



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

September 1, 2021

John Robert Harvey, RA Bueno Box Design, PLLC 1837 Academy St. Charlotte, NC 28205

RE: Occupied Roof and Mechanical Penthouse Related to the 3-Story Limit of the NC Residential

Code

2018 NCRC R101.2

Mr. Harvey:

This letter is in response to your request for formal interpretation dated August 18, 2021 that was received in NCDOI by email on that same date. Your request for formal interpretation states in my words:

Is an occupiable roof that also includes a mechanical penthouse considered a "story" with regards to Section R101.2?

Remarks:

Code sections noted in this letter are referring to the 2018 edition of the NC Residential Code (NCRC) unless otherwise noted.

Although your submittal form requested a "formal interpretation" and an "appeal of a local decision" this matter will be addressed as formal interpretation only as that provides the most opportunity for application and still addresses the matter of the appeal.

Attachment A is a copy of your request for interpretation. It is attached to this letter as a matter of reference.

Code Analysis:

Section R101.2 – Scope states:

R101.2 Scope. The provisions of the *International Residential Code for One- and Two-family Dwellings* shall apply to the construction, *alteration*, movement, enlargement, replacement, repair, *equipment*, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their *accessory structures* not more than three stories above *grade plane* in height. Single family *dwellings* otherwise permitted by this code shall include *bed and breakfast homes*.

Exceptions:

1. Live/work units located in *townhouses* and complying with the requirements of Section 419 of the *International Building Code* shall be permitted to be built as one- and two- family

dwellings or townhouses. Fire suppression required by Section 419.5 of the International Building Code where constructed under the International Residential Code for One- and Twofamily Dwellings shall conform to Section P2904.

2. Deleted.

Comment: The NCRC is limited to 3-stories by nature of the prescriptive structure that is present in the code. NCRC, Table R403.1(1), for example, only lists footings for up to 3-stories. NCRC, Table R602.3(5) is limited to stud height and spacing for 3-stories and a roof assembly.

Chapter 2 – Definitions states for "Attic":

Attic. The unfinished space between the ceiling assembly and the roof assembly.

Comment: The mechanical room in the proposed design does not meet this definition of "attic" because it is located on top of what would be the roof if the mechanical room were not present, but we will see later that the mechanical room does meet the requirements of a "penthouse" in the NC Building Code (NCBC).

Chapter 2 – Definitions states for "Story":

Story. That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above. A floor-resistant enclosure, designed to break away so as not to cause collapse, shall not be considered as a story when determining height.

Comment: The mechanical room is located on a floor with a roof above which meets the definition in the NCRC of a "story".

NC Building Code, Chapter 2 – Definitions states for "Penthouse":

Penthouse. An enclosed, unoccupied rooftop structure used for sheltering mechanical and electrical equipment, tanks, elevators and related machinery, and vertical shaft openings.

Comment: Using the NCBC definition for "Penthouse" a mechanical room or stair shaft termination above the roof line is not considered a story.

NC Building Code, Section 1510.1 states part:

1510.2 Penthouses. Penthouses in compliance with Sections 1510.2.1 through 1510.2.5 shall be considered as part of the story directly below the roof deck on which such penthouses are located. All other penthouses shall be considered as an additional story.

Comments: The proposed design in attachment A appears to comply with the requirements of 1510.2.1 through 1510.2.5 which would make the proposed design a 3-story building with a penthouse and thus able to use the NCRC.

Conclusions:

Based on the evidence of the above referenced code sections, an occupied roof or a mechanical penthouse are not considered a story with regards to applying the NCRC. However, the structure of a 3-story dwelling with a penthouse or occupied roof above the 3rd story is required to be engineered because:

 The NCRC does not address vertical planes (walls of the mechanical room and stair shaft) above 3-stories. The additional vertical planes will increase wind resistance (wind load) on the building that is not accounted for in the prescriptive requirements of the NCRC as well as dead load that is not accounted for in the stud and footing tables as well as girder and header tables. The NCRC is based on a maximum roof live load of 20psf (ref. and Table R301.5 – Minimum Uniform Distributed Live Loads and Table R301.2(1) – Climatic and Geographic Design Criteria).
 An occupied roof above a 3rd story introduces a 40psf live load that is not accounted for in the prescriptive structural requirements of the NCRC.

Please call if you have comments or questions.

Sincerely,

Carl Martin, RA

Deputy Commissioner

Division Chief of Engineering

cc: File

Bridget Herring, Chair – BCC Danny Priest, Vice-Chair – BCC

David Smith, Chairman – BCC Residential Standing Committee

Jeff Vernon – Mecklenburg County Code Enforcement

ATTACHMENT A



GS 153A-374, GS 160A-434

325 North Salisbury Street, Room 5_44 Raleigh, North Carolina 27603 (919) 647-0019 APPEAL TO NCDOI/NCBCC

Hearing (Date		
NCBCC			
PHONE (704)	<u>-421-26</u>	693 x	

Formal Interpretation by NCDOI Appeal of Local Decision to NCDOI						
APPELLANT John Harvey REPRESENTING Buenobox Design PLI ADDRESS 1837 Academy St	.C	PHO	NE (<u>70</u>	4- <u>421</u> -	2693 x	
CITY Charlotte E-MAIL rharvey@buenobox.com				ZIP_	28205	
North Carolina State Building Code, Volume	NCRC 2018	- Section	Chap	oter 2	_	
REQUEST ONE: Formal Interpretation by NCDOI Appeal of Local Decision to NCDOI		Appeal of Local Decision to NCBCC Appeal of NCDOI Decision to NCBCC				

GS 143-140, GS 143-141

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

Please see attached supporting documents.

REASON:

Mecklenburg county has disaproved my townhouse project citing a local interpretation signed by Jeff Vernon and stating that the mechanical space I have at the roof is a story and must be reviewed by the commercial review teal using the NCBC 2018. I disagree with the interpretation they have applied to my design. There may be portions of the design that still require tweaking but the request is specifically about whether or not what I have designed with the mechanical space falls within the NC Residential Code.

_				
	July Hang		8/17/2021	L TO NCDOI/NCBO
Signature _	/	DATE:	8/1//2021	FORM 3/14/17

BuenoBox 1837 Academy St. Charlotte, NC 28205 Tel 704.421.2693 www.buenobox.com



8/18/2021

For Project - Anderson St Townhomes

Dear Mr Carl Martin.

I am writing this letter to get an interpretation on whether or not what I have designed with a rooftop mechanical space should be considered a story and whether or not this should be reviewed using the North Carolina Residential Code (2018). In addition to my architecture drawings we have structural drawings created by a licensed and registered NC structural engineer per section R301.1.3.

I have designed this 4 unit townhouse with an accessible rooftop and a mechanical space next to the stair towers as shown in the plans. I have only included sheets I thought would be relevant to your interpretation. The mechanical space is unfinished and only accessible via ceiling attic access from the 3rd floor. In this design I have interpreted this to be an attic with attic access per evidence listed below. It could also be designed so that there is a door entering the mechanical room from the rooftop rather than an attic access. This would be easier and safer for maintenance. In this configuration it would be considered a mechanical penthouse as defined in the NCBC.

Evidence

NCRC 2018 states -

R301.1.3 Engineered Design

Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the International Building Code is permitted for buildings and structures, and parts thereof, included in the scope of this code.

A licensed NC structural engineer has provided an engineered design for this project.

[RB] ATTIC. The unfinished space between the ceiling assembly and the roof assembly.

The mechanical space is unfinished and is between the ceiling assembly and roof assembly. The NCRC makes no mention of roof style or slope. It also makes no mention of size or shape of the attic.

[RB] ATTIC, HABITABLE. A finished attic area meeting the definition of habitable space and complying with all of the following requirements:

The occupiable floor area is not less than 70 square feet (6.5 m2), in accordance with Section R304.

The occupiable floor area has a ceiling height in accordance with Section R305.

The occupiable space is enclosed by the roof assembly above, knee walls (if applicable) on the sides and the floor-ceiling assembly below.

[RB] HABITABLE SPACE. A space in a building for living, sleeping, eating or cooking. Bathrooms, toilet rooms, closets, halls, storage or utility spaces and similar areas are not considered habitable spaces.

What I have designed meets none of these requirements to be considered "Habitable". In a habitable attic NCRC still does not dictate the shape or style of roof. It states it is enclosed with a roof assembly above and knee walls IF APPLICABLE and a floor-ceiling assembly below. There is no reference to requiring the habitable attic to be a gable or hip roof. There is nothing excluding a low slope membrane roof or a single slope roof.

[RB] STORY. That portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above. A flood-resistant enclosure, designed to break away so as not to cause collapse, shall not be considered as a story when determining height.

ATTIC STORAGE. A floored area, regardless of size, within an attic space that is served by an attic access. Exception: A floor walkway not less than 24 inches (610 mm) wide or greater than 48 inches (1219 mm) wide that serves as an access for the service of utilities or equipment, and a level service space not less than 30 inches (762 mm) deep or greater than 48 inches (1219 mm) deep and not less than 30 inches (762 mm) wide or greater than 48 inches (1219 mm) wide at the front or service side of the appliance, shall not be considered as attic storage. Such floored area shall be labeled at the attic access opening, "NOT FOR STORAGE." The lettering shall be a minimum of 2 inches (51 mm) in height.

The definition of story defines the space between the floor and roof however an attic, habitable attic, attic storage is clearly not a story as defined by NCRC. Attic storage has a floor and a roof above exactly as I have designed the mechanical space. Per my interpretation an attic becomes a story when it exceeds the requirements of the definition of (Story, Attic) below. There is no mention of the shape of the attic. What has been designed is unfinished and served by an attic access. Per the definition there is no limitation on size for attic storage.

STORY, ATTIC. Any story situated wholly or partly in the roof, so designated, arranged or built as to be used for storage or habitation. If an attic that is accessible by a fixed stairway has a 7-foot clear height for greater than 50 percent of the floor area of the story below, then the space shall be considered as a story.

My interpretation of this is that an attic space shall be considered a story ONLY if accessible via fixed stairway, has a 7ft clear height for GREATER than 50% of the floor area of the story below. There is still no mention of roof shape, style or slope.

NC BUILDING CODE 2018 States -

[BG] 1510.2 Penthouses

Penthouses in compliance with Sections 1510.2.1 through 1510.2.5 shall be considered as a portion of the story directly below the roof deck on which such penthouses are located. All other penthouses shall be considered as an additional story of the building.

[A] 101.2 Scope

Exceptions: If any of the following apply the building or structure is exempt from the provisions of this code:

Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with the International Residential Code.

My understanding is that code officials are allowed to reference the NCBC for clarifications on things not clear in the NCRC. If this is correct and the question is whether or not a mechanical penthouse is a story or not then the NCBC has an exception excluding it from being a story. Even if I submitted to commercial plan review using the NCBC and used this exception it would be considered a 3 story building and per 101.2 of NCBC it shall comply with the international residential code (assuming NCRC). My interpretation of this leads me to believe that Mecklenburg county FORCING this to be reviewed using the NC Building Code by the commercial review team is non compliant with the above code sections. I also interpret this to mean a mechanical space with a man door access would be allowable in lieu of an attic access. This would be a preferred method for maintenance of the mechanical unit.

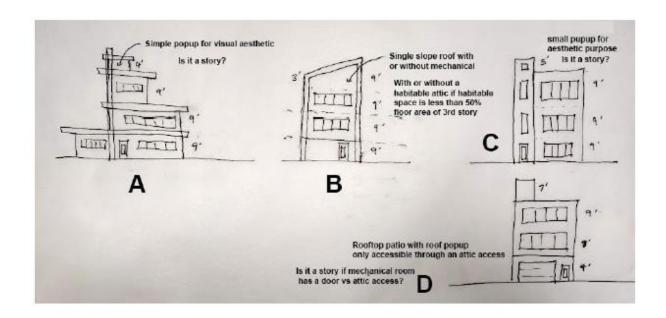
Final Thoughts

In my opinion I believe my design meets the intent of the 2018 NCRC and do not understand why a hip or gable roof is being enforced as a limitation. There are other parts of the Mecklenburg county interpretation that are not part of the NCRC such as requiring the habitable attic space be centrally located.

At the time of this letter Carl Martin at NCDOI has already stated informally that this design falls within NC Residential Code. Jeff Vernon with Mecklenburg county did not accept the informal ruling and requested a formal interpretation. A

From a life safety standpoint logically thinking this design poses no greater risk than if the mechanical space never existed. The mechanical space cannot be used for habitation and in emergency scenarios makes no difference when exiting a building. From a fire standpoint the portion of the mechanical space is still separated by the very same 2 hour wall as any other part of the building including the stair tower which is allowed. I cannot think of any situation this poses additional risk to the inhabitants of the home. My design actually poses less risk than a habitable attic (allowable by code).

In addition to clarifying whether or not a mechanical space as I have designed is a story it would also be helpful to get clarification on whether it is allowable to enforce a specific style of roof to be considered an attic. Per Mecklenburg County ONLY a gable or hip roof will be allowed to be considered an attic and single slope roofs are considered a story. There is no evidence of this standing in the code. I have included examples of multiple roof shapes that I would not consider a story that would be considered a story per Mecklenburg counties interpretation.



BOX DESIGN

CERT. NO. 53362

CAYARLOTTE.

MARKATAN TO THE PARTY OF THE PA

PARLOTTE

Thank you Carl for reviewing this and we eagerly await a response regardless of the outcome.

Thank you and have a great day.

Warm regards,

John Harvey

Principal

rharvey@buenobox.com

704-421-2693

Page 4



MECKLENBURG COUNTY CODE ENFORCEMENT

Residential Building Code Interpretation

SUBJECT:

R202 - Story, Attic Definition

REFERENCE:

NCRC 2018 - Chapter 2, R305

CODE DEFINITION:

STORY, ATTIC. Any story situated wholly or partly in the roof, so designated, arranged or built as to be used for storage or habitation. If an attic that is accessible be a fixed stairway has a 7-foot clear height for greater than 50 percent of the floor area of the story below, then the space shall be considered as a story.

INTERPRETATION:

The intent of the Story, Attic definition is to allow the use of attic space while upholding to the residential code's structural limitations of buildings to three stories. Per MCCE's interpretation:

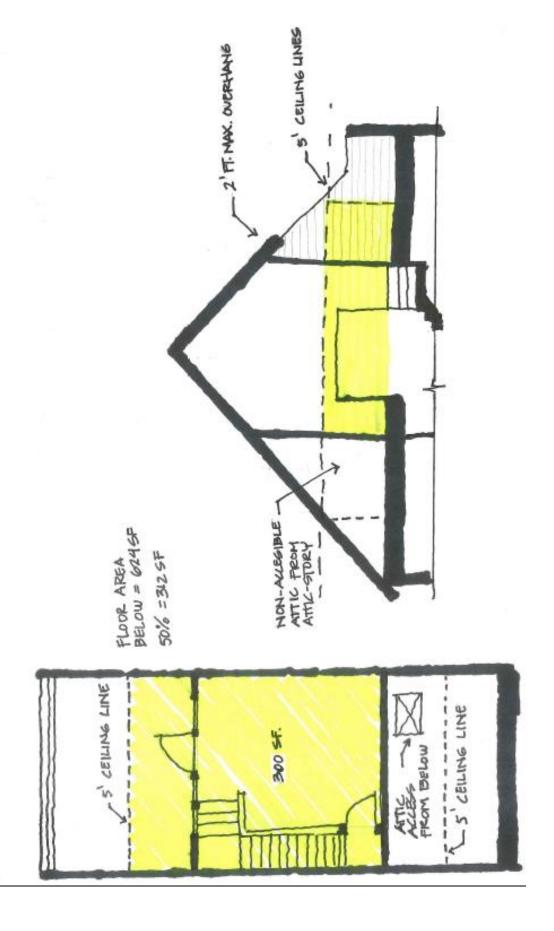
- The Story, Attic will be limited in size to 50% of the floor area below. The attic area shall be measured to the 7 ft. ceiling line.
- Only attics enclosed by gable or hip roofs meet the intent of code. Other roof profiles will be considered stories.
- The occupiable area of the Story, Attic shall be centrally loaded in the span of the joists below so that the ridge of the roof aligns within the middle third of the span.
- Dormers, window wells and mechanical wells are allowed, provided they are limited in size to comply with egress opening requirements and/or to the required mechanical clearances.
- Unenclosed roof terraces are not considered stories per code. A stair landing is allowed for access but it is limited to 25 sf max.
- Buildings with rooftop terraces on the same level of the attic can be allowed to have a maximum
 of one exterior wall on one side of the building, but the following conditions must be met as a
 tradeoff: (see attached examples)
 - The terrace is totally confined within the projected roof line
 - The 50% area limit will be measured to the 5 ft ceiling line of the projected roof line on both sides of the Story, Attic – the attic side as well as the roof terrace side.
 - No dormers or wells will be allowed on the remaining three sides of the building
 - Plans will include a sectional diagram showing compliance with all applicable items above.

APPROVED BY:

Jehr Vernon, MCP, CBO Building Code Administrator

Page 1 of 1

EXAMPLE |



EXAMPLE 2



