Residential sustainability measures

This updates the previous *Practice Note 2007-55* issued May 2007.

Part A: General requirements and new dwellings

1. Summary

This Practice Note provides advice about Victoria's 5 Star Standard, together with options for compliance. The 5 Star Standard applies to Class 1 and 2 buildings. Class 3 – 9 buildings must comply with the energy efficiency measures in Section J of Volume One of the Building Code of Australia (BCA).

2. Building and plumbing controls

2.1 Requirements

For Class 1 buildings, the BCA provides a number of options to demonstrate compliance with the Performance Requirements. Compliance with the performance requirement can only be achieved by complying with the Deemed to Satisfy (DTS) provisions or by formulating an Alternative Solution which complies with the Performance Requirements or is shown to be at least equivalent to the DTS provisions.

2.1.1 New Class 1 Buildings – options for compliance

(a) DTS provisions

Under the DTS provisions of the BCA, new Class 1 buildings are required to comply with the acceptable construction practice or manuals in Part 3.12.

(b) Using the Verification Method

When assessing an Alternative Solution using the Verification Methods in the BCA, new Class 1 buildings are required to achieve a House Energy Rating (HER) of 5 stars using software compliant with the Australian Building Codes Board (ABCB) protocol. The application of software is discussed later in this practice note.

2.2 Rainwater tanks and solar hot water heater systems

Both the DTS and the Verification Method require that new Class 1 buildings also require[1]:

(i) A rainwater tank connected to all sanitary flushing systems; or

(ii) A solar water heater system.

In either case, documentation must be provided to the Relevant Building Surveyor (RBS) to ensure compliance.

Where a solar water heater system is the chosen compliance option and a reticulated gas supply is available for connection to the building, the system must be a gas boosted solar water heater.

A list of solar water heater systems which meet the requirements is available on the Sustainability Victoria website.

A note of caution regarding Heat Pumps:
Where a solar water heater system is selected as the option for compliance with the 5 Star Standard, the plumbing regulations do not allow for the installation of heat pump solar water heater system where reticulated gas supply is available.

The Plumbing Industry Commission has provided advice that this restriction is not applicable where the heat pump solar water heater system is not being installed to meet the 5 Star Standard for a new house.

2.3 Class 2 and 4 buildings

For Class 2 buildings, an average 5 star rating is required for the whole building. Each sole-occupancy unit/dwelling (SOU) is to achieve a rating of at least 3 stars. There is no requirement to install a rainwater tank or solar water heater system in a Class 2 building. The BCA requirements for services must also be complied with.

[1] Plumbing work must comply with the *Plumbing Regulations 1998*. Technical information about these plumbing options can be found on the Plumbing Industry Commission's website.

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A Class 4 part of a building must achieve an energy rating of not less than 4 stars.

2.4 Detailed plans to be provided by building designers, architects, and draftspersons.

Regulation 302 of the Building Regulations 2006 (the Regulations) sets out the minimum information that applicants need to provide to the RBS when applying for the building permit. It includes any reports or computations that show compliance with the Building Act 1993 (the Act) or the Regulations must be provided.

Building designers must provide sufficient information on plans to enable the RBS to determine that the application complies with the Regulations.

This requires designers to provide detailed plans and specifications. For example, window schedules will require specific details. This will include glass type, frame type, U-values, SHGC values, orientation sector, and a copy of the glazing computations. If used, a copy of glazing calculator results must also be included. It is not the responsibility of the RBS to use the glazing calculator. This information must be provided by the building designer in the building permit application documentation.

Building designers should limit the use of general notes. A note such as "The builder is to ensure compliance with BCA Part 3.12" is not appropriate. The design itself must show full compliance.

Ensuring the appropriate details are provided on the plans enables the RBS to ensure compliance is achieved in order to issue the building permit. This also ensures that the builder can construct the building in accordance with the approved building permit documentation.

[2] The term "residential thermal performance assessor" is accepted nationally and used by the ABCB meaning a person assessing the thermal performance of a building. Sustainability Victoria is proposing to align with this terminology and cease using the term "energy rater".

2.5 Relevant Building Surveyor role in assessing plans

The RBS has a responsibly to ensure that the building permit application contains sufficient information to determine compliance with the Act and the Regulations. Where the RBS is not satisfied that the appropriate information has been provided they must not issue the building permit and should request further information to be provided. It is not appropriate that the RBS "mark-up" plans or accept notes on plans that are too general. The RBS should also limit the use of conditions on the building permit. Reliance on general conditions such as the example previously provided is a failure of the RBS to ensure that compliance with the Act and the Regulations has been achieved prior to issuing the building permit.

3. Applying the energy standards

3.1 Building permit

As noted earlier, it is the applicant's responsibility to provide the RBS with evidence that the proposed building design will meet the DTS requirements of Part 3.12 or show compliance with the relevant Performance Requirements.

If a HER is provided as a Varification Method then an accredited residential thermal performance assessors[2] must stamp the plans, recording the energy rating and their accreditation number, which are to be submitted with the application for a building permit.

For new Class 1 buildings, the applicant must separately provide details of any rainwater tank or solar water heater system, including size and location of rainwater tank and the type and size of solar water heater system to be installed. This will assist the RBS in checking compliance and ensuring that any possible effects on the structure have been considered.

3.2 Averaging ratings for Class 2 buildings

The average 5 star rating for a Class 2 building is determined by finding the average energy load in

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MJ/m2 of each SOU, or in the case of FirstRate, the average point score (not the average star rating). This average rating for the whole of a Class 2 building must achieve the 5 star rating level set out in Table A in the Appendix. The rating for any SOU in a Class 2 building must achieve the 3 star rating level set out in Table A.

3.3 Ratings of dwellings adjacent to vacant allotments

HERs must include details of existing adjacent buildings and structures on neighbouring allotments, which overshadow windows of the building being rated. However, trees, shrubs and other landscaping are not required to be considered. Note that future construction to the north may have an impact on the HER.

3.4 Occupancy permit

During the building process, the RBS may choose to carry out additional inspections to ensure that the dwelling is constructed in accordance with the requirements of the approved HER report or BCA Part 3.12 where used.

The RBS may, if necessary, request that the builder provide a statement of compliance regarding sustainability matters. While there is no prescribed format, FirstRate will automatically produce a statement that lists all the energy features and has sections for the builder to detail any changes to these features. Users of NatHERS may produce a suitable report, using that software's Building Data report. A pro forma report is available on the Sustainability Victoria website.

Where an application for an occupancy permit has been submitted to the RBS and the only matters not complying relate to energy efficiency, then the RBS has two options:

- Refuse to issue an occupancy permit;
- Issue an occupancy with conditions; or
- Issue an occupancy permit concurrently with a building notice or order.

Where a rainwater tank or a solar water heater system is installed, the RBS must see a copy of the plumber's compliance certificate issued under section 221ZH of the Act before an occupancy permit can be issued.

4. Compliance Options

4.1 Performance-based BCA

The 5 Star Standard is implemented through the BCA. The BCA is a performance based building code. Compliance with the BCA can be achieved by complying with the prescriptive requirements or by developing an Alternative Solution, which demonstrates that the proposal meets the relevant Performance Requirement/s. Building practitioners choosing to develop an Alternative Solution, should ensure an appropriate Assessment Method is used. Further information on using the performance-based BCA is contained in Practice Note 2006-29.

4.2 Building Appeals Board

The Building Appeals Board (BAB) is an independent statutory body established under the Act. The BAB hears appeals and disputes in relation to building control matters and can waive, modify or vary the provisions of the Regulations and the BCA based upon the particular case. The BAB can consider provisions relating to the residential sustainability measures in the BCA. Further information on the BAB is contained in Practice Note 2006-39.

5. Software

5.1 Approved software

Under the BCA Volume Two, a HER must be determined using a thermal calculation method that complies with the ABCB Protocol for House Energy Rating Software. A thermal calculation method is defined as a calculation method that identifies-

(i) a heating load; or
(ii) a cooling load; or
(iii) a heating and cooling load (annual energy load),

based on the sum of hourly loads or an equivalent approach.

The BCA 2008 references two protocol versions. Version 2005.1 sets out the requirements for first generation HER software and Version 2006.1

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sets out the requirements for second generation software. HER software which complies with either protocol is acceptable until such time that Protocol Version 2005.1 is removed from the BCA.

The Australian Building Codes Board have proposed from BCA 2009, Protocol Version 2005.1 for first generation HER software will be removed. This means that from BCA 2009 only second generation software can be used.

Software that currently meets Version 2005.1 Protocol includes, FirstRate (Version 4.05 or later), NatHERS (version 2.32A or later) and BERS (Version 3.2 or later). The use of other software may be accepted by the RBS as meeting the relevant Performance Requirement. The protocols require that a training program must be available for users. The training program must be for the use of the current version and any new version of the software as well as an understanding of the basic principals of residential building thermal performance. Evidence of training must state the software name and version.

Users of first generation NatHERS should be aware that the star rating levels are incorrect for Victorian climates, and do not take into account area adjustment. This has been rectified in AccuRate, which is the replacement for NatHERS. The correct star rating must be determined manually from the predicted energy load when using NatHERS. Refer to Table A in the Appendix for the maximum annual energy loads for a 3, 4 and 5 star rating when NatHERS is used in Victoria. As a result NatHERS ratings must be accompanied by an additional statement from the energy rater showing the area adjustment allowance[3] and fall within the correct star rating levels

Where FirstRate software is used, a suitable report is generated automatically.

In Victoria, second generation energy rating tools will include:

- the AccuRate software (the NatHERS replacement)
- FirstRate5 (operating with the AccuRate calculation engine)
- BERS second generation

Information about the house energy rating software can be obtained from Sustainability Victoria (www.sustainability.vic.gov.au).
The first generation HER tools can continue to be used for regulatory purposes while they meet the minimum protocol requirements as required by the BCA.

5.2 Using rating tools

The standard input assumptions made when rating the energy performance of a house are:

- That all windows have an internal covereing installed which provides equivalent performance to a Holland (roller) blind.
- Where software requires the input of the size of gaps around window and door frames, these are assumed to be ‘small’.
- That all floors are carpeted, except where alternative floor coverings are specified.

For users of FirstRate, ratings in ‘Regulation Mode’ will automatically input the first two assumptions. However, areas of carpet and hard floor surface must be entered manually.

5.3 Limitations of energy rating software

It is not possible to take into account every feature of dwelling design with the currently approved software, although over 99 per cent of all dwellings currently constructed can be rated in this way. Design features such as:

- earth bermed walls
- trombe walls (utilising masonry or water tanks for storing radiant heat gains)
- solar heated rock storage
- insulating shutters on windows

cannot be rated with the currently approved software.

[3] Area adjustment allowance details are available on the Sustainability Victoria website.

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In addition, where the following window area limits are exceeded, FirstRate version 4 ratings may not be within normal accuracy:

- Dwellings with a total window area in excess of 60 per cent of the Net Conditioned Floor Area (NCFA) of the house; and
- Dwellings with a window area in one orientation of greater than 35 per cent of NCFA.

These glazing limitations do not apply to the second generation FirstRate5.

In cases where dwellings contain such features or have window areas greater than the limits stated above, NatHERS may be used or an Alternative Solution will need to be provided.

5.3.1 Conservatories and other large glazed rooms

Where it is proposed to construct a building with glazing in excess of the limits stated in clause 6.3, the RBS may accept the design if the house energy rater has excluded the room from the rating calculation and if the room:

- Does not exceed 20 per cent of the total floor area of the remainder of the building.
- Is physically separated from the remainder of the building, i.e. any openings must have doors or windows.
- Is thermally isolated from the rest of the building. Walls must be insulated as if they were external. To minimise air leakage from the room to the main house, windows installed in the walls between them must achieve an air leakage of no more than 2 L/s/m^2 of window area, as tested under AS 2047 at 75 Pa pressure difference.
- Does not contain any heating or cooling devices.
- Has openable doors and windows in its external walls equivalent to at least 10 per cent of its floor area.

When completing the rating, if the room has a solid roof this must be entered as a fixed eave if it shades windows in the walls between the house and the room. Furthermore, the rater may consider windows between the main house and the room to be double-glazed if the room meets the requirements listed above and the air leakage of the external windows to the room achieve an air leakage of no more than 5 L/s/m2 of window area, as tested under AS 2047 at 75 Pa pressure difference.

5.4 Accreditation of residential thermal performance assessors

HERs must be prepared by persons accredited in the use of the rating tool. Residential thermal performance assessors require separate accreditation for each rating tool they use – this includes the second generation rating tools. For instance, to use second generation software, residential thermal performance assessors must seek accreditation.

Organisations such as Association of Building Sustainability Assessors and Sustainability Victoria provide the accreditation, a list of accredited assessors and the specific energy rating tools they are accredited to use is listed on their websites.

The assessor will need provide a certificate and report and will need to stamp the plans accordingly. In the event that your design does not meet the required minimum standard, the assessor may suggest some alternatives to improve the performance of the design.

5.5 Victorian climate zones

The second generation energy tools include 11 climate zones for Victoria, compared to 5 for the first generation rating tools. Melbourne is now divided into 3 climate zones, Tullamarine (climate 60), Melbourne RO (climate 21) and Melbourne Airport (climate 62).

To assist builders who construct homes across metropolitan Melbourne, residential thermal performance assessors and the RBS are advised that, when using the second generation energy rating tools, there are two options for the houses to be constructed in climate zones 62 (Moorabbin Airport) and 21 (Melbourne RO):

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- either choose the correct climate zone for the postcode in which the dwelling will be constructed; or
- alternatively the 'Tullamarine' climate zone (climate 60) can be chosen as the default climate zone for houses construc

6. Alternatives to rainwater tanks

6.1 Greywater treatment systems

Greywater is the waste water from your washing machine, laundry tub, shower, hand basin, and bath - excluding the waste water from your kitchen and toilet.

Using greywater
There are two main options for greywater re-use – direct diversion to the garden or installing a domestic greywater treatment system.

Domestic greywater treatment systems
A domestic grey water system collects, stores and then treats grey water. Different systems treat the water to varying levels of purity. Some treatment systems only allow direct water diversion to a garden, while some achieve a water quality which allows the treated water to be used for toilet flushing and in clothes washing machines. Clause 1.0.5 of the BCA Volume Two states that compliance can be achieved by formulating an Alternative Solution that complies with the Performance Requirement. Treatment systems that achieve a water quality that can be connected and used for toilet flushing can be considered by the RBS as an Alternative Solution but it must comply with the relevant BCA Performance Requirement (P2.6.1).

Greywater - Direct diversion
This is when grey water is diverted directly to a garden. This is the cheaper option, but it restricts use. Diverted grey water cannot be stored and cannot be used as an Alternative Solution. It must not be connected to sanitary flushing systems, and can only be diverted through subsoil drains.

6.2 Dual water reticulation and water recycling systems

Dual water reticulation systems and mains water recycling raise the possibility of using a BCA performance approach to approve a 5 star rated house design that uses a dual water reticulation system connected to toilet flushing systems rather than a rainwater tank.

Some new housing estates are providing a source of recycled water and include a recycled water main, as well as a drinking water main. This is often referred to as a 'dual supply' system or previously as a 'third pipe' system. Typically, the water will come from one of Melbourne's major sewerage treatment plants, but supply is also possible from smaller localised treatment plants. The recycled water must be supplied by the Responsible Water Authority and must only be used for approved purposes, including toilet flushing and garden watering.

Dual water reticulation systems raise the possibility of using a BCA performance approach to approve a 5 Star rated house design that uses a dual water reticulation system connected to toilet flushing systems rather than a rainwater tank.

Analysis by the Victorian Department of Sustainability and Environment confirms that a dual water reticulation system will provide equivalent or better performance than a rainwater tank, in terms of water conservation, when the systems are connected to domestic sanitary flushing systems. Dual water reticulation systems conserve drinking water more effectively than rainwater tanks, as they are more reliable, regardless of rainfall and are also available for garden use.

In some housing sub-divisions, it is proposed that rainwater is collected by each home and piped directly to a treatment plant operated by the water authority. The treated rainwater is then piped back through the mains drinking water system to each home.

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These alternatives must still comply with the relevant BCA Performance Requirement (P2.6.1).

Clause 1.0.5 of the BCA Volume Two states that this can be achieved by formulating an Alternative - Solution that complies with the Performance Requirement, or is shown to be at least equivalent to the Deemed-to-Satisfy provisions.
Requirement, or is shown to be at least equivalent to the Deemed-to-Satisfy provisions.

7. General information on insulation

7.1 Reflective foil insulation products

Reflective foil only provides an insulating effect when it faces an air space, because it works by reducing radiant heat flow across this air space. If reflective foil does not face an air space it does not have an R value.

Reflective foil must be used in conjunction with an air space and air must not be allowed to leak from one side of the foil to another. Particular care must be taken during construction, to ensure that all penetrations through the foil and joins are effectively sealed by taping around the joins and penetrations.

Reflective foil product tests often show the R value of the whole building element, whereas bulk insulation tests usually show the R value of the insulation alone. Whole building element R values should be entered into the 'Total R value' field in FirstRate, while insulation product R values should be entered into the 'Insulation R value' field.

7.2 Bulk insulation products

Loose fill products will typically settle after a few years to provide a lower depth than originally installed.

Batt and blanket products can suffer significant degradation of their R-value through poor installation. To maintain the effectiveness of the insulation products, it is recommended that builders ensure that:

- Insulation fits snugly against all framing members and that where gaps exist, off-cuts of batts are used to fill these gaps;
- Bulk insulation is not compressed; and
- Insulation placed near lamps, luminaires and associated transformers is installed in accordance with the electrical safety alert, Thermal Insulation in Roof Spaces, published by Energy Safe Victoria.

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Part B: Applying residential sustainability measures to alterations and relocation of dwellings

8. Specific requirements for alterations to dwellings

8.1 Summary

The requirements for alterations to Class 1 buildings contained in Vic 1.2.2 of BCA 2007 has been removed from the BCA 2008.

Alterations to Class 1 buildings and Class10a buildings with a conditioned space constructed in accordance with the Victorian energy efficiency measures prior to the 5 Star Standard, i.e. pre 1 July 2004, are required to comply with the Performance Requirements P2.6.1 and P2.6.2 of the BCA Volume Two. From 1 May 2008, this can include the use of the Deemed to Satisfy (DTS) requirements of Part 3.12, or using an Alternative Solution. The Verification Methods or other Assessment Methods may be used to assess the Alternative Solution.

A rainwater tank or solar water heater system is not required when undertaking an alteration to an existing dwelling.

Class 1 buildings constructed to the 5 Star Standard i.e. post 1 July 2004

Alterations to a building assessed under the 5 Star Standard must ensure that the existing 4 or 5 star House Energy Rating (HER) of the existing building is maintained.

It is not appropriate to use a HER to determine the rating of the home and then assess an extension using the DTS provisions. An alteration or addition must be assessed using the particular tool (HER software or DTS) for which the building was assessed prior to when the building was first constructed.

Similarly, an alteration to an existing building previously assessed under the DTS provisions of Part 3.12 should be assessed by the same method.

8.2 Regulation 608 and partial compliance

Regulation 608 of the Building Regulations 2006 (the Regulations) applies to alterations to an existing building and requires that building work to alter an existing building must comply with the Regulations. Regulation 608 also requires an entire building to comply with the Regulations where the volume of the proposed alterations, together with any other alterations completed or permitted within the previous 3 years represents more then 50 per cent of the original volume of the building. Regulation 608 also provides that the RBS has discretionary power to consent to partial compliance with the Regulations in certain circumstances. This does not mean that the RBS can allow non compliance. When considering partial compliance the RBS must take the following into account:

(a) the structural adequacy of the building; and

(b) the requirements necessary to make reasonable provision for-

(i) the amenity of the building and the safety and health of people using the building; and

(ii) avoiding the spread of fire to or from any adjoining building.

The circumstances where the relevant building surveyor (RBS) can accept partial compliance are—

- Any building work to alter an existing building including an extension that is not greater than the lesser of:
  (a) 25% of the floor area of the existing building; or
  (b) 1000m^2.
- Any alteration that represents more then 50% of the original volume of the building, including any alterations carried out in the previous 3 years. The discretion to allow partial compliance applies to both the building work associated with the alteration and the requirement to bring the remainder of the building into full compliance.

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There is no discretion to allow partial compliance where the alteration is an extension to an existing building and the floor area of the extension is greater than 25% of the floor area of the existing building or 1,000 square metres (whichever is the lesser). The requirement for full compliance only applies to the extension and has no impact on the existing building (unless the volume is greater than 50%).

A summary of the requirements of Regulation 608 and where the RBS has discretion to allow partial compliance is included in Table B of the Appendix to this Practice Note.

Section 28 of the Act and regulations 502, 503, 609 and 1011 provide the RBS with other discretionary powers related to partial compliance.

Where alterations constructed using concrete panels, cavity brick, earthwall construction, and ashlar stone or other masonry walls including any cavity, the RBS will need to be provided with sufficient information to determine the R-value of the wall system.

Calculation of Volume and Floor Area

When calculating volume for the purposes of Regulation 608, the volume of the building includes the space above the sub-floor defined by:

- External walls;
- Roof space and roof structure;
- Verandas and other roofed structures

Sub-floor below floor framing areas are not included except for rooms, garages etc that are enclosed by walls, floor and roof/ceiling.

The BCA volume 2 includes a definition of floor area. Part 1.1 defines floor area as the area measured within the finished surfaces of the walls and includes the area occupied by any cupboard or other built-in furniture, fixture or fitting.

Satellite Habitable Buildings

Buildings such as a sleepout or bungalow are to be assessed as an alteration to the existing dwelling.

There is currently no requirement to install solar water heater systems or rainwater tanks to these structures.

8.3 Regulation 608 – What is reasonable?

When deciding whether to permit partial compliance under regulation 608, the RBS should consider how reasonable full compliance would be in a particular instance, along with the likely cost and benefit.

The Macquarie Dictionary defines “reasonable” as “agreeable to reason or sound judgment”. The RBS should apply their own judgement (using their qualifications and experience) to the specific matters being assessed. In some instances the RBS will need to seek the advice of other suitably qualified practitioners or industry experts in determining the acceptability or otherwise of a specific building, element of construction or use.[4]

The energy efficiency provisions have been developed on a basis of saving energy and long-term cost effectiveness for the building owner. On the same basis, when determining whether a dispensation from the energy efficiency provisions should be granted, it may be reasonable to ask "Is it cost effective?"

8.3.1 Principals in applying Part 3.12 Deemed to Satisfy provisions

Building fabric

Where a building is being extended, the fabric of the extension should fully comply with the BCA fabric provisions. Partial compliance may be considered where the extension is relatively small (i.e. less and 25% or 1000m2 whichever is the lesser). Where the new work includes replacement of existing elements, such as roof cladding, wall cladding or wall lining, compliance with the BCA fabric provisions should be achieved. However, if the roof cladding, wall cladding or wall lining is only being repaired, then it may be unreasonable to require this to be removed, solely to install new insulation. Fully compliant ceiling insulation should be installed wherever there is access to the roof space.

[4] In addition, Minister’s Guideline 05 states “Municipal building surveyors and private building surveyors must only accept appointment as relevant building surveyors in the area of their own competence.”

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External glazing
Where an existing building is being extended, the glazing in the extension should comply with the BCA glazing provisions. However, this is complicated by the fact that the glazing provisions are determined on the basis of the whole storey. This means that the existing glazing also needs to be considered. In some cases, it may be unreasonable for new glazing in an extension to compensate for the poor performance of existing glazing. In this instance, it would be reasonable to determine compliance by applying the performance of the new glazing uniformly to the whole storey but only require the complying glazing to be installed in the extension.

If all the existing glazing in a building is being replaced, then the new glazing should comply with the current BCA glazing provisions.

Shade is integral to glazing performance. However, there may be site constraints or planning requirements that prevent external shading being added to an existing building. In such instances, the required performance level may be achieved by unshaded glazing, but only by using costly materials. It would therefore be "reasonable" to allow a reduced level of glazing performance, where such constraints on shading exist.

Building sealing
An extension should be sealed in accordance with the BCA sealing provisions. If an existing room is being extended, the need for sealing may depend upon its condition. Sealing of an existing room is an all-or-nothing matter. If the existing part is not sealed – having large areas of unsealed louvred glazing, for example – then there may be little benefit in sealing the new part. In the case of a new extension to an existing unsealed building, a practical approach may be to accommodate the different amounts of sealing in the new and existing parts of the building by installing sealed doors between the two parts. The final decision should be based on the relative size of the extension and the extent to which the existing part is unsealed. However if sealing is practical and achievable it should be undertaken.

Air movement
The BCA air movement provisions generally require two openings in a room, or a breeze path through to another room. In the case of some extensions, it may not be possible to comply with these requirements – for example, where there is insufficient room for the two openings to be installed in the external wall and the existing building does not have complying breeze paths.

Services
New building work must comply with Performance Clause P2.6.2. for Services.
Although Victoria does not call up Part 3.12.5.0 of the BCA. Plumbing work must comply with the Plumbing Regulations 1998. Technical information about these provisions can be found on the Plumbing Industry Commission's website. – see practitioner's technical assistance.

Parts 3.12.5.1 to 3.12.5.3 set out the requirements for the insulation of services, central heating water piping and heating and cooling ductwork. Whether using HER software or applying other parts of 3.12.5, insulation for service piping and ductwork must be provided.

It is important the designers provide the RBS sufficient details of piping and ductwork insulation so that the RBS can ensure that Performance Clause P2.6.2 is complied with.

8.3.2 Principals in using HER software

For existing dwellings that have previously been assess using HER software, it may be necessary to have two HER's submitted. One of the existing building design, and a second of the total building design incorporating the proposed alteration. The second HER must give a higher star rating than the first. If the two ratings were the same, (except where they both achieve a 5 star HER) then the only conclusion would be that no level of compliance has been achieved. As the RBS can only approve a design where at least some improved level of compliance is achieved (partial compliance), the proposed design could not be approved.

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9. Alternative Solutions for alterations Installing rainwater tanks or solar hot water systems

The Regulations do not require the installation of rainwater tank for toilet flushing or a solar hot water system in relation to an alteration to an existing building. However, as the relevant Performance Requirement P2.6.1. makes provision for efficient energy and water use, it is possible for the RBS to consider the installation of these items as an Alternative Solution to achieve compliance if they are satisfied that the proposal contributes with other measures to satisfying the requirement of the Performance Clause.

10. Relocated and prefabricated homes

10.1 Relocated homes

The definition of 'alteration' in the Regulations means "construction in relation to an existing building" includes building work to an existing building. An existing dwelling moved from one allotment to another or relocated on the same allotment is considered an alteration to the dwelling exceeding the 50% volume trigger. This means that the RBS has discretion to allow partial compliance under regulation 608. It is recognised that there are sometimes limited opportunities to improve the thermal performance of an existing building where it is being relocated in its original condition.

However, wherever possible, compliance with the DTS provisions should be achieved. As a minimum, required levels of insulation should be installed in ceilings, walls and floor if there is access to do this. Sealing of windows and doors should be undertaken and if windows are to be replaced, then thermally efficient windows should be provided.

This does not prevent the owner of the property using best practice principals. Section 8 of this Practice Note outlines some basic requirements when altering a home. These principals should be applied to a home that is re-erected.

10.2 Prefabricated kit homes

Homes that are prefabricated in a factory, whether they are fully assembled or delivered to site as "flat pack" kits are required to comply with the Regulations as they are new dwellings. This means that the design will either have been assessed using HER software and achieve a 5 star rating, meet the DTS provisions, or sufficient evidence provided that the design will meet the Performance Requirements of the BCA. These homes will also require the installation of either a solar hot water system or rainwater tank.

11. Non regulatory matters

Designers, builders and to some extent building surveyors are in a position to encourage greater sustainability measures than those required by the Regulations in their capacity to influence consumers. Although the Regulations do not require the installation of a rainwater tanks or solar hot water systems, where alterations are proposed to be undertaken, owners should be encouraged to consider installing these items and potentially take advantage of rebate systems that apply.

Where major plumbing work is proposed and which includes a new hot water service installation, the owner should also be encouraged to consider installing a solar hot water system.

Where new stormwater plumbing work is proposed, such as new spouting and/or downpipes, an owner should again be encouraged to install a rainwater tank at the same time. The rainwater tank should comply with the minimum plumbing requirements for new dwellings and be connected to any new sanitary flushing systems.

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12. Useful contacts and references

For further information on the 5 Star Standard, plumbing standards, or energy efficient design in general, please contact the following organisations:

Websites

Building Commission
www.buildingcommission.com.au
Plumbing Industry Commission
www.pic.vic.gov.au
Sustainability Victoria
www.sustainability.vic.gov.au

The Sustainability Victoria site also has details on:
FirstRate training institutions
FirstRate software — cost, suppliers and obtaining a demo version.

Energy Safe Victoria
www.esv.vic.gov.au
Your Home
www.greenhouse.gov.au/yourhome
www.makeyourhomegreen.vic.gov.au

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Appendix

Table A – Software rating levels for NatHERS and FirstRate 4

Climate Zone[7]	Rating Level					
	3 Stars		4 Stars		5 Stars	
	NatHERS maximum annual energy load MJ/m²	FirstRate minimum point score	NatHERS maximum annual energy load MJ/m²	FirstRate minimum point score	NatHERS maximum annual energy load MJ/m²	FirstRate minimum point score
Melbourne and southern coastal Victoria	239	-28	191	-10	147	7
Inland Victoria (e.g. Wangaratta, Wodonga)	335	-33	244	-16	192	0
Cool Inland (e.g. Ballarat, Bright)	351	-25	271	-10	221	5
Warm Inland (e.g. Mildura)	262	-31	189	-14	137	3
Alpine areas	600	-35	413	2	250	34

[7] Climate selection in energy rating tools is derived from the area postcode.

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Table B – Regulation 608 application to alterations and additions

Type of work	Compliance required	Entire building to comply?	RBS discretion
Building alteration work including extensions less than (the lesser of) 1000m2 or 25% of existing floor area	Y	N*	Y
Building alteration work that exceeds the 50% volume rule (including the re-erection of an existing building)	Y	Y	Y^ (discretion applies to compliance of both the alteration work and the remainder of the building)
Building alteration work that is an extension of floor area greater than the lesser of 25% of floor area of the existing building or 1,000 m	Y	N*	N

* Subject to the alteration not triggering the 50% rule.

^ If the alteration includes an extension that exceeds the size described in the row below, the discretion only applies to the requirement to bring the remainder of the building into compliance.

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