

RESOLUTION NO. 035 (2026/2027)

A RESOLUTION ESTABLISHING A TEMPORARY MORATORIUM ON THE ACCEPTANCE OF APPLICATIONS AND ISSUANCE OF PERMITS FOR DIGITAL ASSET MINING, CRYPTOCURRENCY OPERATIONS, DATA PROCESSING CENTERS, AND BATTERY/ENERGY STORAGE FACILITIES WITHIN THE CITY OF NEVADA, IOWA

WHEREAS, the city council of the city of Nevada, Iowa recognizes the potential impacts of digital asset mining, cryptocurrency operations, data processing centers, and battery/energy storage facilities on land use, infrastructure, public utilities, public safety, and the surrounding community; and

WHEREAS, the city council finds it necessary to evaluate existing city code provisions, zoning regulations, and applicable policies to ensure appropriate standards are established for the development and operation of such facilities within city limits; and

WHEREAS, the city council desires to establish a temporary moratorium to allow sufficient time for a comprehensive review and consideration of potential regulatory changes.

NOW, THEREFORE, BE IT RESOLVED by the city council of the city of Nevada, Iowa:

SECTION 1. Temporary Moratorium. A temporary moratorium is hereby established on the acceptance of applications and/or issuance of permits for the development or operation of digital asset mining facilities, cryptocurrency operations, data processing centers, and battery/energy storage facilities on properties located within the corporate limits of the city of Nevada. the moratorium shall take effect upon adoption of this resolution and shall remain in effect until _____, unless modified, extended, or terminated earlier by action of the city council.

SECTION 2. Establishment of Review Committee. The Mayor shall appoint a committee consisting of representatives from City Administration, the City Council, the Nevada Planning and Zoning Commission, the Nevada Economic Development Council (NEDC), and other individuals or organizations deemed appropriate.

SECTION 3. Committee Responsibilities. The committee shall review existing city code provisions, planning and zoning regulations, infrastructure considerations, and other applicable policies related to these facilities. the committee shall evaluate potential impacts and identify regulatory changes or additional requirements necessary to protect the health, safety, and general welfare of the community while considering the city's long-term development needs.

SECTION 4. Report to City Council. The committee shall present its findings and recommendations to the City Council within six (6) months of the adoption of this resolution. Recommendations shall include any proposed amendments to city code, zoning regulations, or other policies deemed necessary to appropriately regulate these facilities within city limits.

SECTION 5. effective date. This resolution shall be effective immediately upon its passage and approval.

Passed and approved October 12, 2026.

Ryan Condon, Mayor

Attest:

Erin Mousel, City Clerk

Erin Mousel

From: Shelby Hagan (via clerknet list) <clerknet@simplelists.com>
Sent: Monday, September 28, 2026 8:42 AM
To: clerknet@simplelists.com
Subject: Re: [clerknet] Datacenters

External sender <clerknet@simplelists.com>

Make sure you trust this sender before taking any actions.

This is definitely one I would keep an eye on before getting too far down the ordinance rabbit hole!

Data centers have come up quite a bit in the legislative conversations I've been involved in recently, and I fully expect this to be an issue during the 2027 session. There was already legislation introduced last session dealing with data center water and energy use, reporting requirements, utility rates, and tax incentives, so I don't think we've heard the last of it.

It has also become an issue in the Governor's race. Zach Lahn has publicly talked about a temporary moratorium while the state figures out the rules surrounding data centers, including water and energy usage and community impacts. His campaign has also said this is an issue that needs some statewide regulation. His running mate attended our recent legislative breakfast and specifically talked about their support for a moratorium while those issues are worked through.

So, in addition to asking what other cities are doing locally, I think this is something we should be watching very closely at the state level. There could potentially be legislation next session that affects what cities and counties can or cannot regulate locally.

I would also be interested in seeing what ordinances or moratoriums other communities have adopted. This has actually been on my list of 2027 legislative issues to watch, particularly around water usage, energy/grid capacity, infrastructure impacts, tax incentives, transparency, and local control.

It might be another good topic for us to gather examples from Clerk World and then work with the League to understand what is happening statewide before session starts.

Definitely a timely question!



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IOWA DATA CENTER DECISION TOOL FOR COUNTIES, CITIES, COMMUNITIES

The Iowa Data Center Decision Tool provides municipal, county, and community leaders with a framework of questions to consider when evaluating whether to encourage data center development within their jurisdictions. The Decision Tool is intended to support informed decision-making by identifying issues that local governments may wish to assess before engaging with data center developers or considering policies related to data center siting and development.

Introduction: Iowa as the Next Data Center Frontier

Iowa is one of the most attractive locations for data centers in the country due to its flat and affordable land, relatively low energy costs, limited historical drought, and lower construction and labor costs. Large energy and water utilities already serve substantial data center demands, signaling a welcoming environment for expanding or building new data centers.

For some Iowa communities, data centers represent an opportunity to diversify the local tax base, create construction and skilled technical jobs, and attract related business investment. Communities may also view data centers as supporting economic development goals by using available land, expanding digital infrastructure, and generating long-term property tax revenue. Communities may also worry about power imbalances and access to resources between different sized localities. Officials and residents may not have the tools they need to ensure a safe, responsible approach to deciding whether to invite a data center into their community, county, or city.

The questions in this Decision Tool address infrastructure, water and energy use, economic impacts, land use, and community priorities. By considering these questions, city and county officials and residents can better understand the potential impacts of data center development and make informed decisions that align with community needs, goals, and values.

Iowa Data Center Decision Tool: Trusted Iowa Voices

Content in the Iowa Data Center Decision Tool is informed by trusted, *Iowa-based* experts from cities, counties, drinking water utilities, and University of Iowa academic experts.

Officials and community leaders are encouraged to prepare for possible discussions with developers and community members by reviewing the questions on the following pages and understanding what actions they may want to consider depending on the responses. Responses to the following questions may point communities toward zoning amendments, site plan conditions, utility service agreements, road use agreements, state permits, third-party technical review, or perhaps a temporary moratorium on data center development until facts are gathered.

Community Considerations

Residents in communities considering data center development express concerns about limited transparency, insufficient access to information or opportunities to express opinions, environmental impacts, and a lack of trust in negotiations. Thoughtfully engaging residents and businesses is important, and providing the public with factual information will help with understanding. A city or county data center webpage can be a helpful community resource. Engaging residents through public meetings, informational sessions, surveys, and other opportunities for input can help local leaders understand community perspectives and determine whether a data center is a good fit for the jurisdiction.

- When and how do you plan to engage with residents to assess their perspectives about data center development in the jurisdiction?
- How will community perspectives be assessed and weighed (e.g., what if surveys and public comment indicate most residents do not favor development)?
- Could any public infrastructure or utility upgrades, special rates, discounted service, TIF, tax abatement, or other incentives offered to the developer/applicant shift costs or risk to existing residents, businesses, or taxing entities?

If already engaging with a developer:

- Has the community established a proposed public-facing project timeline showing key meetings, required approvals, and when residents will have meaningful opportunities to review information before any final vote?
- In agreements, is confidentiality narrowly tailored, time-limited, ensures responses to requests in a timely fashion, and structured so that the public receives meaningful information before elected officials make final land use, utility, or incentive decisions?
- Has the developer shared projections about impacts to residential water and energy rates?

Planning and Zoning

Land use authority varies, but counties typically regulate only unincorporated areas while cities control annexed land. Most local governments are understandably not fully prepared to regulate data center infrastructure, given the fast pace at which development is being proposed. Officials may choose to tap the brakes on data center development until such time as necessary modifications are made to ordinances. Thoughtful planning is key to public trust, as well as deciding *whether* a data center is a good idea for the city or county.

- Are appropriate zoning ordinances in place that address data centers (e.g., definition/category, noise, lighting, size, energy generation, waste heat, waste and materials)?
- Do current ordinances treat multiple buildings/phases under common control as one campus? Are thresholds based on building size, megawatts, water demand, backup generation, or other measurable impacts?
- Are special permits for data centers appropriate or already in place?
- Have objective, use-specific standards (i.e. caps on sound at the property line) been considered?
- Are measurable performance standards embedded in code, such as dBA (a weighted scale for judging loudness that corresponds to the hearing threshold of the human ear) and low-frequency/DBC (a way of measuring sound that captures low-frequencies that humans can't hear and dBA sound measurement doesn't register), noise limits, lighting standards, setbacks from sensitive receptors, emergency access, hazardous materials, stormwater, construction hours, and periodic post-construction testing/reporting?

- Does the code or ordinance require review of off-site power infrastructure or supporting utility (gas pipeline and/or high voltage transmission) upgrades that will affect environmental impact, and long-term capacity?
- Have impacts to adjacent properties and households been considered?

Water Resources

Some data centers use systems that are designed to be much less dependent on water (e.g., closed loop systems) than other systems. While closed loop systems are more predictable, it still may be difficult to forecast water demand for data centers. Namely, water utilities are required to provide large influxes of water but are not always given projections for when and how consistently this demand is required. A mismatch between projected peak demand and actual usage patterns creates a financial and planning burden, particularly on water utilities.

- What is the source of water for the data center?
- What amount of water will the data center need each day and each year (average day, maximum day, annual total, peak hours, and consumptive use versus water returned as wastewater or discharge)?
- What is the cooling strategy?
- What will the water be used for (drinking, industrial, non-potable)?
- How will water usage be reported?
- Would infrastructure be able to handle extra wastewater flow and the potential surge in flow to the system?
- Have water recycling processes been considered?
- What is the estimated start date of operation?
- Have seasonal or drought conditions been considered to eliminate shortages for residents as well as the data center?
- Would a higher water capacity be required for fire protection, which would require larger water infrastructure to the site (considering potential water utility impacts should they need to implement fire flow rates)?

If already engaging with a developer:

- Has a third-party regional water study or projection been undertaken that evaluates drought/low-flow conditions, competing users, utility capacity, and whether the proposed demand would affect service reliability for existing customers (ideally paid for by the developer/applicant)?
- Does a utility service agreement include conservation, curtailment, monitoring, reporting, and emergency/drought response provision?
- Is the Iowa Department of Natural Resources involved in permitting, given the large volumes of water/wastewater?
- What is the water/wastewater ramp-up schedule (usually beginning with lower demand during construction and ramping up each time a building is brought online)?

Energy Resources: Use and Governance

Communities may have questions about the high level of energy use by data center operations, which may result in competition for limited energy resources. Potential competition raises issues of grid strain and increased rates for existing customers. Grid resiliency in the face of natural disasters or extreme weather events, such as historic flooding, may also be a concern.

- What are the sources of power available to the data center?
- What amount of energy might the data center require, including megawatts at peak load?

- How will energy usage be reported?
- Will the data center use backup generation, temporary generation, on-site generation, or battery energy storage?
- Has renewable energy procurement been considered?
- What ordinances are in place that will oversee air quality emissions and noise associated with power sources?
- Will the local distribution utility conduct a rate assessment/impact study?

If already engaging with a developer:

- How many megawatts are needed, as well as transmission, substation, generation, battery or backup infrastructure and is the developer expecting to pay for those upgrades (which could affect costs or risks to other customers)?
- What is the ramp-up schedule (e.g., phased by building/campus phase, whether transmission/substation upgrades are needed)?
- How flexible or inflexible will the data center's power demand be?
- Can the data center waste heat be reused?
- Has a third-party energy study been considered (ideally paid for by the developer or applicant)?

Incentives and Economic Development

Communities may worry about power imbalances and access to resources between different sized localities, and the need to ensure that all communities have the tools they need to fairly negotiate with data center companies and developers. Coordinating regionally and setting clear expectations upfront for developers can result in communities having more influence than they sometimes realize.

- Have elected officials conducted *net* fiscal impact and economic analyses and made the decision to entice a data center to the community?
- What state and local tax exemptions or incentives apply?
- What taxing entities are affected?
- What public costs and benefits are expected?
- Are there claw backs if investment, jobs, or community benefits do not materialize?
- Is there a fund in place for decommissioning the data center at the end of its lifetime?
- Have officials considered a statewide or region-wide approach to incentives to improve outcomes for Iowa communities, residents, as well as industry?

If already engaging with a developer:

- Has a third-party (or internally conducted) economic impact assessment been undertaken that includes job creation versus tax abatements and sales tax exemptions, public infrastructure investments, unique revenue streams, and long-term labor, fiscal, and ecosystem impacts (ideally paid for by the developer or applicant)?
- Does the Development Agreement contain milestones and enforcement clauses, such as assignment/successor language (agreements should remain enforceable if the project is sold, transferred, delayed, partially built, or operated by a different entity than the original applicant/developer) or incentives tied to reporting requirements such as water use, energy consumption, etc.?
- Does the Development Agreement contain provisions tailored to the community (e.g., workforce training, broadband expansion, green-infrastructure projects, investment in local infrastructure, housing, or betterment funds to help the community as a whole)?

Thinking Ahead to the Construction Phase: During Discussions with Developers

Construction of data centers results in a large amount of activity over a lengthy period and can catch residents and community leaders by surprise unless municipalities and developers plan for disruptions during the planning and permitting phase. Communities may consider requiring a construction management plan that addresses haul routes, worker parking, laydown/staging areas, temporary power or water, dust, lighting, noise, hours of operation, complaints, and emergency access.

- What will water usage be during construction (see also “Water Resources” section)?
- Has a plan been developed or ordinance created, as well as necessary permitting obtained, for disposal of construction waste?
- Has a road use agreement been discussed or prepared, including pre-construction road condition documentation (preferably a report by a third-party, certified engineer), designated haul routes, bonding or financial assurance, repair standards, dust control measures, and post-construction restoration responsibilities?
- What noise impacts are expected during construction (e.g., What mitigation measures have been proposed? What levels are expected and when? How will potential or perceived offsite impacts to neighborhoods, schools, livestock, and wildlife be addressed?)
- What lighting impacts are expected during construction (and post-construction)?
- What is the projected length of time for construction; how many phases; how many buildings; and what size (e.g., communities may consider asking for full-buildout assumptions, phase triggers, and whether later phases require additional review if water, energy, noise, traffic, or utility impacts change)?
- Has a plan been discussed or prepared for a construction staging area?
- What considerations have been outlined to manage disruption from construction traffic (e.g., bus routes, routes for construction workers) not only for the community hosting the data center but those adjacent or likely affected by traffic?
- Is there ample housing for construction workers?

Communities have different assets, infrastructure systems, development patterns, growth goals, and resident priorities. A project that aligns well with one community's vision may not be the right fit for another. Informed, local decision-making is key.

Thank You to Our Contributors

Many Iowa cities, counties, and communities have firsthand experience evaluating, constructing, and hosting data centers and generously share their insights to help inform local decision-making across the state.

The Hubbell Environmental Law Initiative at the University of Iowa College of Law, in partnership with the University of Iowa Tippie College of Business Social Impact Community, extends sincere appreciation to the Iowa stakeholders who contributed their time, expertise, and experiences to the development of this Decision Tool.

Contributors to this Decision Tool include: Iowa State Association of Counties; Iowa League of Cities; City of Cedar Rapids Water Utility; City of Altoona; City of Norwalk; Clean Energy Districts of Iowa; Johnson County Planning, Development and Sustainability Department; Linn County Planning and Development; Civil and Environmental Engineering, College of Engineering, University of Iowa; University of Iowa Initiative for Sustainable Communities; University of Iowa Office of Community Engagement.

For questions regarding this Decision Tool, please contact Jennifer Terry, Hubbell Environmental Law Initiative: jennifer-terry@uiowa.edu.

Erin Mousel

From: Ray Reynolds
Sent: Thursday, October 1, 2026 3:58 PM
To: Erin Mousel; Chris Brandes; Devin Cornish; Joe Mousel; Jordan Cook; Lucas Battani; Mike Sauer; NevadaWater; Rhonda Hilipipre-Maier ; Shawn Ludwig
Cc: clerknet@simplelists.com; jennifer-terry@uiowa.edu; Mike Whitsell; Higgins, Rich; Barker, Brett [LEGIS]; Warme, Kara [LEGIS]
Subject: Additional information on Data centers and fire code action in the future
Attachments: Counts Appendix X DRAFT with Bush Comments 09222026.docx

Good afternoon,

This document was provided to communities across Iowa and was very well done as a starter for the conversation when a data center comes calling. I wanted to expound on additional considerations regarding data centers, large structures, and special hazards.

<https://iowaleague.org/wp-content/uploads/Considering-Data-Center-Development-in-Iowa-Handout.pdf>

I currently serve on the Fire Code Action Committee (FCAC) for the International Code Council (ICC). While I do not speak for the ICC, it is important to know most of the US is covered by the ICC codes, specifically in Iowa the International Fire Code (IFC). The FCAC is currently working on proposals to address unlimited area occupancies and special hazards for code changes to the 2030 IFC on this very topic. Specifically in areas where fire protection is not able to handle these large hazards. I am not an advocate for or against data centers, large distribution centers, or special hazards. It is my opinion the fire code official needs to be involved in the very first discussion. Too often the decision to put a large structure or special hazard occupancy is discovered by the fire department when the foundation is poured.

The fire and buildings codes have always assumed fire departments will provide a robust and adequate fire suppression response. We are only now realizing our built environment and energy storage hazards are exceeding fire department response capabilities. So what does that mean for these mega-structures? So if the fire protection systems do not work to suppress a fire, the building is coming down. To address this concern, a working group of code and building experts are assessing the possibility of adding a new appendix to the code looking at additional protection systems and conducting a risk analysis that evaluates what can be done when the hazard is too much for the fire department to handle. Is it appropriate to let a building burn or should we drain a community's water supply to end up with the same result and an even larger environmental hazard? A fire department capability should be a part of any community's decision before the economic allure they may or may not bring after tax incentives.

I am including the opening starting point draft of the possible appendix so you can truly understand the complexities involved in making a decision to build a data center, distribution center, warehouse, and special hazards like photovoltaic fields that power lithium-ion battery energy storage (BES) systems. This is only a draft stating point and will likely change but you can see the intent of the fire and building code is to provide a pathway and discussions when one of these hazards comes to a community near you. What additional steps or measures should be considered to save lives and property when the fire response is unable to compete with the hazard put before it. I should note, this is not a reflection of a fire department of community, even the biggest and most staffed departments are overwhelmed by big fire incidents.

CURRENT TRENDS IN DATA CENTER (UNLIMITED AREA OCCUPANCIES AND SPECIAL HAZARDS)

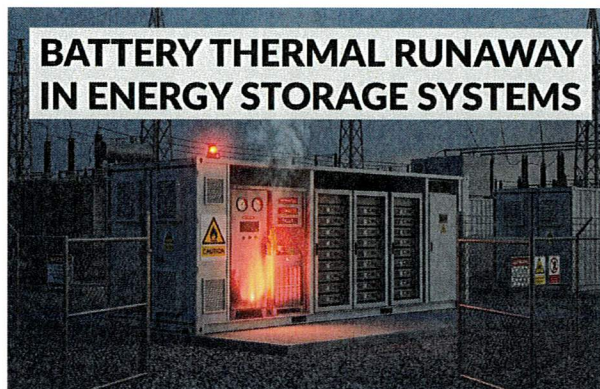
CONSTRUCTION:

The availability of large areas of land are influencing large structures in more rural areas. Within the last year a 600,000 square foot warehouse storage with a BES system was built in a rural Iowa community with no fire department where the town water supply was only 84,000 gallons. While this is only one example of an unlimited area occupancy, the incorporation of a BES adds an explosion, environmental risk, and a complex problem for a fire service. Data centers currently are using 4 troubling practices for fire responses. 1) They consume a large volume of water to cool servers, 2) they use considerable energy resources from the grid, 3) they are large structures with acres of electronic servers and unique energy hazards, and 4) They have very strict site access which often delays a fire response when a fire or emergency occurs.

WATER: Data centers of the future are looking to get away from water cooling and instead either use closed loop water cooling or under development is the use of mineral oils similar to what is found in electric transformers as a cooling agent. It is still a very real threat for communities in the wildland dry interface area when that water supply of a community is needed for fire suppression. It is not uncommon from normal water users to drain existing supplies to concerning levels. That concern is even more pressing when a data center is built and becomes a large water user. Does your community have water capacity to support a high user or to have water capacity for a large fire event?

ELECTRICITY: To ease weaker electrical grids, data centers and large structures have switched to large diesel generators to supplement the natural grid. This creates increased traffic from semi traffic used for fueling, more noise pollution, and the environmental impacts of generator exhaust are known to cause increased cancer and environmental damage. In the future you will see micro nuclear plants near data centers and the development of smaller “modular plug and play” adaptable Data centers. This is already in testing in China and some small scale development in the US. They will also switch from AC power to a higher level of DC current meaning they need to develop it and store it on site. That brings about the solar fields and BES storage on site or inside the building.

BATTERY ENERGY STORAGE (BES) HAZARDS: When BES systems catch on fire, they emit a toxic and explosive confined gas that burns in a thermal runaway fashion. The fire service has not currently found a way to put these fires out. Lithium-ion batteries throughout our country are a real fire problem. These fires produce toxic gas, explosion risk, and burn uncontrollably with no real means to extinguish them except to run their course. Last week a fire in California caused evacuations, firefighter injuries, and resulted in millions of water flowed by the fire department just to cool exposures. The issue with data centers is they want all BES systems stored in the building itself. One code expert advised, “if you let the fire burn it will be over quicker than if you spray water on the event.” Unfortunately if this BES is inside the building, it means the data center will burn to the ground. The environmental disaster would be devastating to a community.



FIRES: Fires in a data center would be costly and involve a lot of a communities resources. If BES is involved even if the fire was suppressed somehow, the equipment would be contaminated. The cost to mitigate this incident may exceed the value of the structure. These would result in considerable health risks to firefighters. NIOSH most recent injury report revealed an EV car fire with lithium-ion battery smoke exposure still 11 months later has firefighters unable to return to work. The city workers comp claims and associated costs are also of concern. More increasingly we are seeing large occupancies overwhelm the designed sprinkler systems. Even with supplemental water storage on site, does the fire department have sufficient pumping supply to meet the over 6,000 gallons per min flow that would be required?

WHAT HAPPENS WHEN THEY LEAVE: There are 6 major companies building data centers along with some smaller companies doing minor support projects. An Iowa community has a 2.6M square foot distribution center in a location where the fire department has only 3 firefighters on duty as minimum staffing. Any event of significance would overwhelm most of the county. The other question to ask is what if technology changes and they become obsolete? I am reminded of the Kmart buildings and large Walmart moves to other locations. Is a community prepared to maintain a vacant 1M square foot structure with no occupants? Who would maintain the fire protection systems if the company just left? Who would want to move into such a structure when abandoned? Abandoned, Vacant, and Dilapidated (AVD) buildings account for the most firefighter line of duty deaths per incident. NIOSH recently examined 50 incidents involving AVD structures that accounted for 60 firefighter deaths and 50 injuries. Having a mega-structure AVD building in your community would be a very difficult problem to address.

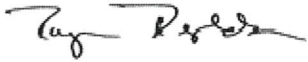
POLITICS OF DATA CENTER CONSTRUCTION: China and the US have the largest economies in the world. They are in strict competition over information and technology. There is some data to suggest China is mounting a disinformation campaign to dissuade the US (through public opinion) from building these structures. There is significant mis-information about the pro's and con's of building data centers in your community. We all contribute to the need for data centers. Buying items on line, researching, social media connections, seeking AI support, connecting the world beyond normal shipping practices drive the need for data center construction. The Data Center big 6 are seeking code guidance to address all of these issues to build these structures to address public opinion, location concerns, and public safety response capabilities. Behind the myths of "is it good or is it bad" should be a research driven approach that immediately involves the fire service and code official.

LEGISLATIVE CONCERNS: The fire service has grown increasingly concern with legislative efforts to remove or modify sections of the fire and building code. It has become all too common to dissect parts of the code for economic arguments. The ICC code consensus process is driven by experts in the field. The role of the FCAC is to assure bad code is not created. The fire and building codes are the absolute minimum safety standards. Any attempt at modifying the code erodes the protections afforded by a well-researched pool of knowledgeable experts who introduce proposals to the fire code. While the code process is 3 years behind technology advances, it still works to address these emerging trends through codes and resist the urge to act quickly when a complex issue comes to your community. Legislative actions involving changes to the international code are often driven by economic factors/arguments and safety is likely an after thought until the bad incident happens.

FINAL THOUGHTS: The allure of a new construction development is always difficult to balance with the needs of a community, the resources needed from a community, and what is the public opinion regarding the project. Often what is lost in the communication is, "what will this mean for the fire department?" When a project offering emerging challenges comes knocking, it is critical to assess if your community fire department

has the staffing, code enforcement ability, equipment, and competency to mount a robust and adequate response to an incident? And even with that, distribution centers, data centers, large mega-warehouses, and special hazards may exceed any fire department's capabilities. When that happens, what is your plan to prevent an incident, during the incident, after the incident, and who will command the next moves.

Raymond A. Reynolds, MA, EFO, CFO, CPM



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APPENDIX XX

FIRE PROTECTION GUIDELINES FOR MEGA-STRUCTURES IN LIMITED-RESOURCE AREAS

X101 General

X101.1 Purpose. This appendix is intended to provide guidance on fire and life safety for very large buildings (or "mega-structures") that are constructed in areas with limited fire protection resources. The provisions in this appendix are **informational only** and not mandatory unless specifically adopted by the jurisdiction. The guidelines herein are designed to help fire code officials, designers, and facility owners identify risk factors and best practices for such buildings beyond the minimum code requirements.

X101.2 Scope. This appendix applies to buildings of exceptionally large size, height, or complexity (referred to as *mega-structures*) that are located in rural or remote areas, or in jurisdictions with limited water supply, extended fire department response times, minimal firefighting staff on duty, or other resource constraints. Example occupancies include, but are not limited to, high-piled storage warehouses, distribution centers, data centers, large manufacturing or industrial plants, and other facilities of similar scale. These guidelines focus on risk-based measures that **exceed the base code requirements** in order to enhance life safety and property protection in situations where standard assumptions about fire service capabilities may not apply.

X101.3 Informational Note: Mega-structures often have footprint areas or fire flow demands that surpass the local fire department's immediate response capacity. In such cases, special design considerations and contingency planning are critical for protecting building occupants, responding firefighters, and nearby property. The recommendations in this appendix are drawn from national standards (e.g., NFPA), industry best practices, and past incident learnings, and are **intended to support the fire code official (FCO)** in evaluating designs and emergency plans for these unique facilities.

X102 Risk Assessment and Pre-Incident Planning

X102.1 Risk analysis. For any proposed mega-structure, the FCO should require a comprehensive **fire risk assessment** early in the development process. This assessment should evaluate the *worst-case fire scenarios* against the community's available fire suppression capabilities. Key factors include: anticipated fire load (fuel type and quantity), required fire flow (see Section X104), probable fire growth rates, potential for flashover or structural collapse, and the time needed for fire service response and intervention. If the analysis indicates that a fire could exceed the control capabilities of built-in systems and responding personnel, the FCO should work with the owner/design team to incorporate additional protective measures as outlined in this appendix.

X102.2 Pre-incident plan. A site-specific **pre-incident plan** should be developed in accordance with the principles of NFPA 1660 (Standard for Emergency, Continuity, and Crisis Management, which includes pre-incident planning guidance). This plan should be prepared *in collaboration with the local fire department prior to occupancy*, and regularly updated (at least annually or whenever significant changes occur in building layout or operations). The pre-incident plan should include:

1. **Facility details:** Construction type, total floor area and height, occupancy classification(s), and any unique structural features (e.g., large open areas, atriums, basements, high-rack storage) that affect fire behavior or firefighting tactics. Identify the presence of any *lightweight construction* or other features that may contribute to early structural collapse, and mark such areas on floor plans available to responders.
2. **Fire protection systems:** Locations and specifications of fire alarm panels, sprinkler/standpipe control valves and risers, fire pumps and water tanks, emergency and backup power controls, smoke control panels, and other built-in fire protection or safety systems. Include operational details (such as fire pump startup procedure, emergency power transfer, and manual controls for any smoke management system).
3. **Water supply information:** Hydrant locations (on-site and nearest off-site hydrants or static water sources), fire pump capacity, on-site water storage volume and refill procedures, and any known limitations of the water supply. The plan should outline contingencies for water supply failure (e.g., how a tanker shuttle or relay pumping operation will be set up, referencing NFPA 1142 for calculating necessary water if applicable).
4. **Site access and layout:** A diagram of fire apparatus access roads, entry gates (including any access codes or Knox® key box locations), designated fire lanes and fire department appliance set-up areas (such as locations for aerial apparatus), building access points for firefighters, and potential obstacles (fences, overhead power lines, etc.).
5. **Special hazards:** Identification and location of hazardous materials, fuel storage, battery energy storage systems (ESS), high-voltage equipment, or other special hazards on site (see Section N107). Note any specific fire control considerations (e.g., need for specialized extinguishing agents or defensive tactics) associated with these hazards. Include Material Safety Data Sheet (MSDS) information and emergency shutoff procedures for utilities and processes (fuel valves, electrical disconnects, etc.).
6. **Operational procedures:** Predefined strategies and decision points for fire response. For example, criteria for switching to defensive operations and focusing on exposure protection (see Section N108) if interior conditions deteriorate (such as rapidly worsening fire conditions, structural instability, or loss of water supply). Include roles for on-site staff (if any) in assisting with emergency actions (like initiating emergency shutdowns, operating on-site fire pumps or water control valves, etc.). Also outline the anticipated sequence of mutual aid

or regional response – i.e., which neighboring departments or specialty units will be automatically dispatched on a first alarm to supplement water delivery and personnel.

7. **Post-incident considerations:** Plans for post-fire actions, such as structural safety evaluations, business continuity (if the facility provides critical services), environmental mitigation (runoff containment, air monitoring for hazardous smoke), and fire watch or security in the aftermath of an incident (see Section X109).
8. **Building Occupancy:** Determine any needs for building occupant evacuation or relocation based upon possible hours of operations; number and location(s) of staff, visitors, and ITM personnel; and areas available for safe egress, and refuge.
9. **Public Utilities:** Provide information on contacts for operation and control of building utility services such as normal electrical power supplied by a public utility, service companies for both on- and off-site gas and other fuel supplies.
10. **Fire Department Operations:** Review the operations of responding fire departments to address issues such as equipment compatibility (hose sizes, hose thread connections, SCBA, power generation, radio communications, command structure, etc.) are adequately understood with planned means for coordinated operations.

Informational Note: The pre-incident plan for a mega-structure should be treated as a living document and integrated into firefighter training. On-site orientation visits, joint exercises (including mutual aid partners), and table-top or full-scale drills should be conducted periodically to ensure responders are familiar with the facility and the plan remains up to date.

X103 Fire-Flow and Water Supply Considerations

N103.1 Required fire-flow analysis. The water supply necessary for manual and automatic firefighting operations (commonly referred to as *needed fire flow*) should be determined for the mega-structure at the design stage. This analysis may use methodologies from **IFC Appendix B** (Fire-Flow Requirements for Buildings), **Insurance Services Office (ISO) Fire Suppression Rating Schedule (FSRS)** guidelines, or **NFPA 1142** (Standard for Water Supplies for Suburban and Rural Fire Fighting), as deemed appropriate by the FCO. In general, the needed fire flow should account for the largest anticipated fire area (considering the potential ineffectiveness or partial operation of automatic suppression systems) and the exposure of other building sections or nearby structures. The fire-flow duration should reflect the time for multiple alarm units to respond and sustain operations (often 2 to 4 hours).

- *Informational Example:* If a calculated fire flow of 3,000 gpm for 4 hours (for a total of 720,000 gallons) is required for a high-piled storage warehouse, but the municipal supply can only provide 1,000 gpm and ~100,000 gallons over 2 hours, the FCO should require on-site water supply enhancements per Section X103.2.

X103.2 On-site water supply and pressure. Where the required fire flow or duration exceeds what the municipal or utility system can provide reliably (due to pipe capacity, limited source, etc.), *on-site water supply* should be provided. Options include elevated or ground-level fire protection water tanks or reservoirs designed and installed per **NFPA 22** (Standard for Water Tanks for Private Fire Protection). On-site water supplies should be capable of delivering the required fire flow for the full calculated duration from Section X103.1. **Redundant supply features** are recommended: for example, providing multiple tanks or reservoirs (or compartments within a single reservoir) to safeguard water supply in case one component fails or is compromised. On-site water should be arranged to allow **rapid replenishment** or drafting by fire department pumpers if extended operations are needed (e.g., an accessible drafting hydrant on a reservoir, or a well/pump that can refill a tank at a high rate). All control valves, connections, and operating instructions for the on-site water supply must be plainly identified and included in the pre-incident plan.

X103.3 Fire pumps and reliability. When fire pumps are necessary to achieve adequate flow or pressure for fire protection systems, they should be installed per **NFPA 20** (Standard for the Installation of Stationary Pumps) and designed with reliability in mind. FCOs should consider requiring **backup pump capacity** – for example, two fire pumps where one alone can handle the full sprinkler demand, or one fire pump with both primary and alternate power sources (normal electric plus emergency generator, or a primary electric pump plus a secondary diesel pump). This redundancy ensures that a single failure (mechanical or power-related) does not leave the building unprotected. Fire pump controllers and transfer switches should be of the listed fire pump type and arranged to kick over to secondary power seamlessly on primary power loss. All fire pump installations must include features for alarm monitoring (per NFPA 20), which should annunciate pump running, loss of power, phase reversal, or controller trouble on the fire alarm system so that any pump issues are immediately known. Protect fire pump assemblies from fire, flooding, or mechanical damage – use 2-hour rated separation or locate pumps in a detached structure, and ensure the pump room is adequately heated in cold climates and ventilated.

X103.4 Hydrants and fire department connections. Mega-structures should be encircled by an on-site fire hydrant system (loop) per **NFPA 24** (Standard for Private Fire Service Mains) to provide multiple points of water supply for fire department use. Hydrant placement should correspond to tactical needs: hydrants every 300 ft (91 m) along access roads, or closer if required by the FCO, with at least one hydrant located within 50–100 ft (15–30 m) of each FDC. Private hydrant outlets should be outfitted with caps and threads matching the local standard (or equipped with adapters available on site if multiple thread standards are in use by mutual aid departments). Provide at least two remotely located **fire department connections (FDCs)** for automatic sprinkler and standpipe systems – for instance, one FDC near the main entrance and another on the opposite side of the building. This allows fire companies to supplement water to sprinklers or standpipes from different

access points, ensuring that at least one connection remains usable if part of the building or its surrounding area is compromised by fire. Mark FDCs with durable signage indicating the systems and zones they serve (e.g., "South Pump Room – Sprinkler FDC" or "Standpipe Zones 5-8 FDC") to avoid confusion during an incident.

Informational Note: Reliable water supply is the cornerstone of fire response in any area, but especially where backup may be far away. FCOs should verify that any private hydrant and water supply systems are included in routine inspections and testing (e.g., annual flow testing of private hydrants and fire pumps under NFPA 25) to maintain performance. Agreements should be in place for the fire department to use the private water supply during emergencies, including any necessary training or keys/equipment needed to access valves and controls.

X104 Fire Apparatus Access and Site Layout

X104.1 Multiple access points. Mega-structures should be served by multiple fire apparatus access points. Provide at least two robust and widely separated access routes from the public way into the site. This enables fire apparatus to approach from different directions and prevents a single blockage (such as a collapsed structure, a stuck vehicle, or a security gate failure) from cutting off all access. The FCO may require an emergency access road or easement if the main entrance is distant or potentially compromised (for example, a secondary road connecting to another side of an industrial park, or an emergency-only access across a neighboring property, secured by a gate). All such routes must meet **IFC 503** and **Appendix D** specifications.

X104.2 Fire lane coverage. Design apparatus access so that no portion of the building's exterior is beyond the reach of hose streams. For buildings protected throughout with sprinklers, IFC generally requires fire access roads within 150 ft (45 720 mm) of all portions of the building perimeter; unsprinklered buildings require 150 ft access to every portion of the exterior walls. For a mega-structure, it is good practice to even exceed reduce these distances – for instance, providing access completely around the building or to 100% of the perimeter when possible. In addition, if parts of the structure are more than 50 feet high or have critical equipment on the roof, allocate sufficient space along at least one side for positioning aerial ladder trucks (per IFC D105). This often means a long side of the building with a fire lane at least 26 feet (7925 mm) in width, no overhead obstructions, and a setback from the building of 15 to 30 feet as needed for effective ladder angles.

X104.3 Roadway specifications and maintenance. All fire apparatus roads shall be designed and maintained to remain passable and functional under all conditions:

- **Surface and support** – Use paving or reinforced surfaces capable of supporting imposed loads of fire apparatus (see IFC D102.1 for minimum 75,000 lbs point load). If the access road includes bridges or elevated structures, those must be designed to AASHTO HS-20 loading

or as required for fire apparatus weight. Provide documentation if requested to confirm load capacity.

- **Grade and angle** – Keep grades and cross-slopes within the limits of IFC 503.2.7 (generally, grade $\leq 10\%$ for conventional apparatus; some apparatus may handle steeper grades but need specific approval). Provide gradual transitions to avoid apparatus bottoming out.
- **Turning radius** – The minimum turning radius should accommodate the largest responding vehicle; IFC Appendix D suggests a 28 ft (8534 mm) inside and 50 ft (15 240 mm) outside turning radius as a guideline, but local apparatus may require different.
- **Turnarounds** – Where dead-end fire access roads cannot be avoided, include an approved turnaround such as a 120-foot hammerhead, 60-foot “Y,” or 96-foot diameter cul-de-sac (per IFC D103.1 and D103.3). Ensure these areas are kept clear at all times.
- **Fire lane marking** – Designate fire lanes with striping (“Fire Lane – No Parking”) or signs per local standards (IFC 503.3) to prevent inadvertent parking or obstruction. Enforce these restrictions via the property management as needed.

X104.4 Security and access control. Security measures on the property should not impede emergency access. Any area of the building which requires specialized means for access should be clearly identified. Any special requirements for building entry, or access to certain interior portions of the building, including means for entry and availability of property personnel (either on-site or remote) should be arranged prior to emergency fire department arrival and operations.

Gate entrances used by fire apparatus should be at least as wide as the required road width (e.g., 20 ft (6096 mm) clear opening). Gates across fire lanes should be equipped with **emergency opening devices** – such as an electric gate with an optically or radio-controlled sensor that opens upon approach of emergency vehicles, or a manually operated gate with a Knox® padlock or key switch available for fire department use. If the site has security staffing 24/7, establish protocols that security will immediately unlock and open all necessary gates upon fire alarm or 911 notification. Mount any access control devices (keypads, card readers) so as not to obstruct apparatus entry (providing at least 30 ft (9144 mm) of queuing space off the public way for fire vehicles to pull in while activating a gate). Additionally, ensure any traffic calming measures on private roads (like speed bumps or chicanes) are designed to be negotiable by fire apparatus – excessive speed bumps can delay response or damage vehicles. Removable or tapered speed control devices are preferred.

X105 Building Design Features

X105.1 Compartmentation and interior separations. It is recommended that large building areas be subdivided to limit fire spread, even where not mandated by code. Internal fire walls or fire barrier walls can compartmentalize the structure into smaller zones that align with manageable fire areas. For example, adding a 2-hour fire wall (with appropriate fire door assemblies and protected

openings) can create fire-separated sections that help to confine a fire and reduce the chance of total building involvement. In unobstructed large spaces (e.g., aircraft hangars, big-box retail, warehouses), incorporating draft curtains and automatic roof vents (or mechanical smoke exhaust systems) can improve conditions for occupant evacuation and firefighter visibility by slowing lateral smoke spread and reducing heat accumulation (see IFC Section 910 for smoke and heat vents). Vertical openings (shafts, atria, utility chases) should be minimized or protected to avoid rapid fire spread between floors; consider noncombustible floor and ceiling assemblies even in types of construction where not required, when the horizontal area is vast.

X105.2 Structural fire endurance. Given the potential for longer burn times in limited-response scenarios, the use of enhanced structural fire protection is advised. Critical structural elements (columns, girders, trusses, roof frames) that are not required by code to be fire-resistance-rated should still be evaluated for fire endurance. Increasing the fire resistance rating of key structural components (through fireproofing or using inherently fire-resistive assemblies) can delay structural failure, providing more time for evacuation and for suppression efforts to control the fire. For example, if the code requires 1-hour fire resistance for a given structural element, consider a 2-hour rated assembly in critical areas. Unprotected steel in roofs can reach collapse temperatures quickly in a fire; therefore, the FCO may recommend applying SFRM (spray-applied fire resistive material) to long-span steel trusses supporting essential areas or to connections whose failure could precipitate wide structural collapse. Also, installing fire-resistance-rated ceilings (even if not required) under mezzanines or particularly hazardous operations can provide an additional layer of protection and time.

X105.3 Interior emergency aids. Due to expansive floor areas, wayfinding and emergency communication inside mega-structures can be challenging during a fire. The following features should be considered to aid emergency responders and occupants:

- **Exit marking and directional signage:** Go beyond minimum exit sign requirements – use directional floor markers (e.g., floor stripe paint or pathfinder lighting systems) and higher-mounted exit signs that remain visible above high storage or equipment. In windowless or long-span areas, consider photo-luminescent or electrical directional markings to guide occupants to exits during power loss or heavy smoke.
- **Fire department communication systems:** Ensure compliance with IFC Section 510 for in-building emergency responder radio coverage. If the building's size or construction is likely to impede radio signals, install a bi-directional amplifier (BDA) system or distributed antenna system (DAS) as needed. Also, in a very large building, a hardwired two-way telephone system (firefighter phones at strategic locations) could supplement radio communications

(not explicitly required by code except in high-rises, but beneficial in large horizontal facilities as well).

- **Firefighting equipment provisions:** Provide wall hydrants or interior hose connections (2½-inch outlets per NFPA 14) in strategic locations (e.g., at 200-foot intervals along main corridors or at entrances to particularly large warehouse bays) so that fire departments can quickly connect hoses inside the structure and avoid extremely long hose lays from the exterior. Although not always required by the base code for one-story buildings, these small “dry” standpipe outlets can be invaluable for speeding up interior hose deployment in a mega-structure. They should be fed from the on-site water system or yard hydrants and built to NFPA 14 standards.

X106 Fire Protection Systems and Power Reliability

X106.1 Automatic suppression and detection systems. Mega-structures should be equipped with automatic fire suppression and detection systems as required by the code, but due to the scale and risk, *upgrades to these systems should be considered:*

- **Sprinkler design criteria:** Design automatic sprinkler systems to the specific high-hazard challenges present. For example, in big-box retail, warehouses, or other storage, use ESFR sprinklers or even additional in-rack sprinklers for better fire knock-down. In large open-process areas or atriums, consider supplemental sprinkler protection (like draft curtain zoning, or deluge systems) to target potential fire locations. The goal is to ensure that sprinklers can either control or at least slow the fire’s growth until firefighters arrive, acknowledging that in some cases suppression may need to operate for an extended period without manual intervention.
- **Detection and alarms:** Provide automatic detection throughout, even in areas where it’s not strictly required (such as normally unoccupied, non-sleeping spaces). The earlier the detection, the better – especially where response times are long. Air sampling smoke detection can sense fires at a very early stage in critical environments (like server farms) and may trigger pre-planned responses (staff investigation, system shutdowns) before sprinklers activate. In areas such as large electrical rooms or mechanical spaces, consider heat detection (or rate-of-rise detection) if smoke detection is impractical. The use of beam-type detection may be considered for large open area spaces. In addition, specialized detection, such as CO monitoring and fuel gas detection, may be required for the detection and early warning of gases or other substances which may present a higher health or fire safety hazard. All detection devices should report to a code-compliant fire alarm system with addressable capability, enabling pinpointing the alarm location. The fire alarm system should be monitored off-site by an approved supervising station in accordance with NFPA 72 for immediate notification of the fire department at the first sign of fire or system trouble.

- **Smoke control:** Assess if smoke management systems (either passive or active) are warranted. While not always required except in specific scenarios (like large atriums or high-piled storage under some conditions), smoke vents or mechanical exhaust can limit smoke and heat damage. In vast single-story spaces, automatic roof vents (with appropriate draft curtain placement) per IFC 910 can slow lateral smoke spread. In more complex buildings (e.g., multi-story malls or data centers with critical equipment), consider mechanical smoke exhaust or compartment smoke control to confine and remove smoke. Provide manual controls for any smoke control or HVAC shutdowns at a central location for firefighters.

X106.2 Power reliability and emergency systems. The building's life safety systems should be supported by reliable emergency power. This typically involves on-site emergency generators or standby power systems meeting **NFPA 110** (Standard for Emergency and Standby Power Systems) criteria, capable of auto-starting within 10 seconds of a power loss. All critical systems – including but not limited to fire pumps, alarm and communications, emergency lighting and exit signage, smoke control systems, and any necessary electronic egress controls – should be on the emergency power circuits. The emergency power system itself should be protected: e.g., generators in a 2-hour rated room or outdoor enclosure, day tanks and fuel lines similarly protected or safely located, and redundant start features or multiple units when power is mission-critical.

- **Redundant arrangements:** If the building relies heavily on mechanical systems for fire safety (like smoke control or large evacuation elevators), consider providing a secondary source of backup power (a second generator or a backup connection for a portable generator) in case the primary EPS fails or requires maintenance.
- **Fail-safe design:** All power-operated life safety features (smoke dampers, fire doors on hold-opens, security locks, etc.) should be configured to revert to their safe position upon loss of power or signal. For instance, smoke dampers should either close or open (as designed to combat smoke spread) without power; magnetic locks should release so that egress doors are unlocked if power fails; and gravity-operated or fusible link systems (like gravity smoke vents or counterweighted fire door assemblies) should be used where possible to avoid total dependence on electrical power.

Informational Note: Complex fire protection and life safety systems in mega-structures require rigorous commissioning and ongoing maintenance. Monthly tests of fire pumps (per NFPA 25), annual full-flow tests of water supplies, routine fire alarm and sprinkler inspections, and periodic drills to verify emergency generator transfer under load are all strongly recommended. The FCO may consider requiring owners to maintain a service contract or internal program for the care of these systems, with annual proof of compliance provided to the jurisdiction.

X107 Special Hazards: Hazardous Materials and Energy Systems

X107.1 Hazardous material management. If the mega-structure will store or handle significant *hazardous materials* (as defined by the IFC), the design should include additional protections to prevent a hazmat incident from escalating or hampering emergency response. For example:

- **Separate high-hazard areas:** Large quantities of flammable, combustible, or toxic substances should be stored in one-story detached buildings or in rooms separated by 2-hour fire barriers, equipped with their own automatic suppression systems and explosion control where required. For instance, a diesel fuel storage for backup generators might be placed in a vault or cut-off room meeting Section 5704 of the IFC, and protected by an appropriate fire suppression system (such as a foam-water system) with a dedicated deluge valve and detection.
- **Spill containment and drainage:** Provide spill control and containment for storage of significant liquid hazards, per IFC requirements (e.g., 66 gallon [250 L] threshold for flammables in a room). Also, evaluate site drainage to ensure that contaminated firefighting water can be confined (with drainage shut-off valves or impoundment areas) to prevent environmental contamination or spread of flammable liquids to exposures.
- **Compressed gases and oxidizers:** Separate and protect any large quantities of oxidizing gases or liquids (like oxygen, nitrous oxide, hydrogen peroxide) as these can accelerate combustion. Ensure ventilation and monitoring per IFC Chapter 53 (for compressed gases) or Chapter 63 (for oxidizers) is in place, and that such systems have backup power if needed to prevent hazardous accumulations during an outage.
- **Hazard communication:** The facility should maintain an updated Hazardous Materials Inventory Statement (HMIS) and make it available to the FCO and emergency responders. Pre-incident plans should clearly indicate where hazardous materials are located in the building (e.g., a map of control areas or H occupancy areas), and what special fire-fighting precautions or methods are recommended (for example, "protect exposure tanks with water spray, allow controlled burn-out of magnesium stock fire," etc.).

X107.2 Battery energy storage systems (ESS). Large-scale energy storage systems must comply with **NFPA 855** and the IFC. Key safety measures include:

- **Dedicated enclosure and separation:** ESS installations should be housed in rooms or enclosures with appropriate fire ratings and clearances as specified by code (e.g., 2-hour rated fire barriers for most indoor systems, and spatial separation or 1-hour rated enclosures for outdoor containerized systems).
- **Thermal runaway mitigation:** Install early detection (smoke and heat detection set to alarm at incipient stages of battery off-gassing) and provide an automatic suppression system.

Water sprinklers (with an appropriately high application density as recommended by NFPA 855 or FM Global datasheets for lithium-ion battery protection) are effective at cooling and controlling battery fires. Where water damage is a major concern, a hybrid approach with clean agent systems for early intervention plus sprinklers for backup can be used. Ensure manual hose connections or portable fire extinguishing equipment (such as Class ABC dry chemical and Class D agents if applicable) are readily available for first response to battery incidents.

- **Gas detection and ventilation:** Because certain battery chemistries can release flammable/toxic gases when heated or failing, continuous gas detection (for flammable gas like hydrogen) with exhaust fan interlocks is recommended in ESS rooms or containers. Duct these exhausts directly to the outside, away from any building air intakes or enclosed areas.
- **Emergency planning for ESS:** Include specific procedures in the pre-incident plan for battery emergencies, such as isolating the affected units (shutting off charging/discharging), cooling adjacent units with hose streams if safe, and allowing controlled burn if extinguishment is not feasible. Coordinate these plans with local hazmat teams and utility providers as needed.

X107.3 On-site fuel supplies and emergency power systems. Generators, HVAC systems, and other on-site equipment often involve fuel or other hazards. Apply the following measures:

- **Fuel storage and delivery:** Diesel or other fuel storage for generators or fire pumps should adhere to all applicable code requirements (IFC, NFPA 30, NFPA 110). As an enhancement, equip fuel storage rooms or areas with automatic suppression or detection even if code does not mandate it, due to the high consequence of a fuel-fed fire. Install remote manual shutoffs for fuel supply lines (clearly labeled Emergency Fuel Shutoff, per IFC 5703.6, for instance) at accessible locations outside the high-hazard area.
- **Pressurized fuel gases (LPG/LNG):** These should generally be stored outside with safety distances as per IFC Chapter 61 (LPG) or NFPA 55/58. Avoid locating LPG tanks down-slope from the main building if possible (since LPG vapors can travel). If the facility uses significant amounts of natural gas (for process or heating), an exterior main gas shutoff (outside the building, in a marked and accessible location) is critical.
- **Standby generators:** Space multiple generator units with sufficient separation (per NFPA 37 and local amendments) to prevent a fire in one from immediately affecting the next. If generators are in an enclosure or room, treat that area as a higher hazard (often requiring sprinklers or clean agent fire protection in the room, plus automated detection). Provide an emergency shutdown control for each generator on the exterior of the enclosure or at a attended location.

- **Emergency shutdown stations:** Group emergency controls for utilities and other critical building systems (e.g., EPO for data centers, HVAC shutdown switches, fire pump emergency start) at the fire alarm panel or Fire Command Center, to allow responding crews to quickly stabilize the incident environment (by removing sources of heat, fuel, or smoke).

X108 Exterior Exposure Protection

X108.1 Adjacent structures. When a mega-structure is near other buildings, protect those structures from radiant heat, direct flame, and firebrand exposure:

- **Spatial separation:** Provide generous separation distance as much as site constraints allow. Distances greater than those required by the IBC for property line separation (or between buildings on site) significantly improve safety. If the existing distance is marginal, consider fire-rated exterior walls and limiting window openings facing the exposure as per the principles of NFPA 80A (e.g., blank masonry wall or protected openings on the side facing the other building).
- **External spray systems:** Where two facing walls are in close proximity (especially if one or both are highly combustible or have many openings), design a fixed **water spray or deluge system** on one or both exteriors. This system, when activated manually or by heat, will wet the wall surfaces to prevent ignition. This is particularly useful for protecting items like exposed combustible coatings on a neighboring tank, or a lower building located in the thermal radiation footprint of the tall structure.
- **Coordination of fire operations:** The pre-incident plan should identify which nearby structures are priority exposures. The plan may specify preferred hose line deployment or master stream placement to shield those structures (for instance, positioning trucks or monitor appliances between the main building and the exposure). This ensures that, during an incident, the incident commander can promptly assign resources to protect these exposures.

X108.2 Open fields and agricultural areas. For mega-structures near open land (grasslands, crops, brush), maintain a clear buffer to slow fire spread:

- **Fuel breaks:** Provide a perimeter fuel break by clearing or regularly mowing vegetation around the facility. For example, maintain a 30 ft (9 m) gravel or irrigated green belt immediately around the building, and a secondary zone out to 100 ft (30 m) where grass is kept short and natural fuels are thinned. If crops (like hay, wheat, etc.) are grown up to the site, coordinate harvest and plowing schedules to minimize periods where dry stubble abuts the facility during fire season.

- **Preparedness:** Include provisions in the emergency plan to fight fire in open areas: identify nearby farm equipment (plows, diskers) that can cut additional fire breaks if needed, and plan for how water tenders or portable pumps will shuttle water to fields (perhaps using the on-site water source or natural sources). If wildfire risk is significant, pre-positioning fire department resources during high hazard conditions could be a strategy (for instance, having a brush truck on standby at the facility during a regional wildfire event).

X108.3 Wildland interface considerations. For facilities in or adjacent to the wildland-urban interface (WUI):

- **WUI construction features:** Utilize ignition-resistant construction techniques per the IWUIC or NFPA 1140: Class A roofing, noncombustible siding, protected eaves and gutters, ember-resistant vents, and multi-pane tempered glass or shutters for windows. Maintain defensible space as described in X108.2.
- **Fire department access for wildland crews:** If the site borders wildland areas, ensure there are access points (e.g., fire roads or trails) and clear signage for wildland firefighting crews. Perhaps install a dry hydrant in a water source (pond or tank) on the property edge accessible to wildland engines, which often have different threading and pumping requirements than municipal engines – coordinate these details with wildland agencies and consider storing thread adapters if needed.
- **Community integration:** The facility's emergency plans should align with community wildfire response plans. This could mean linking into the local evacuation plan (if the facility has a large number of employees or residents nearby, coordinate triggers for evacuation or shelter-in-place). It could also involve participating in community fuel reduction or prescribed burn programs on adjacent lands to maintain safer conditions.

Informational Note: The goal of Section X108 is to ensure a fire in a mega-structure does not ignite significant secondary fires. By addressing exposures – whether they are buildings, stored commodities, or wildland – the overall impact of a potential disaster is contained. FCOs may use a combination of design requirements (fire walls, distances, etc.) and emergency planning (like pre-deploying resources in extreme conditions) to achieve this containment.

X109 Emergency Operations, Response, and Recovery

X109.1 Enhanced response planning. The FCO, in coordination with the fire department, should confirm that adequate *firefighting resources* will be available for a mega-structure fire. This may involve modifying run cards (dispatch protocols) so that any reported fire at the facility automatically triggers a multi-alarm response, calling in mutual aid per pre-arranged agreements. If the region has an interagency incident management system, consider classifying the mega-structure as a target

hazard that warrants a higher initial Incident Command level (e.g., automatically assigning a chief officer, safety officer, and additional specialized teams upon dispatch). The goal is to ensure that water supply operations, exposure protection, ventilation, and potential rescue operations can be conducted simultaneously despite limited on-duty staffing of the primary jurisdiction.

X109.2 Facility emergency response role. Facility management should coordinate with the FCO to define the role of on-site personnel during an emergency. Large facilities, especially those operating 24/7 (like data centers or industrial plants), are encouraged to have a **trained emergency team** on-site. These personnel (often from security or safety departments) should be capable of initiating immediate actions such as: shutting down critical processes or power, activating manual release of fire doors or vents, assisting with evacuation of employees, and communicating vital information to responders. They might also perform incipient stage firefighting if trained (e.g., using fire extinguishers or small hose reels on very small fires). The FCO should ensure that these internal teams do not attempt beyond their training – their primary role is to support the public firefighters, not to engage in dangerous interior fire suppression once a fire grows. Regular joint training exercises between the facility's team and the fire department can greatly enhance on-scene coordination.

X109.3 Defensive operations and firefighter safety. In mega-structure fires, a switch to defensive (exterior) operations may occur early due to safety concerns or overwhelming fire conditions. The incident pre-plan (Section N102.2) should articulate clear thresholds for when to evacuate firefighters and cease interior attack (for example, when two or more sprinkler systems have been overrun by fire, when interior temperatures reach unsurvivable levels despite ventilation, or when building collapse becomes likely). Once defensive mode is declared, priority shifts to preventing fire spread off-site (see Section N108). The incident commander should establish collapse zones (at least equal to the building height, or more if needed) and keep personnel outside those boundaries. Unmanned master streams (e.g., tower trucks or ground monitors) should be used to deliver water from a safe distance. Firefighters must also be aware of **toxic smoke and runoff**; large industrial fires can produce hazardous atmospheres and polluted water. The plan may call for notification of environmental agencies and for use of personal protective equipment for extended operations (SCBA, protective clothing even outside the immediate fire area if hazardous smoke is drifting).

X109.4 Post-incident recovery. The FCO should work with the building owner to implement a safe transition from emergency response to recovery. This may include:

- Ensuring **site security** once the fire department leaves (to prevent unauthorized entry into a damaged structure, which can be very dangerous, and to protect any evidence for fire

investigation). This often means the owner will need to hire security or coordinate with law enforcement.

- **Fire watch:** If portions of the sprinkler or alarm system are out of service due to the fire, a continuous fire watch (with trained personnel) should be provided per IFC 901.7 until protection is restored.
- **Business continuity:** If the mega-structure provided critical community services (power, data, manufacturing of essential goods), the owner and authorities should have contingency plans to transfer those services or mitigate the impact (for instance, utilizing backup data centers, sourcing products from alternate facilities, etc.). These plans, while beyond the scope of the fire code, are part of the holistic emergency management picture as recommended by NFPA 1660.
- **Community impact mitigation:** Large fires can have community-wide effects like traffic interruptions, utility outages, or environmental pollution. The aftermath plan should involve local agencies to handle these – e.g., public works to manage road closures or structural demolition, environmental agencies to advise on hazardous materials cleanup (such as runoff control, air quality monitoring for smoke and fumes), and public information officers to communicate safety messages to the public (like boil-water advisories if water systems were impacted, or avoidance of the area due to smoke).

Informational Note: Recovery is an essential phase of emergency management. By planning for recovery, communities and businesses can reduce downtime and prevent a secondary crisis (such as environmental damage or economic hardship). The fire code official's involvement in pre-planning for recovery (though outside typical code enforcement) can ensure that re-occupancy of the structure, or rebuilding, proceeds safely and in compliance with code.

X110 Informational References. (The following documents and resources are referenced in this appendix and can provide supporting information. The specific provisions in these documents are not enforceable unless separately adopted.)

1. **International Fire Code** (IFC), 2024 edition, International Code Council. (See IFC Chapter 5, Appendix B, Appendix C, Appendix D, etc., for baseline fire flow, hydrant, and access requirements.)
2. **International Wildland-Urban Interface Code** (IWUIC), 2024 edition, International Code Council. (Contains requirements for defensible space, ignition-resistant construction, and other measures in wildfire-prone areas.)
3. **NFPA 13**, *Standard for the Installation of Sprinkler Systems*, 2025 edition, National Fire Protection Association.

4. **NFPA 15**, *Standard for Water Spray Fixed Systems for Fire Protection*, 2022 edition, National Fire Protection Association.
5. **NFPA 20**, *Standard for the Installation of Stationary Pumps for Fire Protection*, 2025 edition, National Fire Protection Association.
6. **NFPA 22**, *Standard for Water Tanks for Private Fire Protection*, 2024 edition, National Fire Protection Association.
7. **NFPA 24**, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, 2022 edition, National Fire Protection Association.
8. **NFPA 72**, *National Fire Alarm and Signaling Code*, 2025 edition, National Fire Protection Association.
9. **NFPA 80A**, *Guide on Protection of Buildings from Exterior Fire Exposures*, 2022 edition, National Fire Protection Association.
10. **NFPA 855**, *Standard for the Installation of Stationary Energy Storage Systems*, 2023 edition, National Fire Protection Association.
11. **NFPA 1081**, *Standard for Facility Fire Brigade Member Professional Qualifications*, 2022 edition, National Fire Protection Association.
12. **NFPA 1140**, *Standard for Wildland Fire Protection*, 2022 edition, National Fire Protection Association.
13. **NFPA 1142**, *Standard for Water Supplies for Suburban and Rural Fire Fighting*, 2022 edition, National Fire Protection Association.
14. **NFPA 1660**, *Standard for Emergency, Continuity, and Crisis Management: Preparedness, Response, and Recovery*, 2024 edition, National Fire Protection Association.
15. **Insurance Services Office (ISO) – Fire Suppression Rating Schedule (FSRS)**, 2023 edition. (Methodology for evaluating community fire protection, including needed fire flows and water supply adequacy.)
16. **FEMA/U.S. Fire Administration (USFA) Technical Reports and Guides** – e.g., *Warehouse Fires* (USFA TR-082, 2013), *Rural Firefighting Operations* (USFA, 1999, updated 2017), *Water Supply Systems and Evaluation Methods* (FEMA, 2008/2018). (These and similar publications provide case studies and strategies for managing large-scale fires and water supply issues in areas with limited resources.)

Informational Note: Jurisdictions and stakeholders should consult the most current editions of the above standards and resources. These references offer detailed technical criteria and lessons learned that support the best practices in this appendix and can inform local adaptations or enforcement policies.

Erin Mousel

From: Luke Spence
Sent: Wednesday, October 7, 2026 1:40 PM
To: Jordan Cook; Erin Mousel; Mayor Condon
Subject: Data Center resolution template

Hi Jordan,

I'm sending this a second time to include Erin Mousel and the Mayor. Could you send this template of a resolution to the rest of the Council, as well as Erin Clanton for her perusal, for them to have going into the meeting Monday.

Thanks,
Luke

A resolution Establishing a Temporary Moratorium on the Acceptance of Applications and/or Issuance of Permits for Digital Asset Mining, Cryptocurrency Operations, Data Processing Centers and/or Battery/Energy Storage Solutions on properties located in the City of Nevada, putting in place a temporary moratorium expiring on or before_____.

In that time, a Mayor appointed committee made up of representatives from City Admin, Council, the Nevada Planning & Zoning Commission, NEDC, (others??) will convene and report back to the council within 6 months on the needed changes to city code, planning and zoning regulations, and any other policies or considerations needed to meet the needs of Nevada in regards to these facilities within the city limits.