
JURISDICTION : STATE ADMINISTRATIVE TRIBUNAL

ACT : RIGHTS IN WATER AND IRRIGATION ACT
1914 (WA)

CITATION : ORD IRRIGATION CO-OPERATIVE LIMITED and
DEPARTMENT OF WATER AND
ENVIRONMENTAL REGULATION
[2020] WASAT 68

MEMBER : JUDGE D PARRY, DEPUTY PRESIDENT
MS C BARTON, MEMBER
MR P CURRY, SENIOR SESSIONAL MEMBER

HEARD : 25, 26, 27 AND 28 NOVEMBER 2019 AND 9, 10, 11,
12 AND 13 MARCH 2020 - PARTIES' PROPOSED
FORM OF FINAL ORDERS FILED ON 27 MARCH
2020

DELIVERED : 26 JUNE 2020

FILE NO/S : DR 340 of 2015

BETWEEN : ORD IRRIGATION CO-OPERATIVE LIMITED
Applicant

AND

DEPARTMENT OF WATER AND
ENVIRONMENTAL REGULATION
Respondent

Catchwords:

Water licensing - Licence to take water - Annual water entitlement - Ord River
Irrigation Area - Historical underutilisation of annual water entitlement - Policy

to grant annual water entitlements to 'match justified crop needs and efficient water use for the area under irrigation' and 'recoup unused water from existing licensees at times of licence renewal' - Justified crop needs - Crop types and areas for purpose of determining justified crop needs and hence annual water entitlement - Crop irrigation water requirements for purpose of determining justified crop needs and hence annual water entitlement - Efficient water use - Distribution efficiency - Allocation for draining M1 Supply Channel to avoid flooding - Correct and preferable decision as to annual water entitlement - Whether there is any cogent reason to depart from application of unused water recoupment policy in circumstances of case - Practice and procedure - Challenge to credibility of applicant's expert witnesses in closing submissions without cross-examination - Whether rule in *Browne v Dunn* applies in SAT proceedings - Whether denial of procedural fairness

Legislation:

Administrative Appeals Tribunal Act 1975 (Cth), s 33(1)(c)

Rights in Water and Irrigation Act 1914 (WA), s 2(1), s 3(1), s 3(2)(c), s 4, s 4(1), s 4(1)(a)(i), s 4(1)(a)(ii), s 4(1)(b), s 4(2), s 4(3), s 5A, s 5C, s 5C(1)(d), s 5C(2)(a), s 5C(3), s 22GG(1)(c), s 28, s 28(1), Sch 1, cl 1, cl 3, cl 6, cl 6(2), cl 6(3), cl 6(4), cl 7(1), cl 7(2), cl 7(2)(a), cl 7(2)(b), cl 7(2)(c), cl 7(2)(d), cl 7(2)(e), cl 7(2)(f), cl 7(2)(g), cl 7(2)(h), cl 7(5), cl 8, cl 15(1), cl 15(2), cl 15(3), cl 22, cl 22(2), cl 22(3)(b), cl 22(5), cl 23, cl 24, cl 24(1), cl 24(1)(a), cl 24(2), cl 25, cl 26, cl 26(4), cl 26(6), cl 27, cl 39, cl 39(1)(c)

State Administrative Tribunal Act 2004 (WA), s 17(1), s 18(1), s 27, s 27(2), s 29, s 29(5)(b), s 32(1), s 32(2)(a), s 90, s 105

Water Agencies (Powers) Act 1984 (WA), s 5(1)(c), s 104(1), s 104(1)(b)

Water Services Act 2012 (WA), s 11

Result:

Application for review allowed

Decision of respondent varied by:

- extending duration of Surface Water Licence SWL156287(3) to 10 years from date of Tribunal's decision;
- specifying the annual water entitlement in Surface Water Licence SWL156287(3) as 335 GL; and
- specifying that the 'Annexure to Licence to Take Water SWL156287(3)' referred to in term, condition or restriction 3 of Surface Water Licence SWL156287(3) is the document which appears in the respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) at pages 1746-1756

Summary of Tribunal's decision:

Ord Irrigation Co-operative Limited (OIC) applied to the Minister for Water (Minister) for a further renewal of its licence to take water from the Ord River and Ord River Basin at Lake Kununurra for distribution and supply to irrigators and for non-potable uses. Whereas OIC's earlier two licences specified an annual water entitlement of 335 gegalitres (GL), when the Minister's delegate renewed OIC's licence to take water for a period of 10 years (from 14 August 2015 to 13 August 2025), the Department of Water and Environmental Regulation (Department) 'recouped' 110 GL (or about 33%) of the annual water entitlement specified in the previous licence that had not been used by OIC's members and non-member customers during the term of that licence (and indeed since 2007) and specified an annual water entitlement of 225 GL in the new licence. OIC sought review by the Tribunal of the annual water entitlement of 225 GL specified in the licence and contended that an annual water entitlement of 335 GL should be substituted.

In an earlier decision of the Tribunal made by its former President, the Tribunal dismissed the application for review and fixed the annual water entitlement at 246.3 GL (which was the outcome contended for by the Department at the earlier hearing). OIC appealed from the earlier SAT decision to the Court of Appeal of Western Australia. The Court of Appeal unanimously allowed the appeal, holding that the Tribunal erred in law in the earlier SAT decision by '... fail[ing] to understand its statutory function of deciding for itself the correct and preferable decision as to the annual water entitlement under [the licence] ... by incorrectly proceeding on the basis that, since OIC was the applicant, the onus was on OIC to prove its case that the annual water entitlement should be 335GL on the balance of probabilities'. The Court of Appeal set aside the earlier SAT decision and remitted the matter 'to a differently constituted Tribunal for reconsideration'.

The Tribunal heard the matter over nine days in Kununurra. On the second day of the hearing, accompanied by the parties' legal representatives and expert witnesses, the Tribunal carried out an extensive view of the Ord River Irrigation Area (ORIA), including Lake Kununurra and Lake Argyle, by vehicle and seaplane. The Tribunal heard evidence in relation to, among other matters, changes in dominant crops in the ORIA over its history, forecast of crop types and areas likely to be planted by OIC's members and non-member customers over the term of the licence, crop irrigation water requirements from eight expert witnesses, water and irrigation policy issues from four expert witnesses, and hydrology issues from two expert witnesses. The expert witnesses gave

concurrent expert evidence in panel sessions on crop irrigation water requirements, water and irrigation policy, and hydrology. OIC contended that the annual water entitlement that should be specified by the Tribunal in the licence is 335 GL, whereas the Department contended that the annual water entitlement that should be specified by the Tribunal in the licence is 258.7 GL.

The Tribunal allowed the application for review and determined that the correct and preferable decision at the time of the decision upon the review is that the annual water entitlement that should be specified in the licence is 335 GL, because:

- the annual water entitlement 'to match justified crop needs and efficient water use for the area under irrigation', applying the guiding policy in the *Ord Surface Water Allocation Plan* (OSWAP), and including an appropriate allocation of 5 GL per year for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event, is (more than) 335 GL and OIC seeks an annual water entitlement of 335 GL in its renewal application;
- although there has been historical underutilisation of the annual water entitlement by OIC, there are cogent reasons to depart from the application of the recoupment of unused water policy in OSWAP in the circumstances of this case; and
- there is not likely to be any alternative or competing user for any part of this annual water entitlement over the 10 year term of the licence and there is sufficient water within the 750 GL per year allocation limit for the Main Ord subarea to enable such development in the Ord East Kimberley Expansion Project as is likely to occur over the next 10 years.

The Tribunal determined that there are three cogent reasons to depart from the application of the recoupment of unused water policy in OSWAP in the circumstances of this case, namely:

- the annual water entitlement 'to match justified crop needs and efficient water use for the area under irrigation' under OSWAP, and including an appropriate allocation of 5 GL per year for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event, is (more than) 335 GL, which was the annual water entitlement under the previous licence (part of which the Department seeks to recoup on its renewal) and is the annual water entitlement sought by OIC in its application to renew the licence;
- the ORIA has never settled and stabilised in terms of a dominant crop or crop mix for more than 10 to 15 years at any time in its history and has been in a state of transition throughout much of this time, including during the period 2008 to 2018, which is the period focused on by the

Department as justifying recoupment of unused water from OIC, with the consequence that historical water use over this period is an extremely poor measure of future water needs; and

- OIC made the bulk of a significant investment in water use efficiency of \$4.05 million and achieved a very significant improvement in the distribution efficiency of water as a result from 56% in 2007 to an average of 76% over the 10 year period 2009 to 2018 at a time when OSWAP did not exist in its current form and the Department's Statewide policy stated (and continues to state) that '[t]he Department will not recoup unused water entitlements that are a result of investment in water use efficiency'.

The Tribunal extended the duration of the licence to 10 years from the date of its decision and specified the annual water entitlement in the licence as 335 GL.

Category: B

Representation:

Counsel:

Applicant : Ms F Ashworth and Mr B Douglas-Baker
Respondent : Ms CA Ide and Mr JA Misso

Solicitors:

Applicant : Kingfisher Law
Respondent : State Solicitor's Office

Case(s) referred to in decision(s):

Allied Pastoral Holdings Pty Ltd v Commissioner of Taxation
[1983] 1 NSWLR 1; (1983) 44 ALR 607; (1983) 70 FLR 447

Bestry Property Group Pty Ltd and Western Australian Planning Commission
[2019] WASAT 15; (2019) 96 SR (WA) 311

Browne v Dunn (1893) 6 R 67 (HL)

Clive Elliott Jennings & Co Pty Ltd v Western Australian Planning Commission
[2002] WASCA 276; (2002) 122 LGERA 433

Comcare v Maganga [2008] FCA 285; (2008) 101 ALD 68; (2008) 47 AAR 487

Falc Pty Ltd v State Planning Commission (1991) 5 WAR 522;
(1991) 74 LGRA 68

ICM Agriculture Pty Ltd v Commonwealth [2009] HCA 51;
(2009) 240 CLR 140; (2009) 170 LGERA 373
Marelic v Comcare (1993) 47 FCR 437; (1993) 32 ALD 155;
(1993) 121 ALR 114
More and Water and Rivers Commission [2006] WASAT 112
Ord Irrigation Cooperative Ltd and Department of Water [2017] WASAT 85;
(2017) 92 SR (WA) 67
Ord Irrigation Cooperative Ltd v Department of Water [2018] WASCA 83;
(2018) 232 LGERA 331; (2018) 12 ARLR 135
O'Sullivan v Farrer [1989] HCA 61; (1989) 168 CLR 210
Water Conservation and Irrigation Commission (NSW) v Browning
[1947] HCA 21; (1947) 74 CLR 492

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REASONS FOR DECISION OF THE TRIBUNAL:

Introduction

Licence to take water

1 On 30 September 2004, a delegate of the Minister for Water (Minister) granted Ord Irrigation Co-operative Limited (OIC or applicant) Surface Water Licence SWL156287(1) under s 5C of the *Rights in Water and Irrigation Act 1914* (WA) (RIWI Act), authorising OIC to take water from the Ord River and Ord River Basin at Lake Kununurra for distribution and supply to irrigators for irrigation use and distribution and supply for non-potable uses, for the period 30 September 2004 to 31 August 2009 (Licence 1). Licence 1 was renewed for the period 7 April 2010 to 31 March 2014 (Surface Water Licence SWL156287(2)) (Licence 2). Licences 1 and 2 both specified an 'annual water entitlement' of 335 gegalitres (GL) and were expressed to be subject to a number of 'terms, conditions and restrictions', one of which was to the effect that OIC must not take more than the specified annual water entitlement in any year.

2 On 25 or 26 February 2014, OIC applied to the Minister for a further renewal of its licence to take water. On 14 August 2015, the Minister's delegate, who is an officer of the Department of Water and Environmental Regulation (Department or respondent), decided to renew OIC's licence to take water for a period of 10 years from 14 August 2015 to 13 August 2025 (Surface Water Licence SWL156287(3)) (Licence 3). The Department 'recouped' 110 GL (or about 33%) of the annual water entitlement specified in Licence 2 that had not been used by OIC's members and non-member customers during the term of that licence (and indeed since 2007) and specified an annual water entitlement of 225 GL in Licence 3. Licence 3 is expressed to be subject to 10 'terms, conditions and restrictions', including terms, conditions or restrictions 2 and 3, which state as follows:¹

- 2 The licensee must not, in any water year, take more water than the annual water entitlement specified in this licence.
- 3 The licensee is to comply with 'Annexure to Licence to Take Water SWL156287(3)' and any amendments made by or with the approval of the Department.

¹ Respondent's section 24 bundle dated 10 May 2019 (volume 1) (Exhibit 3.1) page 917.

Application for review

3 On 10 September 2015, OIC sought review by the Tribunal, under s 26GG(1)(c) of the RIWI Act, of the decision of the Minister's delegate 'as to any term, condition or restriction included in a licence'. In particular, OIC seeks review of:

- the annual water entitlement of 225 GL specified in Licence 3;² and
- the 'Annexure to Licence to Take Water SWL156287(3)' referred to in term, condition or restriction 3 of Licence 3, which sets out requirements relating to, among other matters, groundwater monitoring, metering requirements, trigger level reporting and water efficiency requirements (Annexure).

4 During the proceedings before the Tribunal, the parties agreed to a number of amendments to the Annexure, which resolved the matters in dispute between them in relation to the Annexure.³ In relation to the annual water entitlement specified in Licence 3, the applicant's position in the proceedings when it sought review was (and remains) that the annual water entitlement should be specified as 335 GL, whereas the respondent contended that, in light of evidence to be given by witnesses at the hearing, the annual water entitlement should be specified as 246.3 GL, rather than 225 GL as it had originally determined.

Earlier SAT decision and appeal

5 The matter was heard by the Tribunal constituted by its former President, Justice Curthoys, over four days on 21-24 November 2016 (earlier SAT hearing). On 19 June 2017, the Tribunal published its decision in which it dismissed the application for review and fixed the annual water entitlement for Licence 3 at 246.3 GL, which was the outcome contended for by the respondent at the earlier SAT hearing (earlier SAT decision).⁴

² On 3 December 2015, the Tribunal granted an interim mandatory injunction, under s 90 of the *State Administrative Tribunal Act 2004* (WA), stating that, until further order, 'the annual water entitlement referred to in condition 2 [of Licence 3] is [335 GL]'.
³ Annexure to Licence to Take Water SWL156287(3) (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1746-1756).

⁴ *Ord Irrigation Cooperative Ltd and Department of Water* [2017] WASAT 85; (2017) 92 SR (WA) 67.

6 OIC sought leave to appeal from the earlier SAT decision to the Court of Appeal of Western Australia, under s 105 of the *State Administrative Tribunal Act 2004* (WA) (SAT Act), contending that the Tribunal made errors of law in the earlier SAT decision. The appeal was heard on 7 March 2018. On 28 May 2018, the Court of Appeal⁵ unanimously allowed the appeal, holding that the Tribunal erred in law in the earlier SAT decision by:⁶

... fail[ing] to understand its statutory function of deciding for itself the correct and preferable decision as to the annual water entitlement under Licence 3 ... by incorrectly proceeding on the basis that, since OIC was the applicant, the onus was on OIC to prove its case that the annual water entitlement should be 335GL on the balance of probabilities.

7 In its reasons, the Court of Appeal observed and held as follows:⁷

OIC was entitled to a review of the Minister's decision in which the Tribunal conducted a de novo hearing without OIC bearing any onus to show that a departure of the decision under review was justified. The Tribunal's misunderstanding of the nature of the function it was performing, reflected in its statement about onus identified at [82] above, deprived OIC of its right to such a review.

8 The Tribunal's 'statement about onus' referred to in the quotation immediately above was as follows:⁸

Since the OIC is the applicant, the onus is on the OIC to prove its case that the AWE should be 335GL. The standard of proof is on the balance of probabilities.

9 The Court of Appeal held that:⁹

[T]here is a reasonable possibility that the Tribunal's decision was influenced by its misapprehension as to the nature of its statutory function. It follows that the appeal should be allowed, the decision of the Tribunal should be set aside and the matter sent back to a differently constituted Tribunal for reconsideration.

⁵ Buss P and Murphy and Mitchell JJA.

⁶ *Ord Irrigation Cooperative Ltd v Department of Water* [2018] WASCA 83; (2018) 232 LGERA 331; (2018) 12 ARLR 135 [6(2)]. See also [125]-[128] and [136]-[137].

⁷ *Ord Irrigation Cooperative Ltd v Department of Water* [128].

⁸ *Ord Irrigation Cooperative Ltd and Department of Water* [24].

⁹ *Ord Irrigation Cooperative Ltd v Department of Water* [7].

Rehearing

10 After the matter was remitted by the Court of Appeal to the Tribunal for rehearing, the respondent contended, in its statement of issues, facts and contentions, as follows:¹⁰

... In the absence of more up to date information, an appropriate [annual water entitlement] is 246.3GL, which will meet the anticipated water usage of the applicant's members for the 10 year duration of the licence.

11 Thus, the annual water entitlement originally contended for by the respondent for the purposes of the rehearing by the Tribunal was the same as it contended for at the earlier SAT hearing and had been fixed in the earlier SAT decision set aside by the Court of Appeal. However, in her witness statement dated 9 September 2019, Ms Shaan Pawley, who holds the substantive position of Senior Engineer in the Department's Water Allocation Planning Branch and is acting in the position of Supervising Engineer (Section Manager) for the Surface Water Hydrology Section in the Department's Water Resource Science Branch, and who was called to give evidence by the respondent, calculated 'the annual licence volume required by OIC to be 243.8 [GL] per year'.¹¹ Ms Pawley holds a Bachelor of Engineering (Environmental Engineering) (Honours) degree from the University of Western Australia and a Master of Science in Water Science, Policy and Management degree from the University of Oxford, is a Chartered Professional Engineer and registered on Engineers Australia's National Engineering Register for the practice areas of civil and environmental engineering, and has 16 years' experience in water resource management. In a revised calculation, based on crop types and areas planted by OIC's members and non-member customers in 2018 (with most crops grouped into low, medium and high water use crops, and with sandalwood dealt with separately), and following a chaired pre-hearing conferral between the eight crop irrigation water requirements expert witnesses called by the parties¹² on 13 November 2019,¹³ Ms Pawley calculated 'the OIC's annual licence volume to be 262.9 [GL] per year'.¹⁴ In a further revised calculation, carried out by

¹⁰ Respondent's statement of issues, facts and contentions dated 10 May 2019 (Exhibit 1) [71].

¹¹ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [94]. The calculation is shown in Table 2 on page 42 of Ms Pawley's witness statement.

¹² Mr John Doble, Mr Jim Engelke, Mr Hans-Christian Bloecker, Mr David Menzel, Mr Robert Boshammer, Dr John Ruprecht, Mr Neil Lantzke and Mr Greg Hocking.

¹³ Chaired by Mr P de Villiers M.

¹⁴ Revised calculations of Ms Shaan Michelle Pawley tendered at the hearing on 25 November 2019 (Exhibit 5).

Ms Pawley at the Tribunal's direction in December 2019 after the first four days of the rehearing (during which the eight crop irrigation water requirements expert witnesses gave concurrent evidence), based on crop types and areas planted by OIC's members and non-member customers in 2018 (with most crops grouped into low, medium and high water use crops, and with sandalwood dealt with separately), and inputting the 'consensus' irrigation water requirements figures agreed by the crop irrigation water requirements expert witnesses in their evidence and otherwise the figures according to the evidence of the crop irrigation expert witnesses called by the respondent,¹⁵ Ms Pawley calculated 'OIC's annual licence volume to be 258.7 [GL] per year'.¹⁶ Ultimately, this (258.7 GL) is the annual water entitlement the respondent contends the Tribunal should specify in Licence 3 in this review.

12 In contrast, the applicant contends, as it has since the commencement of these proceedings almost five years ago, that the Tribunal should specify an annual water entitlement of 335 GL in Licence 3 in this review.

13 Whereas the earlier SAT hearing was conducted in Perth (without a view) over four days, we conducted the rehearing in Kununurra over nine days. The Tribunal heard this matter in Kununurra, because of the significant community interest in water licensing in the Ord East Kimberley, six of the witnesses called to give evidence reside there, and the applicant requested the Tribunal to conduct a view of the Ord River Irrigation Area (ORIA). Accompanied by the parties' legal representatives and expert witnesses, the Tribunal conducted an extensive view of the ORIA, including Lake Kununurra and Lake Argyle, by vehicle and seaplane, on the second day of the hearing. The Tribunal found the view to be of great assistance in understanding the evidence presented at the hearing.

14 In these reasons, we will now make background findings of fact in relation to the ORIA and OIC, before reviewing the legal framework and principles, and the policy framework, relevant to this review. We will then identify the principal issues for determination in these proceedings and address each of the issues in turn.

15 For the reasons set out below, in our view, in the exercise of discretion under cl 15(2) of Sch 1 to the RIWI Act, the 'correct and

¹⁵ Mr Lantzke and Mr Hocking.

¹⁶ Exhibit 34 (Revised calculation - Version 1) which is reproduced in Attachment A to these reasons.

preferable decision at the time of the decision upon the review', under s 27(2) of the SAT Act, is to specify the annual water entitlement in Licence 3 as 335 GL.

The ORIA

16 We make the following background findings of fact in relation to the ORIA.

Water resource and distribution

17 On 13 July 1962, the ORIA was constituted as an 'irrigation district' under s 28 of the RIWI Act.¹⁷ On 20 July 1963, the Kununurra Diversion Dam was opened, creating Lake Kununurra, which has a storage capacity of 100.8 GL. Less than a decade later, in 1971, the Ord River Diversion Dam was completed upstream of Lake Kununurra, creating Lake Argyle, which had an initial storage capacity of 5,800 GL and, since the main spillway was raised by 6 metres in 1996, has had a storage capacity of 10,760 GL. The vast scale of the storage capacity of Lake Argyle is apparent from the fact that it can hold nearly twenty times the volume of Sydney Harbour.

18 We reproduce below Figures 1 and 2 in the *Ord Surface Water Allocation Plan* (OSWAP), which was published by the Department in September 2013, and contains the policy which guides the Tribunal in arriving at the correct and preferable decision in this review. Figure 1 'Plan area, proclaimed areas and irrigation areas (stage areas)' in OSWAP shows the location of the ORIA, in the north-east of Western Australia, the towns of Kununurra and Wyndham, Lake Kununurra (which is not named, but adjoins the Kununurra Diversion Dam, which is identified) and Lake Argyle, the rivers flowing into these lakes, and the 'Stage 1 areas' and 'Stage 2 areas' of the ORIA. Figure 2 'Subarea boundaries' in OSWAP shows the same features and also the locations and boundaries of the 'Ord surface water subareas' referred to in OSWAP. As discussed later in these reasons, Licence 3 (and previously Licences 1 and 2) authorises OIC to take water from the Main Ord subarea, which is subject to an allocation limit of 750 GL per year under OSWAP. Figures 1 and 2 in OSWAP also show the Western Australia/Northern Territory border and indicate that, although the ORIA irrigation district under the RIWI Act ends at the geographical limit of State legislative jurisdiction at the border, the

¹⁷ Respondent's statement of issues, facts and contentions dated 10 May 2019 (Exhibit 1) [14] and applicant's statement of issues, facts and contentions dated 5 June 2019 (Exhibit 2) Response to respondent's statement [14].

'Ord plan area' extends across the border into the Northern Territory (Figure 1) and part of the 'Stage 2 areas' are located in the Northern Territory (Figures 1 and 2). In some of the evidence and in the parties' submissions in these proceedings, the part of the 'Stage 2 areas' located in the Northern Territory is referred to as 'Stage 3' or 'Ord Stage 3'. For clarity, in these reasons, we refer to the part of the 'Stage 2 areas' shown in Figures 1 and 2 in OSWAP which is located in the Northern Territory as 'Stage 3' or 'Ord Stage 3'. Figures 1 and 2 in OSWAP are reproduced immediately below.¹⁸

¹⁸ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1052 and 1053.

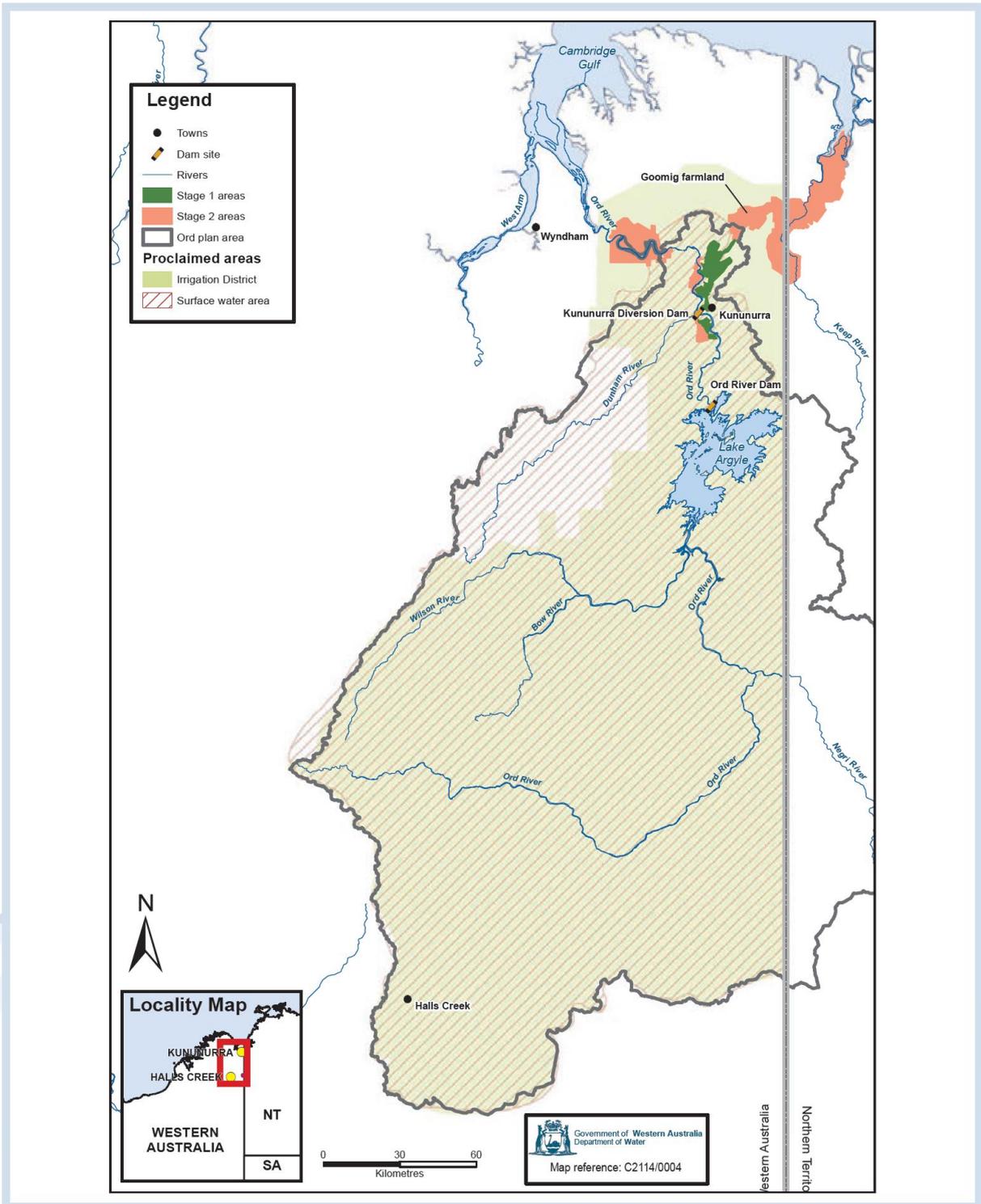


Figure 1
Plan area, proclaimed areas and irrigation areas (stage areas)
Ord surface water allocation plan

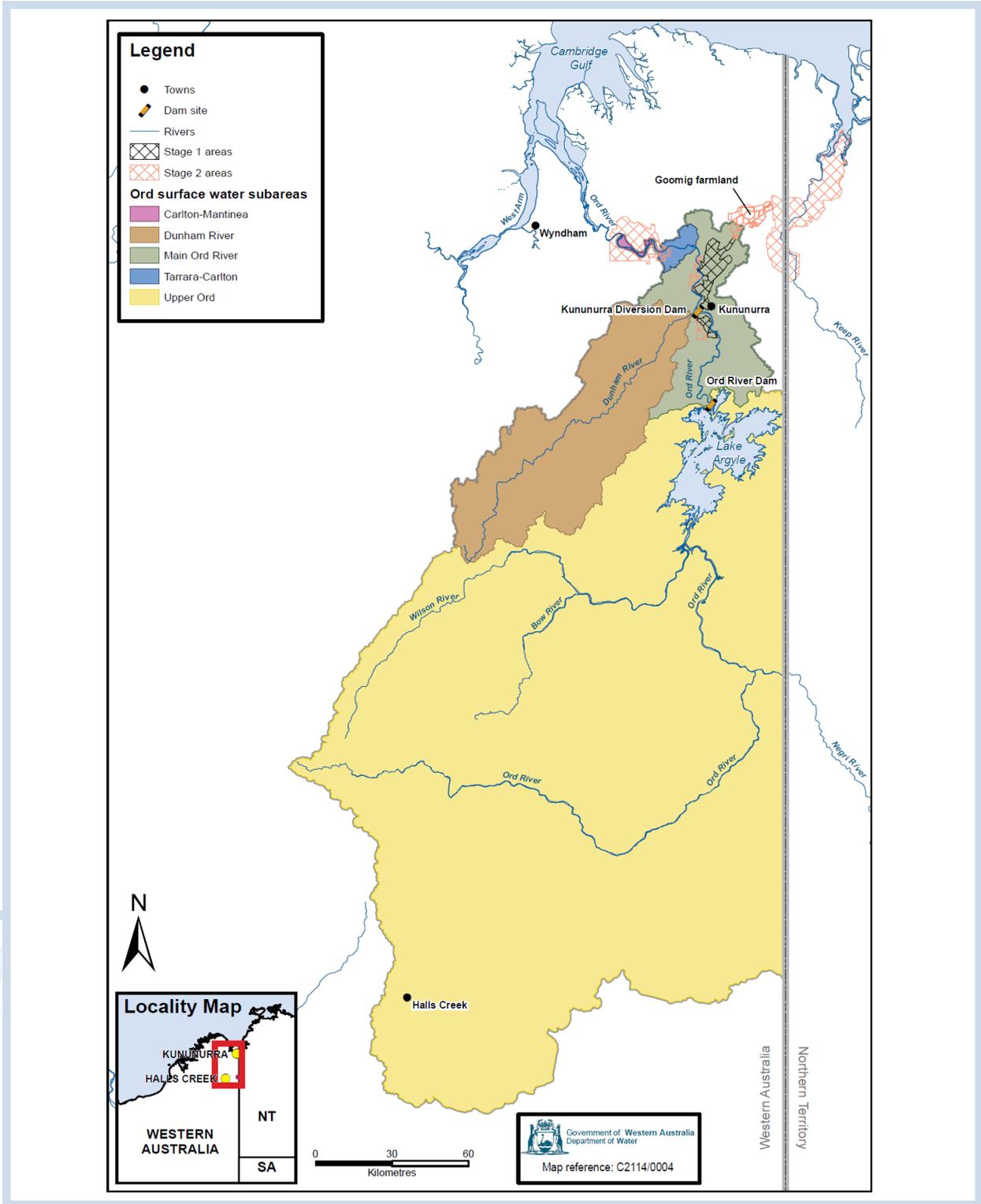


Figure 2
Subarea boundaries
Ord surface water allocation plan

19 The significant civil works that were carried out to construct the Kununurra Diversion Dam and the Ord River Diversion Dam, and thereby create the large storage capacity of Lake Kununurra and the vast storage capacity of Lake Argyle, respectively, are particularly impressive, because they were constructed in the 1950s and 1960s, in what was then, and remains, a remote part of the State and nation. As Ms F Ashworth, who appeared with Mr D Douglas-Baker on behalf of OIC, said in opening, these works were carried out at that time and in this location:¹⁹

... to harness the benefit - rather unique and certainly counterintuitive in an Australian context - of the huge volumes of water flowing down the Ord River in the summer wet season which made it one of Australia's fastest flowing rivers. ...

20 The respondent called Ms Simone McCallum to give evidence. Ms McCallum is employed by the Department as an engineer in the Surface Water Hydrology Section of the Water Resource Science Branch, holds a Bachelor of Science (Physics) (Honours) degree and a Bachelor of Engineering (Environmental Engineering) (Honours) degree from the University of Western Australia, and has more than 10 years' experience working on surface water assessment in Western Australia. As Ms McCallum said in evidence:²⁰

The Kimberley region experiences a climate characterised by a distinct dry season and wet season. The dry season is warm, with very little rainfall. The wet season is hot and rainfall occurs in the form of isolated thunderstorms and low pressure systems or cyclones. The location and timing of rainfall on the Ord River catchment is highly variable, and means river flow is more difficult to predict than in other less variable catchments.

21 Because rainfall in the Kimberley region is so variable, total inflow from the Ord River catchment into Lake Argyle for a year 'could range from as low as hundreds to as high as tens of thousands of gegalitres'.²¹ Ms McCallum also gave evidence that the median annual streamflow into Lake Argyle, which is 'more relevant] ... for ... thinking about the amount of water available, ... [than average annual streamflow] ... is about 3,400 GL'.²² As Ms McCallum also explained, the Ord River catchment and Lake Argyle experience 'a high

¹⁹ ts 92, 25 November 2019.

²⁰ Witness statement of Simone Seensee McCallum dated 30 August 2019 (Exhibit 47) [38].

²¹ Witness statement of Simone Seensee McCallum dated 30 August 2019 (Exhibit 47) [39].

²² ts 792, 11 March 2020.

evaporation rate', with '[a]verage annual evaporation [at] around 3,000 millimetres'.²³

- 22 We reproduce immediately below Figure 3 'How water is distributed from the Ord River and Kununurra Diversion dams' in OSWAP.²⁴ The relative sizes of Lake Argyle and Lake Kununurra shown in Figure 3 are not to scale. As indicated earlier, whereas Lake Kununurra has a storage capacity of 100.8 GL, Lake Argyle has a storage capacity of 10,760 GL. Thus, the storage capacity of Lake Argyle is over one hundred times greater than the storage capacity of Lake Kununurra.

²³ Witness statement of Simone Seensee McCallum dated 30 August 2019 (Exhibit 47) [40].

²⁴ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1060.

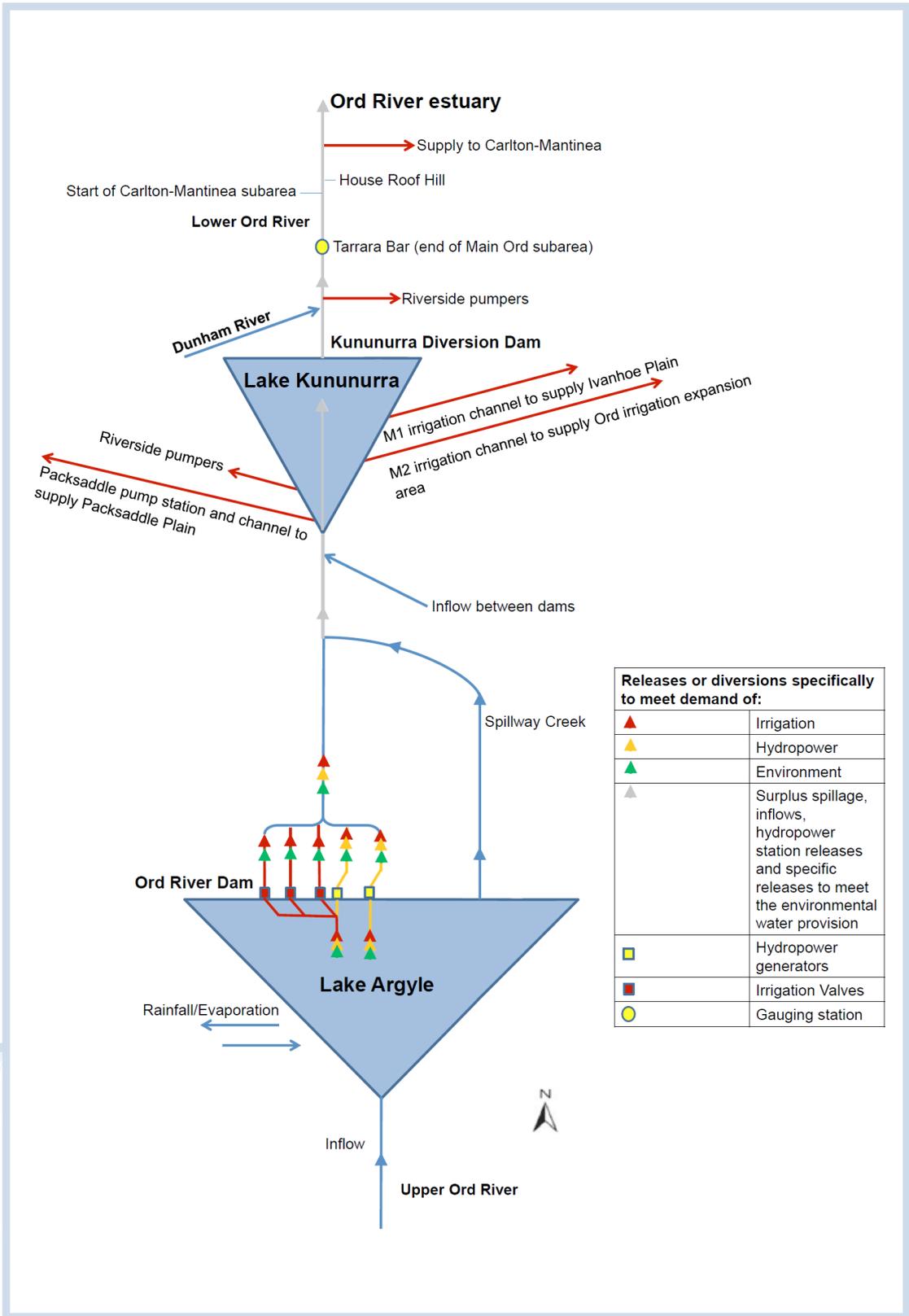


Figure 3
 How water is distributed from the Ord River and Kununurra Diversion dams
 Ord surface water allocation plan

23 As is apparent in Figure 3 in OSWAP, and as Ms Pawley explained in her evidence, water from the Upper Ord River catchment flows into and is stored in Lake Argyle by the Ord River Dam. The Upper Ord River catchment straddles the Western Australia/Northern Territory border, with approximately four-fifths located in Western Australia and approximately one-fifth located in the Northern Territory.²⁵ As Ms Pawley explained in evidence:²⁶

The Ord River system, including the water stored in Lake Argyle (by the Ord River Dam) and Lake Kununurra (by the Kununurra Diversion Dam) and its tributaries ... supports many important stakeholders. It provides water to a growing irrigation area, sustains a unique Kimberley environment, provides water for hydroelectricity generation and supports local indigenous, community, recreational and tourism values

24 Water Corporation owns, operates and maintains the Ord River Dam and is licenced by the Department to store and release (but not divert) the water in Lake Argyle and Lake Kununurra under Surface Water Licence SWL55655(9).²⁷ Pacific Hydro Limited (Pacific Hydro) owns and operates a 30 megawatt hydroelectric power station at the Ord River Dam. Pacific Hydro releases water through the power station to generate hydroelectric power. Pacific Hydro is not licensed by the Department, but rather operates under a 1994 water supply agreement with the former Water Authority of Western Australia (now Water Corporation) (water supply agreement).²⁸ Water Corporation can also release water from Lake Argyle through the irrigation valves that bypass the power station. However, as Ms Pawley said, '[w]ater is released through the power station whenever possible' and '[c]urrently releases via the irrigation valves usually only occur when the power station is shut down for maintenance'.²⁹ As Ms Pawley also said, '[r]eleases via the irrigation valves will likely increase in the future when there are greater water demands from irrigators'.³⁰

25 As can be seen in Figure 3 in OSWAP reproduced at [22] above, the water that is released through the power station and irrigation valves at the Ord River Dam flows down the Ord River and into Lake Kununurra. Lake Kununurra also collects any overflow above the spillway (spills) from Lake Argyle via Spillway Creek and surface

²⁵ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [22].

²⁶ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [21].

²⁷ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [25].

²⁸ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [26].

²⁹ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [27].

³⁰ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [27].

water runoff from the local catchment between the two dams.³¹
As Ms McCallum explained in her evidence:³²

The model is set up to keep a constant water level in Lake Kununurra by ordering water from Lake Argyle that will replenish the water released for irrigation and environmental flow.

Water allocation limits

26 Chapter 4 of OSWAP sets annual allocation limits for each of the five Ord surface water subareas totalling 905 GL per year. The 'allocation limits represent the annual volume of water that can be taken for consumptive use from each subarea'.³³ Under OSWAP, '[a]llocation limits do not include water released for hydroelectricity generation or the downstream environment'.³⁴ Table 3 in OSWAP sets out the allocation limits as follows:³⁵

Table 3
Allocation limits for the *Ord surface water allocation plan area*

Subarea	Allocation limit (total entitlements) (GL/yr)	Allocation limit components (GL/yr)		Annual reliability of supply	Water available for licensing in WA (GL/yr) (at January 2013)
		General licensing	Northern Territory		
Upper Ord	15	15	0	variable	6
Main Ord	750	590	160*	95%	242
Tarrara-Carlton	0	0	0	N/A	0
Carlton-Mantinaea	115	115	0	95%	115
Dunham River	25	25	0	variable	5
Total	905	745	160		368

* The Northern Territory component may be used in Western Australia if demands in this state grow rapidly before extra supply options are approved.

27 OSWAP states that the 750 GL per year allocation limit for the Main Ord subarea and the 115 GL per year allocation limit for the Carlton-Mantinaea subarea are '[f]or irrigation'.³⁶ As also stated in OSWAP, and as can be seen in Table 3 reproduced above ('[a]nnual

³¹ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [28].

³² Witness statement of Simone Seensee McCallum dated 30 August 2019 (Exhibit 47) [36].

³³ Clause 4.1 of OSWAP (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1073).

³⁴ Clause 4.1 of OSWAP (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1073).

³⁵ Clause 4.1 of OSWAP (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1074).

³⁶ Clause 4.1 of OSWAP (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1074).

reliability of supply'), the allocation limits of 750 GL per year for the Main Ord subarea and 115 GL per year for the Carlton-Mantina subarea 'can be granted at 95 per cent reliability from the Ord River downstream of Lake Argyle'.³⁷ As Ms Pawley therefore said in evidence, '[t]he Main Ord subarea, using water from Lake Argyle and Lake Kununurra, has a secure and reliable allocation limit of 750 [GL] per year'.³⁸ As Ms Pawley explained, '[r]eliability refers to the frequency with which a water licence holder can access their full annual licensed water entitlement', and consequently licence holders from the Main Ord subarea 'can ... expect irrigation supply to be restricted on average in [only] five out of every one hundred years, when water levels in Lake Argyle are low'.³⁹ As Ms Pawley also said:⁴⁰

This highly reliable (95 per cent) allocation limit is maintained through water release rules (which include restrictions on releases) for irrigation, hydroelectricity, navigation and environmental releases at the Ord River and Kununurra Diversion dams.

28 As is apparent in Table 3 in OSWAP reproduced at [26] above, the 750 GL per year allocation limit for the Main Ord subarea has been divided into the components of 'general licensing' (590 GL per year) and 'Northern Territory' (160 GL per year). However, the text referenced by the asterisk next to the allocation limit for the Northern Territory states that '[t]he Northern Territory component may be used in Western Australia if demands in this [S]tate grow rapidly before extra supply options are approved'. Similarly, OSWAP states in cl 4.2 that:⁴¹

Much of the remaining 400 GL/yr [that had not been allocated as at February 2013] is expected to be granted for irrigation expansion in WA and a portion will be needed should irrigation expansion proceed in the Northern Territory. Allocation of the remaining water will be based on how developments proceed, any intergovernmental agreements and whether new water is available through water supply planning.

Ord Stage 1

29 The climatic conditions of the Kimberley region referred to above and the large storage capacity of Lake Kununurra and subsequently the vast storage capacity of Lake Argyle, and the consequent high

³⁷ Clause 4.1 of OSWAP (respondent's section 24 bundle dated 10 May 2019) (volume 2) (Exhibit 3.2) page 1074).

³⁸ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [53].

³⁹ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [55].

⁴⁰ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [55].

⁴¹ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1075.

reliability of water supply for irrigation at the Kununurra Diversion Dam and the Ord River Dam, enabled the creation in the 1960s and 1970s of an open drain, gravity-fed, flood or furrow irrigation system, generally to the north of Lake Kununurra at Ivanhoe Plain and in part to the south of Lake Kununurra at Packsaddle Plain, which is known as 'Ord Stage 1'. Ord Stage 1 originally comprised an area of approximately 5,000 hectares of irrigated farmland and now comprises an area of over 16,000 hectares. Water is conveyed to Ord Stage 1 farmland to the north of Lake Kununurra via an open channel known as the 'M1 Supply Channel'. The route of the M1 Supply Channel is shown in Figure 4 in OSWAP, which is reproduced at [31] below.

30 As Ms Pawley said in evidence, '[s]uccessive Western Australian and Commonwealth governments have supported irrigation expansion in the Ord'.⁴² Clause 3.2 of OSWAP refers to 'irrigation expansion' in the Ord as follows:⁴³

Since the 1950s the vision for the Ord irrigation project has been to develop all the irrigable soils on the greater Ord and Keep River floodplains. Expansion beyond the Stage 1 areas was promoted in the mid 1990s, culminating in a proposal to develop more than 30 000 [hectares] of irrigated agriculture to the north of the Stage 1 area, in what became known as the M2 channel supply area.

The M2 channel supply area was thoroughly investigated and granted conditional environmental approval by the [S]tate and Northern Territory governments in early 2002. Although the project lapsed, the approvals remained and the Western Australian Government committed financial resources to develop the first phase of the M2 supply area.

Ord East Kimberley Expansion Project (Ord Stages 2 and 3)

31 In 2008, the State Government committed to developing 7,400 hectares of serviced irrigation farmland, now known as the 'Goomig farmland', to the north-east of Ord Stage 1, as 'the first phase of the greater (30 000 [hectares]) M2 channel supply area development',⁴⁴ which is known as 'Ord Stage 2'. We reproduce immediately below Figure 4 'Current (Stage 1) and proposed irrigation development areas in the plan area' in OSWAP, which shows the route of the M1 Supply Channel through Ord Stage 1 to the north of Lake Kununurra, and the route of the M2 Supply Channel, currently an

⁴² Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [118].

⁴³ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1064.

⁴⁴ Clause 3.2 of OSWAP (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1064).

extension of the M1 Supply Channel, constructed in 2010 to 2012 to convey water to the Goomig farmland and ultimately to the Knox Creek Plain portion of Stage 2.

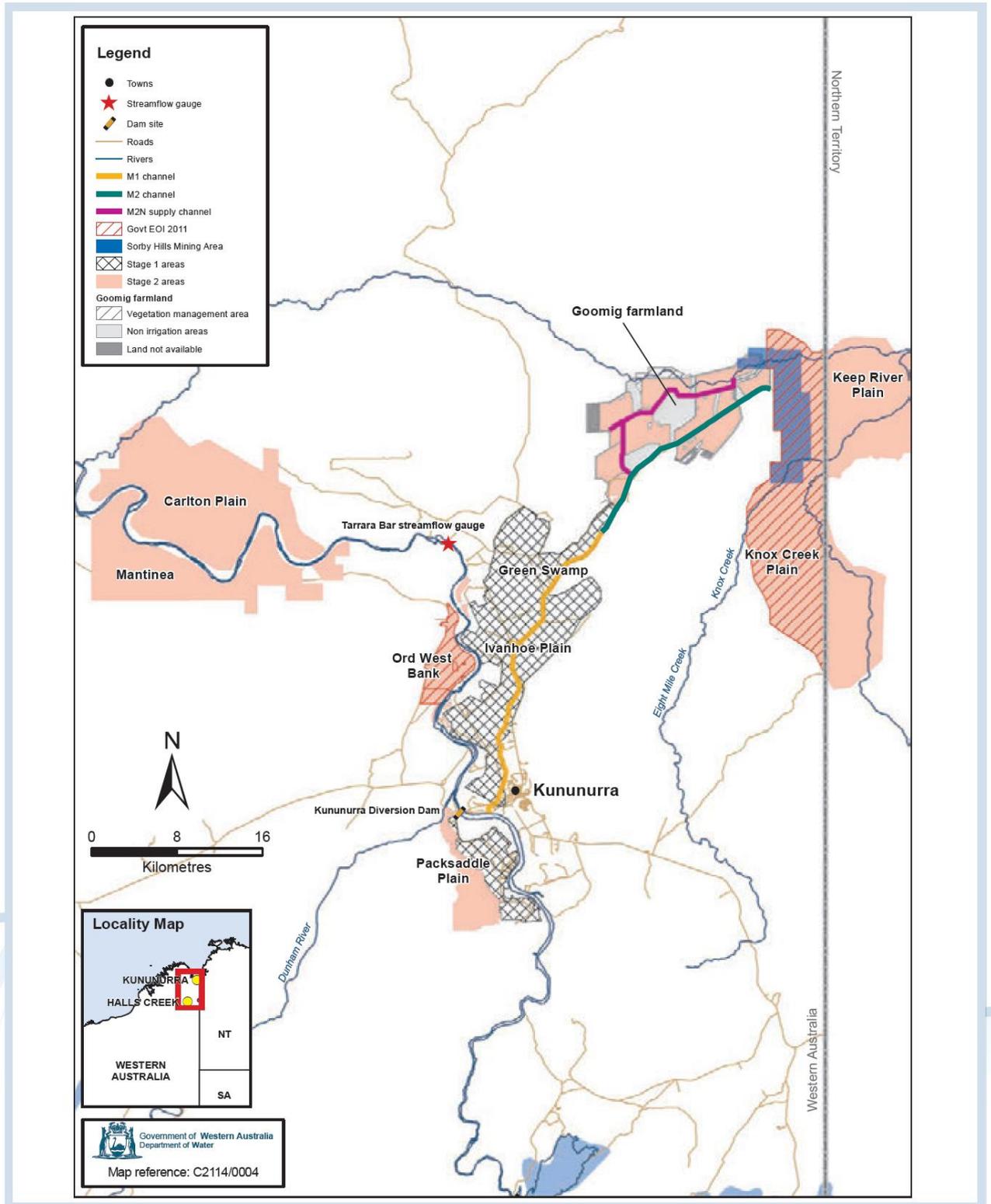


Figure 4
Current (Stage 1) and proposed irrigation development areas in the plan area
Ord surface water allocation plan

32 In addition to Ord Stage 2, OSWAP proposes 'expansion of the Ord River Agricultural Area over the remaining 14 000 [hectares] of the M2 [S]upply [C]hannel area in the Northern Territory',⁴⁵ which is known as 'Ord Stage 3'. OSWAP refers to the Western Australian, Northern Territory and Commonwealth governments having 'recently [as at September 2013] signed a Memorandum of Understanding on the proposed expansion of the Ord River Agricultural Area' in Ord Stage 3.⁴⁶ However, as discussed later in these reasons, an intergovernmental agreement between Western Australia and the Northern Territory has yet to be negotiated and agreed to enable the supply of water from the ORIA, in particular the Main Ord subarea, to Ord Stage 3.

33 The proposed development of approximately 30,000 hectares of new agricultural land in Western Australia (Ord Stage 2) and the potential development of approximately 14,000 hectares of new agricultural land in the Northern Territory (Ord Stage 3) is now collectively known as the 'Ord East Kimberley Expansion Project'. As Ms Pawley said in evidence, the Ord East Kimberley Expansion Project is being managed by the Department of Primary Industries and Regional Development, with support from other State government departments and agencies, including the respondent, and the State and Commonwealth governments have invested over \$500 million 'to deliver key irrigation infrastructure (such as the M2 [Supply] [C]hannel and roads) to expand the ORIA and community infrastructure'.⁴⁷

34 The respondent called Ms Susan Worley, who is the Department's Director of Water Assessment and Allocation, to give evidence. Ms Worley holds a Bachelor of Science Education degree from the University of Western Australia and a Diploma in Science and Maths Education from Curtin University of Technology and has also studied towards a Diploma in Landcare at Curtin University of Technology (incomplete), and has been involved in water resource management through her employment with the respondent and its predecessors for 24 years, including as Regional Manager North West with the Water and Rivers Commission (1999-2006), in which role she was involved in water planning for the Ord East Kimberley, and as Manager of Water Allocation Planning (2006-2010), in which role she was involved in

⁴⁵ Section 3.2 of OSWAP (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1064).

⁴⁶ Section 3.2 of OSWAP (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1064).

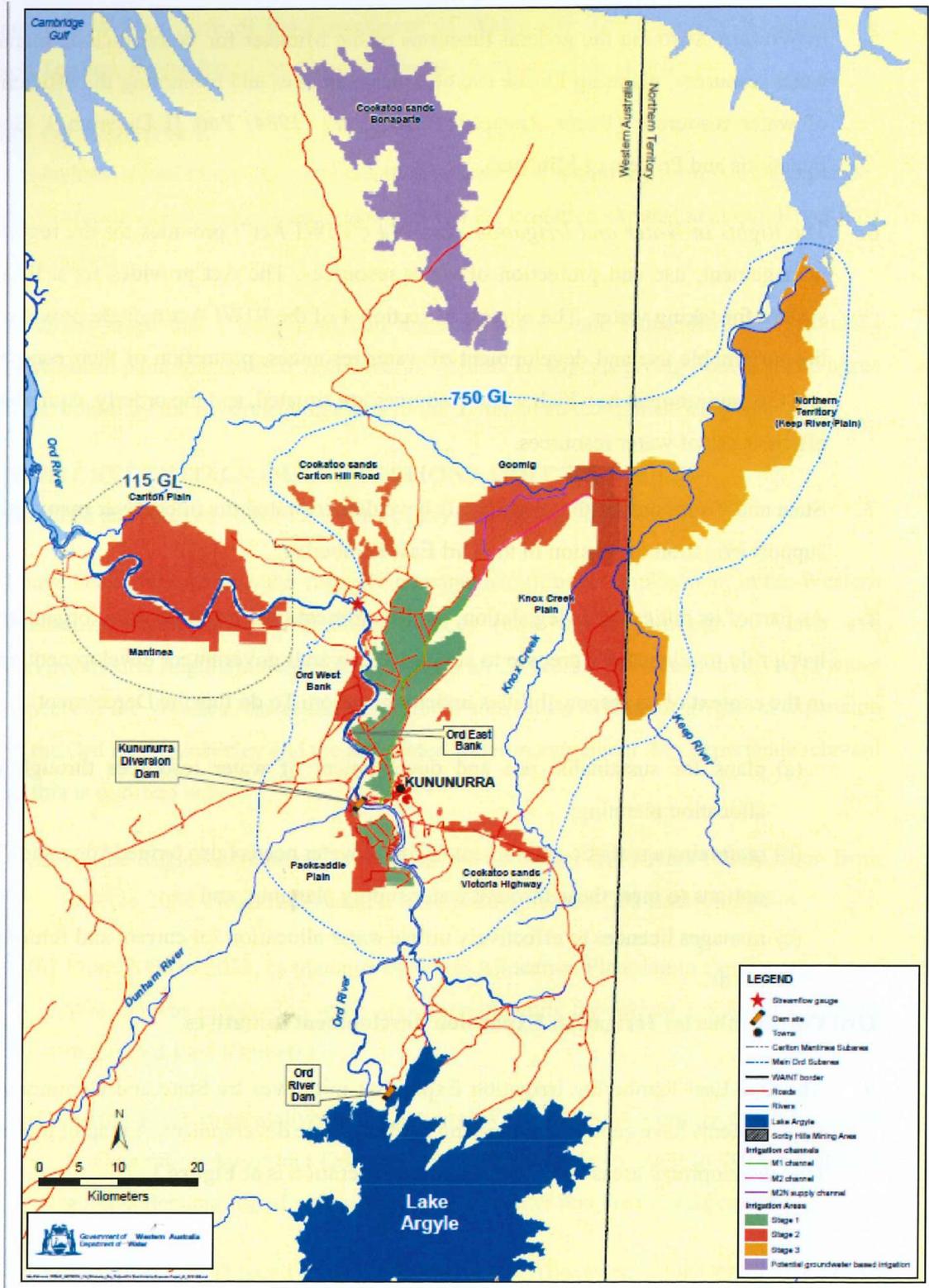
⁴⁷ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [118].

water allocation planning for current and future irrigation in the Ord East Kimberley. As Ms Worley said in her evidence, the Ord East Kimberley Expansion Project has been supported by the State and Commonwealth governments, by releasing land to enable development and in other ways. As Ms Worley also said in her evidence, the Department supports the expansion of irrigated agriculture in the Ord East Kimberley through its role as 'water regulator and water resource planner' and 'aims to have an appropriate level of water planning underway sufficiently ahead of the development planning so that water resource management arrangements are clear and water is not a constraint to a State agenda'.⁴⁸ To date, the Western Australian Government has released new land at Goomig (approximately 7,400 hectares), Knox Creek Plain, Ord East Bank, Ord West Bank, Mantinea, and Packsaddle. The State Government also plans to release land in the areas of Cockatoo Sands Victoria Highway and Carlton Hill Road. These locations can be seen in Figure 1 'Ord East Kimberley irrigation development and expansion areas' in the witness statement of Ms Worley, which is reproduced immediately below.⁴⁹

⁴⁸ Witness statement of Susan Joan Worley dated 5 September 2019 (Exhibit 39) [11].

⁴⁹ Witness statement of Susan Joan Worley dated 5 September 2019 (Exhibit 39) page 4.

Figure 1: Ord East Kimberley irrigation development and expansion areas



Water allocations from the Main Ord subarea

35 In total, the Ord East Kimberley Expansion Project aims to increase the size of the ORIA to a total of approximately 60,000 hectares of agricultural land, comprising approximately 16,000 hectares in Ord Stage 1, approximately 30,000 hectares in Ord Stage 2 and approximately 14,000 hectares in Ord Stage 3. Approximately 51,000 hectares of the 60,000 hectares of agricultural land in the ultimate envisaged ORIA (Ord Stages 1, 2 and 3) would be supplied with irrigation water from the 750 GL per year allocation limit of the Main Ord subarea and approximately 9,000 hectares would be supplied with irrigation water by the 115 GL per year allocation limit of the Carlton-Mantina subarea, located downstream on the Ord river, to the west of the remainder of the ORIA. Ms Pawley also said that water from the Main Ord subarea could be used to supply land in the Carlton-Mantina part of Ord Stage 2.⁵⁰

36 Under Licence 3 (and previously under Licences 1 and 2), OIC diverts water from the Main Ord subarea (at Lake Kununurra) above the Kununurra Diversion Dam for irrigation of approximately 15,031 hectares of agricultural land in Ord Stage 1.⁵¹ Most of the water diverted by OIC under Licence 3 is diverted at the M1 offtake for conveyance via the M1 Supply Channel to Ivanhoe Plain to the north and about 10% - 12% is diverted at the Packsaddle Pump Station for conveyance to Packsaddle Plain to the south.⁵² Between 2015 and 2018, OIC also diverted water under Licence 3 for irrigation by Kimberley Agricultural Investment Pty Ltd (KAI) at the Goomig farmland in Ord Stage 2 and conveyed this water to KAI via the M1 Supply Channel and the M2 Supply Channel. From 2019, KAI has accessed water for the Goomig farmland under its own Surface Water Licence SWL179228(3), rather than from OIC under Licence 3.⁵³

⁵⁰ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [119].

⁵¹ The area of 15,031 hectares is taken from Attachment MD-35 in the witness statement of Mathew Dear dated 12 September 2019 (volume 2) (Exhibit 6.2), which is reproduced at [148] below. As Ms Pawley points out in her witness statement dated 9 September 2019 (Exhibit 41) [60], OIC's 2018 annual report indicates that, in that year, 15,059 hectares of land was available for cropping under Licence 3. However, nothing turns on this relatively small discrepancy. Given that the annual water entitlement that the Tribunal is required to determine for the purposes of Licence 3 in these proceedings will operate prospectively for 10 years, and given that Mr Dear's Attachment MD-35 contains a forecast of crop types and areas which are likely to be irrigated under Licence 3 over the period to 2029, we find that the area of agricultural land to be irrigated in Ord Stage 1 under Licence 3 is 15,031 hectares.

⁵² Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [29] and [53] and OSWAP cl 3.2 and cl 5.2 (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1062 and 1083).

⁵³ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [29].

37 Water Corporation also diverts water from Lake Kununurra, under its Surface Water Licence SWL158784(7), and conveys it via the M1 Supply Channel to supply water to its 'M1 channel customers' and to flush and dilute discharges to the M1 Supply Channel from the Kununurra Wastewater Treatment Plant, which it owns and operates.

38 In addition, there are about 80 self-supply water licensees in Ord Stage 1, known as 'riverside pumpers', who are collectively licensed to take 10.5 GL per year directly from the Ord River above and below the Kununurra Diversion Dam.⁵⁴

39 As Ms Pawley said in evidence, the Department 'will issue licensed water entitlements up to the annual allocation limits at the defined reliability for each of the subareas to support irrigation'.⁵⁵ As Ms Pawley also said, '[o]nce the allocation limit is reached, no more licensed water entitlements will be issued by the Department'.⁵⁶ As at August 2019, 382.3 GL per year (or approximately 51%) of the 750 GL per year allocation limit for the Main Ord subarea 'has already been licensed for irrigation' and a total of 120 GL per year 'has been committed (that is a licence application was approved pending conditions being met)' to KAI for development of the Goomig farmland in Ord Stage 2.⁵⁷ Of this volume, KAI holds a 32 GL per year licence with the remainder (88 GL) reserved to be provided in stages, based on KAI's development timeline. Taking into account the volumes of water currently licensed and committed, the Main Ord subarea is 63% allocated. The water which is currently licensed or committed from the Main Ord subarea is summarised by Ms Pawley in Table 1 of her witness statement, which is reproduced immediately below. As this table shows, 279.7 GL per year from the Main Ord subarea:⁵⁸

... is available for new or increased entitlements to support irrigation expansion in Western Australia and potentially in the Northern Territory, subject to irrigation water requirements and intergovernmental water sharing agreements.

⁵⁴ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [29] and Table 1 page 24.

⁵⁵ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [56].

⁵⁶ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [56].

⁵⁷ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [56].

⁵⁸ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [56].

Table 1 Water licensed or committed in the Main Ord subarea (summarised from information obtained from the Department's water licensing database COMPASS, July 2019)

Who	Licensed (gigalitres per year)	Committed (gigalitres per year)	Total (gigalitres per year)
Ord Irrigation Cooperative – Stage 1 of the ORIA (Surface Water Licence SWL156287(3))*	335	-	335
Kimberley Agricultural Investments – Goomig Development in the new M2 supply area (Surface Water Licence SWL179228(3)) [Attachment SP 4]	32	88**	120
Water Corporation – M1 channel customers and flushing (Surface Water Licence SWL158784(7)) [Attachment SP 5]	4.8	-	4.8
About 80 separate individual self-supply licensees in Stage 1 of the ORIA (colloquially referred to as riverside pumpers)	10.5	-	10.5
Total (gigalitres per year)	382.3	88	470.3
Remaining (gigalitres per year)			279.7 (=750 - 470.3)
<p>* Based on the State Administrative Tribunal's orders made on the 3 December 2015 (Matter Number DR 340/2015), OIC's Surface Water Licence SWL156287(3) (the licence under review) shall operate with an Annual Water Entitlement of 335 gigalitres per year and in compliance with</p>			

the Operating Strategy, as prepared by OIC, which bears the printed date of August 2009, and was approved by the Department on 29 March 2010 (OIC, 2009a) [Attachment SP 9].

** This is presently in the water licensing database COMPASS as 73 gigalitres per year due to an administration error. The licensing officer is currently working on resolving this so that the total licensed and committed to KAI is equal to 120 gigalitres per year.

Isolation and its consequences for farming in the ORIA

40 The evidence before the Tribunal indicates that not only is the ORIA a place of significant opportunities for farming, owing to the vast water resource created by the climatic conditions of the summer wet season and the dams referred to earlier, but it is also a place of significant difficulties and challenges for farming, owing to its isolation.

41 Mr Jim Engelke, who holds a Bachelor of Agriculture degree from the University of Western Australia and a Master of Business Administration degree from the University of New England (Armidale), and has been the General Manager of KAI since 2013 and a director of KAI since 2018, was called to give evidence by the applicant. KAI is a 'large-scale development company' operating in the ORIA 'with a development capacity of approximately 25,000 hectares, including approximately 6,660 hectares in Goomig, 5,500 hectares in Knox Plain, 2,000 hectares in [Carlton] Hill, and 1,200 hectares in Ord Stage 1'.⁵⁹ As KAI's General Manager, Mr Engelke is responsible 'for all aspects of its land development and farming operations - including the design, construction, monitoring and operation of water infrastructure and cropping methods'.⁶⁰

42 Mr Engelke aptly described the ORIA as 'an [i]solated [p]lace' 'in far northern Western Australia'.⁶¹ Mr Engelke referred to the extreme isolation of the ORIA and its consequences for farming in the following passage of his evidence:⁶²

To put the geographical location in perspective, although Kununurra is governed by Perth, Perth is nearly four times further away than Darwin, which is 850 km away by road. These distances affect land

⁵⁹ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [3].

⁶⁰ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [5].

⁶¹ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [8].

⁶² Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [8].

development and farming in the region, principally through increased logistics costs, being the cost of getting farming inputs in and outputs out.

43 As Mr Engelke explained, in consequence of the ORIA's isolation:⁶³

Scale is critical to meeting KAI's farming objectives. Without scale the limitations of locations are more severe. Scale enables increased use of shipping, rather than trucking, bulk purchasing and allowing investment in infrastructure to handle the increased volumes and input and output. To illustrate the point, in 2019 KAI grew maize on a substantial scale. Last year, KAI grew 1,500 hectares of maize that produced a yield of just less than 16,000 tonnes, and KAI is likely to grow approximately 30,000 tonnes this year. The combined production in the region for 2019 will be approximately 50,000 tonnes. At these volumes and coupled with supply contracts investment in grain handling and storage becomes viable.

44 Mr Hans-Christian Bloecker, a second-generation farmer in the ORIA, who grew up on the approximately 1,106 hectare property he farms under the trading name Bothkamp Australia Farm (Bothkamp) in Ord Stage 1, and who was called to give evidence by the applicant, gave similar evidence about the ORIA's isolation and the difficulties and challenges posed by that isolation for farming. Mr Bloecker holds a Bachelor of Science in Agriculture degree and a Bachelor of Economics degree from the University of Western Australia and a Diploma in Horticultural Business from the University of Tasmania. In the 10 years that he has been Managing Director of Bothkamp, Mr Bloecker has been 'responsible for short-term and long-term strategic business decisions, including but not limited to crop selection, agronomy, infrastructure investment, and tropical irrigation methods and practices'.⁶⁴ Over this period, 'Bothkamp has operated a commercially successful, large-scale farming business' in Ord Stage 1.⁶⁵ As Mr Bloecker explained, Bothkamp (and all other farmers in the ORIA) face two main difficulties and challenges in farming in this remote location:⁶⁶

First, the cost of farming inputs such as equipment, seeds, chemicals, machines and equipment parts are expensive owing to the costs of freighting these goods into the region. For example, fertilizer can be purchased at CSPB (fertiliser suppliers) in Perth but it must be

⁶³ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [9].

⁶⁴ Witness statement of Hans-Christian Bloecker dated 6 September 2019 (Exhibit 22) [8].

⁶⁵ Witness statement of Hans-Christian Bloecker dated 6 September 2019 (Exhibit 22) [5].

⁶⁶ Witness statement of Hans-Christian Bloecker dated 6 September 2019 (Exhibit 22) [11] and [13].

transported to the Ord, which costs approximately \$220 per metric tonne. This means that a farmer who purchases urea fertilizer at \$500 per tonne must pay an additional \$220 per tonne to transport the fertilizer to the Ord.

Second, freight not only increases the costs of farming inputs, it also increases the costs of farming outputs. Currently, 90% of Bothkamp's horticulture is sold to domestic markets in Perth, Adelaide, Melbourne, Sydney, Darwin and Brisbane, and 10% of its horticulture is exported predominantly from the ports of Perth, Melbourne and Sydney. Bothkamp gets its horticulture to these markets by loading trucks at the Property and paying the associated freight cost. Although highly variable, in August 2019, these prices were approximately \$200 per tonne to Perth or \$400 for a refrigerated pallet to Melbourne (which is required for crops such as melons). To illustrate the point, Kent pumpkins are currently \$0.60 per kg and at the start of season were \$1.20 per kg. The freight percentage is therefore a significant percentage of a crop that itself is highly variable in price: from 17% of market price as prices stood at the start of the season to over 30% of the market price as prices stood at the end of the season. And it should not be forgotten that in addition to freight, on these prices the farmer has all of the other costs of production, which means that freight can make tight profit margins substantially tighter.

45 Mr Robert Boshammer, who has been a farmer in Ord Stage 1 for 35 years, was also called to give evidence by the applicant. Mr Boshammer holds a Bachelor of Applied Science (Honours) degree from Queensland Agricultural College. Mr Boshammer farms with his son and daughter through a number of family trusts and businesses, which, for convenience, are collectively referred to as 'Oasis'. Oasis owns 2,100 hectares of agricultural land in Ord Stage 1, of which it farms 1,300 hectares and leases 800 hectares to a sandalwood farm. Oasis also farms 300 hectares of land in Goomig (in Ord Stage 2), which is leased from KAI. As the General Manager of Oasis, Mr Boshammer is 'involved in all major decisions concerning the business, including crop choice, investment planning, and tropical irrigation methods and practices'.⁶⁷ Since 2006, Mr Boshammer has also been a non-executive director of Cambridge Gulf Ltd (CGL), which imports and distributes fuel and operates and manages the Port of Wyndham under an operating agreement with the Department of Transport.⁶⁸ Through his work with CGL, Mr Boshammer has 'extensive knowledge of the cost of transporting goods to and from Kununurra, as well as the market opportunities that exist as a result of

⁶⁷ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [5].

⁶⁸ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [4].

the [Port of Wyndham's] operations'.⁶⁹ From 2012 to 2018, Mr Boshammer was also a Board Member of the Kimberley Development Commission (KDC), advising the Minister for Regional Development and Lands on matters affecting the development of the region, including water and food security, projected development of the ORIA, and new market opportunities for local farmers. As a result of his work on the KDC, Mr Boshammer has 'extensive knowledge of proposed developments in the Kimberley, which includes the ORIA, and the business opportunities this presents for local farmers in terms of accessing emerging markets'.⁷⁰

46 Mr Boshammer gave evidence consistent with the evidence of Mr Engelke and Mr Bloecker about the consequences of the ORIA's isolation in terms of the significant freight costs of farming inputs and the significant freight costs and difficulties involved in transporting goods to markets from the ORIA. As Mr Boshammer said in evidence, 'Oasis' properties in Broome and Mataranka provide a clear illustration of how transport alone can affect farming in the ORIA'.⁷¹ As Mr Boshammer explained in his evidence:⁷²

... Until the Mataranka property was sold in 2018, Oasis farmed watermelon on its Mataranka and Broome properties across a combined 400 hectares (approximately). For a number of years before the Mataranka property was sold, Oasis was supplying from these two properties approximately 40% of the Australian watermelon market between May and November. Notwithstanding that Oasis had the expertise to grow watermelons, and the ORIA has the right soils and weather to grow watermelons, Oasis is not interested in growing watermelons in the ORIA because of shipping and production costs. By growing watermelons in Broome and Mataranka as opposed to the ORIA, and without providing commercially sensitive information, I can say that Oasis saves \$60 per tonne in freight alone, which is a substantial enough percentage of our profit margins for Oasis not to grow watermelons in the ORIA.

47 Mr David Menzel 'wears' what he describes as multiple 'hats' in the Ord East Kimberley.⁷³ As a consequence of his multiple roles in the Ord, Mr Menzel has enormous knowledge and experience of the particular circumstances, opportunities, challenges and potential developments within this remote agricultural region. Mr Menzel holds

⁶⁹ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [7].

⁷⁰ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [8].

⁷¹ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [17].

⁷² Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [17].

⁷³ ts 472, 28 November 2019. As Mr Menzel said, 'I might be wearing two or three hats in the one meeting' (ts 472, 28 November 2019).

an Advanced Diploma of Science (Farm Management) from the University of Melbourne and has been a local farmer in Ord Stage 1 for 24 years. He farms approximately 460 hectares of land in partnership with his wife, Karen. Mr Menzel has been the Chairman of the Board of OIC since 2010, was Vice Chairman of the Board from 2006 to 2010, and has been a director of OIC since 2004. Mr Menzel also holds the following positions:

- Shire Councillor and President of the Shire of Wyndham-East Kimberley, the local government in the district of the ORIA, since 2017;
- Chairman of the Independent Review Group for Ord Stage 2 since November 2015, in which role he reports to the Federal Minister for the Environment and Energy in relation to Goomig and Knox Plain regarding environmental management;
- a director of the Ord River District Co-operative (ORDCO) since 2014, which is an independent agricultural co-operative that provides services to members through the provision of product data and information, merchandise relevant to irrigated agriculture (including crop protection and nutrient products, and seed and grain merchants), crop monitoring, research and development, and harvesting, storage and marketing of farm produce; and
- a non-executive director of CGL since 2010.

48 Mr Menzel was also previously Chairman of the East Kimberley Community Reference Group Stage Two Development, which oversees community engagement with the ORIA expansion and infrastructure upgrade. In addition, between May 2014 and June 2015, Mr Menzel was a member of the Prime Minister's Northern Australia Advisory Board, which was responsible for the development of the Developing Northern Australia White Paper. This role 'entailed broad consultation across northern Australia focussed on the topics of land, water, infrastructure, business, trade and investment, education, research and innovation, and governance'.⁷⁴

⁷⁴ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [9].

49 In light of his multiple and overlapping 'hats', we have no hesitation in accepting Mr Menzel's observation that he has 'extensive knowledge of current and future projects in the ORIA',⁷⁵ and his evidence that.⁷⁶

As a local farmer, Chairman of OIC, and director of Gulf Cambridge Ltd and ORDCO, I have experience at every level of production, wholesaling, marketing and transporting produce and equipment, and have witnessed first-hand the difficulties involved in farming in Ord Stage 1. I also have personal experience in commercial farming practices, related costs, water requirements, and tropical irrigation best practice.

50 Indeed, in light of their academic qualifications and significant local knowledge and experience, we fully accept the evidence of Mr Menzel, Mr Engelke, Mr Bloecker and Mr Boshammer in relation to the history, current circumstances and potential developments within and affecting the ORIA.

51 Mr Menzel gave evidence consistent with the evidence of Mr Engelke, Mr Bloecker and Mr Boshammer in relation to the particular challenges posed by the ORIA's isolation. As Mr Menzel said, 'the area's isolation has affected every aspect of farming' and '[o]ne of the more significant effects of the isolation is that transporting goods in and out of the ORIA is inefficient and expensive'.⁷⁷ Mr Menzel gave a 'simple example of how the area's isolation impacts significantly on farming' in that 'it is not uncommon to wait 7-10 days for machinery to be repaired due to the delay involved in the transportation of machine parts to Kununurra', which 'can have significant effects on the cropping or harvesting regime'.⁷⁸ As Mr Menzel also said, 'water availability and reliability is what makes farming in the ORIA commercially viable' and 'partially offsets the other relative disadvantages Ord Stage 1 farmers face'.⁷⁹

52 Similarly, Mr Mathew Dear, who has been the General Manager of OIC since 2012, and an employee of OIC since December 2006, gave the following evidence, which was not questioned or contradicted

⁷⁵ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [11].

⁷⁶ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [13].

⁷⁷ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [14].

⁷⁸ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [15].

⁷⁹ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [16].

and which, given his significant knowledge and experience of the circumstances of the ORIA, we accept:⁸⁰

[I]n my opinion, predicting what will be farmed in the Ord is notoriously difficult. This is because, in my opinion, the Ord is not like other irrigation areas. The Ord is an irrigation area that requires high value crops to be grown or for farmers to grow a large volume of crops to benefit from economies of scale. This is because everything in the Ord is expensive due to the region's isolation. It costs substantially more for farmers to freight farming equipment and supplies in, and farming produce out. This makes it difficult for local farmers to compete with other irrigation districts that have lower farming overheads. For example, if local farmers wish [to] compete in the Perth cucurbit market, local farms will need to compete with growers in Carnarvon in Western Australia which is substantially closer to Perth. For this reason, farmers in the Ord tend to move quickly to and from different crops in order to maximise profit margins by selecting those crops that have the highest return in a particular season.

53 As indicated earlier, KAI seeks to address the difficulties and challenges posed by the increased costs of inputs and outputs in the ORIA by farming at scale. While the properties of other farmers in the ORIA are significantly smaller than the current development, and certainly the development capacity, of KAI, farmers in the ORIA have also sought, individually and collectively, to minimise the costs of transporting farming outputs to markets. For example, in 2019, Oasis spent \$750,000 on a new baler and tractor so that it could heavy bale hay. As Mr Boshammer said, this allows Oasis 'to pack more hay onto trucks, which has the potential to reduce freight costs because fewer trucks are required for the same volume of hay'.⁸¹ Mr Boshammer also gave an 'example of farmers working together to defray freight costs' in that, from 2018, farmers in the region collectively produced enough maize to charter ships to transport this crop from the Port of Wyndham directly to purchasers in South Korea.⁸² This enterprise not only required local farmers to work collaboratively in the production, storage and transportation of maize, but also depended on the use of infrastructure, such as warehouses, that had been built and paid for by the farmers. In 2018, farmers in the ORIA produced enough maize for two 10,000 tonne shipments to South Korea. In 2019, farmers in the ORIA were growing enough maize for three 10,000 tonne shipments.

⁸⁰ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [120].

⁸¹ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [15].

⁸² Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [15].

54 Another means by which farmers in the ORIA have worked cooperatively to mitigate the significant additional costs associated with farming in this remote location is the formation of ORDCO. As Mr Bloecker, who is a director of ORDCO, and Mr Boshammer both explained, ORDCO assists to defray some of the costs of farming inputs, such as seeds, fertiliser and chemicals for weed and pest control, '[t]o some extent',⁸³ by purchasing commonly-used products in bulk and passing on the savings to its members, and storing farm inputs, so that they are available in the district when required and farmers do not have to individually incur the expense of storage and the cash flow problems of having to purchase bulk goods well in advance of requirements. However, as Mr Boshammer said, 'even through ORDCO, the cost of most products is higher for farmers in the ORIA than [in] other regions of Australia' and, similarly, 'machines, machine parts and human capital, all cost more in the ORIA than in other parts of Australia'.⁸⁴

A farming district in transition

55 Although the ORIA was established some 60 years ago, the evidence shows that there has never been a stable dominant crop or crop mix in this farming district for more than 10 to 15 years. While six decades old, as Mr Engelke expressed it, 'the ORIA is not a well-developed farming region', but rather is properly characterised as 'a pioneering region ... [which] needs the room to move, adjust and react'.⁸⁵ The evidence before the Tribunal in relation to the history of irrigated agriculture in the Ord is well expressed and summarised in the following evidence of Mr Engelke:⁸⁶

Stage 1 is a developing region. In my observation, and to my knowledge, the region has not been stable for more than ten years at any time in its history. There have been a few times that the region nearly stabilised, for example with cotton and then with sugar, but something has always destabilised it. In my experience, there has not been a stable crop in the region and farmers have tended, because of necessity, to scramble from one crop to the next. ...

56 As Mr Engelke mentioned in the passage of his evidence set out immediately above, the first major crop in the ORIA was cotton, which was planted extensively in the 1960s and 1970s. However, cotton was found to be susceptible in the Ord to a wet season pest, *Spodoptera littoralis*, 'which would feed on the leaves and flowers of

⁸³ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [16].

⁸⁴ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [16].

⁸⁵ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [57].

⁸⁶ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [61].

the cotton plant'.⁸⁷ Consequently, as Mr Boshammer said, 'the cotton industry ... ceased in the early 1970s'.⁸⁸

57 Next, in the mid-1970s to mid-1980s, came horticulture, including rockmelons, watermelons and pumpkins. However, as Mr Boshammer said in evidence set out earlier in these reasons, although the ORIA has 'the right soils and weather to grow watermelons', it proved to be cost-prohibitive to produce such horticultural crops in the ORIA.⁸⁹

58 Next, in the mid-1980s, came maize. In around 1985, Mr Boshammer observed that farmers in the ORIA were 'beginning to have increasing success in growing maize, such that by around 1987, to the best of my recollection, the region was exporting approximately 5,000 tonnes of maize annually to [Papua] New Guinea for use in animal feed'.⁹⁰ ORDCO built a warehouse in Wyndham for storage of maize before shipping. However, within a few years, as Mr Boshammer said, '[Papua] New Guinea began using wheat instead of maize in animal feed and the maize industry began to decline'.⁹¹

59 Next, in the early 1990s, came sugarcane. Sugarcane 'quickly became the dominant crop in the region for the next 12 to 15 years'.⁹² In 1995, CSR Limited opened a local sugar mill. However, the sugar industry in the ORIA began to decline from around 2005, as Mr Boshammer explained, 'owing to comparatively low world sugar prices (which meant low profit margins for local growers) and shrinking production in the face of competition for land in the ORIA from sandalwood growers'.⁹³ The sugar mill closed in 2007. It appears that, by the end of the first decade of this century, sugarcane, which had been the dominant crop in the ORIA for 12 to 15 years, simply ceased to be commercially grown there, as a consequence of factors outside the control of the farmers.

60 Next, from 1999 and then increasingly in the early-mid 2000s, came sandalwood. The applicant called Mr John Doble to give evidence. Mr Doble, who holds a Bachelor of Business in Agricultural Management degree from Marcus Oldham College and Deakin University, has, since February 2015, been the Assistant Regional

⁸⁷ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [49].

⁸⁸ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [9].

⁸⁹ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [17].

⁹⁰ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [10].

⁹¹ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [10].

⁹² Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [10].

⁹³ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [12].

Manager for Western Australia for Quintis Forestry Limited (Quintis), in which role he manages all aspects of Quintis' Indian sandalwood operations on 16 properties, comprising approximately 5,000 hectares of land, including 3,150 hectares in the ORIA, on which Quintis grows sandalwood, and has also, since January 2012 and January 2013, respectively, been Quintis' Western Australia Irrigation Manager and Harvest Manager. As Mr Doble explained in his evidence, '[s]andalwood is a perennial crop and is currently harvested when the trees reach an age of approximately 15 years' and '[a]s it is a parasitic, it is grown with a range of host trees'.⁹⁴ Quintis first planted sandalwood in the ORIA in 1999, 'following research which identified the suitability of the region for sandalwood growth', and its first commercial harvest of sandalwood was completed in 2014.⁹⁵ Between the mid and late 2000s, sandalwood was planted on approximately one-third of Ord Stage 1, and it is, by far, the dominant crop by area planted. Later in these reasons, when we consider what crop types and areas should be utilised for the purpose of determining 'justified crop needs', under cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, and hence the starting point for the determination of the annual water entitlement in Licence 3, we accept the reasonableness of the assumption and forecast of Mr Dear that 'the sandalwood industry will shrink marginally when plantings from 2008 and 2009 come to the end of their 15-year growing cycle'.⁹⁶ Although sandalwood is likely to remain a dominant crop by area planted until at least 2030 (two growing cycles), it is not a primary or dominant crop for farmers generally in the ORIA, because there are only a small number of sandalwood growers, the two principal growers being Quintis and Santanol Pty Ltd.⁹⁷ For most farmers in Ord Stage 1, who had planted the once-dominant crop of sugarcane, as Mr Boshammer said:⁹⁸

As has often been the case in my 34 years in the ORIA, following the closure of the sugar mill in 2007, the region had to re-invent itself. ...

61 Similarly, as Mr Menzel said, 'the Ord has always been, and remains, a dynamic and, on one view, an unstable region for farming'⁹⁹ and:¹⁰⁰

⁹⁴ Witness statement of John Doble dated 10 September 2019 (Exhibit 26) [13].

⁹⁵ Witness statement of John Doble dated 10 September 2019 (Exhibit 26) [8].

⁹⁶ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [123]. See [151]-[152] below.

⁹⁷ Witness statement of John Doble dated 10 September 2019 (Exhibit 26) [10].

⁹⁸ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [13].

⁹⁹ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [67].

¹⁰⁰ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [22].

The history of sugarcane production and the need to diversify to other crops exemplifies the character of farming in Ord Stage 1, and the ORIA more broadly. In my experience, and to my observation, Ord Stage 1 farmers must adapt according to market opportunities to survive in a region with such high-costs of production and distribution. For this reason it is not possible to predict with certainty what or if any single crop type may emerge in future to dominate production across Ord Stages 1 and 2. That said, to my observation, the region is changing again and is moving to embrace different farming practices, such as double cropping, as well as emerging opportunities in cotton and hay; and as set out below, these changes are already having an effect on water use in the region.

62 In terms of the region 're-inventing itself' since the end of the sugar industry in the late 2000s, other than sandalwood, no dominant crop or crop mix has emerged. However, as we will discuss in relation to what crop types and areas should be utilised for the purpose of determining 'justified crop needs' and hence the starting point for the determination of the annual water entitlement in Licence 3 below, it is reasonable to forecast, among other things, that:

- 'cotton will become the dominant crop in the region over the next 10 years',¹⁰¹ following large-scale, successful cotton trials conducted by KAI in the ORIA in 2018 and 2019, using a recently developed, genetically modified cotton variety, known as 'Bollgard 3';¹⁰²
- 'demand for maize will not weaken';¹⁰³
- 'hay production is likely to increase in coming years on the back of already substantial growth over the last three years';¹⁰⁴ and
- 'double cropping [including cotton as the first crop] will increase from approximately 20 hectares in 2019 to 1,000 hectares over the next 10 years'.¹⁰⁵

¹⁰¹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [122].

¹⁰² Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [12]-[14] and witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [46]-[49]. See [154]-[169] below.

¹⁰³ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [130]. See [170]-[174] below.

¹⁰⁴ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [125]. See [175]-[182] below.

¹⁰⁵ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [131]. See [183]-[187] below.

63 We find, on the basis of the evidence referred to at [55]-[62] above, that an important characteristic of the ORIA is that it has never settled and stabilised in terms of a dominant crop or crop mix for more than 10 to 15 years at any time in its history and that the ORIA has been in a state of transition throughout much of this time, seeking to creatively 're-invent itself', to quote Mr Boshammer,¹⁰⁶ or, as Ms Ashworth put it in opening OIC's case, 'finding its feet'.¹⁰⁷ Furthermore, we find, on the evidence discussed at [154]-[169] and [175]-[187] below, that the ORIA remains in a state of transition, relevantly, in terms of our findings in relation to what crop types and areas should be utilised for the purpose of determining 'justified crop needs' and hence the starting point for the determination of the annual water entitlement in Licence 3, towards a likely significant increase in the production of cotton and hay, and use of double cropping, including growing cotton as the first of the two crops.

OIC

64 We make the following background findings of fact in relation to OIC. Unless otherwise specified, we make these findings on the basis of the evidence given by Mr Dear, who, as indicated earlier, has been employed by OIC since December 2006 and has been its General Manager since 2012, and whose evidence referred to in this section of our reasons was not questioned or contradicted. We accept that, as the General Manager of OIC, Mr Dear has 'extensive and detailed knowledge of water use in the ORIA, and in particular how water is provided to and used by farmers within Ord Stage 1'.¹⁰⁸ Mr Dear also holds the following positions:

- Shire Councillor of the Shire of Wyndham-East Kimberley since October 2017;¹⁰⁹
- General Manager of the Ord Irrigation Asset Mutual Co-operative (OIAMC), which is the holding co-operative for the majority of assets used by OIC, since 2012;¹¹⁰

¹⁰⁶ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [13].

¹⁰⁷ ts 127, 25 November 2019.

¹⁰⁸ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [6].

¹⁰⁹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [2].

¹¹⁰ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [3].

- Chief Operations Officer of CGL, which, as indicated earlier, operates the Port of Wyndham, since March 2019;¹¹¹ and
- Director of the National Irrigation Corporations Water Entitlement Register since 2012.¹¹²

Water supply by OIC

65 OIC was formed in 1996 to manage water supply services to farms within Ord Stage 1. In addition to holding a Surface Water Licence under the RIWI Act (Licence 3), OIC also holds a water service provider licence (Water Services Licence 37) (WL37) issued by the Economic Regulation Authority under s 11 of the *Water Services Act 2012* (WA) (WS Act), which authorises OIC to provide non-potable water supply and irrigation services within its operating area.¹¹³ In 2005, the water services infrastructure in Ord Stage 1 for delivery of water to irrigators, excluding the M1 Supply Channel, was transferred by Water Corporation to OIAMC.¹¹⁴ OIC uses the assets owned by OIAMC in managing water supply services pursuant to a service agreement between OIC and OIAMC.¹¹⁵ OIC operates and maintains infrastructure owned by Water Corporation, including the M1 Supply Channel, pursuant to an operations and maintenance agreement between OIC and Water Corporation (maintenance agreement).¹¹⁶ Under the maintenance agreement, OIC pays all operations and maintenance costs of the M1 Supply Channel, including asset upgrades and renewals. In the 2019 financial year, OIC incurred costs of \$435,754.64 in maintaining the M1 Supply Channel.¹¹⁷

66 OIC employs staff to maintain OIAMC and Water Corporation assets and infrastructure.¹¹⁸ The only assets held by OIC that are used directly in managing water supply services are:

- the Supervisory Control and Data Acquisition (SCADA) system, which Mr Dear describes as 'control system architecture',¹¹⁹ and which has been used by

¹¹¹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [4].

¹¹² Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [5].

¹¹³ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [8].

¹¹⁴ Applicant's statement of issues, facts and contentions dated 5 June 2019 (Exhibit 2) Facts [3].

¹¹⁵ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [13].

¹¹⁶ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [16].

¹¹⁷ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [18].

¹¹⁸ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [20].

¹¹⁹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [11].

OIC to 'close the system'¹²⁰ and thereby achieve very significant distribution efficiency improvements discussed below; and

- machinery such as vehicles, excavators, a loader and a grader.¹²¹

67 Under Licence 3 and WL37, and using OIAMC and Water Corporation assets, OIC supplies water to an area of 15,031 hectares of agricultural land in Ord Stage 1.¹²² As indicated at [36] above, most of the water diverted by OIC under Licence 3 is diverted at the M1 offtake for conveyance via the M1 Supply Channel to Ivanhoe Plain to the north and about 10% - 12% is diverted at the Packsaddle Pump Station for conveyance to Packsaddle Plain to the south. As at August 2019, OIC supplied water to 99 member properties and 11 non-member properties in Ord Stage 1.¹²³ Under OIC's Rules, OIC members are entitled to an allocation of water as determined by the OIC Board, which has been set at 17 megalitres (ML) per hectare (at the farm gate) since 1996.¹²⁴ OIC's non-member customers are landowners whose properties are too small to entitle them to become members of OIC. The non-member customers are required to purchase 12 ML of water per hectare annually, whether they use the water or not.¹²⁵ Water is gravity fed by OIC to its members and non-member customers in Ord Stage 1 'through a series of earth lined, open air supply channels with flow regulators and monitors positioned at critical junctures'.¹²⁶

Cost of water

68 OIC is required to pay for the storage and delivery of water pursuant to a water access agreement entered into on 29 June 2016 with Water Corporation (water access agreement).¹²⁷ Under the water access agreement, OIC pays a bulk water charge to Water Corporation for the full volume of its annual water entitlement (335 GL¹²⁸), irrespective of

¹²⁰ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [59].

¹²¹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [11].

¹²² Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [33].

¹²³ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [23].

¹²⁴ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [21] and [26].

¹²⁵ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [31].

¹²⁶ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [32].

¹²⁷ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [36].

¹²⁸ On 3 December 2015, the Tribunal granted an interim mandatory injunction, under s 90 of the SAT Act, stating that, until further order, 'the annual water entitlement referred to in condition 2 [of Licence 3] is [335 GL]'.

whether OIC uses all of its allocation. As at September 2019, the cost of water to OIC is \$1.47 per ML.¹²⁹

69 OIC members pay OIC for water by means of a fixed service charge, a volumetric charge, an OIAMC asset levy, and a pumping surcharge, plus any additional levies. As at September 2019, these charges equate to \$362.67 per irrigated hectare (plus additional levies, for example, to cover OIC's legal costs).¹³⁰

70 OIC does not have control over how the water it supplies to members and non-member customers is used. OIC 'does not insist upon, oversee, or prescribe the types of crops that may be grown, or farming methods or practices that may be used by farmers who use OIC water' and neither members nor non-member customers 'are required to explain the purpose of water delivery requests'.¹³¹

Investment by OIC and improvement in distribution efficiency

71 As Mr Dear explained, the term 'distribution efficiency' is 'a measure of how much of the water that is diverted from Lake Kununurra is delivered to farms' and is 'expressed as a percentage of the volume of water supplied to farms divided by the volume of water diverted from Lake Kununurra'.¹³²

72 Since 1996, OIC has invested in excess of \$4.05 million to improve the distribution efficiency with which water is conveyed from the diversion points to the point of farm off-take, including in relation to the M1 Supply Channel, which, as indicated earlier, remains in State (Water Corporation) ownership. This cost excludes OIAMC's investments in infrastructure, such as updating a number of gates to reduce leakage, and OIC's investment in staff requirements to operate the SCADA system.¹³³

73 The bulk of OIC's \$4.05 million investment was made during the period 2005 to 2011. A major part of this investment involved installation of the SCADA system, which was done progressively between 2004 and 2008. Mr Dear's employment with OIC commenced in December 2006 when he was 'the person responsible for the SCADA system operation and maintenance'.¹³⁴ Mr Dear expressed the opinions,

¹²⁹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [38].

¹³⁰ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [40].

¹³¹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [41].

¹³² Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [55].

¹³³ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [57].

¹³⁴ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [59].

based on his experience, which were not questioned or contradicted and which we accept, that the full capabilities of the SCADA system became operational in 2008 and 'the greatest improvement in distribution efficiency in Stage 1 ... occurred by closing the system, which was not possible without the SCADA system'.¹³⁵ As Mr Dear explained, 'closing the system' involved 'closing the wasteways and better matching water supply with water demand, including altering the water flow through the M1 [Supply] Channel, which can now occur multiple times per day whereas previously it only occurred once per day'.¹³⁶

74 As a result of OIC's significant financial investment, including the installation of the SCADA system, which enabled 'closing the system' by closing the wasteways and better matching water supply with water demand, OIC achieved a very significant improvement in distribution efficiency from 56% in 2007 to an average of 76% over the 10 years from 2009 to 2018.¹³⁷

75 OIC continues to incur maintenance costs in relation to much of its \$4.05 million investment made during the period 2005 to 2011.¹³⁸

Historical underutilisation of annual water entitlement by OIC

76 It is common ground that OIC has historically underutilised its annual water entitlement of 335 GL in Licences 1, 2 and 3.¹³⁹ Although, during the 'water years' reported in OIC's annual reports between 2003 and 2007,¹⁴⁰ the percentage of the annual water entitlement diverted by OIC was 93% (312.1 GL), 92% (306.6 GL), 81% (270.6 GL) and 79% (263.3 GL), respectively, in 2008 (which was the year in which the 'full capabilities of the SCADA system became operational'¹⁴¹), the percentage of the annual water entitlement diverted by OIC reduced to 51% (169.6 GL).¹⁴² During the 11 years between 2008 and 2018, the percentage of the annual water entitlement diverted

¹³⁵ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [59].

¹³⁶ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [59].

¹³⁷ See [244] and [252]-[257] below.

¹³⁸ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [58].

¹³⁹ On 3 December 2015, the Tribunal granted an interim mandatory injunction, under s 90 of the SAT Act, stating that, until further order, 'the annual water entitlement referred to in condition 2 [of Licence 3] is [335 GL]'.¹⁴⁰

¹⁴⁰ 1 November 2003 to 31 October 2004, 1 November 2004 to 31 October 2005, 1 November 2005 to 31 October 2006 and 1 January 2007 to 31 December 2007.

¹⁴¹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [59].

¹⁴² Respondent's statement of issues, facts and contentions dated 10 May 2019 (Exhibit 1) [27] and applicant's statement of issues, facts and contentions dated 5 June 2019 (Exhibit 2) Response to the respondent's statement [27].

by OIC under its relevant Surface Water Licence for Ord Stage 1 ranged from 41% (138.3 GL) (2013) to 57% (191.7 GL) (2018). In her evidence, Ms Pawley, and in its contention, the respondent, focussed on this 11 year period as justifying recoupment of unused water from OIC. Ms Pawley noted that, during this period, OIC diverted an average of 162 GL per year, which is only 48% of the annual water entitlement of 335 GL, and expressed the opinion that 'OIC has never needed more than 191.7 [GL] per year and a licence of 243.8 [GL] per year would have been more than sufficient to meet OIC's diversions between 2008-2018'.¹⁴³ However, in 2019, OIC diverted 248.4 GL for Ord Stage 1, which is 74% of the annual water entitlement of 335 GL.¹⁴⁴ The following table sets out the volume of water and the percentage of the annual water entitlement diverted by OIC for Ord Stage 1 each year between 2008 and 2019.¹⁴⁵

**Water diverted by OIC for Ord Stage 1 under Licences 1, 2 and 3
2008 - 2019**

Year	Volume of water diverted (GL)	Percentage of annual water entitlement of 335 GL¹⁴⁶ diverted
2008	169.6	51%
2009	182.5	54%
2010	157.2	47%
2011	152.6	46%
2012	146.1	44%
2013	138.3	41%
2014	142.9	43%
2015	188.3	56%
2016	169.1	48%

¹⁴³ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) page 33.

¹⁴⁴ Respondent's further supplementary bundle of documents dated 5 March 2019 (Exhibit 36) and ts 747, 10 March 2020 (Dr Ruprecht and Ms Pawley). On 3 December 2015, the Tribunal granted an interim mandatory injunction, under s 90 of the SAT Act, stating that, until further order, 'the annual water entitlement referred to in condition 2 [of Licence 3] is [335 GL]'.¹⁴⁶

¹⁴⁵ The table is based on information in Figure 2 in the witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) page 33, the respondent's further supplementary bundle of documents dated 5 March 2019 (Exhibit 36) and ts 747, 10 March 202 (Dr Ruprecht and Ms Pawley).

¹⁴⁶ On 3 December 2015, the Tribunal granted an interim mandatory injunction, under s 90 of the SAT Act, stating that, until further order, 'the annual water entitlement referred to in condition 2 [of Licence 3] is [335 GL]'.¹⁴⁶

2017	143.8	43%
2018	191.7	57%
2019	248.4	74%

77 As the table set out immediately above indicates, there was a significant increase in the volume of water diverted by OIC for Ord Stage 1 under Licence 3 in 2019. The amount of water diverted by OIC for Ord Stage 1 in 2019 was:

- 56.7 GL or approximately 30% more than the volume of water diverted by OIC for Ord Stage 1 in the preceding year (2018);
- 104.6 GL or approximately 73% more than the volume of water diverted by OIC for Ord Stage 1 two years before (2017); and
- 86.4 GL or approximately 53% more than the average of 162 GL per year diverted by OIC for Ord Stage 1 over the 11 year period 2008 to 2018, which was the period focussed on by Ms Pawley, in her evidence, and by the respondent, in its contention, as justifying recoupment of unused water from OIC.

Legal framework and principles

Statutory requirement for a licence to take water

78 The management, use and protection of water resources within the State is regulated by the provisions of the RIWI Act. Under s 5A of the RIWI Act, '[t]he right to the use and flow, and to the control, of the water at any time in any ... watercourse; or ... wetland; or ... underground water source, ... vests in the Crown[,] except as allocated under [the RIWI] Act or another written law'. Relevantly, a 'watercourse' is defined in s 3(1) of the RIWI Act to mean 'any river, creek, stream or brook in which water flows', and 'any collection of water (including a reservoir) into, through, or out of which' those surface waters flow. The definition of 'watercourse' extends to any place where water flows that is prescribed to be a watercourse. It is

immaterial that a watercourse has been diverted from its natural course or may have been artificially improved or altered.¹⁴⁷

79 It is an offence to take water from any watercourse, except under, and in accordance with, a licence granted by the Minister under s 5C(1)(d) of the RIWI Act (licence to take water) or a right conferred by the RIWI Act or another written law. The term 'take' is defined in s 2(1) of the RIWI Act as follows:¹⁴⁸

take, in relation to water, means to remove water from, or reduce the flow of water in, a watercourse, wetland or underground water source, including by –

- (a) pumping or siphoning water; or
- (b) stopping, impeding or diverting the flow of water; or
- (c) releasing water from a wetland; or
- (d) permitting water to flow under natural pressure from a well; or
- (e) permitting stock to drink from a watercourse or wetland,

and includes storing water during, or ancillary to, any of those processes or activities[.]

80 Section 28(1) of the RIWI Act provides that the Governor may, on the recommendation of the Minister, by Order in Council, 'constitute any defined part of the State an Irrigation District for the purposes of [the RIWI] Act'. As indicated earlier, the ORIA was designated as an 'irrigation district' under s 28 of the RIWI Act on 13 July 1962.¹⁴⁹ Under s 5C(2)(a) of the RIWI Act, the requirement to hold a licence to take water applies to a watercourse to which Div 1B of the RIWI Act applies, being a watercourse that is situated within the boundaries of an irrigation district. As indicated earlier, under Licence 3 (and previously under Licences 1 and 2), OIC diverts water from the Main Ord subarea at Lake Kununurra above the Kununurra Diversion Dam at the M1 offtake for conveyance via the M1 Supply Channel to Ivanhoe Plain and at the Packsaddle Pump Station for conveyance to Packsaddle Plain. As Lake Kununurra is a 'watercourse', within the meaning of the RIWI Act, which is located within an 'irrigation district', constituted

¹⁴⁷ Section 3(2)(c) of the RIWI Act.

¹⁴⁸ Original emphasis.

¹⁴⁹ Respondent's statement of issues, facts and contentions dated 10 May 2019 (Exhibit 1) [14] and applicant's statement of issues, facts and contentions dated 5 June 2019 (Exhibit 2) Response to respondent's statement [14].

under s 28 of the RIWI Act, OIC requires a licence to take water under s 5C of the RIWI Act.

81 Section 4(3) of the RIWI Act requires the Minister (and the Tribunal on review) to seek to ensure that the objects stated in s 4(1) of the RIWI Act are achieved when exercising a function under Pt III of that Act, including a decision as to whether to grant or refuse a licence to take water and, if a licence is granted, as to what terms, conditions and restrictions are to be included in the licence. Section 4 of the RIWI Act provides as follows:¹⁵⁰

- (1) The objects of this Part are —
 - (a) to provide for the management of water resources, and in particular —
 - (i) for their sustainable use and development to meet the needs of current and future users; and
 - (ii) for the protection of their ecosystems and the environment in which water resources are situated, including by the regulation of activities detrimental to them;
 - and
 - (b) to promote the orderly, equitable and efficient use of water resources; and
 - (c) to foster consultation with members of local communities in the local administration of this Part, and to enable them to participate in that administration; and
 - (d) to assist the integration of the management of water resources with the management of other natural resources.
- (2) The reference to *use and development* in subsection (1)(a)(i) includes use and development for domestic, commercial, recreational, cultural and navigational purposes.
- (3) The Minister is to seek to ensure that the objects stated in subsection (1) are achieved, and other persons are to do so to the extent that they have relevant functions under this Part.

¹⁵⁰ Original emphasis.

82 Section 5C(3) of the RIWI Act provides that Sch 1 to the RIWI Act 'has effect to make provision for and in relation to' a licence to take water.

Power of the Minister to grant, renew and amend a licence to take water

83 The application process for a licence to take water and licensing decisions by the Minister are governed by Div 2 of Sch 1 to the RIWI Act. Clause 7(1) of Sch 1 to the RIWI Act provides that the grant or refusal of an application for a licence to take water and the terms, conditions and restrictions to be included in a licence are 'at the discretion of the Minister'. Clause 7(2) of Sch 1 to the RIWI Act provides that, in exercising this discretion, the Minister is 'to have regard to all matters that the Minister considers relevant', including whether the proposed taking and use of water:

- (a) are in the public interest; or
- (b) are ecologically sustainable; or
- (c) are environmentally acceptable; or
- (d) may prejudice other current and future needs for water; or
- (e) would, in the opinion of the Minister, have a detrimental effect on another person; or
- (f) could be provided for by another source; or
- (g) are in keeping with —
 - (i) local practices; or
 - (ii) a relevant local by-law; or
 - (iii) a plan approved under Part III Division 3D Subdivision 2; or
 - (iv) relevant previous decisions of the Minister;or
- (h) are consistent with —
 - (i) land use planning instruments; or
 - (ii) the requirements and policies of other government agencies; or
 - (iii) any intergovernmental agreement or arrangement.

84 The expression 'public interest' in cl 7(2)(a) of Sch 1 to the RIWI Act is defined in cl 1 of Sch 1 to the RIWI Act to mean 'public interest having regard to any economic, social or recreational benefits to the public, or to a section of the public'. The meaning of the expression 'public interest' is broad in scope and 'imports a discretionary value judgment to be made by reference to undefined factual matters confined only by the subject matter, scope and purpose of the statute in question'.¹⁵¹

85 The 'objects' (or purpose) of Pt III of the RIWI Act ('Control of water resources'), which are relevant to delineating the scope of the expression 'public interest' under cl 7(2)(a) of Sch 1 to the RIWI Act, are, as indicated earlier, set out in s 4(1) of the RIWI Act. One of the objects stated in s 4(1) of the RIWI Act is to provide for the 'sustainable use and development [of water resources] to meet the needs of current and future users'.¹⁵² The expression 'use and development' is defined in s 4(2) of the RIWI Act to include, relevantly, 'use and development for ... commercial ... purposes'. Another object stated in s 4(1) of the RIWI Act is 'to promote the orderly, equitable and efficient use of water resources'.¹⁵³ A further object stated in s 4(1) of the RIWI Act is to provide for 'the protection of [water-dependant] ecosystems and the environment in which water resources are situated, including by the regulation of activities detrimental to them'.¹⁵⁴ The respondent does not contest that the taking and use of water by OIC under Licence 3 is 'ecologically sustainable' and 'environmentally acceptable', for the purposes of cl 7(2)(b) and cl 7(2)(c) of Sch 1 to the RIWI Act, respectively.¹⁵⁵

86 The discretion afforded to the Minister under cl 7(1) of Sch 1 to the RIWI Act is expressly subject to cl 8 of Sch 1, which provides that '[t]he Minister must refuse to grant a licence to a person if the Minister considers that the person would not be willing or able to comply with the terms, conditions and restrictions that would be included in the licence'. Also, the Minister may only grant a licence to a person who is 'eligible' under cl 3 of Sch 1 to hold a licence. There is no dispute that OIC is willing (other than in respect of the matters it seeks review of,

¹⁵¹ *ICM Agriculture Pty Ltd v Commonwealth* [2009] HCA 51; (2009) 240 CLR 140; (2009) 170 LGERA 373 [20] citing *O'Sullivan v Farrer* [1989] HCA 61; (1989) 168 CLR 210, 216. See also *Water Conservation and Irrigation Commission (NSW) v Browning* [1947] HCA 21; (1947) 74 CLR 492, 505.

¹⁵² Section 4(1)(a)(i) of the RIWI Act.

¹⁵³ Section 4(1)(b) of the RIWI Act.

¹⁵⁴ Section 4(1)(a)(ii) of the RIWI Act.

¹⁵⁵ Respondent's closing submissions dated 11 March 2020 [195].

referred to at [3] above) and able to comply with the terms, conditions and restrictions included in Licence 3 and is eligible to hold a licence to take water.

87 Clause 7(5) of Sch 1 to the RIWI Act states as follows:

Without limiting subclause (1), terms, conditions and restrictions prescribed or imposed for the purposes of that subclause may relate to any matter provided for by the Appendix to this Schedule.

88 The matters to which licence terms, conditions and restrictions may relate in the Appendix to Sch 1 to the RIWI Act include the 'taking, use or disposal of water'.¹⁵⁶

89 Division 5 of Sch 1 to the RIWI Act (which comprises cl 22) governs the 'renewal' of a licence to take water. Clause 22(2) of Sch 1 to the RIWI Act provides that, on an application for renewal of a licence to take water, 'the licence is to be renewed unless' one of the circumstances set out in cl 22(2)(a)-(e) prevail.¹⁵⁷ Clause 22(2) of Sch 1 to the RIWI Act states as follows:

On an application for renewal of a licence, the licence is to be renewed unless —

- (a) the renewal would be inconsistent with —
 - (i) a relevant local by law; or
 - (ii) a plan approved under Part III Division 3D Subdivision 2;
- or
- (b) the Minister is of the opinion that, if the application for renewal was an application for the grant of a licence, the Minister would exercise the discretion under clause 7(2) to refuse to grant the licence; or
- (c) it is a term of the licence that it is not renewable; or
- (d) a term, condition or restriction included in the licence has not been complied with; or
- (e) in the opinion of the Minister there are sufficient grounds for the exercise of the power to cancel the licence under clause 25.

¹⁵⁶ Clause 1 in Appendix 1 to Sch 1 to the RIWI Act.

¹⁵⁷ *Ord Irrigation Cooperative Ltd v Department of Water* [118].

90 It is common ground that none of the circumstances set out in
cl 22(2)(a)-(e) of Sch 1 to the RIWI Act prevail, and that consequently
'the licence is to be renewed', subject to the inclusion of relevant and
appropriate terms, conditions and restrictions.

91 Clause 22(5) of Sch 1 to the RIWI Act provides that a licence
which would otherwise expire after an application has been made for its
renewal, but before the Minister has made a decision as to that renewal,
'remains in force until that decision is made'.

92 Clause 22(3)(b) of Sch 1 to the RIWI Act provides that where the
Minister proposes 'to renew a licence subject to the inclusion of a term,
restriction or condition that the Minister considers is inconsistent with
the terms of the application for renewal', sub-clauses 6(2), (3) and (4) of
Sch 1 to the RIWI Act apply 'in the same way as they apply to an
application for a licence'. Where cl 6 of Sch 1 to the RIWI Act applies,
the Minister must notify the applicant of the Minister's proposal,
provide the applicant with an opportunity to make written submissions
(or be heard by a person designated by the Minister for that purpose),
and have regard to any submissions made by the applicant before the
Minister makes a final decision.

93 In *Ord Irrigation Cooperative Ltd v Department of Water*,
the Court of Appeal held at [64] that, understood in its statutory
context, 'the reference to renewal is clearly to the grant of a new licence
for an additional period', and that '[a]s the renewed licence is a new
licence, rather than an extension of an existing licence which remains in
force for an extended term, there is no occasion for cl 22(3)(b) to refer
to the variation of an existing condition'. Rather, '[a]ll conditions of the
renewed licence are imposed, or 'included' in the new licence, when it is
granted'.

94 In addition to the power of the Minister to renew a licence to take
water under cl 22(2) of Sch 1 to the RIWI Act, the Minister has power,
under Div 6 of Sch 1 to the RIWI Act (which comprises cl 23 - cl 27),
to amend a licence. The Minister may 'vary the duration of a licence'
under cl 24(1)(a) of Sch 1 to the RIWI Act. The Minister may also
'vary, add or remove any term, condition or restriction' included in a
licence under cl 24(1)(b) of Sch 1 to the RIWI Act. However, the
Minister may only exercise a power under cl 24(1) of Sch 1 to the
RIWI Act in the circumstances set out in cl 24(2)(a)-(g) of Sch 1,
including if, 'in the opinion of the Minister, the quantity of water that

may be taken under the licence has consistently not been taken'.¹⁵⁸ Clause 39 of Sch 1 to the RIWI Act provides that compensation is payable in certain circumstances where a person suffers damage due to the exercise of the Minister's powers. However, compensation is not payable in respect of the exercise of a power by the Minister to vary, add or remove any term, condition or restriction included in a licence where, in the opinion of the Minister, the quantity of water that may be taken under the licence has consistently not been taken.¹⁵⁹

95 Furthermore, before varying a licence to take water under cl 24(1) of Sch 1 to the RIWI Act, the Minister must (except where the licensee consents to the variation) notify the licensee of the proposed variation, provide the licensee with an opportunity to make written submissions (or be heard by a person designated by the Minister for that purpose), and have regard to any submissions made by the licensee before making a final decision.¹⁶⁰

Scope of the Minister's power to impose terms, conditions and restrictions

96 Division 3 of Sch 1 to the RIWI Act (which comprises cl 15 - cl 18) governs the terms, conditions and restrictions that may be included in a licence to take water. Clause 15(1) of Sch 1 to the RIWI Act provides that regulations made under the RIWI Act may prescribe terms, conditions and restrictions that are 'to be taken to be included in' licences. However, no such regulations have been made. Clause 15(2) of Sch 1 to the RIWI Act provides that '[t]he Minister may, at the Minister's discretion, include in a licence any term, condition or restriction additional to those referred to in subclause (1), but [cl] 7(2) applies to the exercise of that discretion'. Under cl 7(2) of Sch 1 to the RIWI Act, the Minister is required to have regard 'to all matters that the Minister considers relevant', including the mandatory relevant considerations set out in cl 7(2)(a)-(h) of Sch 1.

97 In *Ord Irrigation Cooperative Ltd v Department of Water*, the Court of Appeal identified cl 15(2) of Sch 1 to the RIWI Act as the source of power to include terms, conditions and restrictions on the renewal of an expiring licence to take water. The Court of Appeal observed and held in *Ord Irrigation Cooperative Ltd v Department of Water* at [66] as follows:

¹⁵⁸ Clause 24(2)(d) of Sch 1 to the RIWI Act.

¹⁵⁹ This is because the exercise of a power under cl 24(2)(d) of Sch 1 to the RIWI Act is not referred to in cl 39(1)(c) of Sch 1 to the RIWI Act.

¹⁶⁰ Clause 26(4) and 26(6) of Sch 1 to the RIWI Act.

Clause 15 does not confine the power to include terms, conditions and restrictions to the point at which the first licence is granted. Clause 15 would be redundant if it were so confined, as cl 7(1) makes provision at that point. Clause 15(2) empowers the Minister to include terms, conditions and restrictions at the point of renewal as well as at the point of grant of a licence. In either case, the inclusion of the terms, conditions and restrictions is at the Minister's discretion. In exercising the discretion, the Minister is required to have regard to the mandatory relevant considerations identified in cl 7(2)(a) - (h) of sch 1 to the Act. Otherwise, the Minister is to have regard to all matters that the Minister considers relevant.

98 In relation to the exercise of power under cl 15(2) of Sch 1 to the RIWI Act, the Court of Appeal observed and held in *Ord Irrigation Cooperative Ltd v Department of Water* at [68] as follows:¹⁶¹

It may be that one of the matters which the Minister will consider relevant when exercising the power conferred by cl 15(2) in respect of a renewed licence is the terms, conditions and restrictions to which the former licence was subject. However, the broad terms in which the power is expressed in cl 15(2), read with cl 7(2), is inconsistent with the Minister being bound to include the same conditions in the new licence as were included in the expiring licence. The concept of 'renewal', in an appropriate context, can include renewal on different terms and conditions from those included in an expiring instrument. Clause 22(3)(b) makes it clear that 'renewal' under cl 22 may be on different terms, conditions and restrictions than those contained in an expiring licence. Clause 15 gives the power to include different terms, conditions and restrictions on renewal of an expiring licence.

99 Clause 15(3) of Sch 1 to the RIWI Act provides that, without limiting cl 15(1) or cl 15(2), terms, conditions and restrictions prescribed or imposed for the purposes of those provisions may relate to any matter provided for by the Appendix to Sch 1 to the RIWI Act. As indicated earlier, the matters to which licence terms, conditions and restrictions may relate in the Appendix to Sch 1 to the RIWI Act include the 'taking, use or disposal of water'. The Court of Appeal held in *Ord Irrigation Cooperative Ltd v Department of Water* at [70] that '[t]he amount of water which may be taken under [a] licence can be the subject of a term, condition or restriction included in a licence which is granted or renewed under the [RIWI] Act'. That is, cl 15(2) of Sch 1 to the RIWI Act empowers the Minister (and the Tribunal on review) to include terms, conditions and restrictions in a licence to take water relating to the amount of water that may be taken at both the point of grant of a licence and at the point of renewal of a licence. Furthermore,

¹⁶¹ Citation omitted.

as the Court of Appeal also held in *Ord Irrigation Cooperative Ltd v Department of Water* at [70], cl 15(2) of Sch 1 to the RIWI Act empowers the Minister (and the Tribunal on review) 'to reduce the annual water entitlement of a licence granted under s 5C of the [RIWI] Act when deciding to renew the licence', as that provision 'authorises the Minister [(and the Tribunal on review)] to include in the renewed licence terms, conditions and restrictions which are different from those included in the expiring licence'.

100 Clause 7(2) of Sch 1 to the RIWI Act applies to the exercise of the Minister's (and the Tribunal's) discretion under cl 15(2) of Sch 1. It follows that the matters referred to in cl 7(2)(a)-(h) of Sch 1 to the RIWI Act are mandatory relevant considerations to which the Minister (and the Tribunal on review) must have regard when the discretion under cl 15(2) of Sch 1 is exercised.¹⁶² Otherwise, the Minister (and the Tribunal on review) is to have regard to all matters that the Minister (or the Tribunal) considers relevant in exercising the discretion.¹⁶³

101 It is common ground that the imposition of an annual water entitlement is an appropriate term, condition or restriction to be included in the renewed licence to take water sought by OIC (Licence 3). The issue in dispute between the parties is the amount of water that should be specified as the annual water entitlement in Licence 3.

Role of OIC as a water service provider

102 As indicated earlier, OIC holds a water service provider licence (WL37) under the WS Act. Under the terms of WL37, OIC is authorised to provide non-potable water supply and irrigation services within its operating area. It is common ground that OIC's obligations under the WS Act are separate to, and distinct from, its obligations as the holder of a licence to take water under the RIWI Act (Licence 3).

SAT's review jurisdiction and powers

103 Under s 26GG(1) of the RIWI Act, an applicant for the grant or renewal of a licence to take water, who is 'aggrieved by a decision of the Minister under [Sch 1 to the RIWI Act]', relevantly, 'as to any term, condition or restriction included in a licence',¹⁶⁴ may apply to the Tribunal for a review of the decision. As indicated earlier,

¹⁶² *Ord Irrigation Cooperative Ltd v Department of Water* [66].

¹⁶³ *Ord Irrigation Cooperative Ltd v Department of Water* [66].

¹⁶⁴ Section 26GG(1)(c) of the RIWI Act.

the reviewable decision in this case was made by an officer of the Department acting as the Minister's delegate. Under s 104(1)(b) of the *Water Agencies (Powers) Act 1984* (WA) (Powers Act), the Minister may delegate any power or duty under the RIWI Act to an officer of the Department.¹⁶⁵ It is not in dispute that the power of the Minister to make the reviewable decision was delegated under s 104(1)(b) of the Powers Act to the officer who made the reviewable decision in this case.

104 Under s 17(1) of the SAT Act, the application for review commenced by OIC on 10 September 2015 under s 26GG(1)(c) of the RIWI Act, seeking review of the annual water entitlement of 225 GL specified in Licence 3 and the Annexure referred to in term, condition or restriction 3 of Licence 3, comes within the Tribunal's 'review jurisdiction'. In exercising its review jurisdiction, the Tribunal is required, by s 18(1) of the SAT Act, 'to deal with a matter in accordance with [the SAT] Act and the enabling Act', relevantly the RIWI Act.

105 In *Ord Irrigation Cooperative Ltd v Department of Water*, the Court of Appeal reviewed the provisions of the SAT Act concerning the nature of these review proceedings (s 27 of the SAT Act) and the Tribunal's powers in this review (s 29 of the SAT Act) at [121]-[124] as follows:

121 Section 26GG(1)(c) of the Act allowed OIC to apply to the Tribunal for a review of the decision to include that term, condition or restriction in Licence 3. Section 27(1) of the SAT Act required that the Tribunal's review of that decision be by way of a hearing de novo. In the context of the SAT Act, the phrase 'hearing de novo' bears its ordinary meaning recently described in *Forrest & Forrest Pty Ltd v Minister for Mines and Petroleum* [[2018] WASCA 32]:

An appeal by way of hearing de novo involves a fresh hearing, and the appellate body may overturn the decision appealed from regardless of error. It is an exercise of original, not appellate, jurisdiction. Where the statutory provision indicates that the appellate body is required to 'make such order as it thinks fit', this is an indication that the appellate body's powers are not constrained by the need to identify error on the part of

¹⁶⁵ The RIWI Act is designated as 'a relevant Act', for the purposes of s 104(1) of the Powers Act, under s 5(1)(c) of the Powers Act.

the decision-maker, but, rather, it is obliged to give its own decision on the evidence before it.

122 Under s 27(1) of the SAT Act the Tribunal is not confined to matters that were before the Minister. The Tribunal's review may involve the consideration of new material (whether or not it existed at the time the decision was made). Under s 27(2) of the SAT Act, the purpose of the review is to 'produce the correct and preferable decision at the time of the decision upon the review'. Under s 27(3), the Tribunal's review is not limited by the reasons for decision provided by the Minister. These provisions make it plain that the applicant for review does not bear any legal or practical onus of identifying error in the Minister's decision, or showing that there should be some departure from that decision.

123 Under s 29(1) of the SAT Act, in exercising its review jurisdiction the Tribunal had the functions and discretions corresponding to those exercisable by the Minister in making the reviewable decision. In that manner, the limits on the Minister's power to include terms, conditions and restrictions governed the exercise of the Tribunal's review jurisdiction. Although s 29(1) does not limit the powers given by the SAT Act or the [RIWI] Act to the Tribunal, [see s 29(2) of the SAT Act] the powers of the Tribunal to affirm, vary or set aside the Minister's decision, conferred by s 29(3) of the SAT Act, must be exercised by reference to the limits on the Minister's power to include terms, conditions or restrictions in the licence. The Minister's decision as affirmed, varied or substituted by the Tribunal is to be regarded as, and given effect as, a decision of the Minister under the Act [s 29(5)(a) of the SAT Act]. These provisions of the SAT Act direct attention back to the limits of the Minister's power to include terms, conditions and restrictions under the Act. The Minister's power is not expressed in terms of an onus and does not provide for any starting point from which the Minister or Tribunal must be persuaded to depart.

124 In this statutory context, the function of the Tribunal was to consider the material before it and form its own view as to any appropriate annual water entitlement to be included in Licence 3. It was to do so having regard to the considerations identified in cl 7(2) of sch 1 to the Act. Neither OIC nor the respondent bore any legal or practical onus in relation to that matter.

106 Consequently, the function of the Tribunal in these proceedings is to consider the material before it and form its own view as to the appropriate annual water entitlement that should be specified in Licence 3. The Tribunal is to do so having regard to all matters it considers relevant, including the considerations identified in cl 7(2) of

Sch 1 to the RIWI Act. Neither party bears any legal or practical onus of proof in these proceedings.

Legal principles relating to the application of policy

107 There are two non-statutory policies adopted and published by the Department which contain provisions that are relevant to the determination of the 'correct and preferable decision' under s 27(2) of the SAT Act as to the annual water entitlement that should be specified in Licence 3, in the exercise of discretion under cl 15(2) of Sch 1 to the RIWI Act, in this case. The first is *Policy - Management of unused licenced [sic] water entitlements*,¹⁶⁶ which, although published in November 2019, was previously *Statewide Policy No 11 - Management of unused licensed water entitlements*, first published by the Department's predecessor, the Water and Rivers Commission, in November 2003.¹⁶⁷ Although this policy is no longer referred to by the Department as 'Statewide Policy No 11', as it is referred to as such and as 'SP 11' in the evidence and submissions in these proceedings, we will refer to it as 'SP 11' in these reasons. The second policy is OSWAP. We will review relevant provisions of SP 11 and OSWAP in the next section of these reasons.

108 In *More and Water and Rivers Commission* [2006] WASAT 112, the Tribunal¹⁶⁸ observed and held in relation to the application of provisions of non-statutory policies, such as SP 11 and OSWAP, in the same circumstances as in these proceedings, where the discretionary power to license the taking and use of water and the power to make a general policy to guide the exercise of that discretionary power are vested in the Department, at [33]-[36] as follows:

33 ... [T]he Commission made various submissions on the authority of *Re Drake and Minister for Immigration and Ethnic Affairs (No.2)* (1979) 2 ALD 634 at 636, 639 and 641 arguing that the Tribunal should have regard to the Policy and apply it unless the applicant can show cogent reasons for departing from the Policy to make the correct and preferable decision in his case.

34 We agree with the submissions made by the Commission and believe that their essential effect is well summarised by another passage from the judgement of Brennan J at 645 in that case.

¹⁶⁶ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1776-1798.

¹⁶⁷ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1016-1034.

¹⁶⁸ Justice Barker P and Mr A Gardner S Sess M.

Speaking as President of the Administrative Appeals Tribunal, his Honour said:

"When the Tribunal is reviewing the exercise of a discretionary power reposed in a Minister, and the Minister has adopted a general policy to guide him in the exercise of the power, the Tribunal will ordinarily apply that policy in reviewing the decision, unless the policy is unlawful or unless its application tends to produce an unjust decision in the circumstances of the particular case. Where the policy would ordinarily be applied, an argument against the policy itself or against its application in the particular case will be considered, but cogent reasons will have to be shown against its application, especially if the policy is shown to have been exposed to parliamentary scrutiny."

35 In another passage earlier on the same page, his Honour explained what would be a cogent reason for not applying a general policy. "If it were shown that the application of ministerial policy would work an injustice in a particular case, a cogent reason would be shown, for consistency is not preferable to justice".

36 Brennan J's approach is applicable to the role of this Tribunal determining this case, where the discretionary power to licence [sic] the taking and use of water and the power to make a general policy are vested in the Commission. The Tribunal will apply the Policy unless the applicant can show cogent reasons for not accepting the Policy or for not applying it to his case. A similar approach has been adopted in relation to non-statutory policies in the application of town planning controls: see *Clive Elliott Jennings and Co Pty Ltd v Western Australian Planning Commission* [[2002] WASCA 276;] (2002) 122 LGERA 433 at [24] [(Barker J)].

109 As the Tribunal explained in the passage set out immediately above, a relevant provision of a non-statutory policy, such as SP 11 and OSWAP, is a relevant factor to be taken into consideration in, and will guide, the exercise of discretion of the decision-maker. The Tribunal will apply a relevant provision of SP 11 or OSWAP in the exercise of discretion, under cl 15(2) of Sch 1 to the RIWI Act, as to the annual water entitlement that should be specified in Licence 3, unless there is a cogent reason to depart from the application of the provision in the circumstances of the case. However, a relevant provision of a policy cannot replace the discretion of the decision-maker, and cannot be

inflexibly applied by a decision-maker, regardless of the merits of the particular case.¹⁶⁹

Policy framework

110 As we said earlier, SP 11 and OSWAP are non-statutory policies adopted and published by the Department, which contain provisions that are relevant to the determination of the 'correct and preferable decision' under s 27(2) of the SAT Act, in the exercise of discretion under cl 15(2) of Sch 1 to the RIWI Act, as to the annual water entitlement that should be specified in Licence 3 in this case. We will now review relevant provisions of these policies.

SP 11

111 We note that all of the provisions of SP 11 we refer to below were operative and in substantially the same terms at the time when, as we found earlier in these reasons,¹⁷⁰ OIC made the bulk of its significant investment to improve the distribution efficiency with which water is conveyed from the diversion points to the point of farm off-take, during the period 2005 to 2011, and when, as we find later in these reasons,¹⁷¹ OIC consequently achieved a very significant improvement in distribution efficiency from 56% in 2007 to an average of 76% over the 10 years from 2009 to 2018.¹⁷²

112 Clause 1.2 of SP 11 sets out the intent of the policy in the following terms:¹⁷³

The intent of this policy is to ensure that the water resources allocated are used effectively by:

- reducing unused licensed water entitlements to a minimum;
- ensuring that licensed water entitlements are fully utilised for the benefit of the licence holder, the community and the State;
- reducing speculation in water allocations; and

¹⁶⁹ *Clive Elliott Jennings & Co Pty Ltd v Western Australian Planning Commission* [2002] WASCA 276; (2002) 122 LGERA 433 [24]-[26] (Barker J) referring to *Falc Pty Ltd v State Planning Commission* (1991) 5 WAR 522; (1991) 74 LGRA 68 (Pidgeon, Nicholson and Ipp JJ). See also *Bestry Property Group Pty Ltd and Western Australian Planning Commission* [2019] WASAT 15; (2019) 96 SR (WA) 311 at [99] (Judge Parry DP and Mr P de Villiers M).

¹⁷⁰ See [72]-[73] above.

¹⁷¹ See [244] and [252]-[257] below.

¹⁷² The only substantive difference is that the Department has been substituted in place of the former Water and Rivers Commission.

¹⁷³ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1020-1021 and 1782-1783.

- ensuring that decisions on managing, and in some circumstances recouping, unused licensed water entitlements are fair and equitable.

The policy also seeks to address community concern that licensees may be granted access to large volumes of water without having the intention of using their water entitlements within a reasonable timeframe and be given windfall gains should they later trade their unused water entitlements.

113 Clause 1.4 of SP 11 refers to the application of the policy and states as follows:¹⁷⁴

This policy applies Statewide to all licences to take water granted under the *Rights in Water and Irrigation Act, 1914*, by the [D]epartment.

This policy only applies to water entitlements that were granted by the [D]epartment. It does not apply to:

- water entitlements that have been purchased (traded); or
- *unused water entitlements that are a result of investment in water use efficiency.*

It overrides any earlier policy or practices that were adopted by the [D]epartment in managing unused licensed water entitlements.

The policy may be complemented by future by-laws or rules developed for specific areas by Water Resource Management Committees.

114 Clause 2.1 of SP 11 defines the expression 'unused water entitlement' in terms which include the following:¹⁷⁵

The [D]epartment considers that an unused water entitlement is that part or all of the licensed annual water entitlement that has not been taken (used) for more than three consecutive years, unless otherwise specified in licence conditions or operating strategies or agreed development timeframes.

...

115 Clause 3 of SP 11 sets out the Department's Statewide policy for managing 'unused water entitlements' in the following terms:¹⁷⁶

¹⁷⁴ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1021 and 1783 (emphasis added, other than to the short title of the RIWI Act, which is original). The meaning of the emphasised words is considered at [293] below.

¹⁷⁵ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1022 and 1784.

¹⁷⁶ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1023 and 1785 (original emphasis).

The [D]epartment will manage unused licensed water entitlements to ensure that entitlements are fully and effectively utilised. This will be achieved by seeking to reduce unused entitlements to a minimum, while ensuring that:

- the reasonable water requirements of the licensee are addressed;
- where possible, new applicants seeking access to a water resource are not unreasonably constrained in obtaining a water entitlement; and
- licensed water entitlements reflect actual water usages.

Where the licensee is able to clearly establish to the satisfaction of the [D]epartment that genuine extenuating circumstances have resulted in part or all of the licensed water entitlement not being used, the unused component of the entitlement may be retained for an agreed period.

The management of unused licensed water entitlements will be in accordance with Schedule 1 clause 24(2)(d) of the *RIWI Act* that states:

The Minister may vary any term, condition or restriction in the licence if in the opinion of the Minister, the quantity of water that may be taken under the licence has consistently not been taken.

The effective management of licensed water entitlements is necessary if the use of our water resources is to be optimised. It is essential for the development of the State that new development opportunities are not constrained due to existing licensees consistently not utilising part or all of their water entitlements granted by the [D]epartment.

However, in managing the unused water entitlements, the [D]epartment will have due regard for the licensee's water requirements and timeframes for completing their development. The [D]epartment will also consider any extenuating circumstances beyond the licensee's control that has not allowed completion of the approved development and use of all of the water entitlement.

As the volume of water entitlements granted approaches the sustainable limit for that area, the [D]epartment will become stricter when assessing these circumstances. This assessment will, in most cases, be against pre-determined criteria that are developed in partnership with local Water Resource Management Committees or Advisory Committees.

However, if unforeseen circumstances require immediate action during the term of a licence the [D]epartment may amend the licensed water entitlement.

The extent to which the retention of unused licensed water entitlements will be tolerated is dependent on the management response required and is related to the area allocation status.

116 Part 4 of SP 11 sets out the manner in which the Department implements the policy. Clause 4.4 of SP 11 applies to areas where licensed water entitlements are greater than 30%, but less than 70%, of the approved sustainable limit. As we found earlier,¹⁷⁷ as at August 2019, taking into account the volumes of water currently licensed and committed, the Main Ord subarea is 63% allocated. Consequently, cl 4.4 of SP 11 currently applies to the Main Ord subarea.¹⁷⁸ Clause 4.4 of SP 11 states, in part, as follows:¹⁷⁹

In areas where licensed water entitlements are greater than 30% but less than 70% of the approved sustainable limit, the [D]epartment:

- will not actively pursue the recovery of unused entitlements; and
- will not require licensees to establish extenuating circumstances as to why the approved development has not been implemented and the licensed water entitlement not fully utilised.

...

117 Finally, cl 4.11 of SP 11 concerns the application of the policy in circumstances where a licensee invests in water use efficiency which results in water conservation and, relevantly, unused water entitlements. The provisions in cl 4.11 of SP 11 emphasised in the quotation below are relied on by the applicant and form the basis of one of the three cogent reasons we find below to depart from the recoupment of unused water policy in OSWAP in the circumstances of this case. Clause 4.11 of SP 11 states as follows:¹⁸⁰

The [D]epartment supports the State Water Strategy in ensuring the delivery of ecologically sustainable development of our water resources. In line with this strategy and the community's expectations, the [D]epartment will not tolerate the wasting of water. Licensees wasting water to ensure they have used their full water entitlement run the risk of having their licence cancelled.

The [D]epartment will adopt a more stringent approach in managing water entitlements to ensure the water is used as efficiently as possible.

¹⁷⁷ See [39] above.

¹⁷⁸ As Ms Pawley acknowledges in her witness statement dated 9 September 2019 (Exhibit 41) [60].

¹⁷⁹ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1025 and 1787-1788.

¹⁸⁰ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1029-1030 and 1792-1793 (emphasis added).

In irrigated agriculture potential savings can arise from improved irrigation systems and management practices, providing benefits in terms of increase production, reduced environmental impacts and return flow.

Where a licensee has implemented efficiency methods and reduced the water requirements, the licensee will have the opportunity to sell or lease any water saved that is excess to requirements.

The Department will not recoup unused water entitlements that are a result of investment in water use efficiency. However, it is expected that the water saved will be utilised, either through trading or expansion of the existing operation.

The [D]epartment may take action to ensure the water saved is used, in particular where the demand for accessing the water resources is in excess of the sustainable limit. The licensee should take all reasonable actions to ensure the utilisation of the entitlement or run the risk of the [D]epartment recouping and re-distributing the water entitlement. Profits from the redistribution of these entitlements should be returned to the previous holder of the entitlement.

In the future, licences to take and use water may only be granted where the applicant has demonstrated that all water conservation and reuse options have been considered. Licences may also contain conditions requiring the development and implementation of water conservation strategies that would include the use of efficient systems.

OSWAP

118 Chapter Two of OSWAP is entitled 'What the plan will achieve' and includes, among other provisions, cl 2.1, which sets out the 'expected outcomes' of OSWAP, and cl 2.3, which sets out 'five key strategies to meet the resource objectives and deliver the outcomes'. Clause 2.1 of OSWAP states as follows:¹⁸¹

Outcomes are the broad ecological, social and economic consequences of our water resource management. The expected outcomes of this plan are:

- secure and reliable water supplies for a strong and expanding irrigation industry
- a healthy lower Ord River environment
- as much hydroelectricity production as possible, within the limits of the water needed by irrigators and the downstream environment

¹⁸¹ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1057.

- traditional Indigenous access, water-based tourism and recreational opportunities that complement the irrigation, environmental and power outcomes.

119 Clause 2.3 of OSWAP states as follows:¹⁸²

We have identified five key strategies to meet the resource objectives and deliver the outcomes. They are:

- issue licence entitlements within the allocation limits for each subarea
- manage water releases at the Ord River and Kununurra Diversion dams through this plan's release rules
- adjust releases over time as irrigation development proceeds
- adjust releases in periods of drought
- optimise the water available for new development and power generation by recouping unused water entitlements.

These strategies are described in detail in chapters 4 and 5.

120 Chapter Five of OSWAP is entitled 'Water licensing'. The key provisions of Chapter Five of OSWAP for the purposes of these proceedings are cl 5.2, which concerns licensing large-scale irrigation, and cl 5.7, which concerns licensing policies, including the relationship between Statewide policies, such as SP 11, and local licensing policies in OSWAP. The provisions in cl 5.2 of OSWAP emphasised in the quotation below are central to the determination of the correct and preferable decision as to the annual water entitlement that should be specified in Licence 3 in the exercise of discretion under cl 15(2) of Sch 1 to the RIWI Act. Clause 5.2 of OSWAP states, in part, as follows:¹⁸³

...

Changes to licensing as irrigation developments proceed

New irrigation developments around the current Stage 1 area and in the new M2 area will be drawing on the 750 GL/yr allocation limit for the Main Ord subarea. The [D]epartment will assess and grant new licence entitlements in stages, as each new irrigation area proceeds. This will maximise access to water for further irrigation expansion within the

¹⁸² Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1058.

¹⁸³ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1083-1084 (emphasis added).

allocation limit, and ensure power generation is not unnecessarily restricted before water is fully utilised for irrigation expansion.

For each new licence entitlement we will:

- *grant annual water entitlements to match justified crop needs and efficient water use for the area under irrigation*
- *recoup unused water from existing licensees at times of their licence renewal, or if necessary when we grant new licences for new developments*
- adjust water release rules and restrictions to maintain reliability.

Unused water entitlements will be recouped because maintaining reliability for unused entitlements would mean the storage level that triggers restrictions on electricity generation would be higher than it needs to be. We will make provision for reasonable changes in crop types from year to year, such as a move to higher-water-use crops. Also, savings made from efficiency gains above expected efficiency targets will not be recouped and can either be used to expand production or be traded.

...

This approach will optimise the 750 GL/yr allocation from the Main Ord subarea. ...

121 Clause 5.7 of OSWAP states as follows:¹⁸⁴

The [D]epartment uses policies to guide water licensing assessment and decisions. We develop strategic and operational policies that apply across the state as well as local licensing policies. Local licensing policies apply either because statewide policies do not address the local issues, or because an alternative approach is needed to better manage the local issue.

Local licensing policies

We have developed local licensing policies for the *Ord surface water allocation plan* (Table 8). These local policies provide additional specific guidance for managing licences in the Ord area and summarise the positions already discussed in this chapter. Where a local policy differs from a statewide policy, the local policy in this allocation plan is applied.

122 Table 8 of OSWAP sets out '[l]ocal licensing policy specific to the Ord plan area'. Local licensing policy 2.1, which appears under the

¹⁸⁴ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1096 (original emphasis).

heading 'Licence assessment', in Table 8 of OSWAP states as follows:¹⁸⁵

Policy group	Policy detail
Setting water entitlements and distribution efficiency targets for water service providers	The [D]epartment grants water entitlements to irrigation water service providers on the basis that overall water use will be efficient. The current water service provider has an 80 per cent distribution efficiency target. For new areas, an 85 per cent distribution efficiency target is appropriate given that Total Channel Control systems are being used in new areas. This will increase to 90 per cent once a balancing storage connected to the M2 channel is built.

123 Finally, local licensing policy 4.7, which appears under the heading 'Maximising water for use', in Table 8 of OSWAP states as follows:¹⁸⁶

Policy group	Policy detail
Water use, entitlements and recouping unused entitlements	To ensure full and efficient use of the resource, maximise development and reduce hydropower restrictions, the [D]epartment: <ul style="list-style-type: none"> • aims to grant water entitlements to match justified crop needs and efficient water use for the area under irrigation • will recoup water entitlements (part or full) that have never been used or have not been used for more than two consecutive years.

Section 5C licence tenure

124 Finally, the Department has adopted and published a policy *Section 5C licence tenure* (February 2015). This document is described in its text as a 'standard' and states in cl 1.2 that '[t]he intent of this standard' includes:¹⁸⁷

Implement a 10 year tenure for licences granted under [s] 5C of the [RIWI Act][.]

¹⁸⁵ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1097.

¹⁸⁶ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1100.

¹⁸⁷ Exhibit 10 page 1.

125 It is common ground that, having regard to the protracted history of these proceedings and consistently with the intent of this 'standard', the Tribunal should vary the decision made by the Minister's delegate by extending the duration of Licence 3 'to 10 years from the date of [the Tribunal's final] order'.¹⁸⁸

Issues for determination

126 The ultimate issue for determination in this proceeding is:

What is the 'correct and preferable decision', under s 27(2) of the SAT Act, as to the annual water entitlement that should be specified in Licence 3?

127 The applicant called Dr John Ruprecht and Mr Gregory Munck to give evidence. Dr Ruprecht holds a Bachelor of Engineering (Honours) degree and a Master of Engineering Studies degree from the University of Western Australia, a Master of Business Administration degree from Deakin University and a Doctor of Philosophy degree from Murdoch University,¹⁸⁹ and has over 28 years' experience in hydrology, water resource management and planning, irrigation development and management, and agricultural business planning. Mr Munck holds a Bachelor of Engineering (Civil) degree from the University of Queensland and a Diploma in Management from Deakin University, and has over 40 years' experience in the planning, design and operation of major infrastructure projects, including water supply infrastructure, with particular emphasis on large irrigation areas, including the ORIA over the past 23 years. In their joint statement in relation to water and irrigation policy issues, which resulted from a chaired pre-hearing conferral on 24 October 2019,¹⁹⁰ Dr Ruprecht, Mr Munck, Ms Worley and Ms Pawley agreed as follows in relation to 'methodology for calculating a licence volume for OIC':¹⁹¹

There are three main methodologies to determine a licence volume for OIC for the term of the licence (10 years):

- Option 1 - Recoup the unused portion of OIC's licenced [sic] water entitlement.

¹⁸⁸ Parties' proposed form of final orders filed on 27 March 2020.

¹⁸⁹ Thesis: *Impact of forest disturbance on Jarrah (Eucalyptus marginate) forest hydrology*.

¹⁹⁰ Chaired by Mr P de Villiers M.

¹⁹¹ Joint statement of expert witnesses in relation to water and irrigation policy dated 30 October 2019 (Exhibit 43) pages 2-3.

- Option 2 - Apply a calculation (based on crop area, crop water requirements, distribution and on-farm water use efficiency - as if for a new licence application)
- Option 3 - Renew OIC's licence at the current 335 GL/yr.

That Option 2 is agreed as a starting point (outcome 259.8 GL/yr) for determining a licence volume for OIC for the 10 year term of the licence.

128 At the hearing, both parties embraced 'Option 2' in the joint statement of the expert witnesses in relation to water and irrigation policy ('Apply a calculation (based on crop area, crop water requirements, distribution and on-farm water use efficiency - as if for a new licence application)') as the correct 'starting point' for the determination of the annual water entitlement by the Tribunal in Licence 3. The water and irrigation policy expert witnesses' and parties' 'starting point' for determining the annual water entitlement in Licence 3 reflects the terms of the relevant guiding policy in cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, which state that the Department's policy is to grant annual water entitlements 'to match justified crop needs and efficient water use for the area under irrigation'.

129 The volumetric 'starting point' referred to in the joint statement of the expert witnesses in relation to water and irrigation policy ('outcome 259.8 GL/yr') reflects Ms Pawley's calculation,¹⁹² which she further revised during the hearing to 258.7 GL per year,¹⁹³ of the annual water entitlement in Licence 3, based on, among other inputs:

- crop types and areas planted by OIC's members and non-member customers in 2018 (with most crops grouped into low, medium and high water use crops, and with sandalwood dealt with separately);

¹⁹² See [11] above. The calculation of 259.8 GL per year in the joint statement of expert witnesses in relation to water and irrigation policy is different to the calculations referred to at [11] above, but nothing turns on this. During the hearing, Ms Pawley further revised her calculation of the annual water entitlement in Licence 3 to 258.7 GL to reflect the 'consensus' reached between the crop irrigation water requirements expert witnesses in relation to certain crops during their concurrent evidence on 27 and 28 November 2019 (Exhibit 34 (Revised calculation - Version 1) which is reproduced in Attachment A to these reasons) (ts 113-114, 9 March 2020). As indicated at [11] above, ultimately this (258.7 GL) is the annual water entitlement the respondent contends the Tribunal should specify in Licence 3 in this review.

¹⁹³ To reflect the 'consensus' irrigation water requirements figures agreed by the crop irrigation water requirements expert witnesses in concurrent evidence on 27 and 28 November 2019 and otherwise the figures according to the evidence of the crop irrigation water requirements expert witnesses called by the respondent, Mr Lantzke and Mr Hocking.

- crop irrigation water requirements in accordance with the evidence in the witness statements of Mr Neil Lantzke and Mr Greg Hocking, who were called to give evidence by the respondent (Mr Lantzke holds a Bachelor of Science (Agriculture) (Honours) degree from the University of Western Australia and completed a Graduate Course in Hydrology at the University of New South Wales, and is an agricultural scientist with over 30 years' experience, including over 15 years with the Department of Primary Industries and Regional Development in irrigation research and extension, developing irrigation programmes for a wide range of horticultural producers, and, as a consultant to irrigators in the Pilbara and Kimberley regions, developing irrigation programmes for horticulture and fodder crops; Mr Hocking holds a Diploma in Applied Science, specialising in Agriculture, from Roseworthy Agricultural College in South Australia, and is an agricultural scientist with 40 years' experience in the development of irrigation enterprises, as an irrigation consultant and project manager, including, between 2010 and 2016, overseeing systems designs for the establishment of 6,500 hectares of sandalwood in Western Australia, the Northern Territory and Queensland); and
- distribution efficiency of 80%.

130 Each of the inputs referred to in the bullet points immediately above were contested in the evidence and submissions presented by the applicant. The applicant contends that these inputs for calculating the volumetric 'starting point' for determining the annual water entitlement in Licence 3 should be relevantly:

- Mr Dear's forecast of crop types and areas likely to be planted by OIC's members and non-member customers in 2029 set out in Attachment MD-35 to his witness statement (MD-35);¹⁹⁴
- crop irrigation water requirements as agreed ('consensus') between the crop irrigation expert

¹⁹⁴ Witness statement of Mathew Dear dated 12 September 2019 (volume 2) (Exhibit 6.2) and blown up version (Exhibit 11). MD-35 is reproduced at [148] below.

witnesses in concurrent evidence on 27 and 28 November 2019 and otherwise Mr Bloecker's, Mr Menzel's, Mr Engelke's and Mr Boshammer's evidence as to the irrigation water requirement for cotton, Mr Bloecker's, Mr Menzel's and Mr Boshammer's evidence as to the irrigation water requirement for maize, Mr Menzel's and Mr Boshammer's evidence as to the irrigation water requirement for sorghum hay (in double cropping with cotton) and Mr Doble's evidence as to the irrigation water requirement for sandalwood; and

- distribution efficiency of 76% (or, alternatively, 77%).

131 Consequently, in order to address the ultimate issue of what is the correct and preferable decision as to the annual water entitlement that should be specified in Licence 3, it is first necessary to determine the following three principal issues:

- (1) What crop types and areas should be utilised for the purpose of determining 'justified crop needs', under cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, and hence the starting point for the determination of the annual water entitlement in Licence 3? In particular, should the Tribunal accept and utilise:
 - (a) Mr Dear's forecast in MD-35 of crop types and areas likely to be planted by OIC's members and non-member customers in 2029 (as contended by the applicant); or
 - (b) crop types and areas planted by OIC's members and non-member customers in 2018 (with most crops grouped into low, medium and high water use crops, and with sandalwood dealt with separately) (as contended by the respondent)?
- (2) What crop irrigation water requirements should be utilised for the purpose of determining 'justified crop needs', under cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, and hence the starting point for the determination of the annual water entitlement in Licence 3? In particular, where the crop irrigation

expert witnesses called by the applicant and the respondent disagree, should the Tribunal accept and utilise:

- (a) Mr Bloecker's, Mr Menzel's, Mr Engelke's and Mr Boshammer's evidence as to the irrigation water requirement for cotton, Mr Bloecker's, Mr Menzel's and Mr Boshammer's evidence as to the irrigation water requirement for maize, Mr Menzel's and Mr Boshammer's evidence as to the irrigation water requirement for sorghum hay (in double cropping with cotton) and Mr Doble's evidence as to the irrigation water requirement for sandalwood (as contended by the applicant); or
 - (b) Mr Lantzke's evidence as to the irrigation water requirements for cotton, maize and sorghum hay (in double cropping with cotton) and Mr Hocking's evidence as to the irrigation water requirement for sandalwood (as contended by the respondent)?
- (3) What distribution efficiency should be utilised as 'efficient water use', under cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, and hence the starting point for the determination of the annual water entitlement in Licence 3? In particular, should the Tribunal accept and utilise:
- (a) 76% distribution efficiency (as contended by the applicant);
 - (b) 77% distribution efficiency (as contended by the applicant, in the alternative); or
 - (c) 80% distribution efficiency (as contended by the respondent)?

132 During the course of the proceedings, at the Tribunal's direction, Ms Pawley invaluablely carried out and produced a series of detailed calculations as to the 'starting point' for determining the annual water entitlement in Licence 3, depending on which of the contested inputs the Tribunal ultimately accepts. The applicant accepts that

Ms Pawley's calculations are correct. The calculations carried out by Ms Pawley, depending on which of the contested inputs the Tribunal accepts, are as follows:

Crop types and areas:

- (a) Mr Dear's forecast in MD-35 of crop types and areas likely to be planted by OIC's members and non-member customers in 2029 (as contended by the applicant) - Exhibit 33 (Additional calculation - Version 1; Additional calculation - Version 2; Additional calculation - Version 3) and Exhibit 51 (Additional calculation - Version 4).
- (b) Crop types and areas planted by OIC's members and non-member customers in 2018 (with most crops grouped into low, medium and high water use crops, and with sandalwood dealt with separately) (as contended by the respondent) - Exhibit 34 (Revised calculation - Version 1; Revised calculation - Version 2; Revised calculation - Version 3) and Exhibit 51 (Revised calculation - Version 4).

Crop irrigation water requirements as agreed ('consensus') between the crop irrigation expert witnesses and otherwise:

- (a) Mr Bloecker's, Mr Menzel's, Mr Engelke's and Mr Boshammer's evidence as to the irrigation water requirement for cotton, Mr Bloecker's, Mr Menzel's and Mr Boshammer's evidence as to the irrigation water requirement for maize, Mr Menzel's and Mr Boshammer's evidence as to the irrigation water requirement for sorghum hay (in double cropping with cotton) and Mr Doble's evidence as to the irrigation water requirement for sandalwood (as contended by the applicant) - Exhibit 33 (Additional calculation - Version 2; Additional calculation - Version 3), Exhibit 34 (Revised calculation - Version 2; Revised calculation - Version 3) and Exhibit 51 (Revised calculation - Version 4; Additional calculation - Version 4).

- (b) Mr Lantzke's evidence as to the irrigation water requirements for cotton, maize and sorghum hay (in double cropping with cotton) and Mr Hocking's evidence as to the irrigation water requirement for sandalwood (as contended by the respondent) - Exhibit 33 (Additional calculation - Version 1) and Exhibit 34 (Revised calculation - Version 1).

Distribution efficiency:

- (a) 76% distribution efficiency (as contended by the applicant) - Exhibit 33 (Additional calculation - Version 3) and Exhibit 34 (Revised calculation - Version 3).
- (b) 77% distribution efficiency (as contended by the applicant, in the alternative) - Exhibit 51 (Additional calculation - Version 4; Revised calculation - Version 4).
- (c) 80% distribution efficiency (as contended by the respondent) - Exhibit 33 (Additional calculation - Version 1; Additional calculation - Version 2) and Exhibit 34 (Revised calculation - Version 1; Revised calculation - Version 2).

133 Ms Pawley's calculations in Exhibit 33 (Additional calculation - Version 1; Additional calculation - Version 2; Additional calculation - Version 3), Exhibit 34 (Revised calculation - Version 1; Revised calculation - Version 2; Revised calculation - Version 3) and Exhibit 51 (Additional calculation - Version 4; Revised calculation - Version 4) are reproduced in Attachment A to these reasons.

134 We will now address each of the three issues set out at [131] above in turn, and also a further issue, which arises on the evidence and submissions in this case, as to whether the annual water entitlement in Licence 3 should include an allocation for draining the M1 Supply Channel to avoid flooding in the town of Kununurra and, if so, what amount, before addressing the ultimate issue of what is the correct and preferable decision as to the annual water entitlement that should be specified in Licence 3.

What crop types and areas should be utilised for the purpose of determining 'justified crop needs' under OSWAP and hence the starting point for the determination of the annual water entitlement in Licence 3?

Crop types and areas planted by OIC's members and non-member customers in 2018 (grouped into low, medium and high water use crops, and with sandalwood dealt with separately)

135 As Ms Ashworth correctly observed in her closing submissions on behalf of OIC:¹⁹⁵

... [There is] agreement between the parties that the likely water needs of the applicant over the duration of the licence is, at least, a starting point in the task of determining the correct and preferable decision in this case. It's in the method that the parties seek to apply in determining that likely requirement where the difference lies.

136 We will first address the respondent's evidence and contention as to what crop types and areas should be utilised for the purpose of determining 'justified crop needs', under cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP ('grant [annual] water entitlements to match justified crop needs and efficient water use for the area under irrigation'¹⁹⁶), and hence the starting point for the determination of the annual water entitlement in Licence 3. As indicated earlier, the respondent relies on Ms Pawley's calculation of the annual water entitlement in Licence 3, for the purposes of which she inputs crop types and areas planted by OIC's members and non-member customers in 2018 (grouped into low, medium and high water use crops, and with sandalwood dealt with separately). As also indicated earlier, in her further revised calculation based on these crop types and areas, Ms Pawley calculates 'OIC's annual licence volume to be 258.7 [GL] per year',¹⁹⁷ and this is the annual water entitlement the respondent contends the Tribunal should specify in Licence 3 in this review. Ms CA Ide, who appeared with Mr JM Misso on behalf of the Department, submits that:¹⁹⁸

In the absence of better information about likely crop areas, it is reasonable to use as a starting point actual irrigator behaviour. The [r]espondent used the crop areas historically grown in 2018 (as reported in the [a]pplicant's annual reports) to predict the crop areas going forward.

¹⁹⁵ ts 7, 12 March 2020.

¹⁹⁶ The word 'annual' appears in cl 5.2, but is omitted in local licensing policy 4.7 in Table 8 of OSWAP.

¹⁹⁷ Exhibit 34 (Revised calculation - Version 1) which is reproduced in Attachment A to these reasons.

¹⁹⁸ Respondent's closing submissions dated 11 March 2020 [26].

137 However, there is 'better information about likely crop areas' before the Tribunal on which to determine 'justified crop needs' during the 10 year term of Licence 3, namely, for the reasons set out below, Mr Dear's forecast for the period 2019 to 2029 in MD-35. Furthermore, as the applicant submits, the respondent's method for determining 'justified crop needs' during the 10 year term of the licence, namely relying on 'nothing more than a static and historical snapshot of water use' in 2018,¹⁹⁹ is flawed '[a]s a matter of principle'.²⁰⁰

138 As Ms Ashworth submits:²⁰¹

... As a matter of principle, a determination of likely water use - likely water requirements necessarily involves a future-looking consideration. That, of course, is not the approach embodied in [E]xhibit 34 for which the respondent contends.

As the [T]ribunal will recall, [E]xhibit 34 is based not on a forecast of likely future water requirements, but instead is based on what the applicant - or what the applicant's members and customers grew in 2018 and, in that way, [E]xhibit 34 embodies nothing more than a static and historical snapshot of water use.

139 Indeed, in cross-examination, Ms Pawley appears to have, at least to an extent, conceded that an assessment of justified crop needs involves a future-looking, rather than backward-looking, analysis. Ms Pawley gave the following evidence in cross-examination:²⁰²

ASHWORTH, MS: So that when making an assessment of what is likely to be required, we necessarily need to look to the future; correct.

WITNESS, PAWLEY: Correct. Well, at the time that that calculation was done there was no future plans provided by OIC and there was only 2018 crop data. And I haven't based it solely on what they grew in 2018. We have low, medium and high water use crops, so I've grouped their crop areas from 2018 into those groups and - and used the upper limit of those categories, so to ensure that there was flexibility to move within those categories - - -

ASHWORTH, MS: Okay. Well, we will get to - - -

WITNESS, PAWLEY: - - - as a - no future - as there was no future crop plans provided. That was subsequently provided by Mr Dear in his witness statement. So then I did an additional calculation using the exact crop figures he provided for 2029.

¹⁹⁹ ts 8, 12 March 2020.

²⁰⁰ ts 7, 12 March 2020.

²⁰¹ ts 7-8, 12 March 2020.

²⁰² ts 555-556, 9 March 2020.

ASHWORTH, MS: Okay. But you will recall that at the outset of our questions this morning I asked you if the table at page 1 of [E]xhibit 34 was your current view as to the question you were asked to address in your letter of instructions from the State Solicitor's Office, that is, the - -
-

WITNESS, PAWLEY: Yes.

ASHWORTH, MS: - - - the volume of water likely to be required by OIC over the 10-year duration of the licence and you told me that it was; is that correct?

WITNESS, PAWLEY: This is - this is a figure that arrived - calculation version 1, 258.7, is a calculation based on the information provided at the time of what they would need over the 10 - what they could be licensed over the 10-year period of time.

140 Ms Pawley also gave evidence in cross-examination that 'if the ag experts ... agreed on ... Mr Dear's MD[-]35 projection being a likely projection then that may change my answer' and she agreed that she is 'not in a position to evaluate the reasonableness of Mr Dear's forecast'.²⁰³

141 Furthermore, although in settled and stable agricultural areas, which have an established dominant crop or crop mix, it may be reasonable to utilise crop types and areas planted in the past for the purpose of determining justified crop needs and hence the annual water entitlement in the future, the method adopted by Ms Pawley and the respondent is particularly flawed in the ORIA. As we found at [63] above, the ORIA has never settled and stabilised in terms of a dominant crop or crop mix for more than 10 to 15 years at any time in its history and has been in a state of transition throughout much of this time, seeking to creatively 're-invent itself', to quote Mr Boshammer,²⁰⁴ or as Ms Ashworth put it in opening, 'finding its feet'.²⁰⁵ Furthermore, as we find on the evidence discussed at [154]-[169] and [175]-[187] below, the ORIA remains in a state of transition towards a likely significant increase in the production of cotton and hay, and use of double cropping, including growing cotton as the first of the two crops. However, as Ms Ashworth points out in her closing:²⁰⁶

... [T]he figures in [E]xhibit 34 based on what OIC grew in 2018 include precisely no allowance for double cropping. That is [in] the

²⁰³ ts 558, 9 March 2020.

²⁰⁴ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [13].

²⁰⁵ ts 127, 25 November 2019.

²⁰⁶ ts 24, 12 March 2020.

face of extensive evidence in these proceedings that double cropping is being and will be pursued and will increase in coming years.

142 Given the important characteristic of the ORIA that it is a farming district in transition, 'justified crop needs' for the next 10 years cannot reasonably be based on crop types and areas planted by OIC's members and non-member customers in the past. Rather, the determination of justified crop needs for the next decade should be based on a reasonable forecast of what crop types and areas OIC's members and non-member customers are likely to plant over this period.

143 The significant increase in the volume of water diverted for Ord Stage 1 under Licence 3 in 2019, in comparison to previous years, further demonstrates that the respondent's evidence and contention as to crop types and areas is flawed. As indicated at [77] above, the amount of water diverted by OIC for Ord Stage 1 in 2019 was:

- 56.7 GL or approximately 30% more than the volume of water diverted by OIC for Ord Stage 1 in the preceding year (2018);
- 104.6 GL or approximately 73% more than the volume of water diverted by OIC for Ord Stage 1 two years before (2017); and
- 86.4 GL or approximately 53% more than the average of 162 GL per year diverted by OIC for Ord Stage 1 over the 11 year period 2008 to 2018.

144 In cross-examination, Ms Pawley said that the increase in the amount of water diverted by OIC for Ord Stage 1 in 2019 in comparison with the preceding year 'doesn't change my opinion of [the annual water entitlement under] this licence', because OIC 'would have had enough water under a licence of 258.7 [GL] to meet their [S]tage 1 diversion requirements'.²⁰⁷

145 It is correct that the amount of water diverted by OIC for Ord Stage 1 in 2019 (248.4 GL) was (10.3 GL) less than the annual water entitlement calculated by Ms Pawley (258.7 GL). However, as Ms Pawley's further revised calculation (and the respondent's contention) as to the annual water entitlement is based on crop types and areas planted by OIC's members and non-member customers in 2018 (grouped into low, medium and high water use crops, and with

²⁰⁷ ts 554, 9 March 2020.

sandalwood dealt with separately), and the amount of water diverted by OIC for its members and non-member customers to grow crops in Ord Stage 1 was significantly greater in 2019 than in 2018, then plainly Mr Pawley's further revised calculation (and the respondent's contention) does not match the applicant's justified crop needs over the next 10 years, based on the most up-to-date evidence before the Tribunal. The evidence before the Tribunal shows that in 2019 OIC's members and non-member customers required approximately 30% more water to grow crops in that year than they required to grow crops in the previous year (on the basis of which Ms Pawley has calculated the annual water entitlement for the next 10 years).

146 Ms Pawley gave evidence that she grouped most of the crop types and areas planted by OIC's members and non-member customers in 2018 into low, medium and high water use crops 'so [as] to ensure that there was flexibility to move within those categories.'²⁰⁸ Ms Pawley dealt with sandalwood separately, 'as it forms a large area of land under crop and has a lower on[-]farm efficiency [than] the other crops considered'.²⁰⁹ The respondent submits that the method adopted by Ms Pawley is reasonable in consequence of these aspects of her calculation, and also because 'the highest figure within the range of irrigation water requirements within a water use category was chosen, not the average', thereby permitting 'a crop of any type within that category to be grown, which provides reasonable flexibility'.²¹⁰ The respondent also submits that the methodology it proposes 'is appropriate as the areas of land within the various crop water types groupings have been "relatively stable" between 2008 and 2018', and consequently 'it can be seen that 2018 is a generally representative year of irrigator behaviour'.²¹¹

147 It is correct that the grouping of most of the crop types and areas planted in 2018 into low, medium and high water use crops and choosing the highest figure within the range of irrigation water requirements in a water use category would provide irrigators with some flexibility to change between crops. Figure 4 in Ms Pawley's witness statement also bears out the respondent's submission that 'there has been relatively little movement between crop categories by irrigators' over the period 2008 to 2018. It was also reasonable for Ms Pawley to have dealt with sandalwood separately, because the

²⁰⁸ ts 555, 9 March 2020.

²⁰⁹ Respondent's closing submissions dated 11 March 2020 [27].

²¹⁰ Respondent's closing submissions dated 11 March 2020 [29].

²¹¹ Respondent's closing submissions dated 11 March 2020 [28].

evidence shows that it has a lower on-farm efficiency than the other crops considered. However, for the reasons set out earlier, Ms Pawley's further revised calculation (and the respondent's contention) as to annual water entitlement is based on a backward-looking historical snapshot of Ord Stage 1, rather than a forward-looking reasonable forecast over the period of Licence 3 and is, therefore, a flawed method, particularly in the circumstances of the ORIA.

Mr Dear's forecast of crop types and areas likely to be planted by OIC's members and non-member customers

148 In September 2019, Mr Dear prepared the forecast in MD-35 of crop types and areas likely to be planted by OIC's members and non-member customers during the period 2019 to 2029. We reproduce MD-35 immediately below.²¹²

²¹² Witness statement of Mathew Dear dated 12 September 2019 (volume 2) (Exhibit 6.2) and blown up version (Exhibit 11).

MD-35

Crop group	High estimate Crop water requirement (MM/ha)	2019 Water Required @ Crop Yield	2019		2020		2021		2022		2023		2024		2025		2026		2027		2028		2029	
			70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)	70% water required @ farm gate (ML) Cropped	75% distribution** (ha)
Barley	2	20.2	40	77	2	77	2	77	2	77	2	77	2	77	2	77	2	77	2	77	2	77	2	77
Chia	40	7.3	292	1,669	120	2,503	180	3,476	180	3,476	250	3,476	250	3,476	250	3,476	250	3,476	250	3,476	250	3,476	250	3,476
Chickpea	532	5.2	2,766	5,269	532	5,269	532	5,269	532	5,269	532	5,269	532	5,269	532	5,269	532	5,269	532	5,269	532	5,269	532	5,269
Common	150	8.3	1,242	2,365	1,500	3,943	3,000	47,314	3,000	47,314	3,000	47,314	3,000	47,314	3,000	47,314	3,000	47,314	3,000	47,314	3,000	47,314	3,000	47,314
Crop Group Cereals	4	5.8	39	75	4	75	4	75	4	75	4	75	4	75	4	75	4	75	4	75	4	75	4	75
Crop Group Citrus	370	5.2	1,931	3,679	370	3,679	370	3,679	370	3,679	370	3,679	370	3,679	370	3,679	370	3,679	370	3,679	370	3,679	370	3,679
Crop Group Cucurbits	950	14.0	13,300	25,333	1,250	46,687	1,250	33,333	1,250	33,333	1,250	33,333	1,250	33,333	1,250	33,333	1,250	33,333	1,250	33,333	1,250	33,333	1,250	33,333
Crop Group Hay	1,088	8.3	8,995	16,371	850	15,406	750	11,829	750	11,829	750	11,829	750	11,829	750	11,829	750	11,829	750	11,829	750	11,829	750	11,829
Crop Group Hybrid Seeds	478	8.2	3,907	7,442	478	7,442	478	7,442	478	7,442	478	7,442	478	7,442	478	7,442	478	7,442	478	7,442	478	7,442	478	7,442
Crop Group Margines	341	8.1	2,777	3,696	350	4,067	350	4,067	350	4,067	350	4,067	350	4,067	350	4,067	350	4,067	350	4,067	350	4,067	350	4,067
Crop Group Other Horticulture	1	7.5	7	15	2	9	2	9	2	9	2	9	2	9	2	9	2	9	2	9	2	9	2	9
Crop Group Rice	2	15.4	31	59	2	59	2	59	2	59	2	59	2	59	2	59	2	59	2	59	2	59	2	59
Crop Group Sorghum	2,897	7.7	22,987	43,785	2,335	34,113	1,668	24,369	308	4,500	38	555	38	555	38	555	38	555	38	555	38	555	38	555
Cultivated	76	4.0	302	575	76	575	76	575	76	575	76	575	76	575	76	575	76	575	76	575	76	575	76	575
Fallow	30	4.5	134	256	30	256	30	256	30	256	30	256	30	256	30	256	30	256	30	256	30	256	30	256
Fresh Beans	2,500	9.0	22,500	42,857	2,500	42,857	2,500	42,857	2,500	42,857	2,500	42,857	2,500	42,857	2,500	42,857	2,500	42,857	2,500	42,857	2,500	42,857	2,500	42,857
Maize	5,003	2.0	30,005	19,057	4,984	18,910	6,154	23,444	7,714	29,387	7,784	29,653	7,784	29,653	7,784	29,653	7,784	29,653	7,784	29,653	7,784	29,653	7,784	29,653
Pre-irrigation	5,523	14.0	77,320	147,275	5,423	144,613	5,400	144,000	5,200	138,667	5,400	144,000	5,400	144,000	5,400	144,000	5,400	144,000	5,400	144,000	5,400	144,000	5,400	144,000
Sandshwood	20	5.0	100	190	40	381	80	762	1,000	9,524	1,000	9,524	1,000	9,524	1,000	9,524	1,000	9,524	1,000	9,524	1,000	9,524	1,000	9,524
Double cropping	15,031		167,669	319,179	15,031	327,501	15,031	327,417	15,031	341,411	15,031	344,040	15,031	344,040	15,031	344,040	15,031	344,040	15,031	344,040	15,031	344,040	15,031	344,040
Totals**																								

* Formula = Sum of everything minus Double crop and Pre-irrigation
 ** = ((High estimated crop water requirement - Area Cropped) / 100 / 70) * 100 / 75

149 As the respondent emphasises in its closing submissions, Mr Dear conceded in his witness statement that 'predicting what will be farmed in the Ord is notoriously difficult'.²¹³ Similarly, as the respondent also emphasises in its submissions, Mr Menzel gave evidence that the Ord is a farming region that 'still does not know where, precisely, it is headed',²¹⁴ 'no one knows what the region will grow in the next ten years and, by extension, what the water demands for future crops will be',²¹⁵ and despite 'working and farming in the Ord for 25 years ... I cannot predict the future of farming in the Ord with any degree of certainty'.²¹⁶ The respondent also emphasises the following evidence given by Mr Dear in cross-examination:²¹⁷

Would you accept that there has been a historical tendency for the OIC to over-predict how much water it will - will be required for the following year? - - - I would say that it is historically very difficult to make any prediction with a great degree of accuracy. That asking members to make a decision on what they're going to grow in March in the next year in November - or October/November of the previous year is extremely difficult for them to have any degree of accuracy as to whether that is going to actually be the result and as a result, then - then that will impact on our forecasts. And yes, we do not believe to an extent that that - that those forecasts should be considered with a - a great deal of accuracy in terms of the - what is planned to be cropped from season to season and certainly not predicting a 10-year term of what is likely to occur.

150 As we said earlier, the determination of the annual water entitlement in Licence 3 'to match justified crop needs' requires a reasonable forecast of what crop types and areas are likely to be planted by OIC's members and non-member customers over the period of the licence. It does not require certainty. Although, as the respondent emphasises, Mr Dear said in the extract from his evidence set out in the preceding paragraph that 'we do not believe to an extent that ... those forecasts should be considered with a ... great deal of accuracy in terms of ... what is planned to be cropped from season to season and certainly not predicting a 10-year term of what is likely to occur', reading his answer as a whole, and the other evidence of Mr Dear and the evidence of Mr Menzel emphasised by the respondent and referred to in the preceding paragraph, it is clear that both Mr Dear and Mr Menzel

²¹³ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [120].

²¹⁴ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [67].

²¹⁵ David Menzel's response to respondent's witness statements and expert reports dated 16 October 2019 (Exhibit 21) [10].

²¹⁶ David Menzel's response to respondent's witness statements and expert reports dated 16 October 2019 (Exhibit 21) [19].

²¹⁷ ts 231, 27 November 2019,

candidly acknowledge that accurately predicting cropping in the Ord is difficult, and although one cannot predict with certainty what crop types and areas will be planted over the 10 year term of Licence 3, one can make a reasonable forecast of what crop types and areas are likely to be planted by OIC's members and non-member customers over this period. This is precisely what Mr Dear has sought to do in MD-35. For the reasons which follow, in our view, each of the ten 'assumptions' on which Mr Dear has based his forecast, and hence the forecast itself, is sound and reasonable. Consequently, in our view, MD-35 is an appropriate basis on which to determine 'justified crop needs' of OIC's members and non-member customers over the next 10 years.

Mr Dear's 10 assumptions

151 In preparing the forecast in MD-35, Mr Dear made 10 'assumptions' in relation to crop types and areas. Five of Mr Dear's 10 assumptions, and his reasoning for each of these assumptions, were not contested by the respondent. The uncontested assumptions are as follows:²¹⁸

[1] I have assumed that the sandalwood industry will shrink marginally when plantings from 2008 and 2009 come to the end of their 15-year growing cycle. I say this because in my opinion, when those plantings are harvested, not all of the land will be returned to sandalwood. In recent years, I have had discussions with Mr Brendon Carr, who is a director of the OIC and also the WA Regional Manager of Quintis (which I know as a sandalwood growing company operating in the Ord), and he has said words to me to the following effect:

"It's been determined that some of the land that has sandalwood is not fit for growing sandalwood and won't return to growing sandalwood."

I am also aware of approximately 123 hectares of Ord Stage 1 land that is currently growing sandalwood that, to my observation, is not producing high growth or high quality trees. Given what, in my observation, is poor quality and poor tree growth, I do not expect that sandalwood growers will attempt to grow another crop of sandalwood on much, if any, of these 123 hectares.

...

²¹⁸ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [123]-[124], [126], [127], [128] and [129].

- [2] I have assumed that horticulture will remain relatively constant at approximately 350 hectares over the next ten years. I say this because in my observation, farmers in the region are presently meeting market demand for these crops and I have no reason to consider that that demand will change, on average, in coming years.
- [3] I have assumed that chickpea production will remain relatively constant at approximately 532 hectares over the next ten years. I say this because, although in recent years this number has been higher (for example nearly 900 hectares in 2017), the average since 2006 has been 483 hectares, and in my opinion the 532 hectares being grown in 2019 will remain relatively constant as this appears to be a volume that meets market demand.
- [4] I have assumed cucurbits, chickpeas and fresh bean production will remain relatively constant over the next ten years because, in my opinion, there is only a relatively small market for these crops and market demand is currently being met on present levels of production.
- [5] I have assumed that chia and other hybrid seeds will continue to decrease from highs a few years ago. I say this because it is my understanding from discussions with local growers that demand for chia and other hybrid seeds increased substantially in the recent past because of problems experienced by growers in South America. Based on those same discussions with local farmers, I understand that South American growers have now overcome those problems and are once again producing chia and other hybrid seeds more competitively than growers in the Ord can produce them.

152 Given his significant experience and up-to-date knowledge of the ORIA and its particular circumstances, including its opportunities and challenges, and its current state of transition, and given his explanation for the five assumptions set out above, we accept that each of these five assumptions is sound and reasonable.

153 The respondent disputes Mr Dear's assumptions, for the purposes of his forecast, in relation to cotton, maize, hay, double cropping and fallow land. However, in our view, Mr Dear's assumptions in relation to these five matters are also sound and reasonable, in light of his significant and up-to-date knowledge and experience of the ORIA and its particular circumstances, including its opportunities and challenges, and its current state of transition, his reasoning for each assumption, and the strong support for the assumptions in other evidence which we refer to and accept below.

Cotton

154 Mr Dear's assumption and the reasoning for his assumption in relation to production of cotton, for the purposes of his forecast in MD-35, is as follows:²¹⁹

... [P]erhaps most significantly for the future of farming in the Ord, I have assumed that cotton will become the dominant crop in the region over the next 10 years. I made this assumption for a number of reasons not least of which is that I am aware of the successful cotton trials of the genetically modified cotton known as Bollgard 3 over the last three years. Bollgard 3 is an insect resistant cotton that trials have shown can be successfully planted in February and harvested before the wet season. In addition, I am also aware through my dealings as the General Manager of the OIC, that local farmers are particularly interested in large-scale cotton production (following the success of the Bollgard 3 trials) and to that end are in discussions concerning the construction of a cotton gin in the region. As a result of discussions with local farmers, I am aware that a cotton gin would cost up to \$30 million to build and this means that, in order to justify that cost, local farmers will need to grow cotton on a substantial scale. If cotton does become the dominant crop in the region, based on my discussions with local farmers about the commercial viability of a cotton gin, and in my opinion, cotton will be grown on not less than 3,000 hectares of Ord Stage I and up to possibly 3,500 hectares.

155 As can be seen in MD-35 reproduced at [148] above, Mr Dear forecasts a significant increase in the area cropped for cotton from 150 hectares in 2019, to 250 hectares in 2020, 1,500 hectares in 2021, and 3,000 hectares each year during the period 2022 to 2029. The respondent submits that 'Mr Dear's prediction that 3000 [hectares] of cotton will be grown in Ord Stage 1 by 2029 is highly speculative at present' and, given that '[a] substantial proportion of the [a]pplicant's justification for its [annual water entitlement] is based on the assumptions surrounding cotton' (45.4 GL at the diversion points, if 76% distribution efficiency is applied), 'a large portion of the [annual water entitlement] ... is unsubstantiated'.²²⁰ However, in light of the evidence referred to below, we do not accept the submissions that Mr Dear's prediction that 3,000 hectares of cotton is likely to be grown by 2029 (or by 2022) is 'highly speculative at present' or that the portion of the annual water entitlement attributed, on the basis of Mr Dear's forecast, to cotton, is 'unsubstantiated'. Rather, in light of the

²¹⁹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [122].

²²⁰ Respondent's closing submissions dated 11 March 2020 [41].

evidence referred to below, we find Mr Dear's assumption and forecast in relation to cotton to be sound and reasonable.

156 As indicated earlier, Mr Engelke is the General Manager of KAI, which 'operates a large-scale commodity farming business'²²¹ and has 'a development capacity of approximately 25,000 hectares [in the ORIA], including approximately 6,660 hectares in Goomig, 5,500 hectares in Knox Plain, 2,000 hectares in [Carlton] Hill, and 1,200 hectares in Ord Stage 1'.²²² Mr Engelke gave evidence that, in 2018 and 2019, KAI planted 350 hectares and 150 hectares, respectively, of genetically modified Bollgard 3 cotton 'as part of a research project'.²²³ As Mr Boshammer explained in his evidence, until the genetically modified Bollgard 3 variety of cotton was released about three years ago, cotton was susceptible in the Ord to a wet season pest, *Spodoptera littoralis*, 'which would feed on the leaves and flowers of the cotton plant'.²²⁴ As Mr Boshammer also said, whereas the earlier versions of this genetically modified cotton, Bollgard 1 and Bollgard 2, could be grown in the ORIA during the dry season, 'the quality was quite poor because it was grown in the cooler months of the dry season'.²²⁵

157 On 4 August 2019, Mr Boshammer and over one hundred other people, including Mr Menzel, attended a field day conducted by the Northern Australia Crop Research Alliance in Kununurra 'to view the 2019 cotton and grain trials that were taking place on KAI land'.²²⁶ Mr Boshammer gave evidence that, to his observation, 'the cotton harvested by KAI was good quality and of good yield'.²²⁷ Mr Menzel also said that, to his observation, 'these trials were successful'.²²⁸

158 The evidence indicates that KAI's recent successful 'research project' into genetically modified cotton, the results of which KAI has shared with farmers generally in the ORIA, is likely to have a significant impact such that, as Mr Dear forecasts, 'cotton will become the dominant crop in the region over the next 10 years'.²²⁹ As Mr Boshammer explained, '[t]he significance of these cotton trials is that KAI was able to successfully plant cotton in February and harvest

²²¹ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [4].

²²² Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [3].

²²³ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [12].

²²⁴ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [49].

²²⁵ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [49].

²²⁶ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [47].

²²⁷ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [47].

²²⁸ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [34].

²²⁹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [122].

quality cotton in July through to August'.²³⁰ Consequently, 'this cotton will flower and fill during the warm sunny weather normally experienced in the Ord during March, April and May [and therefore] the cotton should be of excellent quality and reasonable yield (as KAI experienced this year)'.²³¹ A further benefit to farmers in the ORIA from KAI's recent and successful cotton trials is that, 'because Bollgard 3 can be planted early in the season, it will allow Oasis [and farmers generally in the ORIA] to double crop cotton'.²³² We will discuss the likely significant parallel transition in the ORIA to double cropping, with its benefits for enhancing efficient use of land and farm profitability, below. We accept Mr Boshammer's evidence that 'double cropping cotton and sorghum hay would allow Oasis [and, we find, farmers generally in the ORIA] to get the most out of available land and water'.²³³ Mr Menzel gave consistent evidence to Mr Boshammer's evidence in relation to the significance of KAI's recent successful cotton trials for farmers in the ORIA to grow excellent quality cotton with reasonable yield, and to do so early in the season, thereby allowing a second crop to be planted and harvested, increasing the efficiency of the land and profitability of the farming enterprise. We accept Mr Boshammer's evidence that the success of KAI's cotton trials 'is of significance for Oasis, and in my opinion, for farmers in the Ord more broadly'.²³⁴ As Mr Boshammer said, 'the possibility of integrating cotton with hay or grain crops' in double cropping is '[o]f particular interest to Oasis'.²³⁵ As indicated earlier, Oasis farms 1,300 hectares in Ord Stage 1 (as well as 300 hectares on land leased from KAI in Goomig). Mr Boshammer said that, in 2019, his son grew 80 hectares of cotton as 'an experience gathering thing',²³⁶ and that any decision to grow cotton in 2020 would be made by his son. However, Mr Boshammer added that:²³⁷

... We expect it probably in the next two years and we will be - we expect our production to go up to about close to 50 per cent of our area will probably go into cotton or between 40 and 50 per cent when we do that. ...

²³⁰ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [48].

²³¹ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [49].

²³² Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [49].

²³³ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [49].

²³⁴ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [48].

²³⁵ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [49].

²³⁶ ts 446, 28 November 2019.

²³⁷ ts 447, 28 November 2019.

159 When asked by Ms Ide as to how many hectares of cotton Oasis would grow, Mr Boshammer replied:²³⁸

Well, depending on the deal on Manbijim and on some other land that I'm potentially developing with MG Corporation, we expect about five - five or 600 hectares of cotton to be planted. ... within Ord Stage 1.

160 Mr Menzel, who, as indicated earlier, farms approximately 460 hectares in Ord Stage 1, is also 'particularly interested in growing cotton',²³⁹ having observed the success of KAI's trials and that 'it opens up the possibility of double cropping cotton in the ORIA because it allows for a second crop to be planted after the cotton has been harvested'.²⁴⁰ Mr Bloecker, who, as indicated earlier, farms approximately 1,106 hectares of land in Ord Stage 1 under the business name Bothkamp, also said that 'Bothkamp is particularly interested in the combination of cotton and maize for double cropping because of current market demand'.²⁴¹

161 Dr Ruprecht gave the following evidence, which is consistent with the evidence given by Mr Engelke, Mr Boshammer, Mr Menzel and Mr Bloecker:²⁴²

Cotton is now seen as having potential as a base field crop that will need a minimum area of 10,000 [hectares] (based on 50,000 bales per season for a viable cotton gin - Petheram et al 2013) to achieve an economic, competitive and sustainable industry. The Ord industry is moving toward a cotton processing gin. The emerging cotton industry has the potential to drive double cropping with short growing season crops such as mung beans being planted after cotton is harvested. This is expected to increase profitability and total irrigation water demand.

162 Furthermore, and significantly, KAI's recent successful cotton trials have shown that cotton can be grown on a large scale. As we found earlier, on Mr Engelke's evidence, in consequence of the ORIA's isolation, '[s]cale is critical to meeting KAI's farming objectives' and '[w]ithout scale the limitations of locations are more severe'.²⁴³ As Mr Engelke also said in evidence:²⁴⁴

The cotton trials showed KAI that the system for growing large-scale cotton was feasible. As opposed to growing cotton on small plot

²³⁸ ts 447, 28 November 2019.

²³⁹ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [31].

²⁴⁰ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [34].

²⁴¹ Witness statement of Hans-Christian Bloecker dated 6 September 2019 (Exhibit 22) [30].

²⁴² Expert report of Dr John Ruprecht dated 16 September 2019 (Exhibit 16) [28].

²⁴³ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [9].

²⁴⁴ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [14].

replicated trials (half a hectare to one hectare), which might use a 150 horsepower tractor and a two row planter, KAI's cotton trials showed that the cotton could be grown on substantial acreage, using 8 tonne 340 horsepower tractors with 12 metre planters. These scale trials are important because they showed, for example, that the cotton could be planted in January/February with tractors of that size, that fertilisers could be applied to the crop, and all of the other practical implications of large scale cropping could be met. In other words, on the one hand, KAI was running a research and development project with its cotton trials on a scientific basis, and on the other hand, it was also looking at the practicalities and the pragmatic decisions KAI would have to make in the course of a season in order to be able to scale the cotton industry from 350 hectares to 3,000-6,000 hectares.

163 In his evidence set out at [154] above, Mr Dear said that he is aware 'that local farmers are particularly interested in large-scale cotton production (following the success of the Bollgard 3 trials) and to that end are in discussions concerning the construction of a cotton gin in the region'. Mr Engelke gave evidence that, '[g]iven the potential for cotton in the region, KAI has taken a number of steps towards the construction of a cotton gin in the region'.²⁴⁵ Mr Dear conceded in cross-examination that:²⁴⁶

[T]he rapid increase [in cotton production] that is being proposed on MD[-]35 does, in fact, rely in those quantities on a cotton gin being constructed within close proximity to this irrigation area, not necessarily in this irrigation area.

164 Mr Dear said that 'from my understanding, a cotton gin could and has been discussed ... being constructed in Katherine, which is 500 kilometres, roughly, from [Kununurra] ... [or in] Kununurra'.²⁴⁷ However, Mr Dear also conceded in cross-examination that '[m]y understanding is it's still in discussion'.²⁴⁸ Mr Boshammer also conceded in cross-examination that his expectation that, 'probably in the next two years', Oasis would grow cotton on 500 to 600 hectares is 'very contingent on the gin' being built in the region.²⁴⁹ The reason why a cotton gin is required to be constructed in the region to facilitate the significant increase in cotton production forecast by Mr Dear in Ord Stage 1 by 2022 (3,000 hectares) is that, although, as Mr Dear said, 'some cotton is already grown and trucked to other gins in other

²⁴⁵ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [15].

²⁴⁶ ts 232, 27 November 2019.

²⁴⁷ ts 232, 27 November 2019.

²⁴⁸ ts 232, 27 November 2019.

²⁴⁹ ts 447, 28 November 2019.

locations',²⁵⁰ as Mr Boshammer said, the 80 hectares of cotton that Oasis was growing as 'an experience gathering thing'²⁵¹ 'will be sent to Queensland to be ginned ... [which is only] marginally economical ...'²⁵²

165 However, we find, on the evidence, that a cotton gin is likely to be constructed in the ORIA, or in reasonable proximity in the Northern Territory, within the next two to three years, having regard to the success of KAI's cotton trials, KAI's position that '[s]cale is critical to meeting KAI's farming objectives'²⁵³ and that the 'cotton trials showed KAI that the system for growing large-scale cotton was feasible',²⁵⁴ the evidence of Mr Boshammer, Mr Menzel and Mr Bloecker as to their interest in growing cotton, including as part of double cropping, and the evidence we refer to at [166]-[169] below. Moreover, we are satisfied, on the evidence, that, if a cotton gin is built in the ORIA or within reasonable proximity in the Northern Territory, it is likely that at least 3,000 hectares in Ord Stage 1 will be planted with cotton (indeed, we accept Ms Ashworth's submission that '[o]n a proper consideration of the evidence, Ms Dear's estimate is, if anything, conservative'²⁵⁵) and at least 7,000 hectares in Ord Stage 2 will be planted with cotton, making a cotton gin commercially viable. In this regard, Mr Engelke gave evidence that KAI is 'currently clearing 3,055 hectares of land on Carlton Plain [in Ord Stage 2] that could be used for cotton, maize and other crops and KAI has other land that could also be developed for cotton'.²⁵⁶

166 Dr Ruprecht explained in his evidence that '[a] cotton gin is required to separate the cottonseed [representing approximately 50% of the ginned cotton's weight] and trash from the cotton, leaving the lint (or raw cotton fibre)'.²⁵⁷ Mr Engelke gave the following evidence:²⁵⁸

... KAI has done a fair bit of work on costing a cotton gin, looking at the scalability of the cotton industry (both in the ORIA and potentially in the Northern Territory), looking at the speed with which the industry might scale, and the throughput of the gin (which is important because there are considerable annual fixed costs associated with building a

²⁵⁰ ts 232, 27 November 2019.

²⁵¹ ts 446, 28 November 2019.

²⁵² ts 447, 28 November 2019.

²⁵³ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [9].

²⁵⁴ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [14].

²⁵⁵ ts 12, 12 March 2020.

²⁵⁶ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [18].

²⁵⁷ Witness statement of Dr John Ruprecht dated 16 September 2019 (Exhibit 16) [29].

²⁵⁸ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [15]-[17].

cotton gin). For KAI, the construction of a cotton gin is a business decision that must be made on close consideration of the commercial risk. Farming in the Ord region is risky enough, and for this reason KAI is wary of taking unnecessary risk. On KAI's costing, a cotton gin of the kind that KAI is considering, which is one that will keep overhead costs down as much as possible while having a scalable plant, is around \$30 million. The cotton gin would also have other associated costs, such as the need for storage sheds for cotton bales.

At this stage, KAI is hopeful that a cotton gin will be built in the next two to three years. It is not clear at this stage how an ownership structure might work. The co-owned model is the one being pursued by the industry at the moment. However, even if KAI does build a gin, KAI expects that other farmers in the region will be able to use the gin, as all of the numbers that KAI has done in considering the feasibility of the gin are based on processing cotton grown in the ORIA as well as cotton grown in the Northern Territory. KAI has considered what areas in the north of Australia can produce cotton and the likelihood that they would do so if there is a cotton gin in the ORIA (acknowledging that these are a difficult set of numbers to predict, as the exercise requires calculated estimates and assumptions).

On KAI's calculation, for any cotton gin to be commercially viable, there would be a need to balance throughput with available land for cotton production. Loosely speaking, generally accepted business acumen suggests that 100,000 bales of cotton, which is about 10,000 hectares of cotton, is required to make a cotton gin commercially viable. This volume of cotton would place KAI in a good position both with cotton throughput and to meet market demand for both lint and seed. It would [be] possible for a gin to operate commercially on lower numbers, however preferable to move quickly to increased output. Obviously, 100,000 bales is not a commercial limit.

167 Mr Menzel gave evidence that, during the week prior to the first part of the hearing in late November 2019, he was invited by the Minister for Primary Industries and Regional Development, as the President of the Shire of Wyndham-East Kimberley, but also in the knowledge that he is the Chairman of OIC's Board and a non-executive director of CGL, 'to represent my community in discussions they were having in China'.²⁵⁹ The primary purpose of this delegation was to visit Mr Wu, the principal of Shanghai Zhongfu, the parent company of KAI, who Mr Menzel described as 'our key investor in the Ord',²⁶⁰ and a cotton gin manufacturer, and to conduct 'discussions related to the

²⁵⁹ ts 473, 28 November 2019.

²⁶⁰ ts 272, 27 November 2019.

construction of a cotton gin here in the Ord'.²⁶¹ Mr Menzel gave the following evidence:²⁶²

... So we were there to confirm with the proponent here in the Ord as to what their intention was, which was to purchase and construct basically a Chinese built gin and so we went to the manufacturing plant to investigate what that gin looked like and to become more familiar with the capacity of that business. ...

... [T]here is little doubt that it's going ahead. We just wanted to understand the ownership model that might be being looked at and the - the facility, because we have a strong interest as a local community and what sort of facility is going to be [built] in our - in our local region. So we wanted to understand what they were proposing and - and if we could help facilitate their business plans, all - all the better.

168 Furthermore, Mr Boshammer gave evidence of a study commissioned by the Northern Territory farmer's organisation, NT Farmers, at a cost of \$200,000, in relation to the feasibility of constructing a cotton gin in the region, in Katherine in the Northern Territory or in Kununurra (which were 'the final two sites that they looked seriously at', having originally considered five possible sites).²⁶³ Mr Boshammer said that he has attended meetings of NT Farmers, including one five or six weeks before he gave evidence on 28 November 2019, at which this study was discussed. He said that the feasibility study was publicly released on 27 November 2019. He also said that 'we are expecting a cotton gin to be built in the north in the next two or three years'.²⁶⁴

169 Finally, as Dr Ruprecht explained in his evidence, one of the by-products of a cotton gin is cottonseed, which, together with trash, is separated in the ginning process from the lint or cotton fibre. As Dr Ruprecht said, cottonseed is 'an ideal supplement for stock to maximise use of dry standing feed and during drought'.²⁶⁵ We accept Dr Ruprecht's evidence that the construction of a cotton gin 'would also lead to significant value-add industries being developed - the main one being production of cattle feed from the cottonseed'.²⁶⁶ This would 'support at least 70,000 head of cattle by the mid-2030s'.²⁶⁷

²⁶¹ ts 272, 27 November 2019.

²⁶² ts 272, 27 November 2019.

²⁶³ ts 449, 28 November 2019.

²⁶⁴ ts 447, 28 November 2019.

²⁶⁵ Expert report of Dr John Ruprecht dated 16 September 2019 (Exhibit 16) [29].

²⁶⁶ Expert report of Dr John Ruprecht dated 16 September 2019 (Exhibit 16) [30].

²⁶⁷ Expert report of Dr John Ruprecht dated 16 September 2019 (Exhibit 16) [30].

Maize

170 Mr Dear's assumption and the reasoning for his assumption in relation to production of maize, for the purposes of his forecast in MD-35, is as follows:²⁶⁸

... I have assumed that demand for maize will not weaken. Presently, there is strong demand from South Korea for maize grown in the Ord and that demand has increased since 2014. I have no reason to think that this demand will weaken.

171 As indicated earlier, in 2018, farmers in the ORIA produced enough maize for two 10,000 tonne shipments to South Korea and in 2019 were growing enough maize for three 10,000 tonne shipments. Mr Dear forecasts that 2,500 hectares is likely to be planted with maize by OIC's members and non-member customers in each year between 2019 and 2029.

172 The respondent questions Mr Dear's assumption in relation to maize. Relying on Figure 3 in Ms Pawley's witness statement, which shows 'OIC's reported crop areas for maize ... from 2008 to 2018, compared to Mr Dear's forecast of crop areas for maize from 2019 to 2029', the respondent submits that '[m]aize has been grown at highly variable amounts over the last 10 years, with three years where none was grown at all'.²⁶⁹ The respondent also refers to evidence of Mr Boshammer that, in relation to supply of maize from the ORIA to South Korea, 'in some ways we are blessed by the very poor season over east and the dry conditions over east, so there is ... a significant market for maize[,] [b]ut we can't really expect that to keep going on'.²⁷⁰ Mr Boshammer also said that if the South Korean market 'can get maize from New South Wales or Victoria, then they will get their summer production maize from there and winter production maize from here and [we] will possibly only require two shipments of maize next year or the year after'.²⁷¹

173 However, the 'highly variable amounts' of maize, including the three years 'where none was grown at all', referred to in the respondent's submissions, occurred prior to the farmers in the ORIA directly accessing the South Korean market by shipping from the Port of Wyndham. Furthermore, although production of maize in New South

²⁶⁸ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [130].

²⁶⁹ Respondent's closing submissions [44].

²⁷⁰ ts 449, 28 November 2019.

²⁷¹ ts 449, 28 November 2019.

Wales and Victoria is ultimately likely to improve, as Mr Boshammer said, South Korea is clearly not the only market open for maize from the ORIA. In this regard, as indicated earlier, Mr Engelke gave evidence that the 'combined production [of maize] in the region for 2019 will be approximately 50,000 tonnes', whereas the three shipments to South Korea in 2019 comprised a total of only 30,000 tonnes.²⁷² As Mr Engelke also said, '[a]t these volumes and coupled with supply contracts investment in grain handling and storage becomes viable'.²⁷³ Furthermore, Mr Bloecker gave evidence that Bothkamp, which is 'an experienced and successful maize grower', grew maize on just over 50% of its 1,106 hectare property in Ord Stage 1 in 2019,²⁷⁴ and, following KAI's successful cotton trials, is 'planning double cropping cotton, together with another crop (probably maize or mung beans), as well as double cropping after horticulture (also probably maize or mung beans)'.²⁷⁵

174 We are satisfied that Mr Dear's assumption that 'demand for maize will not weaken' is sound and reasonable on the evidence before the Tribunal.

Hay

175 Mr Dear's assumption and the reasoning for his assumption in relation to production of hay, for the purposes of his forecast in MD-35, is as follows:²⁷⁶

... I have assumed that hay production is likely to increase in coming years on the back of already substantial growth over the last three years. I say this because I have observed that increasing amounts of hay is being grown in the region and I am aware, as the General Manager of the OIC, that demand for hay in the region is strong. I am aware, for example, that blocks 66, 67, 77, 78, 105, 106, part of 108, 109 and part of 115, are all being used to grow hay this year (and potentially lots 116 and 117) whereas as recently as a few years ago these lots were not being used for growing hay.

176 Mr Dear forecasts that OIC's members and non-member customers are likely to plant 950 hectares of hay in 2019, 1,750 hectares of hay in 2020, and 1,250 hectares of hay in each year from 2021 to 2029.

²⁷² Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [9].

²⁷³ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [9].

²⁷⁴ Hans-Christian Bloecker's response to respondent's witness statements and experts' reports dated 15 October 2019 (Exhibit 23) [16].

²⁷⁵ Witness statement of Hans-Christian Bloecker dated 6 September 2019 (Exhibit 22) [29].

²⁷⁶ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [125].

177 The respondent submits that 'there is ... insufficient evidence to support a prediction that there will be a substantial increase in dry season hay'.²⁷⁷ However, Mr Boshammer's evidence, which is supported by Mr Menzel's evidence, and to an extent by Mr Engelke's evidence, clearly shows that Mr Dear's assumption that 'hay production is likely to increase in coming years on the back of already substantial growth over the last three years' is sound and reasonable.

178 Mr Boshammer gave evidence that Oasis has increased its hay production from 300 tonnes in 2016 to 11,000 tonnes in 2019, and expects to grow 20,000 tonnes in 2020. Mr Boshammer said that '[i]n my experience, cattle farmers are desperate for feed'²⁷⁸ and 'I am receiving so many phone calls from local graziers looking to buy hay that I expect that I will not be able to meet demand even with 20,000 tonnes in 2020'.²⁷⁹ In order to meet demand for hay, Mr Boshammer has had to arrange for KAI to grow 150 hectares of hay for Oasis in Goomig (in Ord Stage 2) in 2020.

179 The reason for the significant increase in demand for hay in recent years is, as Mr Boshammer said, 'a change in cattle feeding practices' in the region.²⁸⁰ As Mr Boshammer explained, up until about 10 years ago, cattle farmers in northern Australia were leaving their cattle out to graze or, when feeding, were feeding using baled wet season grass. However, baled wet season grass is regarded as of poor quality for reasons including that it is not easily digested by cattle. Over recent years, beef prices have increased substantially, from around \$1.50 per kilogram to over \$3 per kilogram. Oasis started producing high quality hay and graziers came to see that they could wean young cattle onto this high quality hay and manage their herds better to get more production. In consequence, the price of hay received by Oasis increased from about \$200 a tonne five years ago, to about \$270 a tonne three years ago, and to about \$350 a tonne at present.

180 Mr Menzel also gave evidence that '[i]n my observation, and in my experience, the demand for hay grown in the Ord is strong'.²⁸¹ He said that in 2018 he and his wife sold hay to customers near Darwin and that in 2019 he has seen 'trucks carrying hay grown in the Ord heading as far as Darwin, which is a strong indicator of the demand

²⁷⁷ Respondent's closing submissions dated 11 March 2020 [57].

²⁷⁸ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [64].

²⁷⁹ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [54].

²⁸⁰ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [56].

²⁸¹ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [41].

for this product'.²⁸² Mr Engelke also gave evidence that there is 'a growing demand for reliably grown hay across the world and domestically' and that, although 'KAI has not secured an opportunity at this point, ... it is aware of the increasing demand in relation to hay ... [and] [t]he domestic demand for hay is sufficient for KAI to be looking at growing hay long term'.²⁸³

181 Mr Boshammer also gave evidence that he has plans to develop an intensive feeding industry in the region in the form of a feed yard in the Ord. In August 2019, he reached agreement with MG Corporation, the indigenous corporation representing the Miriuwung and Gajerrong people, who are the native title holders, for MG Corporation to apply for the release of 2,000 hectares of land for Oasis to use as a feed yard. He said that, if this project goes ahead, 'Oasis will have an additional market for the silage it grows in the wet season'.²⁸⁴ He also said that he intended to apply for planning approval and a clearing permit 'over the next two months', that is during the period December 2019 to January 2020.²⁸⁵ He said that he would be meeting with the Department of Planning, Lands and Heritage on 29 November 2019 and with the respondent in the first week of December 2019. Mr Boshammer said that he is 'quietly confident that we will have a feed yard being built ... next dry season; if not [then], the following'.²⁸⁶

182 On Mr Boshammer's evidence, there is certainly logic in the development of a feed yard in the region. However, we find that, even if a feed yard is not established, Mr Dear's assumption that 'hay production is likely to increase in coming years on the back of already substantial growth over the last three years' is sound and reasonable, having regard to the evidence as to existing demand in northern Australia and increasing meat prices over recent years.

Double cropping

183 Mr Dear's assumption and the reasoning for his assumption in relation to double cropping, for the purposes of his forecast in MD-35, is as follows:²⁸⁷

... I have assumed that double cropping will increase from approximately 20 hectares in 2019 to 1,000 hectares over the next ten

²⁸² Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [41].

²⁸³ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [27].

²⁸⁴ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [79].

²⁸⁵ ts 359, 27 November 2019.

²⁸⁶ ts 359, 27 November 2019.

²⁸⁷ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [131]-[133].

years. Although I have observed local farmers experiment with double cropping on a small scale over the years, I have recently observed that increasing numbers of farmers are experimenting with double cropping and, to my observation, those farmers are double cropping successfully. In my opinion, based on these observations, more farmers will move into double cropping over the next ten years. I say this because if farmers can take advantage of a situation where fixed costs such as land can be put to additional productive use with a second crop in one season (which is what double cropping represents), in my observation and in my opinion, farmers will take up this opportunity.

Although I cannot predict precisely the extent to which double cropping will be adopted, I consider a fair estimate to be up to 1,000 hectares. The reason why I have suggested that double cropping could be up to 1,000 hectares is because in my opinion this is where farmers will meet market demand for crops that can be double cropped without having a negative impact on the market. In other words, even if the region is growing up to 3,500 hectares of cotton, it is unlikely, in my opinion, that there will be market demand for up to 3,500 hectares of crops that might (on present cropping predictions) be double cropped with cotton such as mung bean, soybeans, or millet or sorghum hay.

Also, I note that I have indicated that double cropping currently occurs on 20 hectares of Ord Stage 1 land. I have based this number on my own estimation based on observation. For this reason, the actual number of hectares that has been double cropped this year may be higher than 20 hectares but I cannot know for certain until the OIC's irrigation officer has completed her calculations as to the actual amount of land that is being double cropped this year.

184 Mr Dear's assumption in relation to double cropping is strongly supported by the evidence. Indeed, on the evidence, Mr Dear's forecast, that 1,000 hectares is likely to be double cropped by OIC's members and non-member customers from 2022 onwards, appears to be conservative.

185 As Mr Menzel explained, '[d]ouble cropping is a form of polyculture where farmers grow more than one crop in the same piece of land per year'.²⁸⁸ As Mr Menzel said, whereas a single crop per season approach means that farmers only have productive crops in the ground for less than 30% of the year, while fixed costs continue throughout the year, double cropping allows farmers to 'more fully utilise the region's main resource of land and water by growing two crops in a single growing season'.²⁸⁹ Furthermore, double cropping is 'more sustainable than a single cropping', because, like crop rotation, it

²⁸⁸ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [23].

²⁸⁹ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [23].

is 'beneficial to soil biology'.²⁹⁰ Mr Menzel said that double cropping is 'already being used by local farmers' and that he and his wife 'have had reasonable success with double cropping and have produced reasonable yields'.²⁹¹

186 Similarly, Mr Bloecker gave evidence that Bothkamp has 'been experimenting with transitioning away from a single annual crop per season to double cropping', essentially for the same reasons as expressed by Mr Menzel.²⁹² He said that, in the last two years, Bothkamp 'has had success with double cropping and it is now undertaking commercial trials of double cropping across 20 hectares'.²⁹³ As indicated earlier, Bothkamp is 'particularly interested in the combination of cotton and maize for double cropping because of current market demand'.²⁹⁴ Mr Engelke also said that he expects that KAI will undertake 'more double cropping in coming years'.²⁹⁵ Similarly, and for essentially the same reasons as the other witnesses who gave evidence about double cropping, Mr Boshammer said that 'Oasis, as with other farms in the region to my observation, has been developing and adapting the method of farming known as double cropping'.²⁹⁶

187 We find, on the evidence, that there is likely to be a significant increase in double cropping by OIC's members and non-member customers and that Mr Dear's forecast of 1,000 hectares of double cropping from 2022 is sound and reasonable, although conservative. Double cropping is plainly, on the evidence before the Tribunal, a sustainable farming practice that makes efficient use of land, improves soil biology, and is likely to result in increased profitability for farmers. The likely significant increase in double cropping in the ORIA, including growing cotton as the first of the two crops, and the likely significant increase in the production of cotton and hay in the ORIA, are prime examples of the ORIA continuing to be in a state of transition, as, we found earlier, has been the case throughout much of its history.

²⁹⁰ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [27].

²⁹¹ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [26].

²⁹² Witness statement of Hans-Christian Bloecker dated 6 September 2019 (Exhibit 22) [16].

²⁹³ Witness statement of Hans-Christian Bloecker dated 6 September 2019 (Exhibit 22) [17].

²⁹⁴ Witness statement of Hans-Christian Bloecker dated 6 September 2019 (Exhibit 22) [30].

²⁹⁵ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [25].

²⁹⁶ Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [24].

Fallow land

188 Mr Dear's final assumption, for the purposes of his forecast in MD-35, is that only 76 hectares of the 15,031 hectares of agricultural land irrigated under Licence 3 will be 'fallow' each year of the forecast. This is a significant reduction from the situation in September 2019, when approximately 2,997 hectares in Ord Stage 1 was 'not being irrigated'.²⁹⁷ However, as Mr Dear explained, 'the majority of these 2,997 hectares belong to a company that grows sandalwood',²⁹⁸ and based on 'brief discussions', Mr Dear understands that the landowners 'are actively looking at growing something else themselves on that land'.²⁹⁹

189 Ms Ide submits that 'the basis for the applicant's assumption that fallow land will nearly be all farmed by 2029 has not been satisfactorily established',³⁰⁰ because 'what is, in effect, a significant change in irrigator behaviour appears to be the result of some brief discussions with the owners or lessees of that land' and no direct 'evidence from the owners or lessees of the relevant land about their intentions was presented'.³⁰¹ The respondent submits that 'that's not an appropriate basis upon which to feel comfortable or accept that previously unused land will be put to active production'.³⁰²

190 Referring to attachment MD-41 to Mr Dear's response to the respondent's witness statements and expert reports (MD-41), which, as Mr Dear said, 'shows that nearly 5,000 hectares of Ord Stage 1 land was not being irrigated in 2017 whereas by 2018 the area of land that was not being irrigated had reduced to approximately 3,550 hectares',³⁰³ Ms Ide also submits as follows:³⁰⁴

In 2017, nearly a third or around a third of [S]tage 1 was not being irrigated, and in 2018, in the order of 20 per cent was not being irrigated, and nearly not 20 per cent in 2019. These are not insubstantial portions of land that has not been put to irrigation use.

191 However, under s 32(2)(a) of the SAT Act, the Tribunal 'is not bound by the rules of evidence or any practices or procedures

²⁹⁷ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [34].

²⁹⁸ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [34].

²⁹⁹ ts 222, 27 November 2019.

³⁰⁰ ts 105-106, 12 March 2020.

³⁰¹ ts 105, 12 March 2020.

³⁰² ts 105, 12 March 2020.

³⁰³ Mathew Dear's response to respondent's witness statements and expert reports dated 21 October 2019 (Exhibit 7) [41].

³⁰⁴ ts 105, 12 March 2020.

applicable to courts of record', and may admit and accept hearsay evidence of Mr Dear's 'brief discussions' with the landowners of the majority of the 2,997 hectares that was not being irrigated in September 2019. Furthermore, we find Mr Dear to be an honest witness who, as the General Manager of OIC, has up-to-date knowledge of farmers' conduct and proposals in the ORIA in general, and Ord Stage 1 in particular, and accept his evidence that most of the 2,997 hectares of land not irrigated in 2019 is owned by a sandalwood company which is 'actively looking at growing something else themselves on that land', as Mr Dear said in evidence.³⁰⁵ It is also logical for the owner of land not used for sandalwood production to seek to put it to economic use. Furthermore, MD-41 indicates that a significant reduction in fallow land by approximately 30% (from 5,059 hectares in 2017 to 3,553 hectares in 2018) occurred in one year and an even more significant reduction in fallow land by approximately 41% occurred over the two year period 2017 to 2019 (from 5,059 hectares in 2017 to 2,997 hectares in 2019).

192 We also do not accept the submission that Mr Dear's assumption in relation to fallow land involves 'what is, in effect, a significant change in irrigator behaviour', when viewed in the context of irrigator behaviour generally over the past 16 years. MD-41 shows that the amount of fallow land over the three year period 2017 to 2019 was significantly higher than at any time over the 13 year period 2004 to 2016. Over those 13 years, the amount of fallow land ranged from 119 hectares (2012) to 1,627 hectares (2005). Indeed, in 2017, the amount of fallow land (5,059 hectares) was 211% higher than in 2005 (1,627 hectares), which was the year in which there was the highest amount of fallow land over the 13 year period between 2004 and 2016. In 2019, the amount of fallow land (2,997 hectares) was 84% higher than in 2005 (1,627 hectares). Rather than 'what is, in effect, a significant change in irrigator behaviour', Mr Dear's forecast that there is likely to be only 76 hectares of fallow land in 2029 (and generally throughout the forecast period) is more in keeping with historical irrigator behaviour than what has occurred over the period 2017 to 2019, which appears to be an aberration when viewed in the context of irrigator behaviour generally over the past 16 years.

193 Finally, our earlier findings that there is likely to be a significant increase in the production of cotton and hay, and use of double cropping, including growing cotton as the first of the two crops, also

³⁰⁵ ts 222, 27 November 2019.

strongly support Mr Dear's assumption and forecast in relation to fallow land. Given the likely transition in the ORIA to cotton becoming a dominant crop, including through double cropping, and increase in hay production, land that has been left fallow during the period 2017 to 2019 is likely to be utilised for productive cropping, as Mr Dear forecasts.

194 We are satisfied that Mr Dear's assumption and forecast in relation to fallow land in MD-35 is sound and reasonable on the evidence.

Determination of issue

195 For the foregoing reasons, the crop types and areas that should be utilised for the purpose of determining 'justified crop needs', under cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, and hence the starting point for the determination of the annual water entitlement in Licence 3, are as indicated in Mr Dear's forecast MD-35.

What crop irrigation water requirements should be utilised for the purpose of determining 'justified crop needs' under OSWAP and hence the starting point for the determination of the annual water entitlement in Licence 3?

Expert witnesses' 'consensus' in relation to crop irrigation water requirements

196 The Tribunal had the benefit of expert evidence in relation to crop irrigation water requirements from eight witnesses, namely Mr Doble, Mr Engelke, Mr Bloecker, Mr Menzel, Mr Boshammer and Dr Ruprecht, who, as indicated earlier, were called by the applicant, and Mr Lantzke and Mr Hocking, who, as also indicated earlier, were called by the respondent. We have briefly summarised each of these witnesses' qualifications and experience earlier in these reasons.³⁰⁶ Each of the eight witnesses holds relevant academic qualifications and has relevant knowledge and experience on the basis of which he is qualified to give expert evidence in relation to crop irrigation water requirements.

197 In accordance with the Tribunal's usual practice, the crop irrigation water requirements expert witnesses took part in a pre-hearing conferral, which was chaired by a member of the Tribunal,³⁰⁷ produced a joint statement,³⁰⁸ and gave their evidence

³⁰⁶ See [60] (Mr Doble), [41] (Mr Engelke), [44] (Mr Bloecker), [47]-[48] (Mr Menzel), [45] (Mr Boshammer), [127] (Dr Ruprecht) and [129] (Mr Lantzke and Mr Hocking).

³⁰⁷ Mr P de Villiers M.

concurrently at the hearing. As is often the case, the processes of pre-hearing conferral, joint statement and concurrent evidence resulted in significant consensus between the expert witnesses, relevantly in relation to the irrigation water requirements of most of the crops in question. Consequently, during concurrent evidence, we directed the expert witnesses to confer again outside the hearing room and produce a tabular summary of their evidence as to crop irrigation water requirements, including identification of the crops in relation to which they agree as to the irrigation water requirement and what that irrigation water requirement is.

198 After the expert witnesses conducted their further conferral, they handed a typed tabular summary of their evidence as to crop irrigation water requirements, which they had all signed, to the Tribunal and the parties' representatives. The Tribunal and counsel then asked questions to clarify aspects of the summary table. The Tribunal queried whether, given the consensus reached in relation to other crops, consensus could also be reached in relation to the irrigation water requirement for melons as the first crop in double cropping melons and maize. Mr Lantzke gave the following evidence:³⁰⁹

WITNESS, LANTZKE: Yes. No, I can go. Thank you. Thank you for pointing that out. No, I agree with what you're saying. I think we can come to a consensus. We can use the figures that - the 5.6 for the melon crop.

THE D.PRESIDENT: Okay. So - well, thank you for that. So it's a - are you saying then, that in the final column of the double cropping melons and maize, we can put in 5.6 plus 8.4 in the first - in the top column, and eight plus 12 in the second column?

WITNESS, LANTZKE: Yes.

199 Mr Lantzke then crossed out his earlier indication that the irrigation water requirement for melons at the crop is '5.2' and substituted '5.6 ML' in handwriting, which is consistent with the evidence of Mr Bloecker and Mr Menzel, and crossed out his earlier indication that the irrigation water requirement for melons at the farm gate is '7.4' and substituted '8 ML' in handwriting, which is also consistent with the evidence of Mr Bloecker and Mr Menzel. The summary table of the expert witnesses' evidence as to crop irrigation water requirements (with Mr Lantzke's handwritten

³⁰⁸ Joint witness statement of irrigated agriculture and sandalwood experts signed at the hearing on 27 November 2019 (Exhibit 28).

³⁰⁹ ts 432, 28 November 2019.

amendments in relation to the irrigation water requirements for melons at the crop and at the farm gate) (summary table) became Exhibit 31 in the proceedings. We reproduce the summary table immediately below.

Ex 31

	Christian Bloecker	David Menzel	Jim Engelke	Rob Boshammer	Neil Lantzke	John Ruprecht	John Doble	Greg Hocking	Consensus
Cotton									
IWR at Crop	8	8	8	8	5.7	8.8			No consensus
IWR at FG	11.5	11.5	11.5	11.5	8.2	12.6			
Hybrid Seeds									
IWR at Crop	8.5				6.2				7.7
IWR at FG	12				8.9				11
Fodder- Wet & Dry									
IWR at Crop		20		20	14				15.4
IWR at FG		24		24	20				22
Fodder - dry									
IWR at Crop		14		14	12				14
IWR at FG		16.5		16.5	17				17
Maize									
IWR at Crop	10	10		10	7.8				
IWR at FG	14	14		14	11.2				
Sandalwood									
IWR at Crop								10	8.2
IWR at FG								20	16.4
Double Cropping - Melons + Maize									
IWR at Crop	5.6 + 8.4	5.6 + 8.4			5.6 ^{11.6}				
IWR at FG	8 + 12	8 + 12			8.2 + 12				
Double Cropping - Cotton + Sorghum Hay									
IWR at Crop		7.2 + 10		7.2 + 10	5.7 + 11.2				17.2
IWR at FG		10.3 + 14		10.3 + 14	8.1 + 16				24.3
Double Cropping - Mung Beans + Maize									
IWR at Crop	5 + 10				5 + 7.8				
IWR at FG	7.2 + 14				7.2 + 11.1				

Handwritten signatures and initials:
 Top right: *Greg Hocking*
 Middle right: *John Doble*
 Middle right: *John Ruprecht*
 Middle right: *Neil Lantzke*
 Middle right: *Rob Boshammer*
 Middle right: *Jim Engelke*
 Middle right: *David Menzel*
 Middle right: *Christian Bloecker*
 Bottom right: *APL*

200 In the summary table reproduced immediately above, the expression 'IWR at FG' refers to the 'crop irrigation water requirement at the farm gate', meaning the amount of water in megalitres per hectare that is required to be received at the entry point of water into the irrigator's property (the 'farm gate') to grow the particular crop. The 'IWR at FG' is less than the crop irrigation water requirement at the diversion points where OIC diverts water from Lake Kununurra under OIC's licence to take water, because of distribution water losses along the M1 Supply Channel and subsidiary supply channels operated by OIC that convey the water to the farm gate. As discussed below, there is a dispute between the parties as to the distribution efficiency percentage to account for water distribution losses (distribution efficiency) that should be utilised as 'efficient water use', under cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, and hence the starting point for the determination of the annual water entitlement in Licence 3. The applicant contends that the distribution efficiency that should be utilised is 76% (or alternatively 77%), based on the average distribution efficiency that was achieved by OIC over the 10 year period 2009 to 2018, whereas the respondent contends that the distribution efficiency that should be utilised is 80%, which is the 'distribution efficiency target' stated in local licensing policy 2.1 in Table 8 of OSWAP.

201 In the summary table, the expression 'IWR at Crop' refers to the 'crop irrigation water requirement at the crop', meaning the amount of water in megalitres per hectare that is required to be received at the planted crop to grow that crop. The 'IWR at Crop' is less than the 'IWR at FG', because of on-farm water losses along the drains and other infrastructure that store and convey the water from the farm gate to the planted crop. It is common ground between the parties that the on-farm water use efficiency that should be utilised to account for on-farm water losses for the purpose of determining the annual water entitlement in Licence 3 is 70%, as stated in local licensing policy 2.3.2 in Table 8 of OSWAP, other than for fine seeded short duration crops (relevantly, chia) and sandalwood, as to which it should be 50%, as agreed by the crop irrigation water requirements expert witnesses in their joint statement,³¹⁰ and for 'fodder-dry', as to which it should be 82%, resulting from the crop irrigation water requirements expert witnesses' 'consensus' in the summary table.

³¹⁰ Joint witness statement of irrigated agriculture and sandalwood experts signed at the hearing on 27 November 2019 (Exhibit 28) issues 1 and 15.

202 When we received the summary table at the hearing, we said to the expert witnesses that 'we're very grateful' for the 'product of [their] labours'.³¹¹ We wish to restate in these reasons the gratitude of the Tribunal to the expert witnesses for producing the summary table and generally for the professional, conscientious and cooperative manner in which they applied their knowledge and experience to their task of assisting the Tribunal to produce the correct and preferable decision in this case.

203 Ultimately, in consequence of the consensus reached by the expert witnesses in relation to crop irrigation water requirements, the only crops as to which there remains a difference of opinion between them - and hence as to which the Tribunal is required to make a determination - are cotton, maize, sandalwood and sorghum hay (as the second crop in double cropping cotton and sorghum hay). In relation to sorghum hay, although the expert witnesses reached consensus on the total amount of water that would be required for double cropping cotton and sorghum hay (17.2 ML at the crop and 24.3 ML at the farm gate), as counsel explained:³¹²

IDE, MS: Whilst there might be agreement with the experts as to the double cropping of cotton and sorghum hay, the way that it has been reflected in the MD[-]35 is just a particular allowance for the second crop. So the way it deals with it is to say, "Well, you can crop whatever your first crop might be, but your second crop we will allow five megalitres". So it's not the case that one can simply input 17.2 in that section ... at the crop.

ASHWORTH, MS: You would instead input the second crop, would be the appropriate course.

IDE, MS: And there's not agreement on that between the experts.

204 Even though Mr Lantzke's evidence is that more water is required for sorghum hay (11.2 ML per hectare at the crop and 16 ML per hectare at the farm gate) than Mr Menzel's and Mr Boshammer's evidence (10 ML per hectare at the crop and 14 ML per hectare at the farm gate), the applicant submits that the Tribunal should prefer Mr Menzel's and Mr Boshammer's evidence of the lower water requirement for sorghum hay.³¹³

³¹¹ ts 431, 28 November 2019.

³¹² ts 434, 28 November 2019.

³¹³ ts 435, 28 November 2019 and ts 35, 12 March 2020. The reason the crop irrigation water requirement for the cotton crop in double cropping cotton and sorghum hay is lower in the evidence of Mr Menzel and Mr Boshammer (7.2 ML per hectare at the crop and 10.3 ML per hectare at the farm gate) than when cotton

Challenge to the credibility of the applicant's expert witnesses

205 The respondent made the following submission:³¹⁴

While the [a]pplicant's agricultural witnesses (with the exception of Dr Ruprecht) have substantial experience in farming in the region as well as, in some cases, academic qualifications, the Tribunal should be cautious about according weight to their evidence, given their direct financial interest in the outcome of the proceedings and, particularly in the case of David Menzel (Chairman of the Board of OIC), their direct involvement in the [a]pplicant's operations.

206 None of the five expert witnesses in respect of whom this submission was made, namely Mr Doble, Mr Engelke, Mr Bloecker, Mr Menzel and Mr Boshammer, was cross-examined in relation to the credibility of the evidence they gave concerning crop irrigation water requirements or any other matter. It was not put to any of these witnesses in cross-examination that the credibility of their evidence may be compromised by 'their direct financial interest in the outcome of the proceedings' and, in the case of Mr Menzel, by his 'direct involvement in the [a]pplicant's operations'. The witnesses were therefore denied the opportunity to respond to the challenge to their credibility in their evidence and the applicant was denied the opportunity to present evidence to respond to the challenge. Ms Ashworth submits in reply as follows:³¹⁵

There is no basis, we say, on which the Tribunal could accept that submission, absent it being put to the witnesses. And whilst we've just touched upon the occasion where Mr Menzel was asked about his wearing of different hats and his emphatic response would give confidence to the Tribunal in accepting his evidence. There is no basis on which the Tribunal could conclude that the evidence of the applicant's agricultural witnesses would be - is impugned by reason of any association with the applicant, absent that being put to them.

207 Although Ms Ashworth did not refer to the case name, in effect, her submission is that the respondent's challenge to the credibility of Mr Doble, Mr Engelke, Mr Bloecker, Mr Menzel and Mr Boshammer is in breach of the rule (or principle) in *Browne v Dunn* (1893) 6 R 67 (HL). The rule in *Browne v Dunn* was described in the following terms by Hunt J in *Allied Pastoral Holdings Pty Ltd v*

is grown as a single crop (8 ML per hectare at the crop and 11.5 ML per hectare at the farm gate) is that, when it is grown as the first crop in double cropping, cotton is planted earlier in the year (in February) towards the end of the wet season, whereas as a single crop it may be planted later in the year (in March or April) after the end of the wet season: evidence of Mr Engelke and Mr Lantzke ts 438, 28 November 2019.

³¹⁴ Respondent's closing submissions dated 11 March 2020 [87].

³¹⁵ ts 1016, 13 March 2020.

Commission of Taxation [1983] 1 NSWLR 1; (1983) 44 ALR 607; (1983) 70 FLR 447 at 16; 623; 462:

It has in my experience always been a rule of professional practice that, unless notice has already clearly been given of the cross-examiner's intention to rely upon such matters, it is necessary to put to an opponent's witness in cross-examination the nature of the case upon which it is proposed to rely in contradiction of his evidence, particularly where that case relies upon inferences to be drawn from other evidence in the proceedings. Such a rule of practice is necessary both to give the witness the opportunity to deal with that other evidence, or the inferences to be drawn from it, and to allow the other party the opportunity to call evidence either to corroborate that explanation or to contradict the inference sought to be drawn.

208 As we said earlier, under s 32(2)(a) of the SAT Act, the Tribunal 'is not bound by the rules of evidence or any practices or procedures applicable to courts of record'. Consequently, the rule in *Browne v Dunn* does not apply in SAT proceedings as part of the rules of evidence.³¹⁶ However, under s 32(1) of the SAT Act, the Tribunal 'is bound by the rules of natural justice', and the rule in *Browne v Dunn* is, as Beazley J said in *Marelic v Comcare* (1993) 47 FCR 437; (1993) 32 ALD 155; (1993) 121 ALR 114 at 443; 161; 119, ultimately, 'a procedural rule grounded in fairness'. *Marelic v Comcare* was an appeal to the Federal Court of Australia from a decision of the Administrative Appeals Tribunal (AAT) on the ground that the applicant was not afforded procedural fairness by the AAT when it affirmed the decision of Comcare that the applicant was not suffering from any continuing incapacity arising from a work related injury. In *Marelic v Comcare*, Beazley J observed and held at 443; 161; 119 as follows:

... It is not necessary to determine whether the rule, as such, applies to proceedings before the tribunal. Indeed I consider that to be the wrong question to determine. The tribunal is bound to observe the rules of procedural fairness and in that regard, the rule in *Browne v Dunn*, with the qualifications to which I have referred, is a convenient statement of the content of that aspect of procedural fairness which requires that a party be given adequate opportunity to meet the case which is put against her or him.

³¹⁶ *Comcare v Maganga* [2008] FCA 285; (2008) 101 ALD 68; (2008) 47 AAR 487 [28] (Bennett J) holding that the rule in *Browne v Dunn* has no application in the Administrative Appeals Tribunal, which, like SAT, 'is not bound by the rules of evidence but may inform itself on any matter in such manner as it thinks fit' under s 33(1)(c) of the *Administrative Appeals Tribunal Act 1975* (Cth).

209 Like the AAT, SAT is bound to observe the rules of procedural fairness and, in that regard, the rule in *Browne v Dunn* 'is a convenient statement of the content of that aspect of procedural fairness which requires that a party be given adequate opportunity to meet the case which is put against her or him'. As Hunt J held in *Allied Pastoral Holdings Pty Ltd v Commissioner of Taxation* [1983] 1 NSWLR 1; (1983) 44 ALR 607; (1983) 70 FLR 447 at 16; 623; 462, 'unless notice has already clearly been given of the cross-examiner's intention to rely upon such matters', the respondent's submission set out at [205] above would involve a denial of procedural fairness to the applicant, because it would have been necessary to squarely put the challenge to credibility and its basis to each of Mr Doble, Mr Engelke, Mr Bloecker, Mr Menzel and Mr Boshammer, and thereby put both the witness and the party calling the witness on notice as to the challenge and giving the witness and the party a fair opportunity to respond to the challenge by giving or presenting evidence.

210 The Tribunal is unaware as to whether notice had already clearly been given by the respondent to the applicant of its intention to challenge the credibility of the witnesses in terms of the submission set out at [205] above. However, it is unnecessary to determine whether the respondent's challenge to the credibility of the witnesses involves a denial of procedural fairness to the applicant in the circumstances of this case, because we do not accept the respondent's submission. Contrary to the submission, it is not correct that the witnesses in question have academic qualifications only 'in some cases'. Each of the five witnesses has relevant academic qualifications, as we set out earlier. Furthermore, each of the five witnesses has significant local knowledge and experience, on the basis of which they can express expert opinions as to the irrigation water requirements of growing the relevant crops in the particular circumstances of the Ord East Kimberley. Each of the five witnesses is, therefore, qualified to give the expert evidence they have given to the Tribunal.

211 Furthermore, the joint statement of the expert witnesses, which set out the matters on which they agree, the matters on which they disagree, and (briefly) the reasons for their disagreement, at their chaired conferral on 13 November 2019, and which was signed at the hearing on 27 November 2019, contains the following '[a]cknowledgements by expert witnesses':³¹⁷

³¹⁷ Joint witness statement of irrigated agriculture and sandalwood experts signed at the hearing on 27 November 2019 (Exhibit 28) page 1 (original emphasis).

Acknowledgments by expert witnesses

Each expert witness acknowledges that he or she:

- (a) has read the Tribunal's pamphlet entitled *A guide for experts giving evidence in the State Administrative Tribunal* and the Tribunal's orders made in this proceeding relating to expert evidence; and
- (b) is bound by the following obligations to the Tribunal:
 - (i) an overriding duty to assist the Tribunal impartially on matters relevant to the expert's area of expertise;
 - (ii) a paramount duty to the Tribunal and not to the party who engaged the expert; and
 - (iii) a responsibility to convey expert opinion to the Tribunal and not to act as an advocate for the party who engaged the expert.

212 We earlier expressed the Tribunal's gratitude to the five witnesses, Mr Doble, Mr Engelke, Mr Bloecker, Mr Menzel and Mr Boshammer, as well as to their three colleagues, Dr Ruprecht, Mr Lantzke and Mr Hocking, for the professional, conscientious and cooperative manner in which they applied their knowledge and experience to their task of assisting the Tribunal to produce the correct and preferable decision in this case. Moreover, having observed the witnesses giving evidence in a panel session over a substantial period, including in the direct exchanges between the Tribunal and the witnesses, in their responses to both counsels' questions, and in their interactions on the expert panel in concurrent evidence, we have absolutely no doubt that Mr Doble, Mr Engelke, Mr Bloecker, Mr Menzel and Mr Boshammer gave honest, candid and considered evidence, and applied their expertise to the issue at hand, based on both relevant academic qualifications and significant local knowledge and experience, to assist the Tribunal to come to the correct and preferable decision in this matter. We are satisfied that their evidence was given faithfully and conscientiously in accordance with the experts' obligations to the Tribunal expressly stated and acknowledged by the expert witnesses in the joint statement.

213 Finally, given that Mr Menzel is the witness explicitly mentioned in the submission set out at [205] above ('particularly in the case of David Menzel'), we accept Ms Ashworth's submission that on 'the occasion where Mr Menzel was asked about his wearing of

different hats ... his emphatic response would give confidence to the Tribunal in accepting his evidence'.³¹⁸ The 'occasion where Mr Menzel was asked about his wearing of different hats' occurred when he was asked by Ms Ide about 'your handwritten annotation on the last page' of the joint statement of the expert witnesses,³¹⁹ which states as follows above Mr Menzel's signature:³²⁰

I, DAVID DOUGLAS MENZEL, am CHAIRMAN OF THE OIC, THE APPLICANT. I HAVE PERFORMED MY DUTIES, AS AN EXPERT, ACCORDING TO THE GUIDE, BUT MAY BE UNABLE TO BE BOUND BY THE GUIDE.

214 The reference to 'THE GUIDE' in Mr Menzel's annotation to the joint statement above his signature set out immediately above is clearly a reference to the Tribunal's pamphlet entitled *A guide for experts giving evidence in the State Administrative Tribunal*, which was referred to in the '[a]cknowledgments by expert witnesses' in their joint statement. Mr Menzel gave the following evidence in the passage referred to by Ms Ashworth:³²¹

IDE, MS: I just wanted to clarify with you an annotation - your hand written annotation on the last page. Where you indicate that you might - that you may be unable to be bound by the guide with the concern about being bound - concerned about whether you are able to able to assist the [T]ribunal impartially?

WITNESS, MENZEL: Thank you, Ms Ide, for the opportunity. No. It's more around declarations of interest in various roles I have. And some of them get fairly complicated in that I might be wearing two or three hats in the one meeting. So I have to be well aware and declare which hat I am actually wearing and be clear in my head whose interests I am representing.

IDE, MS: Yes.

WITNESS, MENZEL: And in this case I just want to acknowledge that I was the chairman of the applicant. But fully understand that as a servant of the [T]ribunal performing as an expert my duty was to the [T]ribunal. Not to the applicant.

IDE, MS: Yes. Okay. So, then you then indicate you may be unable to be bound. Is that just a concern, or - what do you mean by that, bearing in mind of what you have just said.

³¹⁸ ts 1016, 13 March 2020.

³¹⁹ ts 472, 28 November 2019.

³²⁰ Joint witness statement of irrigated agriculture and sandalwood experts signed at the hearing on 27 November 2019 (Exhibit 28) (as written).

³²¹ ts 472-473, 28 November 2019.

WITNESS, MENZEL: Really - yes. Just deferring to the wisdom of the [T]ribunal as to my suitability as an expert. And I am aware there was some rulings made previously on that.

IDE, MS: So you understand and take seriously, as I understand it, your overriding duty to the [T]ribunal in here today?

WITNESS, MENZEL: Absolutely.

IDE, MS: You are wearing your assistant to the [T]ribunal hat today.

WITNESS, MENZEL: I am, while I am sworn to this desk. Yes.

IDE, MS: Thank you. We were just talking about the range of hats you wear, Mr Menzel. You went to China last week. What hat were you wearing when you went to China, in terms of the role that you were - what role did you perform on your China trip? Which position were you going in aid of on that visit?

WITNESS, MENZEL: I've been informed in no uncertain terms that I'm always wearing a [S]hire president's hat. I don't have the option of taking that one off and - - -

IDE, MS: Except right now.

WITNESS, MENZEL: Except right now.

215 We note that in the passage of Mr Menzel's evidence set out immediately above, the challenge as to his credibility ultimately made by the respondent was not put to him. Nevertheless, Mr Menzel explained that his annotation to the joint statement stemmed from his multiple and overlapping roles in the local community ('I might be wearing two or three hats in the one meeting') and he took the opportunity to state that, when giving evidence, he fully appreciates that he is 'a servant of the [T]ribunal performing as an expert my duty was to the [T]ribunal' and '[n]ot to the applicant'. He also said that he '[a]bsolutely' understands that his 'overriding duty [is] to the [T]ribunal' when giving evidence and that he is 'wearing [his] assistant to the [T]ribunal hat today', 'while I am sworn to this desk', referring to the table in the hearing room at which the expert witnesses were seated during their concurrent evidence.

Cotton, maize and sorghum hay

216 For the reasons which follow:

- in relation to the crop irrigation water requirement for growing cotton, we prefer the evidence of

Mr Bloecker, Mr Menzel, Mr Engelke and Mr Boshammer (8 ML per hectare at the crop and 11.5 ML per hectare at the farm gate) over the evidence of Mr Lantzke (5.7 ML per hectare at the crop and 8.2 ML per hectare at the farm gate);

- in relation to the crop irrigation water requirement for growing maize, we prefer the evidence of Mr Bloecker, Mr Menzel and Mr Boshammer (10 ML per hectare at the crop and 14 ML per hectare at the farm gate) over the evidence of Mr Lantzke (7.8 ML per hectare at the crop and 11.2 ML per hectare at the farm gate); and
- in relation to the crop irrigation water requirement for growing sorghum hay as the second crop in double cropping after cotton, we prefer the evidence of Mr Menzel and Mr Boshammer (10 ML per hectare at the crop and 14 ML per hectare at the farm gate) over the evidence of Mr Lantzke (11.2 ML per hectare at the crop and 16 ML per hectare at the farm gate).

217 In relation to each of these crops, we prefer the applicant's evidence over the respondent's evidence where they differ, because, as Ms Ashworth submits, the applicant's evidence is from 'experts who live and work in [Ord] [S]tage 1 who have expertise and are uniquely placed, given their experience in growing these crops in [Ord] [S]tage 1',³²² whereas Mr Lantzke does not possess this experience. As Mr Lantzke explained in his witness statement, the methodology he used to determine the crop irrigation water requirements in his evidence was developed by the United Nations Food and Agriculture Organisation.³²³ When he was asked by Ms Ide as to whether 'anything that you've heard [from the applicant's expert witnesses during concurrent evidence] change[s] your perspective about an appropriate [irrigation water requirement] figure at the farm gate for maize', Mr Lantzke candidly gave the following evidence about the methodology and approach he adopted in his evidence as to crop irrigation water requirements:³²⁴

Yes. Look, the figure could be higher. You know, the - just to go back, the way I've done my calculations, it's a desktop study. So this is what I was going to talk about right at the beginning. You know, and there's

³²² ts 33, 12 March 2020.

³²³ Witness statement of Neil Clifton Lantzke dated 4 September 2019 (Exhibit 14) [28].

³²⁴ ts 352-353, 27 November 2019.

limitations. So - and, as I said, there's limitations with getting data from - from other sources, but the way I've done my calculations is, as I said, to get that ETO data from - from a weather station, so that depends on the temp - the evapotranspiration depends on the temperature, the humidity, the radiation and the wind speed.

Times it by a crop factor, which is a generic figure, and come up - come up with a ballpark-type figure, and that's all they are. And I'm not saying that they're any more than that, but this is the type of calculations that we do with growers. And, you know, when you don't have more detailed information. So you can then go and modify the crop factors within those calculations if you've got some research, for example, in that area.

And - and, you know, as you go through time, you know, with - on your farm, if you get more information, you go through and change those crop factors. So, you know, if - if the grower has - has just said that he's getting higher yields by putting more water on, obviously, you're after maximum yield. Then it makes sense to do that. But I don't know the ins and outs of growing maize in Kununurra so I can't argue any - any more strongly. The figure I came up with was - was based on the calculations that I did using that methodology.

218 Although Mr Lantzke was specifically discussing his evidence as to the irrigation water requirement for maize in the passage of the evidence set out immediately above, he adopted the same methodology and approach in his evidence as to crop irrigation water requirements for all of the crops in question. We prefer the evidence based on Mr Bloecker's, Mr Menzel's, Mr Engelke's and Mr Boshammer's actual experience of the amount of water required in order to grow the relevant crop in the particular circumstances of the ORIA to Mr Lantzke's 'desktop study', which is subject to 'limitations with getting data ... from other sources', and which has 'come up with a ballpark-type figure, and that's all they are'.

219 Mr Engelke has significant recent experience of growing cotton on a total of 500 hectares in the ORIA in 2018 and 2019. As Ms Ashworth submits:³²⁵

Mr Engelke, in particular, has grown cotton here very recently, [and is] probably uniquely placed of anyone in the world to know what the irrigation water requirements of that crop are, given the newly emerging variant that's being grown and the very recent trials that have been undertaken in that regard by him.

³²⁵ ts 33, 12 March 2020.

220 We also accept Ms Ashworth's submission that Mr Engelke's evidence in relation to the crop irrigation water requirement for growing cotton is 'contemporaneous and reliable'.³²⁶

221 Mr Engelke gave the following evidence in relation to the crop irrigation water requirement for growing cotton:³²⁷

... [C]otton is a perennial plant that's forced into an annual system, so we can grow that cotton for 150 days, 160 days, 170, 180, 190, 200 days, so the longer you have a crop in the ground, the longer you have leaves photosynthesising, evapotranspiration, the more water you use. So again, the water use figure is a sort of a number that's - and Mr Lantzke's figure in some cases is probably perfectly acceptable. In other cases, it won't be.

222 Similarly, Mr Bloecker, who also has direct experience of growing cotton in the ORIA, gave the following evidence:³²⁸

I just wanted to add we grow a range of different varieties as well. So some are shorter and some are longer. So in my - my witness statement in number - paragraph - I've lost it now - paragraph 24, I mention 11 megalitres. For this year I used about 10 megalitres at farm gate. But there are other varieties that take longer to mature as well, and that may be why that MD - MD35 figure is a little bit higher [i.e. 11.9 ML per hectare at the farm gate]. So there is a range there as well. I'm specifically talking about the amount of water I used this year for the varieties that I grew.

223 In his evidence, Mr Lantzke 'assumed that [cotton] was planted in February and harvested 170 days later in mid-July'.³²⁹ However, as Mr Engelke and Mr Bloecker explained, cotton may well be planted for longer than 170 days, resulting in a higher irrigation water requirement. We prefer Mr Engelke's and Mr Bloecker's evidence as to the crop irrigation water requirement for growing cotton over Mr Lantzke's evidence, as it is based on actual experience of growing cotton in the Ord. Although Mr Menzel last grew cotton on 2015, and Mr Boshammer has not recently grown cotton, their evidence is based on significant local experience in growing crops and supports the evidence of Mr Engelke and Mr Bloecker.

224 Similarly, in relation to maize, the applicant's evidence, given by Mr Bloecker, Mr Menzel and Mr Boshammer, is based on their recent

³²⁶ ts 34, 12 March 2020.

³²⁷ ts 334, 27 November 2019.

³²⁸ ts 347, 27 November 2019.

³²⁹ Witness statement of Neil Clifton Lantzke dated 4 September 2019 (Exhibit 14) [37].

experience of growing maize in Ord Stage 1. As indicated earlier, Mr Bloecker gave evidence that Bothkamp, which is 'an experienced and successful maize grower', grew maize on just over 50% of its 1,106 hectare property in Ord Stage 1 in 2019.³³⁰ Mr Bloecker gave the following evidence, based on his significant recent experience in growing maize, as to the relevant irrigation water requirement for growing this crop in the ORIA:³³¹

... Commenting on maize. So the average for this year for the entirety of my crop was about 14 [ML] per hectare. We had a range from 12 to just over 18 [ML] per hectare. That was for maize as a primary crop.
...

225 Mr Menzel gave consistent evidence to Mr Bloecker, based on his own experience in growing maize in the ORIA:³³²

In addition to double cropping, another changing farming practice that has affected water use, certainly for Karen and me, has been to apply more water to maize crops. Instead of watering on 9-10 day intervals as we had done previously, Karen and I received advice from Pioneer Seeds last year that new research showed that a watering cycle of 7-8 day intervals would lead to better crop quality and yield. Following this advice has meant that Karen and I have increased our yield for maize and we have also increased the volume of water we apply to maize from 10-11 ML of water per hectare to 13-14 ML.

226 Mr Boshammer also gave consistent evidence to Mr Bloecker and Mr Menzel, based on his own recent experience in growing maize. In particular, like Mr Menzel, Mr Boshammer has contemporaneous experience that, in 2019, using increased water on maize resulted in increased yield. Mr Boshammer gave the following evidence:³³³

... Just one thing about this year. We've - our maize crops, because we had a fairly cool dry season, the cool dry seasons didn't necessarily decrease the evapotranspiration - daily evapotranspiration much, but that cool weather made the crop extend a bit, so we actually had maize in the ground nearly 30 days longer than we normally do in other years, so that - that meant we actually put on two extra irrigations on our maize than we normally budget for.

So that would - one of the reasons why - why we've had more - or possibly one of the reasons why we've used more water this year and maybe the reason we've got better yields this year. Whether that's going

³³⁰ Hans-Christian Bloecker's response to respondent's witness statements and experts' reports dated 15 October 2019 (Exhibit 23) [16].

³³¹ ts 350, 27 November 2019.

³³² Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [29].

³³³ ts 353, 27 November 2019.

to keep on going or not, we don't know, but I would hate to be cut short of water so we can't get those extra yields, because this year we've got - in the valley overall, we've got the best yields that have ever been achieved in the valley and probably some of the best yields on an average area in Australia.

227 In contrast to Mr Bloecker, Mr Menzel and Mr Boshhammer, Mr Lantzke conceded that he has never 'grown maize in the Ord'.³³⁴

228 Similarly, we prefer Mr Menzel's and Mr Boshhammer's evidence in relation to the crop irrigation water requirement for growing sorghum hay as a second crop in double cropping after cotton, because, unlike Mr Lantzke, they have knowledge and experience of the amount of water required to grow this crop in the ORIA. As indicated earlier, Oasis, which is the collective business name for Mr Boshhammer's farming enterprises with his son and daughter, produced 11,000 tonnes of hay in 2019 and expects to produce 20,000 tonnes of hay in 2020. Mr Menzel also has experience in growing fodder crops, including hay.³³⁵ As indicated earlier, in 2018, Mr Menzel sold hay to customers near Darwin.³³⁶

Sandalwood

229 In relation to the crop irrigation water requirement for growing sandalwood in Ord Stage 1, we prefer the evidence of Mr Doble (10 ML per hectare at the crop and 20 ML per hectare at the farm gate) over the evidence of Mr Hocking (8.2 ML per hectare at the crop and 16.4 ML per hectare at the farm gate), because Mr Doble has greater and, significantly, more recent and up-to-date knowledge and experience of growing sandalwood in the ORIA than Mr Hocking.

230 As Mr Doble explained, although Quintis first planted sandalwood in the Ord 20 years ago, 'sandalwood is still very much a recently established industry' and '[w]e are continuing to fine-tune the management of sandalwood, including by identifying the production cycle duration and yield development'.³³⁷ He added that, while Quintis 'has developed significant sandalwood management expertise, which is supplemented through Quintis' ongoing research studies in relation to sandalwood growth ..., we are still learning about the crop, even

³³⁴ ts 351, 27 November 2019.

³³⁵ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [12] and [41].

³³⁶ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [41].

³³⁷ Witness statement of John Doble dated 10 September 2019 (Exhibit 26) [14].

now'.³³⁸ Thus, 'sandalwood growing is still subject to improvements in the science and involves experimentations to increase yield'.³³⁹

231 An example of ongoing experimentation and innovation, and therefore learning, given by Mr Doble is that, whereas the sandalwood crop is currently on a six to seven round irrigation cycle at five week rotations, which equates to an annual irrigation water requirement of approximately 17-20 ML per hectare at the farm gate, '[a]s our cultivation practices have increased in effectiveness, we have brought irrigations closer together and where there is a long dry season - as has recently been the case - the number of irrigation rounds increases'.³⁴⁰ Quintis is currently investigating the possibility of eight rounds of irrigation in order to improve yield, which would equate to an annual irrigation water requirement of up to 23.5 ML per hectare at the farm gate.³⁴¹

232 Whereas Mr Doble has significant and up-to-date experience as to the crop irrigation water requirement for growing sandalwood in the Ord, managing, as he does, 3,150 hectares of land used for growing sandalwood in the ORIA, Mr Hocking's experience of the crop irrigation water requirement for growing sandalwood in the Ord is now somewhat dated. Mr Hocking worked as a consultant for Quintis in the Ord, but that work was carried out 'during the period 2010 to 2014',³⁴² and '[t]he last involvement I had with Quintis was in 2016 as a subconsultant'.³⁴³ As indicated earlier, Mr Hocking's experience overseeing systems designs for the establishment of 6,500 hectares of sandalwood in Western Australia, the Northern Territory and Queensland was during the period 2010 to 2016.

233 Neither Mr Hocking nor the respondent called into question Mr Doble's evidence that 'sandalwood is still very much a recently established industry', 'we are still learning about the crop, even now' and that 'sandalwood growing is still subject to improvements in the science and involves experimentation to increase yield'. We prefer Mr Doble's evidence, which is based on up-to-date knowledge and experience in the Ord, to Mr Hocking's evidence, which draws on knowledge and experience in 2010 to 2016. Indeed, in

³³⁸ Witness statement of John Doble dated 10 September 2019 (Exhibit 26) [23].

³³⁹ John Doble's response to respondent's witness statements and expert reports dated 16 October 2019 (Exhibit 27) [19].

³⁴⁰ Witness statement of John Doble dated 10 September 2019 (Exhibit 26) [20].

³⁴¹ Witness statement of John Doble dated 10 September 2019 (Exhibit 26) [21].

³⁴² Witness statement of Greg William Hocking dated 5 September 2019 (Exhibit 12) Annexure 1 [11.1].

³⁴³ ts 285, 27 November 2019.

cross-examination, Mr Hocking, in effect, conceded that he was basing his evidence on experience of 'the early days for sandalwood in the Ord'.³⁴⁴ When, in answer to a question from Ms Ashworth, Mr Hocking referred to his experience 'back in 2010' concerning 'what we looked at in relation to water requirements and subsequent water budgets that we looked at for the sandalwood plantations', the following evidence was given by Mr Hocking and by Mr Doble, which usefully illustrates Mr Doble's significantly more up-to-date experience in relation to the amount of water required to effectively and productively grow sandalwood in the Ord Stage 1:³⁴⁵

WITNESS, HOCKING: ... So the original basis that we looked at when we started looking at water uses and irrigation requirements back in 2010 in conjunction with tropical forestry services - we were really assuming quite a high dependency of the sandalwood on the performance of the host tree and the ability to maintain the host, and that was certainly a focus of what we looked at in relation to the water requirements and subsequent water budgets that we looked at for the sandalwood plantations.

ASHWORTH, MS: Things have moved on somewhat since 2010, in terms of the development. That was the early days for sandalwood in the Ord, wasn't it?

WITNESS, HOCKING: Yes. Yes. That was - that was 2010 when we started looking at that, and we continued to look at that process through 2014. The last involvement I had with Quintis was in 2016 as a subconsultant.

ASHWORTH, MS: Mr Doble, can I just clarify with you. Your evidence as to effective rainfall is based on what you're seeing in the field at the moment - currently?

WITNESS, DOBLE: Correct.

Determination of issue

234 For the foregoing reasons, the crop irrigation water requirements that should be utilised for the purpose of determining 'justified crop needs', under cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, and hence the starting point for the determination of the annual water entitlement in Licence 3 are:

- for cotton, 8 ML per hectare at the crop and 11.5 ML per hectare at the farm gate, as in the evidence of

³⁴⁴ ts 285, 27 November 2019.

³⁴⁵ ts 285-286, 27 November 2019.

Mr Bloecker, Mr Menzel, Mr Engelke and Mr Boshhammer;

- for maize, 10 ML per hectare at the crop and 14 ML per hectare at the farm gate, as in the evidence of Mr Bloecker, Mr Menzel and Mr Boshhammer;
- for sorghum hay as the second crop in double cropping after cotton, 10 ML per hectare at the crop and 14 ML per hectare at the farm gate, as in the evidence of Mr Menzel and Mr Boshhammer; and
- for sandalwood, 10 ML per hectare at the crop and 20 ML per hectare at the farm gate, as in the evidence of Mr Doble.

What distribution efficiency should be utilised as 'efficient water use' under OSWAP and hence the starting point for the determination of the annual water entitlement in Licence 3?

235 As indicated earlier, Mr Dear explained that the term 'distribution efficiency' is 'a measure of how much of the water that is diverted from Lake Kununurra is delivered to farms' and is 'expressed as a percentage of the volume of water supplied to farms divided by the volume of water diverted from Lake Kununurra'.³⁴⁶ As also indicated earlier, distribution losses occur as water is conveyed from the diversion points through the M1 Supply Channel and subsidiary channels operated by OIC to the farm gate. As Mr Munck explained in his evidence:³⁴⁷

Distribution losses in an irrigation system can be identified as consisting of the following main components:

- a. seepage through channel beds;
- b. evaporation;
- c. meter inaccuracy - most notably that Dethridge wheels (a type of water meter used in Ord Stage 1) have been found to under-read;
- d. channel draining required for maintenance such as weed control, infrastructure maintenance etc; and

³⁴⁶ Witness statement of Mathew Dear dated 12 September 2019 (Volume 1) (Exhibit 6.1) [55].

³⁴⁷ Expert report of Gregory Ross Munck dated 16 September 2019 (Exhibit 37) [2.1.1].

- e. channel overflows resulting from general operating activities, sudden rainfall events resulting in unplanned customer offtake closure, other sudden changes in the demand/supply balance on the supply channels such as gate malfunction etc.

236 As indicated earlier, local licensing policy 2.1 in Table 8 of OSWAP states as follows:³⁴⁸

Policy group	Policy detail
Setting water entitlements and distribution efficiency targets for water service providers	The [D]epartment grants water entitlements to irrigation water service providers on the basis that overall water use will be efficient. The current water service provider has an 80 per cent distribution efficiency target. For new areas, an 85 per cent distribution efficiency target is appropriate given that Total Channel Control systems are being used in new areas. This will increase to 90 per cent once a balancing storage connected to the M2 channel is built.

237 As also indicated earlier, the policy in the first bullet point in cl 5.2 and in local licensing policy 4.7 in Table 8 of OSWAP states that the respondent will or aims to 'grant [annual] water entitlements to match justified crop needs and *efficient water use* for the area under irrigation'.³⁴⁹ As the respondent submits, local licensing policy 2.1 in Table 8 of OSWAP clearly contemplates that 'efficient water use for the area under irrigation' by Licence 3 involves application of the '80 per cent distribution efficiency target'. The reference to '[t]he current water service provider' in local licensing policy 2.1 is plainly to OIC. Furthermore, as the respondent submits, the earlier version of OSWAP (published in December 2006) also contained the same contemplation that efficient water use in provision of water to Ord Stage 1 involves 'a target distribution of 80 per cent' and that document provided a reasonable basis for this target by referring to a 'review of Australian practice' indicated in the publication by the Australian National Committee on Irrigation and Drainage *1998-1999 Australian Irrigation Water Provider: Benchmarking Report* (ANCID, 2000). The version of OSWAP published in December 2006 stated in relation to OIC's licence to take water as follows:³⁵⁰

³⁴⁸ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1097.

³⁴⁹ Emphasis added. The word 'annual' appears in cl 5.2, but is omitted in local licensing policy 4.7 in Table 8 of OSWAP.

³⁵⁰ Attachment SP8 to the witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) page 404.

... Distribution losses between the point of diversion and the farm gate also need to be considered. After a similar review of Australian practice (ANCID, 2000), and consideration of the channel lengths and volumes flowing through the (Stage 1) M1 and Packsaddle Channel systems, a target distribution of 80 per cent was established.

238 As the respondent also submits, an 80% target 'has been a longstanding requirement of the [a]pplicant's two previous surface water licences'.³⁵¹ Commitment 27 in the operating strategy dated September 2004, compliance with which was required by term, condition or restriction 3 of Licence 1, stated that OIC 'shall undertake all reasonably necessary measures and use its best endeavours to achieve distribution efficiency of 80% by the last full annual period (Nov 2007 to Oct 2008) and dry season (2008) of the current Licence period'.³⁵² Commitment 13 in the operating strategy dated 29 March 2010, compliance with which was required by term, condition or restriction 5 of Licence 2, stated that OIC 'will achieve water delivery efficiency during the irrigation season (May-October, inclusive) of 80% of the water diverted into the irrigation system'.³⁵³

239 Ms Pawley expressed the opinion that '[a] distribution efficiency of 80% should be used to calculate a licence volume for OIC', and referred in support of this opinion to local licensing policy 2.1 in Table 8 of OSWAP, OIC having achieved an average annual distribution efficiency of 77% over the 11 years between 2008 and 2018, and to an improvement in OIC's average distribution efficiency from 75% (during the period 2008 to 2014) to 80% (during the period 2015 to 2018).³⁵⁴ In her evidence, Ms Pawley assumed that 'OIC's target distribution efficiency [in local licensing policy 2.1 in Table 8 of OSWAP] of 80 [per cent] takes into account the [ageing] irrigation infrastructure that OIC has inherited, when compared to the target distribution efficiency for new irrigation areas (and hence new infrastructure)'.³⁵⁵ We accept that this is a fair and reasonable assumption. Whereas, after stating that the Department grants annual water entitlements to irrigation service providers 'on the basis that overall water use will be efficient', and stating that '[t]he current water service provider [that is OIC] has an 80 per cent distribution efficiency

³⁵¹ Respondent's closing submissions dated 11 March 2020 [132(a)].

³⁵² Attachment SP20 to the responsive witness statement of Shaan Michelle Pawley dated 18 October 2019 (Exhibit 42) page 21.

³⁵³ Respondent's section 24 bundle dated 10 May 2019 (volume 1) (Exhibit 3.1) page 80.

³⁵⁴ Joint statement of expert witnesses in relation to water and irrigation policy dated 30 October 2019 (Exhibit 43) page 4.

³⁵⁵ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [79].

target', local licensing policy 2.1 states that '[f]or new areas, an 85 per cent distribution efficiency target is appropriate' and that '[this] will increase to 90 per cent once a balancing storage connected to the M2 channel is built'.

240 Ms Worley also expressed the opinion that a distribution efficiency of 80% should be used to calculate a licence volume in Licence 3, and made the point that the distribution efficiency of 80% is:³⁵⁶

... not a standalone value. It needs to be seen in the context of other values applied to the OIC, in particular the reliability of supply, and recognised as a trade-off.

The very high reliability of 95% negotiated by irrigators and State government development agencies with the Department through the allocation planning processes limits the total volume of water that can be made available for allocation (the allocation limit) and therefore increases the need for all licenced [sic] entitlements within the allocation limit to be required to be distributed and used efficiently.

241 On the evidence and for the reasons referred to at [236]-[240] above, the respondent submits that the Tribunal should utilise a distribution efficiency of 80% as 'efficient water use' in applying the policy in the first bullet point of cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP. In contrast, 'the applicant's position is that the actual distribution efficiency achieved over the last 11 years of the operation of the system is what should be used in any calculation of likely water requirement for the duration of the licence'.³⁵⁷

242 In our view, although local licensing policy 2.1 in Table 8 of OSWAP clearly contemplates that 'efficient water use for the area under irrigation', within the meaning of the first bullet point in cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, involves applying a distribution efficiency target of 80%, this target 'is consistent with longstanding policy requirements of the Department', commencing with the 2006 version of OSWAP, and has been 'a longstanding requirement of the [a]pplicant's two previous surface water licences', as the respondent submits,³⁵⁸ there is a cogent reason in the circumstances of this case to depart from the contemplation of local licensing policy 2.1 in Table 8 of OSWAP and its predecessor and the requirements imposed in respect of Licences 1 and 2. Moreover, in the exercise of

³⁵⁶ Responsive statement of Susan Joan Worley dated 18 October 2019 (Exhibit 40) [8]-[9].

³⁵⁷ ts 36, 12 March 2020.

³⁵⁸ Respondent's closing submissions [132(c)] and [132(a)].

discretion under cl 15(2) of Sch 1 to the RIWI Act, on the evidence and in the circumstances of this case, it is reasonable to utilise a distribution efficiency of 76%, rather than 80%, as 'efficient water use', for the purposes of application of the policy in the first bullet point in cl 5.2 and in local licensing policy 4.7 in Table 8 of OSWAP, rather than the '80 per cent distribution efficiency target' referred to in local licensing policy 2.1 in Table 8 of OSWAP. We have come to this conclusion in relation to distribution efficiency for the following reasons.

243 As Mr Dear said in evidence:³⁵⁹

... When considering the efficiency of the OIC's irrigation practices it must be remembered that the entire Ord Stage 1 irrigation scheme, including the water supply, drainage, and farming systems, were all built in the 1960s by the then State Government with Federal Government assistance, and this means that there is an inherent inefficiency built into the system as compared to modern standards.

244 Mr Dear's evidence in this respect is strongly supported by the evidence of Dr Ruprecht and Mr Munck. As indicated earlier, OIC made a significant financial investment of \$4.05 million principally during the period 2005 to 2011 to improve the distribution efficiency with which water is conveyed from the diversion points to the point of farm off-take, including in relation to the M1 Supply Channel, which neither OIC nor OIAMC owns, but rather still remains in State (Water Corporation) ownership, including, importantly, in terms of the SCADA system, which was installed progressively between 2004 and 2008, and resulted in 'closing the system'. It is common ground that OIC's significant financial investment, including in relation to the operation of the M1 Supply Channel, resulted in an improvement in distribution efficiency from 56% in 2007 to an average of 76% (according to Mr Munck's evidence) or 77% (according to Ms Pawley's evidence) over the 10 years during the period 2009 to 2018.

245 Dr Ruprecht gave evidence, which was not questioned or contradicted, and which we accept, that what he describes as 'the legacy infrastructure as transferred to the OIC, of open channels and furrow irrigation, means it is extremely difficult for OIC to [further] improve water efficiency without [further] significant investment'.³⁶⁰ Dr Ruprecht also gave evidence, which was not questioned or

³⁵⁹ Mathew Dear's response to respondent's witness statements and expert reports dated 21 October 2019 (Exhibit 7) [30].

³⁶⁰ Expert report of Dr John Ruprecht dated 16 September 2019 (Exhibit 16) [59].

contradicted, and which we accept, that, notwithstanding the significant investment by OIC, which has improved irrigation system efficiency, some of the issues resulting from the 'inefficient and ineffective' irrigation system 'inherited' by OIC from the State 'remain because the WA Government through the Water Corporation are reluctant to upgrade the M1 [S]upply [C]hannel to reduce leaks and seepage'.³⁶¹ Indeed, as Mr Dear said in evidence, 'OIC has made many attempts to lobby government (and continues to do so) to further invest in and improve the M1 infrastructure owned by the [Water Corporation]'.³⁶²

246 Dr Ruprecht also gave evidence, which was not questioned or contradicted, and which we accept, that:³⁶³

... I am not aware of any open channel irrigation scheme, with the soil type, climate and length of channel similar to the OIC, with an 80% distribution efficiency.

247 As indicated earlier, Mr Munck is a civil engineer with over 40 years' experience in the planning, design and operation of major infrastructure projects, including water supply infrastructure, with particular emphasis on large irrigation areas, including the ORIA over the last 23 years. Significantly, in terms of the weight to be given to his evidence, Mr Munck has extensive knowledge and experience of the water supply infrastructure in the ORIA. In the period May 1996 to April 1997, Mr Munck was engaged as a specialist consultant by the joint venture partners, including the Department of Natural Resources, on the ORIA Preliminary Design Stage 2. During this period, Mr Munck was responsible for the finalisation of the subdivision layout for the overall development, including the preliminary design, operational procedures and cost estimation of all major irrigation channels and drains planned for Ord Stage 2. In 2009, Mr Munck was engaged by LandCorp to provide expert assistance for the detailed design of Phase 1 of the Ord East Kimberley Expansion Project. In 2010, Mr Munck was engaged by the consultancy GHD to act as the design manager for Phase 2 of the Ord East Kimberley Expansion Project. This included direct responsibility for the detailed engineering design of all infrastructure items associated with the water supply, drainage, roads and flood protection of the 8,000 hectare subdivision in Phase 2 of the Ord East Kimberley Expansion Project.

³⁶¹ Expert report of Dr John Ruprecht dated 16 September 2019 (Exhibit 16) [49].

³⁶² Mathew Dear's response to respondent's witness statements and expert reports dated 21 October 2019 (Exhibit 7) [44].

³⁶³ Dr John Ruprecht response to respondent's witness statements and expert reports dated 11 October 2019 (Exhibit 17) [55].

248 In light of Mr Munck's significant knowledge and understanding of the 'legacy' infrastructure inherited by OIC from the State, we accept and place significant weight on the following evidence given by him:³⁶⁴

In my opinion the target system distribution efficiency of 80% has not been achieved consistently in the last 10 years. It is shown in Figure 3 that for 9 of the last 11 years the system distribution efficiency is less than 80%. I believe that it would be more appropriate to use the current average distribution efficiency (around 76%) in any calculations for the next 10 years. My opinion as to the current average distribution efficiency reflects further information that I obtained from my review of the [r]espondent's Statements as to the treatment of delivery volumes reported by OIC in its Annual Reports. If only the period from 2008 - 2014 is considered (which is not influenced by data in respect of deliveries to Stage 2), the average distribution efficiency is 75%. *It is my opinion that the target distribution efficiency is impossible to consistently achieve due to the nature of the distribution system and the likelihood that OIC will not be able to implement any significant efficiency improvements due to the high expenditure required. I consider that the efficiency shown in Column F of Table 2 should be 76% and not 80% as shown.*

249 The respondent submits 'there is nothing to suggest that such a target [80%] will not be met in the future',³⁶⁵ and refers in support to evidence of Mr Dear in which he agreed in cross-examination that 'it would be reasonable to assume ... that distribution efficiencies would ... improve as a result of more water being utilised' and his observation that, with more water going through the system, '[i]t is a lot easier to be more efficient',³⁶⁶ and to Ms Pawley's expression of this view in evidence. The respondent submits, on the basis of this evidence, as follows:³⁶⁷

... If their view is correct, it is reasonable to anticipate increases in distribution to the [a]pplicant's irrigators and increased supply to Goomig over time (which will be supplied via the M1 [S]upply [C]hannel) will improve the distribution efficiency of the [a]pplicant over 80% all the time, rather than on average. If that is so, there will be ... no constraint on development.

250 However, this submission is speculative. No detailed evidence was presented to the Tribunal to show that a distribution efficiency of

³⁶⁴ Gregory Ross Munck's response to respondent's witness statements and expert reports dated 15 October 2019 (Exhibit 38) [17] (emphasis added).

³⁶⁵ Respondent's closing submissions dated 11 March 2020 [132(a)] (this is the second (a) in [132]).

³⁶⁶ ts 216, 27 November 2019.

³⁶⁷ Respondent's closing submissions dated 11 March 2020 [132(a)] (this is the second (a) in [132]).

or above 80% is likely to be achieved within the period of Licence 3. Furthermore, this issue was not explored with Mr Munck.

251 In our view, there is a cogent reason to depart from the distribution efficiency target of 80% contemplated as 'efficient water use' in OSWAP and to utilise the average distribution efficiency achieved by OIC over the 10 year period 2009 to 2018 as 'efficient water use', for the purposes of the application of the policy in the first bullet point in cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, in the circumstances of this case, because notwithstanding the significant expenditure by OIC and the consequent very significant increase in distribution efficiency in the subsequent years, OIC has been unable to achieve the 80% distribution efficiency target consistently and on average over the 10 year period 2009 to 2018, and, as Mr Munck said and we find:

... [T]he target distribution efficiency is impossible to consistently achieve due to the nature of the distribution system and the likelihood that OIC will not be able to implement any significant efficiency improvements due to the high expenditure required. ...

252 Mr Munck and Ms Pawley disagree in their evidence as to whether the average distribution efficiency over the 10 year period 2009 to 2018 is 76% (Mr Munck) or 77% (Ms Pawley). At the Tribunal's request, during their concurrent evidence,³⁶⁸ Mr Munck and Ms Pawley helpfully provided a tabular summary of their respective calculations of distribution efficiencies achieved by OIC over the 10 year period 2009 to 2018, which became Exhibit 45 in the proceedings (distribution efficiencies table). We reproduce the distribution efficiencies table immediately below.

³⁶⁸ Mr Munck and Ms Pawley gave concurrent evidence together with Dr Ruprecht and Ms Worley.

Task 3 – Distribution Efficiencies

Year	Mr Munck Distribution Efficiency	Ms Pawley Distribution Efficiency	Reason for differences For period 2015 to 2018
2009	82%	82%	
2010	72%	72%	
2011	73%	73%	
2012	74%	75%	
2013	68%	68%	
2014	76%	77%	
2015	78%	80%	1 Greg used OIC based base data
2016	84%	85%	2 Shaan used OIC Annual Report data
2017	80%	80%	3 Difference in calculating loss associated with Goomig diversion
2018	71%	74%	
Average 2009 to 2018	76%	77%	
Average 2015 to 2018	78%	80%	
Average 2009 to 2014	74%	74%	

253 As can be seen in the distribution efficiencies table reproduced immediately above, the engineering expert witnesses agree that the average distribution efficiency achieved by OIC during the six year period 2009 to 2014 was 74%. As can also be seen in the distribution efficiencies table, the experts disagree as to the calculation of the distribution efficiency achieved by OIC in three out of the four years between 2015 and 2018 (2015, 2016 and 2018) and consequently disagree as to the average distribution efficiency achieved by OIC during the four year period 2015 to 2018 (78% according to Mr Munck and 80% according to Ms Pawley) and as to the average distribution efficiency achieved by OIC during the 10 year period 2009 to 2018 (76% according to Mr Munck and 77% according to Ms Pawley).

254 As Mr Munck and Ms Pawley explained to the Tribunal, there are two reasons for their different calculations of distribution efficiencies achieved by OIC.³⁶⁹ First, whereas Ms Pawley based her calculations of distribution efficiency on data reported in OIC's annual reports, Mr Munck observed that '[t]here are some slight discrepancies in the volumes that the annual report shows and the base data that OIC holds' for some years.³⁷⁰ Mr Munck gave an example of 'a discrepancy for the year 2016 of the volume diverted at the M1, in that there was a double counting of ... what is in the S1 channel', because, on Mr Munck's understanding, 'there was a malfunction of the major meter at the M1 metering point and there was necessitated some back-calculation ... to get the final figures'.³⁷¹ Where there is a discrepancy, Mr Munck used 'OIC based base data',³⁷² rather than the relevant annual report.

255 The second reason for Mr Munck's and Ms Pawley's different calculations of distribution efficiencies is, as Mr Munck said, 'the slight difference in approach that I have taken with regard to treating the loss associated with the Goomig conveyance',³⁷³ in that Mr Munck made an allowance for the fact that OIC's distribution efficiency data during the period 2015 to 2018 includes its delivery of water through the extension of the M1 Supply Channel, which, based on Mr Munck's experience in relation to the design of the works for Ord Stage 2, he assumed to be

³⁶⁹ Although the expert witnesses identified three '[r]eason[s] for differences' in their calculations in the distribution efficiencies table, reasons 1 and 2 are simply their respective bases in relation to the first reason for their different calculations.

³⁷⁰ ts 750, 10 March 2020.

³⁷¹ ts 750, 10 March 2020.

³⁷² This data is reproduced in Attachment MD-28 to Mr Dear's witness statement (witness statement of Mathew Dear dated 12 September 2019 (volume 2) (Exhibit 6.2)).

³⁷³ ts 752, 10 March 2020.

'the most efficient part of the ... [O]rd [S]tage 1 infrastructure'.³⁷⁴ Based on his experience, Mr Munck assumed that the distribution efficiency of the M1 Supply Channel extension built in 2010 to 2012 is 90%. Having regard to 'the average [distribution efficiency] in those years before Goomig came along' and his assumption that the recently constructed extension of the M1 Supply Channel would have a distribution efficiency of 90%, Mr Munck 'sought to isolate the efficiency solely of the M1 [Supply] [C]hannel'.³⁷⁵ Ms Pawley agreed that Mr Munck accurately explained 'the points of difference' in their calculations of distribution efficiencies.³⁷⁶

256 We prefer and accept Mr Munck's evidence as to the calculation of distribution efficiencies achieved by OIC during the period 2015 to 2018 and consequently his evidence that OIC achieved an average distribution efficiency over the 10 years during the period 2009 to 2018 of 76%, to Ms Pawley's evidence as to the calculation of distribution efficiencies over the period 2015 to 2018, and consequently her calculation of the average distribution efficiency achieved by OIC over the 10 year period 2009 to 2018 of 77%. Although it is unfortunate that there are discrepancies between 'OIC based base data' and the data reported by OIC in its annual reports during the period 2015 to 2018, the OIC based base data is, as Mr Munck considers, likely to be more accurate where there is a discrepancy. The OIC based base data is more of a primary source than the data in the annual report. Furthermore, having regard to his significant experience in relation to the infrastructure in question, we accept Mr Munck's evidence that OIC's distribution efficiencies achieved during the period 2015 to 2018 are likely to have been influenced to appear more efficient as a consequence of its supply of water to KAI's Goomig Ord Stage 2 development through the recently constructed extension of the M1 Supply Channel. Furthermore, although there is obviously an element of professional judgment in the actual adjustment, we accept Mr Munck's adjustment on the basis of his significant experience.

257 We therefore find, on Mr Munck's evidence, that the average distribution efficiency achieved by OIC during the 10 year period 2009 to 2018 was 76%.

258 For the foregoing reasons, the distribution efficiency that should be utilised as 'efficient water use', under cl 5.2 and local licensing

³⁷⁴ ts 629, 9 March 2020.

³⁷⁵ ts 629, 9 March 2020.

³⁷⁶ ts 752, 10 March 2020.

policy 4.7 in Table 8 of OSWAP, and hence the starting point for the determination of the annual water entitlement in Licence 3, is 76%. This is the average distribution efficiency achieved by OIC, with significant expenditure, over the 10 year period 2009 to 2018, and we find, on Mr Munck's evidence, that 'the target distribution efficiency [of 80%] is impossible to consistently achieve due to the nature of the distribution system and the likelihood that OIC will not be able to implement any significant efficiency improvements due to the high expenditure required'.³⁷⁷ We note, however, that the outcome in this case does not turn on whether the distribution efficiency utilised as efficient water use in these proceedings is 76% or 77%, as discussed at [271]-[272] below.

Should the annual water entitlement in Licence 3 include an allocation for draining the M1 Supply Channel to avoid flooding in the town of Kununurra and, if so, what amount?

259 Mr Dear gave evidence, which was not questioned or contradicted, and which we accept, that although the M1 Supply Channel was originally designed so as to be able to receive and convey stormwater runoff from the town of Kununurra, since that time there has been a significant increase in the population of the town and the manner of building construction has changed from 'small houses built largely on stilts, to larger homes built on concrete slabs with concrete driveways', with the consequence that, when there are significant rain events ('meaning rain that delivers above 25 [millimetres] of water onto saturated ground'³⁷⁸), stormwater runoff from the town 'creates a drainage burden that is more than the M1 [S]upply Channel was designed to tolerate'.³⁷⁹ As Mr Dear said, when there is significant rain delivering above 25 millimetres of water onto saturated ground, 'it may be necessary to drain the M1 [Supply] Channel to mitigate stormwater inflows and protect the town from inundation'.³⁸⁰ In his witness statement, Mr Dear said that 'this happens at least 5 times a year'.³⁸¹ On each occasion OIC needs to drain the M1 Supply Channel to protect Kununurra from inundation, OIC loses approximately 1 GL of water. In cross-examination, Mr Dear clarified that the five times a year he refers to in his witness statement 'would be an average'.³⁸²

³⁷⁷ Gregory Ross Munck's response to respondent's witness statements and expert reports dated 15 October 2019 (Exhibit 38) [17].

³⁷⁸ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [87].

³⁷⁹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [86].

³⁸⁰ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [87].

³⁸¹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [89].

³⁸² ts 213, 27 November 2019.

The applicant submits, therefore, that the annual water entitlement in Licence 3 should include an allocation of 5 GL for OIC having to drain the M1 Supply Channel at least five times a year.³⁸³

260 Although, in her responsive witness statement, Ms Pawley 'disagree[d] that this is a loss of irrigation water as OIC is draining the M1 [Supply] [C]hannel of stormwater runoff (which is not irrigation water)',³⁸⁴ in her oral evidence she agreed with Mr Dear 'that he would need to divert 1 [GL] that he wouldn't normally have to divert to refill the channel' when there is a significant rainfall event.³⁸⁵ In effect, Ms Pawley ultimately recognised in her evidence that the annual water entitlement in Licence 3 should include a 5 GL allowance for OIC's loss of '1 [GL] ... about five times a year' to avoid flooding in the town of Kununurra when there is a significant rainfall event. The respondent did not submit otherwise.

261 In our view, the annual water entitlement in Licence 3 should include an allocation of 5 GL for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event on average five times a year.

What is the correct and preferable decision as to the annual water entitlement that should be specified in Licence 3?

Annual water entitlement 'to match justified crop needs and efficient water use'

262 Under s 27(2) of the SAT Act, the purpose of this review 'is to produce the correct and preferable decision at the time of the decision upon the review'. The applicant contends that the correct and preferable decision is that the Tribunal should specify an annual water entitlement of 335 GL in Licence 3. In contrast, the respondent contends that the correct and preferable decision is that the Tribunal should specify an annual water entitlement of 258.7 GL in Licence 3. However, of course, as, under s 27(2) of the SAT Act, it is 'the function of the Tribunal ... to consider the material before it and form its own view as to any appropriate annual water entitlement to be included in Licence 3 [...], having regard to the considerations identified in cl 7(2) of [S]ch 1 to the [RIWI] Act[,] and [n]either OIC nor the respondent [bears] any legal or practical onus in relation to that matter',³⁸⁶

³⁸³ ts 67, 12 March 2020.

³⁸⁴ Responsive witness statement of Shaan Michelle Pawley dated 18 October 2019 (Exhibit 42) [73].

³⁸⁵ ts 632, 9 March 2020.

³⁸⁶ *Ord Irrigation Cooperative Ltd v Department of Water* [124].

as Ms Ashworth submits, 'it's not a binary proposition between 335 [GL] and the figure put forward by the respondent'.³⁸⁷

263 For the reasons which follow, in our view, the correct and preferable decision at the time of the decision upon the review is to specify the annual water entitlement in Licence 3 as 335 GL.

264 As we said at [127] above, the agreed 'starting point ... for determining a licence volume for OIC for the 10 year term of the licence' in the joint statement of the expert witnesses in relation to water and irrigation policy, Dr Ruprecht, Mr Munck, Ms Worley and Ms Pawley, which, as we said at [128] above, was also embraced by the parties as the correct 'starting point' for determining the annual water entitlement by the Tribunal in Licence 3, is:³⁸⁸

Apply a calculation (based on crop area, crop water requirements, distribution and on-farm water use efficiency - as if for a new licence application)[.]

265 As we also said at [128] above, the water and irrigation policy expert witnesses' and parties' 'starting point' for determining the annual water entitlement in Licence 3 reflects the terms of the relevant guiding policy in cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, which state that the Department's policy is to grant annual water entitlements 'to match justified crop needs and efficient water use for the area under irrigation'. As there is no cogent reason to depart from the application of this guiding policy, it should be applied on the basis of our findings set out earlier in relation to:

- the crop types and areas that should be utilised for the purpose of determining 'justified crop needs';
- the crop irrigation water requirements that should be utilised for the purpose of determining 'justified crop needs'; and
- the distribution efficiency that should be utilised as 'efficient water use'.

266 Furthermore, on the evidence and in the circumstances of this case, the annual water entitlement should include an allocation of 5 GL for draining the M1 Supply Channel to avoid flooding in the town of

³⁸⁷ ts 129, 27 November 2019.

³⁸⁸ Joint statement of expert witnesses in relation to water and irrigation policy dated 30 October 2019 (Exhibit 43) page 2.

Kununurra when there is a significant rainfall event on average five times a year (1 GL on each occasion).

267 Ultimately, in light of our findings set out above in relation to crop types and areas, crop irrigation water requirements, and efficient water use, the correct and preferable version of the detailed calculations carried out by Ms Pawley is the calculation in Exhibit 33 (Additional calculation - Version 3).

268 Ms Pawley's calculation in Exhibit 33 (Additional calculation - Version 3) incorporates the following inputs, which, for the reasons set out earlier, we accept:

- (1) Mr Dear's forecast in MD-35 of crop types and areas likely to be planted by OIC's members and non-member customers in 2029;
- (2) Crop irrigation water requirements as agreed ('consensus') between the crop irrigation expert witnesses and otherwise Mr Bloecker's, Mr Menzel's, Mr Engelke's and Mr Boshammer's evidence as to the irrigation water requirement for cotton, Mr Bloecker's, Mr Menzel's and Mr Boshammer's evidence as to the irrigation water requirement for maize, Mr Menzel's and Mr Boshammer's evidence as to the irrigation water requirement for sorghum hay (in double cropping with cotton) and Mr Doble's evidence as to the irrigation water requirement for sandalwood; and
- (3) 76% distribution efficiency.

269 We reproduce Ms Pawley's calculation in Exhibit 33 (Additional calculation - Version 3) immediately below.

Additional calculation – Version 3 (calculation using Mr Dear's forecast of crop types and areas for 2029 with the "consensus" irrigation water requirement figures, and Mr Doble's, Mr Boshammer's, Mr Engelke's and Mr Bloecker's irrigation water requirement figures and a distribution efficiency of 76%)

I have provided in the table below a calculation of OIC's irrigation water requirements (Version 3) for its forecast of crop types and areas for 2029 following conferral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019). Assumptions are annotated below. I have calculated this volume to be 336.3 gigalitres per year.

Crop type	Mr Dear's 2029 crop forecast (ha)	Crop irrigation water requirement at crop (ML/ha)	Crop (A x B)/1000 (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	Irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	Irrigation water required at diversion points (GL)
	A	B	C = (A x B)/1000	D	H = B / (D/100)	E = C / (D/100)	F	I = H / (F/100)	G = E / (F/100)
Bananas	2	20.2	0.0	70%	28.9	0.1	76%	38.0	0.1
Cereals (oats, millet)	0	7.0	0.0	70%	10.0	0.0	76%	13.2	0.0
Chia	250	7.3	1.8	50%	14.6	3.7	76%	19.2	4.8
Chickpeas	532	5.2	2.8	70%	7.4	4.0	76%	9.8	5.2
Citrus	4	9.8	0.0	70%	14.0	0.1	76%	18.4	0.1
Cotton	3000	8.0	24.0	70%	11.5	34.5	76%	15.1	45.4
Cucurbits	370	5.2	1.9	70%	7.4	2.7	76%	9.8	3.6
Fodder - wet and dry	625	15.4	9.6	70%	22.0	13.8	76%	28.9	18.1
Fodder - dry	625	14.0	8.8	82%	17.0	10.6	76%	22.4	14.0
Fresh beans	30	4.5	0.1	70%	6.4	0.2	76%	8.5	0.3
Hybrid seeds	750	7.7	5.8	70%	11.0	8.3	76%	14.5	10.9
Maize (inc corn, sweet corn)	2500	10.0	25.0	71%	14.0	35.0	76%	18.4	46.1
Mangos	478	8.2	3.9	70%	11.7	5.6	76%	15.4	7.4
Mixed horticulture (inc okra and soybeans)	350	6.1	2.1	70%	8.7	3.1	76%	11.5	4.0
Rice	0	7.8	0.0	70%	11.1	0.0	76%	14.7	0.0
Sandalwood	5400	10.0	54.0	50%	20.0	108.0	76%	26.3	142.1
Sugarcane	2	15.4	0.0	70%	22.0	0.0	76%	28.9	0.1
Pre-irrigation allowance	7784	1.1	8.2	70%	1.5	11.7	76%	2.0	15.4
10% double cropping	1000	10.0	10.0	71%	14.0	14.0	76%	18.4	18.4
Fallow	76	0.0	0.0	70%	0.0	0.0	76%	0.0	0.0
Area without survey	38	7.7	0.3	70%	11.0	0.4	76%	14.5	0.6
Total irrigation water required (GL)			158.4			255.6			336.3
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15032								
Average irrigation water required per hectare of cropped area (ML/ha)		42.01	10.54			17.00			22.37

* Struckthrough summation figures have been removed as they were an error in the original document (Exhibit 5)

Assumptions – Version 3

- a) Mr Dear's forecast of individual crop types and areas for 2029 [Attachment MD35];
- b) I have split the 2029 forecast area 50:50 between "Fodder - wet and dry" and "Fodder - dry";
- c) The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - i. Mr Bloecker, Mr Menzel, Mr Engelle and Mr Boshammer's IWR for cotton of 8 ML/ha at the crop and 11.5 ML/ha at the farm gate;
 - ii. The expert's consensus IWR for "fodder – wet and dry" of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - iii. The expert's consensus IWR for "fodder – dry" of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent;
 - iv. The expert's consensus IWR for hybrid seeds of 7.7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - v. Mr Bloecker, Mr Menzel and Mr Boshammer's IWR for maize of 10 ML/ha at the crop and 14 ML/ha at the farm gate;
 - vi. Mr Dobie's IWR for sandalwood of 10 ML/ha at the crop and 20 ML/ha at the farm gate;
 - vii. Mr Menzel and Mr Boshammer's IWR for double cropping of 10 ML/ha at the crop and 14 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - viii. a provision of 1.5 ML/ha at the farm gate for "pre-irrigation allowance" and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- d) the Ord plan's policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) (50 per cent) and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and "fodder – dry" (82 per cent) resulting from the expert's consensus IWR, maize (71 per cent) resulting from Mr Bloecker, Mr Menzel and Mr Boshammer's IWR and double cropping (71 per cent) resulting from Mr Menzel and Mr Boshammer's IWR;
- e) the Applicant's distribution efficiency (76 per cent); and
- f) the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.

270 Ms Pawley's calculation reproduced immediately above shows that the annual water entitlement 'to match justified crop needs and efficient water use for the area under irrigation', under cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, is 336.3 GL. Adding 5 GL as an allocation for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event would result in an annual water entitlement of 341.3 GL in Licence 3. However, as indicated earlier, the applicant only seeks an annual water entitlement of 335 GL.³⁸⁹ Consequently, the correct and preferable decision as to the annual water entitlement that should be specified in Licence 3 cannot be more than 335 GL, even though the annual water entitlement that matches justified crop needs and efficient water use under OSWAP, and including an allocation of 5 GL for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event, would result in an annual water entitlement of 341.3 GL.

271 As we said earlier, the outcome in this case does not turn on whether the distribution efficiency that should be utilised as 'efficient water use' under OSWAP is 76% or 77%. Ms Pawley's calculation which inputs the Tribunal's findings in relation to crop types and areas and crop irrigation water requirements, and a distribution efficiency of 77%, is the calculation in Exhibit 51 (Additional calculation - Version 4), which we reproduce immediately below.

³⁸⁹ ts 134, 25 November 2019 (opening) and ts 47-49, 12 March 2020 (closing).

Additional calculation – Version 4 (calculation using Mr Dear’s forecast of crop types and areas for 2029 with the “consensus” irrigation water requirement figures, and Mr Boshammer’s, Mr Engelke’s and Mr Bloeker’s irrigation water requirement figures and a distribution efficiency of 77%)

I have provided in the table below a calculation of OIC’s irrigation water requirements (Version 4) for its forecast of crop types and areas for 2029 following conferral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019) and evidence given by the policy experts at the hearing in Kununurra and Perth (9 – 10 March 2020). Assumptions are annotated below. I have calculated this volume to be 331.9 gigalitres per year.

Crop type	Mr Dear’s 2029 crop forecast (ha)	Crop irrigation water requirement at crop (ML/ha)	Crop irrigation water required at the crop (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	Irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	Irrigation water required at diversion points (GL)
	A	B	C = (A x B)/1000	D	H = B / (D/100)	E = C / (D/100)	F	I = H / (F/100)	G = E / (F/100)
Bananas	2	20.2	0.0	70%	28.9	0.1	77%	37.5	0.1
Cereals (oats, millet)	0	7.0	0.0	70%	10.0	0.0	77%	13.0	0.0
Chia	250	7.3	1.8	50%	14.6	3.7	77%	19.0	4.7
Chickpeas	532	5.2	2.8	70%	7.4	4.0	77%	9.6	5.1
Citrus	4	9.8	0.0	70%	14.0	0.1	77%	18.2	0.1
Cotton	3000	8.0	24.0	70%	11.5	34.5	77%	14.9	44.8
Cucurbits	370	5.2	1.9	70%	7.4	2.7	77%	9.6	3.6
Fodder - wet and dry	625	15.4	9.6	70%	22.0	13.8	77%	28.6	17.9
Fodder - dry	625	14.0	8.8	82%	17.0	10.6	77%	22.1	13.8
Fresh beans	30	4.5	0.1	70%	6.4	0.2	77%	8.3	0.3
Hybrid seeds	750	7.7	5.8	70%	11.0	8.3	77%	14.3	10.7
Maize (inc corn, sweet corn)	2500	10.0	25.0	71%	14.0	35.0	77%	18.2	45.5
Mangos	478	8.2	3.9	70%	11.7	5.6	77%	15.2	7.3
Mixed horticulture (inc okra and soybeans)	350	6.1	2.1	70%	8.7	3.1	77%	11.3	4.0
Rice	0	7.8	0.0	70%	11.1	0.0	77%	14.5	0.0
Sandalwood	5400	10.0	54.0	50%	20.0	108.0	77%	26.0	140.3
Sugarcane	2	15.4	0.0	70%	22.0	0.0	77%	28.6	0.1
Pre-irrigation allowance	7784	1.1	8.2	70%	1.5	11.7	77%	1.9	15.2
10% double cropping	1000	10.0	10.0	71%	14.0	14.0	77%	18.2	18.2
Fallow	76	0.0	0.0	70%	0.0	0.0	77%	0.0	0.0
Area without survey	38	7.7	0.3	70%	11.0	0.4	77%	14.3	0.5
Total irrigation water required (GL)			158.4			255.6			331.9
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15032								
Average irrigation water required per hectare of cropped area (ML/ha)			10.54			17.00			22.08

* Struckthrough summation figures have been removed as they were an error in the original document (Exhibit 5)

Assumptions – Version 4

- a) Mr Dear's forecast of individual crop types and areas for 2029 [Attachment MD35];
- b) I have split the 2029 forecast area 50:50 between "Fodder - wet and dry" and "Fodder - dry";
- c) The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - i. Mr Bloecker, Mr Menzel, Mr Engelke and Mr Boshammer's IWR for cotton of 8 ML/ha at the crop and 11.5 ML/ha at the farm gate;
 - ii. The expert's consensus IWR for "fodder – wet and dry" of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - iii. The expert's consensus IWR for "fodder – dry" of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent;
 - iv. The expert's consensus IWR for hybrid seeds of 7.7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - v. Mr Bloecker, Mr Menzel and Mr Boshammer's IWR for maize of 10 ML/ha at the crop and 14 ML/ha at the farm gate;
 - vi. Mr Doble's IWR for sandalwood of 10 ML/ha at the crop and 20 ML/ha at the farm gate;
 - vii. Mr Menzel and Mr Boshammer's IWR for double cropping of 10 ML/ha at the crop and 14 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - viii. a provision of 1.5 ML/ha at the farm gate for "pre-irrigation allowance" and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- d) the Ord plan's policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) (50 per cent) and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and "fodder – dry" (82 per cent) resulting from the expert's consensus IWR, maize (71 per cent) resulting from Mr Bloecker, Mr Menzel and Mr Boshammer's IWR and double cropping (71 per cent) resulting from Mr Menzel and Mr Boshammer's IWR;
- e) the distribution efficiency is assumed to be 77 per cent; and
- f) the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.

272 Ms Pawley's calculation reproduced immediately above shows that the annual water entitlement that matches OIC's justified crop needs and a distribution efficiency of 77% is 331.9 GL. Adding an allocation of 5 GL for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event would result in an annual water entitlement of 336.9 GL in Licence 3. As the applicant only seeks an annual water entitlement of 335 GL in Licence 3, there is no practical consequence as to whether we utilise 76% or 77% distribution efficiency.

273 It follows that, applying the Department's guiding policy in cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, to grant annual water entitlements 'to match justified crop needs and efficient water use for the area under irrigation', and including an appropriate allocation of 5 GL per year for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event, on the evidence and in the circumstances of this case, the annual water entitlement in Licence 3 should be specified as (more than) 335 GL, which is the annual water entitlement the applicant seeks. We now turn to consider whether there is any cogent reason to depart from the application of the Department's recoupment policy in relation to unused water entitlements in the second bullet point in cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, the mandatory relevant matters for consideration under cl 7(2) of Sch 1 to the RIWI Act, and achievement of the relevant objects stated in s 4(1) of the RIWI Act.

Is there any cogent reason to depart from the unused water recoupment policy?

274 As indicated earlier, OIC has historically underutilised its annual water entitlement of 335 GL under Licences 1, 2 and 3.³⁹⁰ Although initially OIC diverted 93% (1 November 2003 - 31 October 2004) and 92% (1 November 2004 - 31 October 2005) of the annual water entitlement, in the 2008 calendar year (which was the year in which the full capabilities of the SCADA system became operational), the percentage of the annual water entitlement diverted reduced to 51%. Over the 11 year period between 2008 and 2018, OIC diverted an average of 162 GL per year, which was only 48% of the annual water entitlement. However, in 2019, the amount of water diverted by OIC

³⁹⁰ On 3 December 2015, the Tribunal granted an interim mandatory injunction, under s 90 of the SAT Act, stating that, until further order, 'the annual water entitlement referred to in condition 2 [of Licence 3] is [335 GL]'.

increased significantly to approximately 74% of an annual water entitlement of 335 GL.

275 As also indicated earlier, the second bullet point in cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP contains a recoupment policy by the Department for unused water entitlements which have never been used or have not been used for more than two consecutive years. Clause 5.2 states that the Department will 'recoup unused water from existing licensees at times of their licence renewal'. Local licensing policy 4.7 states that the Department will 'recoup water entitlements (part or full) that have never been used or have not been used for more than two consecutive years'. Clause 5.2 also explains that unused water entitlements 'will be recouped', because 'maintaining reliability for unused entitlements would mean the storage level that triggers restrictions on electricity generation would be higher than it needs to be'.

276 By the reviewable decision made on 14 August 2015, which specified an annual water entitlement of 225 GL in Licence 3, the Department recouped 110 GL per year of unused water from OIC's Licence 2 at the time of its renewal in terms of Licence 3. In these proceedings, the respondent contends, in effect, that there should be recoupment of 76.3 GL of unused water from OIC's Licence 2 at the time of its renewal in terms of Licence 3. In support of this contention, the respondent relies on the evidence of Ms Pawley that 'a licence of 243.8 [GL] [or 258.7 GL] per year would have been more than sufficient to meet OIC's diversions between 2008-2018'.³⁹¹ The respondent also relies on the evidence of Ms Pawley and Ms Worley that recoupment of unused water from OIC's Licence 2, at the time of its renewal in terms of Licence 3, is necessary to ensure that there is enough water for all of the contemplated land releases within Ord Stages 2 and 3. We will review and discuss Ms Pawley's and Ms Worley's evidence in relation to the amount of water likely to be required for Ord Stages 2 and 3 within the 10 year term of Licence 3 when considering whether the proposed taking and use of water under Licence 3 'may prejudice other current and future needs for water', under cl 7(2)(d) of Sch 1 to the RIWI Act, below. We find below that the proposed taking and use of 335 GL per year of water under Licence 3 would not prejudice other current and future needs for water, because there is not likely to be any alternative or competing user for any part of OIC's annual water entitlement, if specified as 335 GL,

³⁹¹ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) page 33.

within the 10 year term of the licence, and there is likely to be sufficient water within the 750 GL per year allocation limit for the Main Ord subarea to enable such development in Ord Stages 2 and 3 as is likely to occur within the 10 year term of the licence.

277 In our view, there are three cogent reasons to depart from the application of the recoupment policy in respect of unused water by OIC in cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, on the evidence and in the circumstances of this case.

278 The first cogent reason to depart from the recoupment of unused water policy in OSWAP in the circumstances of this case is that the annual water entitlement 'to match justified crop needs and efficient water use for the area under irrigation' under OSWAP, and including an appropriate allocation of 5 GL for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event, is (more than) 335 GL, which was the annual water entitlement under Licence 2 (part of which the respondent seeks to recoup as never having been used on its renewal) and is the annual water entitlement sought by the applicant in its application to renew Licence 2. On the evidence and in the circumstances of this case, therefore, recoupment of any unused water from Licence 2, at the time of its renewal in terms of Licence 3, would be inconsistent with the Department's policy in OSWAP to grant annual water entitlements to match justified crop needs and efficient water use for the area under irrigation.

279 The second cogent reason to depart from the recoupment of unused water policy in OSWAP in the circumstances of this case is that, as we found at [63] above, the ORIA has never settled and stabilised in terms of a dominant crop or crop mix for more than 10 to 15 years at any time in its history and has been in a state of transition throughout much of this time. In particular, and most significantly, the period 2008 to 2018, which is the period focussed on by Ms Pawley, in her evidence, and by the respondent, in its contention, as justifying recoupment of unused water from OIC, is a prime example of a period of transition, because it is the period of, and following, the collapse and effective cessation of the sugar industry in the ORIA. At [60] above, we accepted the evidence of Mr Boshammer that, for most farmers in Ord Stage 1 who had planted the once-dominant crop of sugarcane:³⁹²

³⁹² Witness statement of Robert John Boshammer dated 10 September 2019 (Exhibit 18) [13].

As has often been the case in my 34 years in the ORIA, following the closure of the sugar mill in 2007, the region had to re-invent itself. ...

280 At [61] above, we accepted similar evidence of Mr Menzel that '[t]he history of sugarcane production and the need to diversify to other crops exemplifies the character of farming in Ord Stage 1, and the ORIA more broadly'.³⁹³ Given the significant disruption and transition in farming in the ORIA consequent upon the demise of sugarcane, which had been the dominant crop for 12 to 15 years until about 2007, we also accept Mr Menzel's evidence that 'historical water use over the last 10 years is an *extremely* poor measure of future water needs'³⁹⁴ and Mr Engelke's similar evidence that 'given the nature of the ORIA, looking at Stage 1 water use over the last decade or so to determine future water allocation is misguided'.³⁹⁵

281 The second cogent reason for departing from the application of the recoupment policy in respect of unused water in OSWAP, in the circumstances of this case, is well expressed in the applicant's following closing submission, which we accept.³⁹⁶

Understanding the ORIA in that way - its farming practices based on reinvention, of change and renewal - is critical in determining the correct and preferable decision as to annual water entitlement. It is precisely for that reason that looking at a 10-year window of cropping practices in order to determine irrigation needs for the next 10 years is, we say, inappropriate.

282 The third cogent reason to depart from the recoupment of unused water policy in OSWAP in the circumstances of this case is that, at the time when OIC made the bulk of its significant investment in water use efficiency of \$4.05 million during the period 2005 to 2011 and achieved a very significant improvement in distribution efficiency as a result from 56% in 2007 to an average of 76% over the 10 year period 2009 to 2018, OSWAP did not exist in its current form and cl 4.11 of SP 11 provided (and continues to provide) as follows:³⁹⁷

...

The Department will not recoup unused water entitlements that are a result of investment in water use efficiency. However, it is expected

³⁹³ Witness statement of David Douglas Menzel dated 6 September 2019 (Exhibit 20) [22].

³⁹⁴ David Menzel's response to respondent's witness statements and expert reports dated 16 October 2019 (Exhibit 21) [22] (original emphasis).

³⁹⁵ Witness statement of Jim Engelke dated 5 September 2019 (Exhibit 24) [60].

³⁹⁶ ts 57, 12 March 2020.

³⁹⁷ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1030 and 1793.

that the water saved will be utilised, either through trading or expansion of the existing operation.

The [D]epartment may take action to ensure the water saved is used, in particular where the demand for accessing the water resources is in excess of the sustainable limit. The licensee should take all reasonable actions to ensure the utilisation of the entitlement or run the risk of the [D]epartment recouping and re-distributing the water entitlement. Profits from the redistribution of these entitlements should be returned to the previous holder of the entitlement.

...

283 Mr Dear gave evidence, which was not questioned or contradicted, and which we accept, that after the SCADA system was made operational, there was a reduction in distribution losses of (conservatively) 50 GL to 60 GL per year, although 'it could very well be much higher than that'.³⁹⁸ Mr Dear also gave evidence, which was not questioned or contradicted, and which we accept, that OIC 'strives for efficiency savings for a number of reasons, not least of which is that it has been envisaged for some time that water savings will be used to irrigate the East Bank ... [which] is approximately 1,750 hectares of Ord Stage 1 that, when developed, will draw upon OIC's existing water allocation'.³⁹⁹ OIC 'anticipates that the East Bank will require an allocation of 21 GL of water per annum', which '[a]ssuming a distribution efficiency of 74%[,] ... means that the OIC will require 28.37 GL of water annually to supply the East Bank'.⁴⁰⁰ Mr Dear explained that there has been 'some delay in the intended timeline', as it was only in June 2018 that agreement was reached between MG Corporation and the State Government as to the unimproved value of the land, and, as at 28 June 2019, when Mr Dear and Mr Menzel from OIC met with representatives of MG Corporation, MG Corporation 'was still looking for development partners for the East Bank ... [and] was in the process of negotiating with Mr ... Boshammer in relation to the development of most of the East Bank'.⁴⁰¹ OIC's proposal to use water savings to develop the East Bank area of Ord Stage 1 satisfies the Department's 'expect[ation] that the water saved will be used, either through trading or expansion of the existing operation' under cl 4.11 of SP 11, although as Ms Ide properly conceded in the respondent's closing submissions, the 'expect[ation]' is

³⁹⁸ ts 207, 27 November 2019.

³⁹⁹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [61].

⁴⁰⁰ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [63].

⁴⁰¹ Witness statement of Mathew Dear dated 12 September 2019 (volume 1) (Exhibit 6.1) [67].

'effectively an aspirational matter, rather than a matter of application of the policy'.⁴⁰²

284 Ms Pawley calculated the amount of distribution savings as a result of OIC's investment in water use efficiency, consistently with Mr Dear's estimate of 50 GL to 60 GL per year, at 57.1 GL per year, on the basis of the amount of water diverted by OIC during the period 2008 to 2019. Mr Munck calculated the amount of water saved as 67 GL per year, on the basis of full utilisation of the annual water entitlement of 335 GL. We prefer Ms Pawley's calculation, because it reflects the actual amount of water that has been saved on average each year as a result of investment in water use efficiency by OIC. SP 11 stated at the time OIC made its significant investment in water use efficiency and achieved very significant savings of 57.1 GL per year (and continues to state) that '[t]he Department will not recoup unused water entitlements that are a result of investment in water use efficiency'.

285 The respondent 'resists the assertion that [the efficiency gains achieved by OIC should not be recouped because of the terms of cl 4.11 of SP 11] as it is not accepted that SP 11 is the policy to be applied in the circumstances'.⁴⁰³ The respondent submits that 'cl 5.2 of OSWAP is that applicable policy, which only permits retention of efficiency gains above expected targets are immune from recoupment, that is, where the efficiency target of 80% has been achieved'.⁴⁰⁴ The respondent submits that the relevant local licensing policy is 2.1 in Table 8 of OSWAP, which, as indicated earlier, states that '[t]he [D]epartment grants water entitlements to irrigation water service providers on the basis that overall water use will be efficient' and '[t]he current water service provider [that is, OIC] has an 80 per cent distribution efficiency target'.⁴⁰⁵ In support of this submission, the respondent relies on cl 5.7 of OSWAP which, as indicated earlier, states that '[w]here a local policy differs from a statewide policy, the local policy in this allocation plan is applied'.⁴⁰⁶

286 We accept the respondent's submission that local licensing policy 2.1 in Table 8 of OSWAP 'differs' from cl 4.11 of SP 11, because both provisions concern water use efficiency and savings, and that,

⁴⁰² ts 993, 13 March 2020.

⁴⁰³ Respondent's closing submissions dated 11 March 2020 [223].

⁴⁰⁴ Respondent's closing submissions dated 11 March 2020 [223].

⁴⁰⁵ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1097.

⁴⁰⁶ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1096.

consequently, under cl 5.7 of OSWAP, 'the local policy in this allocation plan is applied'. However, as the applicant submits in reply, 'OSWAP did not exist [in its current form] at the time that those investments were made [by OIC], nor did it exist [in its current form] at the time that those savings ... would be considered to have been realised',⁴⁰⁷ and:⁴⁰⁸

... [T]here was an immediate saving in this system at the time after the investments were made, that is, in 2008, when the SCADA system became operational and the system was closed. That is the point in time at which the savings were crystallised in tangible form. ...

287 As Ms Ashworth submits, 'the savings were crystallised in a tangible form' in 2008, during the operation of Licence 1. OSWAP did not exist in its current form at that time. However, SP 11 provided at that time (and continues to provide) that 'unused water entitlements that are a result of investment in water use efficiency' will not be recouped by the Department. Furthermore, although the percentage of the annual water entitlement utilised by OIC reduced from 79% in 2007 to 51% in 2008 and was 55% in 2009, when the respondent granted the renewal of Licence 1 in terms of Licence 2 on 7 April 2010, it did not seek to recoup any of the unused annual water entitlement of 335 GL in Licence 1.

288 Contrary to the respondent's submission, finding that, in the circumstances of this case, there is a cogent reason to depart from the recoupment policy in OSWAP, because, at the time when OIC made its significant investment in water use efficiency and thereby achieved a very significant improvement in distribution efficiency, OSWAP did not exist in its current form whereas SP 11 stated (and continues to state) that the respondent 'will not recoup unused water entitlements that are a result of investment in water use efficiency', does not mean that 'the applicant would be able to bank ... the 2008 efficiency gains for the foreseeable future without any evidence that it has put its efficiency savings towards expansion of its operations' or that 'those efficiency gains would be carried over continuously'.⁴⁰⁹ As indicated earlier, cl 4.11 of SP 11 states that the respondent 'may take action to ensure the water saved is used, *in particular where the demand for accessing the water resources is in excess of the sustainable limit*'⁴¹⁰ and that the licensee 'should take all reasonable actions to ensure the

⁴⁰⁷ ts 998, 13 March 2020.

⁴⁰⁸ ts 999, 13 March 2020.

⁴⁰⁹ ts 995-996, 13 March 2020.

⁴¹⁰ Emphasis added.

utilisation of the entitlement or run the risk of the [respondent] recouping and re-distributing the water entitlement'. We find below, when considering whether the proposed taking and use of water 'may prejudice other current and future needs for water', under cl 7(2)(d) of Sch 1 to the RIWI Act, that there is likely to be sufficient water within the 750 GL per year (sustainable) allocation limit for the Main Ord subarea to enable such development in the Ord East Kimberley Expansion Project as is likely to occur within the 10 year term of the licence. Certainly, if and when the (sustainable) annual allocation limit of the Main Ord subarea is reached, it would be reasonably open to the respondent to 'recoup and re-distribute' any unused water that has been saved as a result of OIC's investment, as stated in cl 4.11 of SP 11. However, unless and until that occurs, there is a cogent reason, in the circumstances of this case, to depart from the recoupment policy in OSWAP in respect of the unused water entitlements that are a result of investment by OIC, principally during the period 2005 to 2011. This does not mean that SP 11 'is the policy to be applied in the circumstances'.⁴¹¹ As the respondent submits, 'cl 5.2 of OSWAP is the applicable policy'.⁴¹² However, as we said earlier, a relevant provision of policy cannot replace the discretion of the decision-maker, and cannot be inflexibly applied by a decision-maker, regardless of the merits of the particular case. In this case, the merits include the fact that OIC made a significant investment in water use efficiency and thereby achieved a very significant improvement in distribution efficiency at a time when OSWAP did not exist in its current form and SP 11 stated (and continues to state) that the respondent 'will not recoup unused water entitlements that are a result of investment in water use efficiency'. The merits of this particular case in this respect constitutes a cogent reason to depart from the application of the recoupment of unused water policy in cl 5.2 (and local licensing policy 4.7 in Table 8) of OSWAP in the circumstances.

289 The respondent also submits that:⁴¹³

... [T]he efficiency improvements were required to be done to comply with the applicant's licence conditions. They were not done to take advantage of SP11, which may have permitted retention of the efficiency gains.

⁴¹¹ Respondent's closing submissions dated 11 March 2020 [223].

⁴¹² Respondent's closing submissions dated 11 March 2020 [223].

⁴¹³ ts 989, 13 March 2020.

290 As indicated earlier, commitment 27 in the operating strategy dated September 2004 stated that OIC 'shall undertake all reasonably necessary measures and use its best endeavours to achieve distribution efficiency of 80% by the last full annual period (Nov 2007 to Oct 2008) and dry season (2008) of the current Licence period'.⁴¹⁴ As also indicated earlier, term, condition or restriction 3 of Licence 1 required OIC to comply with the operating strategy, and also stated that the obligations set out in the operating strategy 'shall form part of the terms and conditions of this Licence'.⁴¹⁵ However, even if the water use efficiency improvements carried out by OIC were done to comply with term, condition or restriction 3 in Licence 1, they were carried out at the time when SP 11 provided (as it continues to provide) that the respondent 'will not recoup unused water entitlements that are a result of investment in water use efficiency'. '[Compliance] with the applicant's licence conditions' and '[taking] advantage of SP 11' are not mutually exclusive. Indeed, cl 4.11 of SP 11 expressly recognises that '[l]icences may ... contain conditions requiring the development and implementation of water conservation strategies that would include the use of efficient systems'. Notwithstanding this recognition, cl 4.11 of SP 11 provided at the time OIC made the bulk of its significant investment in water use efficiency and achieved a very significant improvement in distribution efficiency (and continues to provide) that the respondent 'will not recoup unused water entitlements that are a result of investment in water use efficiency'.

291 The respondent also submits that SP 11 does not relevantly permit non-recoupment of unused water entitlements that are the result of investment by OIC in water use efficiency, because OIC has not complied with the part of cl 4.11 which states that 'it is expected that the water saved will be utilised, either through trading or expansion of the existing operation'. The respondent submits:⁴¹⁶

At the moment there is no market for trading of entitlements because we're not at full allocation, and everyone agrees that. Similarly, the applicant has not demonstrated how that saved water, the 67 [GL] or, on our calculation, 57.1 [GL], while Mr Dear's calculation, 50 to 60 [GL], were in fact utilised as there has not been a 50 to 60 [GL] in its use post- 2008.

⁴¹⁴ Attachment SP 20 to responsive witness statement of Shaan Michelle Pawley dated 18 October 2019 (Exhibit 42) page 21.

⁴¹⁵ Respondent's section 24 bundle dated 10 May 2019 (volume 1) (Exhibit 3.1) page 18.

⁴¹⁶ ts 992, 13 March 2020.

292 However, as we found earlier, OIC has a plan to utilise 28.37 GL (assuming a distribution efficiency of 74%) of the water saved as a result of its investment in water use efficiency on the East Bank development in Ord Stage 1. Furthermore, as counsel properly conceded on behalf of the respondent, the provision in cl 4.11 of SP 11 that 'it is expected that the water saved will be utilised, either through trading or expansion of the existing operation' is 'effectively an aspirational matter, rather than a matter of application of the policy'.⁴¹⁷

293 Finally, we note that cl 1.4 of SP 11 states, as indicated earlier, that this policy 'does not apply to ... unused water entitlements that are a result of investment in water use efficiency'.⁴¹⁸ Although cl 1.4 is unfortunately worded, when it is read in the context of cl 4.11, on its proper interpretation, cl 1.4 does not exclude 'unused water entitlements that are a result of investment in water use efficiency' *from the application of SP 11*. Rather, when read in the context of cl 4.11, on its proper interpretation, cl 1.4 excludes 'unused water entitlements that are a result of investment in water use efficiency' *from the application of recoupment* under SP 11, as provided in cl 4.11.

Mandatory relevant considerations under cl 7(2) of Sch 1 to the RIWI Act and achievement of relevant objects in s 4(1) of the RIWI Act

294 As indicated earlier, in the exercise of discretion under cl 15(2) of Sch 1 to the RIWI Act to include terms, conditions and restrictions at the point of renewal of Licence 2 in terms of granting Licence 3, and in particular in determining what annual water entitlement to specify in Licence 3, the Tribunal is required to have regard to the mandatory relevant considerations set out in cl 7(2)(a)-(h) of Sch 1 to the RIWI Act. As also indicated earlier, s 4(3) of the RIWI Act requires the Tribunal to seek to ensure that the objects stated in s 4(1) of the RIWI Act are achieved when determining what terms, conditions and restrictions are to be included in Licence 3. We set out the objects stated in s 4(1) of the RIWI Act at [81] above. Only objects (a) and (b) are relevant to this review.

'whether the proposed taking and use of water ... are in the public interest'
(cl 7(2)(a))

295 As we said at [84] above, the expression 'public interest' in cl 7(2)(a) of Sch 1 to the RIWI Act is defined in cl 1 of Sch 1 to the

⁴¹⁷ ts 993, 13 March 2020.

⁴¹⁸ Respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) pages 1021 and 1783.

RIWI Act to mean 'public interest having regard to any economic, social or recreational benefits to the public, or to a section of the public' and the meaning of the expression 'public interest' is broad in scope and 'imports a discretionary value judgment to be made by reference to undefined factual matters confined only by the subject matter, scope and purpose of the statute in question'.⁴¹⁹ As we said at [85] above, the 'objects' (or purpose) of Pt III of the RIWI Act, which are relevant to delineating the scope of the expression 'public interest' under cl 7(2)(a) of Sch 1 to the RIWI Act, are set out in s 4(1) of the RIWI Act. The objects which relevantly inform the scope of the expression 'public interest' are to provide for the 'sustainable use and development [of water resources] to meet the needs of current and future users',⁴²⁰ 'to promote the orderly, equitable and efficient use of water resources',⁴²¹ and to provide for 'the protection of [water-dependant] ecosystems and the environment in which water resources are situated, including by the regulation of activities detrimental to them'.⁴²² As we also indicated earlier, the expression 'use and development' is defined in s 4(2) of the RIWI Act to include, relevantly, 'use and development for ... commercial ... purposes'.

296 As the respondent submits, a key consideration in terms of 'public interest' is whether the annual water entitlement specified in Licence 3 'will result in a portion of the [annual water entitlement] which will not be used, or not used efficiently'.⁴²³ The respondent also submits that it is not in the public interest to specify an annual water entitlement of 335 GL in Licence 3, because it is 'in the public interest that as much water as is reasonably available is made available for future development areas, and that water is not held by the [a]pplicant if it will not be used'.⁴²⁴ However, as we found earlier, applying OSWAP, the annual water entitlement in Licence 3 'to match justified crop needs and efficient water use for the area under irrigation', and including an appropriate allocation of 5 GL for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event, is (more than) the 335 GL sought by the applicant. We are, therefore, satisfied that an annual water entitlement of 335 GL will be used, and used efficiently, by OIC's members and non-member customers, and that the proposed taking and use of this amount of water

⁴¹⁹ *ICM Agriculture Pty Ltd v Commonwealth* [20].

⁴²⁰ Section 4(1)(a)(i) of the RIWI Act.

⁴²¹ Section 4(1)(b) of the RIWI Act.

⁴²² Section 4(1)(a)(ii) of the RIWI Act.

⁴²³ Respondent's closing submissions [191].

⁴²⁴ Respondent's closing submissions [192].

by OIC is in the public interest in terms of economic and sustainable use and development of water resources to meet the needs of current and future users and the orderly, equitable and efficient use of water resources. It is in the public interest for an annual water entitlement of 335 GL to be specified in Licence 3, because it is likely to be used, and used efficiently, for the growing of crops, which advances the economy of the region and the State, particularly where, as in this case, as we discuss below in relation to whether the proposed taking and use of water 'may prejudice other current and future needs for water' (under cl 7(2)(d) of Sch 1 to the RIWI Act), there is not likely to be any alternative or competing user for any part of that water within the term of Licence 3 and there is likely to be sufficient water within the 750 GL per year allocation limit for the Main Ord subarea to enable such development in the Ord East Kimberley Expansion Project as is likely to occur within the next 10 years. Furthermore, enabling the economic development of the ORIA, by the economic and sustainable use and development of the vast water resource and the orderly, equitable and efficient use of that resource, is the very purpose for which the ORIA was established. Moreover, economic advancement of the region is also likely to facilitate social benefits to the public in the region, whether directly or indirectly involved in farming or not. It also follows that we are satisfied that specifying an annual water entitlement of 335 GL in Licence 3 achieves the objects stated in s 4(1)(a)(i) and s 4(1)(b) of the RIWI Act to provide for the 'sustainable use and development [of water resources] to meet the needs of current and future users' and 'to promote the orderly, equitable and efficient use of water resources'.

'whether the proposed taking and use of water ... are ecologically sustainable ... [and] are environmentally acceptable' (cl 7(2)(b) and (c))

297 The respondent properly concedes that '[t]here is nothing to suggest that the proposed taking and use [of 335 GL per year] is not ecologically sustainable and environmentally acceptable'.⁴²⁵ As discussed below in relation to whether the proposed taking and use of water 'may prejudice other current and future needs for water' (under cl 7(2)(d) of Sch 1 to the RIWI Act), the (sustainable) allocation limit of 750 GL per year for the Main Ord subarea is not likely to be reached within the 10 year term of Licence 3. Furthermore, as indicated earlier, under OSWAP, '[a]llocation limits do not include water released for ...

⁴²⁵ Respondent's closing submissions dated 11 March 2020 [195].

the downstream environment'.⁴²⁶ Consequently, the proposed taking and use of water would leave sufficient water for environmental flows in the ORIA. We are therefore satisfied that the proposed taking and use of 335 GL per year is ecologically sustainable and environmentally acceptable, and is consistent with the object stated in s 4(1)(a)(ii) of the RIWI Act to provide for 'the protection of [water-dependant] ecosystems and the environment in which water resources are situated, including by the regulation of activities detrimental to them'.

'whether the proposed taking and use of water ... may prejudice other current and future needs for water' (cl 7(2)(d))

298 The respondent submits that specifying the annual water entitlement in Licence 3 as 335 GL 'would prejudice future needs for water by tying up water unnecessarily that could be allocated to others in the future'.⁴²⁷ However, on the evidence before the Tribunal, there is not likely to be any alternative or competing user for any part of the annual water entitlement of 335 GL under Licence 3 during the term of this licence.

299 As we said at [39] above, Ms Pawley gave evidence that, as at August 2019, 382.3 GL per year (or approximately 51%) of the 750 GL per year allocation limit for the Main Ord subarea 'has already been licensed for irrigation' and a total of 120 GL per year 'has been committed (that is a licence application was approved pending conditions being met)' to KAI for development of the Goomig farmland in Ord Stage 2.⁴²⁸ Including both licensed and committed water, therefore, the Main Ord subarea is 63% allocated. As indicated by Ms Pawley in Table 1 of her witness statement set out at [39] above, 279.7 GL of the 750 GL per year allocation limit for the Main Ord subarea is still available for allocation (in addition to the 88 GL committed to KAI for the development of the Goomig farmland, beyond the 32 GL per year already licensed for that development in Stage 2). Ms Pawley gave evidence that the remaining 279.7 GL per year 'could be used to irrigate between 9,200 and 23,700 hectares (depending of the types of crops planted) of new agricultural land' and that '[w]ithout recoupment [from OIC], between about 32,500 and 47,000 hectares (depending on types of crops planted) of the target 51,000 hectares of agricultural land can be developed using water

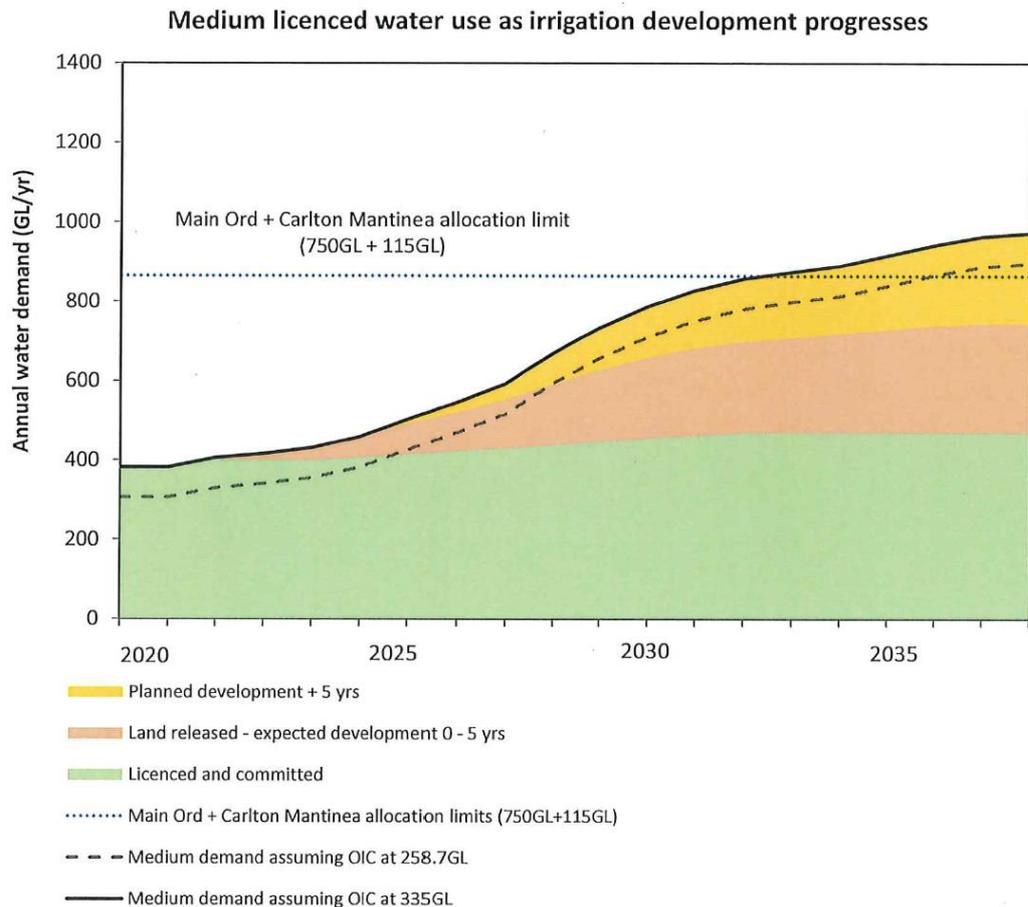
⁴²⁶ Clause 4.1 of OSWAP (respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) page 1073).

⁴²⁷ Respondent's closing submissions dated 11 March 2020 [196].

⁴²⁸ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [56].

within the existing 750 [GL] per year allocation ... limit of the Main Ord subarea'.⁴²⁹

300 However, Ms Pawley recognises in her evidence that 'it is likely that full development [of Ord Stage 2 and Ord Stage 3] will not occur within the 10 year term of OIC's licensed water entitlement'.⁴³⁰ Similarly, in its closing submissions, the respondent states that '[t]he current modelling of the Department shows that the Main Ord [subarea] allocation limit will not be met for the duration of the licence to 2029/2030'.⁴³¹ The Department's current modelling referred to in this submission is shown in the following diagram prepared by Ms Worley.⁴³²



301 Ms Worley also indicates the 'considerable timeframe for development stages' of land proposed to be developed in Ord Stage 2 and Ord Stage 3, on 'a reasonable timeframe projection based on date of

⁴²⁹ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [122].

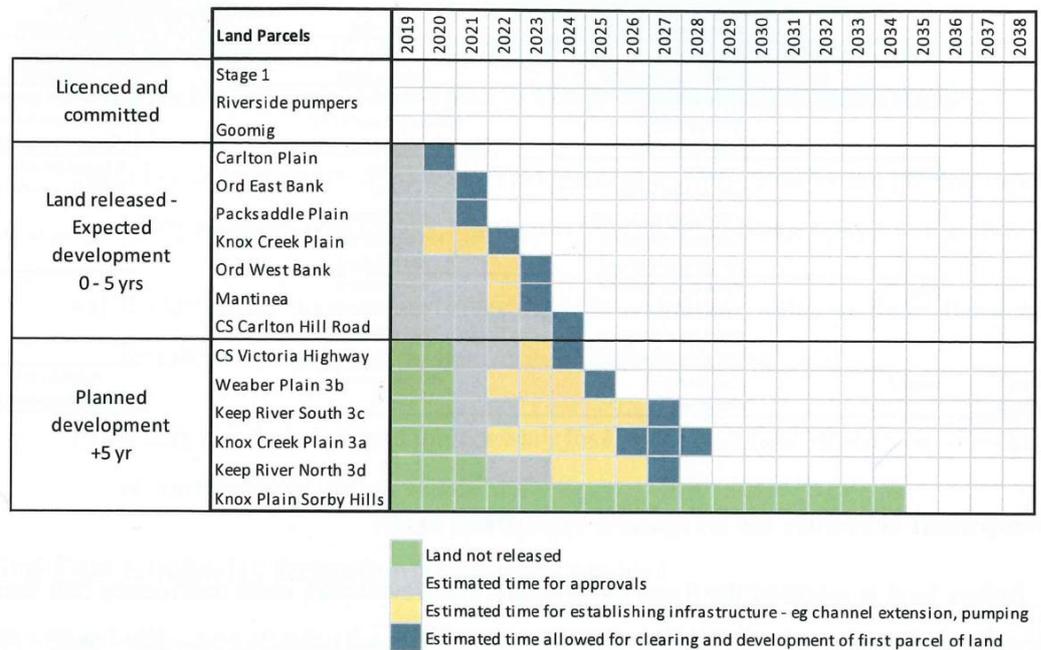
⁴³⁰ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [122].

⁴³¹ Respondent's closing submissions dated 11 March 2020 [169].

⁴³² Exhibit 35.

land release', in Figure 2 in her witness statement, which is reproduced immediately below.⁴³³

Figure 2: Ord East Kimberley Irrigation Development timeframe estimates (at 2019)



302 In Figure 2 in Ms Worley's witness statement reproduced immediately above, all of the 'Land Parcels' in 'Land Released - Expected development 0 - 5 yrs' are in Ord Stage 2 (in Western Australia), as is the first 'Land Parcel' in 'Planned development +5 yr', namely CS Victoria Highway. The other 'Land Parcels' in 'Planned development +5 yr' are in Ord Stage 3 (in the Northern Territory). On the basis of Ms Worley's evidence in the diagram and figure reproduced in the preceding two paragraphs, the respondent submits that, if the annual water entitlement specified in Licence 3 is 335 GL, then the Main Ord and Carlton-Mantina allocation limits will be reached 'in approximately 2032' and '[t]his would most likely impact on water availability for Northern Territory Stage 3 and the Knox [Plain] cockatoo sands areas'.⁴³⁴

303 In relation to Ord Stage 3, Ms Worley gave evidence that the Northern Territory 'did not accept any of the responses to an initial [e]xpression of [i]nterest in 2016 for the 14,000 [hectare] Stage 3'.⁴³⁵ She said that the Northern Territory Department of Environment and Natural Resources is in 'the final stages of soil capability studies to

⁴³³ Witness statement of Susan Joan Worley dated 5 September 2019 (Exhibit 39) [35].

⁴³⁴ Respondent's closing submissions dated 11 March 2020 [184].

⁴³⁵ Witness statement of Susan Joan Worley dated 5 September 2019 (Exhibit 39) [37(i)].

advance the understanding of the extent of land suitable for agriculture and is currently intending to put out another [e]xpression of [i]nterest within the next 12 months' (that is by September 2020).⁴³⁶ However, as Ms Worley also said, in order for Ord Stage 3 to be developed, it is first necessary for there to be an intergovernmental agreement in place between Western Australia and the Northern Territory and 'a future developer will be required to negotiate an Indigenous Land Use Agreement'.⁴³⁷ In relation to an intergovernmental agreement, Ms Worley said that this 'has been a work in progress over several years' and that 'officers from the Northern Territory have just requested that we move towards completing that, that our Ministers set up a meeting, that they start to have a discussion'.⁴³⁸ Ms Worley said that, as a result, '[p]eople from within the Department, including myself' were scheduled to hold a 'meeting with Northern Territory representatives later this month [that is in March 2020], to discuss' an intergovernmental agreement.⁴³⁹ Ms Worley also gave evidence that, to her knowledge, there is '[n]ot yet' any 'support for ... [an] intergovernmental agreement ... at the [M]inisterial level'.⁴⁴⁰ She added that '[i]t was discussed with the previous Ministers, but not with current Ministers'.⁴⁴¹

304 Assuming that the Department's '[m]edium licenced [sic] water use as irrigation development progresses' timeframe for Ord Stage 2 and Ord Stage 3 depicted in Ms Worley's diagram reproduced at [300] above is correct, the evidence shows that there is not likely to be any alternative or competing user for any part of the annual water entitlement of 335 GL in Licence 3 within the 10 year term of the licence and that there is likely to be sufficient water within the 750 GL per year allocation limit for the Main Ord subarea to enable such development as is likely to occur during the 10 year term of Licence 3. Furthermore, we accept Mr Munck's evidence that the Department's currently anticipated timeframes for development of Ord Stage 2 and Ord Stage 3 are 'very optimistic', because 'around 20,000 [hectares] [which is controlled by KAI in Stage 2] could take up to 20 years to develop', 'assuming a reasonable land development rate of 900 hectares per year'.⁴⁴² Mr Munck considers that 'a development rate of

⁴³⁶ Witness statement of Susan Joan Worley dated 5 September 2019 (Exhibit 39) [37(i)].

⁴³⁷ Witness statement of Susan Joan Worley dated 5 September 2019 (Exhibit 39) [37(i)].

⁴³⁸ ts 702, 10 March 2020.

⁴³⁹ ts 702, 10 March 2020.

⁴⁴⁰ ts 703, 10 March 2020.

⁴⁴¹ ts 703, 10 March 2020.

⁴⁴² Gregory Ross Munck's response to respondent's witness statement and expert reports dated 15 October 2019 (Exhibit 38) [11].

900 hectares per year ... throughout the Ord expansion area would be optimistic but reasonable', given that it is 50% above the development rate of 3,000 hectares in Goomig by KAI over 5 years to 2019 (at an average rate of 600 hectares per year).⁴⁴³ We also accept Dr Ruprecht's opinion that the Department's timeframe for development of Ord Stage 3, which is most of the development shown as 'Planned development + 5 yrs' on the diagram reproduced at [301] above, is 'optimistic', given that an intergovernmental agreement still needs to be negotiated and finalised, expressions of interest have not yet been sought or approved, land has not yet been released, environmental and other approvals will need to be obtained from Northern Territory government departments, and an Indigenous Land Use Agreement will need to be negotiated and finalised with the native title holders. However, even assuming that the Department's current timeframe for development of Ord Stage 2 and Ord Stage 3 is reasonable, we find that the proposed taking and use of 335 GL of water per year in Licence 3 would not prejudice other current and future needs for water by existing or future potential irrigators within Ord Stages 1, 2 and 3.

305 As indicated earlier, one of the strategies in cl 2.3 of OSWAP is to 'optimise the water available for new development and power generation by recouping unused water entitlements'. Furthermore, as also indicated earlier, cl 5.2 of OSWAP states that unused water entitlements 'will be recouped because maintaining reliability for unused entitlements would mean the storage level that triggers restrictions on electricity generation would be higher than it needs to be'. As Ms Pawley explained in her evidence, under the water supply agreement entered into in 1994, Pacific Hydro has the right to release water at rates sufficient to generate at least 210 gigawatt hours of electricity per financial year when the water levels in Lake Argyle exceed 78 metres AHD.⁴⁴⁴ Ms McCallum gave the following evidence, which was not questioned or contradicted, and which we accept:⁴⁴⁵

At the current hydropower demand (226 gigawatt hours per year), modelling shows that unused water entitlements impact hydropower restrictions when the total licenced [sic] irrigation entitlements is closer to the allocation limit. If total licenced [sic] annual water entitlements from the Main Ord subarea increased to the allocation limit of 750 GL/year, a hydropower restriction above the 78 m AHD Class 2 restriction level would need to be introduced to meet the modelling

⁴⁴³ Gregory Ross Munck's response to respondent's witness statement and expert reports dated 15 October 2019 (Exhibit 38) [23].

⁴⁴⁴ Witness statement of Shaan Michelle Pawley dated 9 September 2019 (Exhibit 41) [131].

⁴⁴⁵ Witness statement of Simone Seensee McCallum dated 30 August 2019 (Exhibit 47) [54].

targets. In this scenario, a restriction to limit hydropower demand to 100 gigawatt hours per year needs to be put in place when the Lake Argyle falls below 92 m AHD to meet the modelling targets.

306 The 'modelling targets' referred to by Ms McCallum include the full irrigation allocation should be met in 95% of years and the hydropower targets based on the water supply agreement commitment to generate at least 210 gigawatt hours of electricity per financial year when the water levels in Lake Argyle exceed 78 metres AHD. The effect of the modelling referred to by Ms McCallum in her evidence set out in the preceding paragraph is that, if total licensed annual water entitlements from the Main Ord subarea increased to the allocation limit of 750 GL per year, in order to ensure the full irrigation allocation is met in 95% of years, a hydropower restriction would need to be introduced when water levels in Lake Argyle were greater than 78 metres AHD, with the consequence that potentially less than 210 gigawatt hours of electricity per financial year could be generated.

307 However, as Ms Ide said in opening the respondent's case, the 'hydro power generation issue ... has changed from where we were a few years ago'.⁴⁴⁶ This is because the Argyle Diamond Mine, which appears to have been responsible for more than half of the hydroelectric power demand as at August 2019, is closing in 2020. As Ms McCallum said in oral evidence, the closure of the Argyle Diamond Mine means that demand for hydroelectric power will be reduced by more than 50%. Consequently, unless a major alternative electricity customer is established in the region, there is not likely to be any restriction on hydroelectricity production to ensure 95% reliability of water for irrigation, even if the 750 GL per year allocation limit for the Main Ord subarea is reached. Although the respondent submits that '[t]here is nothing to preclude hydropower generation increasing in the future',⁴⁴⁷ there is no evidence before the Tribunal of any likely alternative customer. Consequently, the proposed taking and use of 335 GL of water in Licence 3 would not prejudice future needs for water for hydroelectric power generation.

'whether the proposed taking and use of water ... would, in the opinion of the Minister, have a detrimental effect on another person' (cl 7(2)(e))

308 There is no evidence that granting an annual water entitlement of 335 GL in Licence 3 'to match justified crop needs and efficient water

⁴⁴⁶ ts 56, 25 November 2019.

⁴⁴⁷ Respondent's closing submissions dated 11 March 2020 [153].

use for the area under irrigation', in accordance with OSWAP, would have a detrimental effect on another person.

'whether the proposed taking and use of water ... could be provided for by another source' (cl 7(2)(f))

309 It is common ground that there is no alternative source available to provide the water sought by OIC.

'whether the proposed taking and use of water ... are in keeping with ... local practices; or a relevant local by-law; or a plan approved under Part III Division 3D Subdivision 2' (cl 7(2)(g)(i)-(iii))

310 It is common ground that there are no local practices, relevant by-laws or a plan approved under Pt III Div 3D Subdiv 2 of the RIWI Act.

'whether the proposed taking and use of water ... are in keeping with ... relevant previous decisions of the Minister' (cl 7(2)(g)(iv))

311 The respondent submits that '[t]he two surface water licences previously granted to the [a]pplicant do not establish a basis for a further allocation of 335GL'.⁴⁴⁸ We accept this submission. However, the evidence in this case demonstrates that the annual water entitlement 'to match justified crop needs and efficient water use for the area under irrigation' under OSWAP, and allocating 5 GL per year for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event, is (more than) 335 GL.

'whether the taking and use of water ... are consistent with ... land use planning instruments; or the requirements and policies of other government agencies; or any intergovernmental agreement or arrangement' (cl 7(2)(h))

312 It is common ground that there are no relevant land use planning instruments or requirements or policies of other government agencies that apply. As indicated earlier, no intergovernmental agreement or arrangement has yet been reached with the Northern Territory with respect to the supply of water to Ord Stage 3 in the Northern Territory.

Correct and preferable decision

313 In the exercise of discretion under cl 15(2) of Sch 1 to the RIWI Act, the correct and preferable decision at the time of the decision upon the review as to the annual water entitlement that should be specified in Licence 3 is 335 GL, because:

⁴⁴⁸ Respondent's closing submissions dated 11 March 2020 [204].

- the annual water entitlement 'to match justified crop needs and efficient water use for the area under irrigation', applying the guiding policy in cl 5.2 and local licensing policy 4.7 in Table 8 of OSWAP, and including an appropriate allocation of 5 GL per year for draining the M1 Supply Channel to avoid flooding in the town of Kununurra when there is a significant rainfall event, is (more than) 335 GL and the applicant seeks an annual water entitlement of 335 GL in its renewal application;
- although there has been historical underutilisation of the annual water entitlement by OIC, there are cogent reasons to depart from the application of the recoupment of unused water policy in OSWAP in the circumstances of this case; and
- there is not likely to be any alternative or competing user for any part of this annual water entitlement over the 10 year term of the licence and there is sufficient water within the 750 GL per year allocation limit for the Main Ord subarea to enable such development in the Ord East Kimberley Expansion Project as is likely to occur over the next 10 years.

Conclusion

314 The application for review should be allowed and the decision of the respondent made on 14 August 2015 should be varied, pursuant to s 29(3)(b) of the SAT Act, by:

- extending the duration of Licence 3 to 10 years from the date of this decision;
- specifying the annual water entitlement in Licence 3 as 335 GL; and
- specifying, with effect from the date of this decision, pursuant to s 29(5)(b) of the SAT Act, that the 'Annexure to Licence to Take Water SW156287(3)' referred to in term, condition or restriction 3 of Licence 3 is the document which appears in the respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.2) at pages 1746-1756.

315

The Tribunal makes the following orders:

1. The application for review is allowed.
2. Pursuant to s 29(3)(b) of the *State Administrative Tribunal Act 2004* (WA), the decision made by the respondent on 14 August 2015 is varied by:
 - (a) extending the duration of Surface Water Licence SWL156287(3) to 10 years from the date of this order;
 - (b) specifying the annual water entitlement in Surface Water Licence SWL156287(3) as 335 GL; and
 - (c) specifying, with effect from the date of this order, pursuant to s 29(5)(b) of the *State Administrative Tribunal Act 2004* (WA), that the 'Annexure to Licence to Take Water SWL156287(3)' referred to in term, condition or restriction 3 of Surface Water Licence SWL156287(3) is the document which appears in the respondent's section 24 bundle dated 10 May 2019 (volume 2) (Exhibit 3.1) at pages 1746-1756.

I certify that the preceding paragraph(s) comprise the reasons for decision of the State Administrative Tribunal.

JUDGE D PARRY, DEPUTY PRESIDENT

26 JUNE 2020

Attachment A - Ms Pawley's calculations

Exhibit 33

Additional calculation – Version 1 (calculation using Mr Dear's forecast of crop types and areas for 2029 with the "consensus" irrigation water requirement figures, Mr Lantzké's and Mr Hocking's irrigation water requirement figures and a distribution efficiency of 80%)

I have provided in the table below a calculation of OIC's irrigation water requirements (Version 1) for its forecast of crop types and areas for 2029 following referral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019). Assumptions are annotated below. I have calculated this volume to be 276.5 gigalitres per year.

Crop type	Mr Dear's 2029 crop forecast (ha)	Crop irrigation water requirement at crop (ML/ha)	C = (A x B) / 1000	Irrigation water required at the crop (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	E = C / (D/100)	Irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	I = H / (F/100)	G = E / (F/100)	Irrigation required at diversion points (GL)
Bananas	2	20.2	0.0	0.0	70%	28.9	0.1	0.1	80%	36.1	0.1	0.1	0.1
Cereals (oats, millet)	0	7.0	0.0	0.0	70%	10.0	0.0	0.0	80%	12.5	0.0	0.0	0.0
Chia	250	7.3	1.8	1.8	50%	14.6	3.7	3.7	80%	18.3	4.6	4.6	4.6
Chickpeas	532	5.2	2.8	2.8	70%	7.4	4.0	4.0	80%	9.3	4.9	4.9	4.9
Citrus	4	9.8	0.0	0.0	70%	14.0	0.1	0.1	80%	17.5	0.1	0.1	0.1
Cotton	3000	5.7	17.1	17.1	70%	8.2	24.6	24.6	80%	30.8	30.8	30.8	30.8
Cucurbits	370	5.2	1.9	1.9	70%	7.4	2.7	2.7	80%	9.3	3.4	3.4	3.4
Fodder - wet and dry	625	15.4	9.6	9.6	70%	22.0	13.8	13.8	80%	27.5	17.2	17.2	17.2
Fodder - dry	625	14.0	8.8	8.8	82%	17.0	10.6	10.6	80%	21.3	13.3	13.3	13.3
Fresh beans	30	4.5	0.1	0.1	70%	6.4	0.2	0.2	80%	8.0	0.2	0.2	0.2
Hybrid seeds	750	7.7	5.8	5.8	70%	11.0	8.3	8.3	80%	13.8	10.3	10.3	10.3
Maize (inc corn, sweet corn)	2500	7.8	19.5	19.5	70%	11.2	28.0	28.0	80%	14.0	35.0	35.0	35.0
Mangos	478	8.2	3.9	3.9	70%	11.7	5.6	5.6	80%	14.6	7.0	7.0	7.0
Mixed horticulture (inc okra and soybeans)	350	6.1	2.1	2.1	70%	8.7	3.1	3.1	80%	10.9	3.8	3.8	3.8
Rice	0	7.8	0.0	0.0	70%	11.1	0.0	0.0	80%	13.9	0.0	0.0	0.0
Sandalwood	5400	8.2	44.3	44.3	50%	16.4	88.6	88.6	80%	20.5	110.7	110.7	110.7
Sugarcane	2	15.4	0.0	0.0	70%	22.0	0.0	0.0	80%	27.5	0.0	0.0	0.0
Pre-irrigation allowance	7784	1.05	8.2	8.2	70%	1.5	11.7	11.7	80%	1.9	14.6	14.6	14.6
10% double cropping	1000	11.2	11.2	11.2	70%	16.0	16.0	16.0	80%	20.0	20.0	20.0	20.0
Fallow	76	0.0	0.0	0.0	70%	0.0	0.0	0.0	80%	0.0	0.0	0.0	0.0
Area without survey	38	7.7	0.3	0.3	70%	11.0	0.4	0.4	80%	13.8	0.5	0.5	0.5
Total irrigation water required (GL)			137.5				221.2					276.5	
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15032												
Average irrigation water required per hectare of cropped area (ML/ha)		14.67	9.15					14.72					18.40

* Struckthrough summation figures have been removed as they were an error in the original document (Exhibit 5)

Assumptions – Version 1

- a) Mr Dear's forecast of individual crop types and areas for 2029 [Attachment MD35];
- b) I have split the 2029 forecast area 50:50 between "Fodder - wet and dry" and "Fodder - dry";
- c) The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - i. Mr Lantzke's IWR for cotton of 5.7 ML/ha at the crop and 8.2 ML/ha at the farm gate;
 - ii. The expert's consensus IWR for "fodder – wet and dry" of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - iii. The expert's consensus IWR for "fodder – dry" of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent;
 - iv. The expert's consensus IWR for hybrid seeds of 7.7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - v. Mr Lantzke's IWR for maize of 7.8 ML/ha at the crop and 11.2 ML/ha at the farm gate;
 - vi. Mr Lantzke's IWR for sandalwood of 8.2 ML/ha at the crop and 16 ML/ha at the farm gate;
 - vii. Mr Hocking's IWR for double cropping of 11.2 ML/ha at the crop and 16 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - viii. a provision of 1.5 ML/ha at the farm gate for "pre-irrigation allowance" and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- d) the Ord plan's policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) (50 per cent) and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and "fodder – dry" (82 per cent) resulting from the expert's consensus IWR;
- e) the Ord plan's policy on distribution efficiency (80 per cent); and
- f) the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.

Additional calculation – Version 2 (calculation using Mr Dear's forecast of crop types and areas for 2029 with the "consensus" irrigation water requirement figures, and Mr Doble's, Mr Boshammer's, Mr Engelke's and Mr Bloeker's irrigation water requirement figures and a distribution efficiency of 80%)

I have provided in the table below a calculation of OIC's irrigation water requirements (Version 2) for its forecast of crop types and areas for 2029 following conferral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019). Assumptions are annotated below. I have calculated this volume to be 319.5 gigalitres per year.

Crop type	Mr Dear's 2029 crop forecast (ha)	Crop irrigation water requirement at crop (ML/ha)	Crop irrigation water required at the crop (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	Irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	Irrigation water required at diversion points (GL)
	A	B	C = (A x B)/1000	D	H = B / (D/100)	E = C / (D/100)	F	I = H / (F/100)	G = E / (F/100)
Bananas	2	20.2	0.0	70%	28.9	0.1	80%	36.1	0.1
Cereals (oats, millet)	0	7.0	0.0	70%	10.0	0.0	80%	12.5	0.0
Chia	250	7.3	1.8	50%	14.6	3.7	80%	18.3	4.6
Chickpeas	532	5.2	2.8	70%	7.4	4.0	80%	9.3	4.9
Citrus	4	9.8	0.0	70%	14.0	0.1	80%	17.5	0.1
Cotton	3000	8.0	24.0	70%	11.5	34.5	80%	14.4	43.1
Cucurbits	370	5.2	1.9	70%	7.4	2.7	80%	9.3	3.4
Fodder - wet and dry	625	15.4	9.6	70%	22.0	13.8	80%	27.5	17.2
Fodder - dry	625	14.0	8.8	82%	17.0	10.6	80%	21.3	13.3
Fresh beans	30	4.5	0.1	70%	6.4	0.2	80%	8.0	0.2
Hybrid seeds	750	7.7	5.8	70%	11.0	8.3	80%	13.8	10.3
Maize (inc corn, sweet corn)	2500	10.0	25.0	71%	14.0	35.0	80%	17.5	43.8
Mangos	478	8.2	3.9	70%	11.7	5.6	80%	14.6	7.0
Mixed horticulture (inc okra and soybeans)	350	6.1	2.1	70%	8.7	3.1	80%	10.9	3.8
Rice	0	7.8	0.0	70%	11.1	0.0	80%	13.9	0.0
Sandalwood	5400	10.0	54.0	50%	20.0	108.0	80%	25.0	135.0
Sugarcane	2	15.4	0.0	70%	22.0	0.0	80%	27.5	0.1
Pre-irrigation allowance	7784	1.1	8.2	70%	1.5	11.7	80%	1.9	14.6
10% double cropping	1000	10.0	10.0	71%	14.0	14.0	80%	17.5	17.5
Fallow	76	0.0	0.0	70%	0.0	0.0	80%	0.0	0.0
Area without survey	38	7.7	0.3	70%	11.0	0.4	80%	13.8	0.5
Total irrigation water required (GL)			158.4			255.6			319.5
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15032								
Average irrigation water required per hectare of cropped area (ML/ha)		12.01	10.54			17.00			21.25

* Struckthrough summation figures have been removed as they were an error in the original document (Exhibit 5)

Assumptions – Version 2

- a) Mr Dear's forecast of individual crop types and areas for 2029 [Attachment MD35];
- b) I have split the 2029 forecast area 50:50 between "Fodder - wet and dry" and "Fodder - dry";
- c) The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - i. Mr Bloecker, Mr Menzel, Mr Engelke and Mr Boshammer's IWR for cotton of 8 ML/ha at the crop and 11.5 ML/ha at the farm gate;
 - ii. The expert's consensus IWR for "fodder - wet and dry" of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - iii. The expert's consensus IWR for "fodder - dry" of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent;
 - iv. The expert's consensus IWR for hybrid seeds of 7.7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - v. Mr Bloecker, Mr Menzel and Mr Boshammer's IWR for maize of 10 ML/ha at the crop and 14 ML/ha at the farm gate;
 - vi. Mr Doble's IWR for sandalwood of 10 ML/ha at the crop and 20 ML/ha at the farm gate;
 - vii. Mr Menzel and Mr Boshammer's IWR for double cropping of 10 ML/ha at the crop and 14 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - viii. a provision of 1.5 ML/ha at the farm gate for "pre-irrigation allowance" and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- d) the Ord plan's policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) (50 per cent) and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and "fodder - dry" (82 per cent) resulting from the expert's consensus IWR, maize (71 per cent) resulting from Mr Bloecker, Mr Menzel and Mr Boshammer's IWR and double cropping (71 per cent) resulting from Mr Menzel and Mr Boshammer's IWR;
- e) the Ord plan's policy on distribution efficiency (80 per cent); and
- f) the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.

Additional calculation – Version 3 (calculation using Mr Dear’s forecast of crop types and areas for 2029 with the “consensus” irrigation water requirement figures, and Mr Doble’s, Mr Boshammer’s, Mr Engelke’s and Mr Bloesker’s irrigation water requirement figures and a distribution efficiency of 76%)

I have provided in the table below a calculation of OIC’s irrigation water requirements (Version 3) for its forecast of crop types and areas for 2029 following conferral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019). Assumptions are annotated below. I have calculated this volume to be 336.3 gigal litres per year.

Crop type	Mr Dear’s 2029 crop forecast (ha)	Crop irrigation water requirement at crop (ML/ha)	Crop irrigation water required at the crop (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	Irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	Irrigation water required at diversion points (GL)
	A	B	C = (A x B)/1000	D	H = B / (D/100)	E = C / (D/100)	F	I = H / (F/100)	G = E / (F/100)
Bananas	2	20.2	0.0	70%	28.9	0.1	76%	38.0	0.1
Cereals (oats, millet)	0	7.0	0.0	70%	10.0	0.0	76%	13.2	0.0
Chia	250	7.3	1.8	50%	14.6	3.7	76%	19.2	4.8
Chickpeas	532	5.2	2.8	70%	7.4	4.0	76%	9.8	5.2
Citrus	4	9.8	0.0	70%	14.0	0.1	76%	18.4	0.1
Cotton	3000	8.0	24.0	70%	11.5	34.5	76%	15.1	45.4
Cucurbits	370	5.2	1.9	70%	7.4	2.7	76%	9.8	3.6
Fodder - wet and dry	625	15.4	9.6	70%	22.0	13.8	76%	28.9	18.1
Fodder - dry	625	14.0	8.8	82%	17.0	10.6	76%	22.4	14.0
Fresh beans	30	4.5	0.1	70%	6.4	0.2	76%	8.5	0.3
Hybrid seeds	750	7.7	5.8	70%	11.0	8.3	76%	14.5	10.9
Maize (inc corn, sweet corn)	2500	10.0	25.0	71%	14.0	35.0	76%	18.4	46.1
Mangos	478	8.2	3.9	70%	11.7	5.6	76%	15.4	7.4
Mixed horticulture (inc okra and soybeans)	350	6.1	2.1	70%	8.7	3.1	76%	11.5	4.0
Rice	0	7.8	0.0	70%	11.1	0.0	76%	14.7	0.0
Sandalwood	5400	10.0	54.0	50%	20.0	108.0	76%	26.3	142.1
Sugarcane	2	15.4	0.0	70%	22.0	0.0	76%	28.9	0.1
Pre-irrigation allowance	7784	1.1	8.2	70%	1.5	11.7	76%	2.0	15.4
10% double cropping	1000	10.0	10.0	71%	14.0	14.0	76%	18.4	18.4
Fallow	76	0.0	0.0	70%	0.0	0.0	76%	0.0	0.0
Area without survey	38	7.7	0.3	70%	11.0	0.4	76%	14.5	0.6
Total irrigation water required (GL)			158.4			255.6			336.3
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15032								
Average irrigation water required per hectare of cropped area (ML/ha)			10.54			17.00			22.37

* Struckthrough summation figures have been removed as they were an error in the original document (Exhibit 5)

Assumptions – Version 3

- a) Mr Dear's forecast of individual crop types and areas for 2029 [Attachment MD35];
- b) I have split the 2029 forecast area 50:50 between "Fodder - wet and dry" and "Fodder - dry";
- c) The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - i. Mr Bloecker, Mr Menzel, Mr Engelke and Mr Boshammer's IWR for cotton of 8 ML/ha at the crop and 11.5 ML/ha at the farm gate;
 - ii. The expert's consensus IWR for "fodder – wet and dry" of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - iii. The expert's consensus IWR for "fodder – dry" of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent;
 - iv. The expert's consensus IWR for hybrid seeds of 7.7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - v. Mr Bloecker, Mr Menzel and Mr Boshammer's IWR for maize of 10 ML/ha at the crop and 14 ML/ha at the farm gate;
 - vi. Mr Dobie's IWR for sandalwood of 10 ML/ha at the crop and 20 ML/ha at the farm gate;
 - vii. Mr Menzel and Mr Boshammer's IWR for double cropping of 10 ML/ha at the crop and 14 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - viii. a provision of 1.5 ML/ha at the farm gate for "pre-irrigation allowance" and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- d) the Ord plan's policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) [50 per cent] and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and "fodder – dry" (82 per cent) resulting from the expert's consensus IWR, maize (71 per cent) resulting from Mr Bloecker, Mr Menzel and Mr Boshammer's IWR and double cropping (71 per cent) resulting from Mr Menzel and Mr Boshammer's IWR;
- e) the Applicant's distribution efficiency (76 per cent); and
- f) the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.

Exhibit 34

Revised calculation – Version 1 (calculation using OIC’s crop types and areas planted in 2018 grouped into crop water use categories with the “consensus” irrigation water requirement figures, Mr Lantzke’s and Mr Hocking’s irrigation water requirement figures and a distribution efficiency of 80%)

I have revised my calculation of OIC’s licence volume (originally presented in Table 2 of my witness statement dated 9 September 2019) following conferral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019). Assumptions are annotated below. This calculation is shown in the table below. I have calculated the OIC’s annual licence volume to be 258.7 gigalitres per year.

Crop water use category	Crop areas collated from OIC’s 2018 Annual Report (ha)	Crop irrigation water requirement at crop (ML/ha)	Crop irrigation water required at the crop (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	Irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	Irrigation required at diversion points (GL)
	A	B	C = (A x B) / 1000	D	H = B / (D/100)	E = C / (D/100)	F	I = H / (F/100)	G = E / (F/100)
Low water use crop	4212	8.0	33.7	70%	11.4	48.1	80%	14.3	60.2
Medium water use crop	486	14.0	6.8	70%	20.0	9.7	80%	25.0	12.2
High water use crops	301	20.2	6.1	70%	28.9	8.7	80%	36.1	10.9
Chia	86	7.3	0.6	50%	14.6	1.3	80%	18.3	1.6
Fodder - dry	287	14.0	4.0	82%	17.0	4.9	80%	21.3	6.1
Sandalwood	5596	8.2	45.9	50%	16.4	91.8	80%	20.5	114.7
Pre-irrigation allowance	8973	1.1	9.4	70%	1.5	13.5	80%	1.9	16.8
10% double cropping	0	11.2	0.0	70%	16.0	0.0	80%	20.0	0.0
Fallow	1453	0.0	0.0	70%	0.0	0.0	80%	0.0	0.0
Area without survey	2638	7.7	20.3	70%	11.0	29.0	80%	13.8	36.3
Total irrigation water required (GL)			126.8			206.9			258.7
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15059								
Average irrigation water required per hectare of cropped area (ML/ha)			8.4			13.7			17.2

Assumptions – Version 1

- OIC’s crop types and areas planted in 2018 grouped into low, medium and high crop water use categories (based on the advice of Mr Lantzke on crop water use categories) with separate crop water use categories for chia, “fodder – dry”, sandalwood, “pre-irrigation allowance”, “10% double cropping”, fallow, and “area without survey”;
- I have split the 2018 area 50:50 between “Fodder - wet and dry” and “Fodder - dry”;
- the upper limit of the crop irrigation water requirement range for each low, medium and high crop water use categories as advised by Mr Lantzke;
- The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - Mr Lantzke’s IWR for cotton of 5.7 ML/ha at the crop and 8.2 ML/ha at the farm gate;
 - The expert’s consensus IWR for “fodder – wet and dry” of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - The expert’s consensus IWR for “fodder – dry” of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent, which is why I have separated it out from the high crop water use category;
 - The expert’s consensus IWR for hybrid seeds of 7.7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - Mr Lantzke’s IWR for maize of 7.8 ML/ha at the crop and 11.2 ML/ha at the farm gate;
 - Mr Hocking’s IWR for sandalwood of 8.2 ML/ha at the crop and 16.4 ML/ha at the farm gate;
 - Mr Lantzke’s IWR for double cropping of 11.2 ML/ha at the crop and 16 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - a provision of 1.5 ML/ha at the farm gate for “pre-irrigation allowance” and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- The Ord plan’s policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) (50 percent) and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and “fodder – dry” (82 per cent) resulting from the expert’s consensus IWR;
- The Ord plan’s policy on distribution efficiency (80 per cent); and
- the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.

Revised calculation – Version 2 (calculation using OIC’s crop types and areas planted in 2018 grouped into crop water use categories with the “consensus” irrigation water requirement figures, and Mr Doble’s, Mr Boshammer’s, Mr Engelle’s and Mr Bloecker’s irrigation water requirement figures and a distribution efficiency of 80%)

I have revised my calculation of OIC’s licence volume (originally presented in Table 2 of my witness statement dated 9 September 2019) following conferral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019). Assumptions are annotated below. This calculation is shown in the table below. I have calculated the OIC’s annual licence volume to be 304.7 gigalitres per year.

Crop water use category	Crop areas collated from OIC’s 2018 Annual Report (ha)	Crop irrigation water requirement at crop (ML/ha)	Irrigation water required at the crop (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	Irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	Irrigation required at diversion points (GL)
	A	B	C = (A x B)/1000	D	H = B / (D/100)	E = C / (D/100)	F	I = H / (F/100)	G = E / (F/100)
Low water use crop	2263	8.0	18.1	70%	11.4	25.9	80%	14.3	32.3
Medium water use crop	2435	14.0	34.1	70%	20.0	48.7	80%	25.0	60.9
High water use crops	301	20.2	6.1	70%	28.9	8.7	80%	36.1	10.9
Chia	86	7.3	0.6	50%	14.6	1.3	80%	18.3	1.6
Fodder - dry	287	14.0	4.0	82%	17.0	4.9	80%	21.3	6.1
Sandalwood	5596	10.0	56.0	50%	20.0	111.9	80%	25.0	139.9
Pre-irrigation allowance	8973	1.1	9.4	70%	1.5	13.5	80%	1.9	16.8
10% double cropping	0	10.0	0.0	71%	14.0	0.0	80%	17.5	0.0
Fallow	1453	0.0	0.0	70%	0.0	0.0	80%	0.0	0.0
Area without survey	2638	7.7	20.3	70%	11.0	29.0	80%	13.8	36.3
Total irrigation water required (GL)			148.6			243.8			304.7
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15059								
Average irrigation water required per hectare of cropped area (ML/ha)			9.9			16.2			20.2

Assumptions – Version 2

- OIC’s crop types and areas planted in 2018 grouped into low, medium and high crop water use categories (based on the advice of Mr Lantzke on crop water use categories) with separate crop water use categories for chia, “fodder – dry”, sandalwood, “pre-irrigation allowance”, “10% double cropping”, fallow, and “area without survey”;
- I have split the 2018 area 50:50 between “Fodder – wet and dry” and “Fodder – dry”;
- the upper limit of the crop irrigation water requirement range for each low, medium and high crop water use categories as advised by Mr Lantzke;
- The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - Mr Bloecker, Mr Menzel, Mr Engelle and Mr Boshammer’s IWR for cotton of 8 ML/ha at the crop and 11.5 ML/ha at the farm gate;
 - The expert’s consensus IWR for “fodder – wet and dry” of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - The expert’s consensus IWR for “fodder – dry” of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent, which is why I have separated it out from the high crop water use category;
 - The expert’s consensus IWR for hybrid seeds of 7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - Mr Bloecker, Mr Menzel and Mr Boshammer’s IWR for maize of 10 ML/ha at the crop and 14 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency of 71 per cent, however maize has been incorporated into the medium crop water use category which gives this crop 14 ML/ha at the crop and 20 ML/ha at the farm gate (that is, more than the expert witnesses have indicated) assuming 70 per cent on-farm water use efficiency;
 - Mr Doble’s IWR for sandalwood of 10 ML/ha at the crop and 20 ML/ha at the farm gate;
 - Mr Menzel and Mr Boshammer’s IWR for double cropping of 10 ML/ha at the crop and 14 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - a provision of 1.5 ML/ha at the farm gate for “pre-irrigation allowance” and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- the Ord plan’s policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) (50 per cent) and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and “fodder – dry” (82 per cent) resulting from the expert’s consensus IWR and double cropping (71 per cent) resulting from Mr Menzel and Mr Boshammer’s IWR;
- the Ord plan’s policy on distribution efficiency (80 per cent); and
- the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.

Revised calculation – Version 3 (calculation using OIC's crop types and areas planted in 2018 grouped into crop water use categories with the "consensus" irrigation water requirement figures, and Mr Doble's, Mr Boshammer's, Mr Engelke's and Mr Bloecker's irrigation water requirement figures and a distribution efficiency of 76%)

I have revised my calculation of OIC's licence volume (originally presented in Table 2 of my witness statement dated 9 September 2019) following conferral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019). Assumptions are annotated below. This calculation is shown in the table below. I have calculated the OIC's annual licence volume to be 320.8 gigalitres per year.

Crop water use category	Crop areas collated from OIC's 2018 Annual Report (ha)	Crop irrigation water requirement at crop (ML/ha)	Crop irrigation water required at the crop (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	Irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	Irrigation required at diversion points (GL)
	A	B	C = (A x B) / 1000	D	H = B / (D/100)	E = C / (D/100)	F	I = H / (F/100)	G = E / (F/100)
Low water use crop	2263	8.0	18.1	70%	11.4	25.9	76%	15.0	34.0
Medium water use crop	2435	14.0	34.1	70%	20.0	48.7	76%	26.3	64.1
High water use crops	301	20.2	6.1	70%	28.9	8.7	76%	38.0	11.4
Chia	86	7.3	0.6	50%	14.6	1.3	76%	19.2	1.7
Fodder - dry	287	14.0	4.0	82%	17.0	4.9	76%	22.4	6.4
Sandalwood	5596	10.0	56.0	50%	20.0	111.9	76%	26.3	147.3
Pre-irrigation allowance	8973	1.1	9.4	70%	1.5	13.5	76%	2.0	17.7
10% double cropping	0	10.0	0.0	71%	14.0	0.0	76%	18.4	0.0
Fallow	1453	0.0	0.0	70%	0.0	0.0	76%	0.0	0.0
Area without survey	2638	7.7	20.3	70%	11.0	29.0	76%	14.5	38.2
Total irrigation water required (GL)			148.6			243.8			320.8
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15059								
Average irrigation water required per hectare of cropped area (ML/ha)			9.9			16.2			21.3

Assumptions – Version 3

- OIC's crop types and areas planted in 2018 grouped into low, medium and high crop water use categories (based on the advice of Mr Lantzke on crop water use categories) with separate crop water use categories for chia, "fodder – dry", sandalwood, "pre-irrigation allowance", "10% double cropping", fallow, and "area without survey";
- I have split the 2018 area 50:50 between "Fodder - wet and dry" and "Fodder - dry";
- the upper limit of the crop irrigation water requirements range for each low, medium and high crop water use categories as advised by Mr Lantzke;
- The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - Mr Bloecker, Mr Menzel, Mr Engelke and Mr Boshammer's IWR for cotton of 8 ML/ha at the crop and 11.5 ML/ha at the farm gate;
 - The expert's consensus IWR for "fodder – wet and dry" of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - The expert's consensus IWR for "fodder – dry" of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent, which is why I have separated it out from the high crop water use category;
 - The expert's consensus IWR for hybrid seeds of 7.7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - Mr Bloecker, Mr Menzel and Mr Boshammer's IWR for maize of 10 ML/ha at the crop and 14 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency of 71 per cent, however maize has been incorporated into the medium crop water use category which gives this crop 14 ML/ha at the crop and 20 ML/ha at the farm gate (that is, more than the expert witnesses have indicated) assuming 70 per cent on-farm water use efficiency;
 - Mr Doble's IWR for sandalwood of 10 ML/ha at the crop and 20 ML/ha at the farm gate;
 - Mr Menzel and Mr Boshammer's IWR for double cropping of 10 ML/ha at the crop and 14 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - a provision of 1.5 ML/ha at the farm gate for "pre-irrigation allowance" and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- The Ord plant's policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) (50 per cent) and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and "fodder – dry" (82 per cent) resulting from the expert's consensus IWR and double cropping (71 per cent) resulting from Mr Menzel and Mr Boshammer's IWR;
- The distribution efficiency contended for by the Applicant (76 per cent); and
- the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.

Exhibit 51

Revised calculation – Version 4 (calculation using OIC’s crop types and areas planted in 2018 grouped into crop water use categories with the “consensus” irrigation water requirement figures, and Mr Doble’s, Mr Boshammer’s, Mr Engelke’s and Mr Bloecker’s irrigation water requirement figures and a distribution efficiency of 77%)

I have revised my calculation of OIC’s licence volume (originally presented in Table 2 of my witness statement dated 9 September 2019) following conferral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019) and evidence given by the policy experts at the hearing in Kununurra and Perth (9 – 10 March 2020). Assumptions are annotated below. This calculation is shown in the table below. I have calculated the OIC’s annual licence volume to be 316.6 gigalitres per year.

Crop water use category	Crop areas collated from OIC’s 2018 Annual Report (ha)	Crop irrigation water requirement at crop (ML/ha)	Crop irrigation water required at the crop (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	Irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	Irrigation required at diversion points (GL)
	A	B	C = (A x B) / 1000	D	H = B / (D/100)	E = C / (D/100)	F	I = H / (F/100)	G = E / (F/100)
Low water use crop	2263	8.0	18.1	70%	11.4	25.9	77%	14.8	33.6
Medium water use crop	2435	14.0	34.1	70%	20.0	48.7	77%	26.0	63.2
High water use crops	301	20.2	6.1	70%	28.9	8.7	77%	37.5	11.3
Chia	86	7.3	0.6	50%	14.6	1.3	77%	19.0	1.6
Fodder - dry	287	14.0	4.0	82%	17.0	4.9	77%	22.1	6.3
Sandalwood	5596	10.0	56.0	50%	20.0	111.9	77%	26.0	145.4
Pre-irrigation allowance	8973	1.1	9.4	70%	1.5	13.5	77%	1.9	17.5
10% double cropping	0	10.0	0.0	71%	14.0	0.0	77%	18.2	0.0
Fallow	1453	0.0	0.0	70%	0.0	0.0	77%	0.0	0.0
Area without survey	2638	7.7	20.3	70%	11.0	29.0	77%	14.3	37.7
Total irrigation water required (GL)			148.6			243.8			316.6
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15059								
Average irrigation water required per hectare of cropped area (ML/ha)			9.9			16.2			21.0

Assumptions – Version 4

- OIC’s crop types and areas planted in 2018 grouped into low, medium and high crop water use categories (based on the advice of Mr Lantzke on crop water use categories) with separate crop water use categories for chia, “fodder – dry”, sandalwood, “pre-irrigation allowance”, “10% double cropping”, fallow, and “area without survey”;
- I have split the 2018 area 50:50 between “Fodder – wet and dry” and “Fodder – dry”;
- the upper limit of the crop irrigation water requirement range for each low, medium and high crop water use categories as advised by Mr Lantzke;
- The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - Mr Bloecker, Mr Menzel, Mr Engelke and Mr Boshammer’s IWR for cotton of 8 ML/ha at the crop and 11.5 ML/ha at the farm gate;
 - The expert’s consensus IWR for “fodder – wet and dry” of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - The expert’s consensus IWR for “fodder – dry” of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent, which is why I have separated it out from the high crop water use category;
 - The expert’s consensus IWR for hybrid seeds of 7.7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - Mr Bloecker, Mr Menzel and Mr Boshammer’s IWR for maize of 10 ML/ha at the crop and 14 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency of 71 per cent, however maize has been incorporated into the medium crop water use category which gives this crop 14 ML/ha at the crop and 20 ML/ha at the farm gate (that is, more than the expert witnesses have indicated) assuming 70 per cent on-farm water use efficiency;
 - Mr Doble’s IWR for sandalwood of 10 ML/ha at the crop and 20 ML/ha at the farm gate;
 - Mr Menzel and Mr Boshammer’s IWR for double cropping of 10 ML/ha at the crop and 14 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - a provision of 1.5 ML/ha at the farm gate for “pre-irrigation allowance” and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- the Ord plan’s policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) (50 per cent) and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and “fodder – dry” (82 per cent) resulting from the expert’s consensus IWR and double cropping (71 per cent) resulting from Mr Menzel and Mr Boshammer’s IWR;
- the distribution efficiency is assumed to be 77 per cent; and
- the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.

Additional calculation – Version 4 (calculation using Mr Dear’s forecast of crop types and areas for 2029 with the “consensus” irrigation water requirement figures, and Mr Doble’s, Mr Boshammer’s, Mr Engelke’s and Mr Bloecker’s irrigation water requirement figures and a distribution efficiency of 77%)
 I have provided in the table below a calculation of OIC’s irrigation water requirements (Version 4) for its forecast of crop types and areas for 2029 following referral of the irrigated agriculture and sandalwood experts (13 November 2019) and following the evidence given by the irrigated agriculture and sandalwood experts at the hearing in Kununurra (25 – 28 November 2019) and evidence given by the policy experts at the hearing in Kununurra and Perth (9 – 10 March 2020). Assumptions are annotated below. I have calculated this volume to be 331.9 gigalitres per year.

Crop type	Mr Dear’s 2029 crop forecast (ha)	Crop irrigation water requirement at crop (ML/ha)	Crop irrigation water required at crop (GL)	On-farm water use efficiency (%)	Crop irrigation water requirement at farm gate (ML/ha)	Crop irrigation water required at the farm gate (GL)	Distribution efficiency (%)	Crop irrigation water requirement at irrigation diversion (ML/ha)	Irrigation water required at diversion points (GL)
	A	B	C = (A x B)/1000	D	H = B / (D/100)	E = C / (D/100)	F	I = H / (F/100)	G = E / (F/100)
Bananas	2	20.2	0.0	70%	28.9	0.1	77%	37.5	0.1
Cereals (oats, millet)	0	7.0	0.0	70%	10.0	0.0	77%	13.0	0.0
Chia	250	7.3	1.8	50%	14.6	3.7	77%	19.0	4.7
Chickpeas	532	5.2	2.8	70%	7.4	4.0	77%	9.6	5.1
Citrus	4	9.8	0.0	70%	14.0	0.1	77%	18.2	0.1
Cotton	3000	8.0	24.0	70%	11.5	34.5	77%	14.9	44.8
Cucurbits	370	5.2	1.9	70%	7.4	2.7	77%	9.6	3.6
Fodder - wet and dry	625	15.4	9.6	70%	22.0	13.8	77%	28.6	17.9
Fodder - dry	625	14.0	8.8	82%	17.0	10.6	77%	22.1	13.8
Fresh beans	30	4.5	0.1	70%	6.4	0.2	77%	8.3	0.3
Hybrid seeds	750	7.7	5.8	70%	11.0	8.3	77%	14.3	10.7
Maize (inc corn, sweet corn)	2500	10.0	25.0	71%	14.0	35.0	77%	18.2	45.5
Mangos	478	8.2	3.9	70%	11.7	5.6	77%	15.2	7.3
Mixed horticulture (inc okra and soybeans)	350	6.1	2.1	70%	8.7	3.1	77%	11.3	4.0
Rice	0	7.8	0.0	70%	11.1	0.0	77%	14.5	0.0
Sandalwood	5400	10.0	54.0	50%	20.0	108.0	77%	26.0	140.3
Sugarcane	2	15.4	0.0	70%	22.0	0.0	77%	28.6	0.1
Pre-irrigation allowance	7784	1.1	8.2	70%	1.5	11.7	77%	1.9	15.2
10% double cropping	1000	10.0	10.0	71%	14.0	14.0	77%	18.2	18.2
Fallow	76	0.0	0.0	70%	0.0	0.0	77%	0.0	0.0
Area without survey	38	7.7	0.3	70%	11.0	0.4	77%	14.3	0.5
Total irrigation water required (GL)			158.4			255.6			331.9
Total cropped area (excluding area for pre-irrigation allowance and double cropping) (ha)	15032								
Average irrigation water required per hectare of cropped area (ML/ha)			10.54			17.00			22.08

* Struckthrough summation figures have been removed as they were an error in the original document (Exhibit 5)

Assumptions – Version 4

- a) Mr Dear’s forecast of individual crop types and areas for 2029 [Attachment MD35];
- b) I have split the 2029 forecast area 50:50 between “Fodder - wet and dry” and “Fodder - dry”;
- c) The high estimate of crop irrigation water requirements (IWR) were sourced from Attachment MD35 except for the following:
 - i. Mr Bloecker, Mr Menzel, Mr Engelke and Mr Boshammer’s IWR for cotton of 8 ML/ha at the crop and 11.5 ML/ha at the farm gate;
 - ii. The expert’s consensus IWR for “fodder – wet and dry” of 15.4 ML/ha at the crop and 22 ML/ha at the farm gate;
 - iii. The expert’s consensus IWR for “fodder – dry” of 14 ML/ha at the crop and 17 ML/ha at the farm gate. Note that this results in an on-farm water use efficiency figure of 82 per cent;
 - iv. The expert’s consensus IWR for hybrid seeds of 7.7 ML/ha at the crop and 11 ML/ha at the farm gate;
 - v. Mr Bloecker, Mr Menzel and Mr Boshammer’s IWR for maize of 10 ML/ha at the crop and 14 ML/ha at the farm gate;
 - vi. Mr Doble’s IWR for sandalwood of 10 ML/ha at the crop and 20 ML/ha at the farm gate;
 - vii. Mr Menzel and Mr Boshammer’s IWR for double cropping of 10 ML/ha at the crop and 14 ML/ha at the farm gate. This double cropping figure assumes that the double crop consists of cotton and sorghum hay. The figure provided is for the sorghum component only;
 - viii. a provision of 1.5 ML/ha at the farm gate for “pre-irrigation allowance” and 0 ML/ha for fallow as agreed by the experts at conferral (13 November 2019);
- d) the Ord plan’s policy on on-farm water use efficiency (70 per cent), save for fine seeded short duration crops (chia) (50 per cent) and sandalwood (50 per cent) as agreed by the irrigated agriculture and sandalwood experts at conferral (15 November 2019) and “fodder – dry” (82 per cent) resulting from the expert’s consensus IWR, maize (71 per cent) resulting from Mr Bloecker, Mr Menzel and Mr Boshammer’s IWR and double cropping (71 per cent) resulting from Mr Menzel and Mr Boshammer’s IWR;
- e) the distribution efficiency is assumed to be 77 per cent; and
- f) the irrigated agriculture and sandalwood experts agree that dry year allowance has been incorporated into the high estimate of crop irrigation water requirements presented in Attachment MD35.