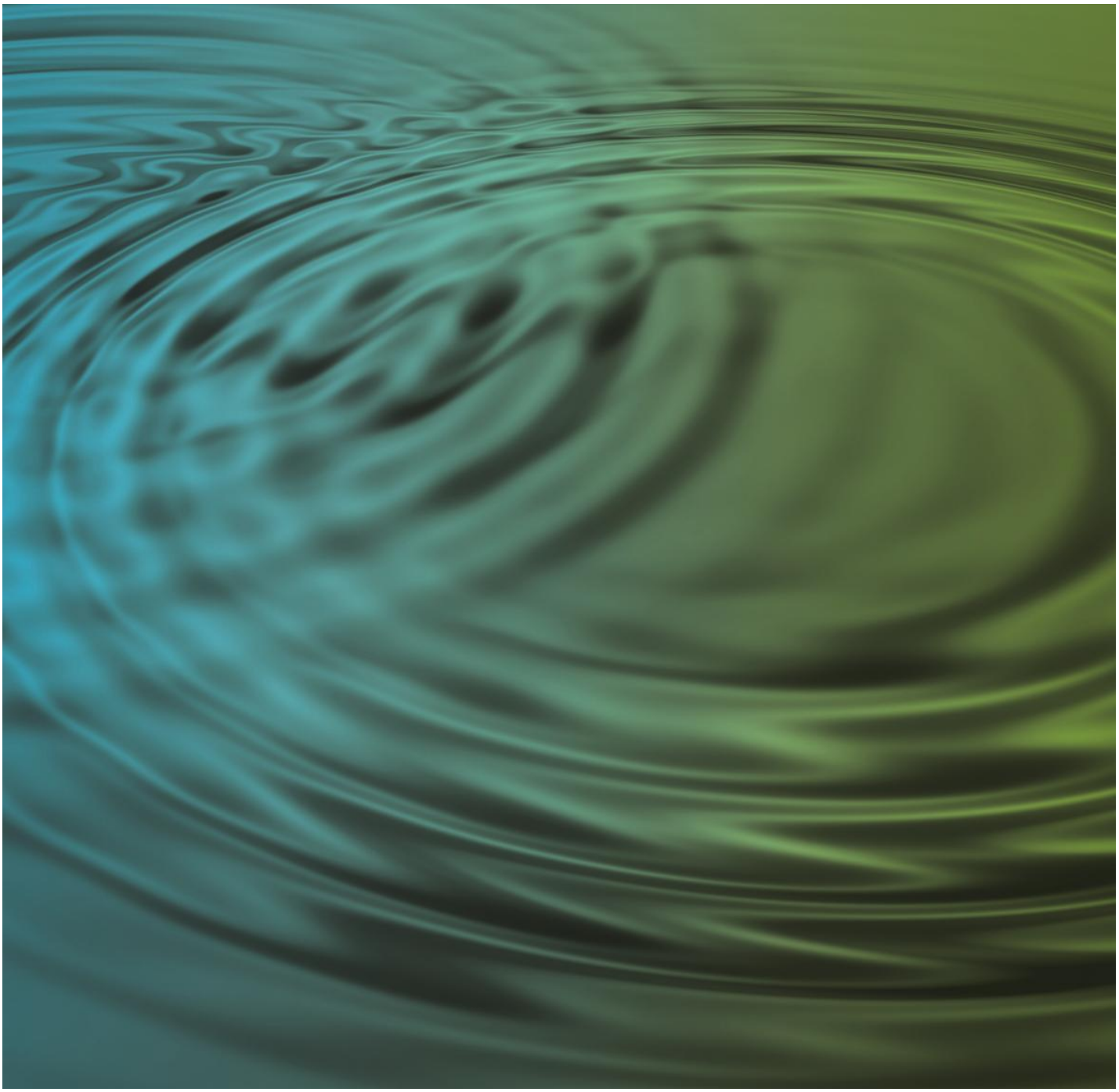
Water Category
Green Building Council of Australia
31-Mar-2014

Green Star Credit Development

Water Category



Green Star Credit Development

Water Category

Client: Green Building Council of Australia

ABN: 43 100 789 937

Prepared by

AECOM Australia Pty Ltd
Level 9, 8 Exhibition Street, Melbourne VIC 3000, Australia
T +61 3 9653 1234 F +61 3 9654 7117 www.aecom.com
ABN 20 093 846 925

31-Mar-2014

Quality Information

Document	Green Star Credit Development
Ref	60315776 p:\60315776\4. tech work area\4.3 esd\01_water\discussion paper\140331 gbca water category development - discussion report_rev b.docx
Date	31-Mar-2014
Prepared by	Robyn Hyslop
Reviewed by	Chris Walker

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
A	24-Mar-14	DRAFT		
B	31-Mar-2014	For Issue	Chris Walker Senior Consultant	

Table of Contents

Executive Summary

As part of the continuing development of Green Star rating tools, the Green Building Council of Australia (GBCA) is condensing the Design & As Built suite of tools into one tool that is flexible enough to cover all building types. Part of this redevelopment has involved an update to the Water category within the Green Star – Design & As Built v1 tool.

Following is a summary of the updates made, highlighting key findings within separable components of the Water category tool.

Notes regarding the updates have also been summarised into the following three categories:

- No updates made, component has remained unchanged
- Minor updates have been made to this component of the category
- Major updates have been made to this component of the category

Table 1 Summary of updates to the Water Category

Category Component	Update Outcome	Notes on Update
General		
Overall Water Category		The overall Water Category has seen some significant changes in order to accommodate all existing tools for different building typologies into the single Design & As Built tool. The credit builds upon the Potable Water Calculator developed for the Public Buildings Tool which needed to be more flexible than its predecessors in order to allow for a combination of National Construction Code building classes within a single project. In addition, the Water Category has been consolidated into the one credit in order to streamline documentation requirements by removing the duplication of identical documentation in multiple credits and removing the likelihood of any double-counting of water savings.
Two compliance pathways		As a part of the redevelopment of the Water Category, an additional Deemed to Satisfy (DTS) compliance pathway has been introduced in order to streamline the submission process for smaller, less complex projects. Projects can still choose to demonstrate compliance via the performance pathway and Potable Water Calculator should they choose. The DTS methodology allows a project that exhibits all of the required provisions for each targeted point, to be deemed compliant with the credit criteria without the need to undertake any water balance calculations.
Water Metering & Monitoring		The former Wat-2 credit related to water metering and monitoring has been proposed to move to the Management Category. The credit itself has not been reviewed or updated as a as a part of the Water Category update.
Maximum number of unweighted points available		With the introduction of a DTS methodology, it was necessary to align the points appropriately between each of the compliance pathways. The maximum number of points allocated for the Water Category remains at 12 points. For the DTS pathway the maximum number of points is limited to 6 points.

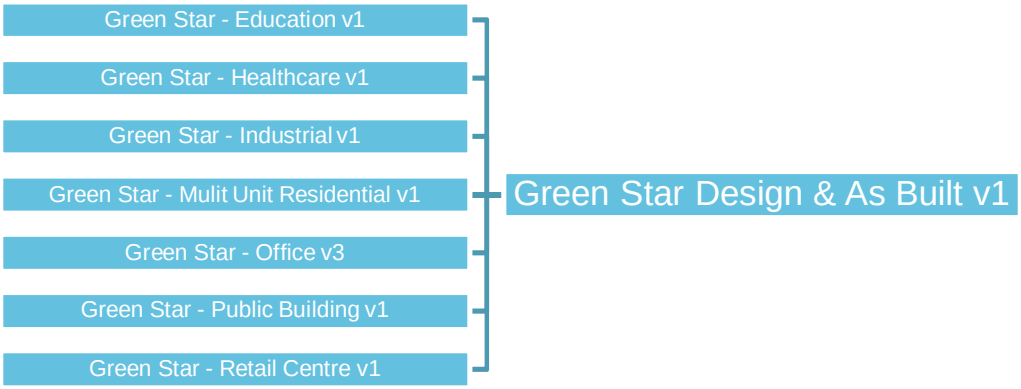
Category Component	Update Outcome	Notes on Update
State based weighting factors	🟡	While this category redevelopment had no direct impact on the weighting factors applied to each category within the overall tool. The recommendation is that a weighting for the category in the range of 12-15%, as it currently stands is appropriate. It is also recommended that the current state-based weighting system be removed and that one consistent weighting system nationally is used. Variations in rainfall and evaporation between climate regions are picked up in the Potable Water Calculator through the requirement for project teams to enter site-specific climate data.
Potable Water Calculator		
Building Checklist	🟡	The Potable Water Calculator now includes a building checklist. The building checklist asks a series of yes/no questions in order to determine the inputs required throughout the remainder of the Calculator. This information is also used to help determine the boundaries of the Standard Practice Building's water consumption.
Sanitation	🟡	The majority of the Calculator related to water demand from fixtures and fittings remains unchanged from the Public Buildings tool. The exception to this is the addition of showers for sporting facilities which have been added to more accurately account for shower use associated with visitors to the venue. Project teams are required to manually enter the patronage of these facilities separately from the building occupancy inputs.
White goods	🔴	Dishwashers and clothes washing machines have been added into the Potable Water Calculator under the heading of 'White goods'. These were previously included in the Multi-Unit Residential tool in a limited form. Previously to be awarded points, the equipment needed to be within one star of the highest available WELS rating. The equipment has now been integrated into the Potable Water calculator with a baseline set for the standard practice building of 3.5 stars for dishwashers and 3-2.5 stars (dependant on capacity) for clothes washing machines.
Heat Rejection	🟡	Updates have been made to the calculation of heat rejection water to take into account the local climate conditions at each site. Project teams will be required to enter additional information about their project location including monthly average temperatures and relative humidity, along with the cycles of concentration for the proposed heat rejection design.
Irrigation	🟡	The irrigation calculation has been simplified by removing the need for project teams to specify a microclimate factor or a density factor for landscaped areas. The inclusion of these factors had a combined impact of 1-5% on the overall outcome of the water used for irrigation.
Swimming Pools	🔴	Water used by swimming pools has been added to the Potable Water Calculator. The calculation for water use is derived from the ACT Planning and Land Authority (ACTPLA) design and siting requirements for water efficiency for outdoor swimming pools. For indoor swimming pools, the calculation references the ASHRAE 1997 Fundamentals Handbook.
Fire Protection Systems	🟢	The former Wat-5 "Fire System Test Water' has been integrated into the Wat-1 Potable Water Calculator. The credit criterion remains unchanged. 1 point is available as an additional point where fire systems either do not expel water for testing or they recycle greater than 80% of the test water on-site. Where reclaimed water is used to meet the demand, this is taken into account in the Potable Water Calculator.

Category Component	Update Outcome	Notes on Update
Process Cooling	🟢	The former Wat-6 'Potable Water Use in Laboratories' and 'Potable Water Use for Equipment' from the Education and Healthcare tools respectively, has been integrated into the Wat-1 Potable Water Calculator. The credit criterion remains unchanged. Where equipment requiring process cooling is either served by a closed loop system, or greater than 95% of process cooling water is non-potable, 1 point is awarded. Where reclaimed water is used to meet the demand, this is taken into account in the Potable Water Calculator.
Reclaimed Water	🟡	The updated calculations solve the perceived issue of double counting by implementing a complex logic to determine whether a reclaimed water source is available on each day of the year and the maximum demand required to be met by that source. The Calculator now allows the project team to enter whether a water use is served by more than one reclaimed source. For example, toilets supplied by rainwater and greywater supplies.
Rainwater Collection	🔴	In order to address the reoccurring issues of inaccuracy and lack of granularity in the Potable Water Calculator, daily calculations have been implemented for reclaimed water use. Rainfall data is now required to be entered for each day of the year. Data has been provided for a number of common green building locations, but project teams may also supply their own. The Calculator now also provides real time feedback to project teams on both the reliability of the rainwater tank – the regularity with which rainwater demands are met on a project – and the water level of the rainwater tank throughout the year. These two outputs give projects a quick indication as to whether the rainwater tank is over or undersized for their particular location and use on a project.
Greywater Collection, Blackwater Collection, & Stormwater or Off-site Reclaimed Water	🟢	There have been no updates to the way project teams enter information for these aspects of the Calculator. These calculations are now undertaken on a daily basis to align with rainwater reuse.

1.0 Introduction

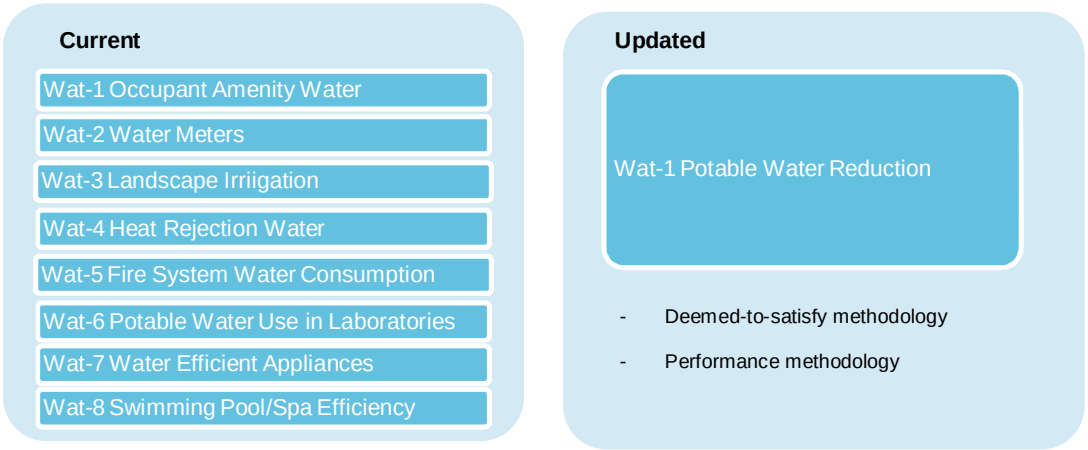
Over the past decade, the GBCA has developed a number of rating tools for a wide range of buildings. Each Green Star tool covers a number of categories that assess the environmental impact that is a direct consequence of a project's site selection, design, construction and maintenance. Within the Green Star rating framework there are currently seven tools that have been developed to assess the sustainable attributes of buildings.

As a part of the GBCA's range of commitments to improve the Green Star rating system, the range of tools that cover numerous building types are being condensed into a single streamlined Design and As Built rating tool that can assess across a range of building types.



As a part of the Green Star rating tool redevelopment, the Water category is also undergoing some fundamental changes:

- Consolidation of all water credits into one core water credit aimed at reducing potable water consumption;
- Implementation of two compliance pathways: Deemed-to-satisfy and a performance methodology to help project teams save time and simplify documentation requirements;
- Updated benchmarks to reflect the market's needs – now and into the future.



1.1 Existing Water Use Coverage

Prior to redevelopment, the water uses covered by each of the existing rating tools differed. While all tools promoted efficiency through fitting and fixture selection, not all tools considered the water used by swimming pools for example. Table 2 shows the inclusions in the Water category of each of the existing rating tools.

Table 2 Water uses assessed in existing Green Star tools

	Taps - Sanitation	Taps - Kitchen	Showers	Toilets	Urinals	Irrigation	Heat Rejection	Fire System	Washdown	Process Cooling	Appliances	Swimming Pools
Education v1	✓		✓	✓	✓	✓	✓	✓		✓		
Healthcare v1	✓		✓	✓	✓	✓	✓	✓		✓		
Industrial v1	✓		✓	✓	✓	✓	✓	✓	✓			
Multi Unit Residential v1	✓	✓	✓	✓		✓	✓	✓			✓	✓
Office v3	✓		✓	✓	✓	✓						
Public Building v1	✓		✓	✓	✓	✓	✓	✓				✓
Retail Centre v1	✓		✓	✓	✓	✓	✓	✓				

2.0 Response to Water Category Review Recommendations

Figure 1 Recommendations for water category update (Source: Green Star Design & As Built, Water Category Review Report, WSP, Dec 2013)

Prior to undertaking this update to the water category, the GBCA undertook a review of the existing Green Star tools and their alignment with industry best practice both nationally and internationally. A number of recommendations were put forward in a report titled '*Green Star Design and As Built, Water Category Review*' (WSP, Dec 2013). The treatment of these recommendations in the redevelopment of the water category is addressed within this section.

2.1 Provide Greater Flexibility

As part of the GBCA's mission to simplify the rating process for projects and reduce documentation requirements, the report recommends adopting an option for the project team to select one of two compliance pathways.

- A deemed-to-satisfy (DTS) methodology where projects that exhibit all of the required provisions are deemed compliant with the credit criteria; and

- A performance methodology where projects could demonstrate a reduction in potable water by comparing their proposed design to a reference building.

In essence, this recommendation has been adopted in developing the updated water category. The key difference between the recommendation and our adopted approach was to include a water calculator within the performance methodology. The *Water Category Review* Report advocated for the removal of the water calculator to address the GBCA's reoccurring issues with tool malfunctions, inaccuracy with rainwater calculations, and the inflexibility of the present tools.

The Report acknowledged that there is presently no protocol available for the detailed water balance calculations that would be required by the rating tool and no holistic water balance modelling software available to undertake the necessary analysis. Therefore project teams would be required to develop their own detailed calculations on a project-by-project basis to embark down the performance methodology path. While many consultants would be capable of reproducing the necessary calculations, it was seen as restricting some projects with limited consultant budgets, to the DTS method alone.

With the development of the updated water calculator, our approach has been to allow greater flexibility in project team inputs to account for a wider variety of building types and their water demands. The water calculator guide has also been updated to provide project teams with further guidance around the calculations used within the calculator.

2.2 Metering Moved to Management Category

To create consistency with the more recently released tools such as Public Buildings v1, the *Water Category Review* Report proposed that the water metering credit be moved and rewarded in the management category. This recommendation has been adopted. Water meters have not been included in the updated water category.

2.3 Use of a Non-linear Points Scale

The reward of points throughout the recently released Green Star tools, for the reduction of potable water has been done on a linear scale. For every 10% that water is reduced in the building, 1 point is awarded. The *Water Category Review* Report recommended adjusting this to a non-linear scale in the updated Design & As Built tool. The Report reasons that more points should be awarded at the top end of the scale due to the relative difficulty of achieving the last few points in the category as opposed to the first few, both in terms of cost and authority restrictions on the use of recycled water for certain demands.

The feedback from the Technical Advisory Group (TAG) was split as to whether a linear or non-linear point scale should be implemented. A number of responses advocated that either approach would be appropriate because while the higher points may be more difficult to achieve, there is an equivalent benefit in water savings whether it

be the first or the last litre of water that is saved. Further, one TAG member went on to comment that often the last litre of water saved is the least environmentally beneficial as it often requires technologies to be implemented that have high embodied carbon or maintenance requirements throughout the operational life of the building.

Our approach has been to maintain a linear point scale. While consistency between the method of awarding of points in other categories was a primary consideration, we also considered the nature of building design practices that the tool may be promoting should a greater number of points be awarded for the highest levels of potable water reduction. The ability of a project to meet the highest level of performance would be dependent on either the implementation of on-site water treatment or connection to a non-potable external water source. A non-linear point scale would reward a project more for the supply of non-potable water, than it would for improving water efficiency and reducing the total demand of potable water within the project. We do not believe that this is the primary outcome that the GBCA wish to support.

2.4 Reward for Restorative Performance

Restorative performance – beyond water neutrality – is currently awarded under the innovation category where project teams demonstrate that the benchmark set for potable water reduction has been exceeded. The *Water Category Review* Report recommends that this level of performance should be awarded within the water category. There are numerous reasons given to back-up this recommendation including the desire to acknowledge buildings that surpass water neutrality as World's Best Practice.

The majority of responses from the TAG show a desire to have restorative performance continue to be rewarded under the innovation category. While the responses acknowledged that the technology required is commercially available, the difficulties with local authorities in allowing recycled water to be reused outside of the project site still requires extensive stakeholder engagement by project teams. Projects that could overcome these barriers on a case by case basis are still seen as being innovative.

The approach in the update of the water category is to retain the points scale up to water neutrality, as currently used in the Public Building v1 tool.

2.5 Appropriate Baseline for Minimum Performance

The *Water Category Review* Report recommended maintaining the current baseline in use by Green Star tools. The existing baseline incorporates minimum WELS ratings for fixtures and fittings, no water recycling, and standard design principles for cooling towers and irrigation.

As a function of consolidating the existing design and as built tools and in ensuring that the benchmarks remain relevant now and into the future, a number of additional baseline variables were added to the existing benchmarks. Both the existing and the additional baseline variables are detailed in Table 3.

In the performance method, the reference case is defined by the baseline variables in combination with project-specific inputs such as floor area, occupancy profiles, and the existence of each of the water demands within the project. This approach varies somewhat from previous versions of the water calculator, notably the MURT v1 tool where projects were heavily penalised for installing swimming pools. While it is recognised that swimming pools can use significant volumes of water, they also provide community and social benefits which were largely ignored in previous versions of the tool.

In the updated version of the calculator, where a project includes amenities such as a swimming pool, the baseline of the reference building is expanded to include a swimming pool of equivalent size to the project, using standard practice filtration and top-up methods. The project team is then able to claim recognition for any improvements made on the standard practice approaches to these elements. This approach has been taken to all non-typical elements of the water demands within the water calculator. If a project does not contain laundry facilities for example, then laundry equipment water use is not included within the reference building.

This modification essentially increases the water used by the reference building and better focuses project team effort on improving the water efficiency of the building attributes that use the greatest volume of potable water, rather than discouraging water use altogether.

Table 3 Water balance baseline variables

Water Balance Input	Retained Baseline	Additional / Altered Baseline
Population and Occupancy Profile	Default profiles from Section J of the NCC 2013	Added user defined input for the number of people and the days of operation for sporting facilities to account for patron shower water use
Toilets	3 star WELS (4 L/flush)	
Urinals	3 star WELS (2 L/flush)	
Taps	4 star WELS (7.5 L/min)	
Showers	3 star WELS (9 L/min)	
Clothes Washing Machines		2.5 star WELS (capacity < 5kg) 3 star WELS (5 kg capacity or greater)
Dishwashers		3.5 star WELS
Heat Rejection - Monthly cooling load - Condenser Water ΔT - Drift Coefficient - Cycles of Concentration	 As determined by Ene-1 modelling 5.5°C (as per requirements in GHG guide) 0.002% (as required by AS3666.1 C4.4)	 6 COC (in alignment with previous Green Star tool versions)
Irrigation - Weighted average crop coefficient - Application efficiency of irrigation system - Microclimate factor & Density of Vegetation	 0.6 75% (night time sprinklers)	 Both of these factors have been removed to simplify the calculations.
Swimming Pools - Use of a pool cover - Backwash (filter cleaning)		Updates to baseline in line with ACTPLA Yes 5 flushes at 250 Litres per year
Fire Protection Systems	The fire system does not expel water for testing OR 80% of fire test water is required to be captured for reuse.	
Process Cooling	A closed-loop system is provided for all process cooling applications OR greater than 95% of water used by open-loop systems is non-potable water.	
Non-potable water sources (Rainwater etc.)	Not included in baseline	

2.6 Combine All Credits within the Water Category

The GBCA has directed the teams looking at updates to the water category to consider the integration of all existing credits into a single water credit. The *Water Category Review* Report supports this direction, with the exception of the metering credit, as discussed in section 2.2. This recommendation was also unanimously supported by the TAG.

The *Water Category Review* Report also proposed that a second water credit be developed, which pulls together the existing Emi-5 Stormwater Management and Emi-6 Discharge to Sewer under the water category. This proposal was supported by the TAG where a fully Integrated Water Management (IWC) approach was taken, as it was envisaged that these aspects of water management would be covered by the IWC approach under the Wat-1 credit.

As a full IWC approach has not been adopted for the updated Wat-1 credit, the water management aspects of Emi-5 and Emi-6 have not been integrated. These two credits therefore remain unchanged, focusing solely on the treatment and emission of stormwater and sewerage from the site and should remain within the emissions category until such a time that a full IWC approach is adopted.

3.0 Credit Benchmarks and Point Allocation

3.1 How points are awarded in Wat-1 'Potable Water'

The method used to allocate points for the deemed-to-satisfy and the modelled water balance approach is different under the new Wat-1 credit. Under the deemed to satisfy methodology, the maximum number of points available is six. Under the modelled water balance methodology, the number of points available increases to 12 points.

Deemed to Satisfy

Points under the deemed to satisfy criteria are awarded for each initiative included in the project as outlined in the following table:

Table 4 Proposed point allocation – deemed to satisfy methodology

Water Use	Water Saving Design Feature	Points Awarded
1 Sanitary Fixture Efficiency	All fixtures are within one star of the best available WELS rating	1
2 Rainwater Reuse	A rainwater tank is installed to collect and reuse rainwater within the project's site boundary and the rainwater tank size meets the criteria established in Table Wat-1.1	1
3 Heat Rejection	No water is used for heat rejection	2
4 Landscape Irrigation	Drip irrigation with moisture sensor override **OR** No water used for irrigation	1
5 Fire System Test Water	The fire system does not expel water for testing **OR** The fire system includes storage for 80% of the fire water and the sprinkler systems for reuse on-site	1
Maximum points available – deemed to satisfy criteria		6

Modelled Water Balance

Up to ten points are awarded for reductions in potable water usage compared to the water usage in a building with standard practice water usage, as per the percentage improvements in Points are awarded for improvements on standard practice performance.

The standard practice benchmark represents water usage for a building designed to the level of standard practice; descriptions of how standard practice is defined are included in each section of this guide.

It should be noted that, as percentage reductions are rewarded with Green Star points, the absolute water consumption for the benchmark varies depending on the building's characteristics.

An additional two points are awarded for the following uses (one point each):

1) compliance with fire protection sprinkler test water requirements

2) compliance with process cooling water requirements

Where either of these two uses is not applicable to the project, the weighting of the percentage reduction points available in

Table 5 will be increased.

Table 5 Proposed point allocation – modelled water balance methodology

Points Awarded	Percentage reduction compared to standard practice benchmark
0	0%
1	5%
2	15%
3	25%
4	35%
5	45%
6	55%
7	65%
8	75%
9	85%
10	95%

1 additional point	Fire System Test Water
1 additional point	Process Cooling

3.2 Weighting Factors

The state based weighting factors for the Water category have remained unchanged over time with the release of new Green Star tools. Within the Water category, weighting ranges from 10% in Queensland and Northern Territory to as high as 15% in South Australia, Tasmania, and Victoria. Across the board, the Water category generally has the third to fifth highest relative weighting of all the Green Star categories (see Table 6). It appears that the overall Water category is weighted appropriately and reflects the relative importance or impact this category has within the Australian environment.

Table 6 Green Star Public Buildings v1 category weightings

Category	ACT%	NSW%	NT%	QLD%	SA%	TAS%	VIC%	WA%
Man	14	14	14	14	14	14	14	14
IEQ	18	18	18	18	18	18	18	18
Ene	22	22	22	22	22	17	22	22
Tra	10	10	10	10	10	10	10	10
Wat	12	12	10	10	15	15	15	12
Mat	13	13	13	13	13	13	13	13
Eco	6	6	8	8	3	8	3	6
Emi	5	5	5	5	5	5	5	5
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Currently, only Eco, Wat and Ene have category weighting factors that vary across the States. It is unclear from where the weightings for the Water Category originated. Rainfall and the extent of evaporation are the two key aspects of the Water Category that vary between locations. To ensure consistency with how environmental issues are dealt with at a national level, it is recommended that the GBCA remove the current state-based weighting system, and use one consistent weighting system nationally (e.g. Apply the ACT's category weighting across all States).

The issue of varying rainfall and evaporation in different regions has been addressed in the latest version of the Potable Water Calculator through the implementation of daily water calculations based on local historical rainfall patterns.

4.0 Summary of Updates

A number of updates to the Water Category have taken place in the development of Green Star – Design & As Built v1. The following table captures the primary updates and indicates the extent of the impact of these updates on the tool.

Notes regarding the updates have been summarised into the following three categories:

- No updates made, component has remained unchanged
- Minor updates have been made to this component of the category
- Major updates have been made to this component of the category

Table 7 Summary of updates to the Water Category

Category Component	Update Outcome	Notes on Update
General		
Overall Water Category		The overall Water Category has seen some significant changes in order to accommodate all existing tools for different building typologies into the single Design & As Built tool. The credit builds upon the Potable Water Calculator developed for the Public Buildings Tool which needed to be more flexible than its predecessors in order to allow for a combination of National Construction Code building classes within a single project. In addition, the Water Category has been consolidated into the one credit in order to streamline documentation requirements by removing the duplication of identical documentation in multiple credits and removing the likelihood of any double-counting of water savings.
Two compliance pathways		As a part of the redevelopment of the Water Category, an additional Deemed to Satisfy (DTS) compliance pathway has been introduced in order to streamline the submission process for smaller, less complex projects. Projects can still choose to demonstrate compliance via the performance pathway and Potable Water Calculator should they choose. The DTS methodology allows a project that exhibits all of the required provisions for each targeted point, to be deemed compliant with the credit criteria without the need to undertake any water balance calculations.
Water Metering & Monitoring		The former Wat-2 credit related to water metering and monitoring has been proposed to move to the Management Category. The credit itself has not been reviewed or updated as a as a part of the Water Category update.
Maximum number of unweighted points available		With the introduction of a DTS methodology, it was necessary to align the points appropriately between each of the compliance pathways. The maximum number of points allocated for the Water Category remains at 12 points. For the DTS pathway the maximum number of points is limited to 6 points.
State based weighting factors		While this category redevelopment had no direct impact on the weighting factors applied to each category within the overall tool. The recommendation is that a weighting for the category in the range of 12-15%, as it currently stands is appropriate. It is also recommended that the current state-based weighting system be removed and that one consistent weighting system nationally is used. Variations in rainfall and evaporation between climate regions are picked up in the Potable Water Calculator through the requirement for project teams to enter site-specific climate data.

Category Component	Update Outcome	Notes on Update
Potable Water Calculator		
Building Checklist	🟡	The Potable Water Calculator now includes a building checklist. The building checklist asks a series of yes/no questions in order to determine the inputs required throughout the remainder of the Calculator. This information is also used to help determine the boundaries of the Standard Practice Building's water consumption.
Sanitation	🟡	The majority of the Calculator related to water demand from fixtures and fittings remains unchanged from the Public Buildings tool. The exception to this is the addition of showers for sporting facilities which have been added to more accurately account for shower use associated with visitors to the venue. Project teams are required to manually enter the patronage of these facilities separately from the building occupancy inputs.
White goods	🔴	Dishwashers and clothes washing machines have been added into the Potable Water Calculator under the heading of 'White goods'. These were previously included in the Multi-Unit Residential tool in a limited form. Previously to be awarded points, the equipment needed to be within one star of the highest available WELS rating. The equipment has now been integrated into the Potable Water calculator with a baseline set for the standard practice building of 3.5 stars for dishwashers and 3-2.5 stars (dependant on capacity) for clothes washing machines.
Heat Rejection	🟡	Updates have been made to the calculation of heat rejection water to take into account the local climate conditions at each site. Project teams will be required to enter additional information about their project location including monthly average temperatures and relative humidity, along with the cycles of concentration for the proposed heat rejection design.
Irrigation	🟡	The irrigation calculation has been simplified by removing the need for project teams to specify a microclimate factor or a density factor for landscaped areas. The inclusion of these factors had a combined impact of 1-5% on the overall outcome of the water used for irrigation.
Swimming Pools	🔴	Water used by swimming pools has been added to the Potable Water Calculator. The calculation for water use is derived from the ACT Planning and Land Authority (ACTPLA) design and siting requirements for water efficiency for outdoor swimming pools. For indoor swimming pools, the calculation references the ASHRAE 1997 Fundamentals Handbook.
Fire Protection Systems	🟢	The former Wat-5 "Fire System Test Water' has been integrated into the Wat-1 Potable Water Calculator. The credit criterion remains unchanged. 1 point is available as an additional point where fire systems either do not expel water for testing or they recycle greater than 80% of the test water on-site. Where reclaimed water is used to meet the demand, this is taken into account in the Potable Water Calculator.
Process Cooling	🟢	The former Wat-6 'Potable Water Use in Laboratories' and 'Potable Water Use for Equipment' from the Education and Healthcare tools respectively, has been integrated into the Wat-1 Potable Water Calculator. The credit criterion remains unchanged. Where equipment requiring process cooling is either served by a closed loop system, or greater than 95% of process cooling water is non-potable, 1 point is awarded. Where reclaimed water is used to meet the demand, this is taken into account in the Potable Water Calculator.

Category Component	Update Outcome	Notes on Update
Reclaimed Water		The updated calculations solve the perceived issue of double counting by implementing a complex logic to determine whether a reclaimed water source is available on each day of the year and the maximum demand required to be met by that source. The Calculator now allows the project team to enter whether a water use is served by more than one reclaimed source. For example, toilets supplied by rainwater and greywater supplies.
Rainwater Collection		In order to address the reoccurring issues of inaccuracy and lack of granularity in the Potable Water Calculator, daily calculations have been implemented for reclaimed water use. Rainfall data is now required to be entered for each day of the year. Data has been provided for a number of common green building locations, but project teams may also supply their own. The Calculator now also provides real time feedback to project teams on both the reliability of the rainwater tank – the regularity with which rainwater demands are met on a project – and the water level of the rainwater tank throughout the year. These two outputs give projects a quick indication as to whether the rainwater tank is over or undersized for their particular location and use on a project.
Greywater Collection, Blackwater Collection, & Stormwater or Off-site Reclaimed Water		There have been no updates to the way project teams enter information for these aspects of the Calculator. These calculations are now undertaken on a daily basis to align with rainwater reuse.

5.0 Outstanding Coordination Issues

As the Water Category forms part of the development of the wider Green Star – Design & As Built tool, there are a number of coordination issues that have been unable to be resolved during this development phase. The outstanding coordination issues are summarised in Table 8.

Table 8 Summary of outstanding credit development issues

Coordination Issue Related To:	Documentation Requiring Update	Comments
Location of Potable Water Calculator in new tool	Potable Water Calculator Guide, Introduction (page 6)	The Introduction section of the guide directs the reader to the location of the Potable Water Calculator. It was unclear whether the location of the Calculator would remain the same in the updated version of the tool.
Reference to Appendix of GHG Emissions Guide	Potable Water Calculator Guide, Section 3.0 Building Occupancy, Areas and Operation (page 10)	The Potable Water Calculator Guide refers back to the GHG Emissions Calculator Guide for the section related to information on dividing the building into space types with different occupancy levels and patterns. It was unclear whether the location of the referenced appendix would remain the same in the updated version of the tool.
Percentage of staff that utilise bicycle parking	Potable Water Calculator Potable Water Calculator Guide, Section 5.0 Fixtures and Fittings (page 15)	The percentages adopted in the Potable Water Calculator for the determination of staff shower use are linked to the number of points claimed under Tra-3 Cyclist Facilities. This is currently 5% for no significant gym or cyclist facilities, 10% for 1 point or provision of a gym, and 15% for 2 points achieved under Tra-3. This is proposed to be increased in the updated tool, however confirmation of this shift in baseline was not received at the time of updating the Water Category.
Location of Sewerage Calculator in new tool	Potable Water Calculator Guide, Section 13.0 Green Star Design & As Built Sewerage Calculator (page 43)	Section 13.0 of the guide directs the reader to the location of the Sewerage Calculator. It was unclear whether the location of the Calculator would remain the same in the updated version of the tool.
Location of GHG Emissions Calculator in new tool	Potable Water Calculator Guide, Section 14.0 Green Star Design & As Built GHG Emissions Calculator (page 44)	Section 14.0 of the guide directs the reader to the location of the GHG Emissions Calculator. It was unclear whether the location of the Calculator would remain the same in the updated version of the tool.
Use of DHW Calculation from the Potable Water Calculator in the GHG Emissions Calculator	Potable Water Calculator Potable Water Calculator Guide, Section 14.0 Green Star Design & As Built GHG Emissions Calculator (page 44)	Section 14.0 of the guide discusses the calculation of domestic hot water (DHW) and the use of this figure in the GHG Emissions Calculator. It was unclear whether the updated GHG Emissions Calculator would still use this figure. The Potable Water Calculator also contains written references to DHW in the 'Results' section.
Reference to IEQ-1 'Ventilation Rates' in new tool	Potable Water Credit (page 3)	Under the Deemed to Satisfy method for teams claiming points for no water based heat rejection, the guidance refers to IEQ-1 'Ventilation Rates' for demonstrating that spaces are adequately naturally ventilated and therefore do not require mechanical ventilation.