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## Appendix G – Verification of the Existing Features of a Home for E+A+A Performance Approach

When adding to or altering an existing home, compliance credit can be given for upgrading existing features by using the performance approach. Additional compliance credit may be taken when the existing features are verified by a third party inspector (HERS rater).

The performance approach provides for a means to trade off against features that may not meet the prescriptive requirements, such as maximum glass area, by demonstrating that the house to be built (proposed house) achieves the same level of efficiency as it would if it were built to the prescriptive requirements (standard house). The standard house is the hypothetical house that sets the target energy budget for the proposed house.

The E+A+A approach gives further credit for upgrading existing features. It does this by adjusting some of the features of the standard house down to match the existing house. The less efficient the standard house is relative to the upgrades, the easier it is for the proposed house to comply. Third party verification of the features prior to the construction may be required to get this compliance credit. This depends on whether defaults are used or actual values (that are worse than defaults).

The proposed house is the house as it will stand after all of the alterations and additions have been made to it. There are three possible classifications for each building component in the proposed house:

1. “Existing” – these building components are unchanged by the alterations or additions (e.g., insulated exterior walls in the existing portion of the home that will not be touched).
2. “Altered” – these building components existed prior to the work, but are being changed (e.g., roof insulation that will be added as part of the construction work, or a furnace that is being replaced as part of the construction work).
3. “New” – these building components did not exist prior to the construction work. (e.g., new walls added to create the addition).

All of these components will exist in the standard house. *Existing* features will be modeled the same in both the proposed and standard houses. *New* features will be modeled in the standard house according to prescriptive package A, Table 150.1-A. *Altered* features will be modeled in the standard house according to Table 150.2-A.

There are two columns in Table 150.2-A. One is for homes where the existing features are not verified by a HERS rater. The other column is used when the existing features are verified by a HERS rater prior to the alterations. Without third party verification the

existing features are assumed to be fairly efficient, probably more efficient than most older homes.

The existing portions of the proposed house are being compared to the existing portions of the standard house, the efficiencies of which are determined by Table 150.2-A. When the feature in the proposed house is better than the standard house, we refer to this as a compliance credit and it can be used to trade off against features that are not as good as the standard house.

For example, without third party verification, attic insulation is assumed to be R-30 in the standard house. With third party verification, attic insulation for the standard house is assumed to be whatever the existing condition is, even if it is R-0. If the actual attic insulation is believed to be substantially less than R-30, then more compliance credit can be obtained by having it third party verified.

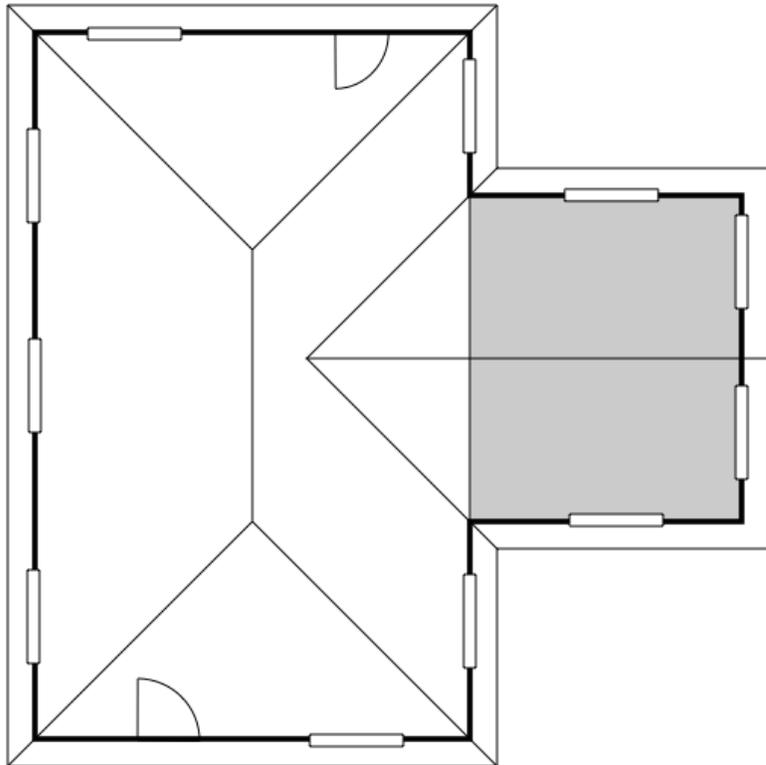
Example:

Consider the following house in climate zone 12. The shaded area is the addition. Some windows and walls were removed to build the addition, but these are ignored.

The existing home has the following features:

- single-pane metal frames windows
- 2x4 R-11 walls
- R-19 attic insulation
- AFUE 70 furnace
- An old composition shingle roof.

Part of the construction work includes replacing all of the windows with low-E vinyl windows to match the new windows in the addition, adding R-19 to the existing attic and re-roofing the entire house with cool roof shingles. The existing furnace will be replaced with a new high efficiency furnace.



None of the attic is modeled as “existing” because it is either new or altered. Similarly for the roof and windows. None of the existing walls are being altered, so they are either “existing” or “new”. The furnace, even though it is new, is modeled as “altered” because it is replacing an existing furnace.

The following table illustrates the difference between the proposed house features and the standard house features if third party verification is **not** used and when it **is** used. The arrows indicate where there is a substantial increase in compliance credit by having the third party verification.

Component	Status	Proposed House	Standard House w/o verification	Standard House w/verification
Attic	Existing	-	-	-
	Altered	R-38	R-30	R-19
	New	R-38	R-38	R-38
Roof	Existing	-	-	-
	Altered	Cool roof	Cool roof	Not cool roof
	New	Cool roof	Cool roof	Cool roof
Walls	Existing	R-11	R-11	R-11
	Altered	-	-	-
	New	R-13	R-15+4	R-15+4
Window	Existing	-	-	-
	Altered	0.30/0.30	0.40/0.35	1.28/0.80
	New	0.30/0.30	0.32/0.25	0.32/0.25
Furnace	Existing	-	-	-
	Altered	0.90	0.78	0.70
	New	-	-	-

The HERS rater will need to visit the home prior to the start of construction, preferably prior to the issuance of the permit.

HERS raters are to follow the protocols for a Whole House Home Energy Rating when verifying existing conditions. The compliance software will automatically generate a draft CF3R-EXC-01-H form. It will list the features that must be field verified by the HERS rater. Upon successful verification and after the CF-1R has been registered with a HERS provider, the rater will input the results of the verification and a final CF3R-EXC-01-H form will be registered for signature.

The Whole House Home Energy Rating protocols are established by the HERS Technical Manual (CEC-400-2008-012). Appendix A of that document details the protocols for verification of each component. Raters must follow all CEC-approved procedures established by the HERS provider.