KANSAS
FLOODPLAIN MANAGEMENT TIPS

Kansas Department of Agriculture
Division of Water Resources

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Technical Bulletin 6 Update

Much like the Technical Bulletin (TB) 3 update, the new version of this bulletin is expanded upon, and considerably more detailed. The introduction now includes *Flood Resistant Design and Construction (*ASCE 24) again as the standard for accepted practice; the update still quotes the applicable Code of Federal Regulations from Ch. 60.3 (c) (3), (4), and (8) as it pertains to floodproofing below the BFE, or flood depth, and certification for such designs. Higher standards taking precedence are expanded upon, state and local requirements, applicable cumulative substantial improvement and damage standards, as well as freeboard requirements, which would also mean higher floodproofing levels.

In the older version, TB 3 continues on to the design of a below-grade parking area, however the update provides information in several other areas, first. The terms "residential", "non-residential", and "mixed-use" are defined by FEMA. Mixed-use and non-residential building dry floodproofing requirements are reiterated; the bulletin explains that this guidance is to be used in conjunction with TB 3 because below grade parking areas are only allowed under dry floodproofed buildings. In fact, it is recommended that the design be submitted with the building's floodproofing documentation for the building permits.

The bulletin has a section on building codes and standards. The family of I-Codes generally meet or exceed NFIP minimum requirements; excerpts of them can be found on FEMA's Building Science Flood Publications webpage. As in TB 3, a table that compares NFIP requirements to the IBC and ASCE 24 on various subjects is provided- definitions of dry floodproofing, general flood hazard area requirements, flood hazard documentation, freeboard, dry floodproofing, and garages; all of which meet or exceed the NFIP minimum requirements.

Next, a section on insurance implications, forgone in the older version. The relationship between compliance and cost of insurance is explained, as well as what it may mean to future owners. Again, it explains for insurance purposes that it will only be credited with 1 foot of freeboard, and the credit amount is based on the details of the dry floodproofing components themselves, which is why consultation with an experienced insurance agent is highly recommended before starting a design.

The older version on designing this type of area is quite short. It mentions TB 3 and the entrance of the garage- either above the BFE or can have fill dirt placed at the entrance to make it higher, or if below the BFE, must have a flood shield that can be installed. It warns about the potential risks associated with active dry floodproofing measures. The update has more considerations for the dry floodproofing design such as site-specific hazards, warning time, functional use, and safety and access; it could lead to danger if floodproofing measures failed or were exceeded by flooding. Operation and inspection and maintenance plans should be centered around flood warning time, versus the needed time and energy to deploy measures. The plans should contain what the rest of the floodproofed building has for deploying measures- instructions, location of needed tools, as well as a backup plan in the case that they cannot be deployed in time, and if the evacuation route is closed.

Floodproofing is not recommended in areas with floodwaters over 3 ft, velocities over 5 ft/sec., and moderate wave heights (1.5-3 ft). ASCE 24 is more restrictive, limiting use to 5 ft/sec. velocities or higher, 12-hour warning time unless sufficient warning to deploy measures, and prohibited in areas with moderate waves. For design of the parking area itself, NFIP insurance for credit requires 1 foot of

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freeboard. ASCE 24 requires floodproofing protection height based on its flood design class, similar to risk zones.

Withstanding flood loads is critical for floodproofing. Special consideration should be given to hydrostatic loads as pressure will transfer to the below-grade area (parking structure) from the building above, as well as the ground as it becomes saturated. ASCE 7 has the guidance for calculating flood loads. ASCE 24 requires that flood shields and covers are designed to resist flood loads. Failure in the below-grade parking structure could be detrimental to the entire building. The hydrostatic load depends on many factors, BFE, adjacent grades, duration, and soil characteristics. As a parking structure, the design should account for the possibility of floating cars left behind during a flood which can cause debris impact or uplift pressures on ceilings. As in TB 3, utility or equipment is expected to be elevated above the flood protection level or to be functional after submersion with minimal cleaning and repair.

The parking structure has the same seepage requirements; designers should address any possible points of entry, and seepage must not exceed more than 4 inches in a 24-hour period, without use of water-removing devices. All seepage pathways must be assessed to avoid unanticipated loads or accumulation as the seepage reaches the lowest point during flooding and in the event that measures are overtopped or fail. There are considerations for below-grade areas that are adjoined to other buildings, they should not share below-grade areas such as pedestrian corridors unless both are dry floodproofed to the same level. Vehicle ramps must be considered and protected, raised above flood protection level or designed to accommodate floodproofing measures. The update provides a sketch of such a ramp, and ends with depictions of dry floodproofing measures deployed, automatic gates, panels, swing door, and stop logs. Floodproofing design of a below-grade parking areas now comes across as a fully developed extension of the entire building design- having the same plans and considerations, whereas before was not as interconnected or comprehensive.

2019 Tuttle Creek Reservoir Flooding Scare

In the spring of 2019, much of Eastern Kansas was experiencing severe flooding. This was the case for the city of Manhattan where Chad Bunger, Assistant Director of Community Development serves as the floodplain administrator. During March and April, they became aware that Tuttle Creek Reservoir was becoming full. Riley County Emergency Management in coordination with the U.S. Army Corps of Engineers were constantly monitoring the lake level via gages and were informed of how much water was behind the dam. The dam was constructed in the 1960s with the contingency plan that if it overflowed, water would need to be released. This occurred once before in 1993. They had a great deal of data from that incident of what would happen if the Corps were forced to open the dam up to varying degrees. This data is nearly 3 decades old however, much of the area has changed significantly. It became clear to Chad during response planning that they did not have a firm grasp on the current risk.

Tuttle Creek Reservoir was within inches of having to open the dam infrastructure which would have significantly flooded neighborhoods on the east side of town. To better understand the risk and improve response planning, Chad came up with an idea to work with Environment & Infrastructure Solutions (Wood) to create models of the risk. Wood created a series of 2D models based on the elevations of the Kansas River of various scenarios of releases from the reservoir, as Manhattan is at its confluence. They went by flood increments that were reasonably expected. The models were not validated by USACE, but were of good quality to be able to extrapolate what their risk would be. The project was completed with a $10,000 budget, a one-month timeline, and completed over 40 unique scenarios.

As this happened, Manhattan, Emergency Management from various local counties and communities, city staff, the fire department, community development, the city manager, and police department went door to door to warn citizens that if they released the water, it would flow directly into their downtown neighborhoods. They provided letters, warnings, and other documents on preparedness. They had a one-week warning time to complete this. The emergency operations center was filled with people 24/7 for several weeks. They covered all neighborhoods within the model scenarios, and a buffer beyond that, just to be safe. They were able to identify citizens that had disabilities or spoke English as a second language and would need help by using Environmental Systems Research Institute (ESRI) Dashboard tools to see this coverage and where response would be needed if it came to that. They pushed the outreach through every available channel, including local news and social media. Chad described the

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approach as “aggressive” to ensure everyone was well informed of the danger. Concerned citizens were calling in for more information, which was better handled when the models were complete, and they were able to inform them of the risk more specifically.

Fortunately, USACE did not end up having to release water but were extremely close. It turned out to be a considerable amount of preparation for an event that did not occur, though many valuable lessons came out of the experience. Emergency operations, coordination, and communications were exercised as though a real emergency was occurring. It went generally well, there were some moments of learning, though the emergency center working jointly with counties and Manhattan system worked well. The sharing of resources and information was very positive. Chad commends the emergency managers that were the head of these efforts. Additionally, the abundance of information from the 2D models from Wood are invaluable resources. The City learned how to work with the models and use them effectively. Chad wishes they had them sooner to help with the uncertainty in the beginning but are well prepared for future events. He is willing to speak with other floodplain administrators and managers about this experience and share lessons learned: (bunger@cityofmhk.com).

Logjams in Kansas

Logjams have a history of causing problems in Kansas as well as other areas of the country and the Midwest. Logjams are naturally occurring obstructions in streams when trees and woody species become trapped, creating a sturdy mass that can be difficult and expensive to remove or manage. They gradually accumulate more logs that can eventually be problematic by trapping other debris and sediment, causing erosion, harming wildlife, blocking the passage of water, and in some cases, damaging or destroying infrastructure over a stream. Blocking the free flow of water can change the hydrologic and hydraulic conditions and may impact flooding conditions over long distances via backwater.

Logjam Congestion

Logjams since the turn of the century have occurred in the Ninnescah, Neosho, Solomon, and Arkansas Rivers and their tributaries within Kansas. The Neosho River logjam accumulated over several years in the early 2000s, leading to a study on the over 1-mile long obstruction and various possible solutions. Many along the riverside had complained of the accumulation and trapped debris. In a community along the Neosho River, the logjam in a tributary has caused backwater effects that have led to urban flooding that had not occurred before, and accumulating water on local properties. Thus far, no structures have been damaged, but citizens have complained of water on their properties that they have associated with the logjam. The City is working fervently to get the blockage removed.

There has been a strong correlation between logjams and railroad tracks over streams. Many times, logjams build up against these bridges, creating issues. On the Arkansas and Ninnescah Rivers, the communities were able to work with the railroad companies who had them removed. The correlation of these events could be the exemption of interstate commerce from state or local building and permitting requirements. Railroad companies are federally regulated as interstate commerce and hence, are exempt from needing a local floodplain development permit when all other development would. It is recommended to try to work with companies to get courtesy permits, but state or local officials cannot require one or enforce any regulations related to their construction. Since they are not regulated, construction standards may diverge from normal floodplain construction standards and lead to logjams. Collaboration and communication on any impacts a community may experience due to these interactions to reach a solution is the best approach.

Logjams in Kansas have been removed using heavy machinery such as grapples or other hand-held tools. For a larger logjam, such as on the Neosho, studies have been prepared to evaluate the various restoration and removal strategies that could be employed. The variation in approach and possible costs vary widely. Each situation and stakeholders are unique and require careful evaluation of options, pros and cons. Periodic maintenance may be an alternative before a logjam is large enough to require substantial investments to manage or remove.

Training Opportunities

The Floodplain Management Program will host the following training sessions throughout Kansas. If you are interested in any of the no-cost training opportunities, please contact Cheyenne Sun Eagle at 785-296-0854 or Steve Samuelson at 785-296-4622. A training registration form is in this newsletter.

Post Flood Responsibility

This course will cover community responsibilities after a flood. Topics will include surveying damages, substantial damages, permits for repairs and other considerations. The format will be an online webinar using the Zoom software platform. This class has been approved for 1 hour of Continuing Education Credit (CEC) toward the Certified Floodplain Manager (CFM) credential.
Virtual Training on June 24th, 2021 from 10:00-11:00a.m.

Find more information about floodplain management from Kansas Department of Agriculture Division of Water Resources online at:
http://agriculture.ks.gov/divisions-programs/dwr/floodplain

Email saves money on postage. The electronic newsletter also has links and the photos are in color. In the case that you are getting this newsletter by postal mail and would prefer email please contact Cheyenne Sun Eagle at: cheyenne.suneagle@ks.gov.

To find and register for upcoming training, as well as recordings of previous trainings, please see our new Floodplain Management Training webpage at:
https://agriculture.ks.gov/divisions-programs/dwr/floodplain/training

Kansas Department of Agriculture
Division of Water Resources
Floodplain Program
Training Registration Form

Name _____

Title _____

Organization _____

Address _____

City _____ State _____ Zip _____

Telephone _____ Fax _____

E-mail _____

Name, date and location of training you will attend _____

_____

_____

*Please share this invitation with anyone else who could benefit from the training.
**Classroom locations will be sent to registered participants one week before the training.
**To find and register for upcoming training, as well as recordings of previous trainings, please see our new Floodplain Management Training webpage at: https://agriculture.ks.gov/divisions-programs/dwr/floodplain/training
** Any individual with a disability may request accommodation in order to participate in training. Persons who require special accommodations must make their needs known at least five working days prior to training. For more information, including special accommodations, please contact Cheyenne Sun Eagle at 785-296-0854 or email Cheyenne.Suneagle@ks.gov.

Please scan and email your registration to: cheyenne.suneagle@ks.gov

Or mail to:

KANSAS DEPARTMENT OF AGRICULTURE
FLOODPLAIN MANAGEMENT PROGRAM
1131 SW Winding Road, Suite 400
TOPEKA, KS 66615

For questions about training, please contact Cheyenne Sun Eagle by email at cheyenne.suneagle@ks.gov or by phone at 785-296-0854. You may also contact Steve Samuelson by email at steve.samuelson@ks.gov or by phone at 785-296-4622.

Please help us keep our records current. If the name that appears on this newsletter is for an individual no longer with your organization, please call 785-296-0854 or email cheyenne.suneagle@ks.gov to report the change.

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Kansas Association For Floodplain Management Conference in Mulvane

The 2021 KAFM conference will be September 1-3rd, at the Kansas Star Event Center in Mulvane, Kansas.

Association of State Floodplain Managers 2022 Conference in Orlando

The 2022 ASFPM conference will be May 15-19, at the Caribe Royale Orlando Hotel in Orlando, Florida.

KDA/DWR Water Structures
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