Higher Regulatory Standards

The *Nebraska Minimum Standards for Floodplain Management Programs* establishes the standards that all Nebraska communities must enforce in their floodplains. All cities, villages, and counties already have a few higher regulatory standards that go above the federal minimum standards in *44 CFR 60.3* including 1-foot of freeboard, restricted development in floodways, and prohibited storage of hazardous materials. States and communities across the country, however, realize that flood damages can be reduced further and citizens kept safer by enacting further higher standards for development in floodplains. Based on common practices in other locations, this document includes a wide range of possible higher standards that communities should evaluate implementing. In the Nebraska Model Ordinances, these standards appear as optional and can be adopted using the language highlighted in the templates.

Freeboard

Description: Freeboard is a "safety factor" in terms of how high the lowest floor must be above the base flood elevation. All communities in Nebraska already have a 1-foot freeboard (i.e. all new or substantially improved buildings must have their lowest floor elevated or floodproofed to 1-foot above BFE). A community may increase that safety factor to 2 or 3 feet, which would make buildings that much safer from both the 1% annual chance flood and more significant flood events like the 0.2% annual chance flood.

Figure 1. Home elevated along the Platte River

Benefits: Buildings built higher will suffer less damage when considering that floods often exceed the base flood elevation and will provide a factor of safety. Flood insurance costs will be much lower as well.

Cost Impacts: Requiring a higher freeboard will increase construction costs either by requiring additional fill or raising the foundation to a higher level. Flood insurance and flood damage reduction savings easily outweigh these costs.

Ordinance Language: this would be included in the Standards for Floodplain Development section:

Require that new construction or substantial improvements of residential structures to have the lowest floor, including basement, elevation to or above **two (2) feet** above the base flood elevation.

[similar language for appropriate other sections]

Administration: Freeboard standards are easy to implement and would require property owners to demonstrate compliance with an elevation certificate or floodproofing certificate.

Substantial Improvement/Damage

Figure 2. Home damaged from flooding in 2015 in DeWitt.

Description: All ordinances require substantially improved or damaged structures with more than 50% improvement or damage be elevated to 1-foot above BFE (or the regulatory flood elevation). Many communities want to encourage safer rebuilding or renovation by including a lower substantial improvement/damage threshold (to, for instance, 30%) or by counting improvements made or damage incurred cumulatively so the trigger to elevate is reached more easily. A detailed tracking system within the community would need to be developed to

ensure these standards are met with each permit application. Implementing this provision means more structures will be renovated or rebuilt safer from flooding.

Benefits: By having regulations like these, more buildings eventually are made safer from flooding. After a major loss or during renovation, the costs of elevation are either less or can be incorporated into broader renovation costs. Having a lower threshold or tracking improvements/damages cumulatively will mean that more buildings in a community will be safer from flooding.

Cost Impacts: While this language does not change the fact that someday a building owner will inevitably have to pay to elevate the structure, it will change the timing of that cost. Bringing a structure into compliance via elevation for example can be a significant cost for a building owner. In the long run, however, flood insurance and flood damage reduction savings are likely to be more than the costs.

Ordinance Language: this language would be changed in the definitions section:

Substantial Damage means damage of any origin sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed **30 percent** of the market value of the structure before the damage occurred.

OR

Substantial Damage means damage of any origin sustained by a structure whereby the **cumulative** cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. **Cumulative costs shall include all costs for reconstruction, rehabilitation, or other improvement of the structure to repair damage incurred within 10 years preceding the date of the floodplain development permit.**

AND

Substantial Improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds **30 percent** of the market value of the structure before "start of construction" of the improvement. This includes structures that have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either (1) any project for improvement of a structure to correct existing violations of state or local health,

sanitary, or safety code specifications that have been identified by the local code enforcement official and that are the minimum necessary to assure safe living conditions, or (2) any alternation of an "historic structure," provided that the alteration will not preclude the structure's continued designation as an "historic structure."

OR

Substantial Improvement means any reconstruction, rehabilitation, addition, or other improvement of a structure, the **cumulative** cost of which equals or exceeds 50 percent of the market value of the structure before "start of construction" of the improvement. This includes structures that have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either (1) any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications that have been identified by the local code enforcement official and that are the minimum necessary to assure safe living conditions, or (2) any alternation of an "historic structure," provided that the alteration will not preclude the structure's continued designation as an "historic structure." **Cumulative costs shall include all costs for reconstruction, rehabilitation, addition, or other improvement of the structure within 10 years preceding the date of the floodplain development permit and shall include any costs resulting from substantial damage.**

Administration: Implementing any of these standards can prove challenging. Communities should already have a system in place for conducting substantial damage estimates and dealing with substantial improvements. Tracking improvements cumulatively, however, will require an effort to set up tracking systems and establishing baseline market values. There will be costs associated with ensuring citizens and businesses know about these standards, particularly after a flood or other disaster.

Enclosure Limitations & Nonconversion Agreements

Description: Most communities generally allow structures to be built with an enclosed area below the lowest floor, either as a crawlspace or a full story enclosed area. These areas are limited exclusively to building access, storage of readily removable materials, and parking. The enclosed areas are required to be wet floodproofed with vents. But, structural integrity is still threatened from floodwaters, particularly fast moving water. Many building owners end up storing valuable or dangerous materials in those enclosed areas too. Often full story enclosures are converted to other uses over time and increase the risk of the structure. Communities can prohibit all enclosed areas or set limitations on their size or height.

Figure 3. Home along the Platte River with a converted crawlspace

Benefits: By limiting or prohibiting any part of a building that is below the BFE, flood risk is reduced at that structure. These standards will encourage other elevation techniques and with fewer building components below the BFE, flood risk will be reduced. Discouraging any incentive to convert enclosures to residential or nonresidential uses protects against loss of life or property.

Cost Impacts: This standard may increase costs of development by removing an alternative for a foundation type, but may yield flood insurance savings on the structure.

Ordinance Language: the language included will be in the Standards for Floodplain Development section:

Require for all new construction and substantial improvements that fully enclosed areas below the lowest floor that are usable solely for parking of vehicles, building access, or storage in an area other than a basement and that are subject to flooding shall be

designed to automatically equalize hydrostatic flood forces one exterior walls by allowing for the entry and exit of floodwaters. **The size of such enclosed areas shall not exceed 299 square feet except for buildings where the minimum clearance height of the enclosed area is less than seven (7) feet.** Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria: A minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be not higher than one foot above grade. Openings may be equipped with screens, louvers, valves, or other coverings or devices provided that they allow the automatic entry and exit of floodwaters.

OR

All new construction and substantial improvements shall not have enclosures below the base flood elevation.

Administration: Communities should also consider requiring any property owner with an enclosure to sign a nonconversion agreement filed with the deed and other property records that states the enclosed area will not be converted to another use (i.e. one that doesn't comply with the use limitations of parking, access, and storage of readily-removable materials). This nonconversion agreement can be done without instituting any of the higher standard ordinance language above.

Overall, this standard would limit the possibility of a property owner causing a violation, which may reduce administration costs in the long run.

Critical Facilities

Description: Critical facilities are those that if flooded would result in severe consequences to public health and safety. This includes facilities that are crucial to be operable during floods and those that house vulnerable populations. Hospitals, nursing homes, and schools are some examples. Critical facilities also include facilities that are needed during floods, such as fire stations, emergency operations centers, and public/private utility facilities. In addition, critical facilities include those that produce, use, or store hazardous materials.

Ideally, critical facilities should be sited outside of flood risk areas, both the 1% and 0.2% annual chance flood zones. However, in some cases, it may not be feasible to do this. Providing a requirement to elevate or floodproof critical facilities to a 0.2% annual chance flood zone help keep buildings safer. Doing so also requires providing an access road that is similarly elevated. If 0.2% annual chance flood zones are not present in a community, requiring elevation to 3 feet above the base flood elevation can provide a similar level of safety.

Figure 4. Prison and juvenile detention facility threatened by the Missouri River in 2011

Benefits: Critical facilities that are built to a higher standard are less likely to shut down or be isolated during a 1% annual chance flood event. Hospitals, fire stations, and emergency response centers are necessary and crucial during a flood event and requiring a higher level of safety will help ensure their proper functioning. Additionally, because many of these facilities are financed by taxpayer dollars, a higher flood safety standards will result in fewer damages and losses. Critical facilities that harbor hazardous waste are less likely to discharge that waste into floodwaters if floodproofed, elevated, or prohibited from 1% annual chance flood zones.

Costs: The costs to elevate or floodproof to a higher standard may be higher initially. Land costs outside of a floodplain may be higher if facilities are sited outside of the floodplain. Facilities dependent on a lower elevation location like wastewater treatment plants may see a higher cost by having to be elevated.

Ordinance Language: A separate section should be placed in the Elevation and Floodproofing Requirements and be similar to:

i. New construction or substantial improvement of any critical facility is prohibited in all areas of the floodplain and the 0.2% annual chance floodplain, unless all of the following provisions are met:

a. No feasible alternative site exists for the construction of an equivalent facility within the corporate or extraterritorial jurisdiction boundaries of {community name};

b. The facility has the lowest floor, including basement, of all structures elevated to one (1) foot above the 0.2% annual chance flood elevation or, together with attendant utility and sanitary facilities, floodproofed so that below one (1) foot above the 0.2% annual chance flood elevation:

1. The structure is watertight with walls substantially impermeable to the passage of water and

2. The structure has structural components with the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy

3. A registered professional engineer or architect shall certify that the standards of the subsection are satisfied. Such certification shall be provided to the floodplain administrator as set forth in Section 4.

c. If the 0.2% annual chance floodplain is not identified on the FIRM, the facility shall have the lowest floor, including basement, elevated to three (3) feet above the base flood elevation or be floodproofed to three (3) feet above the base flood elevation with the standards in 5.2 C (i) (b).

d. The facility has at least one access road connected to land outside the 0.2% annual chance floodplain that is capable of carrying emergency support vehicles and the top of the access road is no lower than the 0.2% annual chance flood elevation.]

Administration: Floodplain administrators will need to work with all government agencies to establish the critical facilities standards. The community overall will need to determine the best definition of critical facilities to which the standard will apply. Communities will also need to keep track of improvements made to critical facilities to track substantial improvement.

Fill in the Floodplain

Figure 5. Fill in the floodplain in DeWitt pushes water on neighboring properties

Description: When fill is placed in the floodplain, area that floodwaters could occupy in the event of a flood is removed. The floodwaters then must go somewhere else and often are higher on adjacent properties. In a detailed study area with floodways, the Zone AE flood fringe area includes calculations for up to 1 foot of rise. Development in the flood fringe is expected to cause up to 1 foot of rise and permits cannot be denied just because a rise of less than 1 foot is caused. Multiple strategies can help reduce the impact of fill in floodplains.

First, fill can be prohibited or limited in quantity in the floodplain to reduce its impact on flood storage and minimize rise caused by its placement. Prohibiting fill would mean that buildings would need to be elevated on crawlspaces or some other method. Limiting fill would limit the amount of space on a site to use fill to elevate a structure. Fill could be limited or prohibited in specific flood zones, such as the floodway.

Second, fill can have a compensatory storage requirement. For any fill placed on a site a calculation of the lost flood storage area must be made, and the same amount of flood storage must be provided either onsite or in a hydrologically connected area.

Additionally, communities may want to set standards for fill in the floodplain including standards for quality and compaction requirements, some of which can be found in FEMA's Technical Bulletin 10.

Benefits: By limiting or prohibiting fill, a community ensures that rise in floodplains is lessened, which keeps properties safer from future flood impacts. As communities grow and develop, the potential for fill causing a rise in floodwater increases. Limiting the use of fill will reduce that risk and give more certainty to current building owners that their flood risk won't increase. Since fill can adversely impact neighboring properties, there is less likely to be a dispute between property owners.

Costs: Not allowing fill removes the ability for a structure to be elevated on fill, which may increase construction costs slightly. Many building owners want the flexibility of using fill so as to not have a crawlspace that might not fit into a neighborhood. Limiting or prohibiting fill would make it difficult for a property owner to obtain a Letter of Map Revision Based on Fill. Requiring compensatory storage may increase the cost of development by requiring additional considerations for preparing the site, particularly if that storage cannot be accommodated on the same site.

Ordinance Language: Because each community will have a little bit different flood characteristics, contact NeDNR for specific ordinance language for your community.

Administration: Fill prohibitions or limitations may need to be reviewed by an engineer, who may or may not already be a part of reviewing floodplain development permits. The floodplain permitting office will also need to allocate more time to review compensatory storage calculations, fill compaction standards, site plans, etc. if implemented.

For technical assistance and guidance on implementing any of these higher standards, please contact NeDNR staff.