:00 on 9 January, Mr Tibaldi was held to be in breach of his obligation to “implement” strategy W4, as well as his obligation to make releases “above the rate of inflows”: Ch 12 [155]. His Honour did not separately consider whether that obligation was also shown to have been breached by a comparison of the actual inflows and outflows from hour to hour during the period from 19:00 to midnight.

571 The primary judge's reasoning as to the application of strategy W4 and its implementation (requiring a substantial increase in releases) applied equally to

the period of Mr Tibaldi's shift from 00:00 to 07:00 on 9 January: Ch 12 [165]. That sufficiently disposed of Rodriguez' pleaded claim for that period.

572 In its written submissions Rodriguez separately contended that Mr Tibaldi was “obliged to make releases at rates exceeding the rate of inflow”. In response Seqwater submitted that during this part of his shift “Mr Tibaldi made releases that were in excess of inflows”: Ch 12 [168]. Having first noted that there was no pleaded allegation of any failure to that effect on 9 January, the primary judge accepted that had such an allegation been made it would not have been separately established because in the early morning of 9 January Mr Tibaldi made releases that were in excess of inflows: Ch 12 [168]. Before this Court, in challenging the finding of breach during the evening shift of the pleaded obligation to make releases “above the rate of inflows”, Seqwater relied on a similar “hourly” analysis of inflows and outflows.

*(e) Disposition: ground 24*

573 Ground 24 challenged the findings that Mr Tibaldi breached his duty of care in failing to implement strategy W4 in his overnight shift on 8/9 January and in failing to make releases that exceeded the rate of inflow in the period to midnight. The primary judge’s finding that Mr Tibaldi was required to implement strategy W4 must be set aside. The analysis supporting that finding depended on a prediction which did not take into account the making of releases during the period of the forecasts. The evidence did not establish that a reasonably competent flood engineer, taking into account releases at rates and for periods assessed as necessary, must have predicted the dam level would exceed 74m.

574 It follows from the rejection of the finding that the implementation of strategy W4 was “required” that the finding that Mr Tibaldi was in breach by failing to make releases at levels which exceeded those necessary to submerge the two bridges must also be set aside. The primary judge did not separately address the alleged failure to make releases that exceeded the rate of inflow, treating that obligation as breached by the failure to make releases at levels which would submerge the bridges. To that extent, that finding must also be set aside.

Doing so makes it unnecessary to consider Seqwater's "hourly" analysis argument.

575 It may seem curious that these quite specific findings of breach in relation to the rates at which releases were being made from Wivenhoe by the evening of 8 January are to be set aside. That is particularly so in circumstances where the judge found that the implementation of strategy W4 on 8 January would not have yielded a different outcome to the proper application of strategy W3. His Honour considered each required, by the end of 8 January, the submerging of the two bridges. However, the primary judge's findings addressed Rodriguez' pleaded case which, as at 8 January, sought to engage simulation F, which in turn required the adoption of strategy W4 when it commenced at 00:00 on 8 January.

(6) *9 January – Mr Malone's day shift (ground 25(a))*

(a) *Summary of shift*

576 On Sunday 9 January, Mr Malone signed on at about 06:30 and finished his shift at 21:30. In the 24 hours to 09:00 the average rainfall in the dam catchments had been 53mm for Somerset and 19mm for Wivenhoe. The morning QPF forecast rain in the dam catchments in the 24 hours from 09:00 of 40-60mm. In fact, at least 140mm of rain fell in those catchments during this period. The 4-day 00UTC PMEs received at 00:00 on 9 January forecast rain in the catchments above the dams of between 75-300mm (Dr Christensen) and 50-300mm (State of Queensland): see Table 9-2 at [312] above. Following a discussion in which Mr Malone expressed concerns in relation to downstream flows and "never before seen Wivenhoe releases" which would submerge the remaining two bridges, Mr Ayre called a meeting of the flood engineers at 15:00: Ch 7 [166].

577 Mr Malone ran several ROG models in the course of his shift. The first, at 09:00, adopted the same gate openings as Mr Tibaldi's 9 January 07:00 ROG run and accordingly sought to limit combined downstream flows to 1600m<sup>3</sup>/s. At 11:01 Mr Malone sent an email to the flood engineers and others entitled



“Forecast Rainfall and Possible Runoff”. He noted that “heavy rainfall” was forecast, especially in the 24 hours from 22:00 on 9 January, with totals of between 200mm and 300mm predicted. Noting that “presently” the ratio of runoff to rainfall was “about 0.45 for Wivenhoe, ... and 0.75 for Somerset”, his memo relevantly continued:<sup>168</sup>

**“Expected Runoff**

Based on the approximate runoff conversion rates and the forecast rainfall, estimated runoff volumes (ML) generated could be of the order of:

Catchment	Monday	Tuesday	Wednesday	Three Day Total
...				
Somerset	50,000-100,000	200,000-300,000	75,000-150,000	325,000-550,000
Wivenhoe	125,000-250,000	250,000-500,00	125,000-250,000	500,000-1,000,000

The lower limit of the inflow to Somerset and Wivenhoe will be similar to the October 2010 flood while the upper limit is similar to the February 1999 floods. However, the starting level of the dams is much higher than in these historical events.

This points to continued flood operations for Somerset and Wivenhoe until at least the weekend of 15/16 Jan ....

**It should be noted that these estimates are based upon forecast rainfall which may or may not eventuate.** (emphasis in original)”

578 At 11:00 Wivenhoe Dam level was 68.54m, leaving storage capacity up to 74m of about 742,000ML. Mr Malone expected that only “about a third” of that forecast runoff would enter Wivenhoe or Somerset during the three days if the forecast rain fell: Ch 7 [174]. The 4-day 00UTC PMEs available at 00:00 on 9 January also predicted substantial rainfall in the Lockyer Creek and Bremer River catchments: Ch 7 [177]. In the 24 hours to 09:00 on 9 January, very little rain had fallen in those catchments.<sup>169</sup>

579 Mr Malone ran further ROG models at midday, 14:00, 16:00, and 18:00 on 9 January: Ch 7 [181], [199], [204]. Whereas the midday run predicted a dam level of 69.21m, the 16:00 run predicted a level of 72.15m and the 18:00 run a level of 72.69m. This was due to continuing rainfall in the dam catchments

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<sup>168</sup> Set out at *Rodriguez (22)* Ch 7 [170].  
<sup>169</sup> Mr Malone’s Observed Rainfall Analysis.

resulting in higher volumes of ROG inflows being taken into account in the later model runs. The ROG inflows in the midday model were 679,815MI, whereas the ROG recorded in the 18:00 model was 1,346,488MI, an increase of 666,673MI. Later records showed that in the 24 hours from 09:00 on 9 January over 140mm of rain fell in the dam catchments.

580 Between 09:00 and 14:00, three further sluice gates were opened at Somerset, increasing the rate of outflow from Somerset to Wivenhoe (the dam level being at or below 100.47m) from 412m<sup>3</sup>/s to 1034m<sup>3</sup>/s at 14:00. Those sluice gates remained open until 15:00 on 11 January when they were gradually closed. At 14:00 on 9 January the rate of inflow to Somerset was 2,744m<sup>3</sup>/s and rising, and the outflow to Wivenhoe was 1,034m<sup>3</sup>/s. Net inflows to Somerset rising to 4,056m<sup>3</sup>/s at 16:00 on 9 January resulted in that dam's level increasing to 102.38m at 00:00 on 10 January. At a dam level of 102m, the discharge from the spillway was approximately 200m<sup>3</sup>/s.<sup>170</sup> By 00:00 on 10 January the rate of outflow from Somerset to Wivenhoe was 1,359m<sup>3</sup>/s, resulting in a net inflow to Somerset of 1,924m<sup>3</sup>/s. At the same time, the inflow to Wivenhoe (excluding Somerset) was 6,577m<sup>3</sup>/s and Wivenhoe was releasing 1462m<sup>3</sup>/s: Ch 7 [107].

581 Following the meeting of flood engineers at about 15:30, the following entry was made in the Event Log (set out at Ch 7 [190]):

“Duty Engineer Conference held at the FOC: Attended by RA [Mr Ayre], JR [Mr Ruffini], TM [Mr Malone] with JT [Mr Tibaldi] on conf phone. At this stage operating at the top end of W1 and the bottom end of W2. Storing approx. 300,000 ML at present (above Wivenhoe) with an additional 500,000 ML expected to flow into the dams from rainfall on the ground. The rainfall system is currently in the N-E part of the catchment and expected to travel south over the next 24-36 hours according to the BOM forecasts. This has the potential to significantly increase flows in Lockyer Ck & the Bremer River which potentially could close Fernvale Bridge and Mt Crosby Bridge and increase the risk of flooding in the Lower Brisbane. Releases from Wivenhoe Dam will be maintained at the current level of ~ 1,400 cumecs. If required, releases from Wivenhoe Dam will be reduced to contain the flow in the Mid-Brisbane to 1,600 cumecs and 3,000 cumecs in the Lower Brisbane. At this stage it is anticipated that levels below 102.5 in Somerset and 72.5 in Wivenhoe can be attained.”

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<sup>170</sup> Manual, Appendix D (assuming all eight crest gates were open).

- 582 It was agreed that starting that evening two flood engineers would work together on each 12-hour shift. The afternoon QPF available at about 16:00 forecast a further 50-80mm rainfall in the dam catchment areas for the 24 hours from 15:00: Ch 7 [138].
- 583 In his situation report distributed before 18:00, Mr Malone reported that catchment average rainfall for the past 12 hours for Somerset Dam was 150mm and for Wivenhoe Dam 80mm, and that the “bulk of the rain ... has fallen in the upper reaches of the Stanley and Brisbane Rivers”.<sup>171</sup> Wivenhoe was at 68.7m with an estimated peak inflow of about 5,000m<sup>3</sup>/s and water level of at least 72.5m by 22:00 on 11 January. Mr Malone advised that the current gate operation strategy would maintain flows of around 1600m<sup>3</sup>/s for the next 24 hours and that those releases might have to be reduced “as Lockyer flows increase”. He added that “releases may have to be increased significantly [on 10 January] depending on the rain in the next 12 to 24 hours”. In cross-examination Mr Malone accepted that there was an “increasing likelihood” by this time that Wivenhoe would reach 74m: Ch 7 [203].
- 584 At around 19:00 Mr Ruffini undertook an ROG run and a 24-hour QPF run. The former predicted a second set of natural peak flows in Lockyer Creek during the evening of 10 January and in the Bremer River during the evening of 9 January. The ROG run also predicted a maximum height of Wivenhoe of 71.69m and combined peak flows at Lowood and Moggill of around 2550m<sup>3</sup>/s at 09:00 on 12 January. The “with forecast” run predicted a maximum dam level of 73.16m on 11 January at 16:00 and combined flow rates at Lowood and Moggill of around 3300m<sup>3</sup>/s at 08:00 on 11 January. Neither of these runs contemplated more than one additional gate opening until the remaining two bridges were submerged: Ch 7 [214].
- 585 In the face of that modelling and the following two days of forecast heavy rain, the primary judge held that by the evening of 9 January it should have been “obvious to each of Mr Ruffini, Mr Ayre and Mr Malone that there was a

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<sup>171</sup> *Rodriguez (22)* Ch 7 [201].

likelihood of Wivenhoe dam exceeding 74m”, so as to require the implementation of strategy W4: Ch 7 [215], [216].

586 Shortly after 19:00, senior Seqwater and Brisbane City Council staff were advised that higher releases in the order of 3,000m<sup>3</sup>/s were expected to be necessary in view of the heavy rain and that releases “causing damaging flooding are likely to be necessary”: Ch 7 [217].

587 Mr Malone issued another situation report at about 21:00: Ch 7 [223]. Having referred to the heavy rainfall (totals up to 100 to 140mm in the Wivenhoe and Somerset catchments in the last six hours) and the level of Wivenhoe (69.1m and rising), the report said that “at this stage, the dam will reach at least 73m” during 11 January. The report continued:

“... Given the rapid increase in inflow volumes, it will be necessary to increase the release from Wivenhoe Monday morning.

The objective for dam operations will be to minimise the impact of urban flooding in areas downstream of the dam and, at this stage, releases will be kept below 3,500m<sup>3</sup>/s and the combined flows in the lower Brisbane will be limited to 4,000m<sup>3</sup>/s. This is below the limit of urban damages in the City reaches.

The current release rate from Wivenhoe Dam is 1,400m<sup>3</sup>/s (120,000 ML/day). Gate opening will start to be increased from noon Monday and the release is expected [to] increase to at least 2,600m<sup>3</sup>/s during Tuesday morning.”

588 Mr Malone’s report also advised that the Wivenhoe releases combined with Lockyer flows and local runoff would mean that all bridges downstream were adversely affected. At 21:10, Mr Ayre advised Seqwater’s dam operations manager that “releases will need to be ramped up from current 1400m<sup>3</sup>/s to 2500m<sup>3</sup>/s which will cause flooding in low lying areas of Brisbane.”

589 After the conclusion of Mr Malone’s shift, further ROG and “with forecast” models were run at 22:00: Ch 7 [231]-[235]. The former predicted further natural peak flows at Lowood (613m<sup>3</sup>/s) and Moggill (830m<sup>3</sup>/s) in the morning of 10 January. The latter predicted a maximum dam level of 75.11m and significantly increased flow rates at Lockyer Creek (1338m<sup>3</sup>/s) and Bremer River (1839m<sup>3</sup>/s) in the evening of 10 January. Those flows, when combined

with releases from Wivenhoe, produced peak rates at Lowood (4222m<sup>3</sup>/s) and Moggill (5652m<sup>3</sup>/s) late on 10 January or early on 11 January.

590 Mt Crosby Weir Bridge and Fernvale Bridge were submerged at around 22:40 on 9 January. At 02:00 on 10 January the gates at Wivenhoe were opened a further seven increments, increasing releases to 2,015m<sup>3</sup>/s at 09:00.

(b) *Findings of breach*

591 In Ch 12 the primary judge made the following findings of breach:

“[183] ... in failing [whilst] on duty on 9 January to implement Strategy W4, each of Mr Malone, Mr Ayre and Mr Ruffini breached their respective duties of care (5ASOC [307(a) and (b)]).”

[184] ... during the course of his shift on 9 January, Mr Malone breached his duty of care by substantially increasing releases from Somerset Dam into Lake Wivenhoe without ensuring that the rate of outflow from Wivenhoe Dam substantially exceeded the rate of outflow from Somerset Dam (5ASOC [307(d)]).”

592 As to the first finding of breach, the primary judge held that on 9 January each of Mr Malone, Mr Ayre and Mr Ruffini was obliged to “implement” strategy W4, which meant “an immediate increase in releases to a level above that necessary to inundate the remaining bridges”: Ch 12 [173]. By the early evening on 9 January it was reasonably clear that the level of Wivenhoe would exceed 74m. Mr Malone accepted that by 18:00 there was an “increasing likelihood” that would occur. His situation report at 21:00 said that the dam level would reach “at least 73m”. The 22:00 “with forecast” modelling predicted a maximum dam level of 75.11m and Mr Ayre accepted that, looking at the position at around 22:30, it was “very likely” the 74m level would be exceeded: Ch 7 [242]. Whether that was the position at the commencement of Mr Malone’s shift at 06:30 on 9 January, viewed from the perspective of any reasonably competent flood engineer and accepting that prediction was to take account of releases, is not obvious.

593 The primary judge found that the “flood engineers were obliged to operate in W4 throughout the day”: Ch 7 [260]. His Honour’s reasoning supporting that

holding was the same as that supporting the similar finding made in relation to operations on 8 January, which addressed the position at 00:00 on 8 January: Ch 10 [10], [19]. That reasoning started with four-day inflow volume estimates based on the 00UTC PME's available at 00:00 on 9 January to give a predicted height of the dam on the assumption that no releases were made during the forecast period. The use of Dr Christensen's or Mr Giles' (corrected) four-day inflow estimates (respectively 886,000MI and 782,000MI), based on those forecasts, gave a predicted dam level of approximately 75.21m (Dr Christensen) and 74.64m (Mr Giles corrected): Table 9-6 at [314] above.

594 In finding that strategy W4 was engaged, the primary judge also referred to Mr Ayre's 72-hour modelling exercise conducted on 8 January at 15:00 which supported that conclusion *if* "proper" modelling were undertaken and releases were kept *below* the level that submerged the two bridges: Ch 12 [173], Ch 10 [19], Ch 7 [124].

595 In relation to Somerset flood operations, the primary judge concluded that a reasonably competent flood engineer would not have "substantially" increased releases from Somerset into Wivenhoe without ensuring that the rate of outflow from Wivenhoe substantially exceeded the rate of inflow from Somerset. Taking that step was said to reduce the risk of Wivenhoe levels rising above 74m and forcing releases that could cause significant downstream flooding. The background to the operation of Somerset, and certain findings in issue on the appeal have been addressed previously in discussing grounds 14 and 15 in part 16 above. It is convenient to reiterate and expand on that discussion in order to deal coherently with the issues raised by ground 25(a).

596 As at 14:00, five sluice gates were open at Somerset with an outflow of 1034m<sup>3</sup>/s. Thereafter, the overall rate of outflow increased as the dam level rose because the discharge rate via the spillway increased. By 00:00 on 10 January the outflow from Somerset was 1403m<sup>3</sup>/s, increasing to 1577m<sup>3</sup>/s at 10:00 on 10 January and 1665m<sup>3</sup>/s at 00:00 on 11 January. The sluice gates were closed between 04:00 and 09:00 on 11 January. During the period from 14:00 on 9 January to 00:00 on 10 January, the total outflows from Wivenhoe

were between 1386 and 1462m<sup>3</sup>/s. By 00:00 on 11 January those outflows had progressively increased to 2713m<sup>3</sup>/s.

597 Rodriguez' case in relation to the operation of Somerset was put in two ways. First, it was said that strategy S3 was engaged and that there was a failure to implement that strategy, by either closing the eight crest gates or closing the sluice gates: Ch 12 [177]. As the Manual provided that during flood operations the crest gates should not be closed, the primary judge did not accept that a reasonably competent flood engineer would or must have closed those gates. It followed that the only precaution that could have been taken to "implement" strategy S3 was to close the sluice gates: Ch 9 [345], Ch 12 [177]. The primary judge was not satisfied that a reasonably competent flood engineer must have expected Wivenhoe to exceed 75.5m, so as to engage strategy S3, (on a "no release" basis) before 18:00 on 9 January when the daily 00UTC PME forecasts became available. It followed that there was no breach in failing to implement strategy S3 and close the sluice gates before the evening of 9 January, and after Mr Malone's shift finished: Ch 12 [178].

598 The judge then considered the second element in Rodriguez' case, that a reasonably competent flood engineer would have ensured that the rate of outflow from Wivenhoe substantially exceeded the rate of outflow from Somerset, including by closing the sluice gates: Ch 12 [179]. The risk which was held to require the taking of that precaution was the "likelihood bordering on a certainty, of Wivenhoe Dam levels rising above 74m and forcing releases that could cause significant downstream flooding": Ch 12 [181]. Because one consequence of closing the sluice gates was to change the dam storage levels relative to each other, it was necessary to have regard to the provisions in strategies S2 and S3 which required that the two dams be operated in tandem. The object was to produce a specified correlation between the predicted maximum levels of the dams. That correlation was shown by the Operating Target Line (OTL) graph shown at [353] above.

599 The primary judge accepted that one of the countervailing risks which had to be considered was the "real possibility that the risk of overtopping both dams

could not be equalised before either of them was overtopped”: Ch 12 [181]. In doing so, and referring to his earlier consideration of Dr Christensen’s simulations, the primary judge acknowledged that this required attention to the OTL: Ch 9 [347]ff, Ch 10 [44]-[49]. In the conditions facing Mr Malone by the afternoon of 9 January – the level of Wivenhoe rising and Somerset level being above 100.45m – strategy S2 required that the OTL was “generally” to be followed as the flood event proceeded. One of the objectives of this requirement was to minimise equally the expected flood level peak of each dam relative to its ultimate failure level (80m for Wivenhoe and 109.70m for Somerset). That was to be achieved by undertaking gate operations which enabled the movement of the “duty point” (the point on the graph recording the current actual level of both dams) progressively towards the “target point” (the point on the OTL based on predicted maximum levels of the dam “using the best forecast rainfall and stream flow information”<sup>172</sup>).

(c) *Disposition: ground 25(a)*

600 This ground challenged the findings of breach by failing to implement strategy W4 and by substantially increasing releases from Somerset without ensuring that the rate of outflow from Wivenhoe substantially exceeded the rate of inflow from Somerset. The latter breach resulted from the opening of three further sluice gates from 09:00, rather than the closing of all of them either then or later on 9 January.

601 Seqwater submitted that the finding that strategy W4 was engaged on the morning of 9 January could not be sustained as it was based on the “no release” assumption. In response Rodriguez noted that the challenges to the finding that strategy W4 was engaged were “repetitious” of arguments made in respect of earlier days, and principally with respect to the “no release” assumption.

602 As the above analysis of the primary judge’s findings shows, it was not until the early evening on 9 January that a reasonably competent flood engineer taking account of proposed releases ought to have expected that the level of

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<sup>172</sup> Manual s 9.3; *Rodriguez (22)* Ch 3 [88].



Wivenhoe was likely to exceed 74m. For that reason Seqwater's challenge to the primary judge's finding of breach in failing to implement strategy W4 must be upheld.

603 With respect to the closure of the sluice gates at Somerset, Seqwater submitted that Mr Malone's releases resulted in the water levels of the two dams "tracking upwards towards a point on the OTL". On the other hand, the primary judge's finding had the consequence that the dam levels would move away from, rather than in the direction of, the OTL. The primary judge considered that the Manual allowed for "temporary movements away from the target line": Ch 10 [40], Ch 3 [89], [91]. Seqwater challenged that interpretation of the Manual and contended that even if such temporary departures were permitted, the primary judge's reasons did not explain why a reasonably competent flood engineer was "required" to depart from the Manual's general instruction to follow the target line. In response, Rodriguez contended that the Manual did not require that the dams be operated in a manner that moved towards the OTL "as quickly as possible".

604 Contrary to Seqwater's submission, the judge's reasons did explain why he considered Mr Malone was required to depart from the OTL. That reason was his Honour's conclusion that it was likely "bordering on a certainty" that the level of Wivenhoe would rise above 74m, requiring forced releases that could cause significant downstream flooding. That conclusion proceeded from the primary judge's finding that strategy W4 was engaged "throughout the day" on 9 January. For the reasons given above, his Honour's findings did not establish that a reasonably competent flood engineer, taking into account proposed releases, must have expected, before the early evening, that the level of Wivenhoe would exceed 74m. In the absence of a finding to that effect the challenge to the breach with respect to the making of releases from Somerset also must be upheld. Absent that justification, however, it is unclear how compliance with the Manual's guidance as to the coordinated operation of the two dams could constitute negligence. That issue was raised by Seqwater in relation to the breach on 10 January, but, as noted below need not be resolved.

(7) *10 January – Mr Malone and Mr Tibaldi’s day shift (ground 25(b))*

(a) *Overview*

605 In the 24 hours ending at 09:00 on Monday, 10 January, the average rainfall in the dam catchments was 210mm (Somerset) and 124mm (Wivenhoe). The average rainfall in the Lockyer Creek and Bremer River catchments was 66mm and 44mm respectively.<sup>173</sup> The morning QPF forecast rainfall of 50-100mm during the 24 hours from 10:00.

606 Mr Ayre and Mr Ruffini were on duty to 07:00 when Messrs Malone and Tibaldi’s day shift commenced. At that time the level of Wivenhoe was 71.16m and the level of Somerset was 102.98m. In the previous 18 hours the inflows to Somerset ranged between 4,011m<sup>3</sup>/s at 18:00 on 9 January and 2,403m<sup>3</sup>/s at 07:00 on 10 January. The releases from Somerset to Wivenhoe during that same period rose from 1,121m<sup>3</sup>/s to 1,535m<sup>3</sup>/s, reflecting increases in the level of that dam with consequences for the spillway discharges. The releases from Wivenhoe between 18:00 on 9 January and 07:00 on 10 January increased from 1,404m<sup>3</sup>/s to 1,875m<sup>3</sup>/s.

607 At trial, Rodriguez addressed only one complaint of breach relating to the actions of the flood engineers in the period to the late afternoon of 10 January: Ch 12 [192]. From that point no further allegations of breach were advanced.

(b) *Summary of shift*

608 There was no specific allegation of breach by failing to implement strategy W4 in relation to releases from Wivenhoe. Specifically it was not said that the conduct of Messrs Malone and Tibaldi in suspending gate openings from 09:00 to keep the combined flows downstream below 3500m<sup>3</sup>/s was a breach of duty: Ch 12 [194], [202]. As the primary judge observed, the releases made after 08:00 on 10 January exceeded 2000m<sup>3</sup>/s “which was consistent with engaging strategy W3 and arguably strategy W4”: Ch 12 [193].

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<sup>173</sup> Mr Malone’s Observed Rainfall Analysis adopted by primary judge at Ch 6 [6].

609 The relevant allegations of breach in this period related to the operation of Somerset. At 07:00 the crest gates and five of the sluice gates remained open. Rodriguez alleged that any reasonably competent engineer would have reduced “significantly” the releases from Somerset. The primary judge found a breach in those terms, that failure continuing “up to late on the afternoon of 10 January”: Ch 12 [202].

610 Addressing the flood engineers’ approach to Somerset Dam operations “on (9 and) 10 January”, the primary judge concluded that the “perceived necessity to move towards the [OTL] as directly as possible took precedence over the concerns in the Manual about avoiding damaging downstream flows and around a time when there was no appreciable risk of the failure level of Somerset being reached if the crest gates at Somerset remained open”: Ch 12 [199]. The finding as to there being no “appreciable risk” was based on Dr Christensen’s assessment of the likelihood of Somerset being overtopped in the circumstances of simulation F. That assessment took into account releases that Dr Christensen considered could be made from Somerset over the relevant three or four day forecast period, provided the crest gates remained open: Ch 10 [44]-[48].

(c) *Disposition: ground 25(b)*

611 This ground challenged the finding that Mr Malone and Mr Tibaldi breached their duty of care by failing to close the sluice gates at Somerset. The relevant period of that breach was from 07:00 to about 17:00 on 10 January. Assuming that the sluice gates were closed by 08:00, the volume of water that would have been retained in Somerset was no more than 36,000MI; that volume was inconsequential.

612 Seqwater challenged this finding on two bases. First, it contended that Mr Malone and Mr Tibaldi were not negligent in seeking to follow the OTL. Secondly, it submitted that there was no evidentiary basis for the conclusion that the four-day rainfall forecasts did not present a risk of Somerset

overtopping, or a position being reached where the risk of overtopping both dams could not be equalised before one overtopped.

613 In response, Rodriguez supported the primary judge's construction of the Manual in relation to flood operations at Somerset and relied on Dr Christensen's evidence as demonstrating that the four-day forecast inflows to Somerset could have been discharged by releases over that period.

614 Given the small amount of water involved, there is no utility in resolving these arguments, as the challenged breach could have no relevance to the causation analysis relied on by Rodriguez. It is sufficient to record that they turn in part on the construction of the Manual and in part on assessments as to where and when, if at all, the four-day forecast rain as at the morning of 10 January might fall in the dam catchment areas, as shown by Dr Christensen's assessment of the risk of Somerset being overtopped in the circumstances of simulation F: Ch 9 [45]-[47]. On any view, breach was not demonstrated on the reduced standard in s 36(2).

## **21 Rodriguez' contention par 3**

### *(1) Overview*

615 For convenience pars 46, 47 and 48(b)-(f) of Rodriguez' written submissions are repeated below:

“46 Even if, contrary to the above submissions, it is held that s 36(1) does apply in present circumstances, the Flood Engineers' conduct, which on this view would be attributable to Seqwater, nonetheless constituted a wrongful exercise or failure to exercise Seqwater's functions. For the reasons that follow, the Flood Engineers' conduct was so unreasonable that no public or other authority having Seqwater's functions could have properly considered that conduct to be a reasonable exercise of its functions.

47 It is incontrovertible that the Flood Engineers were required to follow the Manual. As the primary judge relevantly found (Ch 3 [2]; Ch 1 [47]):

'[a]bout the only matter that all the experts across a variety of disciplines agreed upon was the necessity for flood engineers to follow the Manual during flood operations save for the possibility of following its own procedures for departure from its requirements when the safety of the dams is threatened.'

48 Yet, in flagrant contradiction to the Manual:

a) ...

b) the Flood Engineers sought to avoid bridge closures at the 'expense of guarding against the risk of urban inundation' (Ch 1 [62]; Ch 6 [211], [255]-[267]);

c) to the extent that the Flood Engineers were following any flood strategy for Wivenhoe Dam, it was Strategy W1 when it ought to have been Strategy W3 (Ch 1 [64]; Ch 7 [94]-[105], [210], [254]-[260]);

d) the Flood Engineers operated on the basis that over-the-floor flooding level would result from combined flows at Moggill of 3,500m<sup>3</sup>/s when the relevant level in the Manual was 4,000m<sup>3</sup>/s (Ch 1 [65]; Ch 7 [328]-[336]);

e) the Flood Engineers did not determine the applicable flood strategy based on a predicted storage level of the dams, let alone a predicted storage level where the prediction was based, in part, on the best available rainfall forecast information available (Ch 1 [66]); and

f) the Flood Engineers adopted an approach that underestimated the amount of water that needed to be evacuated and overestimated the capacity of the dams to release water beyond a 12-15 hour period (Ch 1 [67]; Ch 7 [469]-[470])."

616 Some of what follows includes factual material which has already been summarised or referred to in the breach analysis addressing grounds 23(b), 23(c), 24 and 25(a). Again that has been done for ease of reference.

(2) *Paragraph 48(d): 10 January*

617 It is convenient to start with the contention in par 48(d) which is addressed to acts or omissions of Mr Malone and Mr Tibaldi during their day shift on 10 January. Rodriguez' contention was that releases from Wivenhoe were suspended from 09:00 to 15:00 on 10 January in an attempt to keep the combined flow at Moggill at or below 3500m<sup>3</sup>/s; that being the combined flow at Moggill 16 hours after the release of water from Wivenhoe. At that time, it was contended that, if the flood engineers were operating in strategy W3, the intent should have been to limit that combined flow to less than 4000m<sup>3</sup>/s, noting that that was "the upper limit of non-damaging floods downstream".

618 As a result, between 09:00 and 15:00 on 10 January actual releases ranged between 2015m<sup>3</sup>/s and 2155m<sup>3</sup>/s. The releases contended for by Rodriguez

depended on which simulation was adopted. In simulation F, during this period the proposed releases ranged from 1825m<sup>3</sup>/s to 1658m<sup>3</sup>/s. That was because in that simulation, whilst the objective was to keep flow rates at Moggill below 4000m<sup>3</sup>/s, looking forward the peak rate at Moggill was predicted to be between 2000 and 2090m<sup>3</sup>/s. According to Dr Christensen’s methodology, those predictions were made using ROG and 24-hour QPF forecasts: Ch 10, [255]. Only simulation G modelled different releases during this period. That simulation commenced on 10 January and, in view of the actual dam level, adopted a much more aggressive target for combined downstream flows of 5300m<sup>3</sup>/s on the basis that “releases and downstream flows could not be held below the threshold” of 4000m<sup>3</sup>/s: Ch 10 [256].

619 The primary judge described the decision to delay the increase in gate openings as “unreasonable” given that the prevailing conditions required that strategy W4 be engaged: Ch 7 [336]. However, as his Honour later observed, it was not the subject of any separate allegation of breach: Ch 12 [194]. That was no doubt because the releases proposed in simulation F were less than those in fact made<sup>174</sup> and simulation G was only relied on if the Court found that the reasonably prudent flood operations ought to have first commenced on 10 January.

620 Notwithstanding that the conduct to which this contention was directed was not alleged to be a breach, or relied on as resulting in different releases from those that would otherwise have been made, Rodriguez’ submission as to that conduct involving a breach of the standard in s 36(2) may be addressed.

621 In his situation report issued shortly before 18:00 on 8 January, Mr Ayre had said:

“Projections based upon the forecast rainfalls suggest flows of up to 1,200 m<sup>3</sup>/s will emanate from the Bremer River catchment. If similar rainfall magnitudes occur in the Upper Brisbane and Stanley Rivers then increased releases may be required from both Somerset Dam and Wivenhoe Dam. Preliminary projections suggest that such a forecast will extend the release duration until next Saturday 15 January, but mid-Brisbane River flows will be kept to a

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<sup>174</sup> 5ASOC [339], particulars D, E.

maximum of 1,800 m<sup>3</sup>/s. However, if falls are greater than those forecast releases from Wivenhoe Dam may need to adversely impact Mt Crosby Weir Bridge (1,900 m<sup>3</sup>/s) and possibly Fernvale Bridge (2,100 m<sup>3</sup>/s) but will be maintained below 3,500 m<sup>3</sup>/s.”

622 Subsequently, the evidence suggested there had been a debate about whether to keep downstream flows to 3,500m<sup>3</sup>/s or 4,000m<sup>3</sup>/s. In particular, the primary judge referred to a note of a meeting at 08:30 on 10 January which “indicates that one of the topics was ‘3.5 and 4’, which I infer was a discussion about the possibility of urban flooding resulting from an outflow rate of 3,500m<sup>3</sup>/s or 4000m<sup>3</sup>/s”: Ch 7 [298]. The fact that there appear to have been discussions about which outflow rate to choose suggests that this was not a decision which was so unreasonable that no dam operator could properly have considered the selection of the lower rate to be reasonable.

623 Most relevantly for present purposes, the Event Log for 10 January recorded four requests from Brisbane City Council (BCC) to restrict flows to 3,500m<sup>3</sup>/s. They were:

- At 00:45, there is the entry:  
“Ken Morris (BCC) called (taken by John Ruffini). Ken indicated that 3500 cumecs is the damaging flow for Brisbane urban areas. The manual documents 4000 cumecs as the damaging level. John undertook to take this into consideration when preparing the current situation report, and would not refer to damage levels.”
- At 00:55, there is the entry:  
”John Ruffini called Rob Drury to discuss Ken’s view on damaging flow. John confirmed that if flows were kept below 3500 the fuse plug would be triggered. Agreed that situation reports would not allude to damage levels – the councils can make decisions on what to report in this regard.”
- At 08:30, there is an entry “Left a message for Ken Morris to call back”.
- At 09:38, there is the entry:  
“Conference call with Ken Morris (BCC) - informed them that release from Wivenhoe will be maintained at 2000m<sup>3</sup>/s for the next 24 hrs. This will be revised in 24 hrs. The strategy is to limit the flows to 3000 - 3500m<sup>3</sup>/s. At 3500m<sup>3</sup>/s about 322 (the whole property) will be submerged and about 7000 properties will be affected somehow damage bill \$7mil). If the rainfall in the Bremer and Lockyer increases substantially - it is likely the flows from these catchments can peak at 1000m<sup>3</sup>/s (on top of Wivenhoe release).”

- 624 There may be doubt about the force of all aspects of the notes. But they confirm that active thought was being given to the Council's view that combined flow rates should be kept to 3,500m<sup>3</sup>/s, notwithstanding that operating in strategy W3, the Manual authorised flow rates that "should not exceed 4,000m<sup>3</sup>/s".
- 625 This changed in the early afternoon. The Event Log records that at 12:36 on 10 January Ipswich City Council was called to advise "we are moving strategy from urban damage control to dam safety priority". Brisbane City Council was not in fact contacted until 14:30 (seemingly the explanation for the delay in contacting Brisbane City Council is reflected in the note at 12:33 – "Made two calls to BCC – no answer – left messages" and a similar entry a couple of hours later). It is plain that the decision to move to strategy W4 was made no later than shortly after noon on 10 January. Mr Malone issued a directive at 15:00 to open Wivenhoe Dam a further 10 increments, one every half hour from 15:00 (as it turned out, a technical issue delayed the commencement of those increments until 16:00).
- 626 The issue is whether it was unreasonable, in the sense required by s 36(2), to attempt to maintain a flow at Moggill of 3,500m<sup>3</sup>/s, as opposed to 4,000m<sup>3</sup>/s, until around noon on 10 January.
- 627 The Manual stated that 4,000m<sup>3</sup>/s at Moggill was the upper limit of non-damaging flows. But a senior officer at Brisbane City Council called the FOC at 00:45 to advise that in the circumstances which actually prevailed, flow rates at Moggill above 3,500m<sup>3</sup>/s were damaging. There was no evidence to suggest that taking account of and acting consistently with Mr Morris' advice was so unreasonable that no authority in Seqwater's position could properly consider that doing so was a reasonable exercise of its flood mitigation function. Such a conclusion is far from self-evidently correct. The 4,000m<sup>3</sup>/s rate in the Manual is scarcely precise. The flood engineers were being told, by a person whose views might reasonably be regarded as carrying weight, that making releases which would result in a flow rate of 4,000m<sup>3</sup>/s at Moggill would cause millions of dollars of damage. Conversely, the reduction of outflows from Wivenhoe by the 500m<sup>3</sup>/s requested by Mr Morris was, in the scheme of things, a relatively



minor proportion of the releases being made.<sup>175</sup> Adherence to this element of the strategy reduced the releases so that they were around 80% of what they might otherwise have been (they were slightly above 2,000m<sup>3</sup>/s, rather than slightly above 2,500m<sup>3</sup>/s).

628 Still further, from the perspective of Messrs Malone and Tibaldi on 10 January, the strategy to limit flows at Moggill to 3,500m<sup>3</sup>/s had been confirmed by Mr Ayre (including in his situation report shortly before 18:00 on 8 January reproduced above: “releases from Wivenhoe Dam ... will be maintained below 3,500m<sup>3</sup>/s”). Thus Mr Malone wrote in an email at 09:55 on 10 January that “[t]he current operational strategy is to aim for a flow of no greater than 3,500[m<sup>3</sup>/s] in the lower Brisbane River”. That email, and others,<sup>176</sup> proceeded on the uncontroversial assumption that there could only be a single operational strategy throughout a flood event; the Manual does not support the implausible conclusion that, absent a material change in circumstances, there would be a change in strategy when each flood engineer began his shift. Although Messrs Malone and Tibaldi acceded to the decision, that does not deny that it would have been a large thing for either or both of them to disregard it unilaterally.

629 True it is that on 10 January dam levels were rising sharply, in the order of 20cm per hour even with releases at just over 2,000m<sup>3</sup>/s. At 01:00 the level was 69.97m, by 09:00 it was 71.56m and by noon (shortly before Ipswich Council was told that operations were moving from urban damage control to dam safety priority) it was 72.07m. But if it turned out to be necessary to increase releases such that urban areas would be inundated (as of course proved to be the case), it is easy to see how on 10 January it could be thought that the flood storage capacity reflecting the 500m<sup>3</sup>/s which had been forgone could be replaced over time.

630 During the early morning of 10 January there were unprecedented inflows into Wivenhoe, rising to 10,095m<sup>3</sup>/s at 08:00. However, it was not known that at the

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<sup>175</sup> That suggestion was affected by flood operation directives 10 and 11 which had the effect of delaying two of the gate operations proposed by directive 9. See also [493] above.

<sup>176</sup> See, for example, Mr Malone’s 21:00 situation report on 9 January: Ch 7 [223].

same time on the following day inflows would be 8,060m<sup>3</sup>/s and would then rise to 11,561m<sup>3</sup>/s at 13:00, before slowly falling to 8,196m<sup>3</sup>/s at 17:00.

631 The act or omission was outside the case pleaded by Rodriguez and not the subject of any finding of breach by the primary judge. Rodriguez has failed to establish that attempting for some five hours or so on 10 January 2011 to maintain expected flows at Moggill (16 hours later) below 3,500m<sup>3</sup>/s, as requested by Brisbane City Council in order to avoid urban inundation, was so unreasonable that no dam operator could properly consider it to be reasonable. That applies to the conduct of all of the flood engineers, but in the case of those for whom Seqwater might be vicariously liable, the conclusion is fortified by the fact that Mr Ayre had endorsed that decision.

632 It follows that this submission must be rejected.

(3) *Paragraphs 48(e) and (f): use of forecasts*

633 These were generic challenges which particularly informed the more specific contentions, including pars 48(b) and (c).

634 The analysis of the primary judge's findings of breach between 6 and 10 January showed that, whilst the flood engineers made decisions about gate operations using the RTFM, they did not do so using forecast rainfall other than in a few cases. They did however have regard to QPF and PME forecasts in assessing possible inflows to the dams, as well as downstream flows from the Lockyer Creek and Bremer River catchments. In doing so they made assessments as to where forecast rain might fall and when. For example, in his 11:01 email on the morning of 9 January,<sup>177</sup> Mr Malone sought to quantify possible inflows to the dams over the ensuing three days based on PME forecasts and historical runoff rates. In doing so he concluded that the runoff into Wivenhoe could range between 500,000 and 1,000,000ML, whilst noting

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<sup>177</sup> See [577] above.

that “these estimates are based upon forecast rainfall which may or may not eventuate”.

635 Dr Christensen’s methodology in simulation C used 4-day PME’s to select strategy, and in simulations F and H used 24 hour QPF forecasts to select strategies and relied on the four and eight day forecasts for what was referred to as “situational awareness”: Ch 10 [3], [5]. In predicting likely dam levels in these simulations he adopted the “no release” assumption. Doing so invariably resulted in a higher predicted dam level over a period of up to four days in turn resulting in the adoption of a higher strategy.

636 In response to this use of the four-day forecasts, Seqwater submitted that there was no evidence that a dam operator would consider that any operations which did not use 4-day PME forecasts in these ways was so unreasonable that it could not be considered a proper exercise of its functions. That was because (i) Rodriguez did not seek to make out such a case based on s 36(2) at trial and (ii) Rodriguez did not suggest that such uses of the 4-day PME’s was required by the Manual.

637 The asserted force of par 48(f) derives from the following observations of the primary judge in Ch 7:

“[470] Although they may have remained cognisant of the rainfall forecasts, the flood engineers were always effectively assuming that no forecast rain would fall above the dams while at the same time assuming that forecast rain would or might fall below the dams (but only during their short planning horizon of 12 to 15 hours with no rain to fall thereafter). It was an approach that would always tend to underestimate the amount of water to be evacuated and overestimate the capacity to release water beyond that 12 to 15 hour period. It follows from Chapter 3 that this approach was fundamentally contrary to the Manual. It ignored the Manual’s method of strategy selection and meant that ‘within any strategy’ consideration was not given to the flood objectives in their order of priority in making decisions on dam releases.”

638 The judge’s statement on which par 48(f) is based is not a finding of primary fact. Rather, it is a conclusion about the flood engineers’ assumptions and operating practices which principally involved ROG modelling that was regularly updated to account for changes in rainfall, above and below the dams. The

period of “12 to 15 hours” referred to the time rain in the upper reaches of the catchments took to flow into the dams or into the downstream Brisbane River. The statement that the flood engineers overestimated “the capacity to release water beyond” that period implied that in making decisions about releases based on modelling they did not have regard to possible future dam inflows and downstream conditions. There was contemporaneous evidence suggesting otherwise. It included, in addition to Mr Malone’s 11:01 email of 9 January,<sup>178</sup> Mr Ayre’s comments in his status report issued at 12:15 on 8 January and repeated in his evening situation report issued shortly before 18:00.<sup>179</sup>

“Further assessments will be undertaken to determine releases above this level [1250m<sup>3</sup>/s] given the high likelihood of significant inflows in the next few days. The interaction with runoff from the Bremer River and Warrill Creek catchment will also be assessed to determine an appropriate release strategy. Projections based upon the forecast rainfalls suggest flows of up to 1,200m<sup>3</sup>/s will emanate from the Bremer River catchment.”

(4) *Paragraph 48(b): keeping bridges open on 6 and 7 January*

639 At par 48(b) Rodriguez contended that the flood engineers sought to avoid closing Mt Crosby Weir and Fernvale bridges at the “expense of guarding against the risk of urban inundation”, relying on findings at Ch 1 [62] and Ch 6 [211] and [255]-[267]. Those three passages in the judgment all related to 6 and 7 January 2011, immediately after the declaration of the flood event. The primary judge said in the first two paragraphs:

“[62] Third, although a flood event was declared on the morning of 6 January 2011 and solid rain continued throughout that day with much more rain forecast, releases did not commence until the afternoon of 7 January 2011 after natural downstream flows inundated Burtons Bridge. The failure to commence releases earlier was an instance of the flood engineers subverting the priorities of the Manual by seeking to avoid the inconvenience occasioned by bridge closures at the expense of guarding against the risk of urban inundation.”

and

“[211] Mr Malone did not undertake ‘with forecast’ modelling on 6 January 2011 and Mr Ayre did not do so prior to preparing his 6 Jan 21:00 ROG

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<sup>178</sup> See [577] above.

<sup>179</sup> See [553]-[554], [557]-[558] above.

run. It follows that no initial assessment of the flood event was undertaken in accordance with section 8.3. Further, assuming that either Mr Malone or Mr Ayre did advert to a strategy, they certainly did not do so based on predicted dam heights, much less predictions based on modelling using forecasts. If such an assessment had been undertaken with a no release assumption, as the Manual required, then it would have yielded the selection of Strategy W3 (and S2) regardless of which forecast product was used. In turn, this would have directed the flood engineers to prioritise urban protection over the maintenance of keeping rural bridges open. If that priority was considered, it is difficult to see how a flood engineer could have chosen to delay making releases to avoid the premature inundation of one bridge with the consequence that larger releases would then be required at a time when there was a realistic possibility that they would coincide with downstream flows to cause, or threaten to cause, urban damage.”

The third passage was the entirety of the conclusions of section 6.12 of the judgment, dealing with Friday 7 January.

- 640 The second paragraph asserted that the initial assessment by Mr Ayre did not comply with section 8.3 of the Manual. That may be put to one side for present purposes on the basis that Seqwater cannot be made liable for Mr Ayre’s acts or omissions.
- 641 Much of the second paragraph is premised on modelling using the “no release” assumption. For the reasons given in response to ground 8, it was not unreasonable to model during a flood event making allowances for releases.
- 642 Both paragraphs reproduced above, as well as parts of Ch 6 [255]-[256], [257], [258], [262] and [264], held that releases should have been made in accordance with strategy W3, not W1. Insofar as this submission was directed to the decisions to keep the downstream bridges open, rather than protecting the urban areas from inundation, it is best addressed immediately below, with par 48(c).
- 643 However for the reasons upholding grounds 23(b) and (c), in the absence of the “no release” assumption the evidence did not justify a finding that a reasonably competent flood engineer using four-day forecasts must have concluded by the end of Mr Malone’s day-shifts on 6 and 7 January that the level of Wivenhoe was likely to exceed 68.5m so as to engage strategy W2 or

W3.<sup>180</sup> It followed that their conduct did not subvert the policy of protecting against urban inundation.

(5) *Paragraph 48(c): strategy W1 rather than W3*

644 Rodriguez' par 48(c) contended that the flood engineers were following strategy W1 when they should have been following strategy W3. That is to say, it was directed to the period during which the flood engineers made releases designed to leave certain downstream bridges open, when it was said their focus should have been protecting against urban inundation.

645 As formulated, the submission has the potential to confuse. It does not matter for present purposes whether the flood engineers *believed* they were adhering to strategy W1 or W3. On Rodriguez' case, resting as it did upon the no release assumption, a flood engineer could be operating in a higher strategy, but only releasing water in a way which would be consistent with strategy W1. The submission in par 48(c) is to be approached according to what the flood engineers *did*, rather than what they believed. The issue is, in accordance with Rodriguez' submission, "entirely about the acts and omissions of the flood engineers".

646 That said, Rodriguez' pleaded case was that on 7 January any reasonably competent flood engineer would have concluded that strategy W3 was engaged and proceeded on the basis that the primary consideration was protecting urban areas from inundation by limiting the flow at Moggill to less than 4000m<sup>3</sup>/s. The pleaded case on 8 and 9 January was that any reasonably competent flood engineer would have concluded that strategy W4 was engaged, the primary consideration then being to protect the structural safety of the dam.<sup>181</sup> These pleaded strategies were the same as those adopted in simulation C on 7 January and simulations F and H on 8 and 9 January. In dealing with that pleaded case, the breaches found included failing to implement the pleaded strategy.<sup>182</sup> With respect to the submerging of the last of the downstream

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<sup>180</sup> See [513]-[521], [541]-[546] above.

<sup>181</sup> 5ASOC [267(c)], [288(b)], [307(c)].

<sup>182</sup> See [532], [565] above.

bridges, the primary judge's reasoning was that the "implementation" of strategy W3 "required" a substantial increase in releases sufficient to inundate those bridges by midnight or thereabouts on 7 January;<sup>183</sup> and that the "implementation" of strategy W4 on 8 January similarly required releases that submerged those bridges and were "as high as possible" without the combined flows exceeding 4000m<sup>3</sup>/s at Moggill.<sup>184</sup> The same finding was made as to the implementation of strategy W4 on 9 January in relation to releases.<sup>185</sup>

647 The upholding of grounds 23(b), 23(c), 24 and 25(a) means that there were no breaches of duty on the part of the flood engineers in failing to make sufficient releases on 7, 8 and 9 January for which Seqwater could be liable, making it unnecessary to determine whether that conduct breached the standard imposed by s 36(2). Nevertheless, the question may be addressed on the basis that on 7, 8 and 9 January (during shifts undertaken by Mr Malone or Mr Tibaldi) greater releases should have been made, submerging all of the downstream bridges, but not so as to inundate urban areas of Ipswich and Brisbane.

648 Only at 16:00 on 7 January, the second day of the flood event, and with dam levels at 68.06m, were the radial gates opened at all. By 08:00 on 8 January, dam levels were at 68.52m, yet releases were restricted to around 1200-1300m<sup>3</sup>/s until the evening of the following day. The purpose was to keep the Mt Crosby Weir and Fernvale bridges open. The Manual provided that when dam levels were likely to exceed 68.5m, the "primary consideration" was to protect urban areas from inundation. With substantial rain forecast, it was a breach of that direction not to make releases which would at least submerge all of the bridges and limit later damage if greater releases became necessary. That is to say, the releases over this period should have been closer to 2,000m<sup>3</sup>/s. Eventually, keeping the bridges open proved impossible, and the gates were opened further from the evening of 9 January. By 08:00 on 10 January releases exceeded 1900m<sup>3</sup>/s. The judge found that the releases made

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<sup>183</sup> See [535] above.

<sup>184</sup> See [570].

<sup>185</sup> See [591].

by the flood engineers after that time were consistent with engaging strategy W3, and arguably strategy W4: Ch 12 [193].

649 Three points should be made in relation to this scenario. First, this aspect of Rodriguez' case does not turn solely on the "no release" assumption, because by 08:00 on 8 January the level of Wivenhoe exceeded 68.5m. However the factor identified by the primary judge as justifying the "substantial step" of inundating the two bridges was "the likelihood of forced releases above 74m and downstream flows above 4000m<sup>3</sup>/s", which his Honour described as "very real" by 00:00 on 7 January: Ch 12 [132]. Secondly, the primary judge's assessment of that likelihood depended on a number of possibilities coming to pass. Those possibilities included the average of the forecast rain falling in the dam catchments over the following four days, insufficient releases being made over that period and heavy rain downstream resulting in significant natural flow rates at Lowood and Moggill.<sup>186</sup> And thirdly, because the lower releases which kept those bridges open were sustained for a relatively lengthy period of time, there was a significant impact on Wivenhoe's flood storage capacity as a result of that approach.

(6) *Relevant matters*

650 There are a number of matters to be taken into account in assessing the contention. First, the fact that the relevant acts and omissions may have involved a departure from the Manual, even in a serious way, does not of itself entail breach of the standard in s 36(2). We do not accept that a mere breach of the Manual has that consequence. Indeed, breach of the Manual may not entail a breach of the standard of care under s 9. In any event, for the reasons earlier given, it is necessary to apply the language of the statute.

651 Secondly, in applying the test mandated by s 36(2), it is important to keep in mind that the decision for the flood engineers was not the binary choice between keeping the bridges at Fernvale and Mr Crosby Weir open, at the expense of inundating urban areas, and saving urban areas from inundation.

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<sup>186</sup> See [539] above.



The decision for the flood engineers was between making releases which would *inevitably* inundate the major downstream bridges, thereby *reducing the risk* of urban inundation, or keeping those bridges open with a consequential *increased risk* of urban inundation.

652 Thirdly, it is important to put to one side reasoning based on hindsight. With the benefit of hindsight, it is known that not merely was there urban inundation, but also that even if Dr Christensen's simulations had been adopted, hundreds if not thousands of properties would have been inundated in any event. Indeed, it is known that even if there could have been no releases from Wivenhoe whatsoever, there would have been damaging floods. In Ch 7 the primary judge stated:<sup>187</sup>

[403] The plaintiff provided a graph extracted from Dr Altinakar's modelling which estimated that the peak flow at Moggill was at around 1.00pm to 2.00pm on 12 January 2011, was approximately 10700m<sup>3</sup>/s and that the flow without releases at around the same time was approximately 5400m<sup>3</sup>/s.

[404] On these figures, outflows from Wivenhoe Dam contributed somewhere between 4200m<sup>3</sup>/s and 5300m<sup>3</sup>/s to a peak flow at Moggill on 12 January 2011 of between 10420m<sup>3</sup>/s and 10700m<sup>3</sup>/s."

653 Unquestionably, the damage to urban areas was exacerbated by the releases from Wivenhoe. But it will be seen from the above passages that slightly less than half of the peak flow at Moggill was attributable to releases from Wivenhoe. Rodriguez' case was, of course, that insofar as there should have been greater releases on 6, 7, 8 and 9 January, inundating all of the downstream bridges, there would have been greater flood storage capacity; and correspondingly less need to make the critical releases, which in fact combined (16 hours later) with the period of peak natural flows at Moggill.

654 But that was not known on 6, 7, 8 or 9 January. The question whether the standard of care required by s 36(2) was breached must be assessed prospectively, no differently from any other question of breach.

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<sup>187</sup> See also graphs at [421] and [422] above.

655 Fourthly, the onus lay with Rodriguez to adduce evidence that no public authority in Seqwater's position could properly have considered keeping the major downstream bridges open, in the context of the possible outcomes adverted to above, to be a reasonable exercise of its functions.

(7) *Whether breach of s 36(2) standard*

656 Stated more fully, the question is whether the asserted acts and omissions of Messrs Malone and Tibaldi, for which Seqwater was held to be vicariously liable, were so unreasonable that no dam operator with the flood mitigation function of Seqwater could properly consider them to be a reasonable exercise of that function. First and foremost, there is no evidence of this. That reflects the fact that that was not how the case was run at trial. No witness gave evidence of what a dam operator would or would not consider so unreasonable that what occurred could not properly be regarded as a reasonable exercise of that function.

657 It is far from clear that a court, with no real understanding of the operation of a dam with water storage and flood mitigation functions, can supply that gap in the evidence. There are two distinct aspects to this concern.

(1) It is quite unclear how prescriptive or how discretionary the Manual was reasonably understood to be, save that it was common ground that (i) the engineers were obliged to follow it, but (ii) much was left to professional judgment.

(2) It is also quite unclear what weight would be given by a dam operator in the position of Seqwater to the fact that a flood engineer on duty was ordinarily required to adhere to the strategy determined by the Senior Flood Engineer. This point is developed in more detail below by reference to the facts confronting Messrs Malone and Tibaldi over the critical four days. But essentially it is one thing to conclude that it was a breach of the duty to take reasonable care for a more junior flood engineer on a shift not to make more releases; it is another thing to ask whether a flood engineer who failed to depart from the overall strategy

determined by the Senior Flood Engineer was acting so unreasonably that no dam operator could properly consider adherence to the Senior Flood Engineer's strategy to be a reasonable approach to dealing with that flood event.

658 Rodriguez attempted to address the gaps in evidence by submitting that any breaches by the flood engineers were "flagrant". Use of that pejorative ordinarily conveys conscious breach of rights (such as a flagrant infringement of copyright) or, at least, a reckless indifference to the position. But Rodriguez has not established that the flood engineers were not attempting to take steps which they sincerely believed at the time to be properly directed to mitigate flooding. The contemporaneous documents do not suggest that the flood engineers were doing other than attempting to perform that function. If there were evidence, or cross-examination, to the effect that the flood engineers were deliberately taking steps to inundate urban areas, or failing to take steps which would avoid inundating urban areas, or were recklessly indifferent to that prospect, then this Court was not taken to it and could not in any event assess it given the limited scope of Rodriguez' contentions on the appeal.

659 Secondly, that the four flood engineers appear to have acted by way of consensus, but subject ultimately to the strategy determined by the Senior Flood Engineer, Mr Ayre, has two presently relevant consequences.

(1) One is the point made by Seqwater in oral submissions:<sup>188</sup>

"[T]he engineers acted at all times in consultation with each other and with others. Each of those engineers had long experience. The four relevant engineers, or [those] primarily relevant, in this case, were employed by three different employers and, in effect, as has been put at times during submissions, they operated in consensus. All that is inconsistent ... with the proposition that no reasonable public authority could have considered the conduct reasonable."

The fact that four engineers, all well-trained and experienced, appear to have reached consensus as to the steps to be taken throughout the flood

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<sup>188</sup> CA tcpt, p 873.

event, points against their conduct satisfying the test imposed by s 36(2). There could in principle have been a reckless abnegation of individual responsibility, but no such inference should be drawn in the absence of evidence.

- (2) The second is that, while it is rational to identify the conduct over 6, 7, 8 and 9 January as a whole, Seqwater could only be vicariously liable for breaches of duty by Messrs Malone and Tibaldi. That was the finding of the primary judge, and was reflected in the way the appeal was run in this Court. In particular, no part of Rodriguez' submissions contended that Seqwater was liable for breaches of duty by Messrs Ayre or Ruffini. To do so would have required a further notice of contention, as well as being contrary to the proposition that two persons cannot be vicariously liable for the conduct of another: *Oceanic Crest Shipping Company v Pilbara Harbour Services Pty Ltd*,<sup>189</sup> (as the primary judge observed at Ch 11 [171]). While Seqwater's employees Mr Malone and Mr Tibaldi may be taken to have agreed with the strategies put in place by Mr Ayre, the Manual provided that Mr Ayre was in charge. In order for breaches by Seqwater employees to satisfy s 36(2), Rodriguez must establish that no authority in Seqwater's position would properly consider Messrs Malone and Tibaldi complying with Mr Ayre's strategies to be reasonable. We deal with each man's conduct in turn.

(a) *Mr Tibaldi's overnight shift on 8/9 January*

660 Mr Tibaldi returned from leave to undertake the night shift. Just over an hour previously, Mr Ayre had issued his situation report, which stated that "[t]he current gate opening strategy will maintain flows of up to 1,600m<sup>3</sup>/s in the mid-Brisbane River throughout the evening". It went on to say:

"Assessments have been undertaken to determine possible increases to releases given the high likelihood of significant inflows in the next few days. The interaction with runoff from the Bremer River and Warrill Creek catchment is an important consideration as the event magnitude will require the application

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<sup>189</sup> (1986) 160 CLR 626 at 641, 646 and 685; [1986] HCA 34.

of Wivenhoe Dam flood operation strategy W2 (Transition strategy between minimizing downstream impacts and maximizing protection to urban areas).”

661 Thus from Mr Tibaldi’s position, the strategy set by the Senior Flood Engineer had the dam in W1E, with a caution that in the next few days it would be reviewed to consider whether to shift to W2. Mr Tibaldi applied that strategy over his shift, including by opening the gates by two further increments in the early hours of the morning: and in fact dam levels fell slightly during his shift (from 68.65m when he started, to 68.57m when his shift ended).

662 Rodriguez’ case at trial was that Mr Tibaldi was obliged to adopt strategy W4. Assuming that “proper modelling” took account of releases which might reasonably have been made, that case was not made out.<sup>190</sup> There was no basis in the material to which this Court was taken for an inference that the standard in s 36(2) was breached.

*(b) Mr Malone’s day shifts on 6, 7 and 9 January*

663 On Thursday, 6 January, Wivenhoe levels ranged between 67.29m and 67.45m, rising by slightly less than 1cm per hour throughout the entire day. The rate of increase changed at around midnight. Water levels rose by around 3-4cm per hour for the first 11 hours of Friday, 7 January. In the period from 11:00 until 14:00 on that Friday, water levels rose by 7cm, 6cm and 5cm each hour, and thereafter at a slower rate. The radial gates commenced to open at 16:00 on 7 January, at which time the water level was 68.06m.

664 Mr Malone’s original view, communicated by email at 12:14 on 6 January was to open one gate by five increments between 18:00 and 22:00, so as to keep Burtons Bridge open. At 13:30 Mr Malone changed his mind, and said in his “Revised Gate Opening Strategy”:

“There has been further heavy falls in the Lockyer since 0900 Thursday and the flow from the Lockyer is going to be larger than initially assessed, possible as high as 600m<sup>3</sup>/s peaking Saturday. This may close Burtons without any

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<sup>190</sup> See [565]-[571] above.

contribution from Wivenhoe. The opening of the Wivenhoe gates will therefore be delayed until the Lockyer peak passes.”

665 By the conclusion of Mr Malone’s shift on 6 January, the water level was merely 67.41m. His situation report at 17:33 stated:

**“Wivenhoe Dam**

At 1700 Thursday, Wivenhoe was 67.39m and rising slowly. This is 0.39m above FSL and above the gate trigger level of 67.25m. Upstream of the dam river levels are still rising at the Linville and Gregors Ck gauges. The estimated event inflow volume into Wivenhoe Dam is 180,000ML including Somerset Dam outflow.

A peak of about 600m<sup>3</sup>/s is expected from the Lockyer late Friday. At this stage there is some uncertainty associated with this estimate and it may or may not impact Burtons Bridge. Wivenhoe gates will be opened after the impact of Lockyer flows on Burtons Bridge has been ascertained and flood levels in the lower Lockyer subside. At this stage Wivenhoe releases will commence late Friday/early Saturday and may be as high as 1,500m<sup>3</sup>/s, similar to recent events, and continue for a couple of days.

666 Even if this involved a failure to apply the Manual, it was not an unreasonable approach to take, and it has certainly not been shown that it was so unreasonable that no dam operator could properly consider it to be reasonable. Throughout the shift, the dam levels were only between 6cm and 16cm higher than the minimum level at which the radial gates could be opened. Even at the end of the shift, almost the entire flood storage of Wivenhoe (more than 95%) remained available. To be fair, this first shift of Mr Malone was not at the forefront of Rodriguez’ case based on s 36(2).

667 The second shift, on Friday 7 January, was preceded by Mr Ayre’s situation report at 06:06. The primary judge accepted that in issuing that report, “Mr Ayre was setting an ‘overall strategy’ or ‘general strategy’ for the management of at least part of the flood event to the effect that releases would be delayed until Burtons Bridge was inundated, and then gradually increased over the subsequent 24 to 30 hours to approximately 1200m<sup>3</sup>/s.”

668 Mr Ayre’s situation report stated that “it was proposed that Wivenhoe releases will commence late Friday/early Saturday” (ie late on 7 January or early on 8 January). Mr Malone appears to have brought that forward, by determining

at midday (when he issued Directive 1) to commence gate openings at 15:00 on Friday afternoon.

669 Rodriguez did not establish that Mr Malone's implementation of Mr Ayre's strategy was so unreasonable that no dam operator could properly consider it to be a reasonable thing to do. There was no evidence of that, and it is to be borne in mind that dam levels on that shift were from 67.68m to 68.17m.

670 True it is that the primary judge considered that Mr Malone was not excused by that general strategy from determining the applicable Wivenhoe strategy: Ch 6 [262]. So much may be accepted. But it is another thing to conclude that implementing the Senior Flood Engineer's strategy was something which was so unreasonable that no dam operator could consider it a reasonable response.

671 It is also true that the primary judge addressed, in some detail in Ch 6, the likelihood of rainfall over the next four days exceeding 140mm of runoff as follows:

“[265] ... [I]n his affidavit Mr Malone stated that as at 5.00pm [on 7 January], Wivenhoe Dam was at EL 68.10, the available volume was 790,098ML and that was equivalent to '140mm excess rainfall' (ie, runoff). Allowing for losses and releases during the intervening period, he denied that, unless releases were increased in accordance with strategies W3 and S2, there would be insufficient flood storage capacity to avoid releases in volumes that would cause urban flooding. As at 6.00pm Wivenhoe Dam was slightly higher (EL 68.12m). According to Mr Malone's situation report, 160,000ML of rain that already had fallen was still to flow into Wivenhoe Dam (see [235]). This accords with the 7 Jan 18:00 ROG which predicted 161,485ML inflows from 6.00pm on 7 January 2011. Using Mr Malone's estimate of the catchment response during the Late December Flood Event, the 140mm of excess rainfall could be produced by rain on the ground inflows and 145mm of further rain. Using Dr Christensen's estimate of the catchment response, that amount of runoff could be produced by rain on the ground inflows and a further 130mm of rainfall. All reasonable estimates of the four-day PME forecasts available in daily format at 6.00pm that evening exceeded those figures. Mr Malone's situation report referred to four-day totals of 140mm to 300mm and the saturated condition of the catchment such that 'significant inflows will be generated'. The forecasts he referred to suggested higher rainfall downstream which could seriously impede the capacity to make releases at later times, and which otherwise had the potential to also fall upstream.

[266] Thus, given the forecasts and the saturated catchment, the prospect of 140mm of runoff was very likely. In those circumstances there subsisted a serious and significant risk that if sufficient releases were not made at that time, releases would have to be made from above EL 74.0m AHD later.” (footnotes omitted).

672 This analysis has been considered above at [536]-[540]. It depends on the no release assumption applied over a four-day period as well as the coming to pass of a number of other possibilities. It does not address the reality that during the four days dealt with by the PME forecasts, it was anticipated there would be substantial and sustained releases. Once that is appreciated, it does not follow that there was a “serious and significant risk” that implementing the strategy set by Mr Ayre would lead to the need to make large releases days later because levels exceeded 74m.

673 Turning to Mr Malone’s third shift, Wivenhoe was releasing around 1330m<sup>3</sup>/s at the commencement of his shift at 06:30 on Sunday 9 January, in accordance with the strategy of keeping the Mt Crosby Weir and Fernvale Bridges open. The primary judge recorded that Mr Malone made inquiries of the Bureau about the persisting heavy rainfall forecasts, and suggested that there be a discussion with all flood engineers to discuss upcoming operations: Ch 7 [166]. That meeting took place at 15:30.

674 Mr Malone sent his email of 11:01 which has earlier been mentioned. It identified the very large run off into Wivenhoe which could be generated by forecast rainfall over the next three days (from 500,000 – 1,000,000MI), compared the flood event to those of October 2010 and February 1999, and noted that “the starting level of the dams is much higher than in these historical events”.

675 The following extract from his cross-examination, noted in Ch 7, was directed to this point in time:

“[178] Leaving aside any debate about the amount of runoff expected in the following days, Mr Malone agreed that, despite his email, there was no increase in releases on 9 January 2011 and further gate openings only occurred on the morning of 10 January 2011. The cross-examination continued as follows:



- 'Q. The position by 11 o'clock on the 9th was that Mr Ayre had called a meeting for all the flood engineers to get together at the one place at the one time; correct?  
A. Yes.
- Q. That had never happened before during a flood event, had it?  
A. No.
- Q. You were sufficiently concerned to write this email which was not a sit rep but was setting out your concerns; correct?  
A. Correct.
- Q. And the forecasts at the time were indicating still that there could be considerable further rain in the next few days; correct?  
A. Correct.
- Q. And the dam was above 68.5; correct?  
A. Yes.
- Q. There was limited space compared to the difference between FSL and 74 metres; correct?  
A. We still had about - the majority of that space available - about 75 per cent of that space available.
- Q. And you knew that you needed, in order to achieve optimum flood mitigation protection of urban areas, to maximise the space available in the flood compartment of the dam in order to achieve that objective, didn't you?  
A. That was desirable.
- Q. *By this point, the only reasonable decision was to increase the releases from Wivenhoe Dam above the level of about 1,200 or 1,300 cumecs at which releases had been made since the afternoon of 7 January?*  
A. *That's reasonable.*' (emphasis added by primary judge)

[179] The manner in which the last answer was given made it clear that Mr Malone fully accepted all of the propositions put to him in that question.

[180] Seqwater submitted that this answer was only an expression of an opinion in hindsight and did not involve a concession by Mr Malone that *at the time* he recognised that an increase in releases was the only reasonable decision. Having heard the answer and observed Mr Malone's evidence, I regard this answer as a concession that, based on what he knew at the time, releases should have been increased. Seqwater and SunWater also noted that there was no concession as to what the increase in outflows should have been. As at 11.00am on 9 January 2011, releases were kept at around 1200 to 1300m<sup>3</sup>/s to maintain Lowood flows at around 1600m<sup>3</sup>/s so as to avoid inundating bridges. In context, the only relevant increase that could be countenanced was one that inundated the remaining downstream bridges but did not cause flows downstream to exceed the threshold for non-damaging flows. Seqwater also submitted that this concession was overtaken by events that afternoon, including the 3.30pm meeting

with the SFOE. Subject to considering the extent to which they might have been bound by some general strategy that emerged from that meeting (see below), the unfolding events, including the intense rainfall and ever worsening rain on the ground assessments, only reinforced the necessity to increase outflows.”

676 The primary judge regarded Mr Malone as conceding, based on what he knew at 11:00 on 9 January, that releases should have been increased. We agree. However, neither that concession, nor his Honour’s statement that “the only relevant increase that could be countenanced was one that inundated the remaining downstream bridges” entailed breach of the standard in s 36(2). Again, there was no evidence of what another dam operator would regard as so unreasonable that it could not be considered a reasonable response. Furthermore, our earlier breach analysis (at [602] above) concluded that it was not until the early evening on 9 January that a reasonably competent flood engineer taking account of proposed releases should reasonably have expected that the level of Wivenhoe was likely to exceed 74m, thereby requiring releases to a level above that sufficient to submerge the bridges. Moreover, Mr Ayre was in charge. What was Mr Malone to do? It is unrealistic to expect Mr Malone unilaterally to issue directives which would increase releases so as to inundate the major bridges. Mr Malone appears to have been involved in assembling a meeting, one aspect of which was, evidently, to review the strategy. We are not persuaded that taking those steps, and not in the meantime departing from the strategy which had been in place over the previous days, was so unreasonable that it could not properly be considered reasonable by a dam operator in Seqwater’s position.

677 The contemporaneous note of the meeting that afternoon, which the primary judge regarded as accurate and speaking for itself,<sup>191</sup> bears repeating:

“Duty Engineer Conference held at the FOC: Attended by RA, JR, TM with JT on conf phone. At this stage operating at the top end of W1 and the bottom end of W2. Storing approx. 300,000 ML at present (above Wivenhoe) with an additional 500,000 ML expected to flow into the dams from rainfall on the ground. The rainfall system is currently in the N-E part of the catchment and expected to travel south over the next 24-36 hours according to the BOM forecasts. This has the potential to significantly increase flows in Lockyer Ck

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<sup>191</sup> *Rodriguez (22)* Ch 7 [193].

& the Bremer River which potentially could close Fernvale Bridge and Mt Crosby Bridge and increase the risk of flooding in the Lower Brisbane. Releases from Wivenhoe Dam will be maintained at the current level of ~ 1,400 cumecs. If required, releases from Wivenhoe Dam will be reduced to contain the flow in the Mid-Brisbane to 1,600 cumecs and 3,000 cumecs in the Lower Brisbane. At this stage it is anticipated that levels below 102.5 in Somerset and 72.5 in Wivenhoe can be attained.”

678 The timing and content suggests that immediately after the conclusion of that meeting, Mr Malone made the telephone call recorded in the following entry in the Event Log, at 16:15:

“Terry Malone phoned Tony Jacobs at Somerset RC. Advising that the current strategy was to maintain a flow in the Brisbane River such that the Fernvale Bridge and the Mount Crosby Bridge could be kept open. However, future rainfall could well impact on those roads remaining open. Closure next Tuesday is a real possibility at this stage.”

679 That note confirmed that there was a strategy to limit releases to levels to preserve the two major bridges: Ch 7 [200]. It was repeated in a note recording a materially identical communication by Mr Malone to Ipswich City Council at 16:20. A note at 16:27 recorded a similar conversation between Mr Malone and Mr Morris at Brisbane City Council, advising that “[f]low in the Lower Brisbane potentially might reach 3,000 cumecs by next Wednesday or Thursday”. That possibility was reiterated in a file note recording another communication with Brisbane City Council at 17:25.

680 Thus, in accordance with contemporaneous documents recording communications with third parties, the strategy adopted at the meeting on the afternoon of Mr Malone’s shift was to keep releases to levels which would preserve Mr Crosby Weir and Fernvale Bridges, that is, around 1400m<sup>3</sup>/s, but with there being a real possibility that by Tuesday afternoon (11 January) or Wednesday substantially greater releases might occur.

681 Mr Malone completed his 9 January shift with his situation report issued at 21:00 on the Sunday evening, in which he advised all (including Mr Morris at Brisbane City Council) that following further inflows:

“The objective for dam operations will be to minimise the impact of urban flooding in areas downstream of the dam and, at this stage, releases will be kept below 3,500m<sup>3</sup>/s, and the combined flows in the lower Brisbane will be limited to 4,000m<sup>3</sup>/s. This is below the limit of urban damage in the City reaches.

The current release from Wivenhoe Dam is 1,400m<sup>3</sup>/s (120,000ML/day). Gate opening will start to be increased from noon Monday and the release is expected [to] increase to at least 2,600m<sup>3</sup>/s during Tuesday morning.”

682 Thus, by the evening of Sunday 9 January, Mr Malone had unquestionably moved into Strategy W3. The question is not whether that should have occurred earlier, but rather whether Mr Malone’s failure to take that step earlier was so unreasonable that no dam operator in Seqwater’s position could properly consider his conduct to be a reasonable exercise of flood mitigation functions.

683 Breach of this standard has not been made out. Mr Malone adhered to the strategy set by Mr Ayre, abided by the decision reached at a meeting convened by Mr Ayre, and when dam levels continued to rise, altered the strategy to W3. Although this should have occurred before the meeting of flood engineers on the afternoon of 9 January, it was not so unreasonable for Mr Malone to await the outcome of the meeting that no dam operator could properly consider that a reasonable thing to do.

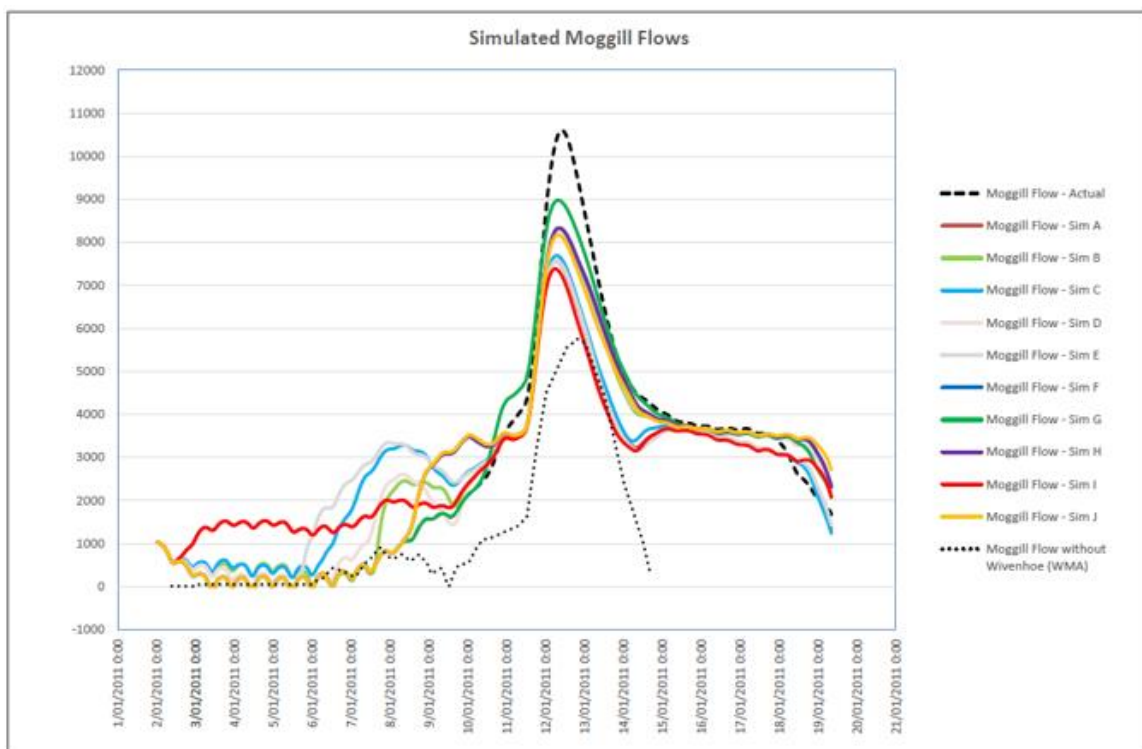
(c) *Benefit of hindsight*

684 Undoubtedly the strongest of Rodriguez’ claims related to the operation of the dams in the period immediately preceding the peak releases from Wivenhoe which resulted in major flooding in Brisbane and Ipswich. However, it is important to bear in mind two matters which are only known with the benefit of hindsight:

- (1) Even if there were zero releases from Wivenhoe, there would have been urban inundation; the peak flows at Moggill without Wivenhoe exceeded 5,000m<sup>3</sup>/s.

(2) Every simulation advanced by Dr Christensen required, in response to the tremendous inflows which took place in the late morning and early afternoon of 11 January (6,817m<sup>3</sup>/s at 06:00, 9,165m<sup>3</sup>/s at 09:00, 10,376m<sup>3</sup>/s at 10:00, 9,606m<sup>3</sup>/s at 11:00, 10,120m<sup>3</sup>/s at noon and a peak rate of 11,561m<sup>3</sup>/s at 13:00) substantial releases from Wivenhoe which contributed to the urban inundation.

685 These two matters are well illustrated by the following graph provided by Rodriguez.



686 The first point is clear from the lowest line on the graph (dotted black), representing “Moggill Flow without Wivenhoe”. The second may be seen from all of the other lines save the top-most (being the dashed black line representing “actual flows”). Effectively there were two contributing causes that led to urban inundation, that is to say flooding independent of any release from Wivenhoe and inflows into the dams on 11 January which required substantial releases from Wivenhoe. But on 7 January, and for most if not all of 9 January, it was not clear that there would be any urban inundation at all. It was certainly not clear that the issue confronting Mr Malone on 7 and 9 January was how best to

minimise the urban inundation which (it is now with the benefit of hindsight known) was to occur on 12 and 13 January.

(8) *Conclusions*

687 For these reasons, Rodriguez could not discharge its onus in making out a contravention of the standard set by s 36(2) in respect of any alleged breach. Seqwater's appeal with respect to the findings of breach on 6-10 January must be upheld. The finding of liability on the part of Seqwater must be set aside. The remaining grounds do not arise, but the issues may be noted, and, as far as appropriate, determined.

**22 Causation (grounds 26, 27)**

(1) *Introduction*

688 As appears from the diagram at [685] above, natural flows at Moggill emanating from catchments below Wivenhoe, that is, without any allowance for water released from Wivenhoe, were above 4,000m<sup>3</sup>/s from about 22:00 on 11 January to about 22:00 on 13 January. Those downstream flows reached a peak of some 5,800m<sup>3</sup>/s at about 00:00 on 13 January.

689 On the non-negligent hypothesis adopted by the primary judge (simulation C), the flows at Moggill would have substantially exceeded 4,000m<sup>3</sup>/s over a period from early afternoon on 11 January until about 23:00 on 13 January. In the actual event, there was a greater level of inundation with flows above 4,000m<sup>3</sup>/s from about 09:00 on 11 January until about 03:00 on 15 January, peaking at 10,700m<sup>3</sup>/s at in the early hours of 12 January. (The peak flow reached the city some hours later.) The factual question of causation turned upon the difference between the non-negligent and actual flows.

690 The plaintiff at trial relied upon modelling prepared by Dr Altinakar to demonstrate the level of flooding caused by the negligence of the flood engineers. Ground 27 in the notice of appeal asserted that the judge had erred in relying on that modelling to support findings that the property of Rodriguez and certain group members would have been inundated had the flood

engineers conducted operations substantially in accordance with simulation C. Dr Altinakar also prepared models for the other simulations, including F and H. In the event, ground 27 was not pressed.

691 The only ground relied upon under the heading “Causation” (ground 26) alleged that the judge had erred in finding that the breaches of each of the flood engineers were sufficient to account for the occurrence of the particular harm suffered by the first respondent and other selected group members, again based on the difference in outflows between the actual events and simulation C. Putting to one side the relevant outflows to be compared, the underlying proposition was that a breach on a particular day by a particular flood engineer could not account for a specific level of harm at a particular property. There was some overlap between this ground and ground 28 under the heading “Apportionment”. However, apportionment turns on a number of assumptions which are theoretical, given the findings above as to the engagement of s 36(2). There is little immediate purpose in considering the extent of the responsibilities of the individual flood engineers, in circumstances where SunWater and the State (the employers of Mr Ayre and Mr Ruffini respectively) were not involved in the appeal before the Court. Nevertheless, because the ground must be rejected those problems may be put to one side.

(2) *Appellant’s submissions*

692 As Seqwater correctly submitted, the starting point in assessing questions of causation is s 11 of the *Civil Liability Act*, which provides:

**11 General principles**

- (1) A decision that a breach of duty caused particular harm comprises the following elements—
  - (a) the breach of duty was a necessary condition of the occurrence of the harm (***factual causation***);
  - (b) it is appropriate for the scope of the liability of the person in breach to extend to the harm so caused (***scope of liability***).
- (2) In deciding in an exceptional case, in accordance with established principles, whether a breach of duty—being a

breach of duty that is established but which can not be established as satisfying subsection (1)(a)—should be accepted as satisfying subsection (1)(a), the court is to consider (among other relevant things) whether or not and why responsibility for the harm should be imposed on the party in breach.

- (3) If it is relevant to deciding factual causation to decide what the person who suffered harm would have done if the person who was in breach of the duty had not been so in breach—
  - (a) the matter is to be decided subjectively in the light of all relevant circumstances, subject to paragraph (b); and
  - (b) any statement made by the person after suffering the harm about what he or she would have done is inadmissible except to the extent (if any) that the statement is against his or her interest.
- (4) For the purpose of deciding the scope of liability, the court is to consider (among other relevant things) whether or not and why responsibility for the harm should be imposed on the party who was in breach of the duty.

693 In considering the question of breach, it is necessary to have regard, prospectively, to a particular “risk of harm”; questions of causation are viewed retrospectively by reference to the relationship between any breach of duty which has been established and the “particular harm” which eventuated. The particular harm in the present case may be identified as the damage caused by inundation to the property of Rodriguez. The inundation occurred as a result of the flows in the Brisbane River exceeding a particular rate, for a period of time.

694 Further, assuming that the appropriate non-negligent program of releases was that identified in simulations F and H, the peak flow at Moggill reached approximately 8,300m<sup>3</sup>/s. Accordingly, the owner of property at a sufficiently low level to be inundated by those flows could not allege that any breach of duty caused the damage suffered. As the actual release rate peaked at about 10,700m<sup>3</sup>/s,<sup>192</sup> on the same hypothesis the owners of properties which suffered inundation as a result of the flows exceeding 8,300m<sup>3</sup>/s were, on Rodriguez’ case, entitled to recover their losses.

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<sup>192</sup> *Rodriguez (22)*, Ch 7 [403].



695 The primary judge approached the question of causation on the basis that there had been several breaches of duty over the period from 2 January until 10 January 2011. These breaches involved failures on the part of the flood engineers to release water from Wivenhoe at an appropriate rate prior to 10 January. The judge accepted that the losses suffered had been caused by the cumulative effect of the several breaches. In doing so, he applied a passage in the joint reasons of the High Court in *Strong v Woolworths Ltd*,<sup>193</sup> dealing with the equivalent provision, s 5D, in the New South Wales *Civil Liability Act*.

“[20] Under the statute, factual causation requires proof that the defendant's negligence was a necessary condition of the occurrence of the particular harm.<sup>194</sup> A necessary condition is a condition that must be present for the occurrence of the harm. However, there may be more than one set of conditions necessary for the occurrence of particular harm and it follows that a defendant's negligent act or omission which is necessary to complete a set of conditions that are jointly sufficient to account for the occurrence of the harm will meet the test of factual causation within s 5D(1)(a).<sup>195</sup> In such a case, the defendant's conduct may be described as contributing to the occurrence of the harm.”

696 Seqwater contended that there were difficulties in applying this reasoning to the present case which, on the primary judge's findings, involved a series of sequential breaches by different parties. Its point may, perhaps, be illustrated by reference to two examples, based on an assumption that there were seven breaches each contributing an increased flow of 300m<sup>3</sup>/s. First, the owner of a property which was only inundated when the peak flow exceeded 10,400m<sup>3</sup>/s could legitimately argue that all the breaches of duty were necessary, in their cumulative effect, to cause damage to that property. In that sense, each breach was an element of a set of conditions, all of which were necessary and sufficient for the occurrence of the particular harm. (What was meant by the reference in *Strong* to “more than one set of conditions” may be disregarded; it is the concept of a “set” involving several elements which is critical.) A second example might

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<sup>193</sup> (2012) 246 CLR 182; [2012] HCA 5 (French CJ, Gummow, Crennan and Bell JJ).

<sup>194</sup> As McHugh J points out in *March v Stramare (E & MH) Pty Ltd* (1991) 171 CLR 506 at 529-530, the concept of a condition that is necessary to an occurrence is the lawyers' adaptation of John Stuart Mill's theory that the cause of an event is the sum of the conditions which are jointly sufficient to produce it. See also Hart and Honoré, *Causation in the Law*, 2nd ed (1985), pp 68-69, 109-114.

<sup>195</sup> Fleming, *The Law of Torts*, 9th ed (1998), p 219; *March v Stramare* ... at 509 per Mason CJ. See also Hart and Honoré ... p 18.

be a property which was inundated when the peak flow reached 8,600m<sup>3</sup>/s. If the non-negligent flow reached 8,300m<sup>3</sup>/s and each breach contributed an increased flow of 300m<sup>3</sup>/s, only one breach was necessary to cause the harm to that particular property. Accordingly, as we understand the appellant's submission, it cannot be said that all of the breaches were "necessary" to cause that harm and, accordingly, it cannot be said that Seqwater was responsible for the damage to that property. If there were merit in viewing the breaches sequentially, the loss might be attributable to the act of the flood engineer who was on duty at the time of the first breach.

697 To present the problem in this way demonstrates a difficulty in so identifying breaches. It is true that Rodriguez pleaded breaches of duty by reference to separate steps taken on a daily basis and, understandably, that approach was followed in the course of the trial and in the judgment. However, the approach is artificial. It involved the dividing of a singular course of conduct into discrete temporal segments. Further, it assumed that each flood engineer could and should from time to time exercise independent judgment. In fact, the decision-making of the flood engineers was more constrained than this approach recognised. As has been explained, for the most part the flood engineers were acting in a collaborative manner in setting a course for dealing with the flood event. Secondly, while it may have been appropriate and indeed necessary for the planned operation to be varied as conditions changed, any change required evaluation from a new starting point and could not achieve large effects immediately. For example, to increase significantly the volume of water being released from Wivenhoe it was necessary to open gates according to a protocol established by the Manual. If there were a legitimate criticism of the engineers for not releasing more water more quickly when the flood event was declared in the early morning on 6 January 2011, to the extent that the flood engineers operated collaboratively, all (and vicariously their employers) were liable for each breach. The fact that a particular engineer was on duty at a particular time was not a critical factor. What was important was the time at which (or period over which) the engineers breached the appropriate standard of care, and the time at which the window of opportunity for pre-releases to create flood storage volume closed. Section 11 did not require the cutting and dicing of a

particular course of conduct to determine separate specific breaches which could be attributed to the damage caused at particular properties.

(3) *Conclusion*

698 It follows that Seqwater’s complaint as to the way the primary judge dealt with the issue of causation must be rejected.

699 That conclusion does not provide an answer to the question of apportionment. Apportionment between tortfeasors was required by Pt 2 of the *Civil Liability Act* and was to be assessed on a “just and equitable” basis: s 31(1)(a). It may be possible to identify different levels of culpability as between the flood engineers and those vicariously liable for their conduct. The approach to causation does not address that issue.

**23. Apportionment (ground 28)**

700 The primary judge undertook an apportionment of liability as between the defendants on the basis that s 28 of the *Civil Liability Act* was engaged. That section stated:

**28 Application of pt 2**

- (1) This part applies to either or both of the following claims (**apportionable claim**)—
  - (a) a claim for economic loss or damage to property in an action for damages arising from a breach of a duty of care;
  - (b) a claim for economic loss or damage to property in an action for damages under the *Fair Trading Act 1989* for a contravention of the Australian Consumer Law (Queensland), section 18.
- (2) For this part, if more than 1 claim of a kind mentioned in subsection (1)(a) or (1)(b) or both provisions is based on the same loss or damage, the claims must be treated as a single apportionable claim.
- (3) This part does not apply to a claim—
  - (a) arising out of personal injury; or

(b) by a consumer.

(4) Also, this part does not apply to a claim to the extent that an Act provides that liability for an amount payable in relation to the claim is joint and several.

(5) A provision of this part that gives protection from civil liability does not limit or otherwise affect any protection from liability given by any other provision of this Act or by another Act or law.

701 Instead of the usual principle that two or more wrongdoers are jointly and severally liable for the whole of the loss suffered by the plaintiff, where s 28(1) is engaged, each will be a “concurrent wrongdoer”, responsible only for the proportion of the loss determined by the court as just and equitable, pursuant to s 31(1)(a). There is no right of contribution between concurrent wrongdoers: s 32A.<sup>196</sup>

702 Consistently with s 28(4), s 30 provides:

### **30 Who is a concurrent wrongdoer**

(1) A concurrent wrongdoer, in relation to a claim, is a person who is 1 of 2 or more persons whose acts or omissions caused, independently of each other, the loss or damage that is the subject of the claim.

(2) For this part, it does not matter that a concurrent wrongdoer is insolvent, is being wound up, has ceased to exist or has died.

703 There appears to have been no contest at trial that the claims were apportionable claims within Pt 2 of the *Civil Liability Act*, which is headed “Proportionate liability”. In *Rodriguez (23)* the primary judge stated that it had been found in *Rodriguez (22)* that the plaintiff’s claim in negligence was an “apportionable claim” within the meaning of s 28(1).<sup>197</sup> The judge determined that it was “highly likely” that the relevant proportionate liability provisions were those contained in the Queensland *Civil Liability Act* and not the New South Wales statute: Ch 14 [85]. The judge then identified the definition of

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<sup>196</sup> The section is set out at [768] below.

<sup>197</sup> *Rodriguez (No 23)* at [35]; referring to *Rodriguez (22)*, Ch 15 [24] which in turn referred to Ch 14 [83]–[90].

“apportionable claim” in s 28(1), observing that, “[t]here are certain exclusions in s 28(3) and 28(4) but they are not relevant.” There was no reference to s 30.

704 Perhaps because Rodriguez did not dispute that the apportionment pleaded by the defendants should be undertaken, there was no consideration of the effect of s 28(4) and s 30(1). Nor was it noted that, in this respect, there was a significant difference between Pt 4 of the *Civil Liability Act* (NSW) and Pt 2 of the Queensland Act. There is no equivalent in the New South Wales Act to the exclusion contained in s 28(4) of claims where, by statute, liability is “joint and several.” Further, whereas the definition of “concurrent wrongdoer” in s 30(1) involves two or more persons whose actions caused “independently of each other” the loss or damage the subject of the claim, the New South Wales Act covers a person who is one of two or more persons whose acts or omissions caused “independently of each other *or jointly*” the damage or loss the subject of the claim.<sup>198</sup> That Seqwater was the sole licensee entitled to release water from Wivenhoe Dam, and that SunWater and the State were only involved because their employees operated as flood engineers in combination with Seqwater’s employees, casts real doubt on whether apportionment was appropriate or even available.<sup>199</sup> The difference between the legislative schemes in this respect appears to be fundamental.

705 The judge apportioned the loss and damage suffered by Rodriguez by reference to each of the flood engineers, namely Mr Ayre (30%), Mr Malone (37.5%), Mr Ruffini (20%) and Mr Tibaldi (12.5%): *Rodriguez* (23) at [112]. The result was that Seqwater, being liable for the acts of Messrs Malone and Tibaldi, bore 50% of the loss and damage.

706 The primary judge was confronted with several differing positions as to the proper method for assessing culpability, as between the defendants. These included an attempt to assess which flood engineer was responsible for

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<sup>198</sup> Emphasis added. The distinction is noted in R Douglas, G Mullins and S Grant, *Annotated Civil Liability Legislation – Queensland*, (3<sup>rd</sup> ed, LexisNexis Butterworths) 2012 at 30.5, fn 723.

<sup>199</sup> For the test of joint liability, see *Thompson v Australian Capital Television Pty Ltd* (1996) 186 CLR 574 at 580 (Brennan CJ, Dawson and Toohey JJ), 591 (Gaudron J), 603 ff (Gummow J); [1996] HCA 38.

releasing particular volumes of water in excess of those deemed reasonable under simulation C. The judge opted, however, for a simpler formula, which turned primarily on the number of shifts served by each engineer during the relevant period.

707 Subject to one qualification, Seqwater did not seek to depart from this approach. Its primary submission turned on the number of relevant shifts. That in turn depended upon the degree of success with respect to the challenges to the judge's findings as to breaches of duty. Thus, it was submitted that if the breaches on 2, 3, 4, 5, 6 and 7 January were set aside, there would have been a significant reduction in Mr Malone's contribution and hence the apportionment to Seqwater.<sup>200</sup> The qualification was that the judge had given insufficient weight, in Seqwater's submission, to the greater responsibility of Mr Ayre as senior flood engineer.<sup>201</sup> Seqwater recognised that if all its challenges were upheld and it was not in breach, the Court would not need to consider apportionment.<sup>202</sup>

708 An issue was raised in the course of submissions as to whether any finding on apportionment would bind the other defendants, namely SunWater and the State, both of which had settled with the plaintiff and did not participate in the hearing of Seqwater's appeal. However, that concern may be put to one side; the *Civil Liability Act* permits an apportionment of liability where not all concurrent wrongdoers are parties to the proceedings: s 31(3) and (4). Further, the Act makes specific provision with respect to separate claims against concurrent wrongdoers: s 32B, s 32C(2).

709 Because the Court has concluded that Seqwater is not liable to the plaintiff or group members, it is not appropriate to address the question of apportionment on a contingent basis, where the contingency is undefined. In other words, apportionment will depend upon the basis and the extent of any liability which is to be assumed, contrary to the findings set out above. The inappropriateness

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<sup>200</sup> CA tcpt, p 365(3)-(18).

<sup>201</sup> CA tcpt, p 365(20)-(23).

<sup>202</sup> CA tcpt, p 362(15)-(17).

of pursuing the issue is reinforced by the doubt that the defendants were in fact “concurrent wrongdoers” within s 30(1) of the *Civil Liability Act*, and the absence of submissions by either party on that provision.

710 It is, however, convenient to note one consideration which might have rendered it inappropriate to reduce Seqwater’s liability below 50%. Although the parties did not address the issue either in this Court or before the primary judge, as has been noted above, Seqwater was the sole party responsible as licensee for controlling the release of water from the dams into the Brisbane River. Whatever arrangement it had with third parties, including SunWater and the State, to engage flood engineers employed by them, it is difficult to envisage that its liability would be less than 50%.

#### **24. Damages for cost of cleaning by volunteers (ground 31)**

711 Ground 31 concerned the calculation of the reasonable commercial cost of cleaning and reinstating damaged property following the flood. It was formulated as follows:

“The primary judge erred in finding that the proper basis on which to calculate the loss attributable to the clean-up of each group member’s property which was undertaken by group members and volunteers was to determine the cost which a commercial cleaner would have charged to clean each property, rather than determining the commercial value of undertaking the actual cleaning that was performed.”

712 On the basis that Seqwater was not liable to the plaintiff or the group members, this ground does not arise. Whether or not the Court should address the issue will turn on principles of judicial economy articulated by the High Court in *Boensch v Pascoe*.<sup>203</sup> The effect of the statements in *Boensch* was to dilute the convention established in *Kuru v New South Wales*,<sup>204</sup> by which intermediate courts of appeal considered whether to deal with grounds which were not dispositive, given conclusions reached on another ground or grounds.

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<sup>203</sup> (2019) 268 CLR 593; [2019] HCA 49 at [7]-[8] (Kiefel CJ, Gageler and Keane JJ); other members of the Court (Bell, Nettle, Gordon and Edelman JJ) agreeing at [101].

<sup>204</sup> (2008) 236 CLR 1; [2008] HCA 26 at [12].

- 713 In favour of disposing of the issues raised and argued, it may be said that there is an issue of principle involved which falls within a narrow compass and is therefore readily resolvable.
- 714 On the other hand, there are three factors which diminish the appropriateness of addressing this ground. First, it is entirely discrete and could, if necessary, readily be dealt with in the event that the High Court set aside this Court's findings on liability. Secondly, it is not apparent that there is any practical utility in addressing the issue in this case. The proceedings involving the other two defendants have been settled; while there may be outstanding issues as to the distribution of any payments resulting from the settlement, it is unlikely that the resolution of the present issue will affect those steps. Thirdly, for reasons which warrant some further explanation, the issue is not easily defined in terms which will readily resolve any contingent factual disputes.
- 715 The first factual complexity lies in the concept of "cleaning costs". The relevant principles have more commonly been stated in cases involving repairs for damaged chattels or fixtures on land. As explained by McPherson J in *Davidson v J S Gilbert Fabrications Pty Ltd*:<sup>205</sup>

"The case is not one involving the assessment of damages for total loss or destruction of a chattel. If it were, the normal measure of damages would be the market value of the chattel destroyed at the time and place of its destruction: see *McGregor on Damages* .... In the case of damage falling short of destruction the normal measure stated in the same text ... is 'the amount by which the value of the goods has been diminished.' The learned author then proceeds to say that 'this [measure], in the ship collision cases, has invariably been taken as the reasonable costs of repair'."

McPherson J continued:<sup>206</sup>

"There is authority for saying that, at least where the cost of repairs actually undertaken greatly exceeds the market value of the article damaged, the owner is limited to the replacement cost of a comparable article .... The effect ordinarily is to confine the recoverable damages to the lesser of the repair cost or replacement value. A somewhat similar result has been held to ensue in the case of permanent damage to land: *Jones v Shire of Perth* [1971] WAR 56, although in that instance there may be special considerations that render

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<sup>205</sup> [1986] 1 Qd R 1 at 3 (Andrews ACJ and Derrington J agreeing).

<sup>206</sup> *Davidson* at 4(19)-(35).



appropriate the higher reinstatement cost as the appropriate measure in particular cases: *Evans v Balog* [1976] 1 NSWLR 36.

All these decisions ultimately reflect a single underlying principle, which is that damages in the law of tort are essentially restitutionary, being designed to ensure that the plaintiff is restored so far as money can do it to his former position by compensating for the loss sustained, no less and no more.”

- 716 There are also cases where a repaired chattel may not attain its full pre-damage value, in which case the cost of repairs, though reasonable in themselves, may not cover the full loss suffered by the owner. In some cases, cleaning costs of a chattel may exceed the value of replacement by a comparable item; a similar possibility may arise in relation to fixtures damaged by water. The value of cleaning costs will undoubtedly be a significant element in the calculation of loss, but it may not equate to the loss suffered by the property owner.
- 717 Any dispute that the owners were entitled to recover compensation for the cleaning services which they or volunteers had undertaken gratuitously was resolved in *Rodriguez (22)* and was not raised by the appeal. The issue addressed by ground 31 was how those services were to be valued. As explained by the primary judge in *Rodriguez (27)*,<sup>207</sup> the different approaches were identified as follows:

“[6] As explained in *Rodriguez (No 26)* at [83], at the hearing in October 2020 an issue arose as to the basis for determining sample group members’ claims to recover the cost of the clean-up of their properties in the aftermath of the flooding. By that time the lead plaintiff, *Rodriguez and Sons Pty Ltd*, had claimed and recovered an amount that was calculated by reference to the commercial cost of cleaning its premises (ie, a ‘top-down approach’). This approach was then sought to be applied to the claims of all group members including the sample group members. However, the first defendant, [Seqwater], and the second defendant, [SunWater], contended that this head of damages should be assessed by costing the actual clean up work that was performed by those volunteers (and group members) (ie, a ‘bottom-up approach’). Seqwater also proposed a variant on that approach which involved costing the reasonable commercial equivalent of the volunteer labour that was provided. The differences between these approaches are best explained by summarising the evidence adduced in support of them.”

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<sup>207</sup> *Rodriguez & Sons Pty Ltd v Queensland Bulk Water Supply Authority Trading as Seqwater (No 27)* [2021] NSWSC 145 (“*Rodriguez (27)*”).

718 It may be seen that, as a matter of principle, both approaches used a market price, or commercial quotation, for undertaking the work. That there were different methodologies underlying the calculations does not appear to involve any question of law. The exercise was no doubt difficult and there were practical considerations affecting how it should be approached. Seqwater's concern was apparently about not paying for work which had not been done. However, this had two mutually inconsistent elements. On the one hand, Seqwater contended that it should not have to pay for professional cleaning services which were not in fact provided; on the other hand, it should not have to pay at an hourly rate for work which was done inefficiently or unnecessarily.

719 After explaining and applying the reasoning of the Victorian Court of Appeal in *Powercor Australia Ltd v Thomas*,<sup>208</sup> and noting arguments which had been considered and rejected in that case, the judge stated:

“[29] Similarly, in this case Seqwater contended that ‘where one is awarding damages to compensate a group member for cleaning up and drying out their property subsequent to a flood, one does so with reference to what actually occurred and one endeavours to place some value on what occurred’.<sup>209</sup> It follows from *Powercor*, that this contention ‘avoid[s] or misstates’ the primary conceptual basis on which ... damages [are] payable’. The group member is not being compensated for their work in ‘cleaning up and drying out their property’. Instead, they are being compensated for the damage to their property and the measure of that damage is the reasonable commercial cost of remediating their property regardless of whether that is greater than or less than the value of the labour they expended in attempting to doing so themselves.”

720 Whether the point of distinction sought to be articulated in this passage was valid would depend upon particular circumstances. That may be illustrated by reference to the circumstances and the reasoning in *Powercor* upon which the primary judge relied.

721 In *Powercor*, propositions which were not in dispute in the present case were at the heart of the appeal. Thus, one issue was whether the farmer (Mr Thomas) whose farm had suffered significant damage as a result of a fire

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<sup>208</sup> (2012) 43 VR 220; [2012] VSCA 87 (Osborn JA, Warren CJ and Bongiorno JA agreeing).

<sup>209</sup> Tcpt p 11008(29).

which commenced through the negligence of the appellant, could recover the cost of repairing fences himself. Osborn JA stated:

“[60] It was also submitted that if a claimant repairs fences himself and is reimbursed for the cost of materials he will have had the fences fixed ‘for nothing’. This is self-evidently incorrect. The claimant will not only have expended the reimbursed costs of materials but also incurred the cost of his own labour. The proper measure of damages is ordinarily the reasonable cost of effecting such repairs. In some cases, the reasonable cost of labour may exceed and, in other cases, may be less than the cost to the claimant of labour actually expended.”

722 *Powercor* dealt with work done by volunteers, in the following terms:

“[74] *Powercor* also contends that Thomas cannot recover in respect of damage to fences or other fixtures if that damage was repaired by volunteers. In *Insurance Australia v HIH Casualty and General Insurance Ltd (in liq)*,<sup>210</sup> Ashley JA observed:<sup>211</sup>

‘There is a broad principle, applicable at least in insurance law and torts law, that credit need not be given by an injured party for moneys received by it which are not to be characterised as extinguishing or reducing that party’s loss, but are rather to be characterised as having been received independently of right of redress. In the field of insurance, the principle is exposed in cases such as *Burnand v Rodocanachi Sons & Co* and *Merrett v Capitol Indemnity Corporation*. In torts law it is seen in personal injury cases such as *National Insurance Co of New Zealand v Espagne* and *Redding v Lee; Evans v Muller*, and in claims for property and other damage such as *Wollington v State Electricity Commissions of Victoria (No 2)* and *Monroe Schneider Associates Inc v No 1 Raberem Pty Ltd*.’

[75] In the present case, the trial judge held that this line of authority supported the proposition that where an injured party has benefitted from the kindness of others not intended to relieve the wrongdoer of his or her obligation, then such benefits should be ignored in the assessment of damages.”

723 The judgment in *Powercor* also referred to the principles applied by the High Court in *Zheng v Cai*,<sup>212</sup> a case in which payments made by a religious organisation for whom a passenger injured in a car accident did voluntary work were, as the High Court held, not to be taken into account in assessing

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<sup>210</sup> (2007) 18 VR 528.

<sup>211</sup> At 555, [160] (citations omitted).

<sup>212</sup> (2009) 239 CLR 446; [2009] HCA 52.

damages for economic loss.<sup>213</sup> That led to two propositions. First, consistently with the approach in *Zheng v Cai*, “the gifts of voluntary labour received by Thomas should be disregarded from the assessment of damages.” Secondly, the contention that the case fell to be determined by reference to the principles stated in *Griffiths v Kerkemeyer* was rejected.<sup>214</sup>

724 Both propositions relate to personal injury cases; one is applied, the other not. As to the first proposition, in the present case the relevance of amounts paid gratuitously to victims of the floods by the State was separately considered and rejected. The question is whether services gratuitously provided to meet a specific compensable need should be dealt with on the same basis. The payments of money in relief of suffering, as in *National Insurance Co of New Zealand Ltd v Espagne*<sup>215</sup> and *Redding v Lee*,<sup>216</sup> are “subventions” to adopt the terminology of Fullagar J in *Blundell v Musgrave*.<sup>217</sup> The reasoning of the majority and the minority (Dixon CJ and Fullagar J) in *Blundell v Musgrave* was not in conflict and, as noted below, has recently been approved by the High Court. The plaintiff, Musgrave, was a member of the Naval Forces, who was injured when hit by a motor vehicle driven by Blundell. The appeal concerned the liability of the defendant for the cost of medical treatment provided to the plaintiff at naval facilities, for which the Navy sought to charge him. The liability of the defendant for those costs turned on the likelihood of the Navy recovering them from the plaintiff. Fullagar J referred to two cases, one of which involved a domestic servant who, prevented by injury from remaining in her employment, received free board and lodging following the accident from her father. The second case involved a plaintiff who had lost wages during a period of disability but had received by way of pension and sick pay amounts equivalent to the wages. In each case the plaintiff was allowed to recover the amount in dispute. Fullagar J observed:<sup>218</sup>

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<sup>213</sup> *Powercor* at [85].

<sup>214</sup> (1977) 139 CLR 161; [1977] HCA 45; *Powercor* at [92].

<sup>215</sup> (1961) 105 CLR 569; [1961] HCA 15.

<sup>216</sup> (1983) 151 CLR 117; [1983] HCA 16.

<sup>217</sup> (1956) 96 CLR 73 at 93; [1956] HCA 66; see also H Luntz and S Harder, *Assessment of Damages for Personal Injury and Death* (5<sup>th</sup> ed, LexisNexis, 2021) at 9.1.2.

<sup>218</sup> *Blundell* at 93.

“In these cases the question is not whether the plaintiff is entitled, in the assessment of his damages, to be credited with the amount of an actual or prospective expenditure by him, but whether he ought to be debited with the amount or value of a subvention of which he has had the benefit. The authorities on the latter question are in a most unsatisfactory state, but they need not be further discussed here.”

725 In relation to the second proposition, in *Van Gervan v Fenton*,<sup>219</sup> a case involving gratuitous domestic care, the High Court rejected the claim that a care provider’s loss was an appropriate measure of the injured person’s loss. The joint reasons of Mason CJ, Toohey and McHugh JJ stated:<sup>220</sup>

“Once it is recognized that it is need for the services which gives the plaintiff the right to an award of damages, it follows that the damages which he or she receives are not determined by reference to the actual cost to the plaintiff of having them provided or by reference to the income foregone by the provider of the services. As Stephen J pointed out in *Griffiths*, the principle laid down in *Donnelly* ‘is concerned not with what outlays of money the plaintiff will in fact incur as a consequence of his injuries but with the objective monetary ‘value of his loss’. Because the market cost of services is ordinarily the reasonable and objective value of the need for those services, the market cost, as a general rule, is the amount which the defendant must pay as damages.”

The same principle informs the basis for compensating for property damage repaired by volunteers, as noted by the primary judge in *Rodriguez (27)* at [29] set out above. There appears to be a strong common element.

726 However, the basis for recovery in *Griffiths v Kerkemeyer* was noted in *CSR Ltd v Eddy*,<sup>221</sup> Gleeson CJ, Gummow and Heydon JJ stating that the case was “anomalous in departing from the usual rule that damages other than damages payable for loss not measurable in money are not recoverable for an injury unless the injury produces actual financial loss.” The three available heads of recovery were identified as general damages (payable for non-pecuniary losses, including pain and suffering), loss of earning capacity and actual financial expense (including medical, hospital and related expenses). The latter two categories have been characterised as economic loss, and payments as “special damages”. It was further noted in *CSR* that the traditional approach to compensable loss was that stated by Dixon CJ in *Blundell v Musgrave*, with

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<sup>219</sup> (1992) 175 CLR 327; [1992] HCA 54.

<sup>220</sup> *Van Gervan* at 333 (footnotes omitted).

<sup>221</sup> (2005) 226 CLR 1; [2005] HCA 64.

whom Fullagar J agreed, the majority accepting the same principles, but differing only in their application.<sup>222</sup> As McHugh J observed, *Griffiths v Kerkemeyer* turned on acceptance that a plaintiff's "injury-caused needs", resulting from the tortfeasor's negligence, should not lead to unrecoverable loss.<sup>223</sup> He continued:

"[115] To the extent that Mr Thompson took pleasure in gardening and attending to the car, he would be entitled to damages for loss of amenity and enjoyment of life. To the extent that his injury prevented him from performing these tasks and necessitated the provision of services from another person, there is no reason why he would not be eligible for *Griffiths v Kerkemeyer* damages at the market rate for those services. The same is true in relation to the domestic duties that he had performed around the house."

727 It is therefore somewhat unclear to what extent, beyond the specific (anomalous) awards made pursuant to *Griffiths v Kerkemeyer*, a plaintiff can recover the cost of services for which no payment has been made, no obligation to pay incurred and for which no payment will be required in the future. On one view, the proper analysis in the present circumstances is dependent upon whether the principles governing charitable gifts, as applied in *Zheng v Cai*,<sup>224</sup> apply to the gratuitous provision of services to assist those in need. If they do, is it necessary to ask whether the benefit was conferred independently of any right or redress the plaintiff might have against others, so that the recipient might enjoy the benefit even if damages were obtained?<sup>225</sup>

728 This point was noted by Handley JA in *Screenco Pty Ltd v R L Dew Pty Ltd*.<sup>226</sup>

"[35] The question arose again in *Dimond v Lovell* [2002] 1 AC 384 where the owner had hired a replacement vehicle under an agreement made unenforceable by the *Consumer Credit Act 1974* (UK). Lord Hoffmann said (at 398–399):

'[The appellant's] next point was that it did not matter whether Mrs Dimond was liable to pay for the hire ... The fact was that Mr Lovell had negligently deprived her of eight days' use of her [vehicle]. This was her loss and the fact that she had been lucky

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<sup>222</sup> *CSR v Eddy* at [31].

<sup>223</sup> *CSR v Eddy* at [111]-[113].

<sup>224</sup> (2009) 239 CLR 446; [2009] HCA 52.

<sup>225</sup> *Zheng* at [29] quoting Mason and Dawson JJ in *Redding v Lee*.

<sup>226</sup> (2003) 58 NSWLR 720; [2003] NSWCA 319.

enough to obtain the use of another car for nothing was, as one used to say, *res inter alios acta*. It should not affect Mr Lovell's liability, any more than if a friendly neighbour who happened to be going on holiday had put his car at her disposal. ...

A general principle that benefits provided by third parties are *res inter alios acta* is obviously strongly supportive of [the appellant's] argument.'

- [36] Lord Hoffmann referred to *Donnelly v Joyce* [1974] 1 QB 454 (followed in *Griffiths v Kerkemeyer* (1977) 139 CLR 161 ), and to *Hunt v Severs* [1994] 2 AC 350 where the House of Lords rejected the broad *res inter alios acta* principle of *Donnelly v Joyce*. In the latter case the House of Lords treated the situations mentioned by Lord Reid in *Parry v Cleaver* [1970] AC 1 at 14, namely receipts from insurance and from benevolent third parties, as apparent exceptions to the rule against double recovery and declined to create another exception for services provided voluntarily by a third party. (In *Kars v Kars* (1996) 187 CLR 354, the High Court declined to follow *Hunt v Severs* on this point.) Lord Hoffmann concluded (at 400):

'... The only way ... in which Mrs Dimond could recover damages for the notional cost of hiring a car which she has actually had for free is if your Lordships were willing to create another exception to the rule against double recovery. I can see no basis for doing so. ... There is no reason of policy why ... Mrs Dimond should be able to retain that benefit and make a double recovery rather than that it should reduce the liability of Mr Lovell's insurers.'

(*Kars v Kars* was a personal injury claim for domestic care, thus a *Griffiths v Kerkemeyer* claim.)

- 729 There was no challenge in this Court to the proposition that the plaintiff and group members were entitled to recover cleaning costs provided by members of the public without charge. However, the legal basis upon which such services are recoverable may affect the appropriate method of valuation. The uncertainty noted by Fullagar J as to the true basis for such claims has not been resolved in the last 65 years. They do not fall within the tripartite classification accepted in *CSR v Eddy*. Uncertainty in this regard provides a further reason for this Court not to address the question raised in circumstances where it does not need to.
- 730 The issue sought to be raised by Seqwater, however packaged, is little more than a dispute as to the best means to quantify that element of compensation.

There would be no benefit, and significant difficulties, in seeking to resolve that issue further in the present circumstances.

## 25. Pre-judgment interest on damages

731 As with ground 31, there is a live issue as to whether it is appropriate to address the two related issues which are covered by this topic. However, both the issues and the context were different from those discussed in relation to ground 31, as will be explained below.

### (1) *Identifying the issues*

732 Two separate but interrelated questions arose with respect to claims for pre-judgment interest on damages. The first was whether the primary judge erred in not awarding interest on damages for cleaning of fixtures and fittings, undertaken by volunteers, but calculated by reference to the commercial cost of the labour. This was the subject of Rodriguez' application for leave to appeal. The second was whether the judge was correct in awarding interest on that proportion of the damages equivalent to the amount received in Round 3 funding from the Premier's Disaster Relief Fund. This was the subject of ground 32 in Seqwater's appeal.

733 The plaintiff's claim for interest was pleaded as "interest in accordance with s 100 of the *Civil Procedure Act 2005* (NSW)". The pleading raised two issues. First, it assumed that interest was available, if at all, pursuant to New South Wales law: it is necessary to consider whether that was correct, or whether the claim was properly to be assessed under Queensland law. Secondly, what was sought was interest "on damages", pursuant to statute; there was no claim for interest "as damages" with respect to tortious injury to property. A claim in the latter terms would have raised an issue as to the application of *Sempra Metals Ltd v Inland Revenue Commissioners*<sup>227</sup> in Australia. As noted in *McGregor on Damages*,<sup>228</sup> both Lord Nicholls and Lord Scott held that a claim for interest as

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<sup>227</sup> [2008] 1 AC 561.

<sup>228</sup> J Edelman (ed), *McGregor on Damages* (21<sup>st</sup> ed, 2021, Thomson Reuters) at 19-061.



common law damages for loss could arise in tort: at [100] and [132] respectively.

(2) *Applicable law*

734 It is necessary first to identify the applicable law. To the extent that an award of pre-judgment interest depends on statute, both Queensland and New South Wales have statutory provisions in broadly similar terms. Section 58 of the *Civil Proceedings Act 2011* (Qld) relevantly provides:

**58 Interest up to judgment**

(1) This section applies in relation to a proceeding in a court for the payment of money, including a proceeding for debt, damages or the value of goods.

...

(3) The court may order that there be included in the amount for which judgment is given interest at the rate the court considers appropriate for all or part of the amount and for all or part of the period between the date when the cause of action arose and the date of judgment.

Section 100 of the *Civil Procedure Act 2005* (NSW) relevantly provides:

**100 Interest up to judgment**

(1) In proceedings for the recovery of money (including any debt or damages or the value of any goods), the court may include interest in the amount for which judgment is given, the interest to be calculated at such rate as the court thinks fit—

(a) on the whole or any part of the money, and

(b) for the whole or any part of the period from the time the cause of action arose until the time the judgment takes effect.

(2) In proceedings for the recovery of a debt or damages in which payment of the whole or a part of the debt or damages has been made after the proceedings commenced but before, or without, judgment being given, the court may include interest in the amount for which judgment is given, the interest to be calculated at such rate as the court thinks fit—

(a) on the whole or any part of the money paid, and

- (b) for the whole or any part of the period from the time the cause of action arose until the time the money was paid.

735 Each of these provisions is in the form of a conferral of power on a court giving judgment for a payment of money, a power which has been described as “discretionary”.<sup>229</sup> However, the discretion is not open-ended: the purpose for which interest is awarded is compensatory and where matters have been proved to the satisfaction of the court warranting a grant of interest, a grant will be obligatory, in the proper exercise of the discretion, in order to fully compensate the victim of a tort or other wrong. Thus, although in form each provision confers a power on a court (which should be understood as a court of Queensland and New South Wales respectively), in substance it is a conferral of an entitlement to a payment in the nature of compensation. Each provision has the dual function of creating a contingent right in the victim of a wrong, and conferring on a court the power to provide the remedy.

736 An award of interest being compensatory, it follows that the right to an award is a matter of substance governed by the *lex loci delicti*, consistently with the statement in *John Pfeiffer Pty Ltd v Rogerson*,<sup>230</sup> that “all questions about the kinds of damage, or amount of damages that may be recovered, would ... be treated as substantive issues”. The relevant provision is therefore s 58 of the Queensland Act. (As discussed earlier in these reasons, this Court’s jurisdiction does not depend on s 4(1) of the *Jurisdiction of Courts (Cross-vesting) Act 1987* (Qld), and s 11 of that Act is not engaged, though if it were, it would produce the same result.)

(3) *Issues raised*

737 Given the compensatory purpose of an award of interest, in each case where interest is sought it will be necessary to have regard to two particular considerations. The first is that, as more expansively stated in s 100(2) of the New South Wales Act, there may be good reason not to require payment of interest where a pre-judgment payment has been made of “the whole or part of

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<sup>229</sup> See, eg, *Giles v Thompson* [1994] 1 AC 142 at 167-168 (Lord Mustill).

<sup>230</sup> (2000) 203 CLR 503; [2000] HCA 36 at [100] (original emphasis).

the debt or damages” the subject of the proceedings. This raises the question identified by Seqwater, namely whether it was correct in principle to disregard the payments made to victims of the flooding from the State relief fund in awarding interest.

738 Secondly, it will be necessary to consider whether payment of interest would involve double recovery. That might occur, for example, where a loss which accrued in 2011 is compensated by a payment of damages assessed in terms of current values at the date of judgment where interest in part allows for losses due to inflation.<sup>231</sup> It might also occur where a revenue-producing asset has required repair and been out of service, the owner being compensated by recovery of the cost of repairs (with interest from the date of payment) and an award of damages for lost revenue during the period before the repairs were completed. Accordingly, the issues of principle sought to be raised cannot be answered in terms which disregard the context in which they come to be applied.

739 The limitations on the value of general rulings may be demonstrated by the lack of final resolution of the rulings with respect to interest in *Rodriguez (23)*, even as applied to the circumstances of the individual cases under consideration. Thus, in *Rodriguez (27)*, delivered on 26 February 2021, the primary judge returned to answer questions about interest on damages where payments had been made by the Queensland Rural Adjustment Authority and the Natural Disaster Relief and Recovery Arrangements, in relation to two particular group members. The issue arose partly in relation to whether those payments were intended to be enjoyed independently of, and cumulatively upon, any right to recover interest in respect of the loss occasioned, and “how a claim for statutory interest would interact with a subsidised loan”: at [84] and [87].

740 There are, therefore, considerations which weigh against dealing with the question of pre-judgment interest. On the other hand, the issues raised by the parties are formulated in terms which identify two specific criteria as

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<sup>231</sup> *MBP (SA) Pty Ltd v Gogic* (1991) 171 CLR 657, 663-664; [1991] HCA 3.

determinative for or against the award of interest. It is possible as a matter of principle to address those questions, although not in terms which would necessarily provide a common outcome for all group members, had liability been established.

(4) *Rodriguez' appeal*

741 Rodriguez sought leave to appeal, whilst submitting that leave was not required. The issue turned on the amount of interest claimed on the award for cleaning services being less than \$100,000, thus engaging the requirement for leave in s 101(2)(r) of the *Supreme Court Act 1970* (NSW). Its answer was that because the issue would affect many class members, including the representative sample of three class members whose damages were assessed by the primary judge, the amount in issue would in practical terms certainly exceed \$100,000.

742 That submission may be accepted, but it demonstrates that the requirement for leave lies elsewhere, namely in the fact that the judgment obtained by Rodriguez was interlocutory, for the reasons identified in relation to Seqwater's appeal. The proceedings have not been finally disposed of by the answering of separate questions in a manner giving rise to liability, but not resolving all issues of damages. On one view, the fact that the issue is now moot in the light of the findings as to liability militates against a grant to Rodriguez of leave to appeal. On the other hand, if the Court were otherwise minded to address the issue, the need for leave to appeal should not stand in the way of that outcome.

743 The issue sought to be raised was addressed in *Rodriguez* (23). The parties had agreed damages of \$200,968, comprising \$101,517 for trading and inventory loss, \$10,377 for loss of fixtures and \$89,074 for "the cost of cleaning and repairing the plaintiff's shop, fixtures and stock after the flooding", which was in fact "undertaken for no charge by a director of the plaintiff, Mr Rodriguez, members of his family and community minded volunteers": at [8]. The defendants contended that interest should not be awarded on the third component of the damages, characterised as "gratuitous services", even if that characterisation did not affect the plaintiff's entitlement to damages.

- 744 The judge observed that an award of interest was intended to compensate a plaintiff for having been kept out of money due between the time of the wrongful act and the time of judgment: at [20]. After considering whether the effect would be to confer a windfall benefit on the plaintiff, he concluded that to award interest “would not be consistent with the compensatory basis on which interest is awarded”: at [33].
- 745 Scattered through the decided cases, and the submissions of the parties in this case, are rhetorical statements reflecting these alternative positions. Thus, defendants generally allege that to award damages calculated as the commercial value of services provided gratuitously may be seen as a “windfall” which does not compensate for any financial loss; to award interest on top of those damages would be to exacerbate the nature of the windfall. Plaintiffs generally argue that such services were not intended to relieve defendants of their liability to pay full compensation at commercial rates, so that to decline to award interest on the payment would equally be to relieve a defendant of part of its liability. Both submissions are consistent with the compensatory principle, but neither assists in resolving the dilemma of requiring a defendant to pay interest on a financial outlay that was not in fact incurred.
- 746 The difficulty in providing a coherent and principled answer lies in the disparate conclusions reached by the courts in the past. The variable factors may be grouped as follows:
- (a) the subject matter affected: personal injury, injury to a chattel, or injury to land;
  - (b) the nature of the loss: loss of earning capacity, loss of use of chattel, loss of use of land;
  - (c) the nature of the use: whether for commercial or non-commercial (domestic) purposes; and

- (d) the purpose of the gratuity: whether intended to ameliorate harm suffered as a result of the tort, or to provide assistance regardless of the cause of the need for relief.

747 Some common areas of concern have been removed by statutory provisions. In Queensland, a court cannot award interest on general damages or damages for gratuitous services provided to an injured person, in respect of personal injury.<sup>232</sup> In New South Wales, that prohibition extends to damages awarded for the loss of a claimant's capacity to provide gratuitous domestic services to his or her dependants.<sup>233</sup> Thus, the decision in *Grincelis v House*<sup>234</sup> requiring an award of interest on damages for past gratuitous care services no longer operates in Queensland (or in this State). The principle may, of course, have broader operation. However, it is by no means clear that that is so. The Court in *Grincelis* referred to the adoption in *Gogic* of the compensatory principle.<sup>235</sup> That in turn was identified by reference to the reasoning of Gibbs CJ in *Batchelor v Burke*.<sup>236</sup> However, the question in *Batchelor* was whether interest was payable on so much of an award of damages as related to loss of earning capacity where the earnings lost before trial had been replaced by payments of worker's compensation. Gibbs CJ referred in the course of his reasons to the principle established in *Fire & All Risks Insurance Co Ltd v Callinan*<sup>237</sup> that, in the case of loss of earning capacity, interest should be allowed "only on that part of the damages awarded under that head which represents compensation for those detriments the practical impact of which, in terms of economic loss actually incurred, has already, at the date of judgment, been experienced by the plaintiff."<sup>238</sup> There was nothing in *Grincelis* to cast doubt on those statements, rather the contrary.

748 Whether cases involving personal injury resulting in loss of earning capacity, or the ability to care for oneself, raise different principles from those applicable to

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<sup>232</sup> *Civil Liability Act*, s 60(1).

<sup>233</sup> *Civil Liability Act* (NSW), s 18(1)(b).

<sup>234</sup> (2000) 201 CLR 321; [2000] HCA 42.

<sup>235</sup> *Grincelis* at [16]; see *MBP v Gogic* at fn 231 above.

<sup>236</sup> (1981) 148 CLR 448 at 455; [1981] HCA 30.

<sup>237</sup> (1978) 140 CLR 427 at 432; [1978] HCA 31.

<sup>238</sup> *Batchelor* at 451.

loss of use of chattels, and whether in the case of chattels, different principles apply with respect to those used for commercial and non-commercial purposes, are questions not readily answered in the abstract. In *Screenco Pty Ltd v R L Dew Pty Ltd*,<sup>239</sup> to which reference has already been made, this Court reviewed a judgment of McClellan J refusing to award interest on the loss of a large outdoor screen used in sporting events, the screen having been destroyed by the negligent construction of the scaffolding supports. While there was no doubt that Screenco, as the owner, was entitled to the value of the screen, a dispute arose as to whether it was entitled to interest on that amount from the date of the loss of the screen to the date of judgment. The case was unusual because Screenco had not paid for the screen, which it had purchased from its parent company. There was no evidence that it was required to make a payment to its parent at any particular date, nor that interest was payable on the outstanding amount. In addition to the cases in the High Court referred to above, Handley JA referred to a number of Admiralty cases which “are important because they recognise that interest and loss of earnings are alternative bases for assessing compensation and both should not be awarded for the same period”: at [30]. He also referred to cases in which motorists who had suffered loss of the use of a vehicle were entitled to recover damages reflecting the loss of opportunity to use the vehicle, but where substitute vehicles had been made available free of charge, no interest being payable on that head of damages. Handley JA quoted a passage from the reasons of Lord Mustill in *Giles v Thompson*<sup>240</sup> to the following effect:<sup>241</sup>

“The argument ... proceeds on the basis that the motorist’s cause of action against the defendant, and the financial loss resulting from it, came into existence at the moment of the accident, and was later quantified ... when the hiring period came to an end. At this time, so the argument runs, the defendant should have recompensed the motorist for her loss. Thereafter, she was ‘kept out of her money,’ a detriment for which she should be recompensed by an award of interest.

Although this argument seemed logical at first sight, it ignores the fact that the power to award interest is discretionary, and that *the exercise of this power should correspond with reality*. In the present case although the motorist incurred a genuine liability for the hire charges day by day, it was not a liability

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<sup>239</sup> (2003) 58 NSWLR 720; [2003] NSWCA 319 (Handley, Sheller and Tobias JJA).

<sup>240</sup> [1994] 1 AC 142 (HL).

<sup>241</sup> *Screenco* at [42]; *Giles v Thompson* at 167-168.

capable of immediate enforcement by the hire company. In both practical and legal terms the financial position of the motorist was wholly unaffected by the defendant's failure to make immediate payment, since ... until judgment was given she was not obliged to pay the hiring charges. ...

Thus, although an award of interest is always discretionary, I am unable to detect any grounds on which ... the discretion could properly be exercised in favour of the motorist." (Emphasis added in *Screenco*.)

749 The result in *Screenco* was explained as follows:

"[49] Subject to any adjustment required to prevent awards of interest and loss of profits for the same period an award of this interest would have followed as a matter of course if the appellant had paid for the screen, received it as a gift, or been obliged to pay interest on the purchase price. ...

[50] If the appellant had been liable to pay interest to its parent at less than gazetted rates the Court would have adopted the lower rate to ensure that the 'interest should restore rather than improve the plaintiff's position' .... If the appellant's interest recovery in such a case would be capped by its interest liability, no interest should be awarded where money has not been paid and there is no interest liability."

750 The primary judge, dealing with a loss of chattels or damage to property, considered he should apply the reasoning in *Screenco*. There was no error in taking that approach; indeed, it would have been wrong not to. It follows that Rodriguez cannot succeed in the present case unless it establishes that *Screenco* was wrongly decided in a matter of principle. *Grincelis*, upon which Rodriguez relied, was decided before *Screenco* and was not understood to be inconsistent with the approach adopted in the earlier High Court cases which were themselves applied in *Screenco*.

751 The submissions made in this Court were quite limited in their scope. It is clear that the claims for interest will vary in a number of respects between members of the group: some will have claims for cleaning costs involving commercial property, others with respect to the cleaning of residential property. It is inappropriate for this Court to address the issues of principle in circumstances where, on the finding as to liability, those issues do not arise. The appropriate course in such circumstances is to refuse Rodriguez leave to appeal.



(5) *Seqwater's appeal – ground 32*

752 The second aspect of the claim for interest arose from the award by the primary judge of interest on damages to the extent that claimants had obtained funding from the Premier's Disaster Relief Fund (PDRF). Ground 32 of the Seqwater's further amended notice of appeal was in the following terms:

“The primary judge erred in finding that the amount of funds received by group members from Round 3 of the Premier[']s Disaster Relief Fund are not to be taken into account in the calculation of interest otherwise payable on each group member's damages”.

753 The primary judge decided this point chiefly on the papers, shortly before the hearing of the appeal: *Rodriguez & Sons Pty Ltd v Queensland Bulk Water Supply Authority t/as Seqwater (No 29)*.<sup>242</sup>

754 The PDRF was a charitable trust that solicited and received donations from members of the public in order to provide grants to relieve people in distress following the flooding in late 2010 and 2011. There were three rounds of PDRF funding, but only the third was relevant, pursuant to which grants were made to persons who had suffered structural damage to their homes. The primary judge concluded (at [14]) that “the circumstances of those payments indicated they were made to alleviate hardship and they were intended to be received by flood victims ‘in addition to whatever rights [they] may have to recover’ elsewhere”, citing *National Insurance Co of New Zealand Ltd v Espagne*.<sup>243</sup> Accordingly, the benefits obtained by group members from Round 3 of the PDRF were not to reduce the amount of damages to which group members were entitled.

755 Seqwater did not challenge this finding. Rather, it submitted that the benefits obtained from the PDRF should nevertheless operate to reduce the interest awarded to group members, relying on the decision in *Rodriguez (23)*, discussed above. However, the judge observed that *Rodriguez (23)* rested on

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<sup>242</sup> [2021] NSWSC 483 (“*Rodriguez (29)*”).

<sup>243</sup> (1961) 105 CLR 569; [1961] HCA 15.

the correspondence between the services provided and the loss suffered. He continued:

[24] The relevant head of damages being awarded to each of Messrs Keller, Lynch and Visser is damage to their real and personal property (*Rodriguez (No 27)* at [29]). The charitable payments made from the PDRF were paid “in recognition of hardship” (*Rodriguez (No 26)* at [45]) and to address their “rehousing and recovery needs” (*Rodriguez (No 26)* at [46]). They serve a different purpose to the award of damages. They are fundamentally different in nature to the damages awarded. The funds received are not to be taken into account in the calculation of interest.”

756 The essence of Seqwater’s submission was as follows:<sup>244</sup>

“PRINCE: ... [T]he recipients of the PDRF funding in this case received a benefit which in the counterfactual world they would not have received, and they have had the benefit of the use of that money, which in our submission should be taken into account in assessing interest, and there was no basis to distinguish the case [of PDRF funding] from his Honour’s reasoning and conclusions in respect of cleaning costs.”

757 Seqwater thus called upon the principle espoused in *Screenco*. It is true that *Screenco* turned on its very particular facts: as was explained by Allsop P in *CHEP Australia Ltd v Bunnings Group Ltd*<sup>245</sup> and *Bunnings Group Ltd v CHEP Australia Ltd*,<sup>246</sup> the ultimate question was whether or not the award of interest would over-compensate the plaintiff.

758 The same “governing principle” applicable to awards of personal injury damages which Windeyer J in *Espagne* identified in the cases involving gratuitous provision of third party assistance to an injured plaintiff should ordinarily apply also by analogy to the discretionary power to award interest. Accordingly, absent special circumstances, “benefits that a plaintiff has received or is to receive from any source other than the defendant are not to be regarded as mitigating his loss, if ... they were given or promised to him by way

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<sup>244</sup> CA tcpt, 20/05/21, p 375(1)-(8).

<sup>245</sup> [2010] NSWSC 301 at [272].

<sup>246</sup> (2011) 82 NSWLR 420; [2011] NSWCA 342 at [188].

of bounty, to the intent that he should enjoy them in addition to and not in diminution of any claim for damages”.<sup>247</sup>

759 Subject to the issues of principle in relation to when and on what basis subventions operate to reduce damages, the approach of the primary judge accorded with current practice. There is no benefit in addressing this ground further.

## 26. Costs of trial – apportionment (ground 30)

760 Ground 30 of Seqwater’s appeal separately challenged the apportionment, as between the three defendants, of their joint and several liability to pay the plaintiff’s costs. Notwithstanding a suggestion by Rodriguez that leave was required, Seqwater is entitled to advance this ground as of right: *Housman v Camuglia*.<sup>248</sup> In any event, it involved a substantial amount of money, and raised a question of principle, namely, the relationship in a case of apportionable claims between the effect of the apportionment legislation upon those claims and the costs discretion.

### (1) *Reasons of primary judge*

761 In *Rodriguez & Sons Pty Ltd v Queensland Bulk Water Supply Authority t/as Seqwater (No 24)*<sup>249</sup> it was ordered that the three defendants each pay the plaintiff’s costs of the proceedings (with some presently irrelevant exceptions). Additionally, the primary judge made the following declaration:

“The Court declares that, as between the first, second and third defendants, they are liable to indemnify each other in respect of the party/party costs payable and paid to the plaintiff on the basis that [Seqwater] is to ultimately bear 50% of those party/party costs, [SunWater] is to ultimately bear 30% of those party/party costs and [the State] is to ultimately bear 20% of those party/party costs.”

762 The primary judge thus apportioned liability for costs amongst the defendants in the proportions for which they had been found liable in damages. His Honour

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<sup>247</sup> *Espagne* at 599-600.

<sup>248</sup> [2021] NSWCA 106 at [84].

<sup>249</sup> [2020] NSWSC 1498.

proceeded on the basis that the source of power was either s 7 of the *Law Reform Act 1995* (Qld) or s 98 of the *Civil Procedure Act 2005* (NSW) and that “[t]hese sources of power, or at least s 98, are supplemented by the *Supreme Court Act 1970*, and that which follows from the Court’s status as a superior court of record, to enable the Court to grant the appropriate relief to reflect a determination of the amount of each defendant’s contribution towards the plaintiff’s costs”.<sup>250</sup> Because none of the plaintiff’s costs had at that time been paid, “the appropriate form of relief is a declaration as to the defendants’ respective obligations to each other”.

763 The primary judge regarded the starting point as being that “a tort was committed for which the three defendants are responsible in proportions of 50%, 30% and 20% respectively”. This informed the “extent” of a “person’s responsibility for the damage” under s 7 of the *Law Reform Act* and also the discretion under s 98(1)(b) of the *Civil Procedure Act*. His Honour then rejected the submission that the relative proportions should be adjusted by reference to the conduct of the litigation. The dispositive reasoning was:

[9] ... [I]n this case, there was nothing in any of the defendants’ conduct of the proceedings which would warrant not making them responsible to each other for the plaintiff’s costs in the proportions identified in *Rodriguez (No 23)*. Even though I do not fully embrace Mr Stoljar SC’s description of the defence of this case as a ‘joint enterprise’, there were very large areas of common ground between the defendants. To an extent, Seqwater’s larger role in the defence followed from its status as the first defendant and the fact that it was defending the conduct of two flood engineers. The first matter is happenstance and the second matter is already reflected in the determination that it bears 50% of the plaintiff’s loss.

[10] Accordingly, Seqwater, SunWater and the State will bear the same proportions of the plaintiff’s costs as they bear for its loss and damage, namely, 50%, 30% and 20% respectively.”

(2) *Consideration*

764 Because Seqwater has succeeded in setting aside orders as to its liability, orders as to the costs of the trial must be set aside and this ground does not arise. What follows proceeds on the basis that the primary judge’s

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<sup>250</sup> *Rodriguez (24)* at [6].

apportionment of liability between Seqwater, SunWater and the State survives. That was the basis upon which the ground was argued.

- 765 The first question is to identify the power being exercised. Section 6 of the *Law Reform Act 1995* (Qld) confers a right of contribution between tortfeasors, and s 7 identifies that the contribution is to be “just and equitable” as determined by a court. The source of the defendants’ shared liability to the plaintiff was the Court’s order made on 20 October 2020. That order conferred a partial indemnity for legal costs incurred by the plaintiff in proceedings commenced and prosecuted in the Supreme Court of New South Wales. Until and unless an order for costs was made, there was no liability for any defendant to pay any part of the plaintiff’s assessed costs.
- 766 In these circumstances, the *Law Reform Act 1995* (Qld) was not applicable. That is not because the Queensland Act was incapable of applying to the liability to pay a plaintiff’s costs. It is established that the right to recover statutory contribution pursuant to statutes in the form of ss 6 and 7 of the *Law Reform Act* (which enact the substance of s 5 of the *Law Reform (Miscellaneous Provisions) Act 1946* (NSW)) extends to the costs payable to the plaintiff in addition to the damages: see *James Hardie & Coy Pty Ltd v Wyong Shire Council*;<sup>251</sup> *South West Helicopters Pty Ltd v Stephenson (No 2)*.<sup>252</sup> (Seqwater made a formal submission to the primary judge that *James Hardie* was wrongly decided, but that submission was not renewed in this Court.)
- 767 Rather, the Queensland statute is inapplicable because the question is not determined by the law of Queensland. The services which generated the plaintiff’s costs were, at least in large measure, performed in New South Wales in order to conduct litigation in the Supreme Court of New South Wales. The closest connection between the costs order and any Australian jurisdiction was with New South Wales. In the event of dispute about the quantification of those costs, the order would fall to be assessed under the New South Wales

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<sup>251</sup> (2000) 48 NSWLR 679; [2000] NSWCA 107.

<sup>252</sup> (2018) 98 NSWLR 96; [2018] NSWCA 99 at [66].

assessment regime. The power to order costs is quintessentially procedural, rather than substantive, as Miles CJ observed in *Labuda v Langford*.<sup>253</sup> Professor Garnett has stated that the position is reasonably settled in Commonwealth countries.<sup>254</sup>

768 Separately from the above, Seqwater submitted that s 32A of the *Civil Liability Act* prevented the *Law Reform Act* applying as between concurrent wrongdoers. Section 32A provides:

**32A Contribution not recoverable from concurrent wrongdoer**

Subject to this part, a concurrent wrongdoer against whom judgment is given under this part in relation to an apportionable claim—

- (a) can not be required to contribute to the damages recovered or recoverable from another concurrent wrongdoer for the apportionable claim, whether or not the damages are recovered or recoverable in the same proceeding in which the judgment is given; and
- (b) can not be required to indemnify the other concurrent wrongdoer.

769 Seqwater submitted that a declaration that it was liable to contribute to costs payable by a co-defendant contravened this provision. There is a large question as to whether, par (a) being limited to contribution to “damages”, the indemnification referred to in par (b) is also so limited, or whether it extends to costs. However, it is not necessary in order to resolve this ground to express a concluded view on the effect of s 32A, especially in its operation to persons found to be concurrent wrongdoers in litigation in another State. Rodriguez submitted, without contradiction, that the primary judge had not been referred to the section.

770 The source of power is the broadly worded s 98 of the *Civil Procedure Act 2005* (NSW), which gives the court “full power to determine by whom, to whom and to what extent costs are to be paid”.

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<sup>253</sup> [2001] ACTSC 126; 36 MVR 154 at [6].

<sup>254</sup> R Garnett, *Substance and Procedure in Private International Law* (Oxford University Press, 2012), p 159.

- 771 Seqwater had two objections against the order made. One was purely formal. It was that a declaration of right could not be made in the form it was. The power was confined to granting a declaration of existing legal rights or legal rights which will come into existence upon the happening of future events. However, Seqwater accepted that s 98(1)(b) conferred a power to make orders that the defendants pay certain proportions of Rodriguez' costs. Examples may be seen in the form of the orders made in *Voli v Inglewood Shire Council*<sup>255</sup> and *Soblusky v Egan*.<sup>256</sup>
- 772 Seqwater's substantive point was that the appropriate starting point was not the apportionment of liability for damages between the three defendants, which was not relevant to an assessment of the defendants' respective responsibilities for the plaintiff's incurring of legal costs. The point was illustrated by a simple example: suppose two defendants were found liable for 75% and 25% of a plaintiff's damages, but the former had only disputed quantum while the latter had disputed both liability and quantum. Seqwater submitted that it would be neither just nor reasonable to apportion responsibility for the plaintiff's costs in accordance with the apportionment for damages. In the proceedings at first instance, it was submitted that the three defendants had in effect made common cause and the starting point for the exercise of the costs discretion was not the apportionment reached at the end of the trial, but the separate liability for the costs of the proceedings which should be divided equally. Seqwater also maintained that that position was supported by contribution in equity in respect of the co-ordinate liability created by the joint and several costs order.
- 773 It is to be borne steadily in mind that the primary judge merely took the apportionment of liability for damages as a *starting point* for the exercise of the costs discretion. His Honour was not persuaded that Seqwater had established a sufficiently strong basis to depart from it. That is an approach reflected in many cases. For example, in *Chapman v Hearse*,<sup>257</sup> the order which was

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<sup>255</sup> (1963) 110 CLR 74 at 101; [1963] HCA 15.

<sup>256</sup> (1960) 103 CLR 215 at 239; [1960] HCA 9.

<sup>257</sup> (1961) 106 CLR 112; [1961] HCA 46.

ultimately confirmed by the High Court was that Mr Hearse was entitled to contribution from Mr Chapman in the amount of one-fourth of the damages and costs he was obliged to pay following the death of Dr Cherry.

774 Indeed, Seqwater's example proves too much. If a defendant who had conceded liability but disputed quantum was ordered to pay 75% of the plaintiff's costs, while the other defendant who had contested liability and quantum was only ordered to pay 25% of the plaintiff's costs, on the basis that the first defendant was ultimately liable to pay 75% of the damages and nothing more, then there would be *House v The King*<sup>258</sup> error. A material consideration to the exercise of the costs discretion would be the fact that the entirety of the plaintiff's costs incurred in relation to liability were attributable to the stance taken by the second defendant. But that proves merely that the damages ordered against multiple defendants can only be an appropriate starting point for the exercise of the discretion as to costs. The primary judge considered Seqwater's submission, but determined not to depart from that starting point. That approach does not disclose appealable error. The fact that his Honour relied on an additional source of power which was not available did not vitiate the exercise of discretion.

775 For those reasons, had this ground arisen, we would have recast the orders in the light of Seqwater's objection to their form, but not interfered with their substance.

## **27. Costs – generally**

### *(1) Costs of trial*

776 Because Seqwater has succeeded in setting aside the judgment against it, the order as to costs of the trial, which followed the event, must also be set aside. As to the appropriate substitute order, this Court does not have before it sufficient information to reassess the costs of the trial, which involved numerous issues and a multiplicity of separate judgments over several years. There would be merit in returning this issue to the mediator who has been involved

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<sup>258</sup> (1936) 55 CLR 499 at 505; [1936] HCA 40.



with the case in the past. However, this is a matter for the parties to consider. It may be that agreement can be reached in any event. The Court will not make orders as to the costs of the trial at this stage, but will grant leave to the parties to seek further orders, such leave to be exercised within 28 days, subject to further order of a judge of the Court.

777 It should be stated expressly that the Court does not intend itself to resolve a dispute as to the proper order for the costs of the trial, in the light of the substantive orders made on the appeal. If the matter cannot be resolved extrajudicially, it will be remitted to the primary judge: an order to that effect will be made.

(2) *Costs of appeal*

778 Seqwater, having been successful in setting aside the orders made at trial with respect to its liability, is entitled to its costs of the appeal. Its success turned on the primary ground on the appeal concerning the engagement and application of s 36(2) of the *Civil Liability Act*. It also succeeded on various grounds concerning the proper construction of the Manual, with the result that all findings of breach of duty have been reversed.

779 Although it has been unsuccessful with respect to specific grounds, these do not warrant a reduction in the award of costs.

**28. Orders**

780 The Court makes the following orders:

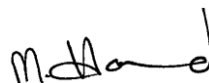
(A) In matter 2020/189434 (Seqwater's appeal) –

(1) In relation to orders relating to group members not the subject of final orders, grant Seqwater leave to appeal.

- (2) Allow the appeal and
- (a) set aside order (3) made on 29 May 2020 in *Rodriguez (No 23)* and orders (3)-(6) made on 7 May 2021 in *Rodriguez (No 29)*;
  - (b) set aside order (2) made on 29 May 2020 in *Rodriguez (No 23)* and order (1) made on 7 May 2021 in *Rodriguez (No 29)* in so far as the answers to the common questions relate to Seqwater or its employees;
  - (c) set aside orders 1-4 made on 28 October 2020 in *Rodriguez (No 24)*, in so far as they relate to costs payable by Seqwater, and remit to the primary judge any outstanding issue as to the costs of the proceeding in the Common Law Division in matter 2014/200854 involving Seqwater.
- (3) Subject to the remittal provided in order (2)(c), dismiss the proceedings in the Common Law Division in matter 2014/200854 as against Seqwater.
- (4) Order that the first respondent (Rodriguez & Sons Pty Ltd) pay the appellant's costs of the appeal.
- (B) In matter 2020/189716 (Rodriguez' application for leave to appeal) –
- Dismiss the summons seeking leave to appeal (with no order as to costs).

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I certify that the preceding 780 paragraphs are a true copy of the reasons for judgment of the Court.



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Associate  
8 September 2021

## APPENDIX A

### 8 WIVENHOE DAM FLOOD OPERATIONS

#### 8.1 Introduction

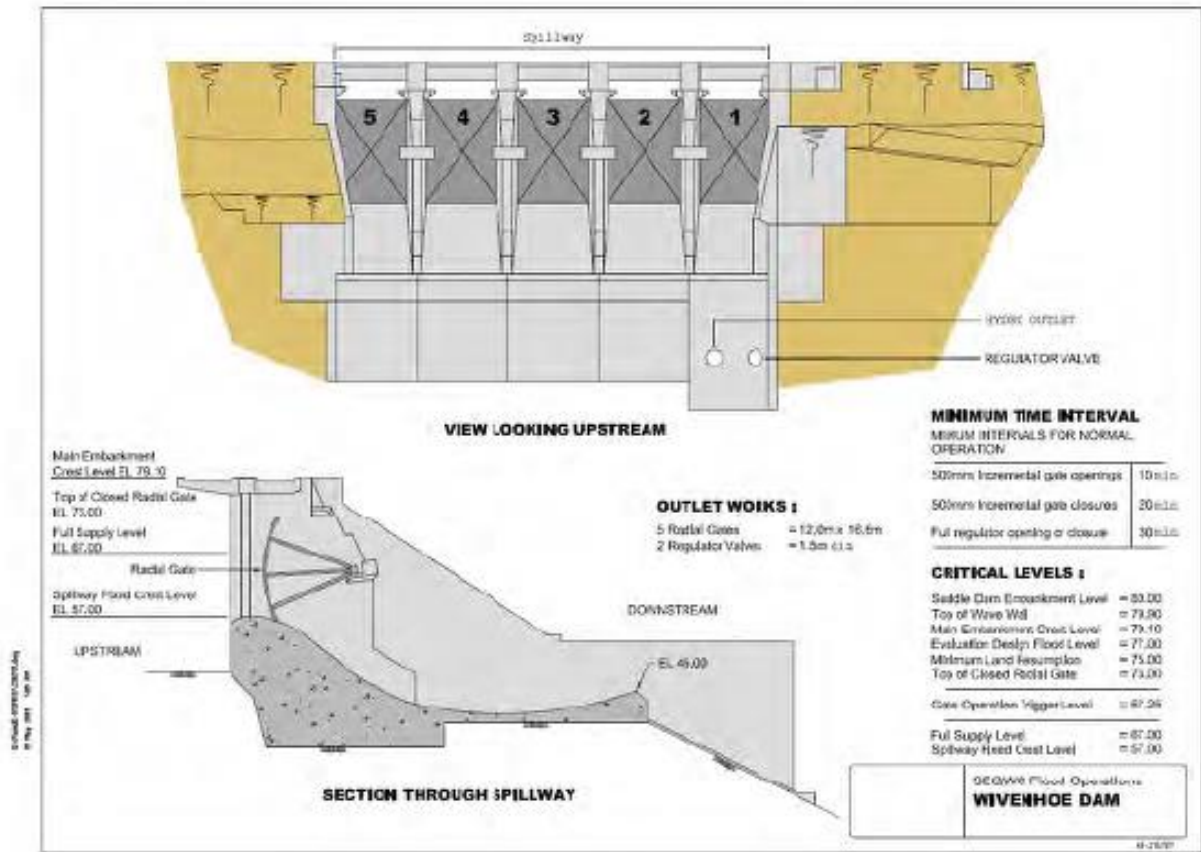
Wivenhoe Dam is capable of being operated in a number of ways to reduce flooding in the Brisbane River downstream of the dam, depending on the origin, magnitude and spatial extent of the flood. Maximum overall flood mitigation effect will be achieved by operating Wivenhoe Dam in conjunction with Somerset Dam.

The reservoir volume above FSL of EL 67.0 is available as temporary flood storage. How much of the available flood storage compartment is utilised, will depend on the initial reservoir level below FSL, the magnitude of the flood being regulated and the procedures adopted.

Splityard Creek Dam is part of the overall Wivenhoe Area Project and it forms the upper pumped storage for hydro power generation. Splityard Creek Dam impounds a volume of 28,700 ML at FSL (EL 166.5). This volume can be emptied into Lake Wivenhoe within 12 hours and this water can affect the level in Wivenhoe Dam by up to 300mm when Wivenhoe Dam is close to FSL. Operation of the power station and release of water from Splityard Creek Dam to Lake Wivenhoe is outside the control of Seqwater, but should be considered when assessing the various trigger levels of Wivenhoe Dam.

#### 8.2 Flood Release Infrastructure

Radial Gates and an Auxiliary Spillway are the primary infrastructure used to release water during flood events at Wivenhoe Dam. The arrangement of the Radial Gates is shown in the diagram below:



In addition to the five radial gates, the auxiliary spillway was constructed in 2005 as part of an upgrade to improve flood adequacy of this storage. The auxiliary spillway consists of a three bay fuse plug spillway at the right abutment. In association with other works constructed at the dam, this gives the dam crest flood an AEP of approximately 1 in 100,000. Another one bay fuse plug spillway may be constructed at Saddle Dam Two in the future.

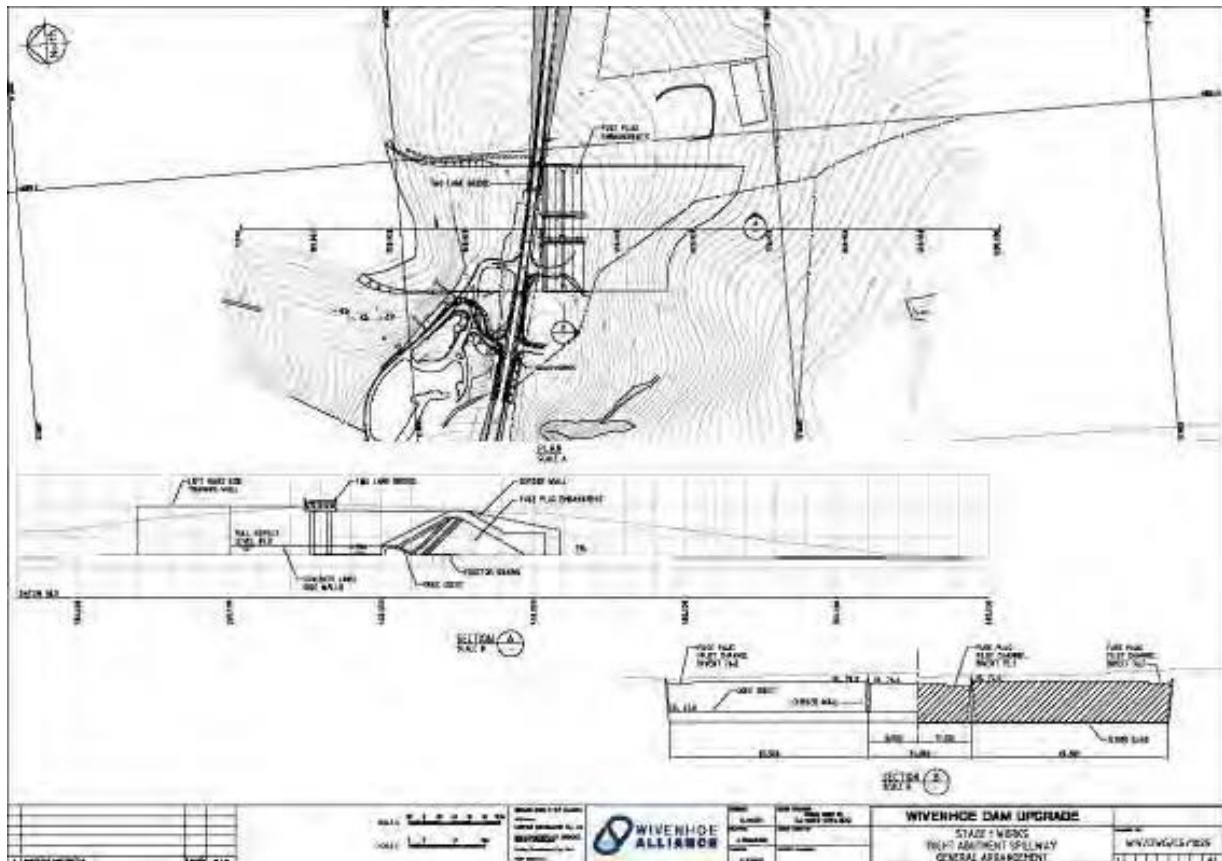
Pertinent information about the auxiliary spillway, including the initiation level for the specific bays is given in the following table.

#### AUXILIARY SPILLWAY - FUSE PLUG DETAILS

Auxiliary Spillway Component	Spillway Type	Spillway Width	Spillway Crest Level	Fuse Plug Pilot Channel Invert Level	Storage Level corresponding to Fuse Plug Pilot Channel Invert Level*
		m	m AHD	m AHD	m AHD
Central Bay	Ogee	34.0	67	75.7	75.7
Right Side Bay	Ogee	64.5	67	76.2	76.23 <sup>+</sup>
Left Side Bay	Ogee	65.5	67	76.7	76.78 <sup>++</sup>

- \* Storage Level is as per that measured at the Headwater Gauge. Initiation of Fuse Plug is expected to occur when the Lake Water Level exceeds the Lake Level at Fuse Plug Pilot Channel by 0.10 - 0.15 m.
- + Includes 0.03m of drawdown from the Fuse Plug Pilot Channel Invert to the Lake Water Level
- ++ Includes 0.08m of drawdown from the Fuse Plug Pilot Channel Invert to the Lake Water Level

The arrangement of the Auxiliary Spillway is shown in the diagram below.



### 8.3 Initial Flood Control Action

Once a Flood Event is declared, an assessment is to be made of the magnitude of the Flood Event, including:

- A prediction of the maximum storage levels in Wivenhoe and Somerset Dams.
- A prediction of the peak flow rate at the Lowood Gauge excluding Wivenhoe Dam releases.
- A prediction of the peak flow rate at the Moggill Gauge excluding Wivenhoe Dam releases.

The spillway gates are not to be opened for flood control purposes prior to the reservoir level exceeding EL 67.25.

#### **8.4 Flood Operations Strategies**

There are four strategies (W1 to W4) used when operating Wivenhoe Dam during a flood event as outlined below. These strategies are based on the Flood Objectives of this manual. As outlined in Section 3, the objectives, listed in descending order of importance, are as follows:

- Ensure the structural safety of the dams;
- Provide optimum protection of urbanised areas from inundation;
- Minimise disruption to rural life in the valleys of the Brisbane and Stanley Rivers;
- Retain the storage at Full Supply Level at the conclusion of the Flood Event.
- Minimise impacts to riparian flora and fauna during the drain down phase of the Flood Event.

Within any strategy, consideration is always given to these objectives in this order, when making decisions on dam releases.

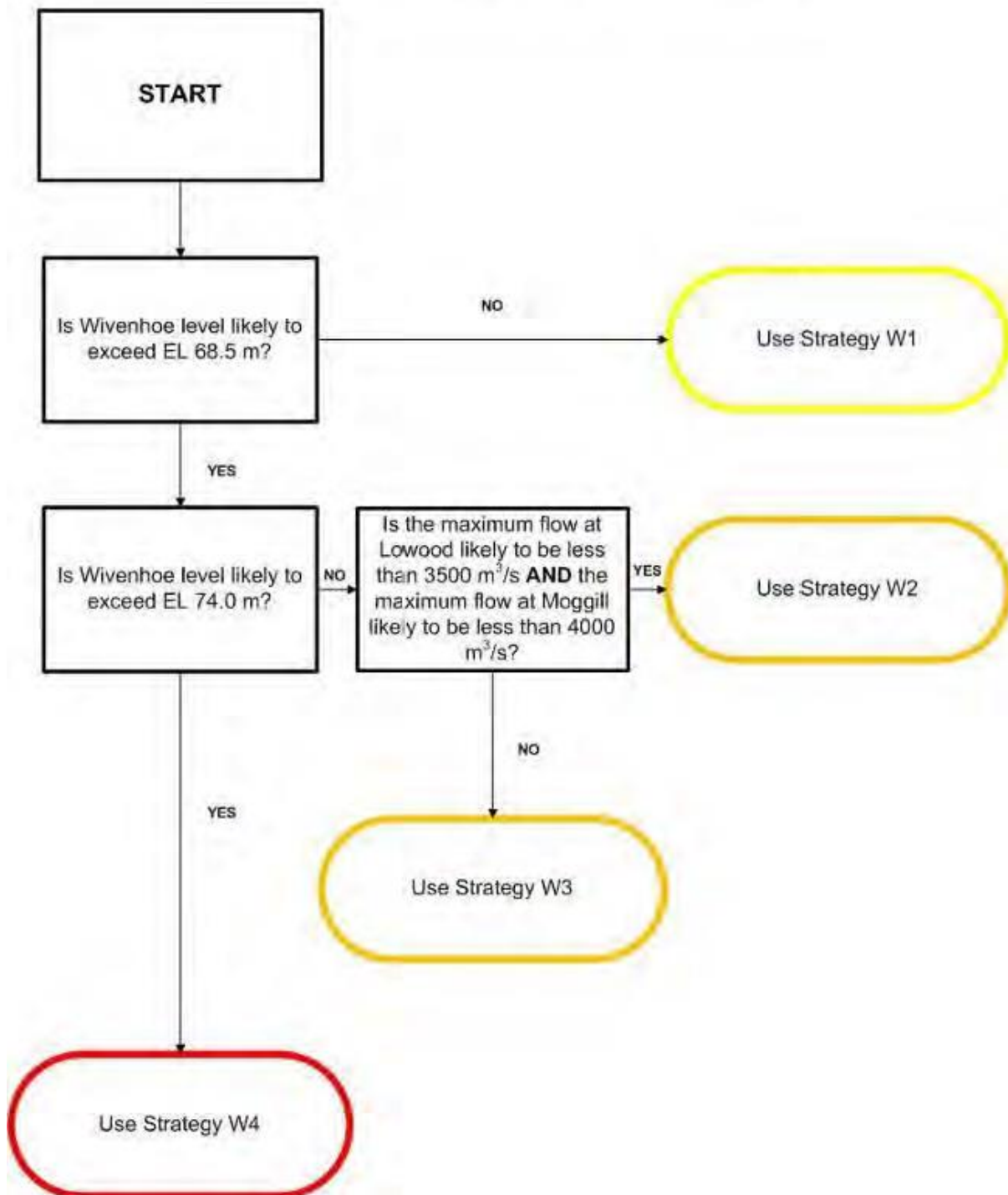
The strategy chosen at any point in time will depend on the actual levels in the dams and the following predictions, which are to be made using the best forecast rainfall and stream flow information available at the time:

- Maximum storage levels in Wivenhoe and Somerset Dams.
- Peak flow rate at the Lowood Gauge (excluding Wivenhoe Dam releases).
- Peak flow rate at the Moggill Gauge (excluding Wivenhoe Dam releases).

Strategies are likely to change during a flood event as forecasts change and rain is received in the catchments. It is not possible to predict the range of strategies that will be used during the course of a flood event at the commencement of the event. Strategies are changed in response to changing rainfall forecasts and stream flow conditions to maximise the flood mitigation benefits of the dams.

When determining dam outflows within all strategies, peak outflow should generally not exceed peak inflow. A flowchart showing how best to select the appropriate strategy to use at any point in time is shown below:

## WIVENHOE FLOOD STRATEGY FLOW CHART



**Strategy W1 - The Primary Consideration is Minimising Disruption to Downstream Rural Life**

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• <b>Wivenhoe Storage Level predicted to be less than 68.50 m AHD</b></li> <li>• <b>Maximum release predicted to be less than 1,900 m<sup>3</sup>/s</b></li> <li>• <b>The primary consideration is minimising disruption to downstream rural life</b></li> </ul>
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The intent of Strategy W1 is to not to submerge the bridges downstream of the dam prematurely (see Appendix I). The limiting condition for Strategy W1 is the submergence of Mt Crosby Weir Bridge that occurs at approximately 1,900 m<sup>3</sup>/s.





For situations where flood rains are occurring on the catchment upstream of Wivenhoe Dam and only minor rainfall is occurring downstream of the dam, releases are to be regulated to limit, as much as appropriate in the circumstances, downstream flooding.

The following strategies require a great deal of control over releases and knowledge of discharges from Lockyer Creek. In general, the releases from Wivenhoe Dam are controlled such that the combined flow from Lockyer Creek and Wivenhoe Dam is less than the limiting values to delay the submergence of particular bridges. The diagram above shows the location of the impacted bridges and the approximate river flow rate at which they are closed to traffic.

### **Strategy W1A      Twin Bridges, Savages Crossing and Colleges Crossing**

#### **Lake Level greater than 67.25 m AHD [Maximum Release 110 m<sup>3</sup>/s]**

Firstly, endeavour to maintain Twin Bridges trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 50 m<sup>3</sup>/s.

Once Twin Bridges is closed to traffic, endeavour to maintain Savages Crossing trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 110 m<sup>3</sup>/s.

Once Savages Crossing is closed to traffic, endeavour to maintain College's Crossing trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 m<sup>3</sup>/s. Note that College's Crossing can be impacted by tidal influences.

When the flood event subsides, all gates are to be closed when the dam achieves FSL in accordance with Section 8.5.

### **Strategy W1B      College's Crossing and Burtons Bridge**

#### **Lake Level greater than 67.50 m AHD [Maximum Release 380 m<sup>3</sup>/s]**

No consideration is given to maintaining Twin Bridges or Savages Crossing open.

Endeavour to maintain College's Crossing trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 175 m<sup>3</sup>/s.

Once College's Crossing is closed to traffic, endeavour to maintain Burtons Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 m<sup>3</sup>/s.

**Strategy W1C      Burtons Bridge and Kholo Bridge**

**Lake Level greater than 67.75 m AHD  
[Maximum Release 500 m<sup>3</sup>/s]**

No consideration is given to maintaining College's Crossing open.

Endeavour to maintain Burtons Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 430 m<sup>3</sup>/s.

Once Burtons Bridge is closed to traffic, endeavour to maintain Kholo Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 m<sup>3</sup>/s.

**Strategy W1D      Kholo Bridge and Mt Crosby Weir Bridge**

**Lake Level greater than 68.00 m AHD  
[Maximum Release 1900 m<sup>3</sup>/s]**

No consideration is given to maintaining Burtons Bridge open.

Endeavour to maintain Kholo Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 550 m<sup>3</sup>/s.

Once Kholo Bridge is closed to traffic, endeavour to maintain Mt Crosby Weir Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 m<sup>3</sup>/s.

**Strategy W1E      Mt Crosby Weir Bridge and Fernvale Bridge**

**Lake Level greater than 68.25 m AHD  
[Maximum Release 1900 m<sup>3</sup>/s]**

No consideration is given to maintaining Kholo Bridge open.

Endeavour to maintain Mt Crosby Weir Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 1900 m<sup>3</sup>/s.

Once Mt Crosby Weir Bridge is closed to traffic, endeavour to maintain Fernvale Bridge trafficable by limiting the combined flows from Wivenhoe Dam and Lockyer Creek to a maximum of 2000 m<sup>3</sup>/s.

**If the level reaches EL 68.5 m AHD in Wivenhoe Dam, switch to Strategy W2 or W3 as appropriate.**

***Strategy W2 - Strategy W2 is a Transition Strategy where the primary consideration changes from Minimising Impact to Downstream Rural Life to Protecting Urban Areas from Inundation.***

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• <b>Wivenhoe Storage Level predicted to be between 68.50 and 74.00 m AHD</b></li> <li>• <b>Maximum Release predicted to be less than 3,500 m<sup>3</sup>/s</b></li> <li>• <b>This is a transition strategy in which the primary consideration changes from minimising disruption to downstream rural life to protecting urban areas from inundation</b></li> <li>• <b>Lower level objectives are still considered when making decisions on water releases. Objectives are always considered in order of importance</b></li> </ul>
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The intent of Strategy W2 is limit the flow in the Brisbane River to less than the naturally occurring peaks at Lowood and Moggill, while remaining within the upper limit of nondamaging floods at Lowood (3,500 m<sup>3</sup>/s). In these instances, the combined peak river flows should not exceed those shown in the following table:

LOCATION	TARGET MAXIMUM FLOW IN THE BRISBANE RIVER
Lowood	The lesser of: <ul style="list-style-type: none"> <li>• the natural peak flow at Lowood excluding Wivenhoe Dam releases, and;</li> <li>• 3,500m<sup>3</sup>/s.</li> </ul>
Moggill	The lesser of: <ul style="list-style-type: none"> <li>• the natural peak flow at Moggill excluding Wivenhoe Dam releases, and;</li> <li>• 4,000m<sup>3</sup>/s.</li> </ul>

***Strategy W3 – The primary consideration is Protecting Urban Areas from Inundation***

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• <b>Wivenhoe Storage Level predicted to be between 68.50 and 74.00 m AHD</b></li> <li>• <b>Maximum Release should not exceed 4,000 m<sup>3</sup>/s</b></li> <li>• <b>The primary consideration is protecting urban areas from inundation</b></li> <li>• <b>Lower level objectives are still considered when making decisions on water releases. Objectives are always considered in order of importance</b></li> </ul>
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The intent of Strategy W3 is to limit the flow in the Brisbane River at Moggill to less than 4000 m<sup>3</sup>/s, noting that 4000 m<sup>3</sup>/s at Moggill is the upper limit of non-damaging floods downstream. The combined peak river flow targets for Strategy W3 are shown in the following table. In relation to these targets, it should be noted that depending on natural flows from the Lockyer and Bremer catchments, it may not be possible to limit the flow at Moggill to below 4000 m<sup>3</sup>/s. In these instances, the flow at Moggill is to be kept as low as possible.

<b>TIMING</b>	<b>TARGET MAXIMUM FLOW IN THE BRISBANE RIVER</b>
Prior to the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases).	The flow at Moggill is to be minimised.
After the naturally occurring peak at Moggill (excluding Wivenhoe Dam releases).	The flow at Moggill is to be lowered to 4,000m <sup>3</sup> /s as soon as possible.

***Strategy W4 – The primary consideration is Protecting the Structural Safety of the Dam***

<b>Conditions</b>	<ul style="list-style-type: none"> <li>• <b>Wivenhoe Storage Level predicted to exceed 74.00m AHD.</b></li> <li>• <b>No limit on Maximum Release rate</b></li> <li>• <b>The primary consideration is protecting the structural safety of the dam</b></li> <li>• <b>Lower level objectives are still considered when making decisions on water releases. Objectives are always considered in order of importance</b></li> </ul>
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**The intent of Strategy W4 is to ensure the safety of the dam while limiting downstream impacts as much as possible.**

This strategy normally comes into effect when the water level in Wivenhoe Dam reaches 74.0 m AHD. However the Senior Flood Operations Engineer may seek to invoke the discretionary powers of Section 2.8 if earlier commencement is able to prevent triggering of a fuse plug.

Under Strategy W4 the release rate is increased as the safety of the dam becomes the priority. Opening of the gates is to occur generally in accordance with the requirements of Section 8.6, until the storage level of Wivenhoe Dam begins to fall.

There are no restrictions on gate opening increments or gate operating frequency once the storage level exceeds 74.0 AHD, as the safety of the dam is of primary concern at these storage levels. However the impact of rapidly increasing discharge from Wivenhoe Dam on downstream reaches should be considered when determining gate opening sequences.

**Strategy W4A – No Fuse Plug Initiation Expected**

**Lake Level between 74.0 and 75.5 m AHD  
[No Maximum Release]**

Strategy 4A applies while all indications of the peak flood level in Wivenhoe Dam are that it will be insufficient to trigger operation of the first bay of the fuse plug by reaching 75.5 m AHD.

Gate openings are generally to occur at the minimum intervals and sequences as specified in Section 8.6 until the storage level of Wivenhoe Dam begins to fall. However, to protect the safety of the dam, minimum opening intervals can be reduced and gate opening sequences can be modified.

## **Strategy W4B – Fuse Plug Initiation Possible**

### **Lake Level greater than 75.5 m AHD [No Maximum Release]**

Strategy W4B applies once indications are the peak flood level in Wivenhoe Dam may exceed EL75.5 and trigger the fuse plug under normal operations. Two scenarios are possible under this strategy. The first scenario is where it may be possible to prevent fuse plug initiation by early opening of the gates. The second scenario is where fuse plug initiation cannot be avoided. The actions associated with these scenarios are contained in the following table:

SCENARIO	ACTION
Potential to keep lake level below EL 75.5 by early opening of the gates and/or varying the operational procedures at Somerset.	<p>The following actions can be used to prevent initiation of the fuse plug provided the safety of the dams is not compromised:</p> <ul style="list-style-type: none"> <li>• Retain water in Somerset Dam (See Somerset Dam Strategy S3 for guidelines).</li> <li>• Bring the gate operation sequence forward to increase discharge from the dam.</li> </ul> <p>In addition to dam safety issues, the impact of rapidly increasing discharge from Wivenhoe Dam on downstream reaches should be considered when determining the rate of gate openings.</p>
Fuse plug initiation cannot be avoided.	<p><u>PRIOR TO FUSE PLUG INITIATION</u></p> <p>If possible, the gates are to be raised at a rate to ensure they are out of the water before the initiation of the first fuse plug. The gates should be in the fully open position before the dam water level reaches 75.7 m AHD.</p> <p><u>FOLLOWING FUSE PLUG INITIATION</u></p> <p>The impact of rapidly changing discharge from Wivenhoe Dam on downstream reaches should be considered when determining the rate of gate closings in these circumstances. However, once a fuse plug is initiated, the flood storage at the dam is to be drained as quickly as possible within the gate closure sequence.</p>

## **8.5 Gate Closing Strategies**

In general, gate closing commences when the level in Wivenhoe Dam begins to fall and is generally to occur in the reverse order to opening. The final gate closure should occur when the lake level has returned to Full Supply Level. The following requirements must be considered when determining gate closure sequences:

- Where possible, total releases during closure should not produce greater flood levels downstream than occurred during the flood event.

- The maximum discharge from the dam during closure should generally be less than the peak inflow into Wivenhoe Dam experienced during the event. The discharge from Wivenhoe Dam includes discharge from triggered fuse plugs, gates, regulator cone dispersion valve and hydro release.
- If, at the time the lake level in Wivenhoe Dam begins to fall, the combined flow at Lowood is in excess of 3,500 m<sup>3</sup>/s then the combined flow at Lowood is to be reduced to 3,500 m<sup>3</sup>/s as quickly as practicable.
- The aim should always be to empty stored floodwaters stored above EL 67.0m within seven days after the flood peak has passed through the dams. However, provided a favourable weather outlook is available, this requirement can be relaxed for the volume between EL 67.0m and EL 67.5m, to obtain positive environmental outcomes.
- If the flood storage compartments of Wivenhoe Dam and Somerset Dam can be emptied within seven days, the maximum flow in the Brisbane River at Lowood should not exceed 3,500 m<sup>3</sup>/s.
- To minimise the stranding of fish downstream of the dam, final closure sequences should consider Seqwater policies relating to fish protection at the dam.

There may be a need to take into account base flow when determining final gate closure. This may mean that the lake level temporarily falls below Full Supply Level to provide for a full dam at the end of the Flood Event.

## 8.6 Gate Operation Sequences

### Radial Gate Opening Operations

When dam outflows are less than 4,000 m<sup>3</sup>/s, rapid opening of the radial gates can cause undesirable rapid rises in downstream river levels. Accordingly, when dam outflows are less than 4,000 m<sup>3</sup>/s, the aim in opening radial gates is to operate the gates one at a time at intervals that will minimise adverse impacts on the river system. The table below shows the target minimum interval for gate operations in these circumstances. This target interval can be reduced if the gates are at risk of being overtopped or the safety of the dam is at risk.

**TARGET MINIMUM INTERVAL FOR RADIAL GATE OPENING  
(DOWNSTREAM RIVER FLOWS < 4000 m<sup>3</sup>/s)**

OPERATION	TIME INTERVAL BETWEEN SUCCESSIVE OPENING OF INDIVIDUAL GATES  (mins)
Radial Gate opening of 500 mm	10

When dam outflows exceed 4,000 m<sup>3</sup>/s, the impact of rapid gate openings on downstream water levels is reduced due to the already elevated river levels. Under these circumstances, the safety of the dam will generally be of primary concern and therefore there are no minimum gate opening intervals in these circumstances.

Under extreme circumstances, the mechanical capability of the radial gate operating system provides the facility to open each radial gate more than five metres within a one hour period. Accordingly, unless a mechanical breakdown is experienced, physical gate opening capability is unlikely to be a constraint in meeting projected outflow targets.

### Radial Gate Closing Operations

When dam outflows are less than 4,000 m<sup>3</sup>/s, rapid closure of the radial gates can cause adverse impacts to the river system. Accordingly, when dam outflows are less than 4,000 m<sup>3</sup>/s, the aim in closing radial gates is to operate the gates one at a time at an interval that will minimise adverse impacts on the river system as outlined in the table below.

**TARGET MINIMUM INTERVAL FOR RADIAL GATE CLOSURE**

OPERATION	TIME INTERVAL BETWEEN SUCCESSIVE CLOSING OF INDIVIDUAL GATES (mins)
Radial Gate closure of 500 mm	20

When dam outflows exceed 4,000 m<sup>3</sup>/s, the impact of rapid gate closings is reduced due to the already elevated river levels. However, given that the safety of the dam is unlikely to be at risk if decisions are made to close radial gates, the target of operating the gates one at a time in accordance with the time interval shown in the above table remains.

Rapid closure of radial gates is permissible however, when there is a requirement to preserve storage or to reduce downstream flooding. When determining gate closure sequences, consideration should also be given to following the calculated natural recession of the flood in the river to aim to ensure that the recession impacts are not greater than those that would have been experienced had the dam not been constructed.

### Protection of the Spillway Walls

The flip bucket spillway is designed to control the discharge from the reservoir and to dissipate the energy of the discharge. The flip throws the discharge clear of the concrete spillway structures and into a plunge pool where the energy is dissipated by



turbulence. Under nonsymmetric flow conditions or when Gates 1 and 5 are not operating, the discharge jet may impinge on the walls of the plunge pool. As these walls have been excavated into erodible sandstone rock, this impingement may cause non-predictable erosion. Upstream migration of this erosion is to be avoided. This can be achieved by operating Gates 1 and 5 to deflect the discharge away from the walls of the plunge pool.

Therefore in operating the spillway, the principles to be observed in order of priority are:

- (i) The discharge jet into the plunge pool is not to impinge on the right or left walls of the plunge pool.
- (ii) The flow in the spillway is to be symmetrical.

### Normal Gate Operation Sequences

Under normal operation, only one gate is to be opened at any one time and the sequences shown in the table below are to be adopted. Generally gates are operated in the order of 3,2,4,1,5. Variations are allowed at any time to protect the structural safety of the dam.

It should also be noted that:

- Gates are numbered 1 to 5 from the left bank looking downstream
- Flow in spillway to be as symmetrical as possible.

### RADIAL GATE OPENING SEQUENCES

Gate 1 Opening	Gate 2 Opening	Gate 3 Opening	Gate 4 Opening	Gate 5 Opening	Gate Operated
(m)	(m)	(m)	(m)	(m)	
-	-	-	-	-	-
0.0	0.0	0.0	0.0	0.0	-
0.0	0.0	0.5	0.0	0.0	3
0.0	0.0	1.0	0.0	0.0	3
0.0	0.0	1.5	0.0	0.0	3
0.0	0.0	2.0	0.0	0.0	3
0.0	0.0	2.5	0.0	0.0	3
0.0	0.0	3.0	0.0	0.0	3
0.0	0.0	3.5	0.0	0.0	3
0.0	0.5	3.5	0.0	0.0	2
0.0	0.5	3.5	0.5	0.0	4
0.0	0.5	4.0	0.5	0.0	3
0.0	1.0	4.0	0.5	0.0	2
0.0	1.0	4.0	1.0	0.0	4

Gate 1 Opening (m)	Gate 2 Opening (m)	Gate 3 Opening (m)	Gate 4 Opening (m)	Gate 5 Opening (m)	Gate Operated
0.5	1.0	4.0	1.0	0.0	1
0.5	1.0	4.0	1.0	0.5	5
0.5	1.5	4.0	1.0	0.5	2
0.5	1.5	4.0	1.5	0.5	4
1.0	1.5	4.0	1.5	0.5	1
1.0	1.5	4.0	1.5	1.0	5
1.0	2.0	4.0	1.5	1.0	2
1.0	2.0	4.0	2.0	1.0	4
1.5	2.0	4.0	2.0	1.0	1
1.5	2.0	4.0	2.0	1.5	5
1.5	2.5	4.0	2.0	1.5	2
1.5	2.5	4.0	2.5	1.5	4
1.5	2.5	4.5	2.5	1.5	3
2.0	2.5	4.5	2.5	1.5	1
2.0	2.5	4.5	2.5	2.0	5
2.5	2.5	4.5	2.5	2.0	1
2.5	2.5	4.5	2.5	2.5	5
2.5	3.0	4.5	2.5	2.5	2
2.5	3.0	4.5	3.0	2.5	4
2.5	3.5	4.5	3.0	2.5	2
2.5	3.5	4.5	3.5	2.5	4
3.0	3.5	4.5	3.5	2.5	1
3.0	3.5	4.5	3.5	3.0	5
3.0	4.0	4.5	3.5	3.0	2
3.0	4.0	4.5	4.0	3.0	4
3.0	4.0	5.0	4.0	3.0	3
3.5	4.0	5.0	4.0	3.0	1
3.5	4.0	5.0	4.0	3.5	5
3.5	4.5	5.0	4.0	3.5	2
3.5	4.5	5.0	4.5	3.5	4
4.0	4.5	5.0	4.5	3.5	1
4.0	4.5	5.0	4.5	4.0	5
4.5	4.5	5.0	4.5	4.0	1
4.5	4.5	5.0	4.5	4.5	5
4.5	5.0	5.0	5.0	4.5	2,4
5.0	5.0	5.0	5.0	5.0	1,5
5.0	5.0	5.5	5.0	5.0	3
5.0	5.5	5.5	5.5	5.0	2,4
5.5	5.5	5.5	5.5	5.5	1,5
5.5	5.5	6.0	5.5	5.5	3
5.5	6.0	6.0	6.0	5.5	2,4
6.0	6.0	6.0	6.0	6.0	1,5
6.0	6.0	6.5	6.0	6.0	3
6.0	6.5	6.5	6.5	6.0	2,4
6.5	6.5	6.5	6.5	6.5	1,5
6.5	6.5	7.0	6.5	6.5	3
7.0	7.0	7.0	7.0	7.0	2,4,1,5

Gate 1 Opening	Gate 2 Opening	Gate 3 Opening	Gate 4 Opening	Gate 5 Opening	Gate Operated
(m)	(m)	(m)	(m)	(m)	
7.5	7.5	7.5	7.5	7.5	3,2,4,1,5
8.0	8.0	8.0	8.0	8.0	3,2,4,1,5
8.5	8.5	8.5	8.5	8.5	3,2,4,1,5
9.0	9.0	9.0	9.0	9.0	3,2,4,1,5
9.5	9.5	9.5	9.5	9.5	3,2,4,1,5
10.0	10.0	10.0	10.0	10.0	3,2,4,1,5
11.0	11.0	11.0	11.0	11.0	3,2,4,1,5
12.0	12.0	12.0	12.0	12.0	3,2,4,1,5
13.0	13.0	13.0	13.0	13.0	3,2,4,1,5
14.0	14.0	14.0	14.0	14.0	3,2,4,1,5
15.0	15.0	15.0	15.0	15.0	3,2,4,1,5
17.5	17.5	17.5	17.5	17.5	3,2,4,1,5

During the initial opening or final closure sequences of gate operations it is permissible to replace the discharge through a gate by the immediate opening of a regulator valve (or the reverse operation). This allows for greater control of low flows.

### Gate Failure or Malfunction Procedures

Gate operating procedures in the event of equipment failure are contained in Appendix G. If one or more gates are inoperable during the course of the flood event, the gate openings of the remaining gates are to be adjusted to provide the required discharge from the dam. These adjustments should ensure that:

- The impact of the flow on the sidewalls of the plunge pool should be minimised, and
- The flow in the spillway is as symmetrical as practicable.

### Radial Gate Turbulence Considerations

Unless in the process of lifting the gates clear of the flow, the bottom edge of the radial gates must always be at least 500 millimetres below the release flow surface. Having the bottom edge of the gates closer to the release flow surface than 500 millimetres may cause unusual turbulence that could adversely impact on the gates. This procedure has never been undertaken in practice and should be observed closely when being undertaken. Variations to the procedure are allowed to protect the structural safety of the dam.

### Lowering Radial Gates that have been lifted Clear of the Release Flow

When lowering radial gates that have been lifted clear of the release flow, the bottom edge of the gates must be lowered at least 500 millimetres into the flow. Lowering gates into the release flow less than this amount may cause unusual turbulence that

could adversely impact on the gates. This procedure has never been undertaken in practice and should be observed closely when being undertaken. Variations to the procedure are allowed to protect the structural safety of the dam.

### **8.7 Modification to Flood Operating Procedures if a Fuse Plug Triggers**

Where the operation of a fuse plug spillway bay has been triggered, the flood operation procedures are to be modified such that:

- The discharge from the triggered fuse plug is to be taken into account when determining total flood releases from the dam;
- The gates are to be operated, to the extent possible, so that the same discharge restrictions apply as would have if the fuse plug embankment was intact.

### **8.8 Modification to Flood Operating Procedures if a subsequent flood event occurs prior to the reconstruction of Triggered Fuse Plugs**

Where the operation of any or all of the fuse plug spillway bays has been triggered and a flood event occurs before the fuse plug can be reinstated, the flood operation procedures are to be modified such that:

- The discharge from the triggered fuse plug is to be taken into account when determining total flood releases from the dam;
- The gates are to be operated, to the extent possible, so that the same discharge restrictions apply as would have if the fuse plug embankment was intact.
- Discharge from the Auxiliary Spillway will occur before the Gate Trigger Level of EL 67.25 m AHD. This flow should be taken into account when applying the flood operation strategies relevant to the low level bridge crossings.

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