
Developing a Floodplain Management Overlay Ordinance for the City of Ann Arbor, MI

Dow Sustainability
Fellowship Program

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III. Abbreviations

ACS: American Community Survey

ASCE: American Society of Civil Engineers

CFR: Code of Federal Regulations

CRS: Community Rating System

EPA: Environmental Protection Agency

FEMA: Federal Emergency Management Agency

FIRM: Flood Insurance Rate Map

MBC: Michigan Building Code

MDEQ: Michigan Department of Environmental Quality

MRC: Michigan Residential Code

MZEA: Michigan Zoning Enabling Act

NFIP: National Flood Insurance Program

NREPA: National Resources and Environmental Protection Act

PDM: Pre-Disaster Mitigation

PDR: Purchase of Development Rights

TDR: Transfer of Development Rights



IV. Executive Summary

As a result of an increase in severe flood events in recent years, the City of Ann Arbor (the City) has been interested in developing an ordinance to manage risk and development within areas affected by flooding. Our interdisciplinary graduate student team of Dow Sustainability Fellows has worked with the City over the past ten months to develop a floodplain management overlay ordinance to regulate development within the floodplain in the City of Ann Arbor.

In combination with the City, we worked to create an ordinance that accomplishes the following goals:

1. To protect open space and limit development in the floodplain;
2. To provide a clear process and set of guidelines for property owners within the floodplain to follow when seeking to develop or improve structures on their property;
3. To lower National Flood Insurance Program mandatory premiums for individuals living within flood hazard area by meeting specific Community Rating System criteria;
4. To expand floodplain regulation beyond the area that is currently regulated by the Michigan Department of Environmental Quality; and
5. To fit within existing Federal and State regulatory frameworks.

We began by examining current Ann Arbor planning documents, including the Ann Arbor 2007 Flood Mitigation Plan, which lays out a strategy for comprehensive management of flood events across the City, to ensure our ordinance would advance the City's overall goals. Additionally, we looked at flood management ordinances from cities comparable to Ann Arbor to understand best practices and explore different types of ordinance structures. We analyzed the federal and state regulatory and legal context in which we would be creating the ordinance to ensure it was consistent and would survive potential legal challenges.

Next, we developed the Floodplain Management Overlay Ordinance in partnership with the City. This ordinance defines a floodplain overlay district for flood hazard areas which are composed of the floodway, the flood fringe, and a 50-foot buffer. This floodplain management overlay ordinance imposes specific restrictions regarding development within the aforementioned overlay district and expands floodplain regulations to all parcels located within the 100-year floodplain. Furthermore, it improves upon existing standards from the Michigan Building Code and requires structures located within flood hazard areas to be elevated so that the lowest floor is at least one foot above the 500-year flood elevation.

The regulations contained within the proposed ordinance are intended to mitigate the impacts of future flood events. This is done by limiting future development and creating a land buffer within the floodplain that can better handle extreme weather events, thereby decreasing damages and injuries in the wake of such events and reducing the communities' recovery costs of these events



After developing the ordinance, we also examined possible next steps for the City. Since the ordinance must go through a process of public review prior to City Council's vote, we addressed potential concerns that residents, developers, and property owners could have regarding the new regulation. These included restrictions on future development; an inability to substantially improve or rebuild residences in the floodplain; and a more burdensome permitting process.

We also looked at ways in which this ordinance fit within a larger flood mitigation plan and suggested other possible actions that could supplement the positive impact of the ordinance, including open space preservation/acquisition and relocation and stormwater management.

V. Project Background

There has been a growing incidence of flooding in Ann Arbor and similar communities as a result of climate change. In response, these communities are identifying proactive ways to mitigate the causes of flooding to reduce the damages to people and property. In early 2014, the University of Michigan - Graham Sustainability Institute approached a team of Dow Sustainability Fellows about the City of Ann Arbor's (the City) request for legal and policy assistance in developing a floodplain management overlay ordinance.

As defined by the American Planning Association, an overlay zone is "a zoning district which is applied over one or more previously established zoning districts, establishing additional or stricter standards and criteria for covered properties in addition to [the standards] of the underlying zoning district."¹ This floodplain management overlay ordinance would have an immediate effect in supporting the community's adaptation to extreme precipitation and flooding events. In addition, it would also allow the City to realize a few major goals of its 2007 Flood Mitigation Plan: first to adapt to recent changes in the National Flood Insurance Program (NFIP) and, second, to take advantage of the Community Rating System (CRS) incentives for adopting more restrictive floodplain management strategies.

At the time of its request, the City had made only marginal headway on the ordinance because it was unable to find appropriate examples of floodplain management overlay ordinances in Michigan. Our team of Dow Sustainability Fellows, representing law, urban planning, public policy, naval architecture, and public health student agreed to partner with the City to develop this floodplain management overlay ordinance. Through this year-long project, we researched floodplain management overlay ordinances and developed a proposed ordinance for the City of Ann Arbor.

We began this project by analyzing the City's existing draft ordinance and reviewing the Ann Arbor 2007 Flood Mitigation Plan, Ann Arbor Allen Creek Greenway Findings and Recommendations Report, and the updated Federal Emergency Management Agency's (FEMA) floodplain maps for Ann Arbor. Next, we looked for floodplain management overlay

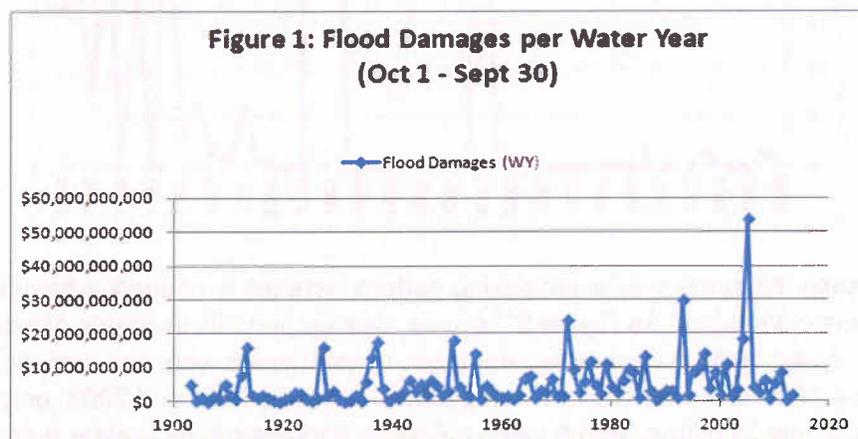
ordinances in cities with analogous geographies and populations to inform our approach to Ann Arbor's ordinance. Finally, we analyzed the legal and political feasibility of this new ordinance by gaining a thorough understanding of the existing regulatory framework and key stakeholders that would be impacted by the ordinance. Through this research and analysis, we strove to provide the City with timely and appropriate legal and policy recommendations for floodplain management.

VI. Pillars of Sustainability

We incorporated the three pillars of sustainability into our process and floodplain management overlay ordinance. The pillars of sustainability relate to floodplain management as follows:

1. **Economic:** Floodplain management overlay ordinances will impact potential development within the regulated area by imposing specific restrictions on the types of development permitted. We strove to understand how this kind of ordinance might impact future development, as well as current property owners within the floodplain.
2. **Environmental:** This ordinance protects open space and limits development within the floodplain, which will improve floodplain management in the area and help to remove wastewater pollutants from the floodwaters.
3. **Equity:** According to the American Community Survey (ACS), households affected by the newly proposed ordinance have a lower median income than the City, but these households are still subject to increased flood insurance rates. Thus, lower income residents are disproportionately affected by the increased flood insurance rates. By implementing a floodplain management overlay ordinance with heightened standards, the City can affect a substantial premium reduction for those that live within special flood hazard areas.

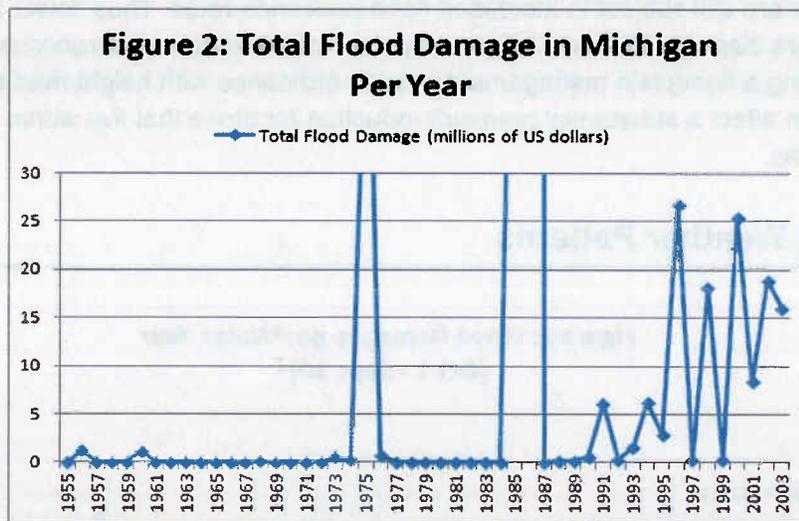
VII. Changing Weather Patterns



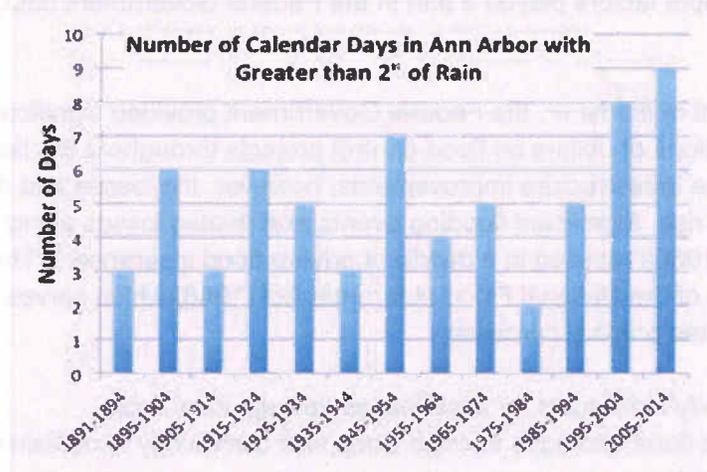


According to the Environmental Protection Agency (EPA), as a result of rising temperatures caused by global climate change, the air becomes more saturated with vapor, leading to more severe storms and greater precipitation.² Currently, the United States receives, on average, six percent more precipitation than it did 100 years ago,³ and climate scientists predict that spring and winter precipitation will increase by between 20 and 30 percent by the end of the century⁴. This increase in precipitation has also led to a rise in severe flood incidents around the country in recent decades, as evidenced by Figure 1,⁵ which shows a clear rise in the total amount of flood damages per water year since 1900. According to the U.S. Geological Survey, the term water year refers to a 12-month period, starting in October 1 of the relevant year and ending in September 30 of the following year; it is used to measure the supply of surface water supply during that time.⁶ Even taking into account periodic abnormal flood incidents throughout the years, an upward trend is apparent.

This trend shows what James Lee Witt, then director of FEMA, argued as early as 1998, that **“there is no disagreement that the frequency and severity of what we call ‘weather events’ are on the rise;”**⁷ even at that time, almost two-thirds of the disasters to which FEMA responded were related to flooding.⁸ These disasters are not only occurring with increasing frequency, but are also causing more damage and having a higher negative economic impact than they used to. In fact, the National Weather Service’s Hydrologic Information Center estimates that between October 1, 2012 and September 30, 2013 flooding caused approximately \$2,152,417,080 in damages throughout the United States.⁹



Michigan has seen the same overall increasing pattern increase in of serious flood incidents and resultant economic damages. As Figure 2¹⁰ shows, despite periodic incidents of extreme flooding (in 1975 and 1986, for example), damages in most years were consistently low, remaining below \$2 million until 1991. In comparison, between 1991 and 2003, only 5 years had flood damages below \$5 million, with 5 years reflecting flood damages greater than \$15 million.

Figure 3¹¹

The City of Ann Arbor has not been immune to these challenges or changes in precipitation levels over the last several decades. As seen in Figure 3, the number of days with significant amounts of rain increased steadily over the last 30 years; this rise in precipitation will increase risk of flooding for a larger land area than may have previously been impacted and can lead to higher building and infrastructure damage within affected zones. A rise in extreme flood events will also lead to greater runoff into nearby bodies of water that could have costly consequences for the environment.¹² Preventive steps taken to restrict development and enforce flood proofing standards in areas at risk of severe flooding could reduce future costs for both property owners and the community at large.

VIII. Regulatory Context and Statutory Authorization

In 2007, the Ann Arbor City Council approved a Flood Mitigation Plan that would incorporate numerous floodplain management recommendations into a new floodplain management overlay ordinance. The City Council then passed a resolution directing the City staff to draft a floodplain management overlay ordinance. Since that time, Ann Arbor decided that a floodplain management overlay ordinance would best suit the City's needs. The City sought assistance researching and drafting a floodplain management overlay ordinance in keeping with its Flood Mitigation Plan and recently adjusted floodplain zone. With this ordinance, Ann Arbor would be able to move forward in joining the Community Rating System (CRS) which provides the City with additional incentives for adopting more restrictive floodplain management strategies.

Federal: National Flood Insurance Program

The NFIP was created in 1968 under the National Flood Insurance Act. After decades of combating flooding and flood damage with structural measures and disaster assistance money, Congress created a more proactive means of approaching flood events. The NFIP represents a



shift from private insurance coverage of American lives and property to a market with federally backed policies. Multiple factors played a part in the Federal Government backing flood insurance.¹³

Prior to the enactment of the NFIP, the Federal Government provided significant disaster relief funding and spent billions of dollars on flood-control projects throughout the first half of the 20th century. Despite these infrastructure improvements, however, the losses and damages due to flooding continued to rise. Significant flooding events and related losses along the Mississippi River corridor in the 1960s resulted in a dearth of private flood insurance.¹⁴ This trend led to the drafting and passage of the National Flood Insurance Act (1968) which serves the three following interconnected primary purposes:

1. Better indemnify individuals for flood losses through insurance;
2. Reduce future flood damages through State and community floodplain management regulations; and
3. Reduce Federal expenditures for disaster assistance and flood control.¹⁵

The second of these goals actually serves as a requirement for a community to benefit from the first goal, the flood insurance provided by FEMA. The regulations that are adopted by communities must meet the criteria listed in 44 Code of Federal Regulations, Part 60 (44 CFR 60).¹⁶ Beyond the three purposes identified above, the Federal Government recognized a need for local and state governments to create regulatory structures that would positively impact land use decisions within the floodplain.

While 44 CFR 60 establishes a minimum standard that community regulations must meet in order for the community to be eligible for federally subsidized insurance rates, FEMA recognized the benefits of providing incentives for communities to adopt floodplain management regulations that exceed the requirements in 44 CFR 60. In 1990, FEMA created the Community Rating System (CRS) to encourage communities to adopt more comprehensive floodplain management regulations.¹⁷

Federal: Community Rating System

Any community that meets the minimum federal requirements (outlined in 44 CFR 60) is eligible to join the CRS. This voluntary system financially benefits both the residents of communities by providing discounts on flood insurance premiums and also the communities as a whole by promoting an uninterrupted, responsive floodplain.¹⁸ These floodplains are then more capable of handling extreme weather events, thereby decreasing damages and injuries in the wake of such events and reducing the communities' response costs to these events.

In the application process to become a part of the CRS, the interested community submits a package documenting implementation of actions for which the community will be requesting



credit. The actions that a community can take span four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Warning and Response. There are between three and six action items in each category, combining for a total of nineteen activities. These activities range from providing Flood Insurance Rate Map (FIRM) assistance for residents to acquiring buildings that are in the floodplain and relocating them to areas outside of the floodplain.¹⁹ The full list of incentivized actions may be seen in reference.

The CRS assigns cities to one of 10 possible class levels. Class 1 includes cities that have taken extensive measures beyond the minimum standards in 44 CFR 60, while Class 10 encompasses communities that have yet to enroll in the CRS. When a community reaches Class 9, the residents of the community receive a 5 percent reduction of flood insurance premiums; this reduction increases in increments of 5 percent until the community reaches Class 1, at which point the residents are eligible for a 45 percent reduction in flood insurance premiums. Ann Arbor is currently not a member of the CRS, however the City will submit the application upon the passage of a floodplain management overlay ordinance.

Upon entry into the CRS, a municipality usually starts as a Class 9 or Class 8 community. During the annual recertification process, communities can apply for a better class level by documenting additional measures implemented since the last certification process. Table 1 summarizes the premium reduction benefits at each class level.²⁰

Table 1 - Overview of Community Rating System Class Point Totals

CRS Points	Class	Premium Reduction for Properties in SFHA	CRS Points	Class	Premium Reduction for Properties in SFHA
4,500+	1	45%	2,000-2,499	6	20%
4,000- 4,499	2	40%	1,500-1,999	7	15%
3,500-3,999	3	35%	1,000-1,499	8	10%
3,000-3,499	4	30%	500-999	9	5%
2,500-2,999	5	25%	0-499	10	0%

While the most well recognized aspect of the CRS is the reduction in premiums for property owners in the floodplain, ultimately, the program seamlessly integrates with the broader effort of floodplain management. As stated in the CRS Coordinator’s Manual, “floodplains in riverine and coastal areas perform natural functions that cannot be replicated elsewhere. The CRS provides special credit for community activities that protect and/or restore natural floodplain functions, even though some of the activities may not directly reduce flood losses to insurable buildings.”²¹ While it is important to emphasize the financial benefit that results from a community’s





participation in the CRS, fostering a healthy, functional floodplain is the predominant reason for regulatory floodplain management.

Federal: Mandatory Ordinance Components

As part of the CRS application process, FEMA provides communities with a regulations review checklist, included in Appendix I. The checklist serves as a guide to municipalities during the development of floodplain regulations. By addressing the 46 items in the checklist during the ordinance drafting process, a community can be sure to meet the minimum standards in 44 CFR 60, the baseline requirement to enter into the CRS. Selected sections of the checklist are discussed below.

As expected, a floodplain management overlay ordinance must cite statutory authorization; this authorization usually comes from the state as a form of delegating responsibility. In the case of Ann Arbor, the statutory authorization comes from the Michigan Zoning Enabling Act (MZEA), found in Michigan Compiled Laws §125.3201(3). In that section of state code, the Michigan legislature has delegated the responsibility of adopting regulations to minimize flood losses to local governments.

Furthermore, definitions specific to floodplain regulation must be included as part of a community's ordinance. These definitions include Base Flood, Base Flood Elevation, FIRM, Floodway, and others. Along with the definitions, the appropriate FIRM panels with correct revision dates and the most recent Flood Insurance Study must be incorporated by reference. Apart from general administrative sections, any floodplain management overlay ordinance must also include a permitting process; restrictions on construction in the floodplain (to include minimum flood-proofing standards); permitted and prohibited uses of sites in the floodplain; and regulate the construction or substantial improvement of manufactured homes in the floodplain.²²

State: Authorization

Although the NFIP anticipates floodplain regulation by local entities, before drafting the ordinance we wanted to make sure that the City had the statutory authority and the legal foundation under Michigan State law to regulate development in the floodplain. The State must have specifically delegated to municipalities the authority to regulate land development. Not only does the 1963 Michigan Constitution contain "home rule" provisions that would strengthen the ability of municipalities to regulate land control in the absence of other state legislation,²³ but the Michigan legislature has also enacted the MZEA, which contains legislation directly pertinent to this issue.²⁴ Section 201 of the MZEA explicitly permits local governments, by zoning ordinance, to establish districts within which they may regulate land development for a number of purposes, including to promote public health, safety, and welfare.²⁵ The Act's provision of regulatory power applies "only to land areas and activities involved in a special program to achieve specific land management objectives and avert or solve specific land use problems..." This concept clearly

includes the “regulation of land development and the establishment of districts in areas subject to damage from flooding...”²⁶

In Section 203, the MZEA states that a zoning ordinance must be based upon a plan designed to promote the public health, safety, and general welfare.”²⁷ More specifically, Section 203 states one of the permitted purposes of a zoning ordinance is to “reduce hazards to life and property...” Ensuring that the regulation explicitly fulfills this purpose and enumerates the public benefits to be conferred through heightened development standards would satisfy this requirement as well as increase the likelihood that, if challenged, it would withstand judicial scrutiny. We additionally incorporated recommendations from the City’s master plan as a way to ensure consistency.

Once we determined that the City had the statutory authority to enact a floodplain management overlay ordinance, we conducted a survey of other state statutes and regulations in order to ensure compliance and consistency with them. The most important laws we identified were the Michigan Building Code (MBC) and related Michigan Residential Code (MRC), as well as the Water Resources Protection section of the Natural Resources and Environmental Protection Act (NREPA).

The MBC and the MRC, found in the Michigan Administrative Code, provide a number of rules to which various forms of development must adhere.²⁸ In Section 1612.4, the MBC requires that buildings and structures as defined in the American Society of Civil Engineers (ASCE) 24 table 1-1 and located in flood hazard areas are designed and constructed to specific standards which would minimize the probability that the development will be impacted by or negatively impact flood conditions. One specific example is the MBC’s requirement that Type II and Type III buildings (from the ASCE table) located in flood hazard areas are elevated so that the lowest floor is at least one foot above the 500-year flood elevation (Section 1612.4.3.) The 500-year flood elevation refers to the elevation that has a 2 percent chance of being equaled or exceeded each year; by comparison, the 100-year flood refers to the elevation that has a 1 percent chance of being equaled or exceeded this year.²⁹ Using the specific standards for freeboard elevation (R322.2 of the 2009 MRC) and other flood protection measures found in the MBC and MRC as a regulatory baseline, we recommended that the City implement heightened standards for floodplain development.

By implementing heightened standards for floodplain development, the ordinance could more effectively mitigate the impacts of future flood events if it banned the placement of critical facilities (defined as Type II or Type III buildings) within the floodplain and utilized the specific requirement of elevating buildings to one foot above the 500-year flood elevation as a broader standard for all buildings found within the floodway and flood fringe. Additionally, where possible we used definitions from these regulations in order to achieve broader consistency with the state.



Section 324.3104, found in the Water Resources Section of the NREPA, designates the Michigan Department of Environmental Quality (MDEQ) as the state agency to cooperate with governmental units such as the City in matters concerning the water resources of the state, including flood control.³⁰ This section, as well as the established standards and processes in Sections 325.3105 through 324.3108, also give the MDEQ control over the alterations of natural or present watercourses to assure that floodways are not developed or inhabited and are kept free of interferences that will cause any undue restriction of the capacity of the floodway. To implement this responsibility, the MDEQ requires a permit to alter the floodplain.

To integrate these requirements into the City's floodplain management overlay ordinance, we proposed language that would inform applicants about their required duties in order to receive a state permit for this type of activity and required communication of the applicant with the MDEQ in other instances. For example, because the MDEQ may require the provision of new floodplain information if the current FIRM shows outdated flood information, we recommend the City require applicants to notify MDEQ when the development approval process reveals that actual field conditions conflict with the boundaries of the FIRM zones.

Local: Natural Features

The City of Ann Arbor Natural Features Master Plan states that "a healthy natural environment is necessary to sustain a high quality of life. This master plan describes our natural features, both publicly and privately owned, and sets forth policies to protect, restore and sustain them."³¹ This plan contains seven distinct goals aimed at specific aspects of Ann Arbor's natural features, including to "identify, restore, and sustain floodplains."³² In order to meet this goal, it is necessary for the City to adopt an ordinance that will govern land use throughout the entirety of the City's floodplain, not just the areas presently regulated under MDEQ ordinances.

The importance of the City's floodplains (and other natural features) goes beyond creating a community that is a desirable location for people to live. A floodplain that has been subject to limited or no land use regulation adds disaster susceptibility to the community. There are a number of factors that can reduce the efficacy of a natural floodplain: an increase in impervious surface; a redirection of the natural waterway; removal of land within the floodplain; use of fill within the floodplain; and the location/type of structures in the floodplain.

The infiltration process is impeded when impervious surfaces (asphalt, concrete, structures, etc.) are built within a floodplain. The proximate result of this is standing water in locations of low permeability. Figure 4 below provides a visual example of the impact that improper land use regulation can have on the infrastructure of a community. The significant amounts of standing water throughout the southern area of downtown Ann Arbor in late June of 2013 were caused by approximately 1.3 inches of rain, a total that is less than one-third of the 100-year flood.

Figure 4 - Flooding on South Fifth Avenue, Ann Arbor, from rainstorm on June 27, 2013.



During a 5 hour period between roughly 3:00 pm and 8:00 pm Ann Arbor saw 1.3 inches of rain fall.

Despite the existing development of downtown Ann Arbor, much of which lies within the Allen Creek floodplain, it is still necessary to implement appropriate actions to protect and restore the floodplain as part of the Natural Features Master Plan. An additional consequence of development in the floodplain is that an increase in impervious surfaces leads to increased levels of contaminants (e.g., oil residues from roads, construction material, other foreign substances) in runoff water. These contaminants are then carried into aquatic habitats, adversely impacting fish, water-fowl, and even terrestrial species.³³

By creating regulations to limit new developments, regulate re-developments, and require an increase in net storage capacity for floodwaters, the impacts of existing infrastructure and buildings inside the floodplain can be mitigated. The Natural Features Master Plan calls for restoring “floodplains to natural conditions where possible,” but recognizes that a balance with economic development is necessary.³⁴ This balance is in the form of direct city action, education of citizens, and regulatory control.

Within Chapter 57 of the Ann Arbor Municipal Code, the impact on natural features must be considered for area plans or site plans. Within Chapter 57, sections 5.126-129 specify the requirements for a natural features statement of impact, mitigation of (impact to) natural features, protection of natural features, and the City’s review criteria for the natural features statement of impact.³⁵ Key aspects of the Natural Features Master Plan that relate to the development and review of natural features statements of impact include:



1. The development of “a policy to restore city-owned wetlands, especially those with high flood storage capacity;”
2. The development of “a policy that would restrict or prohibit new development within any floodway within the City unless the development is deemed to be of greater public interest than potential flooding hazards and damage”; and
3. An effort to “promote stewardship on private lands by educating the public to identify native plants and invasive species.”³⁶

Local: Community Districts

Another important aspect of overlay ordinances is the interaction between the overlay district and previously established districts in the community. In Ann Arbor, there are two main zoning areas to consider. The first is the manufactured home site in the Swift Run floodplain. Existing Ann Arbor zoning restricts mobile homes to the Sunnyside Park Drive area on the south side of Packard Road. This zone, designated as R6, will be impacted by the proposed floodplain management overlay ordinance in the following manner:

New and replacement mobile homes must be elevated in compliance with Section 5 of this ordinance and shall be securely anchored to an adequately anchored foundation system that resists flotation, collapse and lateral movement. Methods of anchoring may include, but are not limited to, use of over-the-top or frame ties to ground anchors. This requirement is in addition to applicable state or local anchoring requirements for resisting wind forces.³⁷

The second existing district with which the proposed ordinance would interact is the historic district. Ann Arbor’s historic districts span residential, commercial, and mixed use areas and spread throughout much of the downtown in a disjointed manner. Not surprisingly, much of the historic district falls within the floodplain. This is a situation that has the potential of resulting in conflicting development requirements.

The owner of a structure or parcel in the historic district who desires to develop, improve, or redevelop on the site would normally be subject to the regulations of the historic district, included in Title VIII, Chapter 103, of the Ann Arbor Municipal Code. However, the presence of an overlay district supersedes the underlying zoning regulations. If the previously mentioned structure or parcel is in the floodplain overlay district in addition to an historic district, the owner/developer would be required to follow the regulations in the proposed floodplain management overlay ordinance, in addition to the historic district regulations. In the event of a conflict between the two regulations, the stricter regulations would take precedence.

IX. Consistency with Master Plan

Overlay zones can be very effective regulatory tools because they tailor regulations to specific properties and districts. By tailoring these regulations, Cities can better address inequities and meet specific community goals laid out in a master plan.³⁸ The City of Ann Arbor's master plan guides public and private decision-makers in regard to the physical development of the City. The master plan is comprised of multiple documents or "elements" that address Ann Arbor's major geographical areas and essential facilities. It is a framework intended to preserve the City's character and diversity, support investment, and promote desired change.

The master plan is documentation of the City's long-term preferences and serves as a legal basis for its land-use planning and controls. This floodplain management overlay ordinance aims to achieve specific floodplain management goals defined in the master plan. The floodplain management overlay ordinance should be consistent with the master plan, particularly Ann Arbor's Natural Features Master Plan (2004), Land Use Element (2009) and Flood Mitigation Plan (2007), which are the three main elements that provide a rationale and legal basis for floodplain management.

In addition to the previously discussed Natural Features Master Plan, the Land Use Element (2009) asserts that the City requires substantive protection of natural features, including the floodplain, which can change over time. One objective in this Element is to improve the quality of surface water entering the Huron River by implementing multiple actions. One corresponding action is to enact methods to predict the effects and mitigate impacts of new development in floodways. Another corresponding action to achieve this objective is to "modify City ordinances to prohibit or carefully regulate any new buildings within a floodway to substantially reduce or eliminate impacts to flooding."³⁹

An additional objective is to review and modify city codes to reduce the overall amount of impervious surfaces, thereby reducing surface flooding. One action to achieve this objective is to revise the zoning code to adjust setback requirements. These examples demonstrate how the Land Use element serves as a guideline and basis for protecting the floodplain and mitigating impacts of development within it.

The Floodplain Mitigation Plan (2007) is another master plan element that provides guidance on flood mitigation strategies and their implementation. In particular, the Floodplain Mitigation Plan has two important objectives that are directly relevant to the floodplain management overlay ordinance. One objective is to integrate floodplain management into "new planning projects to prevent hazards associated with previously planned uses that are not supported by current floodplain management standards."⁴⁰ The next objective is to implement regulatory measures and develop standards to mitigate the flood risk for properties in the floodplain.⁴¹ These objectives justify the regulation of land use and development in the floodplain overlay district for the purpose of protecting the floodplain and mitigating development impacts within it.



These three Elements of the City’s master plan provide support and a legal basis for regulating the land and properties within the floodplain overlay district. By keeping the requirements of the ordinance consistent with the goals and objectives of the City’s master plan, Ann Arbor is acting in the interest of the constituents whose preferences are embodied by the master plan.

X. Impact of the Floodplain Management Overlay Ordinance

City Population

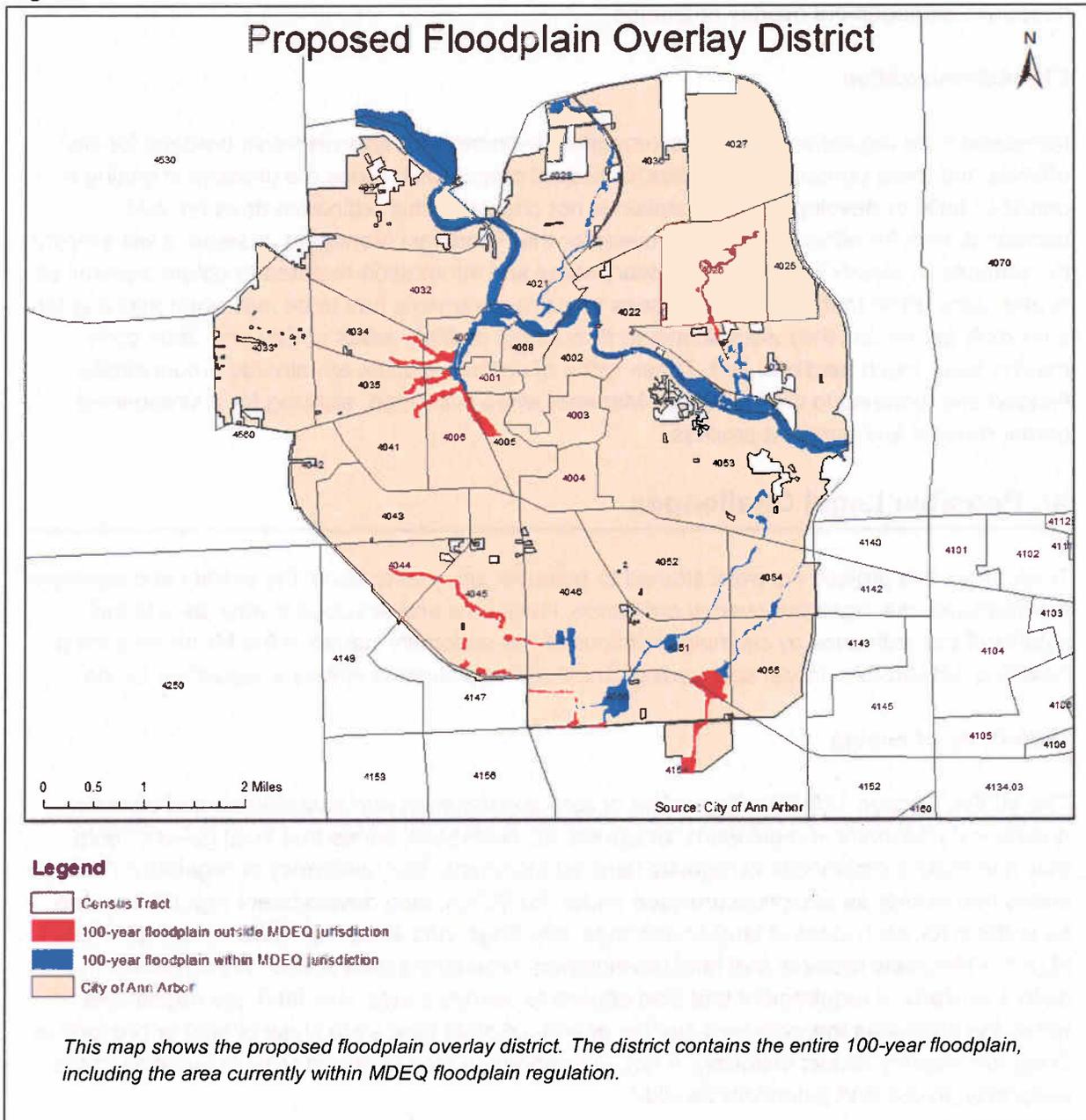
According to the 2008-2012 ACS, the City of Ann Arbor has a population of 114,725. The City spans an area of 27.83 square miles of land and has a population density of 4,122.4 persons per square mile. The floodplain overlay district covers 2.79 square miles, or about 10 percent of the City.⁴²

Although, on average, the overall population in Ann Arbor is relatively wealthy and well-educated, there are some socioeconomic differences between populations living near the floodplain and away from the floodplain. For example, according to the 2008-2012 ACS, the median household income of the populations within the 12 census tracts affected by the newly proposed ordinance is \$40,253 as opposed to \$54,128 across the City. Additionally, while 3.5 percent of the City’s population older than 25 years has less than a high school education, 5 percent of the population in the affected census tracts has less than a high school education. Lastly, while 7.5 percent of the City population identifies as Black or African American alone, 9.06 percent of the population in the affected census tracts identifies as such.⁴³ The differences in these indicators of socioeconomic status provide insight on the importance of floodplain management in areas that are at increased financial and social vulnerability due to flooding.

The City and State currently discourage development in the floodway, especially residential development. The State of Michigan requires structures within the floodplain to be elevated or flood-proofed to one foot above the base flood elevation. In addition, the State prohibits all residential uses and development in the floodway in areas under the jurisdiction of the MDEQ.⁴⁴

According to the City of Ann Arbor, 513 buildings across 1,035 parcels of land are within the reach of the 100-year floodplain. The proposed floodplain overlay district would encompass these 513 buildings within the 1,035 parcels of land. Currently, only a portion of the land and buildings are subject to the MDEQ floodplain regulations. At present, 51.46 percent of buildings and 37.20 percent of parcels in the 100-year floodplain are regulated by MDEQ.⁴⁵ The floodplain management overlay ordinance supplements the scope of the MDEQ jurisdiction by regulating all parcels and buildings within the 100-year floodplain. Figure 5 below shows the areas that are within the proposed floodplain overlay district.

Figure 5.



University of Michigan

As of 2012, the University of Michigan owns 2.39 (about 8.4 percent), of the city’s 28.55 square miles.⁴⁶ The University is exempt from Ann Arbor’s local land-use controls that govern zoning and historic structures because it is a state entity. Given that part of the floodplain lies within

University property, the University's land, properties, and facilities are not subject to the City's floodplain management overlay ordinance.

City Administration

Increased local regulation is often accompanied by increasing administrative burdens for city officials and more bureaucratic hurdles for project proponents. Since the process of getting a permit to build or develop in the floodplain is not changing, this ordinance does not add additional work for either the property owner or the Floodplain Managers. Instead, it will simplify the process by clearly listing the necessary steps and information required to obtain a permit all in one place. Prior to this ordinance, these same requirements had to be met when applying for a building permit, but they were scattered throughout multiple areas of City and State code, making them much harder to find. These types of permit requests are already automatically flagged and funneled to the Floodplain Manager when submitted, allowing for a streamlined permit request and approval process.

XI. Possible Legal Challenges

Throughout this project, we were attuned to potential arguments about the validity and legality of the floodplain management overlay ordinance. Residents and developers may dispute the legality of the ordinance by claiming violations of the uniformity clause of the Michigan Zoning Enabling Act (MZEA), illegal spot zoning, and that the ordinance effects a regulatory taking.

Uniformity of zoning

The MZEA, Section 125.320, *Regulation of land development and establishment of districts; provisions; uniformity of regulations; designations; limitations*, states that local governments may use zoning ordinances to regulate land development. The "uniformity of regulations" clause states that except as otherwise provided under the MZEA, land development regulations shall be uniform for each class of land or buildings, dwellings, and structures *within a district*. The MZEA additionally requires that land development regulations treat similar structures within a district similarly, a requirement that also applies to overlay zones. Any land use regulations within the floodplain management overlay ordinance shall treat each class of land or property in floodplain overlay district uniformly. If not, the ordinance may be found to be in violation of the uniformity clause and potentially invalid.⁴⁷

Spot zoning

The term "spot zoning" refers to *legislative* acts (e.g., rezonings), as opposed to *administrative* acts, such as variances or special permits. Spot zoning occurs when an island of land is rezoned for more- or less-intensive use than is permitted on adjacent properties. The courts view and use the term "spot zoning" as a neutral description of a certain set of facts about land

regulation. The common view and use of the term “spot zoning” is negative, however, which often leads to the legal argument that a rezoning is invalid. Claims of spot zoning, therefore, are usually the most frequent arguments made against rezonings.⁴⁸

Rezoning that appear to serve narrow or private interests often warrant review from the courts because opponents of overlay zoning ordinances may claim that they are an incidence of spot zoning and are invalid. The overriding question about the legality of spot zoning is whether or not the rezoning achieves goals consistent with the master plan. If the rezonings are shown to be consistent with the master plan, concerns of illegality are usually dispelled.⁴⁹ While the absolute size of the spot is a factor in spot zoning cases, it is not the predominating issue. Instead, courts must also look at the relative size of the spot zoning by comparing the size of the area rezoned with the size of the larger surrounding area. In addition to considering the relative size of the spot zoning, courts may assess the validity of the spot zoning by considering the number of lots that are rezoned and the number of landowners who will benefit from the rezoning.⁵⁰

XII. Regulatory Takings

What is a Regulatory Taking?

The term “taking” derives from the Just Compensation Clause of the Fifth Amendment of the U.S. Constitution, which states “...nor shall private property be taken for public use, without just compensation.”⁵¹ Thus, the Just Compensation Clause provides a check against the police power not by prohibiting public agency action, but by requiring payment of just compensation.⁵²

There are two essential flavors of “takings.” The more basic, and clearest, sort of taking occurs when a public agency takes, occupies, or encroaches upon private land for its own proposed use, such as to build roads, create parks, or develop other public uses.⁵³ These explicit takings actions—called eminent domain or condemnation actions—are premised upon the payment of just compensation, or fair market value, for the property. Challenges to these types of takings usually involve the straightforward application of *per se* rules governing the meaning of “public use” and the measure of “just compensation.”⁵⁴ In drafting our ordinance, these “explicit takings” did not present an issue.

The other type of taking, a regulatory taking, or “implicit taking,” occurs when a regulation becomes so onerous that it has the practical effect of a direct appropriation.⁵⁵ The application of the Fifth Amendment to these takings cases was made clear in *Pennsylvania Coal Company v. Mahon*, in which the Supreme Court announced that overly restrictive regulation of property owner’s freedom can constitute a “taking.”⁵⁶ An extreme example would be zoning private land as a public park. Such a regulation does two things: first, it prevents the owner from putting the land to any economic use; and second, it prevents the owner from exercising one of the most fundamental characteristics of property ownership: the right to exclude others. Thus, the



regulation would have a similar effect as if the zoning authority had condemned the land and built a park.

“Takings” in the Context of the Floodplain Management Overlay Ordinance

It was important to consider the Supreme Court’s guidance on regulatory takings throughout drafting the proposed ordinance in order to ensure that our ordinance would not go so far in restricting use of flood prone properties as to become a “taking” of that property. When an ordinance is found to be unduly restrictive in violation of the Fifth Amendment, the consequences are serious. In addition to awarding just compensation to the property owner, the regulation in question is often rescinded or reduced to avoid additional claims. This results in a loss of municipal assets, a waste of agency resources, and uncertainty or even distrust among the public.

Supreme Court Takings Jurisprudence

Avoiding exposure to takings claims, unfortunately, is not cut-and-dry business. By its very nature, land use planning adjusts rights for the public good by imposing benefits and burdens unequally among landowners. This is certainly the case in floodplain management, in which the location of property—whether in or out of the overlay district, and, if inside the district, whether in a more restrictive or more permissive zone—has an impact on landowners’ latitude to develop their property as they wish.

Courts, and in particular the U.S. Supreme Court, in evaluating regulatory takings over the years, have not articulated an easy-to-understand set of rules to help planners, citizens, and landowners understand when a regulation crosses the line to a taking. In fact, a long line of literature claims that the Court’s regulatory takings rules are a mess: a “crazy-quilt pattern, a “welter of confusing and apparently incompatible results,” “liberally salted with paradox,” “incoherent,” “hopelessly confused,” a “muddle,” a “puzzle,” “in doctrinal and conceptual disarray,” a “top contender for the dubious title of ‘most incoherent area of American law,’” and so on. The following oft-cited passages help to illustrate the Supreme Court’s uneven treatment of regulatory takings:

“The Fifth Amendment . . . was designed to bar Government from forcing some people alone to bear public burdens which, in all fairness and justice, should be borne by the public as a whole.”⁵⁷

“Government hardly could go on if to some extent values incident to property could not be diminished without paying for every such change in the general law.”⁵⁸

While these quotes evidence the changing and inconsistent views of the Court, its decisions

have also articulated some core rules. Below, we briefly summarize the Court's key rulings on regulatory takings in order to demonstrate the guideposts we followed in drafting our ordinance.

The Supreme Court's Key Decisions and Implications for Floodplain Management

The Court has laid down three basic rules:

Rule 1, confirmed most prominently in *Loretto v. Teleprompter Manhattan CATV Corp.*, states that a regulation working a permanent physical occupation of land is always a taking.⁵⁹ The rule is categorical. Any regulation working a permanent physical occupation of land by the government or its agents or members of the public is a taking, regardless of how trivial the impact of the invasive regulation on the economic value of the regulated land.⁶⁰ If the physical occupation is only temporary, the takings issue is resolved by an *ad hoc* approach of the sort to be considered in the discussion of Rule 3 below.^{61 62}

Rule 2 is another categorical rule. In *Lucas v. South Carolina Coastal Council*, the Court held that if a regulation "denies all economically beneficial or productive use of land,"⁶³ then it is always a taking. The rule is straightforward on one reading, but ambiguous on another. If it is limited to regulations that literally reduce the market value of land to zero, then its application is clear but its reach extraordinarily narrow⁶⁴. If, on the other hand, the rule is read not quite so literally, then its reach becomes ambiguous and its categorical status questionable.

Finally, Rule 3 originated in *Pennsylvania Coal Co. v. Mahon*—regarded by most observers as the Court's first regulatory takings case—and was restated in *Penn Central Transportation Co. v. City of New York*. In *Pennsylvania Coal*, Justice Holmes, writing for the Court observed that government could hardly go on if obliged to pay compensation every time a regulation diminished the value of property.⁶⁵ There are still limits, however, and regulations that go "too far" will be treated as takings. How far is too far is "a question of degree" that "depends upon^{66 67} the particular facts;" it "cannot be disposed of by general propositions." As the Court put it some^{68 69} fifty years later in *Penn Central*, judgment turns on "essentially *ad hoc*, factual inquiries," with several factors being of "particular significance."⁷⁰

The factors mentioned in *Pennsylvania Coal*, together with those added or restated in *Penn Central*, amount to five: the degree of diminution in value caused by the regulation; the extent to which it interferes with investment-backed expectations; whether it provides an average reciprocity of advantage among owners of the regulated property (as in, for example, zoning restrictions that limit the uses of each lot in a neighborhood in order to enhance the value of all the lots); the character of the government action (whether, for example, it can be characterized as a physical invasion, on the one hand, or as controlling noxious uses, on the other); and whether it destroys recognized property rights.

These three rules for takings determinations were recently articulated by the Court in *Lingle v.*

Chevron.⁷¹ In clarifying their application, the Court also dealt with a fourth, broader regulatory takings inquiry announced in an earlier case: *Agins v. City of Tiburon*.⁷² In that case, the Court had established a two-part test for determining a taking: (1) whether the regulation substantially advances a legitimate state interest, and (2) whether the regulation denies the owner an economically viable use of the land. In the *Lingle* ruling, the Court dropped the first part of that test; that is, courts should no longer inquire into whether the regulation “substantially advances a legitimate state interest.”

The removal of this portion of the takings test reduces barriers to floodplain managers and to planners in general. In essence, the question of whether an action by a legislative body “substantially advanced a legitimate state interest” provided a mechanism by which courts could second-guess the relative merits of enacted laws. In *Lingle*, the Supreme Court indicated that it would defer to legislative decisions unless there is no real relationship between what the legislative body desires and the action taken.

The Court summed up its reasoning in *Lingle* by stating that the four tests it listed “all aim to identify regulatory actions that are functionally equivalent to a direct appropriation of or ouster from private property.” This clear statement by the High Court court supports the principles of both the NFIP and local regulation. In both, the goal is to help communities and property owners develop land safely without causing harm to others. The NFIP’s model language for community ordinances does not support nor even approach an ouster of owners from their land (or appropriation of that land), and local ordinances that follow its principles ought to be free from takings issues.

Takings Jurisprudence in the State of Michigan

In our domestic court system, a plaintiff can contest a regulation for conflicting with both the Federal Constitution and the State constitution. Section 2 of Article 10 of Michigan’s 1963 Constitution, which has been loosely equated with the 5th Amendment of the U.S. Constitution, states “[p]rivate property shall not be taken for public use without just compensation therefore being first made or secured in a manner prescribed by law.” In deciding whether a challenged governmental action and its effect on private property constitutes a “regulatory taking,” Michigan state courts have not substantially diverged in their analysis from federal courts.

In a landmark state case, *K&K Const v. Dep’t of Natural Resources*, 267 Mich App 523; 705 NW 2d 365 (2005), the Michigan Supreme Court most clearly outlined the approach that state courts will utilize to determine whether application of a specific land use regulation constitutes a partial regulatory taking. Utilizing the takings jurisprudence articulated in *Penn Central* and its progeny, the court held:

If the land-use regulation, like traditional zoning and wetland regulations: (1) is comprehensive and universal so that the private property owner is relatively equally benefited and burdened by

the challenged regulation as other similarly situated property owners, and (2) if the owner purchased with knowledge of the regulatory scheme so that it is fair to conclude that the cost to the owner factored in the effect of the regulations on the return of investment, and (3) if, despite the regulation, the owner can make valuable use of his or her land, then compensation is not required under Penn Central.⁷³

Ultimately, the court found that no regulatory taking had occurred because the regulation in question provided an “average reciprocity of advantage” for all property owners, the plaintiffs’ property retained significant value even after the challenged permit denial, and, as commercial land developers with knowledge of wetland regulations, plaintiffs’ investment-backed expectations would have been reasonably tempered by the knowledge that their development would be restricted by the presence of wetlands.

In determining the wetland regulations provided an “average reciprocity of advantage,” the Court looked to the fact that all people, including property owners, were the intended beneficiaries of the regulations. The court also commented, “like zoning regulations, wetland regulations place a burden on some property owners, but this burden ultimately benefits all property owners, including those who claim they are unfairly burdened.”⁷⁴

It is likely a court would find a floodplain regulation’s to have “average reciprocity of advantage” in much the same way the court found in *K&K*; this possible finding will be made especially easy through a clear statement that the purpose of the regulation is to protect the City’s community and property owners (and providing more specific rationale on how it will do this). Additionally, the finding that the character of the government action was a wide-reaching regulatory action that sought to protect the rights of the public and provide “average reciprocity of advantage” was considered to be a factor that weighed heavily against finding a compensable regulatory taking.⁷⁵

Importantly, the court found that where the regulation serves an important public interest and is widespread and ubiquitous, “to sustain a regulatory taking claim, a plaintiff must prove that the economic impact and the extent to which the regulation has interfered with distinct investment-backed expectations are the functional equivalent of a physical invasion by the government of the property in question.” For the most part, the economic impact analysis mirrored that of federal takings jurisprudence. Additionally, one similarity between the challenged regulation in *K&K* and our possible floodplain regulation is the regulatory backdrop. Because most developers, especially those looking to develop land within the floodplain, likely have notice of floodplain regulations promulgated under NREPA and the NFIP, a court might find it fair to conclude that the cost to the owner be factored into the return of investment calculation.

In another Michigan case, a homeowner’s claim that the imposition of costly flood-resistant building code requirements for the reconstruction of their home after flood damage constituted a regulatory taking was found to not be ripe for adjudication when they had failed to bring a claim



for alternative relief from an adjudicatory body which had the power to award variances.⁷⁶ Because they had not demonstrated that an appeal to this board would have been futile, under the rule of finality, the homeowner's claim failed. By providing property owners with the opportunity to apply for a variance from the Zoning Board of Appeals in Ann Arbor, much like the current zoning regulations in place, the floodplain management overlay ordinance has an additional layer of legal defensibility such that property owners faced by economic impracticability (and subject to a number of other requirements) may be permitted to take action without fully complying to the strict regulations of the ordinance.

XIII. Enactment Process

Approving and implementing the ordinance requires a multi-step process with different sets of stakeholders involved at different points in the process. First, in order to be implemented in any capacity, the ordinance must be approved by the Ann Arbor City Council. According to the MZEA, the process for approval is as follows:

1. The City Council is given the zoning ordinance to review
2. Public hearings are held, with appropriate notice given to the city residents
3. The City Council can, if they so choose, refer the ordinance to the Planning Commission for review and comment.
4. City Council, taking into account information from the above proceedings takes a vote on the ordinance. A majority of the council must vote for it in order for it to be approved.⁷⁷

After the City Council has the zoning ordinance and the process of moving toward approval has begun, the first important step is to hold a series of public meetings in which the ordinance is discussed and residents of the city have a chance to provide feedback. These meetings provide an opportunity for the City to share further information about the ordinance, answer questions and address any concerns that the public might have about future implications of the changing regulation. The Planning Commission also has an opportunity to review the ordinance and provide comments on the ordinance.

Once these stakeholders have been given the chance to weigh in regarding the ordinance, the City Council then votes on whether or not to approve it, taking into account the results of the public hearings and other opportunities for review and comment.

XIV. Public Engagement

As previously described, during the enactment process, before the City Council votes on whether or not to approve the ordinance, there will be opportunities for public comment and feedback. During the public comment period, it will be important that the City engages in



meaningful educational outreach about the ordinance that can provide context and help residents understand the impact of the ordinance.

In recent years, the City has successfully gone through this public approval process with other environmental regulations, including regulations on stormwater management. The City should use the same type of education process to help citizens understand the purpose of the ordinance, highlighting specific ways in which it can benefit the community, such as through improved environmental impacts; increased protection against flood damage; lower flood insurance premiums; and public health and safety.

We anticipate that there will likely be a few primary concerns from property owners, developers, and residents in the floodplain that will arise during the public comment period before the Council takes a vote. These include restrictions on future development in parcels in the floodplain; an inability to substantially improve or rebuild residences in the floodplain; and a more burdensome permitting process.

Restrictions on Future Development

The proposed ordinance does impose some restrictions upon building within the floodplain, but these restrictions are specifically aimed at managing risk and reducing personal and economic losses for owners and residents of land within the floodplain. In responding to concerns about these restrictions, the City should point to economic damages suffered in recent years as a result of flooding. These damages could potentially be lessened or avoided altogether in the future if appropriate risk management measures are put in place. Furthermore, the City does not ban all development in the floodplain; instead, it only prohibits future residential development, in keeping with current MDEQ regulations and places constraints on other development to ensure future building will not harm the floodplain.

Finally, it would also be important for the City to discuss the provisions for non-conforming structures, which allow current buildings to remain in place, and also for special exceptions, which give property owners the opportunity to request a permit for certain uses that would normally fall outside of those permitted by the ordinance.

Residential Restrictions

In the portion of the floodplain that is currently regulated by the MEDQ, residential development is already prohibited. Residences located on parcels within the floodplain when these MDEQ regulations were implemented were grandfathered in through a nonconforming structure clause, which allows structures with characteristics that violate building restrictions to remain legal so long as they do not substantially expand or improve their structures. As such, if one of these residences were to be substantially damaged in a flood or other incident or somehow fall into disrepair, it is unlikely that they would be able to rebuild.



The proposed Floodplain Management Overlay Ordinance is consistent with the MDEQ regulation on residential development and simply expands those regulations to the remainder of the floodplain. There are approximately 1,400 residential parcels (both single-family and multi-family homes) in the floodplain, but currently outside of MDEQ jurisdiction that will be newly impacted by the proposed ordinance. Residents and property owners connected to these parcels will want to understand these restrictions and could be concerned about how their ability to build could be impacted in the future.

One response to these concerns is the potential for lowered NFIP insurance premiums. As previously discussed, developing an ordinance that implements a comprehensive approach to floodplain management (which would include restricting residential development in the floodplain) improves Ann Arbor ratings through the CRS. In turn, this lowers the mandatory flood insurance rates for property owners. Since all property owners with a federally-backed mortgage located in the floodplain are required to purchase flood insurance, regardless of whether or not they are covered by floodplain regulations, this could provide financial benefits for them.

Additionally, while these property owners are prevented from making substantial improvements or expansions to residential structures, the City should note that their structures will still be allowed to remain standing and in use once the proposed ordinance is implemented.

Permitting Process

As previously discussed, the requirements associated with a request for a building permit in the floodplain will not change. These requirements will, however, be clearly listed in one place, thereby improving the process for property owners.

XV. Strengthening Floodplain Management

The CRS, as discussed in Section II.1.b, provides a useful roadmap for communities on how to take actions beyond the minimum standards. A cursory review of Ann Arbor's current measures, combined with the regulations in the proposed ordinance, shows that the City is already well positioned to take advantage of the benefits of the CRS. Table 2 lists each of the nineteen supplemental actions, the average points earned by all communities currently enrolled in the CRS, and whether or not Ann Arbor can take advantage of the credits associated with the activity.

If an activity is marked as "Yes" for Ann Arbor that is an indicator that the proposed ordinance includes items that will allow the City to claim a credit, or it has been determined from the Natural Features Master Plan, Flood Mitigation Plan, or other State of Michigan and City of Ann Arbor documents that minimal steps would be required to earn some amount of credit points in that activity. The total number of points for which Ann Arbor would be eligible is a summation of the average points earned by all communities through the activities for which the City meets the



minimum criteria. This total, 1,445 points, would put the City only 55 points shy of entering the CRS as a Class 7 community, based on the information in Table 1.

The City can take steps in multiple areas to earn more points; the most likely candidates for additional attention from the City staff are: Activity 330, Outreach Projects; Activity 420, Open Space Preservation; Activity 430, Higher Regulatory Standards; Activity 450, Stormwater Management; and Activity 520, Acquisition and Relocation. The following sections will focus on possible improvements the City can make to their floodplain management

Table 2 - Overview of Ann Arbor's Standing Within the CRS

Series ID	Activity	Average Points	Ann Arbor?
310	Elevation Certificates	45	Yes
320	Map Information Service	50	Yes
330	Outreach Projects	72	No
340	Hazard Disclosure	19	No
350	Flood Protection Information	39	Yes
360	Flood Protection Assistance	49	No
370	Flood Insurance Promotion	0	No
410	Floodplain Mapping	64	Yes
420	Open Space Preservation	463	Yes
430	Higher Regulatory Standards	213	Yes
440	Flood Data Maintenance	87	Yes
450	Stormwater Management	107	Yes
510	Floodplain Management Planning	167	No - D
520	Acquisition and Relocation	165	Yes
530	Flood Protection	45	No
540	Drainage System Maintenance	212	Yes
610	Flood Warning and Response	129	No
620	Levees	0	No
630	Dams	0	Yes
	Total	1445	

Open Space Preservation/Acquisition and Relocation

Ann Arbor has already demonstrated the willingness to acquire flood-prone parcels and turn them into open space. In 2012, the City Council approved the purchase of two properties, 215 West Kingsley and 219 West Kingsley, that reside wholly in the floodplain as shown in Figure 6.⁷⁸ The property at 219 West Kingsley had a vacant residential structure that had been previously flooded, while the 215 West Kingsley parcel was vacant. The City secured a Pre-Disaster Mitigation (PDM) grant from FEMA for the purchase of the parcels; destruction and removal of the structure, foundation, and pervious surfaces; and grading of the site. The City's foresight and execution of this project resulted in not only the removal of a structure that blocked the natural flow of water in the floodway and floodplain, but also the implementation of a stormwater management effort (Activity 450), a rain garden that was subsequently created in the purchased lots.



Figure 6 – Floodplain Map of 215 and 219 West Kingsley.

Approximately 10 percent of the City's land is within the 100-year floodplain, land that contains a large number of parcels. Although not all these parcels are developed, there are 513 buildings currently located within the floodplain. If the City were to continue to seek FEMA PDM grants or use other means to secure buildings and parcels in the floodplain, a high number of CRS points could be earned. Other methods that could be employed to preserve open space and/or acquire and relocate structures include open space subdivision design, cluster development, conservation easements, planned unit developments, transfers of development rights (TDR). The use of the final option, TDRs, can be problematic for a city such as Ann Arbor though because the lack of available open space for development and the inter-municipality agreements make finding adequate acreage of desirable receiving areas for the TDR process difficult.

Conservation easements, on the other hand, could prove to be a useful regulatory tool for the City. A conservation easement can take two forms: 1) a voluntary transfer of rights from a property owner through a donation or a land trust or 2) a purchase of the development rights to the land by the municipality.⁷⁹ If the development rights are purchased, the transaction is called a purchase of development rights (PDR). In either situation, the result is the same: once land has been included in a conservation easement no development activity may take place on the parcel, in perpetuity. The benefit to a City is the assurance that the land will never be developed (a primary goal in the case of floodplain area), assurance received without the need to purchase the land. In the case of a PDR, the purchasing organization is paying the landowner the difference between the cost of the land in a developed state and undeveloped state.



A powerful next step for the City of Ann Arbor would be to create and publicize a program, perhaps in concert with the Huron River Watershed Council (HRWC), to organize conservation easement efforts. This program could perhaps evolve into a means of creating a “right of first refusal” for properties in the floodplain. Establishing a program where the City or conservation organization such as the HRWC would be given acquisition priority when a parcel in the floodplain becomes available would create a strong system to slowly reduce the number of developable lots affected by the City’s floodplains. While this process of actively seeking out undeveloped floodplain land to conserve as open space is useful and meets the requirements of CRS Activity 420, the 513 structures in the floodplain must be handled separately.

The process of acquiring land or structures can be prohibitively expensive in the current economic environment, which makes pursuing available grant money, such as FEMA PDM grants, a worthwhile endeavor. CRS Activity 520 gives communities points for acquiring structures that are in the floodplain (and, therefore, impeding the flow of floodwaters) and relocating these structures. The CRS program provides extra points for critical facilities within the 500-year floodplain, repetitive loss buildings, severe repetitive loss buildings, and buildings in an “A” flood zone that are acquired and relocated, with standard points awarded for normal buildings in the floodplain that are acquired and relocated.⁸⁰ Using this and other regulatory methods, Ann Arbor can certainly take further steps to reduce the number of structures in the floodplain, earning CRS points along the way.

Stormwater Management

While the rain garden that was put in place at the acquired Kingsley Street properties is part of CRS Activity 450, the City also has other initiatives in place that will help with this activity. Stormwater management regulations governing the amount of runoff (flow and volume) from sites as well as requirements on sites’ abilities to absorb stormwater can earn the City CRS points. Ann Arbor’s Stormwater Incentive Program can be expanded to bolster alignment with CRS Activity 450 guidelines. This effort could be accomplished with nominal work and could be aligned with public education and engagement activities.

The proposed ordinance is consistent with Ann Arbor’s Master Plan, including the Natural Features Master Plan, Flood Mitigation Plan, and Land Use Element as previously discussed. Additional CRS credits can come from making clear the ties between the City’s ordinances, such as all base zoning ordinances and overlay ordinances and the Master Plan sections pertaining to the watershed. Agreement between regulations and the Master Plan provides the city with a roadmap for decision making when it comes to land use and development in the floodplain

¹ “Property Topics and Concepts.” American Planning Association. January 1, 2008. Accessed December 1, 2014. <https://www.planning.org/divisions/planningandlaw/propertytopics.htm>.

² “Rising Atmospheric Moisture from Global Warming Not to Blame for 2013 Colorado Flood | NOAA Climate.gov.” Rising Atmospheric Moisture from Global Warming Not to Blame for 2013 Colorado Flood |



NOAA Climate.gov. Accessed December 1, 2014.

³ "Changing Rain and Snow Patterns." EPA. Accessed December 1, 2014.

⁴ Kousky, Carolyn, Sheila Olmstead, Margaret Walls, Adam Stern, and Molly Macauley. "The Role of Land Use in Adaptation to Increased Precipitation and Flooding: A Case Study in Wisconsin's Lower Fox River Basin." Resources for the Future, 2011. <http://www.rff.org/RFF/Documents/RFF-Rpt-Kousky.etal.GreatLakes.pdf>.

⁵ "Hydrologic Information Center - Flood Loss Data." NOAA's National Weather Service. Accessed December 1, 2014. <http://www.nws.noaa.gov/hic/>.

⁶ "Explanations for the National Water Conditions." USGS--Water Resources of the United States. Accessed December 1, 2014. http://water.usgs.gov/nwc/explain_data.html.

⁷ Precipitation and Damaging Floods: Trends in the United States, 1932-97

⁸ *Ibid.*

⁹ "Hydrologic Information Center - Flood Loss Data."

¹⁰ "States Flood Data." Accessed December 1, 2014.

<http://www.flooddamagedata.org/data/statescurrent326212257-666.txt>.

¹¹ Kousky, Carolyn, Sheila Olmstead, Margaret Walls, Adam Stern, et al. "The Role of Land Use in Adaptation to Increased Precipitation and Flooding: A Case Study in Wisconsin's Lower Fox River Basin."

¹² "Climate Data Online." National Climate Data Center. Accessed December 1, 2014.

<http://www.ncdc.noaa.gov/cdo-web/>.

¹³ "National Flood Insurance Program: Program Description." Federal Emergency Management Agency. August 1, 2002. Accessed December 1, 2014. http://www.fema.gov/media-library-data/20130726-1447-20490-2156/nfipdescrip_1_.pdf.

¹⁴ National Association of Insurance Commissioners. National Flood Insurance Program. Available at http://www.naic.org/cipr_topics/topic_nfip.htm

¹⁵ "National Flood Insurance Program: Program Description"

¹⁶ *Ibid.*

¹⁷ *Ibid.*

¹⁸ Federal Emergency Management Agency. Fact Sheet, Community Rating System. March 2014. Available at http://www.fema.gov/media-library-data/1395661546460-d6859e8d080fba06b34a6f1a4d0abda/NFIP_CRS_March%202014%20508.pdf.

¹⁹ *Ibid.*

²⁰ *Ibid.*

²¹ *Ibid.*

²² See 44 CFR 60

²³ "Each such city and village shall have power to adopt resolutions and Michigan Municipal ordinances relating to its municipal concerns, property and government subject to constitution and law." In Article VII, section 34, "Powers granted to counties and townships by this constitution and by law shall include those fairly implied and not prohibited by this constitution." "The provisions of this constitution and law concerning counties, townships, cities and villages shall be liberally construed in their favor."

²⁴ Mich. Comp. Laws Ann. § 125.3101 to 125.3702 (West)

²⁵ MCLA 125.3201.1

²⁶ MCLA 125.3201.3

²⁷ MCLA 125.3203

²⁸ R 408.30401 through R 408.30547

²⁹ "Flood Zones | FEMA.gov." Flood Zones | FEMA.gov. Accessed December 1, 2014. <https://www.fema.gov/floodplain-management/flood-zones>.

- ³⁰ 324.3104 Cooperation and negotiation with other governments as to water resources; alteration of watercourses; federal assistance; formation of Great Lakes aquatic nuisance species coalition; report; requests for appropriations; recommendations; permit to alter floodplain; application; fees; disposition of fees; other acts subject to single highest permit fee. ("NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT (EXCERPT)." Michigan Legislature.)
- ³¹ "City of Ann Arbor Natural Features Master Plan." City Ann Arbor. Accessed December 1, 2014. <http://www.a2gov.org/departments/planning-development/planning/Pages/City-Master-Plan.aspx>.
- ³² *Ibid.*
- ³³ "Flooding in Ann Arbor." Storify. June 27, 2013. Accessed December 1, 2014. <https://storify.com/MLive/flooding-in-ann-arbor>.
- ³⁴ "City of Ann Arbor Natural Features Master Plan."
- ³⁵ *Ibid.*
- ³⁶ "City of Ann Arbor Municipal Code, Chapter 57." Accessed December 1, 2014. https://www.municode.com/library/mi/ann_arbor/codes/code_of_ordinances.
- ³⁷ Draft Floodplain Management Overlay Ordinance
- ³⁸ "Property Topics and Concepts"
- ³⁹ "Land Use Element." In City of Ann Arbor Master Plan. 2009.
- ⁴⁰ "Flood Mitigation Plan." In City of Ann Arbor Master Plan. 2007.
- ⁴¹ *Ibid.*
- ⁴² U.S. Census Bureau. 2008 to 2012 (5-Year Estimates) (SE), ACS 2008 -- 2012 (5-Year Estimates), Social Explorer.
- ⁴³ *Ibid.*
- ⁴⁴ "Flood Mitigation Plan."
- ⁴⁵ City of Ann Arbor, Department of Planning and Development Services (2014).
- ⁴⁶ AnnArbor.com (2013). University of Michigan expansion: Buying land in Ann Arbor raises questions about tax base
- ⁴⁷ "Property Topics and Concepts."
- ⁴⁸ Julian Juergensmeyer & Thomas Roberts, Land Use Planning and Development Regulation Law 139-141 (3rd ed. W. Academic Publ'g 2013).
- ⁴⁹ *Ibid.*; See also U.S. DEP'T OF COMMERCE, A. STANDARD STATE ZONING ENABLING ACT, Section 3 (1926)
- ⁵⁰ *Ibid.*
- ⁵¹ U.S. Const. amend. V.
- ⁵² First English Evangelical Lutheran Church v. County of Los Angeles, 482 U.S. 304, 314 (1987).
- ⁵³ See Palazzolo v. Rhode Island, 533 U.S. 606, 617 (2001).
- ⁵⁴ Penn Central Transp. Co. v. City of New York, 438 U.S. 104, 124 (1978).
- ⁵⁵ See Lingle v. Chevron U.S.A., 544 U.S. 528 (2005)
- ⁵⁶ *Penn Central*, 438 U.S. at 123.
- ⁵⁷ Pennsylvania Coal Company v. Mahon, 260 U.S. 293 (1922).
- ⁵⁸ Armstrong v. United States, 364 U.S. 40, 49 (1960).
- ⁵⁹ Pennsylvania Coal, 260 U.S. 293 (1922).
- ⁶⁰ Loretto v. Teleprompter Manhattan CATV Corp., 446 N.E.2d 428 (N.Y. 1983)
- ⁶¹ *Ibid.*
- ⁶² Loretto, 458 U.S. at 436 n.12. Moreover, the Court in Loretto noted that if the New York statute had required landlords to provide cable service at tenant request, such that the landlord owned the required landlords to provide cable service at tenant request, such that the landlord owned the installation, then



Rule 1 might be avoided. *Id.* at 440 n.19. In the context of regulatory takings, the distinction between ad hoc and categorical approaches is this: categorical rules hold that in certain salient circumstances government regulatory activity is always (or never) a taking, period. Ad hoc rules, in contrast, determine the takings question with reference to a number of factors, considered on balance, with no one factor being decisive

⁶³ 505 U.S. 1003 (1992).

⁶⁴ *Ibid.* at 1015

⁶⁵ Penn Central, 438 U.S. 104 (1978).

⁶⁶ Pennsylvania Coal, 260 U.S. at 415

⁶⁷ *Ibid.* at 416.

⁶⁸ *Ibid.* at 413.

⁶⁹ *Ibid.* at 416

⁷⁰ Penn Central, 438 U.S. at 123

⁷¹ 544 U.S. 528 (2005)

⁷² 447 U.S. 255 (1980)

⁷³ K&K Const v. Dep't of Natural Resources, 267 Mich App 523, 529 (2005)

⁷⁴ *Ibid.* at 531.

⁷⁵ *Ibid.* at 558-63.

⁷⁶ Cummins v. Robinson Twp. 770 N.W.2d 421 (2009). See also Mich. Comp. Laws Ann. § 125.1515.

⁷⁷ Michigan Zoning Enabling Act. Available at

<http://www.legislature.mi.gov/%28x3eqqx2ix0ez34nsl1zysl45%29/documents/mcl/pdf/mcl-Act-110-of-2006.pdf>

⁷⁸ City of Ann Arbor. Legislation Details (With Text): "Resolution to Approve the Purchase of Property at 215 and 219 W. Kingsley St., Ann Arbor in Fee Title for \$185,000.00 (8 Votes Required). March 5, 2012.

⁷⁹ New Mexico State University. Technical Report 34: "Purchase of Development Rights and Conservation Easements: Frequently Asked Questions." Reprinted November 2002. Available at

<http://aces.nmsu.edu/pubs/research/economics/TR34.pdf>

⁸⁰ "National Flood Insurance Program: Program Description"

XVI. Appendix

Appendix I – The Michigan Zoning Enabling Act, Section 201/203

Appendix II – The Michigan Building Code, Section 1612

Appendix III – ASCE Table 1-1

Appendix IV – NFIP Community Flood Plain Management Regulations Review Checklist

Appendix I - Michigan Zoning Enabling Act, Section 201/203

125.3201 Regulation of land development and establishment of districts; provisions; uniformity of regulations; designations; limitations.

Sec. 201. (1) A local unit of government may provide by zoning ordinance for the regulation of land development and the establishment of 1 or more districts within its zoning jurisdiction which regulate the use of land and structures to meet the needs of the state's citizens for food, fiber, energy, and other natural resources, places of residence, recreation, industry, trade, service, and other uses of land, to ensure that use of the land is situated in appropriate locations and relationships, to limit the inappropriate overcrowding of land and congestion of population, transportation systems, and other public facilities, to facilitate adequate and efficient provision for transportation systems, sewage disposal, water, energy, education, recreation, and other public service and facility requirements, and to promote public health, safety, and welfare.

(2) Except as otherwise provided under this act, the regulations shall be uniform for each class of land or buildings, dwellings, and structures within a district.

(3) A local unit of government may provide under the zoning ordinance for the regulation of land development and the establishment of districts which apply only to land areas and activities involved in a special program to achieve specific land management objectives and avert or solve specific land use problems, including the regulation of land development and the establishment of districts in areas subject to damage from flooding or beach erosion.

(4) A local unit of government may adopt land development regulations under the zoning ordinance designating or limiting the location, height, bulk, number of stories, uses, and size of dwellings, buildings, and structures that may be erected or altered, including tents and recreational vehicles.

History: 2006, Act 110, Eff. July 1, 2006.

125.3202 Zoning ordinance; determination by local legislative body; amendments or supplements; notice of proposed rezoning.

Sec. 202. (1) The legislative body of a local unit of government may provide by ordinance for the manner in which the regulations and boundaries of districts or zones shall be determined and enforced or amended or supplemented. Amendments or supplements to the zoning ordinance shall be adopted in the same manner as provided under this act for the adoption of the original ordinance.

(2) Except as provided in subsection (3), the zoning commission shall give a notice of a proposed rezoning in the same manner as required under section 103.

(3) For any group of adjacent properties numbering 11 or more that is proposed for rezoning, the requirements of section 103(2) and the requirement of section 103(4)(b) that street addresses be listed do not apply to that group of adjacent properties.

(4) An amendment to a zoning ordinance by a city or village is subject to a protest petition under section 403.

(5) An amendment to conform a provision of the zoning ordinance to the decree of a court of competent jurisdiction as to any specific lands may be adopted by the legislative body and the notice of the adopted amendment published without referring the amendment to any other board or agency provided for under this act.

History: 2006, Act 110, Eff. July 1, 2006,

Am. 2008, Act 12, Imd. Eff. Feb. 29, 2008.

125.3203 Zoning ordinance; plan; incorporation of airport layout plan or airport approach plan; zoning ordinance adopted before or after March 28, 2001; applicability of public transportation facilities.

Sec. 203. (1) A zoning ordinance shall be based upon a plan designed to promote the public health, safety, and general welfare, to encourage the use of lands in accordance with their character and adaptability, to limit the improper use of land, to conserve natural resources and energy, to meet the needs of the state's residents for food, fiber, and other natural resources, places of residence, recreation, industry, trade, service, and other uses of land, to ensure that uses of the land shall be situated in appropriate locations and relationships, to avoid the overcrowding of population, to provide adequate light and air, to lessen congestion on the public roads and streets, to reduce hazards to life and property, to facilitate adequate provision for a

system of transportation including, subject to subsection (5), public transportation, sewage disposal, safe and adequate water supply, education, recreation, and other public requirements, and to conserve the expenditure of funds for public improvements and services to conform with the most advantageous uses of land, resources, and properties. A zoning ordinance shall be made with reasonable consideration of the character of each district, its peculiar suitability for particular uses, the conservation of property values and natural resources, and the general and appropriate trend and character of land, building, and population development.

(2) If a local unit of government adopts or revises a plan required under subsection (1) after an airport layout plan or airport approach plan has been filed with the local unit of government, the local unit of government shall incorporate the airport layout plan or airport approach plan into the plan adopted under subsection (1).

(3) In addition to the requirements of subsection (1), a zoning ordinance adopted after March 28, 2001 shall be adopted after reasonable consideration of both of the following:

(a) The environs of any airport within a district.

(b) Comments received at or before a public hearing under section 306 from the airport manager of any airport.

(4) If a zoning ordinance was adopted before March 28, 2001, the zoning ordinance is not required to be consistent with any airport zoning regulations, airport layout plan, or airport approach plan. A zoning ordinance amendment adopted or variance granted after March 28, 2001 shall not increase any inconsistency that may exist between the zoning ordinance or structures or uses and any airport zoning regulations, airport layout plan, or airport approach plan. This section does not limit the right to petition for submission of a zoning ordinance amendment to the electors under section 402 or the right to file a protest petition under section 403.

(5) The reference to public transportation facilities in subsection (1) only applies to a plan that is adopted or substantively amended more than 90 days after the effective date of the amendatory act that added this subsection.

History: 2006, Act 110, Eff. July 1, 2006;

Am. 2010, Act 305, Imd. Eff. Dec. 17, 2010.

125.3204 Single-family residence; instruction in craft or fine art as home occupation.

Sec. 204. A zoning ordinance adopted under this act shall provide for the use of a single-family residence by an occupant of that residence for a home occupation to give instruction in a craft or fine art within the residence. This section does not prohibit the regulation of noise, advertising, traffic, hours of operation, or other conditions that may accompany the use of a residence under this section.

History: 2006, Act 110, Eff. July 1, 2006.

125.3205 Zoning ordinance subject to certain acts; regulation or control of oil or gas wells; prohibition; extraction of valuable natural resource; challenge to zoning decision; serious consequences resulting from extraction; factors; regulations not limited.

Sec. 205. (1) A zoning ordinance is subject to all of the following:

(a) The electric transmission line certification act, 1995 PA 30, MCL 460.561 to 460.575.

(b) The regional transit authority act.

(2) A county or township shall not regulate or control the drilling, completion, or operation of oil or gas wells or other wells drilled for oil or gas exploration purposes and shall not have jurisdiction with reference to the issuance of permits for the location, drilling, completion, operation, or abandonment of such wells.

(3) An ordinance shall not prevent the extraction, by mining, of valuable natural resources from any property unless very serious consequences would result from the extraction of those natural resources. Natural resources shall be considered valuable for the purposes of this section if a person, by extracting the natural resources, can receive revenue and reasonably expect to operate at a profit.

(4) A person challenging a zoning decision under subsection (3) has the initial burden of showing that there are valuable natural resources located on the relevant property, that there is a need for the natural resources by the person or in the market served by the person, and that no very serious consequences would result from the extraction, by mining, of the natural resources.

(5) In determining under this section whether very serious consequences would result from the extraction, by mining, of natural resources, the standards set forth in *Silva v Ada Township*, 416 Mich 153 (1982), shall be applied and all of the following factors may be considered, if applicable:

- (a) The relationship of extraction and associated activities with existing land uses.
 - (b) The impact on existing land uses in the vicinity of the property.
 - (c) The impact on property values in the vicinity of the property and along the proposed hauling route serving the property, based on credible evidence.
 - (d) The impact on pedestrian and traffic safety in the vicinity of the property and along the proposed hauling route serving the property.
 - (e) The impact on other identifiable health, safety, and welfare interests in the local unit of government.
 - (f) The overall public interest in the extraction of the specific natural resources on the property.
- (6) Subsections (3) to (5) do not limit a local unit of government's reasonable regulation of hours of operation, blasting hours, noise levels, dust control measures, and traffic, not preempted by part 632.

Appendix II - Michigan Building Code, Section 1612

Mich. Admin. Code R. 408.30451c R 408.30451c. Flood loads.

Rule 451c. Sections 1612.3.1 and 1612.4 of the code are amended and 1612.4.1, 1612.4.2,

1612.4.3, 1612.4.4, and 1612.4.5 are added to the code to read as follows:

1612.3.1. Alternate flood hazard provisions. Absent the adoption of a flood hazard map and supporting data, flood hazard areas as determined by the state under its administration of the Part 31, floodplain regulatory authority of the natural resources and environmental protection act, 1994 PA 451, [MCL 324.101](#) to [324.90106](#), shall become the basis for regulation of floodplain development within the community and section 1612 shall apply to buildings and structures within those areas.

1612.4.1. Minimum requirements for buildings and structures. All of the following are in addition to the requirements of ASCE 24:

- (1) Buildings and structures in flood hazard areas subject to high velocity wave action (zone V) shall be in compliance with the requirements of ASCE 24 for such flood hazard areas.
- (2) The lowest floors of structure category II buildings and structures shall be at or above the elevation specified in ASCE 24 or 1 foot (305 mm) above the design flood elevation, whichever is higher.
- (3) The lowest floors of structure category III and IV buildings and structures in flood hazard areas not subject to high velocity wave action (zone A) shall be at or above the elevation specified in ASCE 24 or 1 foot (305 mm) above the 500-year flood elevation, whichever is higher. For the purpose of this requirement, the 500-year flood elevation is the elevation of flooding having a 0.2% chance of being equaled or exceeded in any given year.
- (4) Dry floodproofing for structure category II buildings and structures shall extend to or above the elevation specified in ASCE 24 or 1 foot (305 mm) above the design flood elevation, whichever is higher.
- (5) Dry floodproofing for structure category III and IV buildings and structures shall extend to or above the elevation specified in ASCE 24 or 1 foot (305 mm) above the 500-year flood elevation, whichever is higher. For the purpose of this requirement, the 500-year flood elevation is the elevation of flooding having a 0.2% chance of being equaled or exceeded in any given year.
- (6) The interior floor or finished ground level of under-floor spaces and crawlspaces shall comply with section 1805.1.2.1 of this code.

Credits

(By authority conferred on the director of the department of licensing and regulatory affairs by section 4 of 1972 PA 230, [MCL 125.1504](#), and Executive Reorganization Order Nos. 2003-1, 2008-4 and 2011-4, [MCL 445.2011](#), [445.2025](#), and [445.2030](#))

Current through 2014 Register #19 (November 1, 2014)

Mich. Admin. Code R. 408.30451c, MI ADC R. 408.30451c

Appendix III – ASCE Table 1-1

**TABLE 1-1. Classification of Structures for Flood-Resistant Design and Construction
(Classification same as ASCE 7, Ref. [1])**

Nature of Occupancy	Category
<p>Structures that represent a low hazard to human life in the event of failure including, but not limited to:</p> <ul style="list-style-type: none"> ▪ Agricultural facilities^a ▪ Certain temporary facilities ▪ Minor storage facilities^b 	I
All structures except those listed in Categories I, III and IV	II
<p>Structures that represent a substantial hazard to human life in the event of failure including, but not limited to:</p> <ul style="list-style-type: none"> ▪ Buildings and other structures where more than 300 people congregate in one area ▪ Buildings and other structures with day-care facilities with capacity greater than 150 ▪ Buildings and other structures with elementary school or secondary school facilities with capacity greater than 250 ▪ Buildings and other structures with a capacity greater than 500 for colleges or adult education facilities ▪ Health care facilities with a capacity of 50 or more resident patients but not having surgery or emergency treatment facilities ▪ Jails and detention facilities ▪ Power generating stations and other public utility facilities not included in Category IV <p>Buildings and other structures not included in Category IV (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing sufficient quantities of hazardous materials considered to be dangerous to the public if released.</p> <p>Buildings and other structures containing hazardous materials shall be eligible for classification as Category II structures if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2^c that a release of the hazardous material does not pose a threat to the public.</p>	III
<p>Structures designated as essential facilities including but not limited to</p> <ul style="list-style-type: none"> ▪ Hospitals and other health-care facilities having surgery or emergency treatment facilities ▪ Fire, rescue, ambulance, and police stations and emergency vehicle garages ▪ Designated earthquake, hurricane, or other emergency shelters ▪ Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response ▪ Power generating stations and other public utility facilities required in an emergency ▪ Ancillary structures (including, but not limited to, communication towers, fuel storage tanks, cooling towers, electrical substation structures, fire water storage tanks or other structures housing or supporting water, or other fire-suppression material or equipment) required for operation of Category IV structures during an emergency ▪ Aviation control towers, air traffic control centers, and emergency aircraft hangars ▪ Water storage facilities and pump structures required to maintain water pressure for fire suppression ▪ Buildings and other structures having critical national defense functions <p>Buildings and other structures (including but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing extremely hazardous materials where the quantity of the material exceeds a threshold quantity established by the authority having jurisdiction.</p> <p>Buildings and other structures containing extremely hazardous materials shall be eligible for classification as Category II structures if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.2^c that the extremely hazardous material does not pose a threat to the public. This reduced classification shall not be permitted if the buildings or structures also function as essential facilities</p>	IV

^aCertain agricultural structures may be exempt from some of the provisions of this Standard – see section C.4.3.

^bFor the purposes of this standard, minor storage facilities do not include commercial storage facilities.

^cSection 1.5.2 reference is made to ASCE Standard 7-05, not this standard.

Appendix IV – NFIP Community Flood Plain Management Regulations Review Checklist

**NATIONAL FLOOD INSURANCE PROGRAM
COMMUNITY FLOODPLAIN MANAGEMENT REGULATIONS REVIEW CHECKLIST**

Community _____ C.I.D _____ State _____

Reviewed by: _____ Date of Review: _____

Community Floodplain Management Regulations Reviewed by (circle one): FEMA State Other: (Agency Name) _____

Reviewer's Determination: /___/ The floodplain management regulations are compliant. /___/ The floodplain management regulations are not compliant.

Approved by: _____ (FEMA only) Date of Approval: ___/___/___

The "Item Description" is a synopsis of the regulatory requirement and should not be construed as a complete description. Refer to the actual language contained in the National Flood Insurance Program Floodplain Management Regulations at Title 44 Code of Federal Regulations (CFR) Part 59 and 60 for the complete description of the required minimum criteria. Below the "Level of Regulations" column, you can indicate whether the community ordinance meets or exceeds the respective provision in the non-shaded areas.

Item Description (Section reference to the NFIP Regulations follows)	Level of Regs					Applicable Ordinance Section/Comments
	a	b	c	d	e	
ORDINANCES MUST CONTAIN THE FOLLOWING PROVISIONS:						
1. Citation of Statutory Authority						
2. Framework for administering the ordinance						

(including permit system, establishment of the office for administering the ordinance, record keeping, etc.).					
3. Adequate enforcement provisions (including a violation and penalty section specifying actions the community will take to assure compliance).					
4. Variance section with evaluation criteria and insurance notice. [60.6(a)]					
5. Effective Date: Adoption Date:					
6. Signature of Appropriate Official and Certification Official.					

Item Description <i>(Section reference to the NFIP Regulations follows)</i>	Level of Regs					Applicable Ordinance Section/Comments
	a	b	c	d	e	
OTHER PROVISIONS AND ACTIONS THAT MAY BE NECESSARY TO MAKE THE ORDINANCE LEGALLY ENFORCEABLE AND ENSURE THAT IT CAN BE PROPERLY ADMINISTERED:						
7: Purpose section citing health, safety, and welfare reasons for adoption.						
8: Disclaimer of Liability section advising that the degree of flood protection required by the ordinance is considered reasonable but does not imply total flood protection.						

<p>9. Abrogation and Greater Restriction section. (e.g., This Ordinance shall not in any way impair/remove the necessity of compliance with any other applicable laws, ordinances, regulations, etc. Where this Ordinance imposes a greater restriction, the provisions of this Ordinance shall control.)</p>						
<p>10. Severability section. (e.g., If any section, provision, or portion of this ordinance is adjudged unconstitutional or invalid by a court, the remainder of the ordinance shall not be affected.)</p>						
<p>11. Public hearing (State/local laws may require hearings)</p>						
<p>12. Publication (State/local laws may require public notices)</p>						
<p>Item Description (Section reference to the NFIP Regulations follows)</p> <p>MINIMUM NFIP CRITERIA:</p>	Level of Regs					Applicable Ordinance Section/Comments
	a	b	c	d	e	

<p>13. Definitions: [59.1] <input type="checkbox"/> Base Flood; <input type="checkbox"/> Base Flood Elevation; <input type="checkbox"/> Development; <input type="checkbox"/> Existing manufactured home park or subdivision; <input type="checkbox"/> Expansion to an existing manufactured home park or subdivision; <input type="checkbox"/> Flood Insurance Rate Map; <input type="checkbox"/> Flood Insurance Study; <input type="checkbox"/> Floodway; <input type="checkbox"/> Lowest Floor; <input type="checkbox"/> Manufactured Home; <input type="checkbox"/> Manufactured Home Park or Subdivision; <input type="checkbox"/> New Construction; <input type="checkbox"/> New Manufactured Home Park or Subdivision; <input type="checkbox"/> Recreational Vehicle; <input type="checkbox"/> Special Flood Hazard Area; <input type="checkbox"/> Start of Construction; <input type="checkbox"/> Structure; <input type="checkbox"/> Substantial Damage; <input type="checkbox"/> Substantial Improvement; <input type="checkbox"/> Violation;</p> <p>Other Definitions as appropriate such as</p> <p><input type="checkbox"/> Floodproofing; <input type="checkbox"/> Highest adjacent grade for community's with mapped AO Zones; <input type="checkbox"/> Historic Structures</p>				
<p>14. Adopt or reference correct Map and date. [60.3(b)] (If the community has an automatic adoption provision in its ordinance, is it valid?)</p>				
<p>15. Adopt or reference correct Flood Insurance Study and date. [60.3(c), (d), and/or (e)] (If the community has an automatic adoption provision in its ordinance, is it valid?)</p>				

Item Description <i>(Section reference to the NFIP Regulations follows)</i>	Level of Regs					Applicable Ordinance Section/Comments
	a	b	c	d	e	
16. Require permits for all proposed construction or other development including placement of manufactured homes to determine whether such construction or development is in a floodplain. [60.3(a)(1)]						
17. Require permits for all proposed construction and other development within SFHAs. [60.3(b)(1)]						
18. Assure that all other State and Federal permits are obtained. [60.3(a)(2)]						
19. Review permits to assure sites are reasonably safe from flooding and require for new construction and substantial improvements in flood-prone areas [60.3(a)(3)]: (a) Anchoring (including manufactured homes) to prevent flotation, collapse, or lateral movement of the structure. [60.3(a)(3)(i)]						
(b) Use of flood-resistant materials. [60.3(a)(3)(ii)]						
(c) Construction methods and practices that minimize flood damage. [60.3(a)(3)(iii)]						

Item Description (Section reference to the NFIP Regulations follows)	Level of Regs					Applicable Ordinance Section/Comments
	a	b	c	d	e	
(d) Electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities designed and/or located to prevent water entry to accumulation. [60.3(a)(3)(iv)]						
20. Review subdivision proposals and other development, including manufactured home parks or subdivisions, to determine whether such proposals will be reasonably safe from flooding [60.3(a)(4)]. If a subdivision or other development proposal is in a flood-prone area, assure that:						
(a) Such proposals minimize flood damage. [60.3(a)(4)(i)]						
(b) Public utilities and facilities are constructed so as to minimize flood damage. [60.3(a)(4)(ii)]						
(c) Adequate drainage is provided. [60.3(a)(4)(iii)]						
21. Require new and replacement water supply and sanitary sewage systems to be designed to minimize or eliminate infiltration. [60.3(a)(5) and 60.3(a)(6)]						
22. Require onsite waste disposal systems be designed to avoid impairment or contamination. [60.3(a)(6)(ii)]						

<p>23. Require base flood elevation data for subdivision proposals or other developments greater than 50 lots or 5 acres. [60.3(b)(3)]</p>					
<p>24. In A Zones, in the absence of FEMA BFE data and floodway data, obtain, review, and reasonably utilize other BFE and floodway data as a basis for elevating residential structures to or above the base flood level, and for floodproofing or elevating non-residential structures to or above the base flood level. [60.3(b)(4)]</p>					
<p>Item Description (Section reference to the NFIP Regulations follows)</p>	<p>Level of Regs</p>			<p>Applicable Ordinance Section/Comments</p>	
		<p>a</p>	<p>b</p>		<p>c</p>
<p>25. Where BFE data are utilized in Zone A, obtain and maintain records of the lowest floor and floodproofing elevations for new and substantially improved construction. [60.3(b)(5)]</p>					
<p>26. In riverine areas, notify adjacent communities of watercourse alterations and relocations. [60.3(b)(6)]</p>					
<p>27. Maintain the carrying capacity of an altered or relocated watercourse. [60.3(b)(7)]</p>					
<p>28. Require all manufactured homes to be elevated and anchored to resist flotation, collapse, or lateral</p>					

Item Description (Section reference to the NFIP Regulations follows)	Level of Regs					Applicable Ordinance Section/Comments
	a	b	c	d	e	
movement. [60.3(b)(8)]						
29. Require all new and substantially improve <u>residential</u> structures within A1-30, AE, and AH Zones have their lowest floor (including basement) elevated to or above the Base Flood Elevation. [60.3(c)(2)]						
30. In AO Zones, require that new and substantially improved <u>residential</u> structures have their lowest floor (including basement) to or above the highest adjacent grade at least as high as the FIRM's depth number. [60.3(c)(7)]						
31. Require that new and substantially improved <u>non-residential</u> structures within A1-30, AE, and AH Zones have their lowest floor elevated or floodproofed to or above the Base Flood Elevation. [60.3(c)(3)]						
32. In AO Zones, require new and substantially improved <u>non-residential</u> structures have their lowest floor elevated or completely floodproofed above the highest adjacent grade to at least as high as the depth number on the FIRM. [60.3(c)(8)]						

<p>33. Require that for floodproofed non-residential structures, a registered professional engineer/architect certify that the design and methods of construction meet requirements at 60.3(c)(3)(ii). [60.3(c)(4)]</p>																				
<p>34. Require, for all new construction and substantial improvements, that fully enclosed areas below the lowest floor that are used solely for parking of vehicles, building access or storage in an area other than a basement and which are subject to flooding shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing the entry and exit of floodwaters in accordance with the specifications in 60.3(c)(5). (Openings requirement)</p>																				
<p>Item Description (Section reference to the NFIP Regulations follows)</p>																				
<p>35. Until a regulatory floodway is designated, no encroachment may increase the Base Flood level more than 1 foot. [60.3(c)(10)]</p>																				
<p>36. In Zones AO and AH, require drainage paths around structures on slopes to guide water away from structures. [60.3(c)(11)]</p>																				
<p>Applicable Ordinance Section/Comments</p>																				

<p>37. Require that manufactured homes placed or substantially improved within A1-30, AH, and AE Zones, which meet one of the following location criteria, to be elevated such that the lowest floor is to or above the Base Flood Elevation and be securely anchored:</p> <ul style="list-style-type: none"> (i) outside a manufactured home park or subdivision; (ii) in a new manufactured home park or subdivision; (iii) in an expansion to an existing manufactured home park or subdivision; iv) on a site in an existing park which a manufactured home has incurred substantial damage as a result of a flood. <p>[60.3©(6)]</p>			
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Item Description <i>(Section reference to the NFIP Regulations follows)</i>	Level of Regs					Applicable Ordinance Section/Comments
	a	b	c	d	e	
<p>38. In A-1-30, AH, and AE Zones, require that manufactured homes to be placed or substantially improved in an <u>existing</u> manufactured home park to be elevated so that</p> <ul style="list-style-type: none"> (i) the lowest floor is at or above the Base Flood Elevation; OR (ii) the chassis is supported by reinforced piers no 						

less than 36 inches in height above grade and securely anchored. [60.3©(12)]					
39. In A1-30, AH, and AE Zones, all recreational vehicles to be placed on a site must (i) be elevated and anchored; OR (ii) be on the site for less than 180 consecutive days; OR (iii) be fully licensed and highway ready. [60.3©(14)]					
40. Designate a regulatory floodway which will not increase the Base Flood level more than 1 foot. [60.3(d)(2)]					
41. In a regulatory floodway, prohibit any encroachment, unless hydrologic and hydraulic analyses prove that the proposed encroachment would not cause an increase in flood levels during the Base Flood discharge. [60.3(d)(3)]					
42. In V1-30, VE, and V Zones, obtain and maintain the elevation of the bottom of the lowest horizontal structural member of the lowest floor of all new and substantially improved structures. [60.3(e)(2)]					

Item Description (Section reference to the NFIP Regulations follows)	Level of Regs					Applicable Ordinance Section/Comments
	a	b	c	d	e	
43. In V1-30, VE, and V Zones, require that all new						

<p>construction and substantial improvements:</p> <p>(a) Are elevated and secured to anchored pilings or columns so that the bottom of the lowest horizontal structural member is at or above the Base Flood Elevation. [60.3(e)(4)]</p>			
<p>(b) A registered professional engineer/architect certify that the design and methods of construction meet elevation and anchoring requirements at 60.3(e)(4)(i) and (ii). [60.3(e)(4)]</p>			
<p>(c) Have the space below the lowest floor either free of obstruction or constructed with breakaway walls. Any enclosed space shall be used solely for parking, building access, or storage. [60.3(e)(5)]</p>			
<p>(d) All new construction must be landward of mean high tide. [60.3(e)(3)]</p>			
<p>(e) Prohibit use of fill for structural support. [60.3(e)(6)]</p>			
<p>(f) Prohibit alterations of sand dunes and mangrove stands, which would increase potential flood damage. [60.3(e)(7)]</p>			

Item Description <i>(Section reference to the NFIP Regulations follows)</i>	Level of Regs					Applicable Ordinance Section/Comments
	a	b	c	d	e	
<p>44. Require that manufactured homes placed or substantially improved within V1-30, VE, and V Zones, which meet one of the following location criteria, meet the V Zone standards in 60.3(e)(2) through (e)(7):</p> <ul style="list-style-type: none"> (i) outside a manufactured home park or subdivision; (ii) in a new manufactured home park or subdivision; (iii) in an expansion to an existing manufactured home park or subdivision; (iv) on a site in an existing park which a manufactured home has incurred substantial damage as a result of a flood. <p>[60.3(e)(8)]</p>						
<p>45. In V1-30, VE, and V Zones, require that manufactured homes to be placed or substantially improved in an existing manufactured home park to be elevated so that</p> <ul style="list-style-type: none"> (i) the lowest floor is at or above the Base Flood Elevation; OR (ii) the chassis is supported by reinforced piers that are not less than 36 inches in height above grade and securely anchored. <p>[60.3(e)(8)(iv)]</p>						

