Number	Code section	Justification
1	IBC 1612.2 Design and construction	A modification is recommended to prohibit the use of structural fill to elevate buildings and foundations in Zone A flood hazard areas. Placement of fill may reduce the ability of floodplains to store and convey floodwater, sometimes increasing water levels. Using fill can also contribute to local drainage problems and have an adverse impact on native vegetation, wetlands, local drainage, infiltration, and water quality. The modification should allow earthen-filled stem walls. The objective of this modification is to limit the potential for increased water levels and associated adverse effects of placing fill material in a flood hazard area. Additional explanation and example language is provided in Section 5.3.9 of the source listed below. Source: Chapter 5, Reducing Flood Losses Through the International Codes (2019), Sec. 5.3.9, page 5-27.
2	IBC 1612.2 Design and construction	This section refers to the referenced standard ASCE 24, Flood Resistant Design and Construction. ASCE 24 specifies the design requirements for buildings and structures in flood hazard areas. The IBC requires applicants for buildings in flood hazard areas to assign a Flood Design Class in accordance with ASCE 24 (see Sec. 1603.1.7). Similar to risk categories, Flood Design Classes indicate the importance of buildings and is used to determine elevation requirements. The ASCE 24 table that defines the classes is included in "Highlights of ASCE 24-14" prepared by FEMA: https://www.fema.gov/sites/default/files/2020-07/asce24-14_highlights_jan2015.pdf ASCE 24 requires Flood Design Class 4 structures in flood Zones A/AE to be elevated or dry floodproofed to or above the base flood elevation plus 2 feet or the 500-year flood elevation, whichever is higher. Flood Design Class 3 structures must be elevated or dry floodproofed to BFE plus one foot (2 feet in Zone V and Coastal A Zones). A summary of the elevation requirements is included in "Highlights of ASCE 24-14." A modification is recommended for ASCE 24 relating to Critical and Essential Facilities in flood hazard areas. This modification would require that, to the extent feasible, all critical and essential facilities be located outside of the flood hazard area and outside of the 500-year floodplain. If feasible sites are not available outside of these areas, then critical facilities would have the lowest floor or level of dry floodproofing at or above the base flood elevation plus 3 ft. or the 500-year flood elevation plus 1 ft. whichever is higher. The requirements could be applied to both Flood Design Class 3 and Class 4, or just to Class 4. The objective of this modification is to reduce the potential for flood damage to critical and essential facilities, thus enhancing community resilience, increasing life safety and reducing disruption of vital socioeconomic activities. Additional explanation and example language is provided in Section 5.3.12 of the source listed below. Source: Chapter 5, Reducing Flood Losses Through the International Codes (2019), Sec. 5.3.12, page 5-30.
3	IEBC 1703.6.2 Tests and Inspection Records	Additional of language adding for timely distribution of concrete test results to the concrete producer. The purpose of the change is to improve the quality control of concrete performance, through the timely distribution of test results to the concrete producer. As part of the PA IBC Building Code requirements, Chapter 26 of ACI (section 26.12.3.1) notes that if the strength requirements are not being met "steps shall be taken to increase subsequent strength". This would not be not possible when test reports are not provided to the concrete producer promptly. ACI 318 Section 21.12.3.1(f) states: "All reports of acceptance tests shall be provided to the licensed design professional, contractor, concrete producer, and, if requested, to the owner and the building official." This proposed amendment is crucial to determine when such reports shall be provided. This proposal will enable a timelier response to: Detecting changes in concrete performance Recognizing testing variables which affect the test results Continuous application of code required acceptance calculations Critical adjustments to the mixtures before a potential issue occurs Assessing the contractor's level of control Making code required revisions to the overdesign values The proposed change is the second sentence noted below and included here as a reference to this justification submittal. 1703.6.2 Test and inspection records. Copies of necessary tests and special inspection records shall be filed with the building official. Any agency conducting tests on materials supplied for the project shall provide copies of test reports to both the registered design professional of record and the material supplier when reporting results to their client.

Number	Code section	Justification
4	IBC 1703.1.3 Personnel	**Add new Table 1703.1.1** Minimum Concrete Special Inspection and Technician Qualifications. This proposed addition to the Pennsylvania IBC was recommended for approval by the Building Code (IBC) Structural Technical Advisory Committee of the Pennsylvania Uniform Construction Code Review & Advisory Council (RAC) in May of 2020 as part of the 2018 ICC Code review. Procedural issues, not related to this proposal, prevented the RAC from voting upon this recommendation. In August and September of 2020, observations were made at 103 active construction projects across Pennsylvania. While these projected were supposedly being constructed in accordance with the PA IBC. the observations revealed that testing of concrete was only being conducted in accordance with the code requirements on 15% of the projects observed. This is an eighty five percent (85%) rate of non-compliance with the Pennsylvania Building Code (PA IBC). Unlike most other structural building materials, concrete does not arrive at the construction site in its final form. Therefore, improper testing and inspection may result in uncertainty and deficiencies regarding the performance of structural concrete. It is important that qualified individuals conduct concrete sampling, testing, and inspection to ensure proper performance. Establishing clear minimum qualifications for special inspectors and technicians will assist Building Code Officials and Licensed Design Professionals in understanding, documenting, and ensuring the proper qualifications of those charged with conducting these critical structural inspections and tests. Improper sampling and testing can lead to costly added testing and construction delays. In some instances, unnecessary removal and replacement of concrete. The latter may result in challenges to ensure proper structural integrity. A copy of the table that was recommended for approval by Building Code (IBC) Structural Technical Advisory Committee of the Pennsylvania Uniform Construction Code Review & Advisory Council (RAC) in May of 2020 is submitted with this justification submittal for reference below. CHAPTER 17 SPECIAL INSPECTIONS AND TESTS SECTION 1703 APPROVALS Add new language and Table 1703.1.3.1 as follows: 1703.1.3 Personnel. An approved agency shall employ experienced personnel educated in conducting, supervising TABLE 1703.1 MINIMUM CONCRETE SPECIAL INSPECTOR AND TECHNICIAN QUALIFICATIONS Category of Testing and Inspection Minimum Qualifications (refer to key at end of Table) Shop Testing or Inspection Field Testing or Inspection Review Testing, Certification, & Lab Reports Inspection of Fabricators Pre-cast concrete A, C, E Concrete Construction Special Inspection Reinforcing placement, cast-in-place bolts, post installed anchors concrete and shotcrete placement and curing operations. Inspection of formwork for shape, location and dimensions A, C, H Pre-stressing steel installation A, C, D, E Erection of pre-cast concrete members A, C, H Review certified mill reports A, C Verify use of required design mix A, I, J, H, C Pre-stressed (pre-tensioned) concrete force application A, C, E Post-tensioned concrete force application A, C, D Review of in-situ concrete strength, prior to stressing of tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs
5	IBC 509.3 Area Limitations	“Incidental uses shall not occupy more than 10 percent of the building area of the story in which they are located.” Incidental use can easily exceed 10% of the building area of the story in which they are located. This section should be deleted or the allowable amount increased, as the solutions to address associated incidental-use risks are fire rated separations, automatic sprinkler system or both.
6	IBC 420.3 Horizontal Separation	The intent of the IBC, to provide life safety and property protection, is to provide requirements for structures that protect the public. Current requirements of Section 420.3 Horizontal Separations should be improved using more robust materials that will provide for enhanced compartmentation and therefore less fire spread from one unit to the next. Thus providing enhanced life safety and property protection for occupants, emergency personnel and property protection in the event of a fire, flood, hurricane, tornado or any event that could cause damage to the multi-residential structure. These structures include but are not limited to townhouses, condominiums, assisted living facilities, campus housing, senior housing and others included in Group I-1, R-1 and R-2 occupancies. During and after a conflagration of a multi-residential structure, the community impacts are costly to the area of governance that are impacted with respect to fire and emergency equipment and personnel, traffic impacts during and after the event, effects on water and sewer utilities in the community, debris removal, and potential loss of revenue to businesses that are close to the conflagration. These impacts to the community must be considered when determining the appropriate building code requirements. We request a review of this section to add more robust building codes to increase resilient construction for all types of multi-residential structures. Technical rationale, insurance industry data as well as cost impact information will be supplied if it is deemed to proceed to the next level of review by the RAC for the benefit of all Pennsylvania citizens.

Number	Code section	Justification
7	IBC 420.2 Separation Walls	The intent of the IBC, to provide life safety and property protection, is to provide requirements for structures that protect the public. Current requirements of Section 420.2 Separation walls should be improved using more robust materials that will provide for maintaining the structure integrity of the wall system, thus providing enhanced life safety and property protection for occupants, emergency personnel and property protection in the event of a fire, flood, hurricane, tornado or any event that could cause damage to the multi-residential structure. These structures include but are not limited to townhouses, condominiums, assisted living facilities, campus housing, senior housing and others included in Group I-1, R-1 and R-2 occupancies. During and after a conflagration of a multi-residential structure, the community impacts are costly to the area of governance that are impacted with respect to fire and emergency equipment and personnel, traffic impacts during and after the event, effects on water and sewer utilities in the community, debris removal, and potential loss of revenue to businesses that are close to the conflagration. These impacts to the community must be considered when determining the appropriate building code requirements. We request a review of this section to add more robust building codes to increase resilient construction for all types of multi-residential structures. Technical rationale, insurance industry data as well as cost impact information will be supplied if it is deemed to proceed to the next level of review by the RAC for the benefit of all Pennsylvania citizens.
8	IBC 406.4	Adopt Sections R406.4, R406.7.1, R406.7.6 ANSI/RESNET/ICC 301—2019: Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index as printed in the 2021 IECC. ANSI/RESNET ICC 301 is the industry standard for calculating an Energy Rating Index (ERI). Utilizing other software tools that are not in accordance with this standard could lead to market confusion and inconsistency between the ERI scores calculated in one software tool versus another. The RAC should consider requiring the use of software tools that are in accordance with ANSI/RESNET ICC 301 because it will ensure consistent ERI scores statewide streamlining code compliance for builders and code officials.
9	IBC 403.2.3	Adopt R403.2.3 Building Cavities as printed in the 2021 IECC. Building cavities spaces as return air pathways are inherently leaky and sets builders up for challenges and failure of duct leakage tests. Even when all ducts are inside, leaky air return pathways can create pressure differentials within the home resulting in increased envelope infiltration. Air being pulled into these pathways from interstitial spaces, attics, crawl spaces, etc., may be of poor quality and negatively impact indoor air quality and occupant health. The RAC should consider removing language allowing building cavities spaces as return air pathways because they are usually not airtight, which reduces a home's energy savings increasing a homeowner's energy costs. These cavities also negatively impact the air quality inside the home because they can encourage the growth of mold in humid climates and can pull in polluted air from outside.
10	IRC R322.2.3 Foundation design and construction	A modification is recommended to prohibit the use of structural fill to elevate buildings and foundations in Zone A flood hazard areas. Placement of fill may reduce the ability of floodplains to store and convey floodwater, sometimes increasing water levels. Using fill can also contribute to local drainage problems and have an adverse impacts on native vegetation, wetlands, local drainage, infiltration, and water quality. The modification should allow earthen-filled stem walls. The objective of this modification is to limit the potential for increased water levels and associated adverse effects of placing fill material in flood hazard areas. Additional explanation and example language is provided in Section 5.3.9 of the source listed below. Source: Chapter 5, Reducing Flood Losses Through the International Codes (2019), Sec. 5.3.9, page 5-27.
11	IRC R322.2.3 Foundation design and construction	A modification is recommended to require certification by a registered design professional for foundation designs of dwellings in all flood zones to ensure that dwellings are designed for the site-specific conditions that contribute to flood loads, including water depth, velocity, waves, and debris impact. This modification will reduce the potential for damage caused by differential settling, local scour and erosion, and foundation failure due to flood induced loads and effects. Additional explanation and example language is provided in Section 5.3.10 of the source listed below. Source: Chapter 5, Reducing Flood Losses Through the International Codes (2019), Sec. 5.3.10, page 5-28.
12	!RC R106.1.4 Information for construction in flood hazard areas	Although Pennsylvania does not retain the IRC Chapter 1, similar provisions are in Title 34, Chapter 403. Therefore, this public comment recommends **adding to Sec. 403.62a, Item (d)**, an additional submittal requirement to require applicants for permits for one- and two-family homes to submit nonconversion agreements to acknowledge the restrictions on use of enclosures below elevated dwellings and to agree not to modify or convert the enclosures. This agreement should specify that the community has the right to periodically inspect inside of enclosures to ensure that the agreement has been upheld. Many jurisdictions that require nonconversion agreements require the agreements to be recorded on or with property deeds and other property records to inform future owners of the use limitations. The objective is to reduce the likelihood that owners, including future owners, might convert enclosures to uses other than permitted uses of parking of vehicles, storage, and building access. Discouraging illegal conversions will limit financial losses during future floods and prevent life safety concerns. Additional explanation and example language is provided in Section 5.3.5 of the source listed below. Source: Chapter 5, Reducing Flood Losses Through the International Codes (2019), Section 5.3.5, page 5-18.

Number	Code section	Justification
13	IRC 105.3.1.1 Determination of substantially improved or substantially damaged existing buildings in flood hazard areas 202 Definitions, Substantial Improvement, Substantial Damage	Although Pennsylvania does not retain the IRC Chapter 1, the requirement to take action on applications is in Title 34, Chapter 403 (Sec. 403.43 Commercial and Sec. 403.62 Residential). Therefore, this public comment recommends **adding an item to Sec. 403.63(b)** to specify the building code official must make determinations when work is proposed on existing buildings in flood hazard areas, and require compliance with the flood provisions of the code when that determination finds the proposed improvements or repairs constitute substantial improvement or repair of substantial damage. This is a basic requirement of the National Flood Insurance Program (and the I-Codes). Adding the definitions for “substantial damage” and “substantial improvement” that are in the IBC and IEBC will improve enforcement and compliance. In addition, this comment recommends requiring costs of all improvements and repairs be tracked over a specified period time and counted toward the Substantial Improvement determination. This would be accomplished by amending the definition for “Substantial Improvement” to specify the period of accumulation. The objective of this cumulative tracking of improvements, including additions and repairs, is to reduce flood losses over the long term. A period of one to five years discourages deliberate phasing of large improvement projects. While a longer period of accumulation would mean that existing nonconforming buildings are brought into compliance with current floodplain management requirements sooner than otherwise, thus increasing community resilience. Additional explanation and example language is provided in Section 5.3.7 of the source listed below. Source: Chapter 5, Reducing Flood Losses Through the International Codes (2019), Sec. 5.3.7, page 5-24.
14	IRC M1411.4	more consistant enforcement Where condensate pumps are installed they need to be interconnected with the equipment regardless of location. Pump failure could caause damage to structure or finished basements.
15	IECC R406.3 (.1), R406.1.1, R406.7 (.1-.3), and 2018 R406.6.4 and R406.6.5	It is not appropriate to continue using the 2015 IECC text related to the Energy Rating Index path. Since that version of the IECC, the 2018 and 2021 IECC have explicitly mentioned ANSI/RESNET/ICC 301 as the standard to be followed when calculating an ERI. This is critical to ensuring the ERI is calculated in a consistent manner. When considering the language, it would be important to use 2021 IECC text rather than 2018 since it references ANSI/RESNET/ICC 301-2019 (currently in use) and retains the same ERI values as the 2015 IECC. A notable deviation to be considered is removing the 2021 IECC R406.4 reference to Equation 4-2. That equation will likely be removed in the 2024 IECC and creates an unnecessary complication if retained.
16	IECC 408.2.4 Preliminary Commissioning Report	It is our request that the requirement for commissioning services should be determined by the project specific owner and/or tenant. Commissioning services are already available in the business community. Code mandating such services can dilute the industry with unqualified entities. This request was approved by the RAC Board during the last code cycle.
17	IECC R403.3.7	The Responsible Energy Codes Alliance ("RECA") requests the RAC to review section R403.3.7 of the 2021 IECC (which was R403.3.5 in the 2018 IECC) as an "additional section" to prohibit the use of building cavities as return ducts and plenums. Currently, the UCC only prohibits the use of building cavities as supply ducts. The IECC has prohibited the use of building cavities as all ducts and plenums since the 2012 edition of the IECC. This change is a common sense improvement to help ensure compliance with Pennsylvania's current duct tightness requirements and will help ensure a more comfortable and resilient home with better indoor air quality for Pennsylvania residents. According to the Pacific Northwest National Laboratory, building cavities used as return air plenums are probably the biggest duct leakage culprits in the HVAC industry today. Because cavity spaces are leaky, building pressure imbalances across the building envelope will occur, driving building infiltration. This causes indoor air quality issues. A cavity space used as a return air pathway will pull pollutants into the building from unknown sources. Additionally, by negatively pressurizing the walls, warm humid air could be drawn into the walls from the exterior, and condensation is likely to occur on the cooler air-conditioned surfaces. Another issue with using cavity spaces as return air pathways is fire safety. Building materials such as wood products do not meet the flame and smoke spread criteria as do approved duct materials. Using cavities as ducts is not a fire hazard in itself but will encourage a fire to spread throughout the building. See https://basc.pnnl.gov/resource-guides/building-cavities-not-used-supply-or-return-ducts#edit-group-description. RECA encourages the RAC to adopt the full 2021 IECC. In order to achieve full compliance with the model code's requirements for duct systems, the RAC should make Section 4.3.3.7 an "additional section" designated for review in the 2021 update process.