



How Do We Retrofit the Tough Buildings?

Cape Cod Style and Masonry

Ken Neuhauser, Building Science Corporation



Cape Cod Style



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29 April 2013



Energy Efficiency &
Renewable Energy



Cape Cod Style



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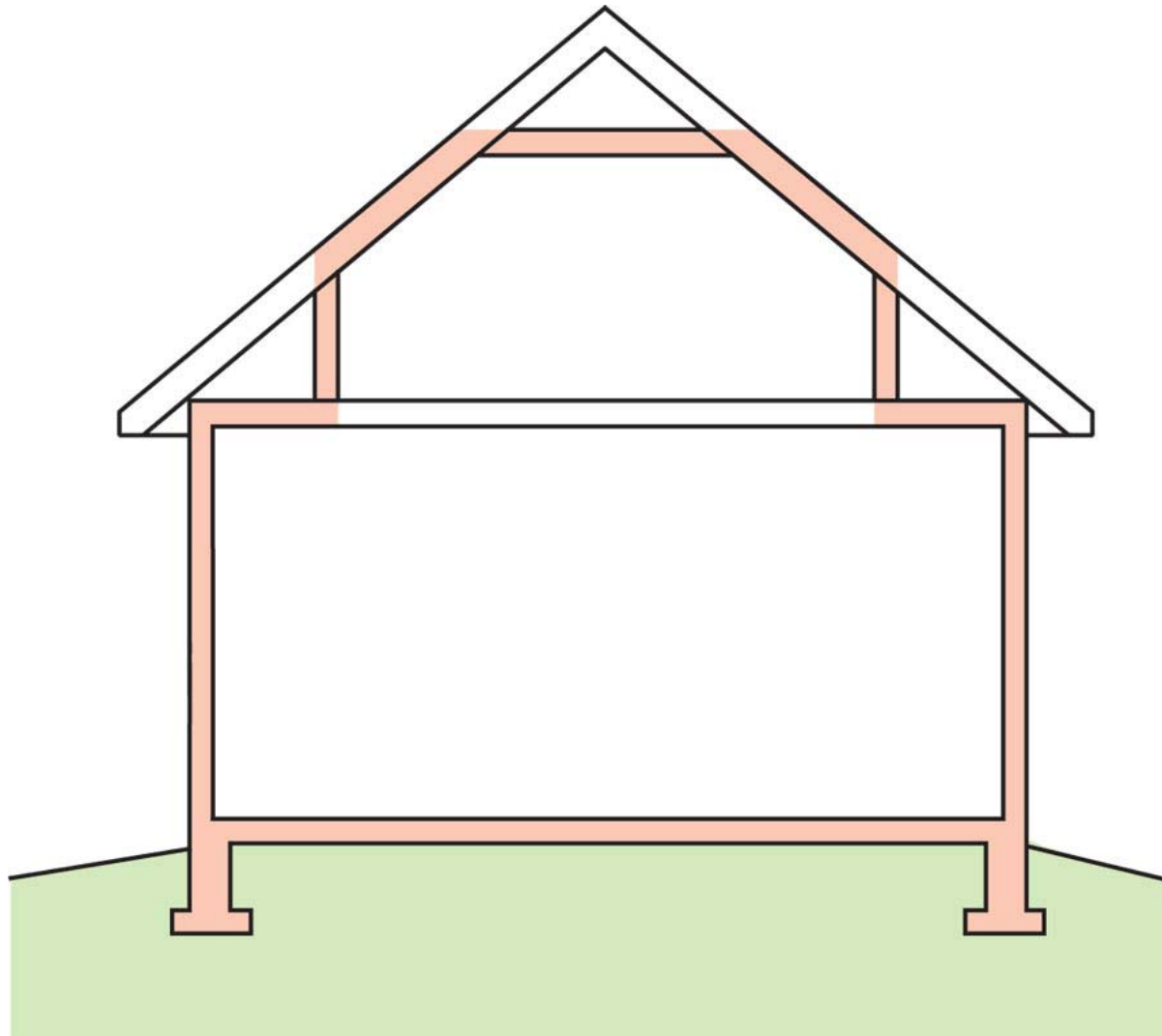
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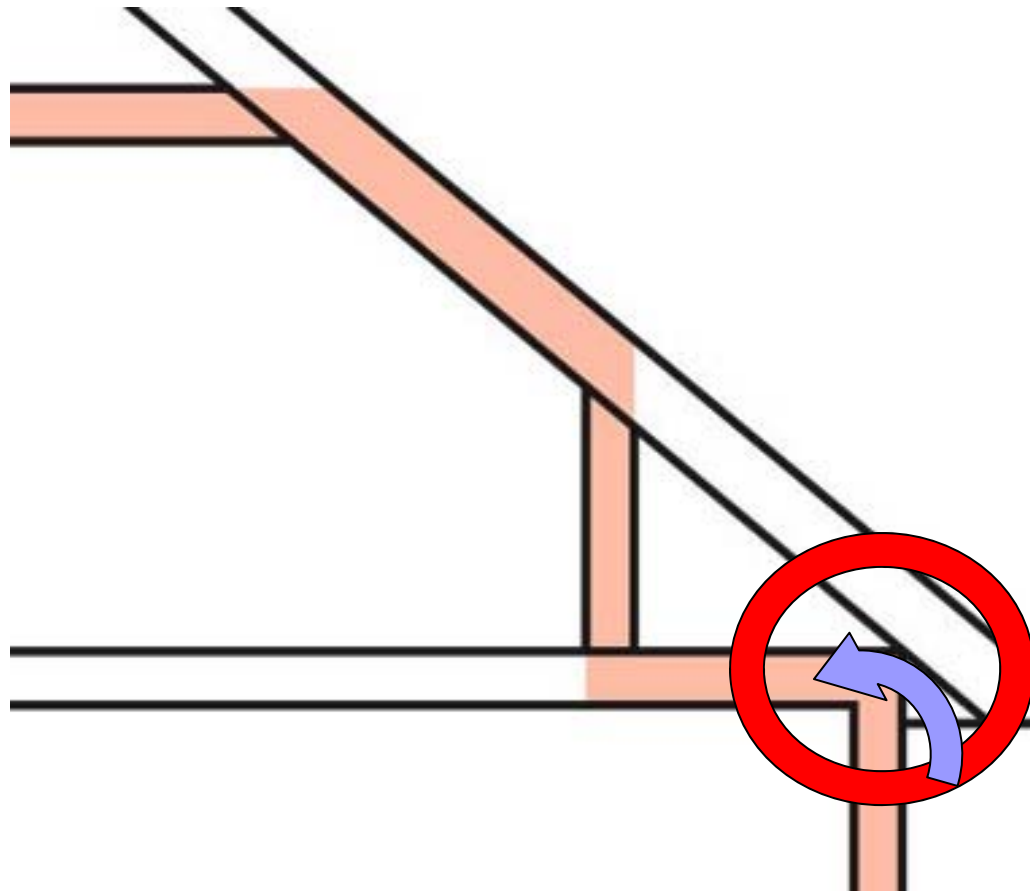
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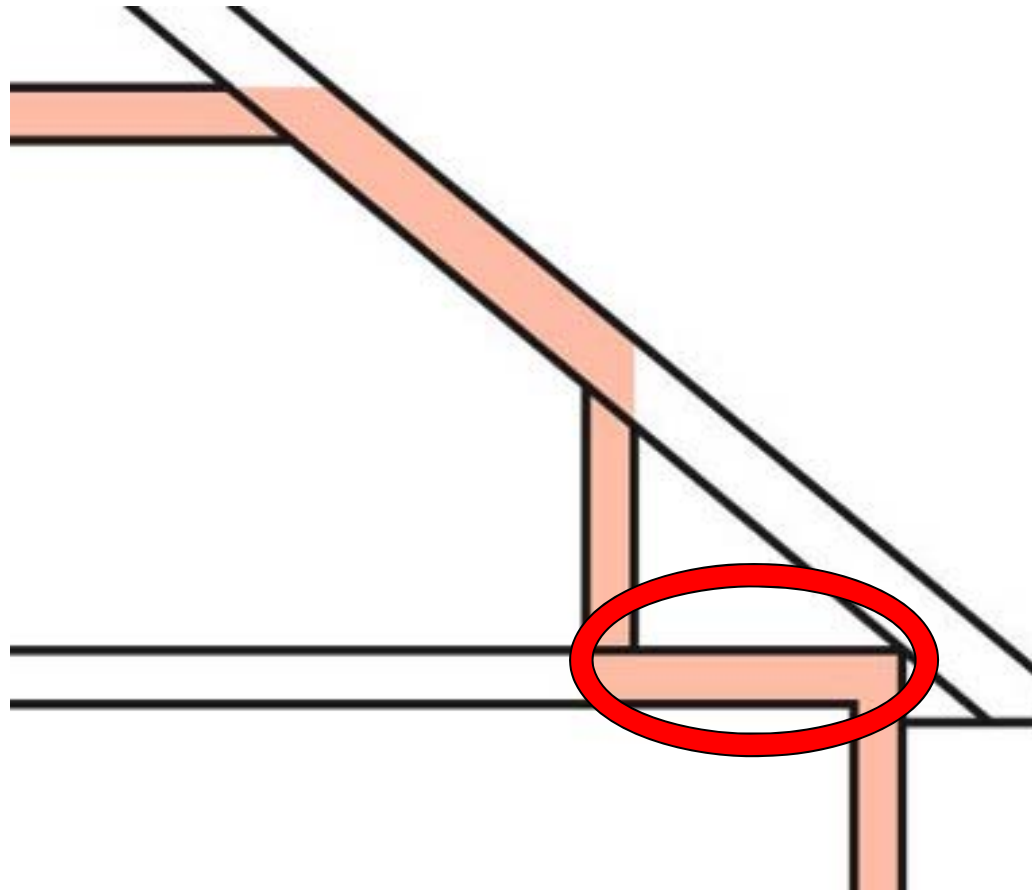
Cape Cod Style



Cape Cod Style



Cape Cod Style



Cape Cod Style



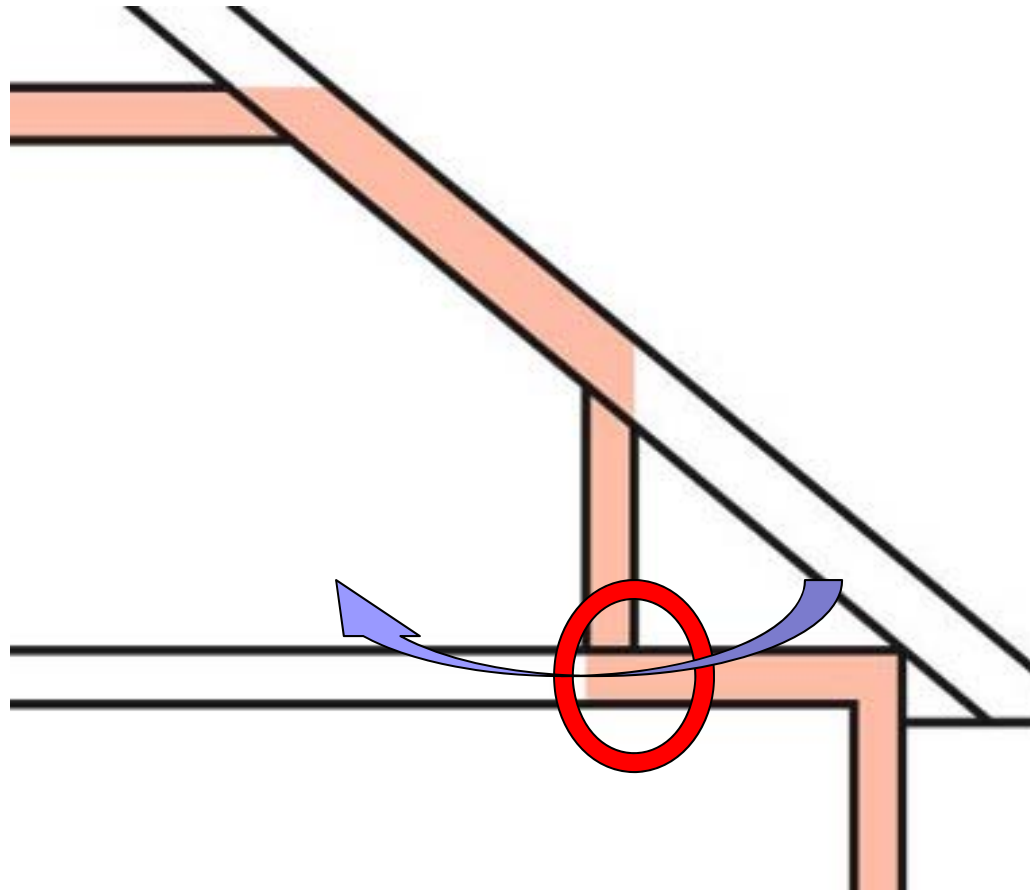
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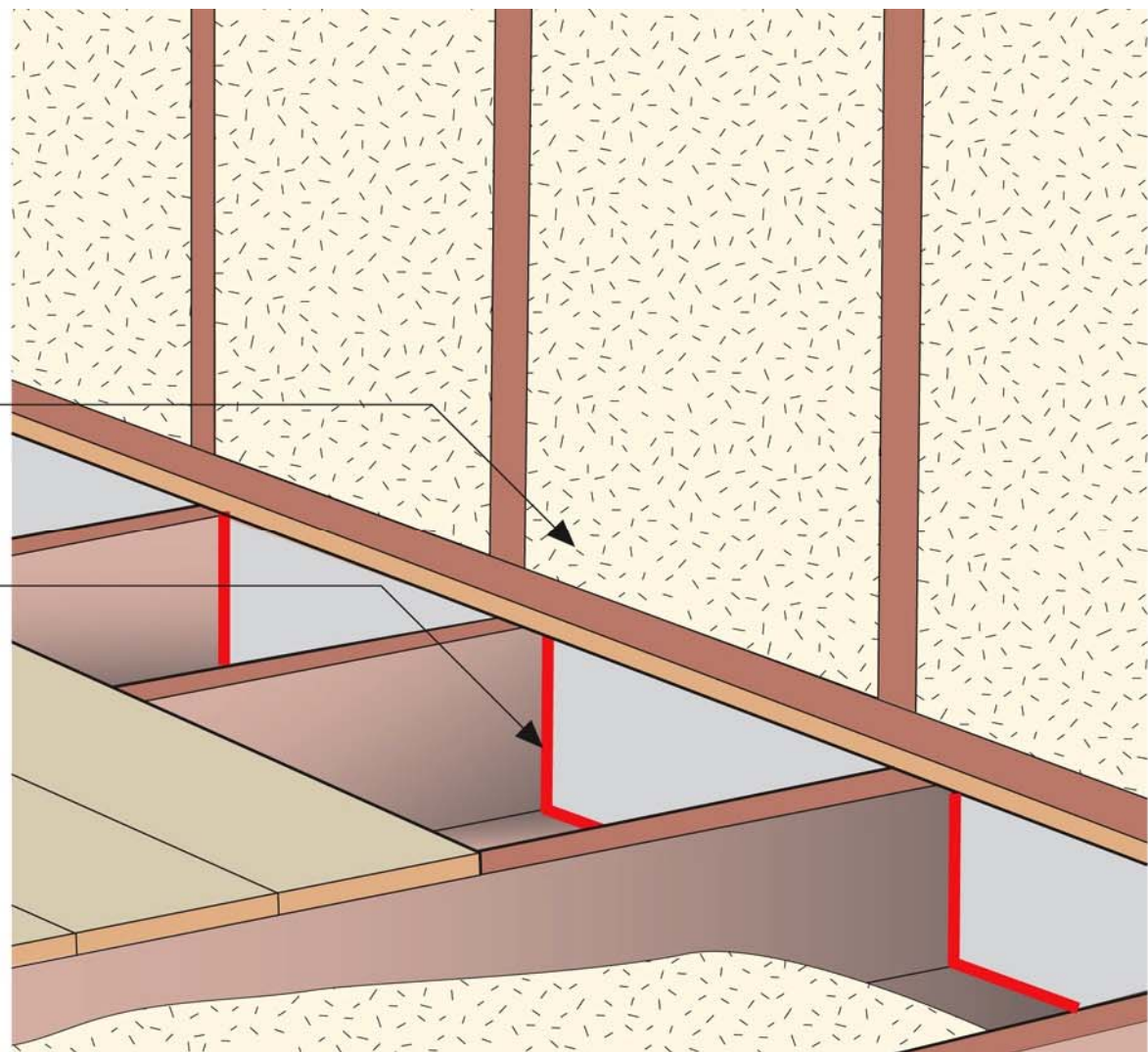
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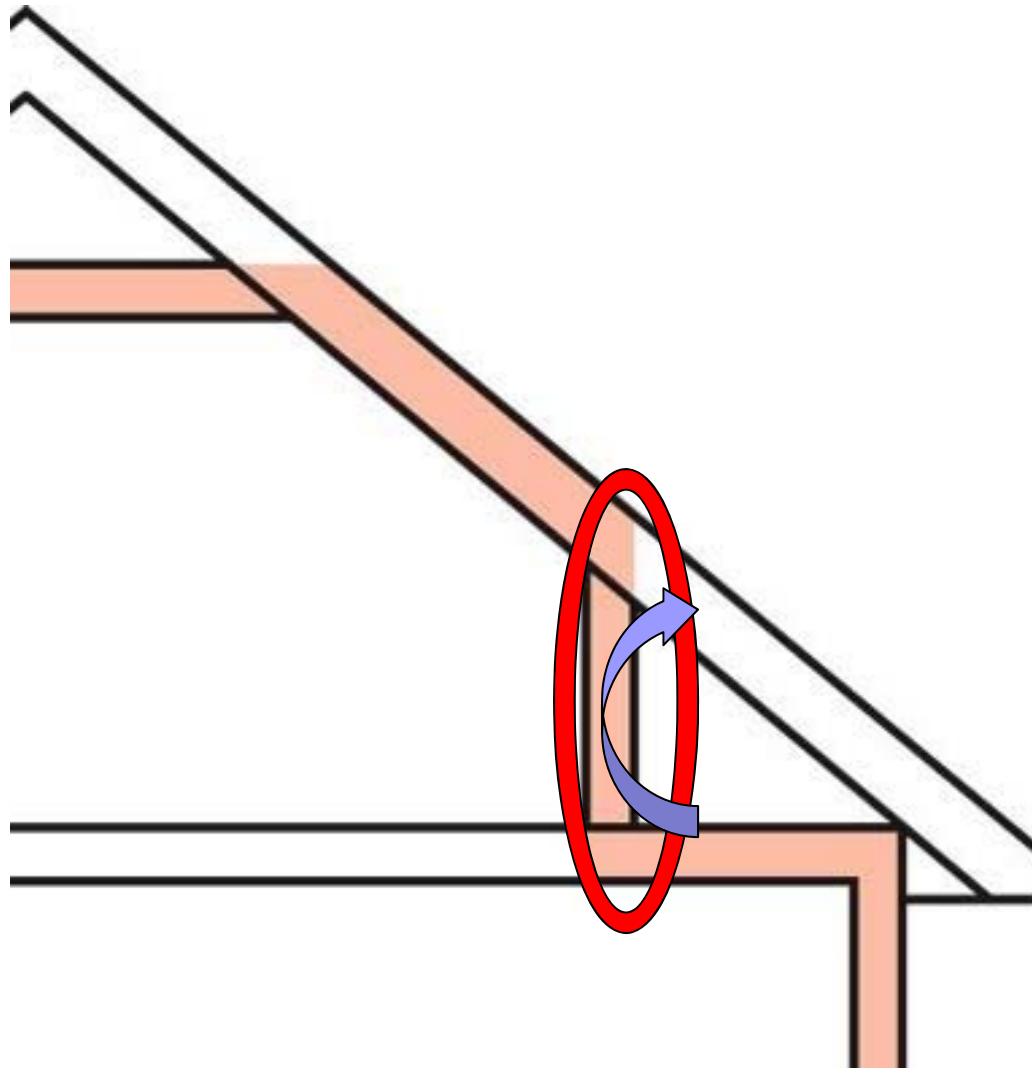
Cape Cod Style – Knee Wall

Replace insulation
in cavity

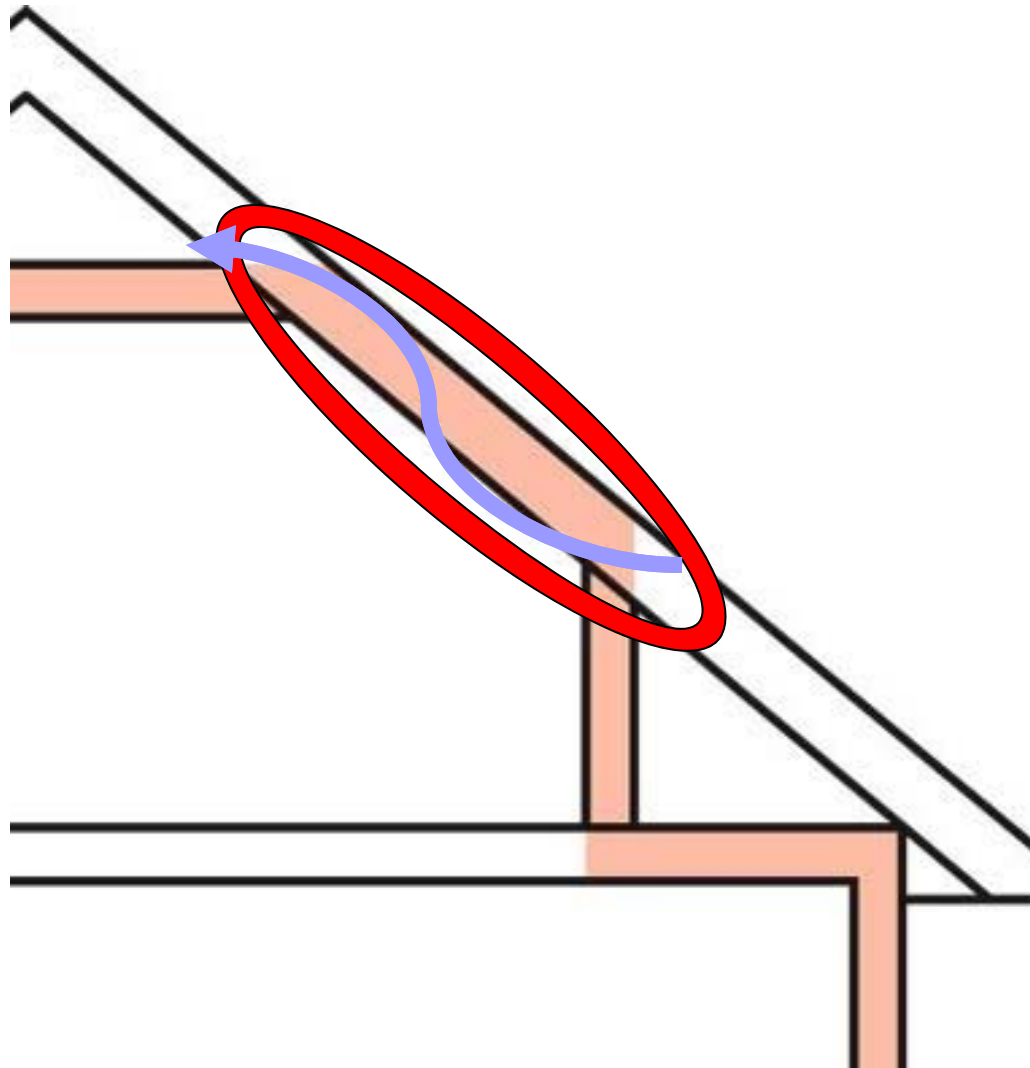
Continuous bead
of sealant around
entire perimeter
of closure



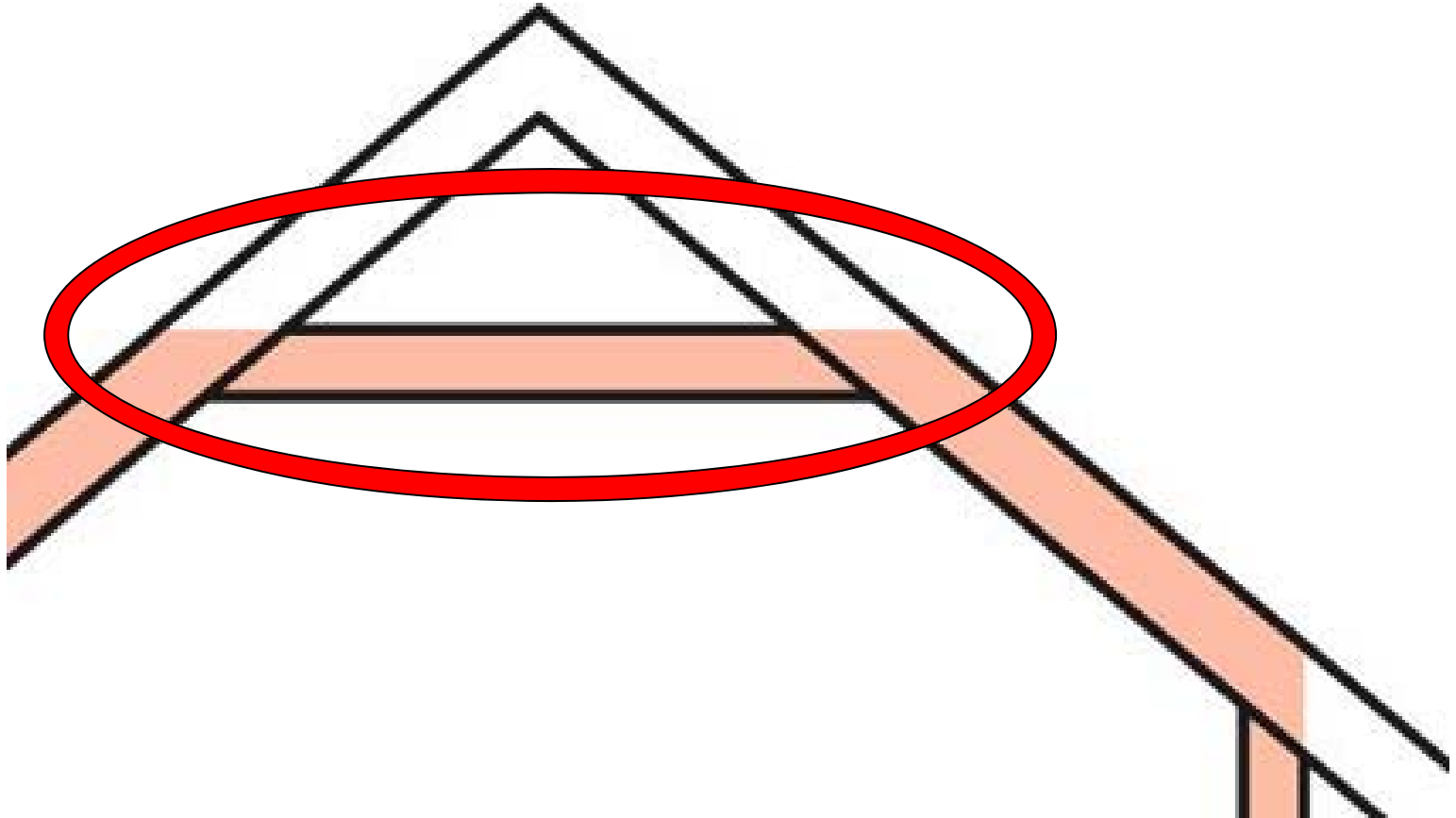
Cape Cod Style



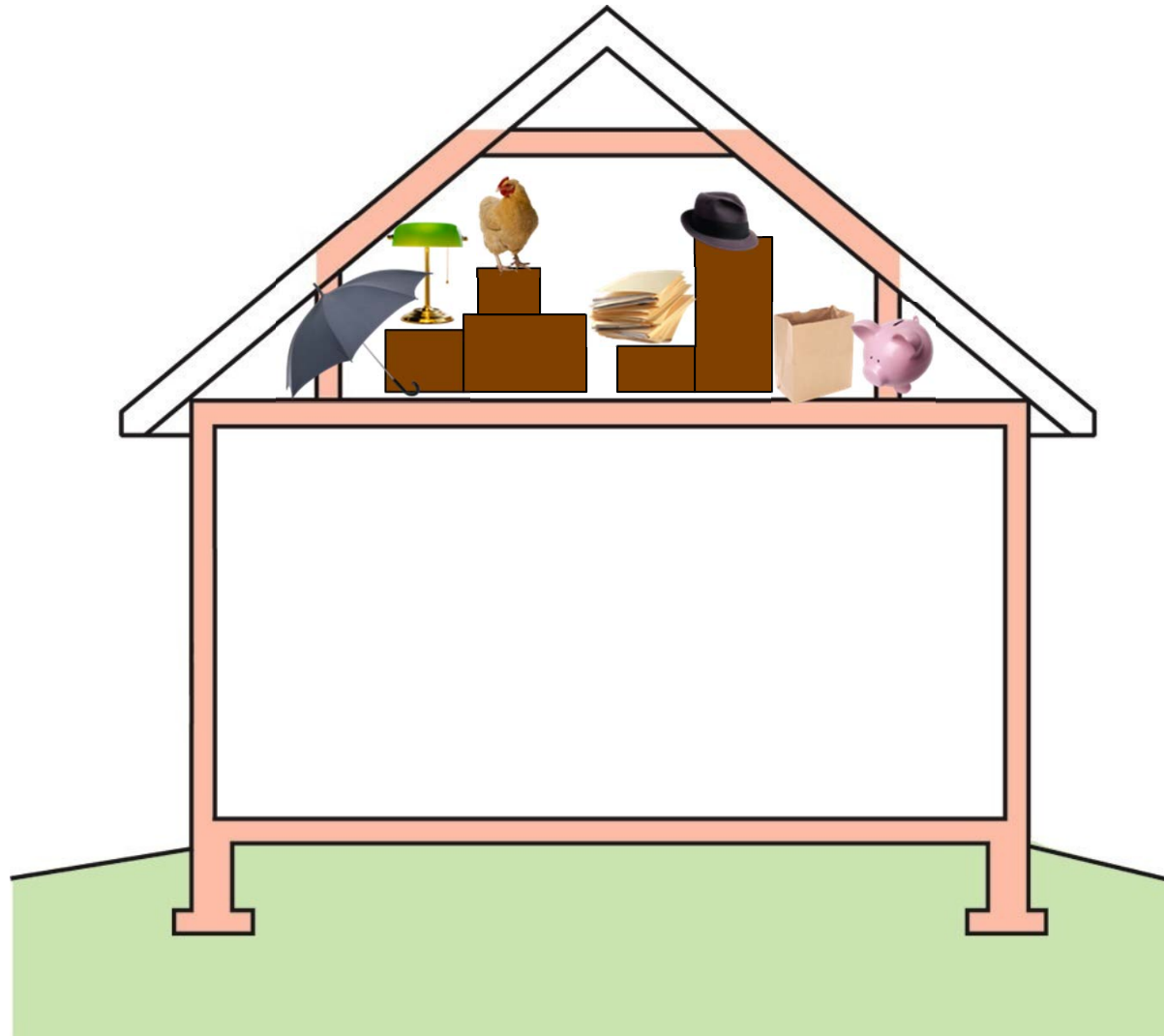
Cape Cod Style



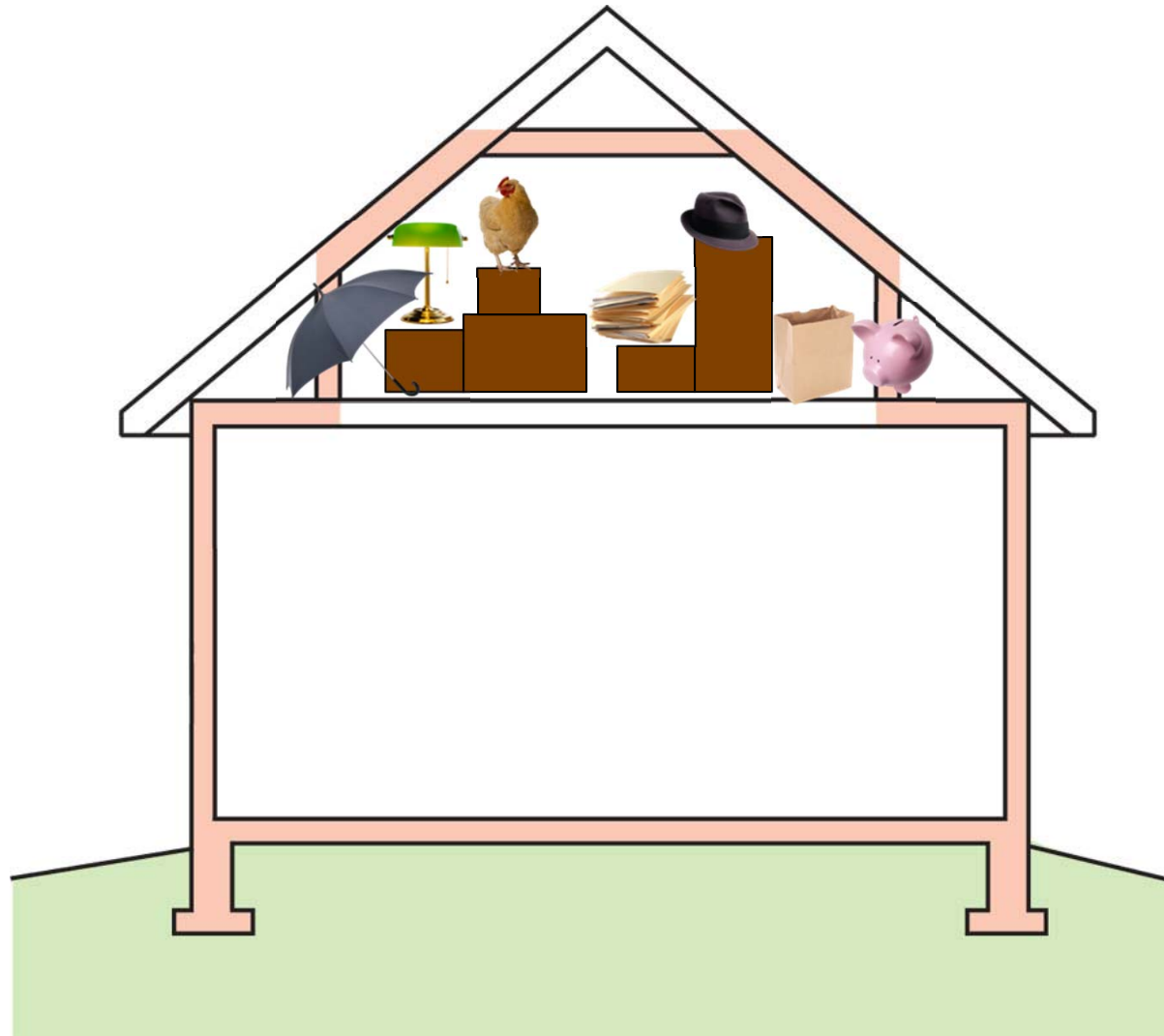
Cape Cod Style



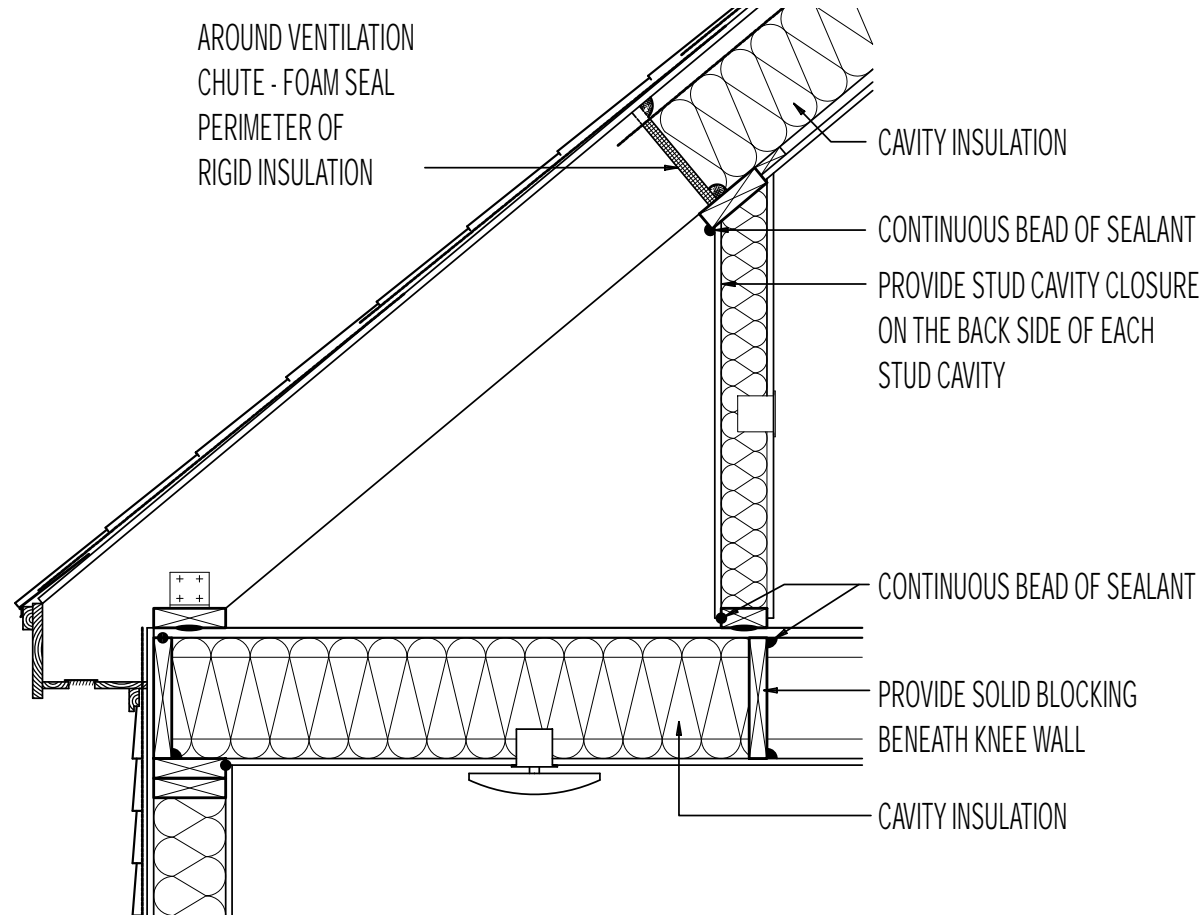
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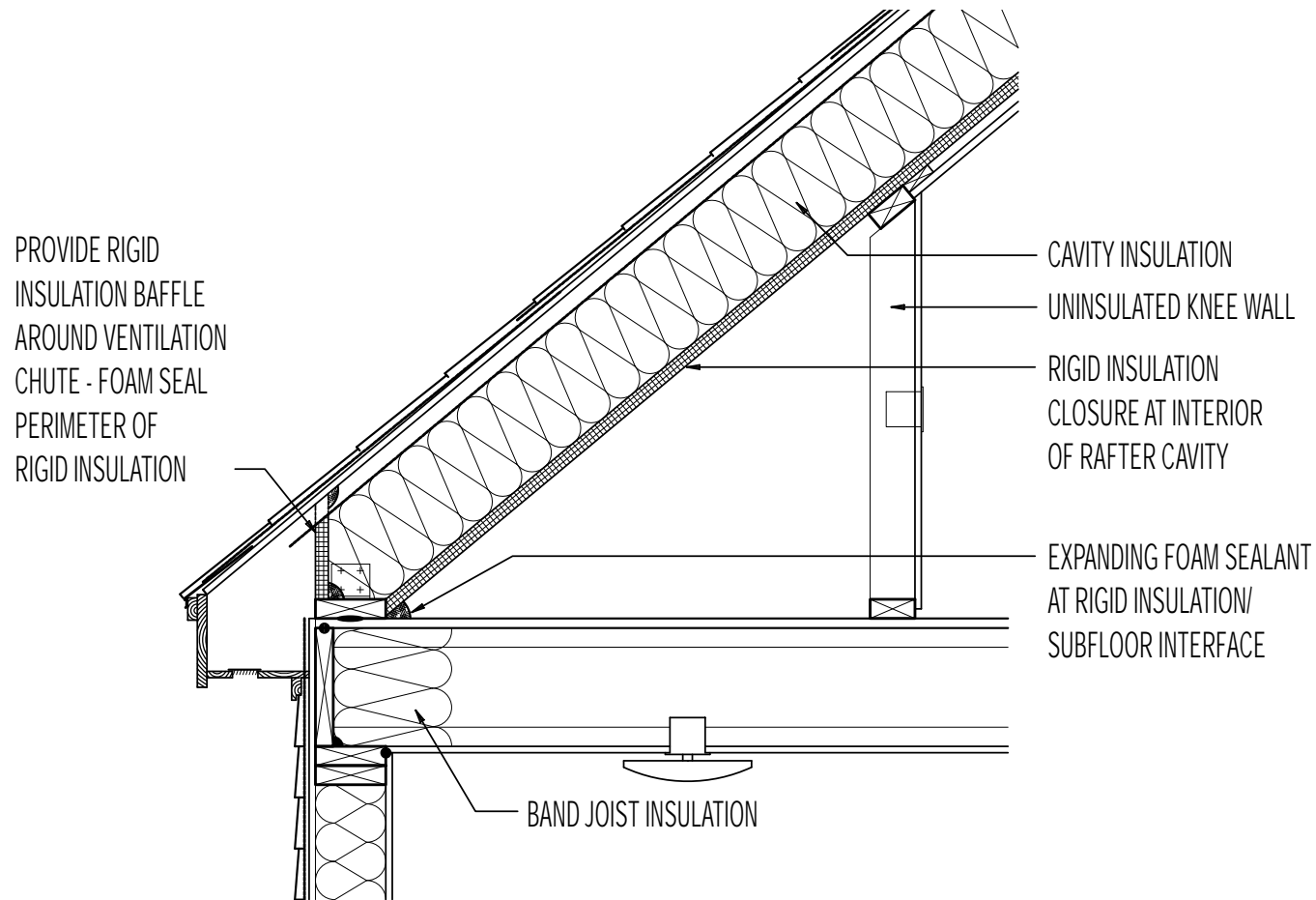
Cape Cod Style



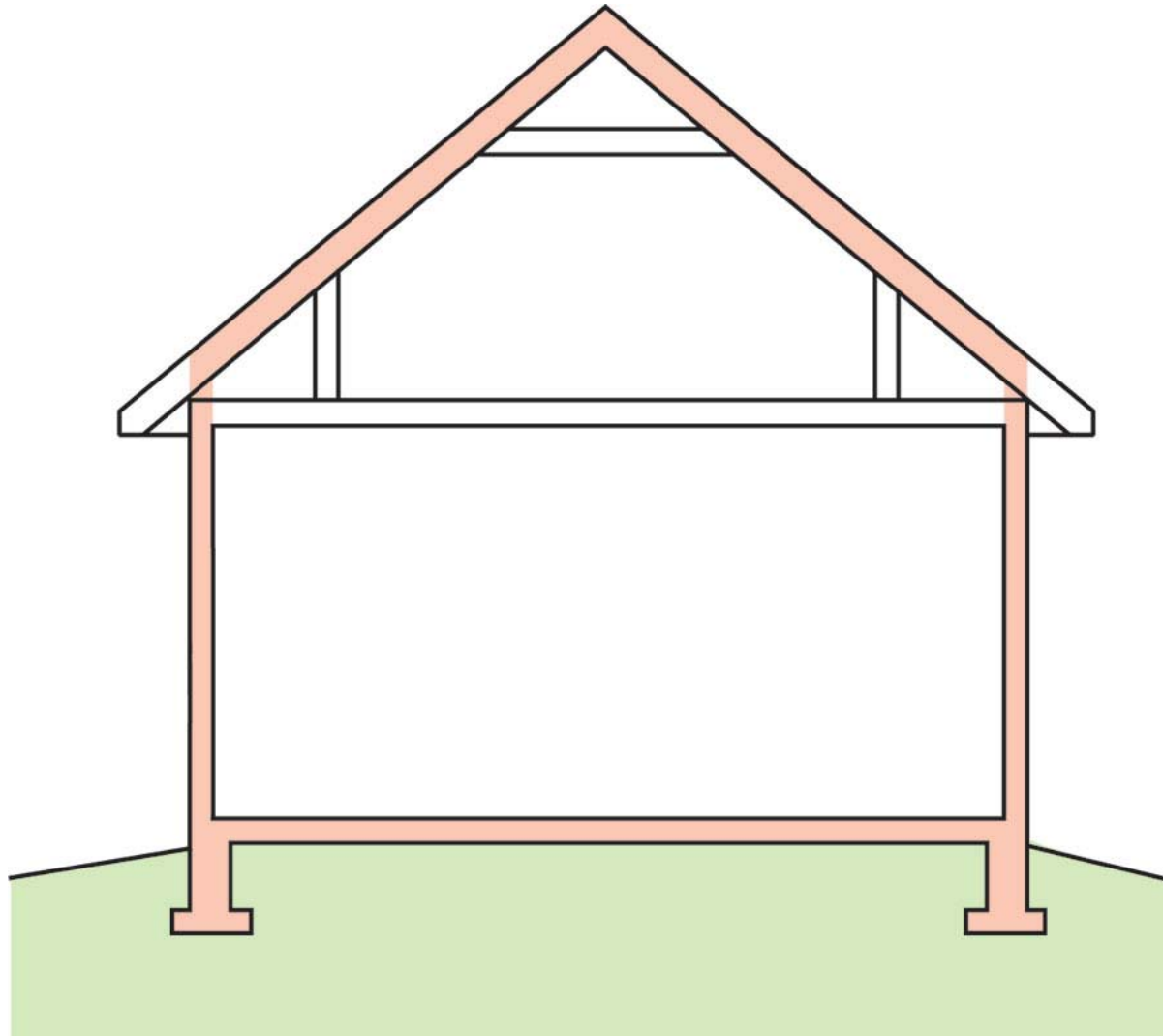
Cape Cod Style



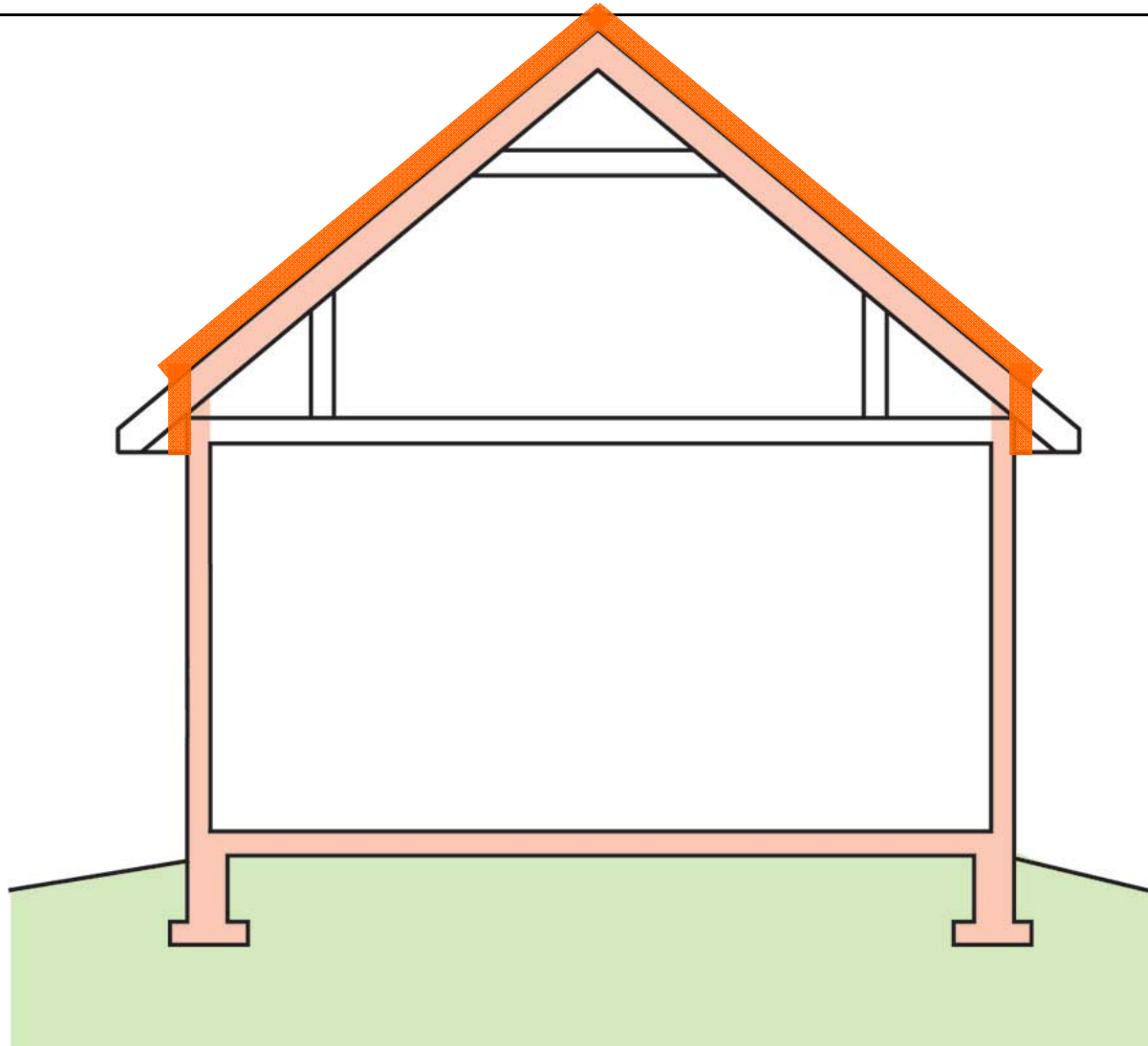
Cape Cod Style



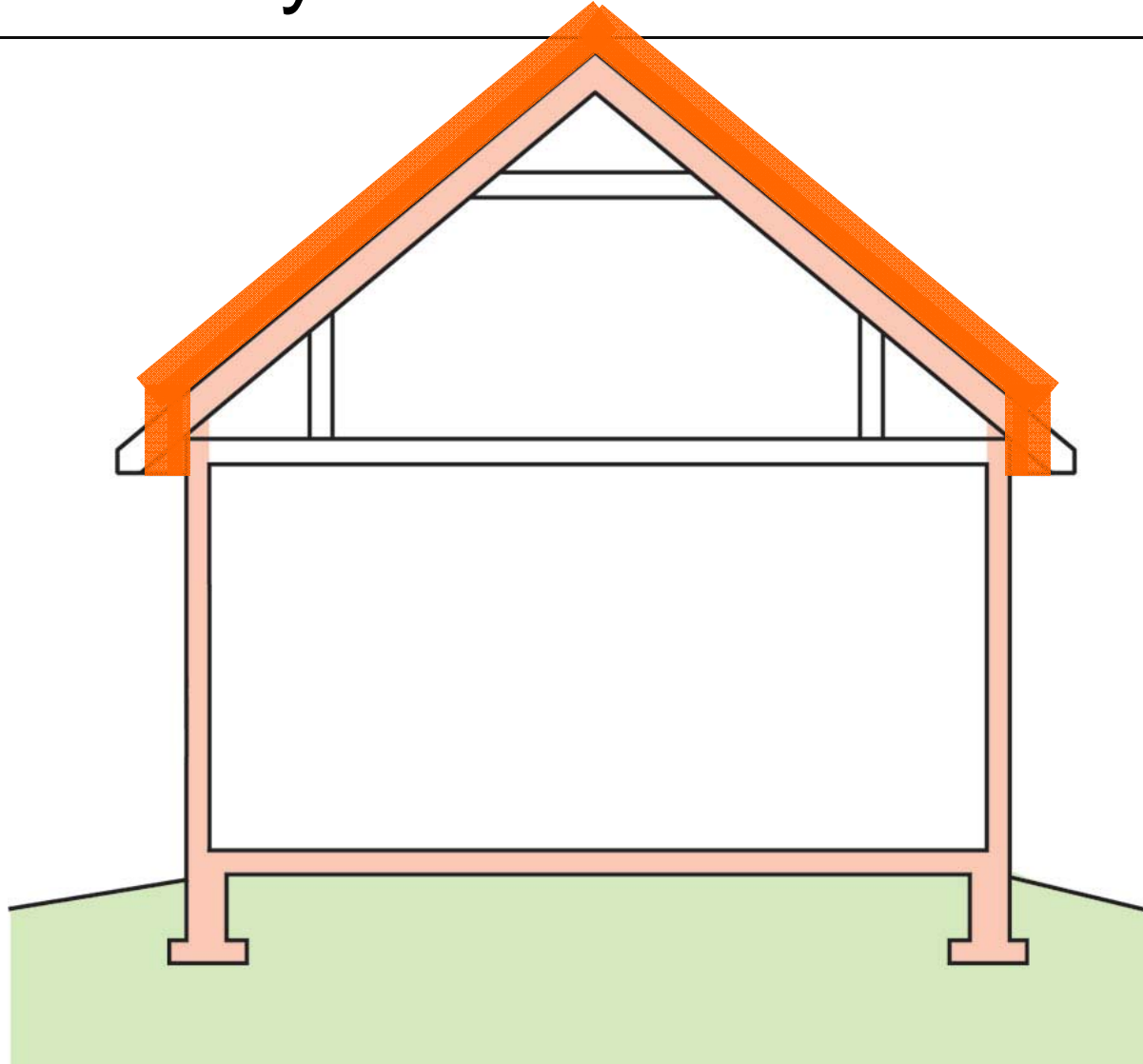
Cape Cod Style

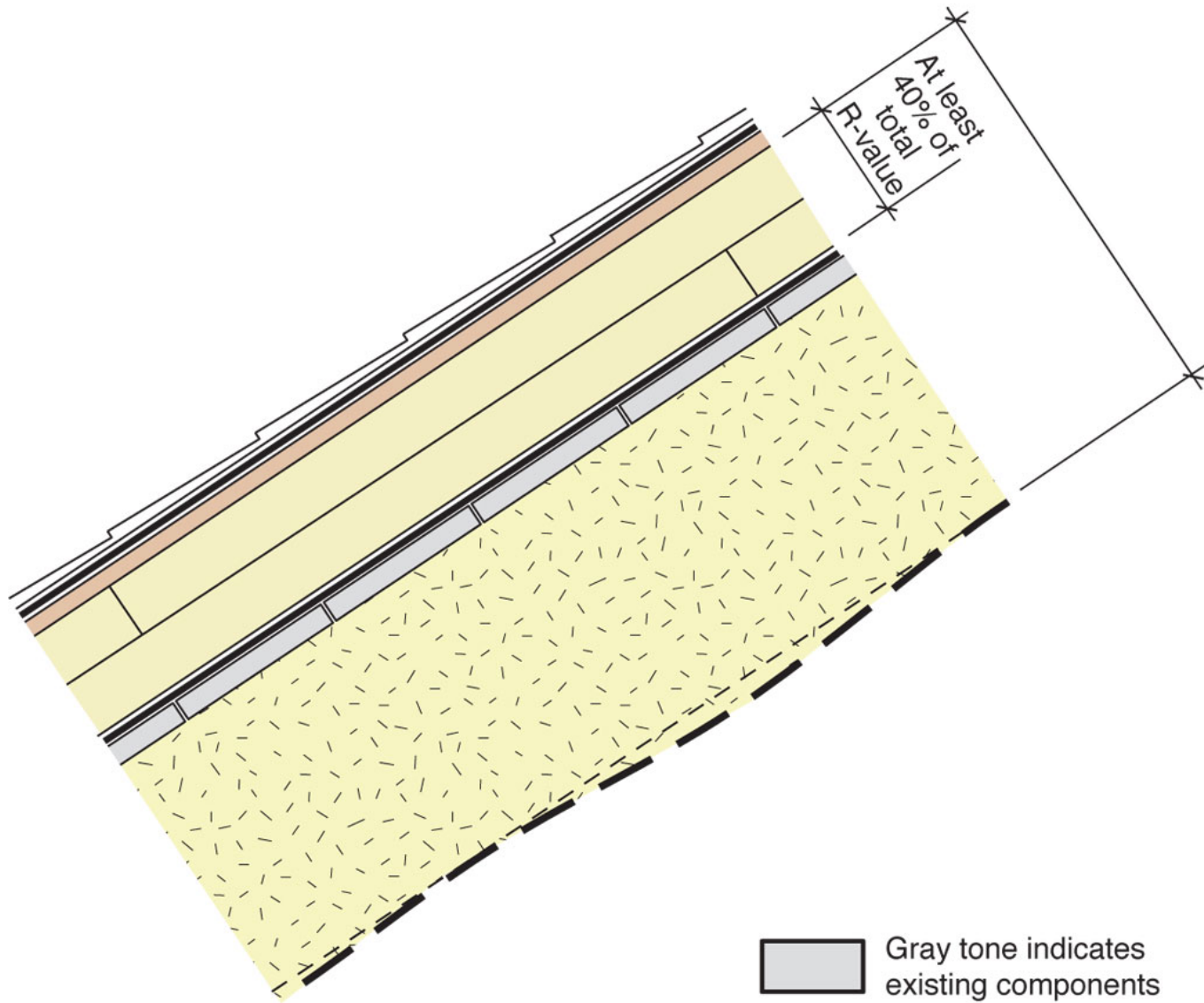


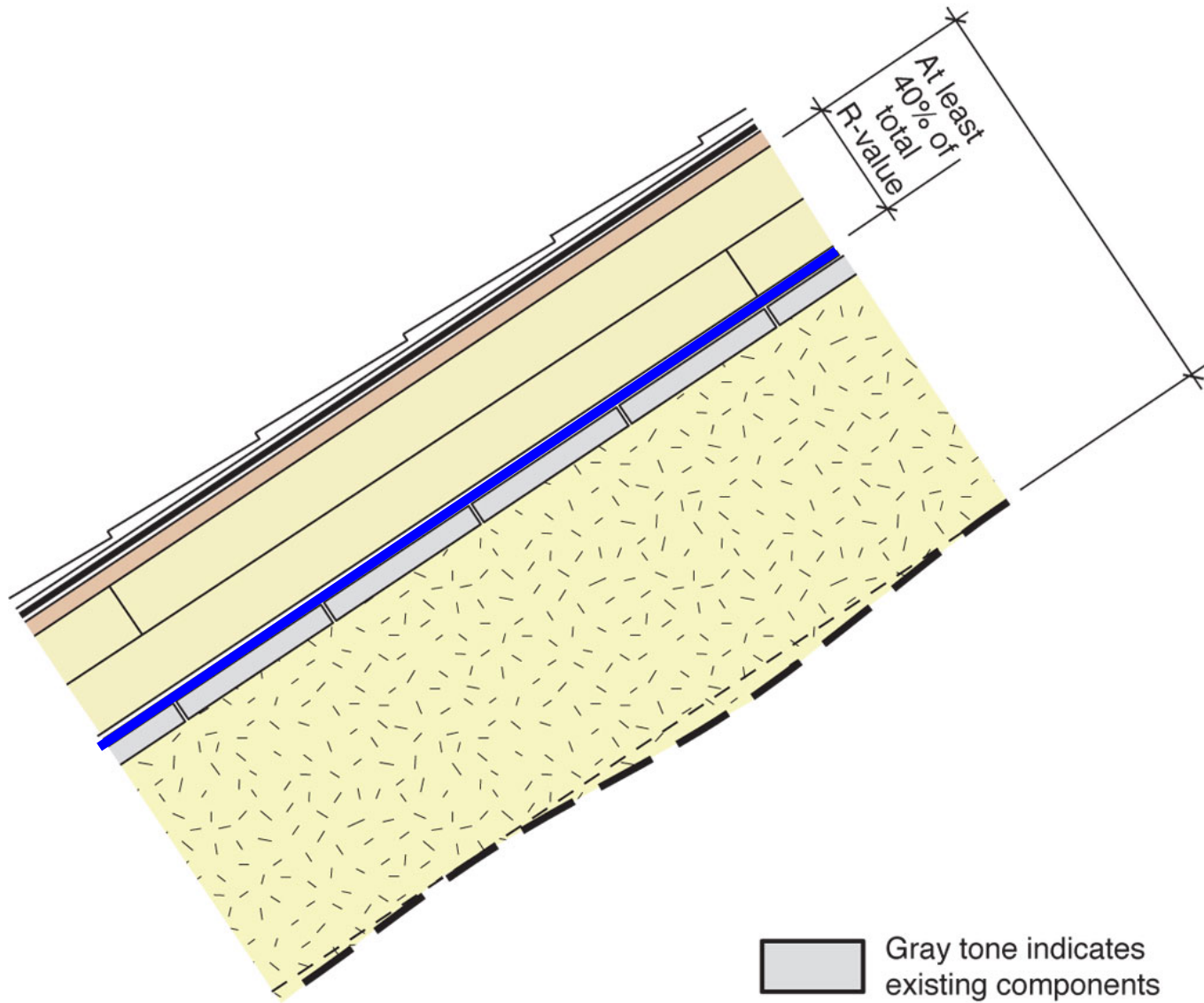
Cape Cod Style

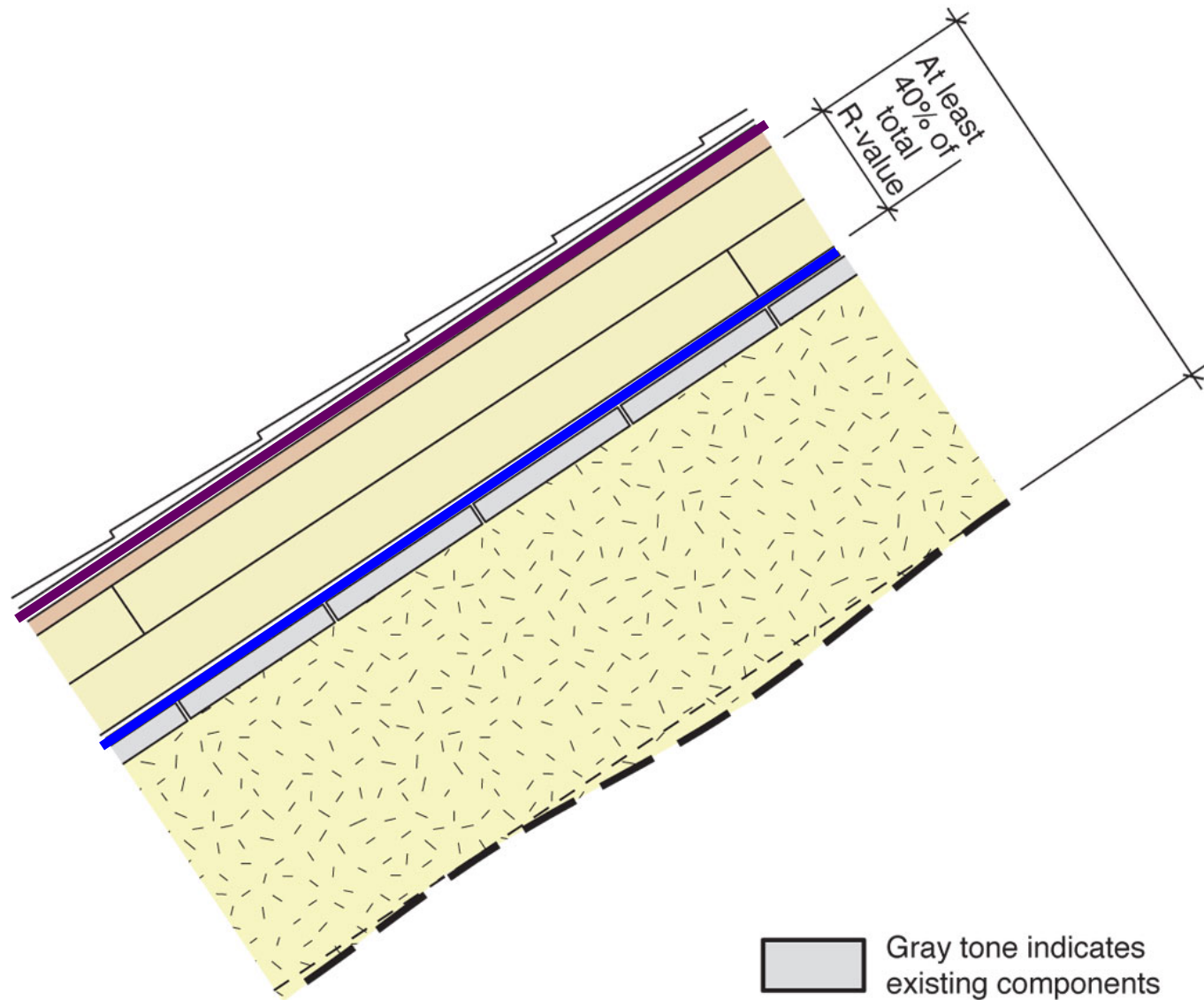


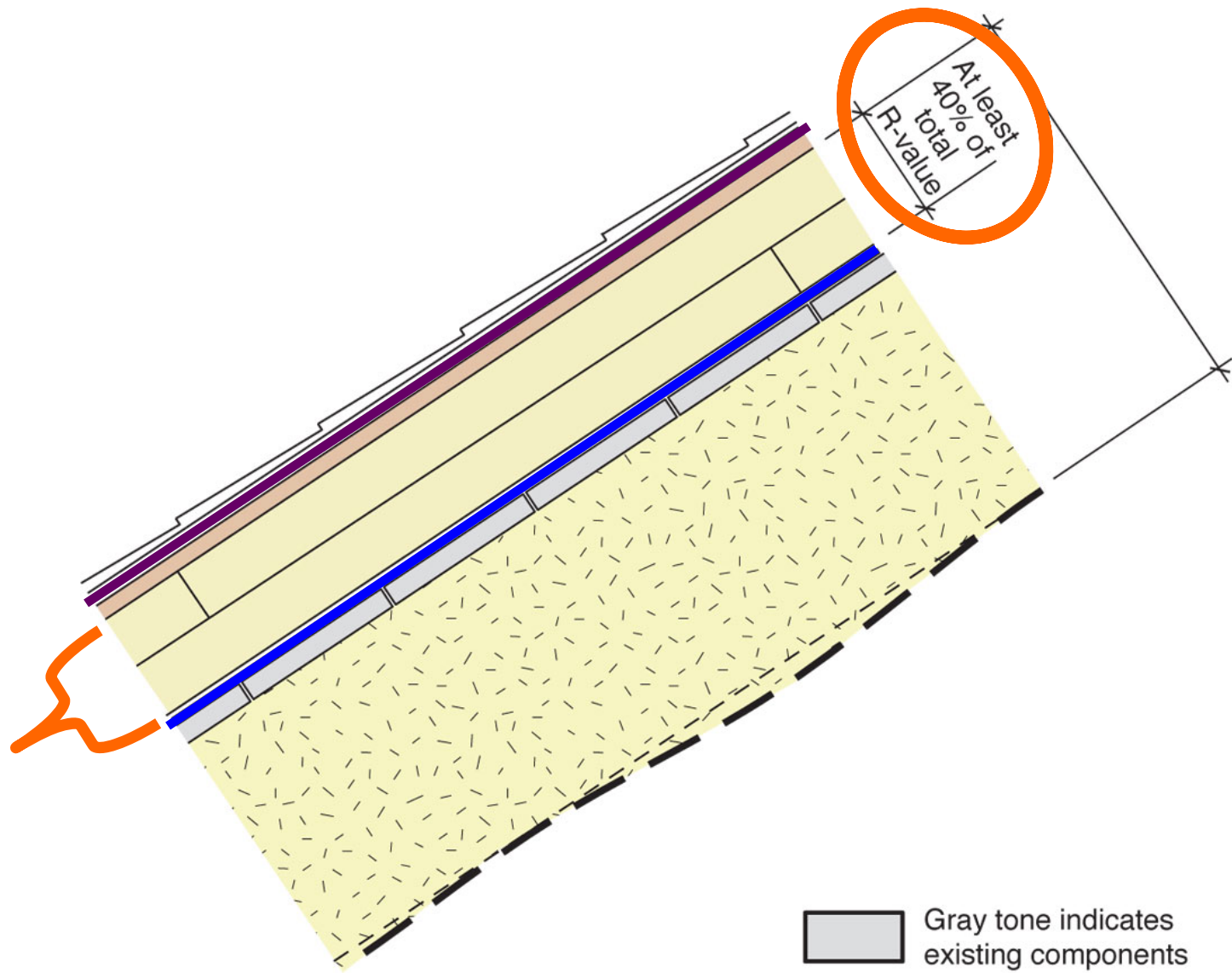
Cape Cod Style

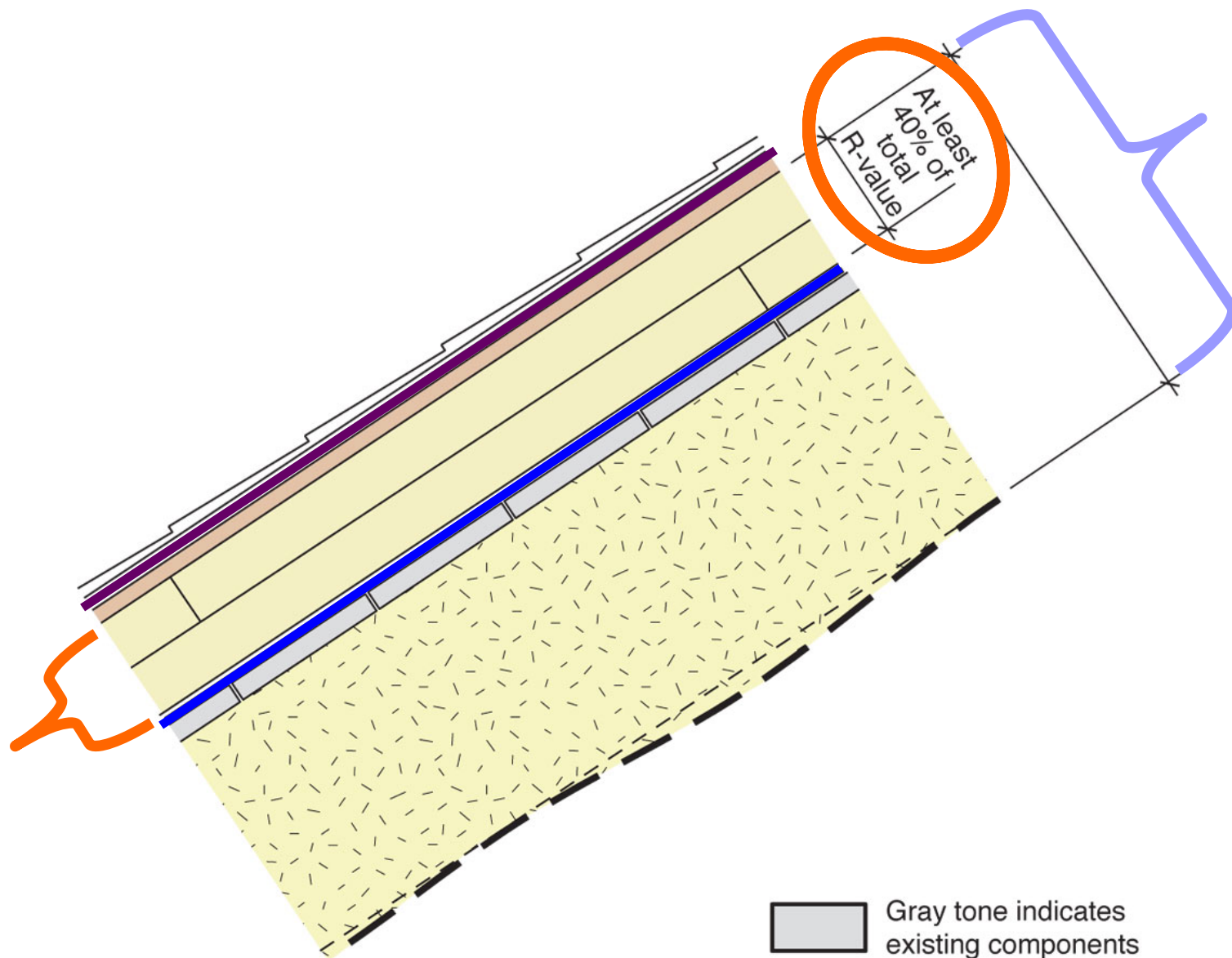




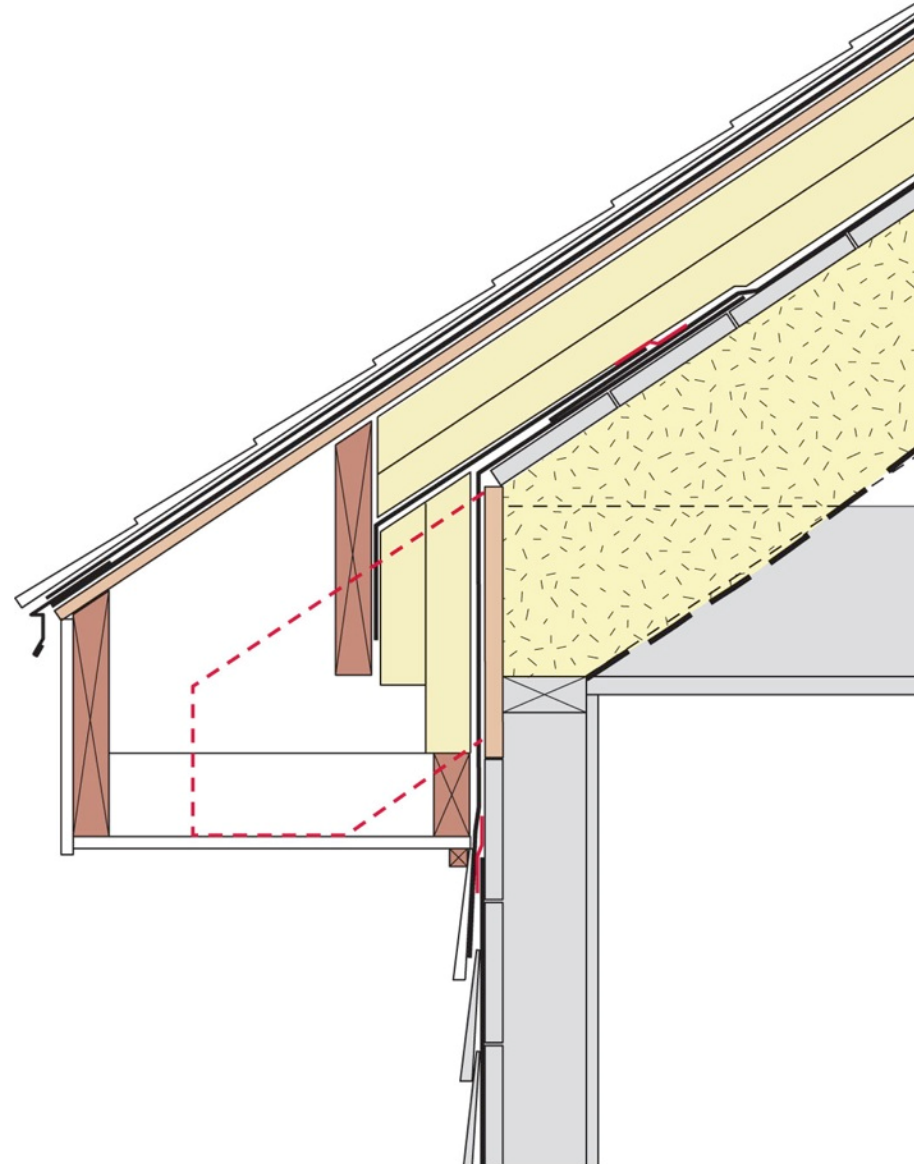








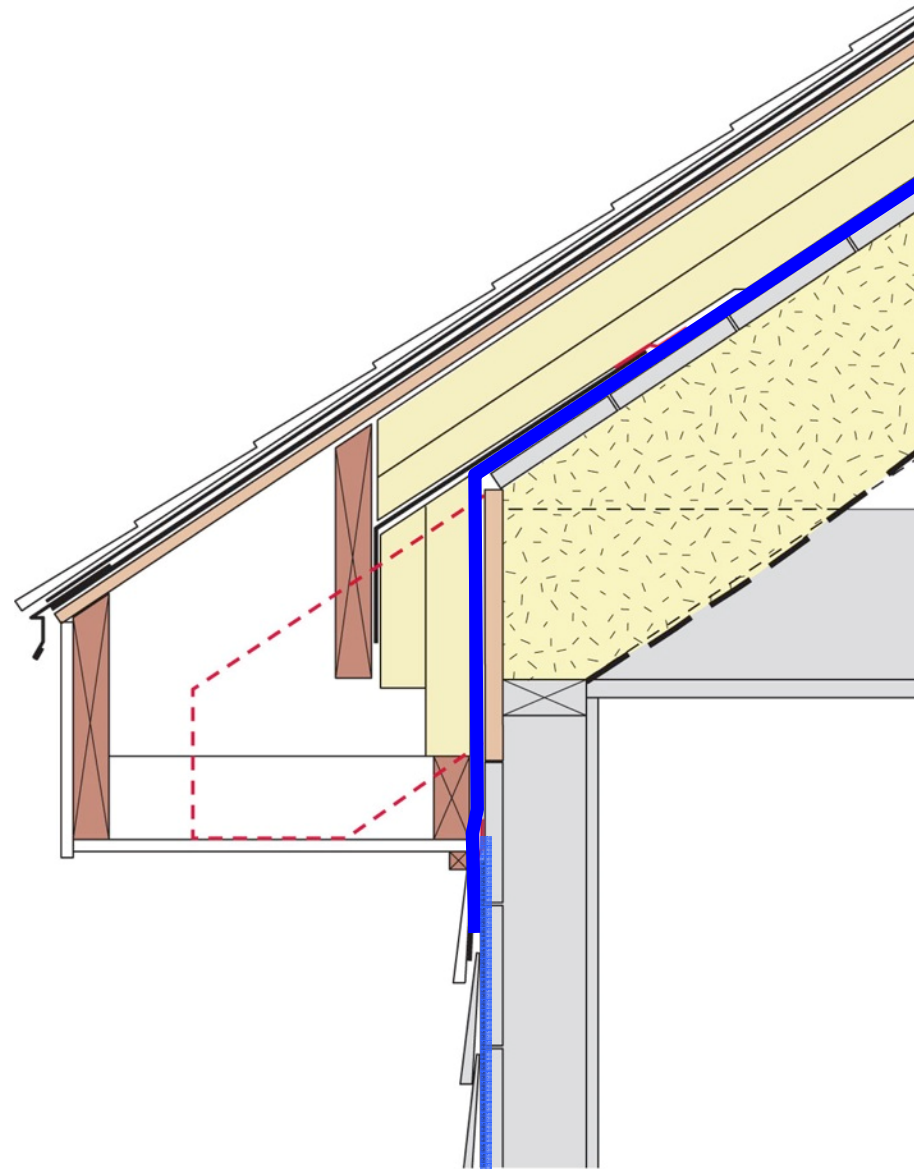
Roof 1
Assembly



Untreated Wall
Assembly

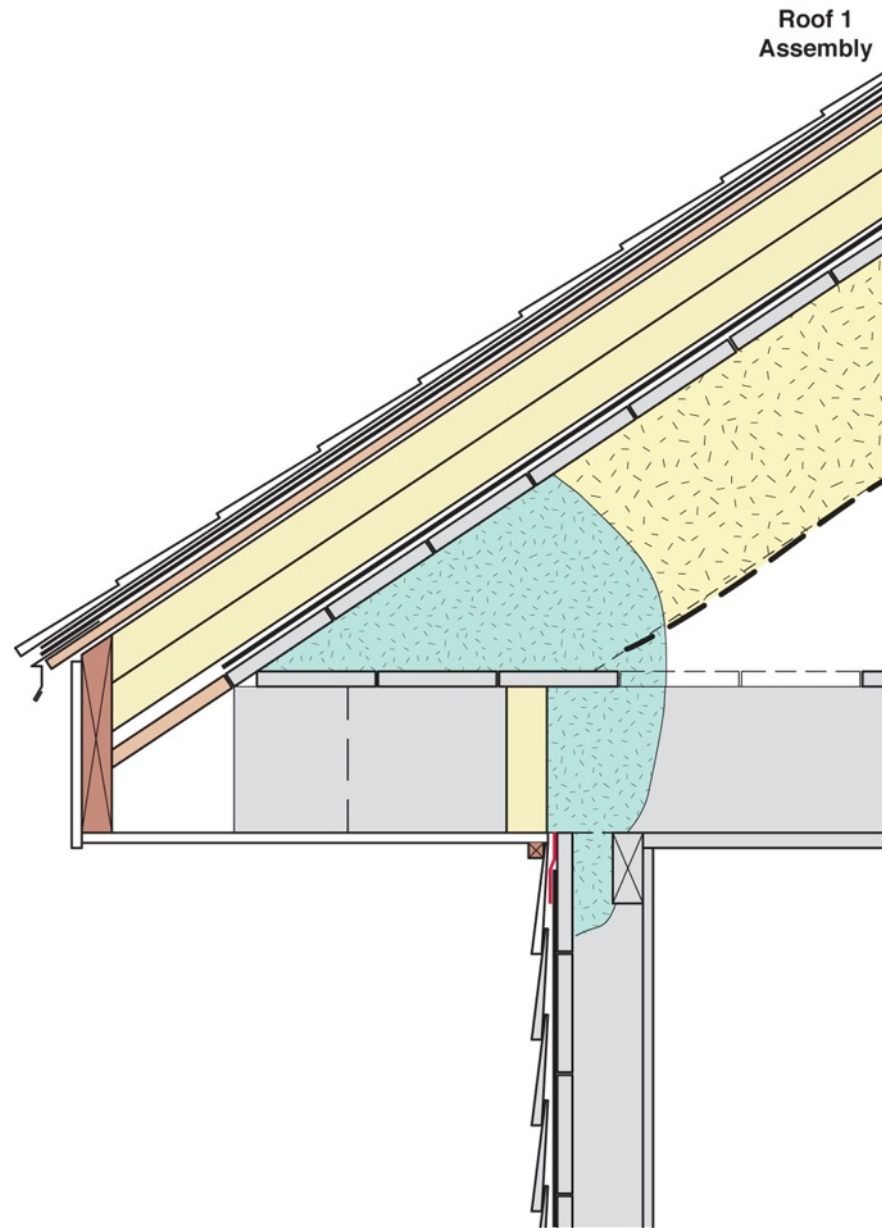
Gray tone indicates
existing components

Roof 1
Assembly



Untreated Wall
Assembly

Gray tone indicates
existing components

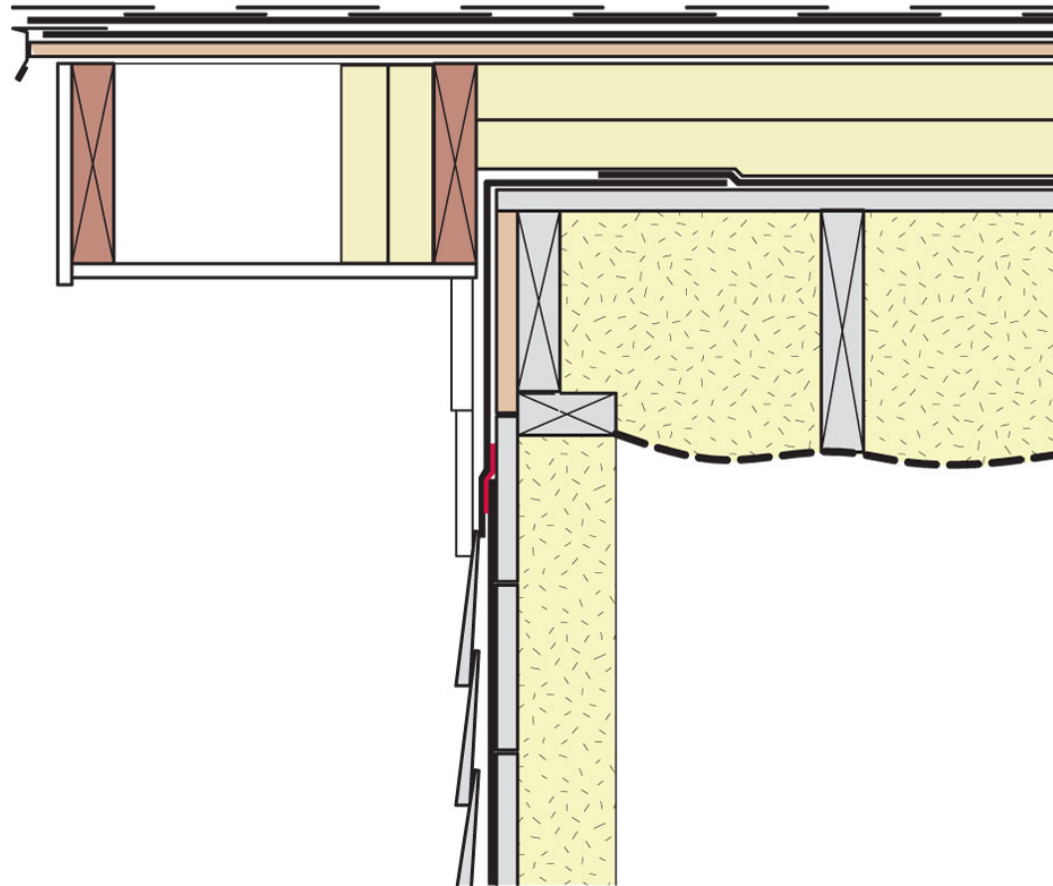


**Untreated Wall
Assembly**

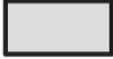


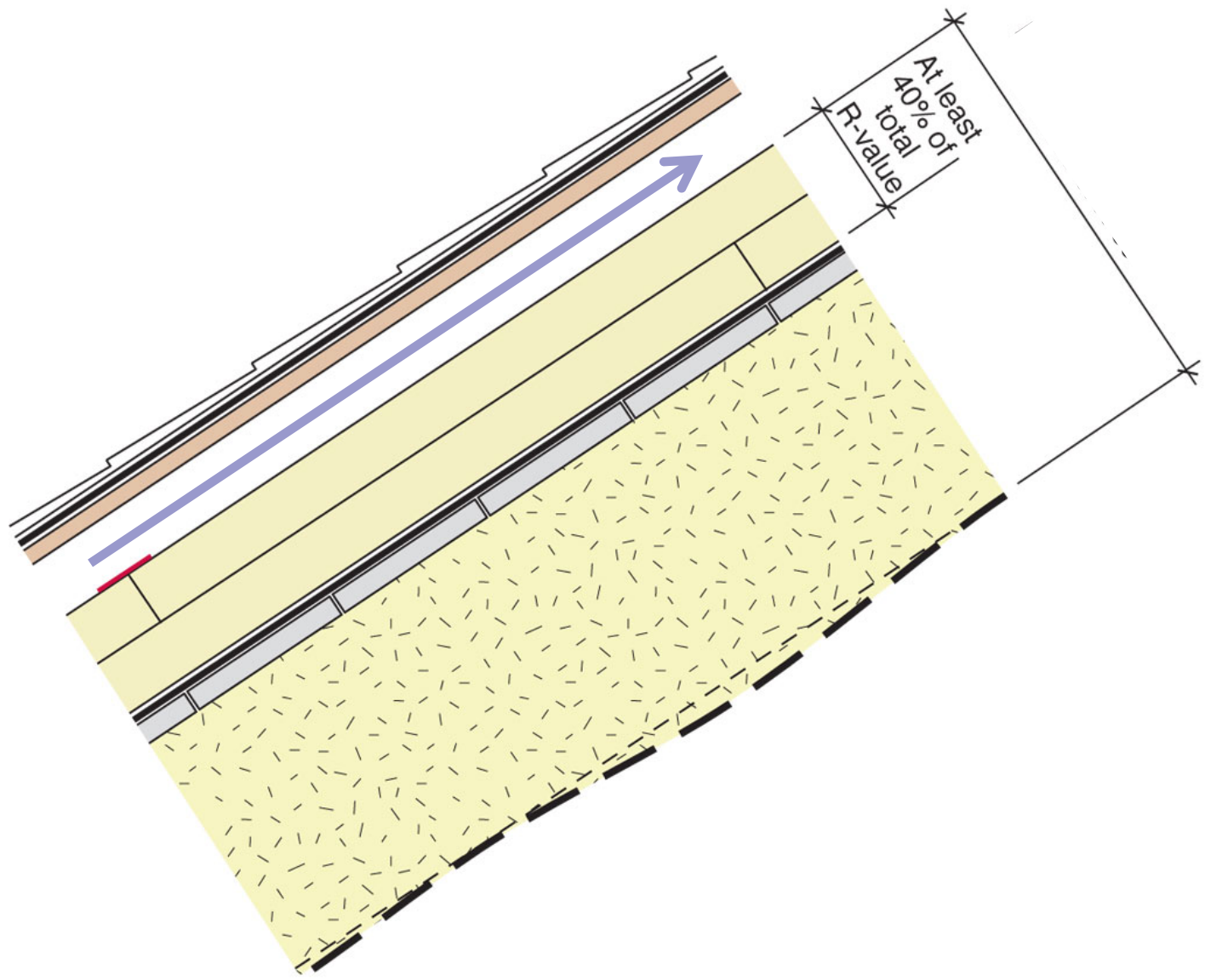
Gray tone indicates
existing components


**Roof 1
Assembly**



**Untreated Wall
Assembly**

 Gray tone indicates
existing components



 Gray tone indicates existing components

Cape Cod Style – air control layer



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Cape Cod Style – air control layer



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Cape Cod Style – insulating sheathing



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Cape Cod Style – insulating sheathing



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Cape Cod Style – ready for roofing



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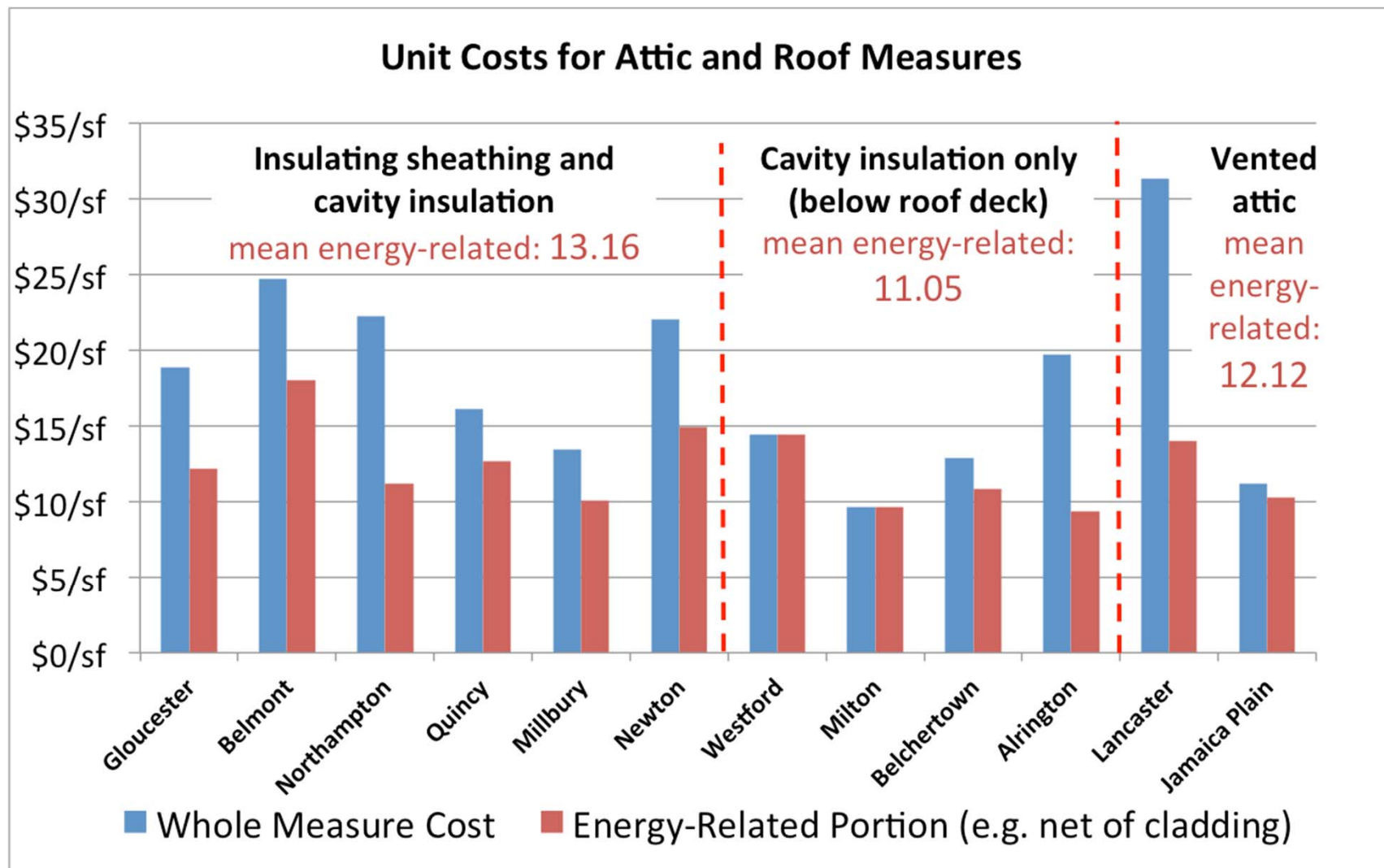
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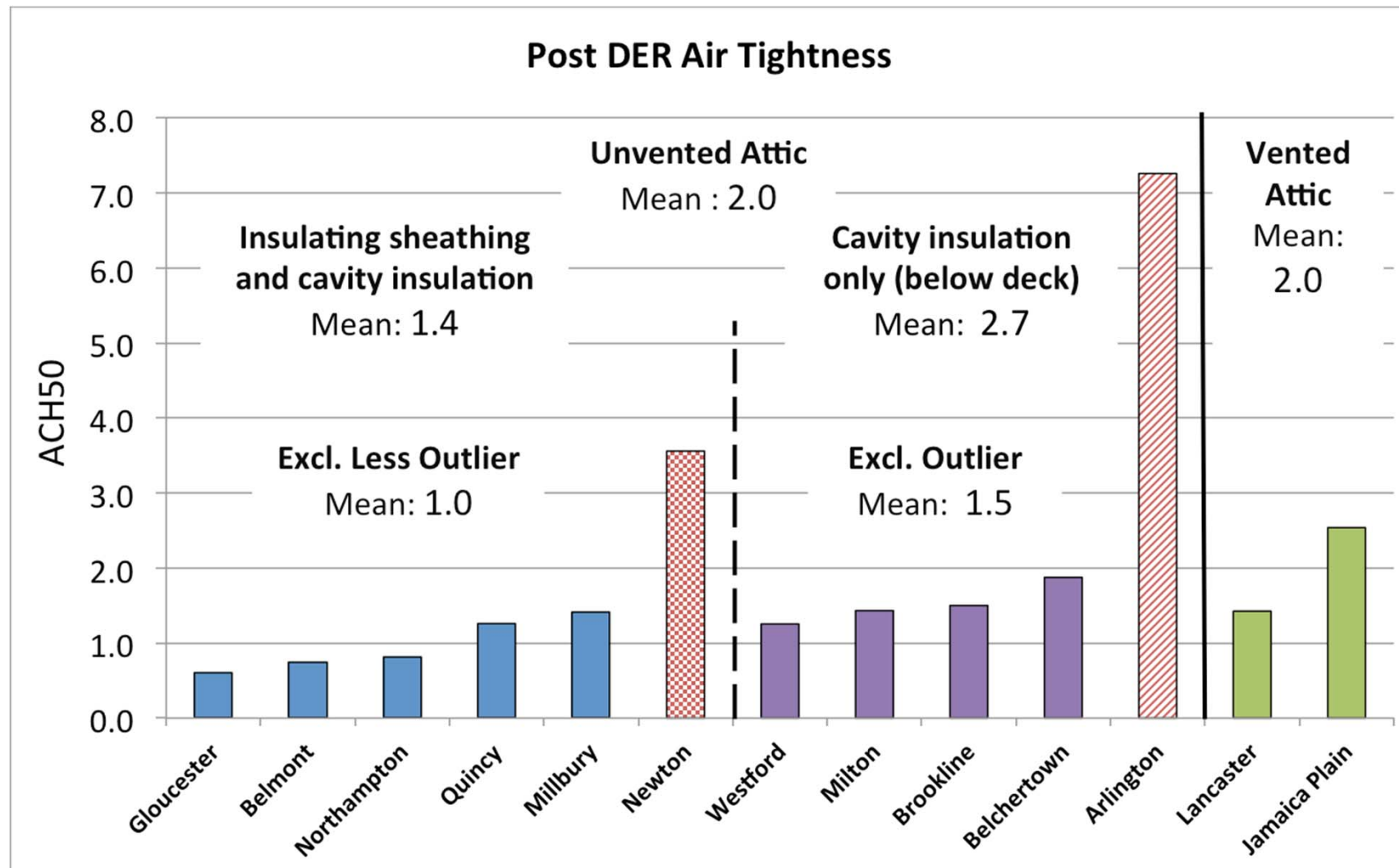
DER Pilot – cost data

- National Grid Deep Energy Retrofit Pilot Program (Massachusetts)
- R-60 target
- Data for 6 implementations
- Cost net of standard re-roofing
 - Mean: \$13.16 / s.f.
 - Range: \$10 – 18 / s.f.

DER Pilot – cost data



DER Pilot – performance data



Cape Cod Style – Before



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Cape Cod Style – After



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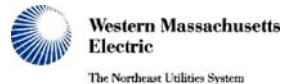
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MASS SAVE DEEP ENERGY RETROFIT BUILDER GUIDE

<https://www1.nationalgridus.com/DeepEnergyRetrofit-MA-RES>



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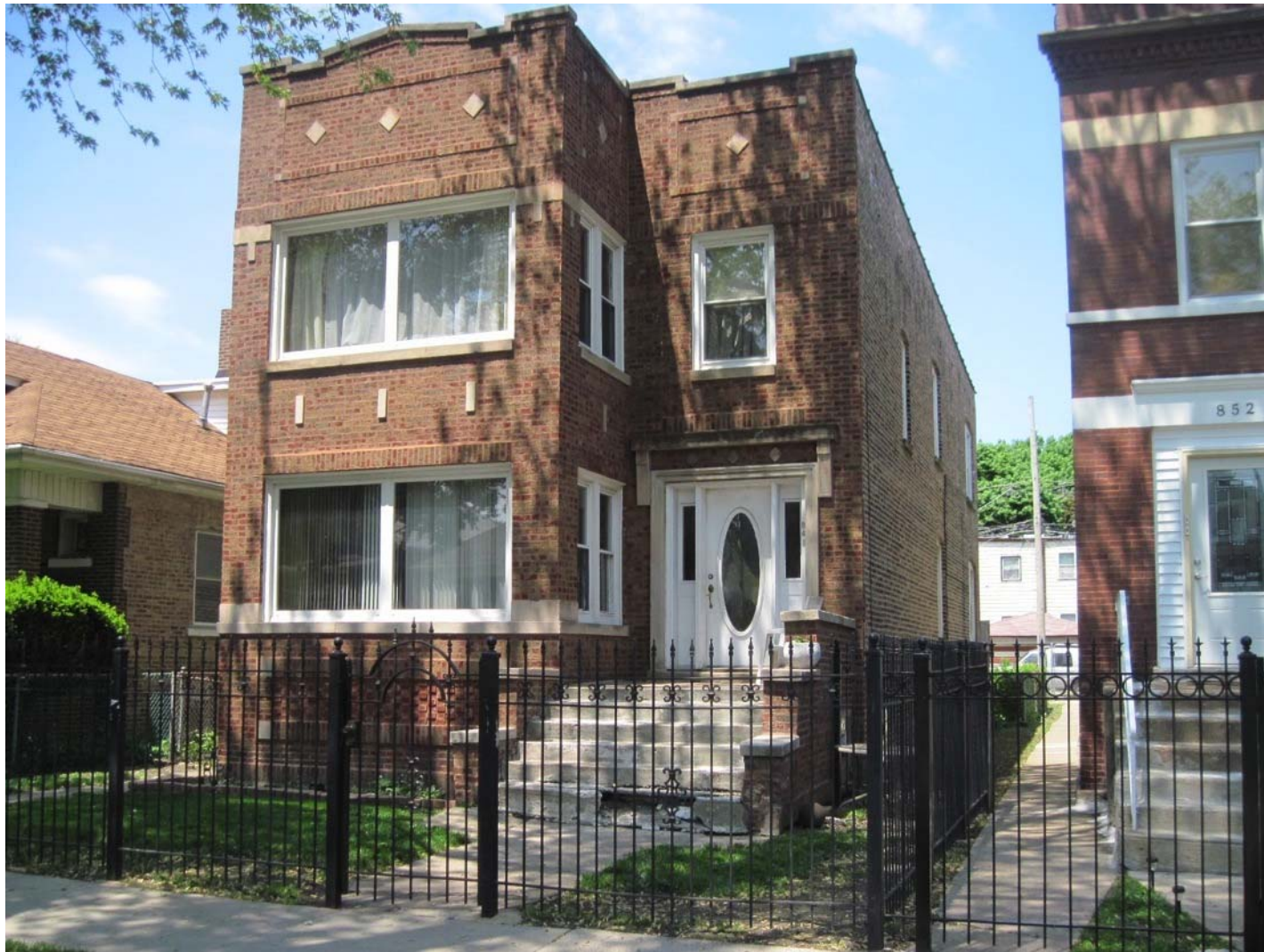
BUILDING TECHNOLOGIES PROGRAM

Initial Performance Results for Massachusetts DER Pilot Program

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Masonry Walls



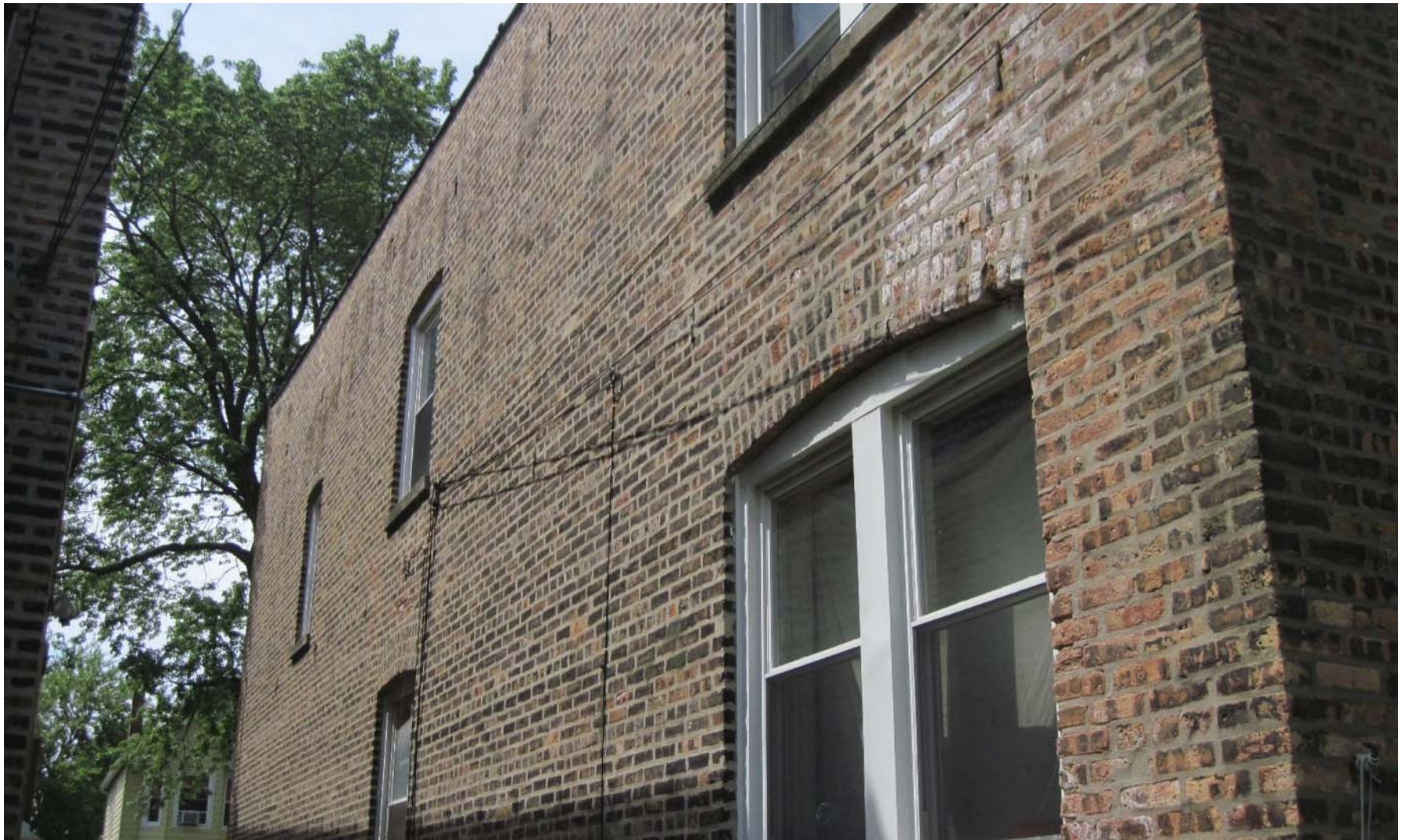
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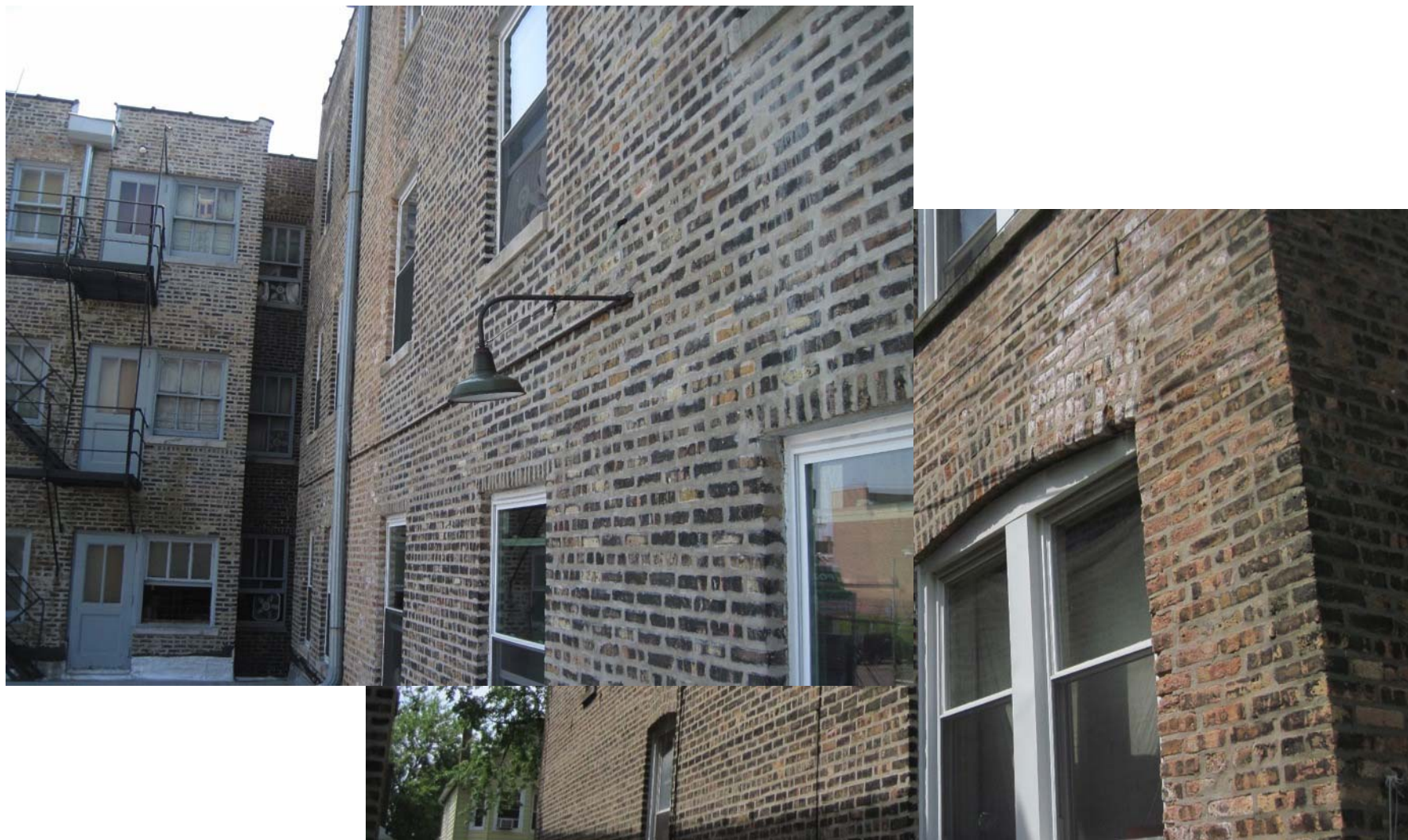
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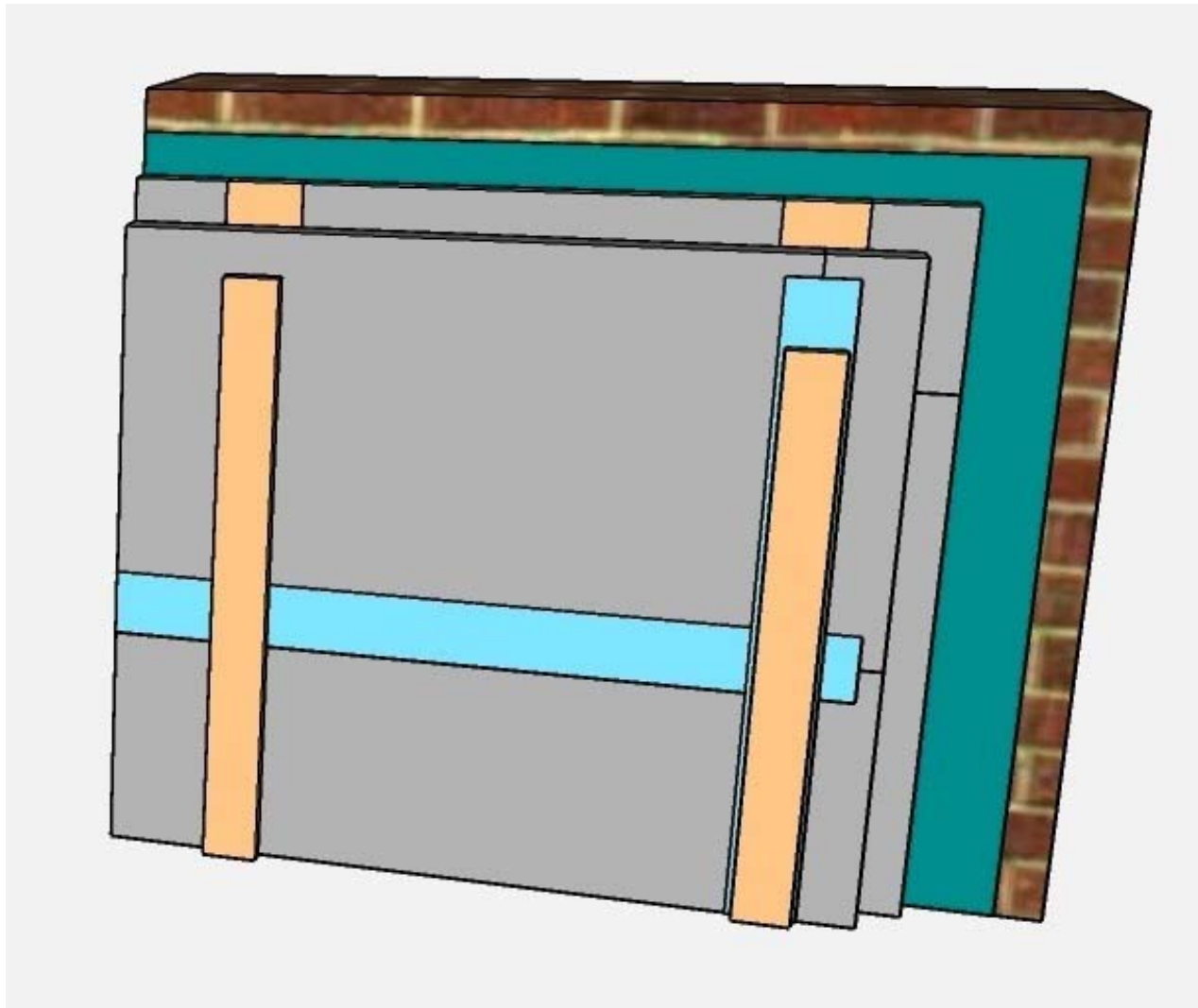
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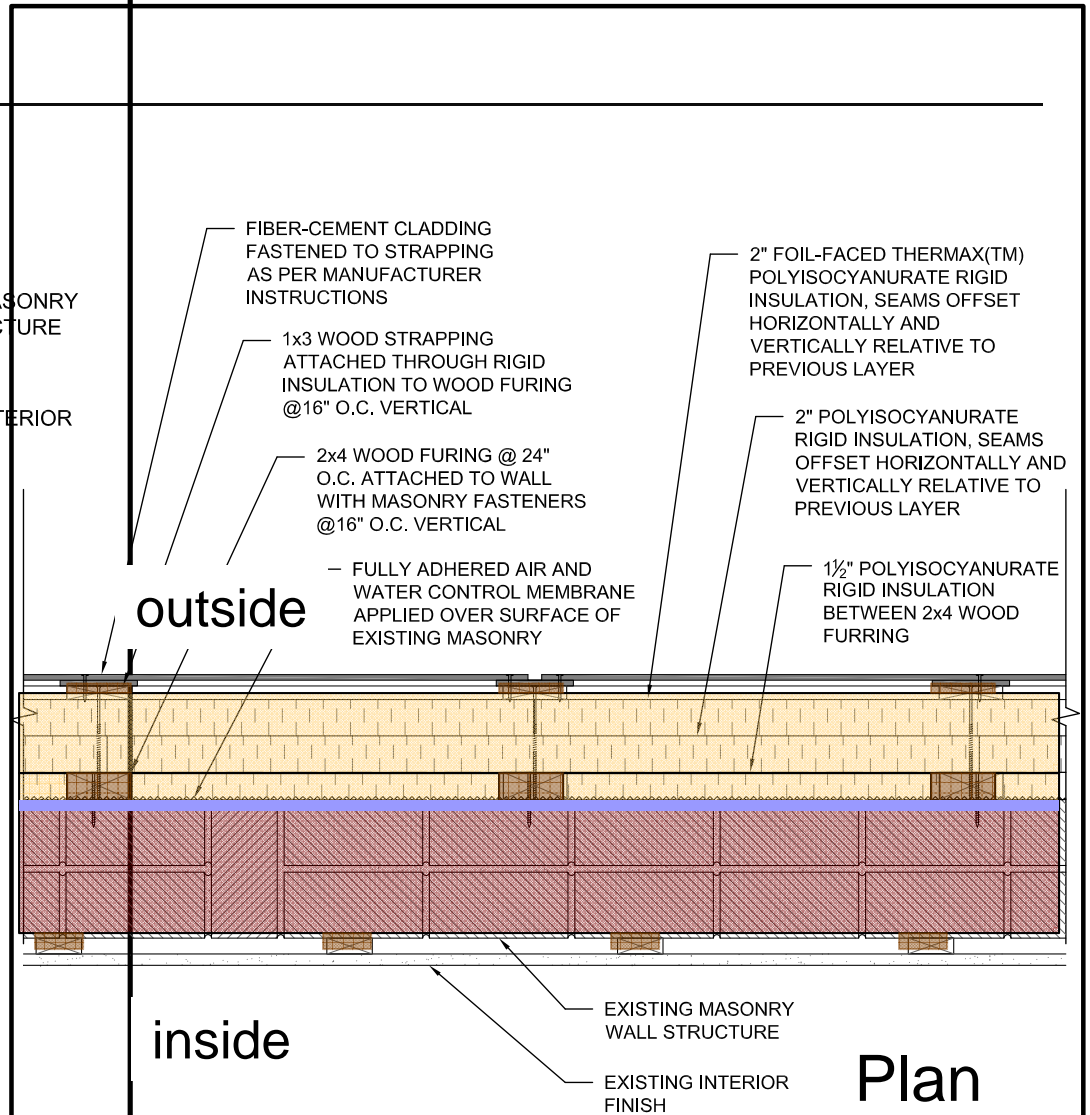
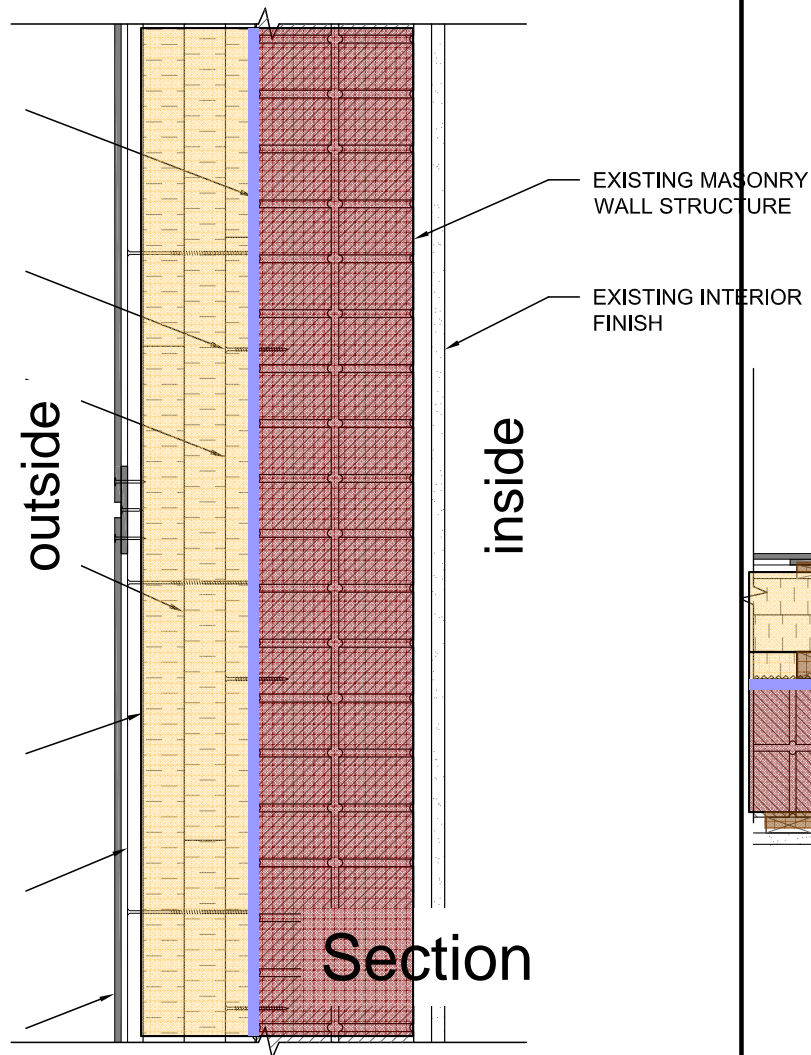
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CEDA Wx Implementation – cost data

- 2 Story (Average of 3 lowest bids):
 - \$14.43 / s.f. gross wall area
- Post implementation contractor estimate:
 - \$12.60 / s.f. gross wall area
- Above 2 stories (Average of 3 lowest bids):
 - \$25.31 / s.f. gross wall area
- Post implementation contractor estimate:
 - \$20.10 – 21.30 / s.f. gross wall area

Evaluation of Two CEDA Weatherization Pilot Implementations of an Exterior Insulation and Over-Clad Retrofit Strategy for Residential Masonry Buildings in Chicago