



Tara Hall

North Carolina Housing Finance Agency (NCHFA)

3508 Bush St

Raleigh, NC 27609

October 10, 2024

**RE: 2025 North Carolina Qualified Allocation Plan**

Dear Ms. Hall:

Phius Alliance North Carolina appreciates the opportunity to provide comments suggesting an amendment to the 2025 Qualified Allocation Plan (NC QAP).

Phius Alliance believes that the NCHFA should incorporate Phius into its QAP because:

- **Buildings that meet the Phius standard use up to 90 percent less energy for space conditioning than conventional buildings, and up to 60 percent less overall energy.**
- **Buildings constructed to the Phius standard provide superior indoor air quality, resilience during power outages, and an extremely quiet, comfortable indoor environment.**
- **Buildings constructed to the Phius standard require less maintenance and reduce the impact on community infrastructure and resources.**
- **Affordable Housing constructed to the Phius standard meets the intent embodied in Governor Coopers' Executive Order Number 246 by meeting and exceeding the Greenhouse Gas emissions targets set for 2030 in a socially equitable manner.**
- **Affordable Housing constructed to the Phius standard meets the intent embodied in Governor Cooper's Executive Order Number 80 by meeting and exceeding the Greenhouse Gas emissions target set for 2025.**

By including Phius, the NCHFA can make these benefits available to residents. The suggested amendments are as follows, with supporting data and resources included as appendices.



## 1. Suggested Amendments to the QAP

In addition to the current minimum requirement of meeting ENERGY STAR Multifamily New Construction Program, Phius recommends adding additional points, which would apply to projects meeting the Phius CORE standard.

Phius requests that in the 2025 Qualified Allocation Plan, developers should be allowed to pursue Phius CORE Certification to receive consideration for up to 25 points afforded on page 24 in Section IV.G.2(b) for Quality of Construction. See also “Exhibit A”, attached.

The specific suggested amendment (in bold, red, and italics) is as follows:

### G. DESIGN STANDARDS

1. THRESHOLD REQUIREMENTS
2. CRITERIA FOR SCORE EVALUATION (MAXIMUM 30 POINTS)
  - a. Site Layout: The Agency will award up to 5 points based on its evaluation of the site layout. The following characteristics will be considered.
  - b. Quality of Design and Construction: The Agency will award up to 25 points for new construction projects based on its evaluation of the quality of the building design, and the materials and finishes specified. The following characteristics will be considered:
    - i. The extent to which the design uses multiple roof lines, gables, dormers and similar elements to break up large roof sections.
    - ii. The extent to which the design uses multiple types, style, and colors of siding and brick veneer to add visual appeal to the building elevations.
    - iii. The level of detail that is achieved through the use of porches, railings, and other exterior features.
    - iv. Use of brick veneer or masonry products on building exteriors.
    - v. ***Achieve Phius CORE certification as a means to ensure Quality Construction.***

Phius requests that in the 2025 Qualified Allocation Plan, developers should be allowed to pursue Phius CORE Certification to receive consideration for up to 25 points afforded on page 24 in Section IV.G.2(b) for Quality of Construction. See also “Exhibit A”, attached.

The specific suggested amendment (in bold, red, and italics) is as follows:



## C. PROJECT DEVELOPMENT COSTS, RPP LIMITATIONS, AND WHLP

### 1. MAXIMUM PROJECT DEVELOPMENT COSTS (NEGATIVE 10 POINTS)

a. The Agency will assess negative points to applications listing more than the following in lines 5 and 6 of the project development costs (PDC) description, as outlined in Chart A below. The point structure in Chart B will apply to the following:

- all units are detached single family houses or duplexes,
- serving persons with severe mobility impairments,
- development challenges resulting from being within or adjacent to a central business district,
- public housing redevelopment projects, or
- building(s) with both steel and concrete construction and at least four stories of housing.

The per-unit amount calculation includes all items covered by the construction contract, ENERGY STAR, certifications for green programs, and any other costs not unique to the specific proposal.

#### Chart A

\$130,000 -10

#### Chart B

\$145,000 -10

***b. Projects seeking to achieve Phius CORE or Phius ZERO certification are exempt from receiving negative points listing more than listed above in Chart A and Chart B.***

## Rationale:

We believe that adding the Phius standard into the QAP makes sense for the following reasons:

1. Buildings built to the Phius standard undergo a rigorous certification process
2. Projects meeting the Phius standard provide a myriad of benefits to building residents
3. Cost data from work done in other states show that Phius projects are cost-competitive using traditional construction methods.
4. Energy Star MFNC, noted as a threshold requirement in the NC QAP, is directly aligned with the Phius standard. The proposed points are based on the relative stringency of the programs as shown by the diagram in Appendix C.
5. This amendment to the QAP will aid in developing a workforce in North Carolina that is well-prepared to deliver net-zero energy buildings of all building typologies, including affordable housing.
6. Maine's 2023-2024 QAP (found in [Appendix E, Table 3](#)) included a 3% increase to the per-unit price cap for projects seeking to achieve Phius certification. Maine's 2025-2026



QAP (found in Appendix E, Table 3) then removed the 3% increase by increasing the overall price cap by approximately 16%.

## Rigorous Certification Process

Buildings designed to the Phius standard achieve significantly higher energy performance compared against the energy code. The main standard, Phius CORE, is a system-wide, performance-based standard that aims to ensure that all the design components work together to achieve the intended energy savings through the use of comprehensive energy modeling, commissioning, and quality control.

## Benefits to Residents

While the Phius building standard sets real, certifiable benchmarks for energy conservation, the benefits reach far beyond performance:

**1. Comfortable Indoor Environment:** The integration of superinsulation, air-tight construction, and high-efficiency mechanical systems allow Phius buildings to maintain a comfortable interior temperature and comfortable humidity levels year-round as drafts and cold spots do not exist within the units. Not only are the units within a Phius certified multi-family building more physically comfortable for residents, but they consume up to 90% less energy on space conditioning than a building of similar construction. Utility bills are also significantly lower, with the monthly cost savings passed on to residents.

**2. Clean Air:** Phius buildings are thoroughly air-sealed, which provides two direct benefits. First, it prevents external air pollutants from leaking into the building. This is extremely important when buildings are located near areas with high automobile traffic or in neighborhoods with low air quality. Second, the mechanical systems included within a Phius project constantly cycle in fresh air, filter it, and circulate it throughout the buildings and the individual units. The continual replacement of interior air with fresh, filtered air rapidly removes odors and harmful airborne particles from the building. Finally, these mechanical systems maintain proper humidity levels, preventing the growth of mold and other respiratory irritants.

**3. Noise Reduction:** Superinsulated walls and triple-paned windows significantly increase the soundproofing capability of exterior walls. A joint study performed by NK Architects, a leading firm in Passive House design and SSA Acoustics, showed that exterior noise penetration in Passive House buildings is reduced by up to 10 decibels. Residents will experience a living environment twice as quiet as a typical building.



## Cost-Competitive

Data from other states have shown that the initial construction cost of Phius designed affordable housing, on average, is not greater than construction of a code-level building—although it does take some time for the market to adjust. The adoption of substantive Phius related incentives within a state’s QAP drives significant growth in the number of Phius certified projects, which ultimately reduces the cost.

The Pennsylvania Housing Finance Authority (PHFA) first included Phius in its 2015 QAP and that year, of the 39 multi-family projects awarded funding, 8 were Phius projects (26 projects were completed, of which 7 were passive house projects). As of 2021, 50 Phius multifamily projects are in various stages of development across Pennsylvania. As increasing numbers of designers and builders adopted the standard (number of CPHC and Builders here), costs decreased in turn. A measurable effect was observed within 3 years when Phius projects came in, on average, at a lower cost than conventional construction. Similar data, gathered in Massachusetts, shows that the incremental cost of a Phius certified project ranges between 1-4%. (See Appendix D)

More Phius projects in north Carolina would also bring down construction costs in a comparable manner, hence the need for incentives.

## Conclusion and Signatures:

Affordable housing projects designed to the Phius standard directly benefit residents through healthier environments and lower utility bills. These buildings place less demand on the utility grid and are better able to withstand outages due to extreme weather events. Finally, the initial cost for Phius buildings has proven to be competitive with code-built projects in states whose QAP’s promote it.

For these reasons, Phius Alliance believes that NCHFA should include Phius as part of its QAP. Phius Alliance respectfully requests that the QAP be modified as suggested above.

## Signatures

Name and Qualifications	Position/Title	Firm/Organization
	Interim Director of Sustainability and Energy Management	Appalachian State University



## **Appendix A: Introduction to Phius Alliance and the Phius CORE Standard**

Phius Alliance, the membership component of Phius (formerly Passive House Institute U.S.) Phius is a non-profit 501(c)(3) organization committed to making high-performance passive building the mainstream market standard. Phius trains and certifies professionals, maintains the Phius climate-specific passive building standard, certifies and quality assures passive buildings, and conducts research to advance high-performance building.

Project teams are increasingly adopting passive building principles and the Phius standard for single-family, multifamily, and commercial buildings to achieve Net Zero buildings, resulting in over 7,000 units certified, and totaling over 7.4 million square feet across North America.

Projects receiving the Phius certification<sup>1</sup> are not only among the most energy efficient buildings, but also reduce the energy burden on low-income households as well as local community resources and infrastructure, ensure a healthy living environment, and are durable. This combination of qualities leads to a longer, useful lifespan and provides resilience as Phius buildings will maintain their indoor temperature for a much longer time than comparable buildings built to minimum energy codes. Finally, as will be detailed in Appendix D, projects built to the Passive House standard are not more expensive to build.

All buildings built to the Phius standard foreground five principles:

- Using continuous insulation throughout the building envelope to minimize or eliminate thermal bridging.
- Building a well-detailed and extremely airtight building envelope, preventing infiltration of outside air and loss of conditioned air while increasing envelope durability and longevity.
- Using high-performance windows (double- or triple-paned windows, depending on climate and building type) and doors; solar gain is managed to exploit the sun's energy for heating purposes in the heating season and to minimize overheating during the cooling season.
- Using some form of balanced heat- and moisture-recovery ventilation to significantly enhance indoor air quality.
- Minimizing the space conditioning energy used because of lower space conditioning loads.

These principles ensure the energy efficiency and comfortable indoor environment of each project that receives certification.

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<sup>1</sup> Phius provides two certifications: Phius Core for buildings meeting the strict energy efficiency targets and Phius Zero for buildings which achieve net-zero performance.



For residential projects to reach Phius certification, they must also meet the criteria laid out in these pre-requisite programs:

- US Environmental Protection Agency (EPA) ENERGY STAR Program
- EPA Indoor airPLUS program
- EPA WaterSense Program
- US Department of Energy (DOE) Zero Energy Ready Home program
- ASHRAE 62.2 ventilation requirements

**In particular, Phius Alliance believes that the EPA WaterSense Program should be required of all projects submitting for the LIHTC given the very important need to conserve water in the state.**

All buildings seeking Phius certification go through a two-part process: design review and post-construction verification. This process ensures timeliness from design through build and that the construction of each project is thorough and matches the original design.

#### **PART 1:**

First, Phius certification staff reviews construction drawings, product specifications, and modeling to ensure that the building energy use is below the stringent values specified in the standard. In addition to reviewing energy performance, building envelope components and details are evaluated for moisture and condensation performance. After all issues are identified and resolved, the project is design certified.

#### **PART 2:**

After design certification, actual construction is reviewed on-site by a Phius-trained Rater/Verifier who ensures that the building is constructed to the pre-certified plans and that it meets the criteria of the programs listed above. If changes to the design occur, the modeling is updated, and the new energy use of the building must still meet the Phius standards for certification. This process ensures both quality construction and deep energy efficiency. As a result, multi-family homes built to the Phius standard provide superior comfort, health, excellent indoor air quality, and resiliency. The focus on quality assurance, quality control, and building sciences provides for a long-lasting building with lower maintenance costs.



## **Appendix B: Phius Buildings Provide Benefits Beyond Energy Savings Including Resilience and Reduction in Energy Burden.**

### **Energy Burden:**

Housing meeting the high energy efficiency requirements of the Phius standard, offer far lower energy costs over their lifetime, and thus provide a strong opportunity to reduce the energy burden for North Carolina's low-income residents.

According to the report, "Lifting the High Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low-Income and Underserved Communities" by the American Council for an Energy Efficient Economy, low-income residents in Charlotte face among the highest energy burdens in the country. The median energy burden in both cities is between 5 and 10% which is significantly higher than the median value for all residents, which stands at 4%.<sup>2</sup>

North Carolina has seen an increase in electricity prices year over year of 70% as of June 2022. This type of increase can be untenable for most low-income residents already living on thin margins. Living in a building built to the Phius standard would significantly lower that economic burden on residents over the life of the building.

Performance data compiled by Phius has shown that Phius buildings meeting the standard closely match the modeled/predicted energy savings calculated during the design stage. This data indicates that these buildings will use 40-60% less energy than a code-level building.<sup>3</sup> Preliminary benchmarking data from Boston and Philadelphia has found the same result.<sup>4</sup>

### **Resilience:**

Phius construction principles align with an increase in resilience. Phius buildings emphasize the reduction of air flow into and out of buildings along with the elimination of thermal bridges across the building envelope through the use of continuous insulation. This approach recognizes that the building's enclosure is like a battery that stores winter warmth and summer cooling. Maintaining the indoor temperature of a building at safe levels is particularly important in a climate subject to extreme temperatures. These buildings remain at safe and comfortable

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<sup>2</sup> Drehobi and Ross, "Lifting the Higher Energy Burden in America's Largest Cities: How Energy Efficiency Can Improve Low Income and Underserved Communities," Appendix B. April 2016  
<https://www.aceee.org/sites/default/files/publications/researchreports/u1602.pdf>

<sup>3</sup> Phius Monitored Projects Presentation; <https://www.phius.org/phius-monitored-projects-presentation>

<sup>4</sup> Apigian, Michele et al. *At the Finish Line: How Two Affordable passive Projects Crossed the Hardest Hurdles*; BuildingEnergy Boston, February 28, 2022  
[file:///C:/Users/phius/Downloads/bos22-202\\_at\\_the\\_finish\\_line%20\(4\).pdf](file:///C:/Users/phius/Downloads/bos22-202_at_the_finish_line%20(4).pdf)







## **Appendix D: Cost Effectiveness as Shown by Data from Projects in Pennsylvania and Massachusetts.**

The Phius standard is designed to achieve deep energy savings and cost savings both from a first cost and across the building's life cycle. Recent experience of the Pennsylvania Housing Finance Authority (PHFA) demonstrates that building an affordable, multi-family home to Phius standards does not result, on average, in a higher construction first cost per square foot once there is significant market adoption. Other states have seen this cost-reducing rapid market adoption as a result of incentivization in the QAP.

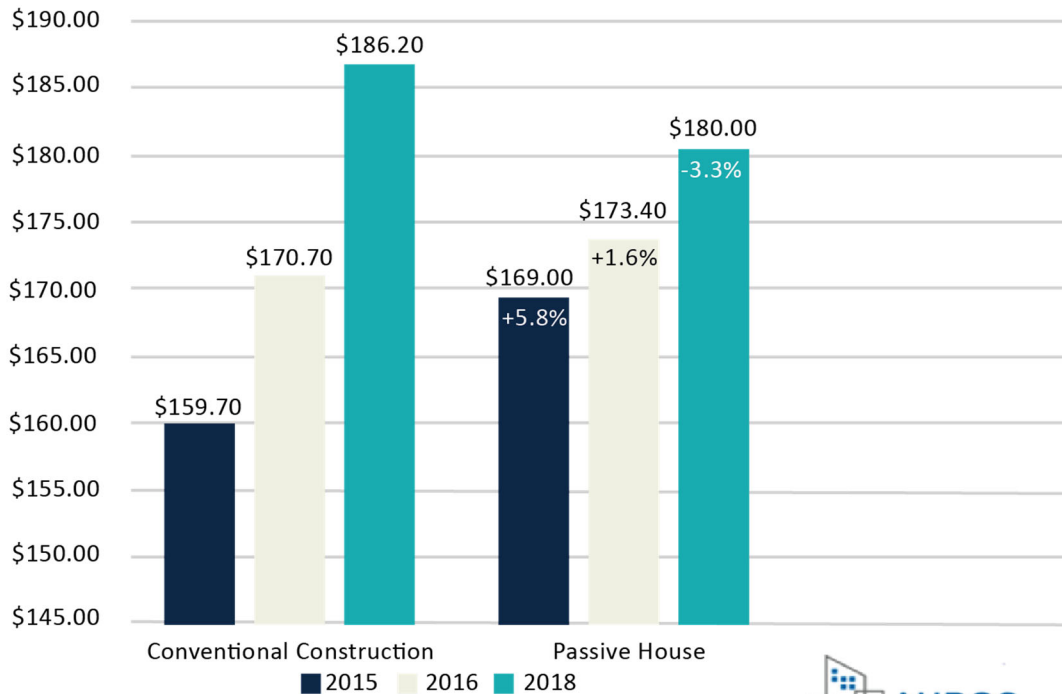
### **Pennsylvania:**

A comparison of the costs associated with passive house and non-passive house projects indicated that, on average, there was no cost premium in relation to building passive house certified projects. High efficiency housing meeting the Phius standard, offering far lower energy costs over their lifetime (and drastically reduced emissions), are thus a strong opportunity to reduce the energy burden for Texas' low-income residents.

A cost analysis by the PHFA found an important and intuitive result. The first few passive house projects were somewhat more expensive than conventional construction. **By the third round of projects (in 2018), Phius projects were, on average, less expensive than conventional construction.**

**TABLE 1 : Cost Comparison Between Passive House and Non-Passive House Projects<sup>5</sup>**

**Passive House Costs Less with Experience**



**Note:** Low-income housing tax credits were not awarded in 2017

**Source:** “How a PA affordable housing agency is molding ultra-efficient buildings mainstream” Pittsburgh Post-Gazette December 31, 2018 & Pennsylvania Housing Finance Agency (PHFA)

**Massachusetts:** the agency collected cost data in order to determine the incremental cost of building to the Phius standard as compared to the energy code. The agency found that the incremental costs for projects

A similar result has been found in Massachusetts. Massachusetts, through both its QAP and a robust incentive program, has seen a sharp rise in the number of multi-family buildings meeting the Phius standard (through 2021 there are 43 are in various stages of development). The Massachusetts Clean Energy Center funded a challenge to better understand the cost and energy savings of Phius projects. The agency provided incentives aimed at building 8 low-income multi-family structures to the Phius standard. For these 8 projects, it ranged between 1% and 4%. Following is a chart showing the individual incremental costs.<sup>6</sup>

<sup>5</sup> Source Pennsylvania Housing Finance Agency. <https://passivehouseaccelerator.com/articles/2019-new-gravity-housing-conference-july-1st-2nd>

<sup>6</sup> <https://www.masscec.com/emerging-initiatives/passive-house>



Project	Number of Units	Incremental Cost
Bartlett Station/Kinzie	52	1.0%
Depot Village/Hanson Village	48	4.1%
Finch Cambridge	98	1.4%
Harbor Village	30	1.8%
Mattapan Station	135	2.0%
North Commons	53	4.3%
Old Colony; Phase 3C	55	2.8%

## **Appendix E. Several states have included Phius in their QAP**

Over the last several years, multiple state housing agencies have recognized the value of constructing a building to the Phius standard and have included the Phius standard into their QAPs. Currently, 16 other states have explicitly included the Phius standard in their QAPs due to the significant benefits buildings meeting the Phius standard provide to its residents. See Table3.



**TABLE 3: States that Include Passive House in Their QAPs**

State	Agency	QAP Link
Arizona	Arizona Dept. of Housing	<a href="https://housing.az.gov/sites/default/files/documents/files/QAP%202022-2023%20-%20Final%2011.5.21.pdf">https://housing.az.gov/sites/default/files/documents/files/QAP%202022-2023%20-%20Final%2011.5.21.pdf</a>
California	California State Treasurer	<a href="https://www.treasurer.ca.gov/ctcac/programreg/2020/20201221/regulations.pdf">https://www.treasurer.ca.gov/ctcac/programreg/2020/20201221/regulations.pdf</a>
Connecticut	Connecticut Housing Finance Authority	<a href="https://www.chfa.org/assets/1/6/FINAL_2022-23_QAP_(July_2021).pdf?10215">https://www.chfa.org/assets/1/6/FINAL_2022-23_QAP_(July_2021).pdf?10215</a>
Delaware	Delaware State Housing Authority	<a href="http://www.destatehousing.com/Developers/lihtc/2021/2021_qap.pdf">http://www.destatehousing.com/Developers/lihtc/2021/2021_qap.pdf</a>
Idaho	Idaho Housing and Finance Association	<a href="https://www.idahohousing.com/documents/2021-final-qap-governor-approval-3-26-2021.pdf">https://www.idahohousing.com/documents/2021-final-qap-governor-approval-3-26-2021.pdf</a>
Illinois	Illinois Housing Development Authority	<a href="https://df7qosnywqs6g.cloudfront.net/wp-content/uploads/2021/09/QAP_2022-2023_Website.pdf">https://df7qosnywqs6g.cloudfront.net/wp-content/uploads/2021/09/QAP_2022-2023_Website.pdf</a>
Indiana	Indiana Housing and Community Development Authority	<a href="https://www.in.gov/ihcda/files/DRAFT-2022-2023-QAP.pdf">https://www.in.gov/ihcda/files/DRAFT-2022-2023-QAP.pdf</a>
Maine	Maine State Housing Authority	2023-2024: <a href="https://www.novoco.com/public-media/documents/maine-lihtc-qap-2023-2024-final-08012022.pdf">https://www.novoco.com/public-media/documents/maine-lihtc-qap-2023-2024-final-08012022.pdf</a> 2025-2026: <a href="https://www.mainehousing.org/docs/default-source/qap/2025-2026-qap.pdf?sfvrsn=a78d9e15_1">https://www.mainehousing.org/docs/default-source/qap/2025-2026-qap.pdf?sfvrsn=a78d9e15_1</a>
Massachusetts	Commonwealth of Massachusetts Department of Housing and Community Development	<a href="https://www.mass.gov/doc/2022-2023-qap/download">https://www.mass.gov/doc/2022-2023-qap/download</a>
Michigan	Michigan State Housing Development Authority	<a href="https://www.michigan.gov/mshda/-/media/Project/Websites/mshda/developers/lihtc/assets/liqap/mshda_li_qap_2022_2023_qap_final.pdf?rev=db31cac47b7d458ca72bf1783912f5d9&amp;hash=9BD84DFDED17EA8BE7F844791036B737">https://www.michigan.gov/mshda/-/media/Project/Websites/mshda/developers/lihtc/assets/liqap/mshda_li_qap_2022_2023_qap_final.pdf?rev=db31cac47b7d458ca72bf1783912f5d9&amp;hash=9BD84DFDED17EA8BE7F844791036B737</a>



**TABLE 3** *(continued)*

State	Agency	QAP Link
New Hampshire	New Hampshire Housing	<a href="https://www.nhhfa.org/wp-content/uploads/2020/03/2021-2022-Qualified-Allocation-Plan_FINAL.pdf">https://www.nhhfa.org/wp-content/uploads/2020/03/2021-2022-Qualified-Allocation-Plan_FINAL.pdf</a>
New Jersey	New Jersey Housing and Mortgage Finance Agency	<a href="https://nj.gov/dca/hmfa/dca/hmfa/developers/docs/lihtc/qap/tc_qap_proposed_2019_2020.pdf">https://nj.gov/dca/hmfa/dca/hmfa/developers/docs/lihtc/qap/tc_qap_proposed_2019_2020.pdf</a>
Pennsylvania	Pennsylvania Housing Finance Agency	<a href="https://www.phfa.org/forms/multifamily_program_notices/qap/2021/2021-lihtc-allocation-plan.pdf">https://www.phfa.org/forms/multifamily_program_notices/qap/2021/2021-lihtc-allocation-plan.pdf</a>
Rhode Island	Rhode Island Housing	<a href="https://www.rihousing.com/wp-content/uploads/2022-Final-QAP-ATT-B.pdf">https://www.rihousing.com/wp-content/uploads/2022-Final-QAP-ATT-B.pdf</a>
Vermont	Vermont Housing Finance Agency	<a href="https://www.vhfa.org/documents/developers/2022_qualified_allocation_plan_february_1_2021_signed.pdf">https://www.vhfa.org/documents/developers/2022_qualified_allocation_plan_february_1_2021_signed.pdf</a>
Virginia	Virginia Housing	<a href="https://www.novoco.com/sites/default/files/atoms/files/virginia-lihtc-qap-proposed-changes-2022-062021.pdf">https://www.novoco.com/sites/default/files/atoms/files/virginia-lihtc-qap-proposed-changes-2022-062021.pdf</a>