

Municipality of Anchorage

Exhibit B

Title 23 Significant Changes

Preface

Building codes are updated on a regular basis, typically every three years but this can vary. Anchorage is currently on the 2012 codes. We skipped the 2015 codes and are proposing to adopt the 2018 codes under this ordinance.

The codes proposed for adoption are comprised of over 4,000 pages of technical material. While the text in some chapters (like 23.10, The Anchorage Administrative Code) comprise a complete document, the text in other chapters consists of local amendments to international codes. For instance, Chapter 23.15 contains 27 pages of amendments to the International Building Code (IBC), a 725-page document. Since amendments amend specific sections in the IBC, they generally must be read in conjunction with the section amended to have context. Codes like the IBC adopt referenced standards. For example, the structural loads adopted by the IBC are contained in ASCE 7-10 (Minimum Design Loads for Buildings and Other Structures) which is a 593-page document. Given the volume and complexity of building codes and standards, there is no single expert, and one person cannot be expected to know everything. Consequently some 100 individuals, having relevant experience, participated in the review of the codes being proposed for adoption.

New versions of building codes typically have hundreds of changes, the vast majority of which have little to no significance. Some changes however are significant, and the purpose of this exhibit is to explain those changes.

Significant Changes

Chapter 23.10 – Anchorage Administrative Code

Section 23.10.104.3.5 Temporary and seasonal use permit cash bonds.

The requirement to post a \$5,000 bond for temporary and seasonal use structures has been deleted. Reasons:

1. The custody of cash bonds and certified checks takes disproportionate staff time.
2. We have other means through enforcement actions and property liens to incentivize timely removal and recoup costs if the MOA ends up having to remove the temporary structure.
3. During this Summer where outdoor business activity was highly desired to increase social distancing, it became apparent that the \$5,000 bond had a severe and disproportionate effect on smaller businesses.

Section 23.10.104.9 Optional residential single-family and two-family plan review.

Under this section an applicant can choose to have their house plans reviewed by private sector individuals in lieu of municipal plan reviewers. Even though the building official has the authority

to audit reviews conducted by the private sector, the following provision was added to make this explicitly clear:

H. The building official may audit reviews conducted by independent reviewing professionals as necessary to enforce the provisions of this code.

The department has experienced instances of fraud and poor-quality work under this private sector plan review option. Auditing is an essential tool in dealing with these situations.

Chapter 23.15 – International Building Code

Section 23.15.430.4.1 Existing licensed residential care assisted living facilities.

This is a companion provision to 23.45.1103.12 where the goal is to provide a reasonable level of safety to occupants in assisted living homes who are incapable of responding to a fire. The provision requires a fire sprinkler system be installed when a new license is issued. A new license is issued when a business changes hands. A detailed discussion is included under 23.45.1103.12.

Chapter 23.20 – International Mechanical Code (IMC)

No significant changes.

Chapter 23.25 – Uniform Plumbing Code (UPC)

No significant changes.

Chapter 23.30 – National Electrical Code (NEC)

Since the currently adopted 2017 NEC is not changing, there are no significant changes other than the proposed electric vehicle charging amendment discussed below.

23.30.210.52 Dwelling Unit Receptacle Outlets.

The following new amendment is being proposed:

Electric vehicle (EV) charging rough-in for detached one- and two-family dwellings and townhouses. Detached one- and two-family dwellings and townhouses require a minimum of one EV charging rough-in per dwelling unit. The rough-in shall include an adequately sized conduit or cable wiring method terminated in a J-box with cover. The panel shall have sufficient space and capacity to feed a 50 amp circuit with 9.6 KVA EV load. The outlet shall be located inside a garage when the dwelling is served by a garage, otherwise the outlet shall be located adjacent to onsite parking.

This provision is intended to reduce the cost and complexity of providing electric vehicle charging in new single-family homes. Given their mechanical simplicity, superior performance, lower fuel cost, no emissions, and eventual lower first cost, it is anticipated that electric vehicles will become common.

Chapter 23.45 – International Fire Code (IFC)

507.1 Required water supply.

Both the 2012 and 2018 International Fire Codes, section 507, require an approved water supply capable of supplying a minimum amount of water (quantity and flow rate) for fire protection to all premises upon which facilities, buildings or portions of buildings are constructed or moved. This requirement has been in fire codes adopted by the municipality for decades. Historically, the municipality has amended this requirement to exempt the following structures: detached one- and two-family dwellings, including accessory structures; Group U occupancies; structures constructed of at least one-hour fire resistive construction; and structures protected throughout by an automatic fire sprinkler system. Through time these amendments allowed construction to occur (as it presently does) on the Anchorage hillside and other areas of the municipality not served by a water utility. In order to fight fire in these areas the fire department must haul water to the fire site and suppress the fire before it spreads to surrounding wildland fuels where it could quickly grow out of control under favorable weather conditions. Suppressing a fire using hauled water takes considerably more time than using a utility water supply. As we have witnessed in other states, Canada, and even Alaska, a fire spreading out-of-control in an area having substantial wildland fuels and no fire suppression water can destroy hundreds and even thousands of homes.

The 2012 IFC committee chose to delete this long-standing amendment. They based their decision on a provision in the 2012 IFC, Appendix B, which states:

B103.3 Areas without water supply systems. For information regarding water supplies for fire-fighting purposes in rural and suburban areas in which adequate and reliable water supply systems do not exist, the fire code official is authorized to utilize NFPA 1142 or the International Wildland-Urban Interface Code.

Basically, the idea is that if you comply with either NFPA 1142 or the International Wildland-Urban Interface Code, the fire code official can waive the water supply requirement in IFC section 507.

NFPA 1142 is a standard on water supplies for suburban and rural fire fighting. This standard allows water to be transported to a fire; however the standard requires 4,000 to 10,000 gallons for the typical home and this water must be available within 5 minutes of arrival of the first apparatus to the incident. The fire stations serving areas (not served by a water utility) each have one tender and these tenders hold either 2,500 or 3,000 gallons. Given the distance between fire stations and the extent of our rural areas, the fire department cannot provide the amount of water required by NFPA 1142.

IFC section B103.3 also allows compliance with the International Wildland-Urban Interface Code (IWUIC) as an alternative to providing the code required water supply. This however is not a simple matter. First, the IWUIC requires wildland-urban interface areas be recorded on maps available for inspection by the public. Ideally these maps would qualify the hazard due to the type/density of vegetation (wildland fuels) and the slope of the terrain (topography). The IWUIC considers: water supply, fire apparatus access, fire hazard severity (wildland fuels, slope of the terrain and critical fire weather frequency), defensible space, automatic fire sprinkler systems, and ignition resistant construction. Under the IWUIC new subdivisions require an approved permanent water source, no exceptions. Infill lots may be developed without an approved water source provided mitigating measures such as defensible space, ignition resistant construction and/or automatic fire sprinkler systems are provided. The IWUIC provides compliance options to allow flexibility; however these options complicate application of the code. Options like defensible space are a moving target. If not actively maintained, wildland fuel will eventually take over. Given

the complexity of the wildland-urban interface, one cannot simply adopt the IWUIC by reference and expect consistent application of the code. The code would need to be formally adopted through a thorough public process involving all stakeholders, and the wildland-urban interface properly mapped to allow accurate and consistent application of the code.

The International Code Council, publisher the IWUIC, states the following: The IWUIC code is founded on principles intended to mitigate the hazard from fires through the development of provisions that adequately protect public health, safety and welfare; provisions that do not unnecessarily increase construction costs; provisions that do not restrict the use of new materials, products or methods of construction; and provisions that do not give preferential treatment to particular types or classes of materials, products or methods of construction.

Due to the deletion of a long-standing amendment and an unrealistic expectation that IFC section B103.3 adequately addresses the issue in our community, the Development Services Department has been in a quandary concerning the issuance of permits in areas not served by a water utility. These areas generally coincide with the wildland-urban interface.

In order to allow construction to continue in areas not served by a water utility, the 2018 IFC committee approved the following amendment:

23.45.507.1 Required water supply.

Amend Section 507.1 by adding the following exception:

Exception: In areas of the jurisdiction not served by a water utility the following structures do not require a water supply:

1. Detached one- and two-family dwellings regulated by the International Residential Code and protected throughout by an approved automatic fire sprinkler system;
2. Structures accessory to detached one- and two-family dwellings and regulated by the International Residential Code having 3,000 square feet or less gross floor area;
3. Structures classified as a Group U occupancy in accordance with the International Building Code having 3,000 square feet or less gross floor area;
4. Structures classified as a Group U occupancy in accordance with the International Building Code in excess of 3,000 square feet of gross floor area and protected throughout by an approved automatic fire sprinkler system;
5. Buildings protected throughout by an approved automatic fire sprinkler system and constructed of Type I-A or I-B construction in accordance with the International Building Code;
6. Buildings protected throughout by an approved automatic fire sprinkler system and constructed of Type II-A construction when Type II-B construction is allowed based on occupancy classification, allowable height and allowable area in accordance with the International Building Code;
7. Buildings protected throughout by an approved automatic fire sprinkler system and constructed of Type III-A construction when Type III-B construction is allowed based on occupancy classification, allowable height and allowable area in accordance with the International Building Code; and
8. Buildings protected throughout by an approved automatic fire sprinkler system and constructed of Type V-A construction when Type V-B construction is allowed based

on occupancy classification, allowable height and allowable area in accordance with the International Building Code.

The significant difference between this proposed amendment and previous amendments is the requirement for a fire sprinkler system. The reason for the sprinkler system is their proven ability to contain a fire and thus prevent it from spreading to the wildland fuel.

This proposed amendment allows construction to continue in areas having no fire water, like the Anchorage hillside. By requiring a fire sprinkler system in new buildings, the wildfire risk associated with new development is somewhat mitigated. Overall however this amendment does not address the potential for massively destructive wildfire in the Anchorage wildland/urban interface where thousands of homes are located amongst a dense fuel source and where there is no fire water. A warming climate may only exacerbate the situation. Consequently, the municipality should consider adopting a code designed to mitigate fire hazard in the wildland-urban interface such as the IWUIC.

23.45.903.4 Sprinkler system supervision and alarm.

23.45.907.6.6 Monitoring.

The proposed amendments require fire sprinkler and alarm systems serving Group R-3 and R-4 assisted living homes be monitored for alarm, supervisory and trouble by a third party. The estimated initial/install cost is \$3,000 and the annual monitoring cost is roughly \$600 per home.

Monitoring automatically notifies the fire department in an alarm condition allowing for rapid response. Monitoring also notifies the third-party monitoring agency in a trouble condition, such as someone closing an essential valve, or taking the system offline. Hence monitored fire life safety systems are more likely to perform as intended in an emergency.

23.45.1103.11 Monitoring.

The proposed amendment is retroactive and requires all existing fire sprinkler and fire alarm systems that are currently not monitored be monitored by a third party. Group I (institutional) and R (residential) occupancies are required to comply by January 1, 2023. Other occupancies are required to comply by January 1, 2025. Estimated first cost is \$700 to \$3,000 depending on system configuration.

23.45.1103.12 Group I-1, R-3 and R-4 occupancies.

The proposed amendment is retroactive and requires existing assisted living homes (Group R-3 and R-4) and institutional facilities (Group I-1) install a fire sprinkler by January 1, 2024. This requirement is due to the inability of homes to evacuate residents within a safe amount of time.

Background:

According to the State of Alaska, Department of Health and Social Services, Residential Licensing section, non-ambulatory residents from around the state tend to end up in Anchorage assisted living homes due to ready access to medical facilities. These assisted living homes are typically single-family residences housing up to 5 residents. The IFC, as amended, requires occupants in assisted living homes (having no fire sprinkler system) be able to evacuate in under 3 minutes. Why 3 minutes? Research conducted UL demonstrates that 3 minutes is all the time we may have to evacuate a modern home fire. Modern homes (with open floor plans, constructed of light weight engineered lumber and furnished with modern furnishings) burn up to

8 times faster than older homes. Where older homes generally allowed 17 minutes of evacuation time, newer homes may allow only 3 minutes to safely get out. This 3-minute evacuation has proven to be impractical in age-in-place assisted living homes where occupants cannot evacuate under their own means. According to the State of Alaska, Department of Health and Social Services, Residential Licensing section, non-ambulatory residents almost never can evacuate in 3 minutes. The Anchorage Fire Department continues to encounter homes where residents cannot evacuate in 15 minutes, let alone 3 minutes.

The state issues 3 types of residential care licenses as follows:

- License for seniors/physically disabled (SS). Residents can be non-ambulatory.
- License for developmentally disabled/mental health (DD/MH). Residents are required to be ambulatory; however mental impairment can affect their ability to respond to an emergency. Mental impairment can also increase the risk of fire from improperly discarded cigarettes, unattended cooking, arson, etc.
- License allowing care for either category (DU). Residents can be non-ambulatory.

In March 2020, the numbers were as follows:

- 317 assisted living homes caring for 3 to 5 residents.
- 161 homes licensed to care for non-ambulatory residents (SS and DU). Of these 121 homes do not have a fire sprinkler system. Of these un-sprinklered homes 104 provide care for 5 residents.
- 156 homes licensed to care for developmentally disabled/mental health residents (DD/MH). Of these 118 homes do not have a fire sprinkler system. Of these un-sprinklered homes 56 care for 5 residents.
- Estimated cost to install a fire sprinkler system is \$20,000 to \$40,000 per facility. Since the average reimbursement per resident is \$6800 per month, a home with 5 residents receives around \$30,000 in revenue per month.

Note that the International Residential Code, section R313 requires a fire sprinkler system in all new homes (not just assisted living homes). Anchorage does not adopt this provision, which became effective in 2011. Residential occupancies are the number one group of occupancies that suffer loss of life during fire events. In the event of fire, home sprinkler systems reduce the risk of dying by 80%. Research conducted by UL and the Research Council of Canada demonstrated that modern light weight (engineered wood) construction burns faster and fails quicker than old conventional dimensional lumber construction. This information was a major driver behind the IRC mandate for fire sprinkler systems in new homes.

Chapter 23.60 – International Energy Conservation Code (IECC)

Since the amendments produced by code committees significantly relax provisions in the 2018 IECC, we do not anticipate changes to the commercial provisions to be considered significant from a first cost (construction) perspective.

Residential energy conservation provisions were not adopted under the current 2012 codes. Residential provisions are proposed for adoption under this ordinance, but not under Chapter 23.60 (the IECC). Residential provisions were reviewed by the residential (IRC) code committee and are proposed for adoption under IRC Chapter 11. See Chapter 23.85 discussion.

Chapter 23.65 – International Existing Building Code (IEBC)

As the result of information learned from the earthquake, a couple of amendments were passed by the IBC/IEBC code committee.

23.65.302.7 Abandoned equipment

Amend section 302 by adding the following section:

302.7 Abandoned equipment. Equipment no longer in use and suspended over occupied space shall be removed.

It's common practice to abandon equipment no longer being used in place. Most of this equipment was installed prior to the enforcement of modern seismic restraint requirements. During a strong earthquake this equipment can break loose and smash into adjacent piping causing water leaks and extensive water damage. It can even fall through the ceiling into the space below, creating substantial risk to building occupants. We know of an instance during the November 30 earthquake where an abandoned air-conditioning unit weighing in excess of 1,000 pounds fell through a drop ceiling into the office space below. By luck it did not land on someone. Given the safety and economic implications abandoned equipment represent in our high seismic zone, the design professionals on the building code committee believe this proposed amendment should become code.

23.65.302.8 Existing acoustical tile and lay-in panel suspended ceilings.

Amend section 302 by adding the following section:

302.8 Existing acoustical tile and lay-in panel suspended ceilings. Suspended ceiling systems exceeding 144 square feet in area and undergoing repair, modification, raising or lowering of the grid, or where more than 50 percent of the tiles are replaced shall be evaluated for compliance with the seismic provisions of ASCE 7. Noncompliant ceiling systems shall be seismically restrained in accordance with ASCE 7. The suspended ceiling system area is the area of ceiling bounded by walls, partitions, soffits, or seismic separation joints.

Exception: Where the grid is not being replaced, two-inch wide perimeter support closure angle and seismic separation joints are not required.

The building Code requires new drop ceiling systems be seismically restrained. Drop ceilings in many (if not most) existing buildings are not seismically restrained. The existing building code does not provide direction on how to address existing noncompliant drop ceilings. Many noncompliant ceilings failed during the November 30 earthquake resulting in costly repairs and lost time for businesses, schools and institutions. When ceilings fail, objects can fall on occupants below. The intent of this provisions is to make existing buildings safer and reduce the social/economic implication of downtime following an earthquake.

Chapter 23.70 – Abatement of Dangerous Buildings Code

No changes to this chapter.

Chapter 23.75 – American National Standards Institute/American Society of Mechanical Engineers ANSI/ASME A17.1 2016 Safety Code for Elevators and Escalators

Since the currently adopted version is not changing, there are no changes.

Chapter 23.76 - American National Standards Institute/American Society of Mechanical Engineers ANSI/ASME A18.1-2017 Safety Standard for Platform Lifts and Stairway Chairlifts

Since the currently adopted version is not changing, there are no changes.

Chapter 23.85 – International Residential Code (IRC)

Section R302.13 Fire protection of floors.

First, there is no change to this section. The fire protection of floors requirement is currently in place in the MOA. The IRC committee proposed an amendment that would not require fire protection over an unfinished basement as-long-as the basement is not used for storage. Since this is impossible to police, and since this is a life-safety issue potentially impacting occupant's ability to evacuate and first responder's ability to perform search and rescue during a fire, the administration has not included the proposed committee amendment in this ordinance. This proposed amendment defeats the purpose of the code requirement.

The requirement for fire protection of floors is the result of injury and death to firefighters conducting search and rescue operations during home fires. This requirement, which was new to the 2012 IRC, is due to modern light weight construction (particularly wood I-joists) failing in a relatively short period of time when exposed to fire. A simple google search reveals numerous instances of firefighters falling thru floors. The intent of the provision is to allow occupants sufficient time to evacuate and allow reasonable safety to firefighters performing search and rescue operations. As previously mentioned, research conducted by UL and the Research Council of Canada demonstrated that modern light weight (engineered wood) construction burns faster and fails quicker than conventional dimensional lumber construction.

This provision typically ends up applying to floor assemblies located over unfinished basements and basically requires the I-joints be protected by a single layer of ½ inch gypsum wall board. The provision does not apply to crawlspaces, areas protected with a fire sprinkler system and floor assemblies constructed from traditional dimensional lumber (i.e. 2x10s or 2x12s). Also, fire-retardant-treated I-joists are now available that do not require gypsum wall board protection.

23.85.R802.12 Wood frame roof attachment at eave – blocking.

Truss Blocking Option #5.

Under the adoption of the (current) 2012 codes, the Assembly amended truss blocking option #5 at the request of AHBA. The end result is a less robust structural connection between the roof diaphragm and exterior walls. In the interest of earthquake resiliency, this 2012 amendment should be reversed.

Attic Ventilation and Truss Blocking:

Proper installation of full-height truss blocking makes homes stronger thus allowing them to better resist earthquakes and extremely strong wind. The reason is full-height truss blocking

creates a robust load path to transfer wind and seismic forces between the roof diaphragm and the exterior walls. Unlike partial height blocking, full height blocking is nailed to both the wall top plate and the roof deck. Partial height blocking is not nailed to the roof deck because there is a 1.5 to 2 inch gap between the top of the block and the roof deck.

The cost difference between full height and partial blocking is minimal at best compared to the cost to frame a house. A full height block is typically cut from a 2x12, has a beveled top and four 2 inch diameter holes covered by insect screen to allow ventilation. These blocks are mass produced by SBS. A partial height block is typically cut from a 2x10. The labor to install the block is the same, other than the roof deck nailing into the full height block which occurs when the roof is covered with plywood, and insect screen must be field installed for the partial height block.

The only significant argument against full height blocking is the potential for ice damming. Ice damming is caused by an excessive amount of heat entering the attic from the living space. Stack effect (the tendency of warm air to rise) is the driving force. Sufficient insulation and proper installation of a well-sealed ceiling vapor retarder is essential to minimize heat entering the attic. Attic ventilation, typically via eave and ridge vents, then allows the attic temperature to remain close to ambient temperature thus avoiding ice-damming conditions. Homes lacking a quality vapor retarder installation can have excessive heat entering the attic. Some feel the solution is to throw a lot of ventilation at the problem, hence the request by AHBA to allow partial height blocking in all circumstances. Because stack effect is the driving force, installation of a small continuous duty exhaust fan can eliminate ice-damming by reversing the stack effect. This was demonstrated through the AHFC weatherization program. This fan is typically either a toilet room or a crawlspace exhaust fan.

Homes are being constructed every day using truss blocking options 1 through 4 and not experiencing ice damming. The builder must pay attention to the details like a well-sealed ceiling vapor retarder, sealed light fixtures, etc to minimize the amount of heat and moisture entering the attic.

The MOA provides 5 blocking options under 23.85.R802.12. Prior to adoption of the 2012 codes, Option 5 could be used when it was demonstrated through calculations that the roof diaphragm shear was less than 125 plf for wind loads and 89 plf for seismic loads. This option typically worked for simple roofs. The Assembly deleted the requirement to check the loads, thus allowing the use of option #5 in all cases, no matter how large the loads may be. This decision was not based on science or engineering, is not in the best interest of the home owner, and should be corrected.

Truss blocking timeline in Anchorage:

- When muni started enforcing full height truss blocking in the early 1990s, the standard design of (3) 1.5 inch holes per block was insufficient. In many cases it didn't even meet the minimum code requirement for ventilation. This was exacerbated by the general poor quality of vapor retarder installations at the time and the popularity of ceiling mounted recessed-can type light fixtures. The requirement has since been updated to specify (4) 2 inch diameter holes per block (Handout RD.13, Option 1).
- The MOA next allowed a continuous 1.5 to 2 inch air space above every other block while the full height blocks had holes (RD.13, Option 2).

- Working with the home builders the MOA next developed two additional blocking options that allow a 1.5 to 2 inch airspace above all blocks where additional blocking is installed either inside or outside the attic (RD.13, Options 3 and 4). **Note that Use of Options 3 and 4 provides a continuous 1.5 to 2 inch airspace above all truss blocking just like Option 5.**
- Finally, working with the home builders the MOA developed Option 5 which allows a continuous 1.5 to 2 inch airspace above all truss blocking when the roof diaphragm shear stress is less than 125 plf for wind and 89 plf for seismic loads. Unlike options 3 and 4, no additional blocking is required which saves time/money. This option generally works on simple roofs. Complex roofs can have concentrated wind and/or seismic loads that require a more robust load path where option 3 would be more applicable.
- Note that ventilation is not the whole story. In order to ensure no ice build-up on eaves the builder must:
 - Pay attention to the installation of the insulation baffles so they do not block the ventilation openings.
 - Do a quality job on the installation of the ceiling vapor retarder to minimize the amount of warm air stack-drafting up into the attic.
 - Pay attention to light fixtures installed in the ceiling. Recessed can type light fixtures with incandescent or halogen bulbs can put significant heat into the attic.

IRC Chapter 11 – Energy Efficiency

For what best can be described as political reasons, Anchorage currently has no energy efficiency standards for residential construction. We adopt the International Energy Conservation Code (IECC); however, it has been amended to not apply to residential construction. Under this ordinance the administration is proposing to adopt the energy efficiency provisions in IRC Chapter 11, which are basically the same as those in the IECC. The proposed amendments are intended to align Anchorage's code with AHFC requirements. Note the two codes are not identical because the proposed Anchorage amendments allow more flexibility in demonstrating compliance.

Adoption of energy efficiency provisions reduces heating cost, reduces the amount of carbon entering the atmosphere and extends the availability of the finite natural gas resource. Energy efficiency requirements are also healthy for the local economy because money not wasted on fuel can be spent on other things.

All homes built to qualify for AHFC financing will comply with the proposed energy efficiency provisions. Residential contractors currently building in accordance with AHFC requirements will not be affected by the adoption of the proposed standards. Since entry level homes are typically built for compliance with AHFC standards in order to qualify for AHFC financing, this is not an affordable housing issue. Only those homes not built to qualify for AHFC financing will *potentially* be impacted by requiring compliance with a minimum energy efficiency standard. These are typically the large, custom homes.

Chapter 23.95 - Relocatable Ancillary Buildings, 1997 Edition

No changes.

Chapter 23.100 - Mobile Aircraft Shelters, 1997 Edition

No changes.

Chapter 23.105 - Grading, Excavation, Fill, and Landscaping, 2018 Edition

No changes.

Chapter 23.110 - International Fuel Gas Code (IFGC)

No changes.