Appendix A
Current Drawings

The numbering on these drawings correspond to those in the 2012 International Existing Building Code and are similar to those in the 2012 (or 2013) Florida Existing Building Code.
FIGURE C104.1.1
BASIC GABLE END RETROFIT METHODOLOGY
FOR L-BENT STRAP METHOD

1. HORIZONTAL BRACES
   FASTENED TO ROOF
   AND CEILING
   DIAPHRAGMS VIA THE
   ROOF AND CEILING
   FRAMING MEMBERS.

2. RETROFIT STUD
   FASTENED TO
   EXISTING STUD
   TO SUPPLEMENT
   EXISTING STUD.

3. RETROFIT STUDS
   CONNECTED TO
   HORIZONTAL BRACES
   WITH STRAPS.

4. GABLE END FRAMING
   MEMBER CONNECTED
   TO WALL BELOW.

THIS FIGURE SHOWS A TRUSS GABLE END.
THE METHODOLOGY FOR A CONVENTIONALLY FRAMED GABLE END IS SIMILAR.
THE NUMBERS INDICATE A TYPICAL SEQUENCE OF INSTALLATION.
IN ORDER TO SHOW STRAPS COMPRESSION BLOCKS ARE NOT SHOWN.
Figure C104.2(1)

Truss Framed Gable End. L-Bent Strap

Elevation View

Existing Stud of Truss Flat Against Gable End Wall

Retrofit Stud. Minimum 2x4 secured to existing stud with minimum 3" fasteners 6" on center with minimum end distance of 2-1/2".

Minimum 2x4 for retrofit configuration A
Minimum 2x8 for retrofit configuration B
Minimum 2x10 for retrofit configuration C
Minimum 2 each 2x8 for retrofit configuration D

Metal strap. Bent into 'L' shape and secured to back of retrofit stud and face of horizontal brace.

Minimum thickness 20 gauge fastened with minimum 6 each 1-1/4" fasteners at each end for retrofit configuration A.
Minimum thickness 20 gauge fastened with minimum 9 each 1-1/4" fasteners at each end for retrofit configuration B.
Minimum thickness 18 gauge fastened with minimum 12 each 1-1/4" fasteners at each end for retrofit configuration C.
Minimum thickness 18 gauge fastened with minimum 8 each 1-1/4" fasteners at each end of each strap for retrofit config. D.

Compression block. Minimum 2x4. Compression blocks are permitted to be placed over straps.

Secured to horizontal brace with minimum 6 each for retrofit configuration A.
Secured to horizontal brace with minimum 8 each for retrofit configuration B.
Secured to horizontal brace with minimum 10 each for retrofit configuration C.
Secured to horizontal brace with minimum 12 each for retrofit configuration D.

Horizontal brace. Minimum 2x4 secured to each attic framing member with 3 each 3" fasteners.

1 horizontal brace for retrofit configurations A, B, and C.
2 horizontal braces for retrofit configuration D.

Fasteners shall not be placed closer to ends of lumber than 2-1/2".
Fasteners shall not be placed closer to edges of lumber than 1/2" except where straps dictate otherwise.
The number of fasteners shown is not necessarily the number required.

Plan Views

Existing Stud
Retrofit Stud
Metal Strap
Compression Block (can be placed over strap) (each can butt existing stud)
Attic Framing
Retrofit Configuration D
Horizontal Brace

Exterior Wall
Exterior Wall

Attic Framing Members
FIGURE C104.2
CONVENTIONALLY FRAMED GABLE END, L-BENT STRAP
ELEVATION VIEW

EXISTING STUD WITH EDGE AGAINST GABLE END WALL

RETROFIT STUD. MINIMUM 2X4 SECURED TO EXISTING STUD WITH MINIMUM 3" FASTENERS 6" ON CENTER WITH MINIMUM END DISTANCE OF 2-1/2" MINIMUM 2X4 FOR RETROFIT CONFIGURATION A MINIMUM 2X6 FOR RETROFIT CONFIGURATION B MINIMUM 2X8 FOR RETROFIT CONFIGURATION C MINIMUM 2 EACH 2X8 FOR RETROFIT CONFIGURATION D

METAL STRAP, BENT INTO "L" SHAPE AND SECURED TO BACK OF RETROFIT STUD AND FACE OF HORIZONTAL BRACE MINIMUM THICKNESS 20 GAUGE FASTENED WITH MINIMUM 9 EACH 1-1/4" FASTENERS AT EACH END FOR RETROFIT CONFIGURATION A MINIMUM THICKNESS 18 GAUGE FASTENED WITH MINIMUM 12 EACH 1-1/4" FASTENERS AT EACH END FOR RETROFIT CONFIGURATION B MINIMUM THICKNESS 18 GAUGE FASTENED WITH MINIMUM 12 EACH 1-1/4" FASTENERS AT EACH END FOR RETROFIT CONFIGURATION C MINIMUM THICKNESS 18 GAUGE FASTENED WITH MINIMUM 8 EACH 1-1/4" FASTENERS AT EACH END OF EACH STRAP FOR RETROFIT CONFIGURATION D

COMPRESSION BLOCK. MINIMUM 2X4. COMPRESSION BLOCKS ARE PERMITTED TO BE PLACED OVER STRAPS. SECURED TO HORIZONTAL BRACE WITH MINIMUM 8 EACH FOR RETROFIT CONFIGURATION A SECURED TO HORIZONTAL BRACE WITH MINIMUM 10 EACH FOR RETROFIT CONFIGURATION B SECURED TO HORIZONTAL BRACE WITH MINIMUM 12 EACH FOR RETROFIT CONFIGURATION C SECURED TO HORIZONTAL BRACE WITH MINIMUM 12 EACH FOR RETROFIT CONFIGURATION D

HORIZONTAL BRACE. MINIMUM 2X4 SECURED TO EACH ATTIC FRAMING MEMBER WITH 3 EACH 3" FASTENERS 1 HORIZONTAL BRACE FOR RETROFIT CONFIGURATIONS A, B, AND C 2 HORIZONTAL BRACES FOR RETROFIT CONFIGURATION D

ATTIC FRAMING MEMBERS

WALL BELOW

FASTENERS SHALL NOT BE PLACED CLOSER TO ENDS OF LUMBER THAN 2-1/2".
FASTENERS SHALL NOT BE PLACED CLOSER TO EDGES OF LUMBER THAN 1/2" EXCEPT WHERE STRAPS DICTATE OTHERWISE.
The number of fasteners shown is not necessarily the number required.

PLAN VIEWS
RETROFIT CONFIGURATIONS A, B, AND C

EXISTING STUD

RETROFIT STUD

METAL STRAP

COMPRESSION BLOCK
(CAN BE PLACED OVER STRAP.)
(EACH CAN BUTT EXISTING STUD)

ATTIC FRAMING

RETROFIT CONFIGURATION D

HORIZONTAL BRACE

EXISTING STUD

EXTERIOR WALL

EXTERIOR WALL
EXISTING STUD OF TRUSS FLAT AGAINST GABLE END WALL

RETROFIT STUD. MINIMUM 2X4 SECURED TO EXISTING STUD WITH MINIMUM 3" FASTENERS 6" ON CENTER WITH MINIMUM END DISTANCE OF 2-1/2"
MINIMUM 2X4 FOR RETROFIT CONFIGURATION A
MINIMUM 2X5 FOR RETROFIT CONFIGURATION B
MINIMUM 2X6 FOR RETROFIT CONFIGURATION C
MINIMUM 2 EACH 2X8 FOR RETROFIT CONFIGURATION D

METAL STRAP, BENT INTO 'U' SHAPE, WRAPPED AROUND RETROFIT STUD, AND SECURED TO 2 EDGES OF HORIZONTAL BRACE
MINIMUM THICKNESS 20 GAUGE FASTENED WITH MINIMUM 5 EACH 1-1/4" FASTENERS AT EACH END FOR RETROFIT CONFIGURATION A
MINIMUM THICKNESS 20 GAUGE FASTENED WITH MINIMUM 6 EACH 1-1/4" FASTENERS AT EACH END FOR RETROFIT CONFIGURATION B
MINIMUM THICKNESS 18 GAUGE FASTENED WITH MINIMUM 7 EACH 1-1/4" FASTENERS AT EACH END FOR RETROFIT CONFIGURATION C
MINIMUM THICKNESS 18 GAUGE FASTENED WITH MINIMUM 8 EACH 1-1/4" FASTENERS AT EACH END OF EACH STRAP FOR RETROFIT CONFIG. D

HORIZONTAL BRACE. MINIMUM 2X4 SECURED TO EACH ATTIC FRAMING MEMBER WITH 3 EACH 3" FASTENERS:
1) HORIZONTAL BRACE FOR RETROFIT CONFIGURATIONS A, B, AND C.
2) HORIZONTAL BRACES FOR RETROFIT CONFIGURATION D.

FASTENERS SHALL NOT BE PLACED CLOSER TO ENDS OF LUMBER THAN 2-1/2".
FASTENERS SHALL NOT BE PLACED CLOSER TO EDGES OF LUMBER THAN 1/2" EXCEPT WHERE STRAPS DICTATE OTHERWISE.
THE NUMBER OF FASTENERS SHOWN IS NOT NECESSARILY THE NUMBER REQUIRED.

PLAN VIEWS

EXISTING STUD
RETROFIT STUD
METAL STRAP
ATTIC FRAMING
HORIZONTAL BRACE

EXISTING STUD
RETROFIT STUD
METAL STRAP
RETROFIT CONFIGURATION D
ATTIC FRAMING
HORIZONTAL BRACE
FIGURE C104.2 (4)
CONVENTIONALLY FRAMED GABLE END. U-BENT STRAP

ELEVATION VIEW

EXISTING STUD WITH EDGE AGAINST GABLE END WALL

RETROFIT STUD. MINIMUM 2X4 SECURED TO EXISTING STUD WITH MINIMUM 3" FASTENERS 6" ON CENTER WITH MINIMUM END DISTANCE OF 2-1/2"
MINIMUM 2X4 FOR RETROFIT CONFIGURATION A.
MINIMUM 2X6 FOR RETROFIT CONFIGURATION B.
MINIMUM 2X8 FOR RETROFIT CONFIGURATION C.
MINIMUM 2 EACH 2X8 RETROFIT CONFIGURATION D.

METAL STRAP. BENT INTO 'U' SHAPED, WRAPPED AROUND RETROFIT STUD, AND SECURED TO 2 EDGES OF HORIZONTAL BRACE.
MINIMUM THICKNESS 20 GAUGE FASTENED WITH MINIMUM 8 EACH 1-1/4" FASTENERS AT EACH END FOR RETROFIT CONFIGURATION A.
MINIMUM THICKNESS 20 GAUGE FASTENED WITH MINIMUM 9 EACH 1-1/4" FASTENERS AT EACH END FOR RETROFIT CONFIGURATION B.
MINIMUM THICKNESS 18 GAUGE FASTENED WITH MINIMUM 12 EACH 1-1/4" FASTENERS AT EACH END FOR RETROFIT CONFIGURATION C.
MINIMUM THICKNESS 18 GAUGE FASTENED WITH MINIMUM 8 EACH 1-1/4" FASTENERS AT EACH END OF EACH STRAP FOR RETROFIT CONFIGURATION D.

HORIZONTAL BRACE. MINIMUM 2X4 SECURED TO EACH ATTIC FRAMING MEMBER WITH 3 EACH 3" FASTENERS.
1 HORIZONTAL BRACE FOR RETROFIT CONFIGURATIONS A, B, AND C.
2 HORIZONTAL BRACES FOR RETROFIT CONFIGURATION D.
ATTIC FRAMING MEMBERS

WALL BELOW

FASTENERS SHALL NOT BE PLACED CLOSER TO ENDS OF LUMBER THAN 2-1/2".
FASTENERS SHALL NOT BE PLACED CLOSER TO EDGES OF LUMBER THAN 1/2" EXCEPT WHERE STRAPS Dictate OTHERWISE.
THE NUMBER OF FASTENERS SHOWN IS NOT NECESSARILY THE NUMBER REQUIRED.

PLAN VIEWS

EXISTING STUD
RETROFIT CONFIGURATIONS A, B, AND C
EXTERIOR WALL

RETROFIT STUD
METAL STRAP
RETROFIT CONFIGURATION D
ATTIC FRAMING
HORIZONTAL BRACE
EXTERIOR WALL
EXISTING STUD

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FIGURE C104.2.3
OMITTED HORIZONTAL BRACE
OVERVIEW

PLAN VIEWS
RETROFIT CONFIGURATION A AND B ONLY
NOT ALLOWED FOR RETROFIT CONFIGURATION C OR D
UNIDENTIFIED NUMBERS INDICATE THE NUMBER OF FASTENERS.

ATTIC FRAMING MEMBERS

TRUSS GABLE END
- 4 EACH 1-1/4" FASTENERS

HORIZONTAL BRACES FULLY BUTTED TO EXISTING STUDS

2X8 STRONG BACK

CONVENTIONALLY FRAMED GABLE END
- 4 EACH 1-1/4" FASTENERS

STRONG BACK BUTTED TO RETROFIT STUD

2X8 STRONG BACK

2X6 HORIZONTAL BRACES

OMITTED HORIZONTAL BRACE LOCATIONS

DETAILS OF CONVENTIONALLY FRAMED GABLE

4 EACH 1-1/4" FASTENERS EACH SIDE INTO RETROFIT STUD

HORIZONTAL BRACE BUTTED EXISTING STUD

STRONG BACK BUTTED TO RETROFIT STUD

STRONG BACK SHALL EXTEND 2-1/2" BEYOND EDGE OF HORIZONTAL BRACE.

HORIZONTAL BRACE FASTENED TO FRAMING MEMBERS WITH 3" FASTENERS. 3 EACH AT 2 LOCATIONS AND 4 EACH AT A THIRD LOCATION. FASTENERS SPACED A MINIMUM OF 3/4" FROM EDGE OF HORIZONTAL BRACE AND A MINIMUM OF 1/2" FROM EDGE OF FRAMING MEMBER. FASTENERS SPACED A MINIMUM OF 1-1/4" FROM EACH OTHER.

STRAPS FASTENED TO HORIZONTAL BRACES WITH 1-1/4" FASTENERS AT EACH END OF EACH STRAP 9 FOR RETROFIT CONFIGURATION A AND 12 FOR RETROFIT CONFIGURATION B

2X8 STRONG BACK

4 @ 3" FASTENERS 2-1/2" APART AND 3/4" FROM LUMBER EDGES

2X6 HORIZONTAL BRACE
FIGURE C104.2.8 (1)
SPLICED HORIZONTAL BRACES
SECTION VIEWS

(a) 3 FASTENERS
2-1/2" MIN.
CEILING DIAPHRAGM

(b) A TOTAL OF 6 FASTENERS
OF 2 ROWS 2-1/2" APART
EACH WITH 3 FASTENERS
3 FASTENERS
2-1/2" MIN.
CEILING DIAPHRAGM

(c) A TOTAL OF 6 FASTENERS
OF 2 ROWS 2-1/2" APART
EACH WITH 3 FASTENERS
3 FASTENERS
2-1/2" MIN.
CEILING DIAPHRAGM

(d) A TOTAL OF 6 FASTENERS
OF 2 ROWS 2-1/2" APART
EACH WITH 3 FASTENERS
3 FASTENERS
2-1/2" MIN.
CEILING DIAPHRAGM

(e) A TOTAL OF 6 FASTENERS
OF 2 ROWS 2-1/2" APART
EACH WITH 3 FASTENERS
3 FASTENERS
2-1/2" MIN.
CEILING DIAPHRAGM

ALL FASTENERS 3"
FIGURE C104.2.8 (2)
SPLICED HORIZONTAL BRACES
SECTION VIEWS

A TOTAL OF 6 FASTENERS
OF 2 ROWS 2-1/2" APART
EACH WITH 3 FASTENERS

3 FASTENERS

2-1/2" MIN.

CEILING DIAPHRAGM

3 FASTENERS

2-1/2" MIN.

CEILING DIAPHRAGM

A TOTAL OF 6 FASTENERS
OF 2 ROWS 2-1/2" APART
EACH WITH 3 FASTENERS

3 FASTENERS

2-1/2" MIN.

CEILING DIAPHRAGM

2-1/2" MIN.

CEILING DIAPHRAGM

3 FASTENERS

2-1/2" MIN.

CEILING DIAPHRAGM

3 FASTENERS

2-1/2" MIN.

CEILING DIAPHRAGM

3 FASTENERS

2-1/2" MIN.

CEILING DIAPHRAGM

ALL FASTENERS 3"

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FIGURE C104.2.8 (3)
SPLICED HORIZONTAL BRACES
SECTION VIEWS

ALL FASTENERS 3"

CABLE END

3 FASTENERS

2-1/2" MIN.

CEILING DIAPHRAGM

3 FASTENERS

2-1/2" MIN.

CEILING DIAPHRAGM

3 FASTENERS

2-1/2" MIN.

CEILING DIAPHRAGM
<table>
<thead>
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<th>TRUSS FRAMING</th>
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<td>PLAN VIEWS</td>
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<tr>
<td>CONVENTIONAL FRAMING</td>
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<td>PLAN VIEWS</td>
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**STUD FACES PERPENDICULAR TO WALL**

(a) METHOD #1: FACE TO EDGE OR TO FACE METHOD OF C104.3.2
MINIMUM 1-1/2" PENETRATION OF FASTENER INTO SECONDARY MEMBER

(b) METHOD #2: FACE TO OFFSET FACE METHOD OF C104.3.3
MINIMUM 1-1/2" PENETRATION OF FASTENER INTO SECONDARY MEMBER

(c) METHOD #4 BUTTED RETROFIT STUD METHOD OF C104.3.4
MINIMUM 1-1/4" PENETRATION OF FASTENER INTO LUMBER

(d) METHOD #4: OFFSET RETROFIT STUD METHOD OF C104.3.5
MINIMUM 1-1/4" PENETRATION OF FASTENER INTO LUMBER

(e) METHOD #5: NAILER WITH RETROFIT STUD METHOD OF C104.3.6
MINIMUM 1-1/2" PENETRATION OF FASTENER INTO SECONDARY MEMBER

THE FIGURES DO NOT REFLECT THE NUMBER OF REQUIRED FASTENERS OR SHOW HORIZONTAL BRACES OR STRAPS. FASTENERS SHALL BE PLACED MAXIMUM 6" ON CENTER AND A MINIMUM OF 2-1/2" FROM ENDS. 3" FASTENERS CAN BE INSTALLED FROM EITHER SIDE OF LUMBER AS LONG AS THERE IS 1-1/2" FASTENER PENETRATION. ES INDICATES AN EXISTING STUD. RS INDICATES A RETROFIT STUD. N INDICATES A NAILER.
Appendix A
Original Engineering Drawings showing Gable End Retrofit Components and Connections.

WARNING: Some of these drawings have been superseded by others because of refinements in the retrofit measures that evolved since the drawings were made; however, with that warning, they are included because they may lend clarity to some of the topics discussed in the body of this Gable End Retrofit Guide.

Requirements
- The number of fasteners shall be specified on the table.
- Compression blocks shall be lumber no smaller than 2x4.
- The compression block must be long enough to accommodate the number of fasteners specified in the table.
- Fasteners must be a minimum of 2-1/2" apart along the length of the compression block.
- Fasteners must be a minimum of 1" apart from each other side to side.
- Fasteners must be a minimum of 1/2" from the edge of the compression block and the horizontal brace.
- Fasteners must be nails 10d in diameter or #8 screws.
- Fasteners must be no closer to the ends of the compression block than 2-1/2"
FIGURE A-1  SECTION VIEW OF CABLE END RETROFIT (TRUSS WALL)
FIGURE A.2  DETAILS OF STRAP & COMPRESSION BLOCK INSTALLATION – 2x4 RETROFIT STUD
Figure A-3: Details of Strap & Compression Block Installation - 2x6 Retrofit Stud
FIGURE A-4
DETAILS OF STRAP & COMPRESSION BLOCK INSTALLATION – 2x8 RETROFIT STUD
FIGURE A-5  DETAILS OF STRAP & COMPRESSION BLOCK INSTALLATION - (2) 2x8 RETROFIT STUD
Figure A-8 Section View of Gable End Retrofit (Conventional Framed)
EXISTING FRAMED GABLE END WALL

EXISTING STUD

MIN. (6) 1/4" LONG FASTENERS • FLAT STRAP ANCHOR WRAP

2x4 RETROFIT STUD – ATTACH TO EXISTING STUD W/ MIN. 3" LONG FASTENERS • 6" O.C.

COMPRESSION BLOCK TIGHT AGAINST EXISTING STUD (MAX GAP 1/8")

2x4 COMPRESSION BLOCK (MIN. 1 1/4" LONG) – ATTACH TO HORIZONTAL BRACE W/ (6) 3" LONG FASTENERS

FLAT STRAP ANCHOR – ATTACH TO HORIZONTAL BRACE W/ MIN. (6) 1/4" LONG FASTENERS

EXISTING FRAMING MEMBER

FLAT 2x4 HORIZONTAL BRACE

3/4" MIN.

MIN. (3) 3" LONG FASTENERS • HORIZONTAL BRACE CONNECTION TO EACH FRAMING MEMBER

FIGURE A-7 DETAILS OF STRAP & COMPRESSION BLOCK INSTALLATION – 2x4 RETROFIT STUD
FIGURE A-8 DETAILS OF STRAP & COMPRESSION BLOCK INSTALLATION – 2x6 RETROFIT STUD
FIGURE A-9 DETAILS OF STRAP & COMPRESSION BLOCK INSTALLATION – 2x8 RETROFIT STUD
FIGURE A-10 DETAILS OF STRAP & COMPRESSION BLOCK INSTALLATION – (2) 2x8 RETROFIT STUD
FIGURE A-11  DETAIL OF ANCHOR BLOCK INSTALLATION
NOTE:
Splice location may be required at top of gable end stud if height > 11'-0" to 12'-0"

FIGURE A-12 DETAIL OF RETROFIT STUD SPLICE
**FIGURE A-13** DETAIL OF LADDER BRACING FOR OMITTED RETROFIT STUD (TRUSS GABLE END)
FIGURE A-14 DETAIL OF LADDER BRACING FOR OMITTED RETROFIT STUD (CONVENTIONAL FRAMING)
**Figure A-15** Detail of Retrofit Ridge Tie Installation