

**Preamble**

The WA Alterations & Additions Protocol for Energy Efficiency (Protocol) is an *Alternative Solution* that describes a *Building Solution* that satisfies National Construction Code Volume Two – Building Code of Australia for Class 1 and Class 10 buildings *Performance Requirements P2.6.1 Building and P2.6.2 Services*, when building work is undertaken on an existing Class 1 and/or attached Class 10 building.

Nominated performances have been determined by research and investigation as making reasonable allowance for existing building performance when determining the “to degree necessary” outcome that applies for *Performance Requirements P2.6.1 and P2.6.2*.

To provide for a practical application of this Protocol, where building work alters and/or is added to an existing building, compliance is determined using the Building Code of Australia edition that applies for the building work.

Scope	National Construction Code series. Volume Two – Building Code of Australia for Class 1 and 10 Buildings (BCA).	
	<i>Performance Requirements</i>	P2.6.1 Building. P2.6.2 Services.
	Part 3.12 Energy Efficiency	This Protocol describes <i>Alternative Solutions</i> to acceptable construction practice ( <i>DTS Provisions</i> ). A <i>Building Solution</i> satisfies P2.6.1 and P2.6.2 when it complies with BCA Part 3.12, except where the Protocol provides an alternative and the building work satisfies that alternative.  <b>3.12.0 Application of Part 3.12</b>  3.12.0 nominates two <i>DTS</i> options for satisfying P2.6.1 Building: 3.12.0(a)(i) – herein referred to as the <b>HERS</b> option, and 3.12.0(a)(ii) – herein referred to as the <b>EP</b> option.  3.12.0 nominates one <i>DTS</i> option for satisfying P2.6.2 Services: 3.12.0(b) – herein referred to as the <b>Services</b> option.
Application of this Protocol	Building work to be undertaken on an existing Class 1 and/or attached Class 10 building.	
	But does not apply to	Existing Class 1 and 10 buildings where no alteration and/or addition has taken place and approval was granted using the provisions of BCA 2012 or later.
		Existing Class 1 and 10 buildings where an alteration or addition has taken place and approval for the alteration and/or addition was granted using the provisions of BCA 2012 or later.
		New Class 1 buildings.
		New detached Class 10 buildings.
Relocation of an existing Class 1 or 10 building (Regulation 31D of the Building Regulations 2012).		
Defined terms (Protocol defined terms shown shaded)	Building work has the meaning given in Sections 3 of the Building Act 2011.	
	Existing building has the meaning given in Section 92 of the Building Act 2011.	
	Applicable building standard(s) has the meaning given in Section 3 of the Building Act 2011.	
	Alteration/Alter(s)	Means building work undertaken on part(s) of an existing building.
	Addition/Added	Means building work undertaken on an existing building that increases floor area of the building and/or changes the classification of part(s) of the building.
	HERS	Means <i>house energy rating software</i>
	NatHERS principles	Means data setting descriptions in the Nationwide House Energy Rating Scheme Principles for Ratings in Regulation Mode
	EP	Means BCA elemental provisions Parts 3.12.1, 3.12.2, 3.12.3 and 3.12.4
	Services	Means BCA Part 3.12.5
	Words shown in <i>italic</i> are BCA defined terms	

**Document notices**

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Amd No.	Date	Description
3	23 October 2014	HERS option definitions for "Building area", "Zone" and "Affected zone area" amended.
4	10 November 2014	NatHERS Principles definition amended "...Means data setting descriptions in the ...."

## A. The HERS option of the Protocol

### Background

If the HERS option is used, then BCA 3.12.0(a)(i) and BCA 3.12.0(b) apply.

BCA 3.12.0(a)(i)(A) states that BCA 3.12.0.1 is to be used to determine the *required* minimum star rating.

BCA 3.12.0.1 states that HERS is to be used to determine the *required* star rating. However, NatHERS principles only allow ratings to be determined for the whole building, meaning that the existing building is likely to need to achieve a higher rating than originally applied.

### Objective

This part of the Protocol describes building rating outcomes for HERS using NatHERS principles, expressed as a maximum Total MJ Target, that make reasonable allowance for the likely performance of the existing building portion of the building, so that a single building rating can be used.

Defined terms that apply for this part of the Protocol (shown shaded)	Building area	Means the aggregate existing, altered and/or added area of all stories of the Class 1 building measured within the enclosing walls.
	Zone	Means the conditioned and/or unconditioned area of the Class 1 building as defined by the NatHERS principles.
	Affected zone area	Means the aggregate area of all added building work zones and any zone(s) abutting an alteration and/or addition to the Class 1 external wall(s) and/or external glazing.
	Affected proportion	Means a percentage calculated as follows: $[\text{Affected zone area (m}^2\text{)} \div \text{Building area (m}^2\text{)}] \times 100$
	Area weighted rating	Means a proportional star rating calculated as follows: $[(A_1 \times R_1) + (A_2 \times R_2) + (A_3 \times R_3)] \div (A_1 + A_2 + A_3)$ <p>Where: <math>A_{1,2,3}</math> = the aggregate of existing area (m<sup>2</sup>) approved before 1 May 2004 or 2006 or 2012.</p> <p><math>R_{1,2,3}</math> = the star rating that is nominated in this Protocol as applying for the existing area.</p>
	Total MJ	Means the mega joule/m <sup>2</sup> /annum outcome reported by HERS when in regulation mode.
	Total MJ Target	Means a Total MJ that is equivalent to the calculated area weighted rating.

### A1 Heating and cooling loads

A1.1 – as an alternative to a star rating nominated in BCA 3.12.0.1(a), a Total MJ Target based on the affected proportion is used to determine the acceptable building performance.

When the affected proportion is less than 10%	Achieve a Total MJ Target no greater than that equivalent to an area weighted rating calculated with	Existing area approved before 1 May 2004 having a 2 star rating, and
		Existing area approved before 1 May 2006 having a 3 star rating, and
		Existing area approved before 1 May 2012 having a 4 star rating.
When the affected proportion is greater than 10% and no more than 80%	Calculate the area weighted rating with	Existing area approved before 1 May 2004 having a 2 star rating, and
		Existing area approved before 1 May 2006 having a 3 star rating, and
		Existing area approved before 1 May 2012 having a 4 star rating.
	Achieve a Total MJ Target no greater than that equivalent to the proportional rating calculated as	Area weighted rating + $\{[(\text{Affected proportion} - 10\%) \div 70\%] \times (6 - \text{area weighted rating})\}$ , or
For climate zone 1 when BCA 3.12.0.1(a)(ii) applies: Area weighted rating + $\{[(\text{Affected proportion} - 10\%) \div 70\%] \times (5.5 - \text{area weighted rating})\}$ , or		
For climate zone 1 when BCA 3.12.0.1(a)(iii) applies: Area weighted rating + $\{[(\text{Affected proportion} - 10\%) \div 70\%] \times (5 - \text{area weighted rating})\}$ .		
When the affected proportion exceeds 80%	Achieve a Total MJ Target no greater than that equivalent to the star rating <i>required</i> by BCA 3.12.0.1.	

**Guidance note:** When the HERS option of the Protocol is used, existing glazing performance is the known performance or the appropriate HERS generic value.

**A2 Compensating for the loss of ceiling insulation**

As an alternative to BCA 3.12.1.2(e), where the building work fills an existing opening, leaves a gap, or forms a penetration in existing or added ceiling insulation, then Protocol B1.1.3 applies.

**A3 Building sealing**

As an alternative to BCA 3.12.3, where the building work affects existing building sealing, Protocol B3.1 applies.

Vented recessed downlights	For the affected zone area, the air tightness of existing recessed downlights is calculated using the worst altered or added recessed light air tightness. Existing recessed downlights that are outside the affected zone area can be calculated as being air tight.
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## B. The EP option of the Protocol

### Background

If the EP option is used, then BCA 3.12.0(a)(ii) and BCA 3.12.0(b) apply.

However, for some parts of the EP, this is likely to mean that the existing building will be *required* to achieve a higher performance than originally applied.

### Objective

This part of the Protocol describes targets that can be applied for an EP assessment so that reasonable allowance is made for the likely performance of the existing building.

Defined terms that apply for this part of the Protocol (shown shaded)	Compliance	Means as <i>required</i> by the BCA edition that applies for the building work.
	Space	Means an area in which building work is undertaken and that is enclosed by: <ul style="list-style-type: none"> <li>• Walls (external and internal), <i>glazing</i>, doors and the like, or</li> <li>• A combination of enclosed areas, or</li> <li>• The whole of the area of the storey(s) of the building.</li> </ul>
	<i>Total R-Value Target</i>	Means a building <i>fabric</i> performance value determined by calculations described in this Protocol.
	Area weighted value	Means a performance value that applies for the whole of the roof, wall or floor <i>fabric</i> in a <i>space</i> , calculated as follows: <ul style="list-style-type: none"> <li>• For each building <i>fabric</i> part, calculate a <i>Total U-Value</i>:  <math>= 1 \div \textit{Total R-Value}</math>, then</li> <li>• For each part of the building <i>fabric</i>, calculate the area weighted <i>Total U-Value</i>:  <math>= [(A_{add} \times U_{add}) + (A_{alt} \times U_{alt}) + (A_{exist} \times U_{exist})] \div (A_{add} + A_{alt} + A_{exist})</math>, then</li> </ul> Where: $A_{add}$ = the <i>added</i> building <i>fabric</i> area. $U_{add}$ = the <i>Total System U-Value</i> of <i>added</i> building <i>fabric</i> . $A_{alt}$ = the <i>altered</i> building <i>fabric</i> area. $U_{alt}$ = the <i>Total System U-Value</i> of <i>altered</i> building <i>fabric</i> $A_{exist}$ = the existing building <i>fabric</i> area. $U_{exist}$ = the <i>Total System U-Value</i> of the existing building <i>fabric</i> . <ul style="list-style-type: none"> <li>• Calculate the <i>Total R-Value Target</i>:  <math>= 1 \div \textit{Area weighted Total U-Value}</math></li> </ul>
	Added insulation	Means the <i>R-Value</i> of insulation that must be <i>added</i> to achieve the calculated <i>Total R-Value Target</i> . For existing building <i>fabric</i> that is <i>altered</i> , the installed <i>R-Value</i> can be less than that calculated to the degree that the existing roof, <i>external wall</i> or floor construction limits the thickness of the installed insulation that is otherwise used.
	New <i>glazing</i> proportion	A percentage calculated as follows: $[\textit{Area of new glazing for the storey (m}^2) \div \textit{Area of all glazing of the storey (m}^2)] \times 100$

**Guidance note:** For *external walls*, the *fabric* area used for an *area weighted value* calculation is the net wall area (excludes the area of all openings).

The thickness of installed insulation could be limited by: in the case of a raked ceiling lined to the underside of existing rafters, by the depth when the rafter; in the case of a framed wall, by the width of the existing studwork.

<b>B1 Building fabric</b>		
<b>B1.1 Roofs</b>		
When a roof is added, the <i>Total R-Value</i> required in BCA 3.12.1.2 applies.		
<b>B1.1.1 – as an alternative to the values in BCA Table 3.12.1.1a, for an existing roof, when building work:</b>		
<ul style="list-style-type: none"> <li>• Does not change the way compliance is achieved, then existing performance must be retained.</li> <li>• Changes the way compliance is achieved, then a proportional calculation is used to determine a <b>Total R-Value Target</b>.</li> </ul>		
When existing roof cover is replaced	<p>The <b>Total R-Value Target</b> is the greater of the existing performance or the value calculated as follows:  <math display="block">\{[(\text{Outdoor air film } R\text{-Value} + \text{Existing roof cover } R\text{-Value} + \text{Roof air space } R\text{-Value}) \div \text{Total } R\text{-Value of the existing roof excluding any existing insulation}] \times \text{Total } R\text{-Value in BCA Table 3.12.1.1a for the upper surface solar absorptance of the new roof cover}\} + \text{Existing ceiling lining } R\text{-Value} + \text{Indoor air film } R\text{-Value}.</math></p> <p>As an alternative to BCA 3.12.1.2(a)(ii), when the above applies for the whole roof of a storey, the added insulation can be placed at roof cover level.</p>	
When existing ceiling lining is replaced	<p>The <b>Total R-Value Target</b> is the greater of the existing performance or the value calculated as follows:  <math display="block">\{[(\text{Indoor air film } R\text{-Value} + \text{Existing ceiling lining } R\text{-Value} + \text{Roof air space } R\text{-Value}) \div \text{Total } R\text{-Value of the existing roof excluding any existing insulation}] \times \text{Total } R\text{-Value in BCA Table 3.12.1.1a presuming a roof cover upper surface solar absorptance of 0.4}\} + \text{Existing roof cover } R\text{-Value} + \text{Outdoor air film } R\text{-Value}.</math></p>	
When the colour of existing roof cover is altered	As an alternative to Table 3.12.1.1a, when the only roof fabric alteration is the colour of the roof cover, the building work can be undertaken without any change to the existing roof insulation.	
<p><b>Guidance note:</b> For a roof, building work that changes the way compliance is achieved could be the replacement of one of the existing building fabric layers. Building work that would not change the way compliance is achieved would be the temporary removal and replacement of part of the existing roof cover to allow for roof frame realignment.</p>		
<b>B1.1.2 – as an alternative to BCA Table 3.12.1.1(a), when there is existing, altered and/or added roof in the same space, then an area weighted value is used to determine a Total R-Value Target.</b>		
For the whole of the roof in a space	The area weighted value is calculated using the:	<p><i>Total R-Value</i> prescribed in Table 3.12.1.1a for any added roof, and</p> <p><i>Total R-Value Target</i> described in B1.1.1 for any altered roof, and</p> <p><i>Total R-Value</i> of any existing roof.</p>
<b>B1.1.3 – as an alternative to 3.12.1.2(e), where building work fills an existing opening, leaves a gap, or forms a penetration in existing or added ceiling insulation, then the following apply.</b>		
Openings and gaps	Are to be filled with insulation having an <i>R-Value</i> the greater of the adjacent existing insulation or the value determined from using B1.1.1 or B1.1.2.	
Penetrations	<p>For the aggregate area of all spaces that are part of the building work, when the area of ceiling insulation is reduced by altered or added penetrations nominated in BCA 3.12.1.21(e) the percentage of ceiling area uninsulated that applies for BCA Table 3.12.1.1b is determined as follows:</p> $\{[P_a + ((P_{ae} + P_e) - (A_{ea} \times 0.5\%_{max}))] \div (A_a + A_{ea})\} \times 100$ <p>Where: <math>P_a</math> = total area of added penetrations nominated in BCA 3.12.1.2(e) made in the added ceiling area.</p> <p><math>A_a</math> = added ceiling area.</p> <p><math>P_{ae}</math> = total area of added penetrations nominated in BCA 3.12.1.2(e) made in the existing and/or altered ceiling area</p> <p><math>P_e</math> = total area of existing penetrations calculated using the largest added exhaust fan, flue or recessed downlight penetration area for each existing exhaust fan, flue or recessed downlight.</p> <p><math>A_{ea}</math> = existing and/or altered ceiling area.</p> <p><math>0.5\%_{max}</math> = a concession with a maximum value of 0.5% that reduces the value of <math>P_{ae} + P_e</math> to no less than zero.</p>	
<p><b>Guidance note:</b> <i>R-Values</i> are shown in BCA Volume One Specification J1.2 Material properties and Specification J1.3 Roof and ceiling construction.</p>		

**B1.2 Roof lights**

When a *roof light* is added, the requirements of BCA 3.12.1.3 apply.

Existing <i>roof light</i>	When building work	Does not change the way compliance is achieved, existing performance must be retained.
		Changes the way compliance is achieved and the <i>roof light</i> no longer complies, it must be altered to achieve compliance with BCA 3.12.1.3.

**Guidance note:** For a *roof light*, building work that affects the way compliance is achieved could be a reduction in *floor area*, a change of shaft length, or adding other *roof lights* to the storey of the building.

**B1.3 External walls**

When an *external wall* is added, the *Total R-Value required* in BCA 3.12.1.4 applies.

**B1.3.1 – as an alternative to the values in BCA Table 3.12.1.3a, for an existing external wall, when building work:**

- Does not change the way compliance is achieved, then existing performance must be retained.
- Changes the way compliance is achieved, then a proportional calculation is used to determine a *Total R-Value Target*.

When external cladding of an existing wall is replaced	The <i>Total R-Value Target</i> is the greater of the existing performance or the value calculated as follows: $\{[(\text{Outdoor air film } R\text{-Value} + \text{Existing wall cladding/masonry } R\text{-Value} + \text{Air space } R\text{-Value}) \div \text{Total } R\text{-Value of the existing external wall excluding any existing insulation}] \times \text{Total } R\text{-Value in BCA Table 3.12.1.3a for that part of the external wall}\} + \text{Existing wall lining/masonry } R\text{-Value} + \text{Indoor air film } R\text{-Value}.$
When internal lining of an existing wall is replaced	The <i>Total R-Value Target</i> is the greater of the existing performance or the value calculated as follows: $\{[(\text{Indoor air film } R\text{-Value} + \text{Existing wall lining/masonry } R\text{-Value} + \text{Air space } R\text{-Value}) \div \text{Total } R\text{-Value of the existing external wall excluding any existing insulation}] \times \text{Total } R\text{-Value in BCA Table 3.12.1.3a for that part of the external wall}\} + \text{Existing wall cladding/masonry } R\text{-Value} + \text{Indoor air film } R\text{-Value}.$

**Guidance note:** For an *external wall*, building work that changes the way compliance is achieved could be the replacement of one of the existing building *fabric* layers or a change to wall shading. Building work that would not change the way compliance is achieved would be adding a new layer to the face of otherwise unchanged existing building *fabric*.

**B1.3.2 – as an alternative to BCA Table 3.12.1.3a, when there is existing, altered and/or added external walls in the same space, an area weighted value is used to determine a Total R-Value Target.**

For the whole of the <i>external wall</i> in a space	The area weighted value is calculated using the:	<i>Total R-Value</i> required in BCA Table 3.12.1.3a for any added <i>external wall</i> , and
		<i>Total R-Value Target</i> described in B1.3.1 for any altered <i>external wall</i> , and
		<i>Total R-Value</i> of any existing <i>external wall</i> .

**B1.3.3 – as an alternative to BCA 3.12.1.4, when building work fills an existing opening in an external wall, then the following applies.**

Filled openings	The filled part of an <i>external wall</i> is to have a <i>Total R-Value</i> that is the greater of the existing adjacent <i>external wall</i> or that calculated using B1.3.1 or B1.3.2.
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**B1.4 Floors**

When a floor is added, the *Total R-Value required* in BCA 3.12.1.5 applies.

**B1.4.1 –as an alternative to the values in BCA Table 3.12.1.4, when there is existing, altered and/or added floor in the same space, then an area weighted value is used to determine a Total R-Value Target.**

For the whole of the floor in a space	The area weighted value is calculated using the:	<i>Total R-Value</i> prescribed in Table 3.12.1.4 for any added floor area, and
		<i>Total R-Value</i> of any existing floor.

**B1.5 Attached Class 10a buildings**

When a Class 10a building is added, the requirements of BCA 3.12.1.6 apply.

**B1.5.1 – as an alternative to BCA 3.12.1.6, for an existing attached Class 10a building, when building work:**

- Does not change the way compliance is achieved, then existing performance must be retained.
- Changes the way compliance is achieved and the Class 10a building no longer complies, then it must be altered to achieve compliance.

**Guidance note:** For an attached Class 10a building, building work that changes the way compliance is achieved could be a change to the garage door orientation, Class 1 building external wall (*climate zone* specific) or ceiling insulation. Building work that would not change the way compliance is achieved would be relocating the garage door without changing its orientation.

<b>B2 External glazing</b>
<b>B2.1 External glazing</b>
When external <i>glazing</i> is added, the requirements of BCA 3.12.2 apply.
<b>B2.1.1 – as an alternative to BCA 3.12.2.1, when there is existing <i>glazing</i> and <i>glazing</i> is added, a proportional calculation is used to determine aggregate Conductance and Solar Heat Gain Targets for each storey of the building.</b>
<b>B2.1.2 – as an alternative to BCA 3.12.2.1, for existing <i>glazing</i>, when building work:</b>
<ul style="list-style-type: none"> <li>• Does not change the way compliance is achieved, then existing performance must be retained.</li> <li>• Changes the way compliance is achieved, then either existing performance must be shown to be retained or a proportional calculation must be used to determine aggregate Conductance and Solar Heat Gain Targets for each storey of the building.</li> </ul>

**Guidance note:** For external *glazing*, building work that changes the way compliance is achieved could be a change of glass type, shading, floor type, or the area of the storey.

When the proportional option is used for the storey of the building	Unless stated otherwise, compliance is determined as required by BCA 3.12.2.			
	<table border="1"> <tr> <td><i>Total System U-Value</i> and <i>Total System SHGC</i></td> <td>For new <i>glazing</i>, values are those required by BCA 3.12.2.1.</td> </tr> <tr> <td></td> <td>For existing <i>glazing</i>, values can be the known performance or those shown in Schedule One.</td> </tr> </table>	<i>Total System U-Value</i> and <i>Total System SHGC</i>	For new <i>glazing</i> , values are those required by BCA 3.12.2.1.	
<i>Total System U-Value</i> and <i>Total System SHGC</i>	For new <i>glazing</i> , values are those required by BCA 3.12.2.1.			
	For existing <i>glazing</i> , values can be the known performance or those shown in Schedule One.			
When the new glazing proportion is less than 10%	Achieve Aggregate Conductance and Solar Heat Gain percentages that are no greater than the values calculated using: The values listed in Schedule Two for existing <i>glazing</i> .			
When the new glazing proportion is greater than 10% and less than 80%	Schedule Two value – {(Schedule Two value – 100%) x [(New glazing proportion - 10%) x (100/70)]}			
When the new glazing proportion is greater than 80%	The new <i>glazing</i> value of 100% for Conductance and Solar Heat Gain.			

**Guidance note** Schedule Two contains Aggregate Conductance and Solar Heat Gain percentages for range of variables. Refer to the notes provided for interpolation of values when more than one variable applies.

<b>B3 Building sealing</b>
When building sealing is added, the requirements of BCA 3.12.3 apply.
<b>B3.1 – as an alternative to BCA 3.12.3, for existing building sealing, when building work:</b>
<ul style="list-style-type: none"> <li>• Does not change the way compliance is achieved, then existing performance must be retained.</li> <li>• Changes the way compliance is achieved and the building sealing no longer complies, then the building sealing must be altered to achieve compliance.</li> </ul>

**Guidance note:** For building sealing, building work that affects the way compliance is achieved would be altering or replacing part of the building element or otherwise diminishing its sealing performance.

<b>B4 Air movement</b>
<b>B4.1 Air movement</b>
When <i>habitable room</i> is added, the requirements of BCA 3.12.4 apply.
<b>B4.1.1 – as an alternative to BCA 3.12.4.1 and 3.12.4.2(a)(ii), for existing <i>habitable room</i>, when building work:</b>
<ul style="list-style-type: none"> <li>• Does not change the way compliance is achieved, then existing performance must be retained.</li> <li>• Changes the way compliance is achieved and the <i>ventilation opening</i> no longer complies, then the <i>ventilation opening</i> must be altered to achieve compliance.</li> </ul>
<b>B4.1.2 – as an alternative to BCA 3.12.4.2(a)(i) and 3.12.4.2(b):</b>
<ul style="list-style-type: none"> <li>• For existing <i>habitable room</i>, when building work does not change the way compliance is achieved, then existing performance must be retained.</li> <li>• For existing <i>habitable room</i> when building work changes the way compliance is achieved or for added <i>habitable room</i>, if an existing ventilation opening that is not part of the building work is used to achieve a breeze path, then this does not invoke compliance for the existing <i>ventilation opening</i>.</li> </ul>

**Guidance note:** For air movement, building work that affects the way compliance is achieved would be changing the configuration of *glazing* or increasing the *floor area* of the associated *habitable room*.

**C The Services option of the Protocol**

**Background**

BCA 3.12.0 Application of Part 3.12 nominates BCA 3.12.0(b) as the *DTS* option for satisfying P2.6.2 Services.

When BCA 3.12.0(b) is used, then BCA Part 3.12.5 is to be used to determine building work compliance.

However, for some BCA Part 3.12.5 provisions, this is likely to mean that existing Services will be *required* to achieve a higher performance than originally applied.

**Objective**

This part of the Protocol describes targets that can be applied for BCA Part 3.12.5 so that reasonable allowance is made for the likely performance of existing Services.

**C1 Services**

**C1.1 Artificial lighting**

When the building work alters or adds artificial lighting in a space, then the requirements of BCA 3.12.5.5 apply.

**C1.1.1 – as an alternative to BCA 3.12.5.5(a), for the aggregate area of all spaces that are part of the building work, when there is existing artificial lighting and artificial lighting is altered or added, then the following applies.**

Existing artificial lighting Wattage	The Wattage of each existing artificial light is calculated using the highest altered or added artificial light Wattage.
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**C1.2 Water heater in a heated water supply system**

When the building work includes a new water heater, then the requirements of BCA 3.12.5.6 apply.

**C1.2.1- as an alternative to BCA 3.12.5.6, where building work relocates an existing water heater to another location on the building, the following applies.**

Existing water heater	When a water heater is not altered, then the existing status is retained and the heated water system can continue to be used.
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**Guidance note:** Water heater compliance is separate from installation compliance. When an existing water heater is relocated it is likely that the provisions of BCA 3.12.5 related to installation and the WA Additions will apply.



**Schedule ONE****Nominated existing glazing performance values (Total System U-Value / Total System SHGC)**

Glazing	Frame			
	Aluminium	Timber	UPVC	Thermally broken aluminium
Clear	6.60 / 0.75	5.60 / 0.75	5.40 / 0.70	6.0 / 0.70
Tinted	6.60 / 0.50	5.50 / 0.50	5.40 / 0.50	5.80 / 0.50
Low-e clear	4.70 / 0.65	3.80 / 0.60	3.50 / 0.60	4.10 / 0.60
Double glazed clear	4.30 / 0.70	3.30 / 0.70	3.10 / 0.70	3.60 / 0.70

**Schedule TWO****Nominated aggregate Conductance and Solar Heat Gain Targets for existing glazing**

Climate zone	Floor type	Wall insulation concession invoked	Aggregate Conductance	Aggregate Solar Heat Gain
1	Floor in direct contact with the ground	No	109%	294%
		Yes	109%	299%
	Suspended floor	No	121%	264%
		Yes	121%	330%
3	Floor in direct contact with the ground	No	153%	259%
		Yes	153%	324%
	Suspended floor	No	170%	287%
		Yes	170%	358%
4	Floor in direct contact with the ground	No	252%	169%
		Yes	314%	169%
	Suspended floor	No	279%	188%
		Yes	349%	188%
5	Floor in direct contact with the ground	No	153%	121%
		Yes	153%	143%
	Suspended floor	No	170%	135%
		Yes	170%	158%
6	Floor in direct contact with the ground	No	297%	106%
		Yes	372%	106%
	Suspended floor	No	330%	117%
		Yes	413%	117%

**Note 1:** For BCA Part 3.12.3 Air movement, alterations and additions building work typically does not affect all *ventilation openings*, therefore “Standard” air movement would apply because the whole of the storey has not been assessed as needed for compliance with BCA Table 3.12.2.1 Note 2. Therefore, the Aggregate Solar Heat Gain percentages list above are most likely “Standard” air movement values.

If all *ventilation openings* for the storey are included, then higher air movement levels can be used. When higher than “Standard” air movement is nominated, the Aggregate Solar Heat Gain percentages above shown must be adjusted down proportional to the change in the  $C_{SHGC}$  Constant shown in BCA Table 3.12.2.1.

As per Table 3.12.2.1 Notes 3 and 4, values can be interpolated when air movement and floor type settings are between “Standard and High” and “Direct and Suspended”.

**Note 2:** When the “Wall insulation concession” is invoked because a wall type from BCA Table 3.12.1.3b is used for a part of the *external wall*, the Glazing Calculator applies the applicable  $C_{SHGC}$  penalty to all *glazing* for storey. Whilst the Protocol does not include Table 3.12.1.3b wall alternatives, using the Protocol does not preclude the use of both Table 3.12.1.3b wall types and Protocol alternatives. However, if the “Wall insulation concession” is invoked by the use of a Table 3.12.1.3b wall type, the “wall insulation concession invoked – Yes” Aggregate Solar Heat Gain value shown above must be used for Protocol B2.1.