



MIKE CAUSEY, INSURANCE COMMISSIONER & STATE FIRE MARSHAL
BRIAN TAYLOR, CHIEF STATE FIRE MARSHAL

August 24, 2022

Ms. Eurilynn Caraballo
Associate Residential Building Code Administrator
Mecklenburg County Code Enforcement
2145 Suttle Avenue
Charlotte, NC 28105

**RE: 2018 NC Residential Code Section R302.2.4 Structural independence
2018 NC Building Code Section 1609.1 Application**

Ms. Caraballo:

This letter is in response to your request for formal interpretation dated May 31, 2022, that was received in NCDOI by email on June 1, 2022. Your request for formal interpretation states:

“Does the code allow decreases in wind loads on townhouse engineered designs, based on the shielding by separate units?”

Clarification is needed to address designs with reductions on end units, middle units and/or all units in the building. The prescriptive bracing reductions are on the front face of the building, the sides of the building provide 100% of the prescriptive bracing requirements.

Section R302.2.4 indicates that townhouses (with two 1hr. separation walls) shall be structurally independent. Some engineers argue that end units and/or middle units can be designed to only provide 60% of the bracing required by the NCRC since they are shielded from the wind on one side. The 60% concept comes from ASCE-7 GCp values for windward and leeward walls values (.40 & -0.29) for flat roofs. Section 1609.1 of the NCBC states that decreases in wind loads shall not be made for the effect of shielding by other structures.”

Remarks:

Code sections noted in this letter are referring to the 2018 edition of the NC Residential Code and NC Building Code unless otherwise noted.

Attachment A is comprised of the request for formal interpretation as well as all supporting information submitted with the request.

Code Analysis:

For townhouses built under the 2018 NC Residential Code, 2018 NCRC Section R302.2.4 Structural independence states the following:

R302.2.4 Structural Independence. Each individual *townhouse* shall be structurally independent.

Exceptions:

1. Foundations supporting *exterior walls* or common walls.

2. Structural roof and wall sheathing from each unit fastened to the common wall framing.
3. Nonstructural wall and roof coverings.
4. Flashing at termination of roof covering over common wall.
5. *Townhouses* separated by a common wall as provided in Section R302.2.

Comments: Each townhouse shall be structurally independent and be capable of being removed without affecting the adjacent townhouse(s). Each townhouse is a separate building with a separate owner. In the event of a fire, alteration or renovation, the requirement for structural independence allows demolition and construction to be made to a townhouse without affecting the adjacent townhouse(s).

For townhouses built under the 2018 NC Building Code, 2018 NCBC Section 1403.3 Structural states the following:

[BS] 1403.3 Structural. *Exterior walls*, and the associated openings, shall be designed and constructed to resist safely the superimposed loads required by Chapter 16.

Comments: The structural requirements for the design and construction of code-compliant exterior walls are discussed in 2018 NCBC Chapter 16 Structural Design.

For townhouses built under the 2018 NC Building Code, 2018 NCBC Section 1609.1 Applications states the following:

1609.1 Applications. Buildings, structures and parts thereof shall be designed to withstand the minimum wind loads prescribed herein. Decreases in wind loads shall not be made for the effect of shielding by other structures.

Comments: This section provides the minimum criteria for the design and construction of buildings and other structures to resist wind loads. Decreases in wind loads shall not be made for the effect of shielding by other structures.

For townhouses built under the 2018 NC Building Code, 2018 NCBC Section 1609.1.1 Determination of wind loads states the following:

1609.1.1 Determination of wind loads. Wind loads on every building or structure shall be determined in accordance with Chapters 26 to 30 of ASCE 7 or provisions of the alternate all-heights method in Section 1609.6. The type of opening protection required, the ultimate design wind speed, V_{ult} , and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

Exceptions:

1. Subject to the limitations of Section 1609.1.1.1, the provisions of ICC 600 shall be permitted for applicable Group R-2 and R-3 buildings.
2. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AWC WFCM.
3. Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of AISI S230.
4. Designs using NAAMM FP 1001.

5. Designs using TIA-222 for antenna-supporting structures and antennas, provided the horizontal extent of Topographic Category 2 escarpments in Section 2.6.6.2 of TIA-222 shall be 16 times the height of the escarpment.
6. Wind tunnel tests in accordance with ASCE 49 and Sections 31.4 and 31.5 of ASCE 7.

The wind speeds in Figures 1609.3(1), 1609.3(2) and 1609.3(3) are ultimate design wind speeds, V_{ult} , and shall be converted in accordance with Section 1609.3.1 to nominal design wind speeds, V_{asd} , when the provisions of the standards referenced in Exceptions 4 and 5 are used.

Comments: This section requires that buildings be designed and constructed to resist the wind loads quantified in Chapter 26 through 30 of ASCE 7. Positive and negative external pressure coefficients are used for all wind directions and loading patterns in designing exterior walls in buildings, including townhouses. ASCE 7 notes in 27.1.4, 28.1.4 and 29.1.4 the following: "There shall be no reductions in velocity pressure due to apparent shielding afforded by buildings and other structures or terrain features."

Conclusions: *The 2018 NC Residential Code and the 2018 NC Building Code does not allow decreases in wind loads on townhouse engineered designs, based on the shielding by separate units. A single townhouse is considered a separate building that is structurally independent unless exceptions apply. Exceptions include the following: Double walls or common walls, foundations supporting exterior walls, double walls or common walls, structural roof and wall sheathing from each unit fastened to the double wall or common wall framing, nonstructural walls and roof coverings and flashing at termination of the roof covering over double walls or common walls.*

Please call or email if you have comments or questions.

Sincerely,



David B. Rittlinger, PE, LEED AP
Chief Code Consultant
NCDOT-OSFM Engineering & Codes Division

cc: File
Bridget Herring, Chair – BCC
Nathan Childs, Assistant Attorney General, Insurance Section, NCDOT
John Hoomani, General Counsel, NCDOT

ATTACHMENT A



**APPENDIX E
APPEALS
NORTH CAROLINA
BUILDING CODE COUNCIL**
325 North Salisbury Street, Room 5_44
Raleigh, North Carolina 27603
(919) 647-0095

APPEAL TO NCDOI/NCBCC Hearing Date ____ / ____ / ____
GS 153A-374, GS 160A-434 GS 143-140, GS 143-141
Formal Interpretation by NCDOI _____ Appeal of Local Decision to NCBCC _____
Appeal of Local Decision to NCDOI _____ Appeal of NCDOI Decision to NCBCC _____

APPELLANT Eurilynn Caraballo **PHONE** (704) 578 - 7811 x _____
REPRESENTING Mecklenburg County Code Enforcement
ADDRESS 2145 Suttle Ave.
CITY Charlotte **STATE** NC **ZIP** 28105
E-MAIL eurilynn.caraballoluccioni@mecknc.gov **FAX** (_____) _____ - _____

North Carolina State Building Code, Volume 2018 - Section R302.2.4 & 1609.1

REQUEST ONE: Formal Interpretation by NCDOI Appeal of Local Decision to NCBCC
 Appeal of Local Decision to NCDOI Appeal of NCDOI Decision to NCBCC

Type or print. Include all background information as required by the referenced General Statutes and the attached policies. Attach additional supporting information.

Does the code allow decreases in wind loads on townhouse engineered designs, based on the shielding by separate units?

Clarification is needed to address designs with reductions on end units, middle units and/or all units in the building. The prescriptive bracing reductions are on the front face of the building, the sides of the building provide 100% of the prescriptive bracing requirements.

REASON:

Section R302.2.4 indicates that townhouses (with two 1hr. separation walls) shall be structurally independent. Some engineers argue that end units and/or middle units can be designed to only provide 60% of the bracing required by the NCRC since they are shielded from the wind on one side. The 60% concept comes from ASCE-7 GCp values for windward and leeward walls values (.40 & -0.29) for flat roofs. Section 1609.1 of the NCBC states that decreases in wind loads shall not be made for the effect of shielding by other structures.

APPEAL TO NCDOI/NCBCC

Signature *Eurilynn Caraballo*

DATE: 5/31/2022 **FORM 3/14/17**

202.9 Appeals

202.9.1 Engineering Division. A written technical interpretation shall be provided as specified in Section 203.2.1.2. Any person may appeal in writing an order, decision, or determination pertaining to the code or any state building law by filing written notice with the Commissioner of Insurance or his designee within ten (10) days after the order, decision, or determination. A copy of the appeal shall be furnished to each party.
(General Statutes 143-140, 153A-374 and 160A-434)

203.2.1 Interpretations

203.2.1.1 Informal Interpretations. The Engineering Division shall provide informal interpretations on code related matters either by e-mail, letter or telephone. These informal interpretations may be accepted by the local code enforcement official or party requesting the interpretation. Either party may request a formal interpretation of the code.

203.2.1.2 Formal Interpretations. Any person may request in writing a formal interpretation of the code. The request shall be addressed to the Chief Code Consultant for the Department of Insurance. The request shall be specific and shall reference the code sections in question. All formal interpretations shall be in writing. A formal interpretation shall be binding on all parties unless appealed to the Building Code Council as specified in Section 201.9.2. Formal interpretations determined to be of a general nature may be posted on the Department website. (General Statute 143-140)

203.2.2 Appeals. Any person may appeal in writing an order, decision, or determination of a code enforcement official pertaining to the code or any state building law. The appeal shall be addressed to the Chief Engineer for the Department of Insurance by filing written notice within ten (10) days after the order, decision, or determination. The appeal shall contain the type and size of the building in question, the location of the building, and shall reference the code sections in question. The decision shall be in writing and shall set forth the facts found. The decision rendered shall be based on the technical provisions of the code, public health and safety and shall be construed liberally to those ends. A decision shall be binding on all parties unless appealed to the Building Code Council as specified in Section 201.9.2. A copy of the appeal and written decision shall be furnished to each party. (General Statutes 153A-374 and 160A-434)

202.9.2 Building Code Council. The Building Code Council shall hear appeals from the decisions of State enforcement agencies relating to any matter related to the code. Any person wishing to appeal a decision of a State enforcement agency to the Building Code Council shall give written notice of appeal as follows:

202.9.2.1 Twenty one (21) copies including an original of the Notice of Appeal shall be filed with the Building Code Council c/o NC Department of Insurance, Engineering Division, 325 North Salisbury Street, Room 5 44, Raleigh, NC 27603 and one (1) copy shall be filed with the State enforcement agency from which the appeal is taken.

202.9.2.2 The Notice of Appeal shall be received no later than thirty (30) days from the date of the decision of the State enforcement agency.

202.9.2.3 The Notice of Appeal shall be legibly printed, typewritten or copied and shall contain the following:

- (1) Name, address of the party or parties requesting the appeal.
- (2) The name of the State enforcement agency, the date of the decision from which the appeal is taken, and a copy of the written decision received from the enforcement agency.
- (3) The decision from which the appeal is taken shall be set forth in full in the Notice of Appeal or a copy of the decision shall be attached to all copies of the Notice of Appeal.
- (4) The contentions and allegations of fact must be set forth in full in a clear and concise manner with reference to the sections of the code in controversy.
- (5) The original Notice of Appeal shall be signed by the party or parties filing appeal.
- (6) The Notice of Appeal shall be received by the first day of the month prior to the Building Code Council's quarterly scheduled meeting in order to be placed on the agenda for that meeting. The Chairman may schedule a special meeting to hear an appeal.

202.9.2.4 Upon the proper filing of the Notice of Appeal, the Building Code Council Secretary shall forward one (1) copy of the Notice of Appeal to each member of the Building Code Council. The Chairman may appoint a Hearing Committee to hear appeals. The Secretary shall send notice in writing to the party or parties requesting an appeal and to the Building Code Council Hearing Committee members at least fifteen (15) days prior to the Hearing Committee meeting. A written decision of the Hearing Committee meeting shall be provided to all Building Code Council Members. The actions of the Hearing Committee shall be final, unless appealed to the full Building Code Council in writing within 30 days of the Hearing Committee's action. If a Hearing Committee consists of at least seven Council members, it will constitute a quorum of the full Council. Further appeals shall be as specified in Section 202.9.3.

202.9.2.5 The Building Code Council shall, upon a motion of the State enforcement agency or on its own motion, dismiss appeals for the following reasons:

- (1) Not pursued by the appellant or withdrawn;
- (2) Appeal not filed in accordance with these rules; or
- (3) Lack of jurisdiction.

202.9.2.6 When the Building Code Council finds that a State enforcement agency was in error in its interpretation of the code, the Building Code Council shall remand the case to the agency with instructions to take such actions as the Building Code Council directs. When the Building Code Council finds on appeal that materials or methods of construction proposed are equivalent to those required by the code, the Building Code Council shall remand the case to the State enforcement agency with instructions to permit the use of such materials or methods of construction. The Building Code Council shall immediately initiate procedures for amending the code to permit the use of such materials or methods of construction.

202.9.2.7 The Building Code Council shall provide a written decision setting forth the findings of fact and the Building Code Council's conclusions to each party or parties filing the appeal and to the State enforcement agency from which the appeal was taken.

202.9.3 Superior Court. Whenever any person desires to appeal a decision of the Building Code Council or a decision of a State or local enforcement agency, he may appeal either to the Wake County Superior Court or the Superior Court of the county in which the proposed building is to be situated in accordance with the provisions of Chapter 150B of the General Statutes.
(General Statute 143-141(d))

FW: [External] Formal Interpretation Request - Bracing



Yip, Pak
To: Rittlinger, David B
Cc: Caraballo Luccioni, Eurilynn; Jeff Vernon



Reply Reply All Forward Wed 6/1/2022 12:50 PM

Eurilynn,

I have forwarded your formal interpretation request to David Rittlinger, our Chief Code Consultant.

Please let me know if you have any questions.

Pak Keung Yip, P.E.
Chief Building Code Consultant



N.C. Department of Insurance
Office of State Fire Marshal
622 Mall Service Center
Raleigh, NC 27699-1202
919-647-0007

From: Caraballo Luccioni, Eurilynn <Eurilynn.CaraballoLuccioni@mecklenburcountync.gov>
Sent: Wednesday, June 1, 2022 12:45 PM
To: Yip, Pak <pak.yip@ncosfi.gov>
Cc: Vernon, Jeffrey D. <jeff.vernon@mecklenburcountync.gov>
Subject: [External] Formal Interpretation Request - Bracing

CAUTION: External email. Do not click links or open attachments unless you verify. Send all suspicious email as an attachment to Report Spam.

Please find attached a formal interpretation request on bracing requirements. This is a topic that we've been discussing for years. Some engineers have reached out to us with these questions. They believe that reductions should not be allowed, but to design them otherwise would put them at a competitive disadvantage in the market as many other designers are making some reductions on end units or in some cases all units. Note that the reduction are typically needed on the front face of the building. The sides of the building will provide 100% of the required bracing. I also want to clarify that these are not designed as shear walls, it is just an analysis to justify a reduction on a prescriptive brace wall.

Kind Regards,



EURILYNN CARABALLO, AIA
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Mecklenburg County Code Enforcement
Land Use & Environmental Services Agency
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Mobile 704-878-7811
Connect with us: [Web](#) | [Notify Me E-mail Updates](#)