

STERLING EAST NEIGHBORHOOD

Action Plan for Implementation of the
Sterling East Redevelopment Area Activities

PREPARED FOR THE CITY OF ELKHART, IN

SPRING 2018



ACKNOWLEDGEMENTS

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INTRODUCTION

*"Neighborhoods are the places
where everyday life occurs.*

*They create and form communities and
flourish with the availability of quality and
proximate housing, schools, jobs, health
care, public safety, retail, and services."*

Elkhart Comprehensive Plan 2015

EXECUTIVE SUMMARY

In 2004, the City of Elkhart Redevelopment Commission created the Sterling East Redevelopment Area Plan. The goal of this plan was to facilitate and encourage reinvestment and redevelopment in the area, both public and private, in the form of new and upgraded housing, improved infrastructure additional greenspace and industrial development and redevelopment. In 2017, the Redevelopment Commission developed the Sterling East Action Plan (SEAP) to address the unique assets of the area, as well as the challenges posed, by the land use conflicts and floodplain issues previously identified. This area, comprised of approximately 200 acres, is located one mile southeast of the downtown, and is entirely within the Consolidated South Elkhart Economic and Redevelopment Area. The approximate boundaries of the neighborhood are Indiana Avenue to the north, the Elkhart River to the east, Lusher Avenue to the south, and the railroad tracks to the west. It features a mix of residential, industrial and recreational uses, with approximately one-third of the neighborhood located in the floodplain.

Contributing to the direction of the SEAP effort includes the following:

- Vibrant Communities and Regional Cities initiatives (ongoing)
- River District Master Plan (2018), which addressed urban development in downtown Elkhart near Sterling East
- Elkhart/Goshen Bicycle and Pedestrian Master Plan (2017)
- Environmental Center (EEC) Master Plan (2016), which is a City-owned amenity within the neighborhood
- MACOG Active Transportation Plan (2016)
- Sterling East Redevelopment Area Plan (2004)
- Flood Mitigation Plan (adopted 1998, amended 1999)

Development recommendations include housing infill projects, industrial land use boundaries and transition areas, open space improvements, as well as pedestrian and bicycle infrastructure

connections. This plan also addresses reuse of City-owned properties, many of which are located in the floodplain, and identifies opportunities for potential acquisition. Though development is complicated by the varying land use patterns and the floodplain, this neighborhood features amenities that make it an attractive choice for residents, including its proximity to employment centers, schools (such as Mary Beck Elementary), the Elkhart River, Sterling Park, Studebaker Park and Pavilion, the Elkhart Environmental Center, and the MapleHeart Trail.

Implementation of the SEAP requires ongoing coordination among several City departments and the Sterling East Neighborhood, including residents and businesses. The recommendations contained in the SEAP require a commitment to that vision to strengthen the Sterling East neighborhood and by extension, the entire City.



FIG. 1.03



FIG. 1.04



FIG. 1.01



STERLING EAST NEIGHBORHOOD



FIG. 1.02

FIG. 1.01 and 1.02 The Sterling East Neighborhood sits at the Southeast corner of the City, a key gateway into the downtown, positioned just East of Main Street.

FIG. 1.03: The River District Plan serves as the hub of the City's development focus, with the Sterling East neighborhood acting as an important connecting spoke.

FIG. 1.04: SEMP is an extension of the EEC Master Plan which addressed district connectivity through several project recommendations and priorities.

GENERAL STRATEGY AND APPROACH

The City of Elkhart's Comprehensive Plan update in 2015 outlined six key goals:

1. Continue revitalization of the downtown
2. Create additional opportunities through neighborhood investment
3. Establish a more connected transportation system
4. Grow and diversify Elkhart's economy
5. Ensure the protection of the City's natural resources and open spaces
6. Protect quality of life through coordinated land use decisions and public services

The Comprehensive Plan further builds on these goals and addresses four subsequent planning themes:

1. Land use,
2. Environment and design
3. Economic development
4. Corridor character

These four planning themes are addressed through three specific strategies. These strategies include:

1. Neighborhood site development and recommended improvements
2. Contextual connections
3. Address the available open spaces in the neighborhood with a consolidated strategy

In order to facilitate and encourage reinvestment and development in the Sterling East Neighborhood, the City of Elkhart understood there to be several critical areas to address. These areas, identified through feedback during the SEAP process, as well as neighborhood-wide inventory and analysis, led to three overarching strategies.

Site Development and Improvements

Development in this neighborhood is complicated by the irregular shape of the Elkhart River and its floodplain, which follows a similar path, in addition

to the barrier of the railway line. By developing an infill strategy that identifies optimal locations for both residential investment and industrial expansion, the Sterling East neighborhood will be better positioned to leverage its many amenities. Additionally, this strategy aligns with a larger City development plan.

Contextual Connections

How people move and circulate through the neighborhood is an important component to making the area successful. Several recent plans, including a 2017 Bicycle and Pedestrian Plan as well as a Michiana Area Council of Governments' (MACOG) regional Active Transportation Plan, outlined mobility recommendations for the surrounding community. In addressing mobility and connectivity issues within the neighborhood that dovetails these other City efforts, the SEAP will strengthen the existing capacity of the Sterling East Neighborhood while also amplifying the value of City investments to existing mobility infrastructure.

Open Space Strategy

From the onset, the Elkhart River and its adjacent floodplain were the most obvious opportunity and constraint within the neighborhood. The floodplain is currently the largest consolidated land use and ownership within the Sterling East neighborhood. The majority of the land located in the floodplain is owned by the City and currently functions as "open space." The floodplain is used to store flood water during significant rain events, recharge groundwater aquifers, and acts as a wildlife habitat.

As such, it is important to determine an appropriate solution to protect private assets, while also utilizing public assets such as the Elkhart River, adjacent open spaces, the Environmental Center, Riverwalk, Mapleheart Greenway, and Studebaker Park.





FIG. 1.05: ELIZABETH STREET
Typical street section with minimal tree lawns, no curbs, single family homes, sidewalks, and a 22' roadway section

INVENTORY AND ANALYSIS

BASE MAPS

CASE STUDIES AND EXISTING PLANS

PROCESS

STAKEHOLDER FEEDBACK

STRENGTHS, WEAKNESSES, OPPORTUNITIES, THREATS

PLAN GOALS AND VISION



FIG. 2.01: BELMONT AVE.

BACKGROUND

Flood Mitigation and Natural Restoration

In 1998, the City of Elkhart adopted the Hudson-Sterling Neighborhood Flood Mitigation Plan, which provided a detailed description of the neighborhood, gave an in-depth hazard analysis for the area, outlined flood mitigation options, and makes recommendations on the best method of implementation. Additionally, in 2001, a plan was developed for natural restoration and park development for the area. This plan builds on the 1999 flood mitigation plan and the 2001 natural restoration and park development plan for the Sterling East area.

Housing

In 2017 as part of the River District planning process, the City of Elkhart Redevelopment Commission retained Zimmerman Volk Associates to conduct an Analysis of Residential Market Potential for Downtown Elkhart. The study found that Elkhart could absorb approximately 5,000 new residential units. The Sterling East Neighborhood's amenities and proximate location to the downtown make it a prime location for residential redevelopment.

Inventory and Analysis

In order to gain a thorough understanding of the overall neighborhood conditions and elements that

influence the SEAP, an inventory and analysis process was conducted. The physical and social contexts of the neighborhood were examined through field observations, aerial photography review, and GIS base map review. Assessment topics included population, topography and drainage patterns (including Floodplain and Floodway), public utilities, existing infrastructure (such as streets and sidewalk conditions), zoning, current land use and parcel ownership, and overall environmental conditions.

GIS Base Maps

The inventory maps shown throughout this section of the document were assembled with geospatial data provided by the Michiana Area Council of Governments (MACOG), the City of Elkhart Public Works Department, and the Indiana GIS Portal.

FIG. 2.01: The Sterling East neighborhood, north of Lusher is primarily characterized by older single family dwellings on smaller lots. The streets are paved, but without curb and gutter in most locations. Sidewalks are intermittently found throughout the neighborhood, with some new ADA ramps and detectable warning strips.

STERLING EAST NEIGHBORHOOD

Neighborhoods are the fundamental building blocks of the Elkhart community. They flourish when they are in close proximity to amenities - including good schools, quality public spaces, healthy food, and reliable jobs. To facilitate engaged, vibrant, and thriving residential areas, they need ongoing maintenance, reinvestment, and a focus on people.

Sterling East is full of opportunities for reinvestment stemming from its abundant neighborhood resources, established businesses, engaged social centers, and active community members. Strengthening the social aspects neighborhood to bolster what it already does well will provide long-term physical benefits for the area. Examples Sterling East's capacity includes:

- Businesses rooted in the neighborhood, like MORryde and Johnson Controls, that encourage their employees to take advantage of local amenities through walking and recreation thus promoting their internal health initiatives.
- Social Centers, such as the Belmont Neighborhood Fellowship, provide assistance such as educational tutoring, local service projects, and support groups.
- Resources like Sterling East's parks, trails, and the Elkhart Environmental Center providing programmatic support such as events.

Strengthening is accomplished through a myriad of physical improvements, programmatic support, and policy revisions, as outlined in the 2015 Comprehensive Plan update. Furthermore, the ability of individuals, communities, institutions, and organizations within the Sterling East neighborhood to implement sustainable development strategies are another component that contribute community vibrancy and resiliency.

In addition to infrastructure improvements and development strategies, capacity building goes well beyond the provision of basic needs. It is a matter of development at all levels of society and includes institutional development, community development, and economic development.

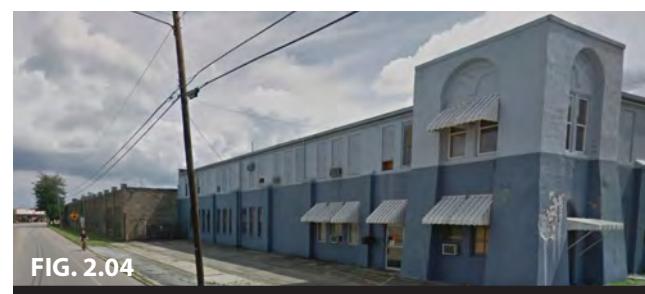
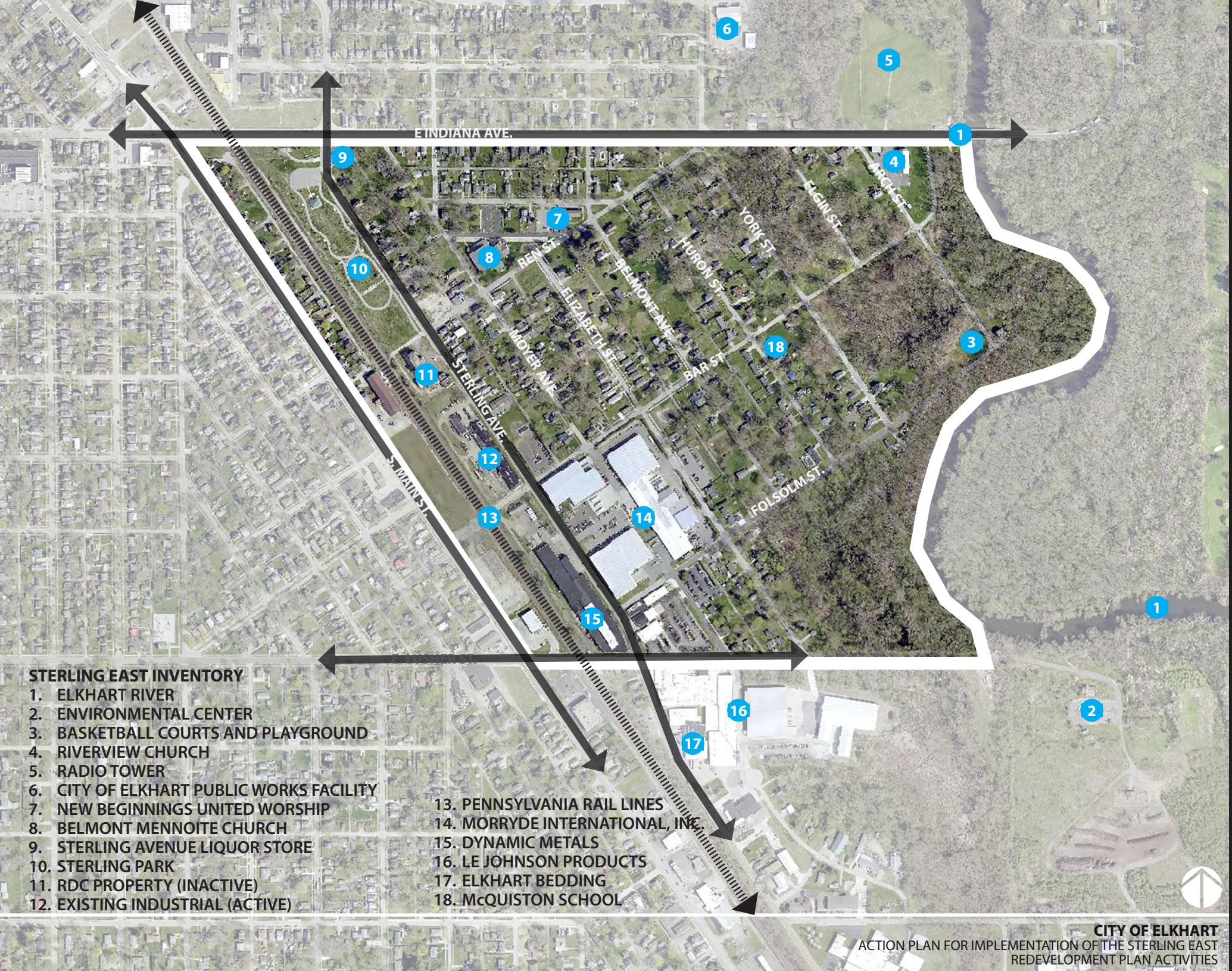


FIG. 2.02 - 2.07: From neighborhood outreach to social support to popular events, the Sterling East neighborhood boasts an engaged community. Resources, such as park amenities and available land/building stock, add character, programming opportunities, and development opportunities that should be leveraged to improve external perception.



Population Assessment

The Sterling East Neighborhood has the lowest population density of any adjacent area. The areas immediately north of Indiana Ave and farther west have substantially higher density and corresponding median home values and median family incomes.

Infrastructure Assessment

Portions of the Sterling East Neighborhood do not meet current City standards for street design. Improvements such as curbing and sidewalks would help to improve safety, function, and perception of the neighborhood. Existing sanitary and water lines serve the entire neighborhood, with approximately 25% coverage for storm sewers. Bike lanes are currently striped down Sterling Avenue and could be used to connect to other key routes, such as Bar and Ren streets to encourage better connectivity.

Zoning Assessment

Review of the City's 2015 Comprehensive Master Plan shows Sterling East primarily as a low density housing (R-2) area. Further assessment shows that there are four zoning districts within the Redevelopment Area. These include R-2 One Family Dwelling, R-4 Multi-Family Dwelling, M-1 Limited Manufacturing, and M-2 General Manufacturing. The residential zoning areas are located primarily north of Lusher Avenue. Both manufacturing zones are located along Sterling Avenue.

Parcel Ownership Assessment

- 656 parcels within the study area
- 282 parcels are listed as vacant, unidentified, or undeveloped
- 142 City owned properties within the study area
- 21 properties listed on the 2017 Tax Sale

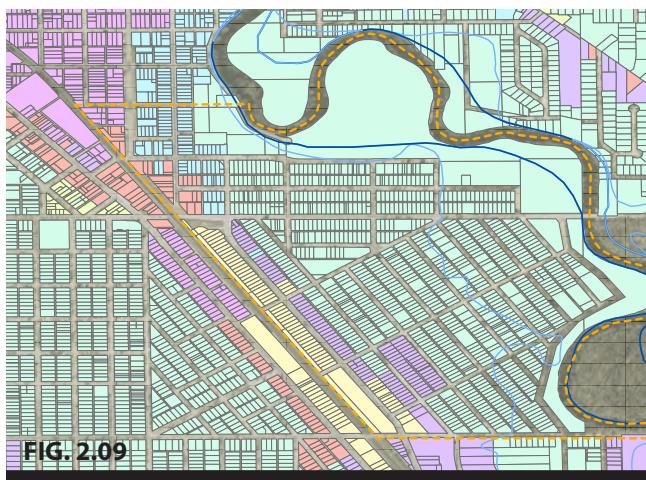
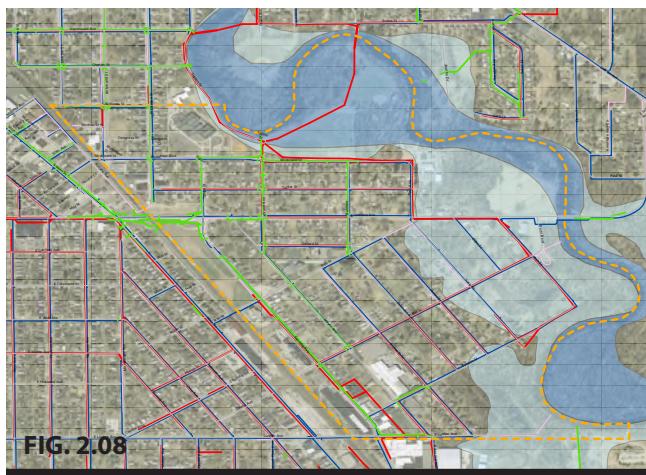
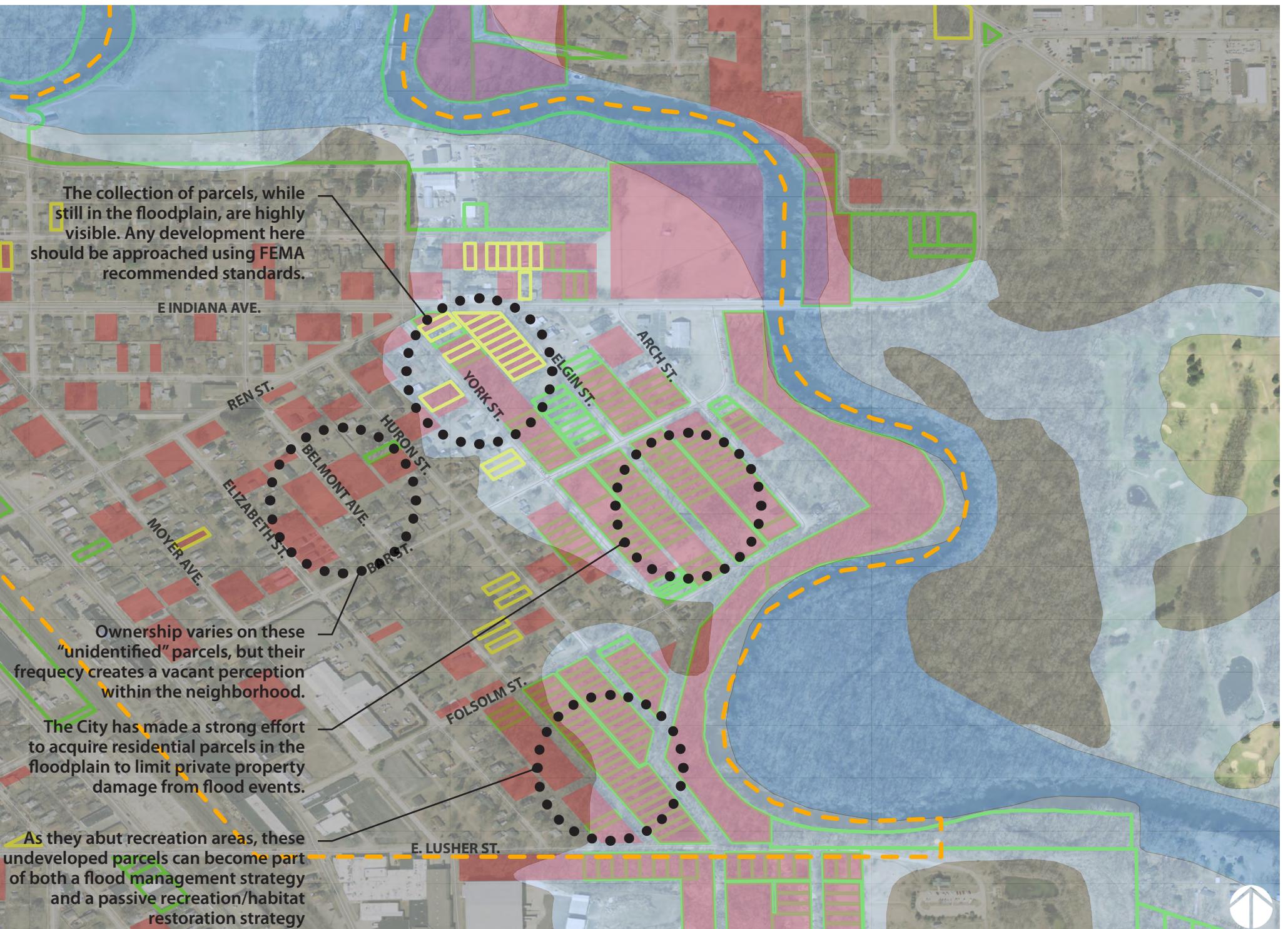


FIG. 2.08: Existing Utilities Map

FIG. 2.09: Existing Zoning Map

FIG. 2.10: Existing Population Distribution Map

FIG. 2.11: Existing Parcel Status Assessment Map



Environmental Assessment

As noted in the Elkhart Environmental Center Master Plan (2016), the Sterling East Neighborhood is part of over 43 miles of Elkhart River Corridor and serves as a key watershed for Lake Michigan. As a connected and linear green space migration corridor, the Elkhart River sees upwards of 40% of all North American Waterfowl travelling along its watershed as part of the Mississippi Flyway.

Floodplain and Floodway Assessment

Fluvial, or riverine flooding, occurs when excessive rainfall over an extended period of time causes a river to exceed its capacity. It can also be caused by heavy snow melt and ice jams. The damage from a river flood can be widespread as the overflow affects smaller rivers downstream, often causing dams and dikes to break and swamp nearby areas. There are two main types of riverine flooding:

- Overbank flooding occurs when, as the water rises, it overflows the edges of a river or stream. This is the most common type of flooding and can occur in any size channel - from small streams to huge rivers.
- Flash flooding is characterized by an intense, high velocity torrent of water that occurs in an existing river channel with little to no notice. Flash floods are very dangerous and destructive not only because of the force of the water, but also the hurtling debris that is often swept up in the flow.

The National Oceanic and Atmospheric Administration models predict increases in severe weather that will impact local flood mapping and required responses. It is anticipated that the Federal Emergency Management Association (FEMA) will update its floodplain mapping in response to these models.

Sterling East's adjacency to the Elkhart River necessitates sensitivity to these models. Any future development projects made within the Sterling East neighborhood will require compliance with FEMA's current floodplain maps and mitigation recommendations.



FIG. 2.12



FIG. 2.13

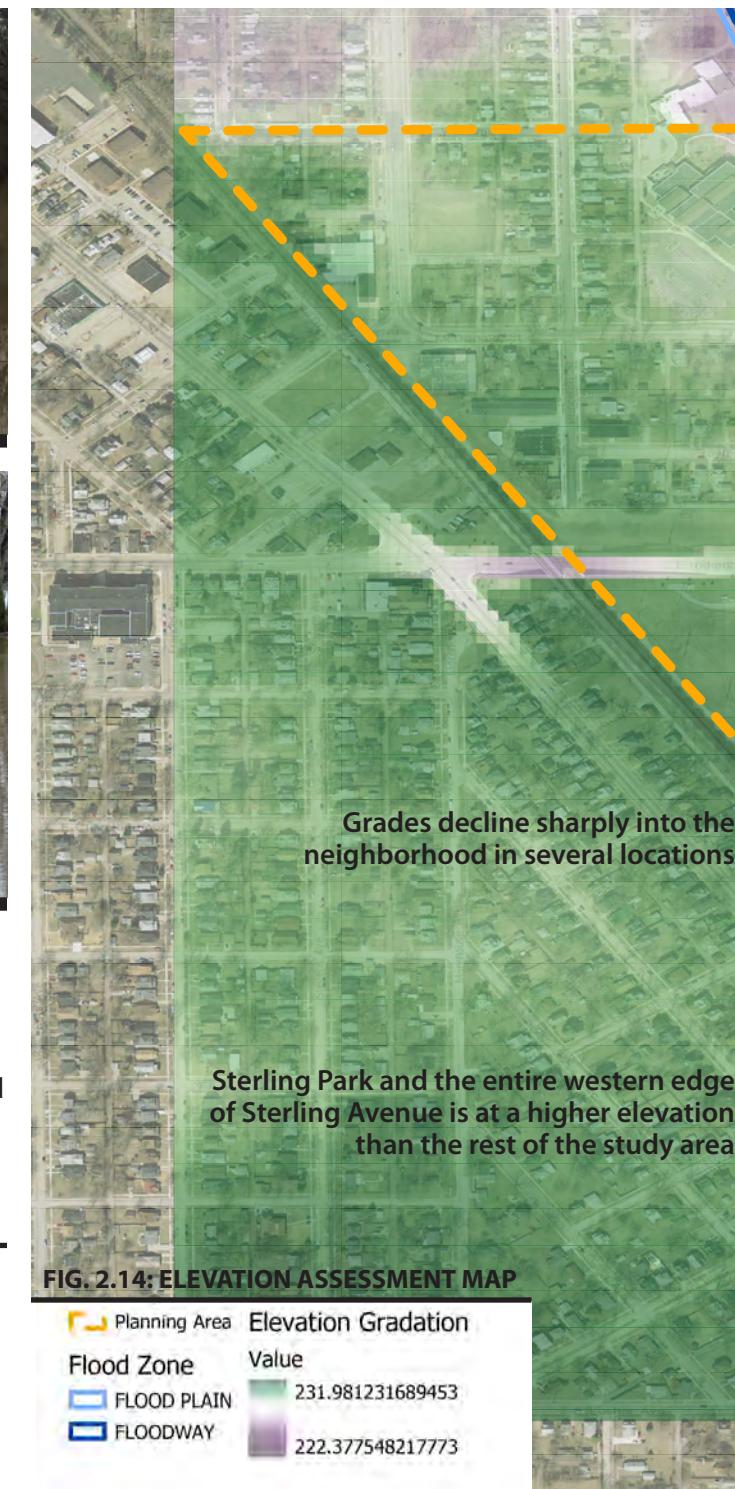
Grading and Drainage Assessment

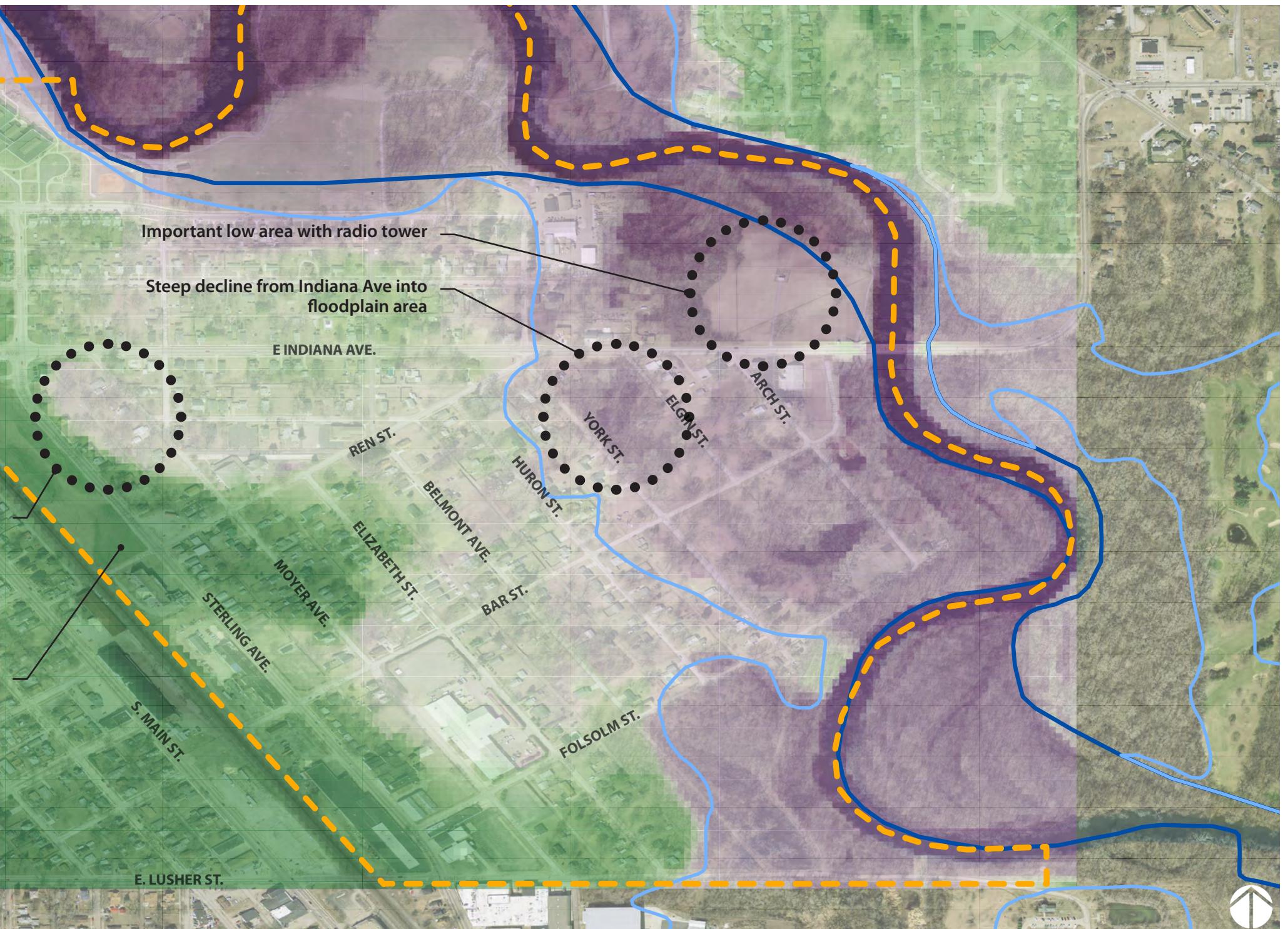
Currently, the area drains toward the floodplain, with the highest spot along the Sterling Avenue corridor and some of the lowest spots adjacent to City owned parcels. Fill should be limited to FEMA recommended strategies within the floodplain, with mitigation best practices implemented where appropriate.

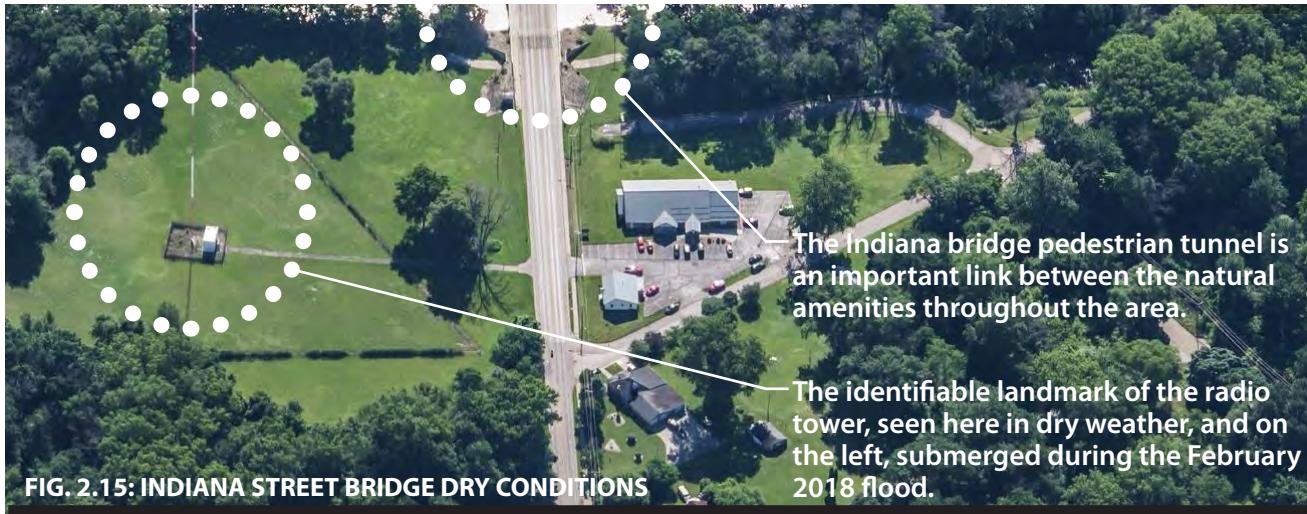
FIG. 2.12: February 2018 Flooding that resulted in a declaration of a State of Emergency devastating homes in and around the Sterling East neighborhood.

FIG. 2.13: This plan is an extention of the EEC Master Plan which addressed district connectivity through several project recommendations and priorities.

FIG. 2.14 Elevation Assessment Map







2018 Flood Observation

Record snowfall throughout Northern Indiana in February of 2018 was immediately followed by record rainfall. Snow melt and intense rain events led to swift rise of streams, creeks, and rivers throughout the region.

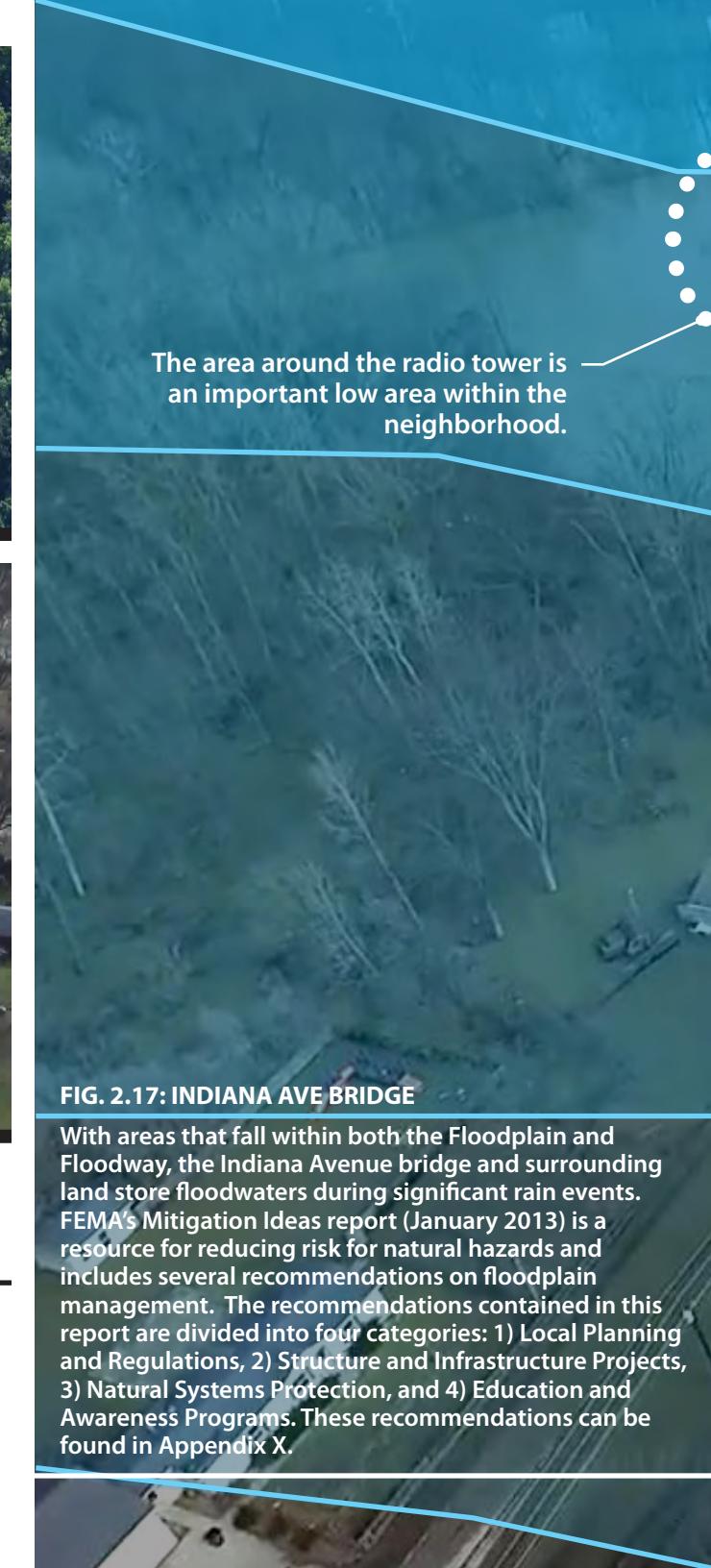
Stormwater inside the floodplain around Elkhart's two rivers rose to historic levels, flooding hundreds of homes. The Sterling East neighborhood was hit

particularly hard. On the opposite page, observed flood waters are shown in blue, with approximate flood levels shown along the far right.

FIG. 2.15: Indiana Ave, near Riverview General Baptist, in 2017 during dry weather

FIG. 2.16: York Street, looking south in 2018 after a significant flood event.

FIG. 2.17: Indiana Ave, near Riverview General Baptist in 2018 after a significant flood event.



With areas that fall within both the Floodplain and Floodway, the Indiana Avenue bridge and surrounding land store floodwaters during significant rain events. FEMA's Mitigation Ideas report (January 2013) is a resource for reducing risk for natural hazards and includes several recommendations on floodplain management. The recommendations contained in this report are divided into four categories: 1) Local Planning and Regulations, 2) Structure and Infrastructure Projects, 3) Natural Systems Protection, and 4) Education and Awareness Programs. These recommendations can be found in Appendix X.



Field Observation

A street by street assessment of the neighborhood was conducted on two separate occasions during the action planning effort. This was done to gain a better understanding of the condition of the housing stock and public infrastructure while also observing flood conditions.

Key observations included noting locations of well-maintained private property, scale of streetscapes and how they contribute to the perception of the neighborhood, and the physical transition between industrial and residential land uses. Each of these observations was then weighed against available geo-spatial data and aerial photography to influence the recommendations.

FIG. 2.18: Panorama looking west along Sterling Ave. toward Bar St.



FIG. 2.18

FIG. 2.19: Indiana Ave. at Main St. railroad underpass serves as an important gateway to the neighborhood.

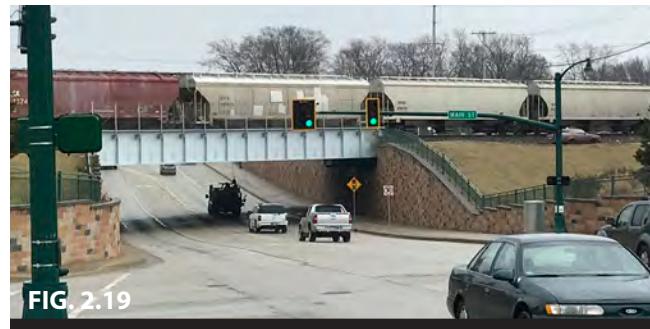


FIG. 2.19

FIG. 2.20: Unique architecture is located throughout the neighborhood - this house is near the Elgin St. and Indiana Ave. intersection



FIG. 2.20

FIG. 2.21: Looking south at housing along Indiana Ave. near the corner of Grand Ave.



FIG. 2.21

FIG. 2.22: Many of the single family homes, outside of the floodplain, are in good condition, such as this home located along Oxford Ave. facing the New Beginnings United Worship campus.



FIG. 2.22



FIG. 2.24



FIG. 2.23

FIG. 2.23: City CSO wetland project at the corner of Bar St./River Blvd. and Arch St.

FIG. 2.24: At the corner of Bar St. and Huron, the McQuiston School/Concord Township District No. 15 has a "Notable" historic value as designated with the Elkhart Scattered Sites Interim Report.

FIG. 2.25



DEVELOPMENT TYPES

This SEAP report primarily focuses on what is commonly referred to as the "Missing Middle Housing" supply. Missing Middle is a range of multi-unit or clustered housing types compatible in scale with single-family homes that help meet the growing demand for walkable urban living. The diagram above highlights different housing types, from lowest density to highest, with various types of multifamily options. Each type of multifamily housing could be used in different iterations throughout the study area to achieve the desired impact without feeling out of place in the single-family neighborhood.

Urbanism Perspective

Urban environments evolve over time, responding to daily process fluctuations and seasonal changes. The entire infrastructure catalog of municipal development and configuration all operate independently while at the same time interacting and responding to each other. This includes everything from spaces like roads and parks to objects like lighting and street trees. This network of interaction must be considered in addition to residential, commercial, and industrial buildings and structures.

In this way, the approach to Sterling East should not focus solely on infill housing, but how that housing relates to other spaces, infrastructure, and amenities within the neighborhood and City.

Transect-Based Zoning Vs Conventional Zoning

The transect defines a series of zones that transition from sparse rural farmhouses to the dense urban core. Each zone contains a similar transition from the edge to the center of the neighborhood and has been divided into six zones. The six Transect Zones provide the basis for real neighborhood structure, which requires walkable streets, mixed use, transportation options, and housing diversity. The T-zones vary by the ratio and level of intensity of their natural, built, and social components.

Based on proximity to the urban core of Elkhart, as well as adjacency of industrial areas, Sterling East operates at between T-4 General Urban Zone and T-3 Sub-Urban Zone. Overall, as a gateway corridor into Elkhart, Sterling East transitions from the broad rural land use swaths of Elkhart County to denser residential neighborhoods that lead into Elkhart's urban core.



FIG. 2.26



FIG. 2.27

FIG. 2.25: Housing Typology, with a focus on mid-level scale and density that fits the Sterling East context.

FIG. 2.26 Traditional transition zone density for municipalities across the country.

FIG. 2.27 Same location as above, after a "Sprawl Repair" implementation, with a focus on density and walkability.

Streetscapes

Sterling East has several types of land uses, from residential and industrial buildings to park and natural open spaces. To help facilitate any infill strategy, from both a capacity and functional standpoint as well as public perception (curb appeal) and appropriate development scale, streetscapes must be addressed. In addition to infill strategies, addressing floodplain concerns through the design of the dominant land uses will help ensure that both public and private investments are protected.

Streetscape considerations include but are not limited to, traffic management, bicycle/pedestrian system connectivity and accommodation within the right-of-way, parking capacity, visibility, wayfinding, and green/resilient infrastructure. Types of green infrastructure streetscape implementations include in-street rain gardens, which serve to collect stormwater from the existing system, while also slowing down traffic at intersections or mid-block crossings. The following images show types of vehicular and pedestrian traffic management, as well as green infrastructure within the streetscape area.



FIG. 2.28



FIG. 2.32



FIG. 2.29



FIG. 2.33



FIG. 2.30



FIG. 2.34



FIG. 2.31



FIG. 2.35

FIG. 2.28: NACTO approach to small urban street corridors.

FIG. 2.29: NACTO raised pedestrian crossing, with bump-outs to control traffic within a neighborhood.

FIG. 2.30: NACTO shared street, with narrow travel lanes, minimal lawn, and permeable paving strips.

FIG. 2.31: NACTO demonstration of traffic calming implementation - transition from urban corridor to neighborhood streets.

FIG. 2.32: Traffic calming implementation with a "Green Streets" rain garden that utilizes existing city stormwater management system.

FIG. 2.33: Another type of green street implementation with a focus on pedestrian experience.

FIG. 2.34: Larger rain gardens can be used for both for stormwater management and flood control within the neighborhood.

FIG. 2.35: Parking lot stormwater management.



FIG. 2.36

HOUSING TYPES

Historically, the Sterling East neighborhood has been identified as strictly an industrial and low density residential neighborhood. Combined with the juxtaposition of the open space and floodplain area that comprises the eastern third of the neighborhood, the resulting land use has waning density, incongruous function, and an overall negative external perception. Contemporary trends and studies show an increased need for housing in the City that responds to workforce shortfalls, income level, and public investments in other districts. To respond to existing neighborhood scale and density, a variety of housing types were explored through regional case studies. Each of these studies aligns with Elkhart's Comprehensive Plan goals and overall community direction.

FIG. 2.36: Central Apartments located in Indianapolis IN was formerly a clothing manufacturing facility. Now the building operates as housing with 86 apartments situated among several redeveloped lots in the Northside Historic District.



FIG. 2.37

TOWNHOMES

Pictured: Riverwalk Townhomes, Mishawaka, IN

A townhouse has two connotations-- row houses and townhomes-- but the category generally refers to a multi-story residential unit with a small building footprint. The small building footprint of the townhouse allows it to be within walking public transportation, employment centers, and other amenities within the city, while also offering a range of styles that attract varying demographics.

Row houses are similar to townhomes and consist of several adjacent, uniform units. These were originally found in older, pre-automobile urban areas. A row house will generally be smaller and less luxurious than a dwelling called a townhouse. A townhouse is where there is a continuous roof and foundation and a single wall divides adjacent townhouses.

Pros/Cons

- Higher density
- Lower energy and environmental footprint
- Parking concerns



FIG. 2.38

SINGLE FAMILY AND DUPLEX HOUSING

Pictured: Garden Valley Estates, Cleveland, OH

The entire space around the building is private to the owner and family, and in most cases, can be added onto if more room is needed. They also typically have no property management fees, such as the ones associated with condominiums and townhomes.

From an environmental point of view, single-family houses are likely to require much more energy to heat in cold weather than buildings with shared walls, because of their very high surface-area-to-volume ratio. In wealthier countries, people who live in single-family houses are much more likely to own and use a private automobile rather than walking, biking, or using public transit to commute. The low density of housing leads to less frequent bus service and longer distances to commute, thus leading to increased car use. This makes single-family houses part of a much more energy intensive lifestyle. The low-density nature of this type of housing requires using more land which could otherwise be used for agriculture or as natural habitat.

Pros/Cons

- Lower density
- Higher energy and environmental footprint
- Minimal parking concerns



FIG. 2.39

MIXED USE

Pictured: Colfax/Hill, South Bend, IN

Mixed-use development is a type of urban development that blends residential, commercial, cultural, institutional, or entertainment uses, where those functions are physically and functionally integrated. This type of development also promotes pedestrian connections. The term may also be used more specifically to refer to a mixed-use real estate development project—a building, complex of buildings, or district of a town or city—that is developed for mixed-use by a private developer, governmental agency, or a combination. Types considered for Sterling East include:

- **Neighborhood commercial zoning:** convenience goods and services, permitted in otherwise strictly residential areas.
- **Main Street residential/commercial:** 2 to 3-story buildings with residential units above and commercial or civic units on the ground floor facing the street.
- **Office/residential:** multi-family residential units within office building(s).
- **Live/work:** residents can operate small businesses on the ground floor of the building where they live.
- **Studio/light industrial:** residents may operate studios or small workshops in the building where they live.

Pros/Cons

- Higher density and variety of housing
- Lower energy and environmental footprint
- Some parking concerns



FIG. 2.40

APARTMENT COURTYARD

Pictured: Ivy Quad, Notre Dame, IN

A medium- to large-sized structure consisting of multiple side-by-side and/or stacked dwelling units accessed from a courtyard or series of courtyards. Each unit may have its own individual entry or multiple units may share a common entry. Courtyard apartments, similar to Bungalow Courts, utilize a shared public space for recreation or just for nicer views, reducing the footprint needed. The scale of this type of multiplex tends to be smaller to not overburden the public space and make the facility more relatable.

Pros/Cons

- Higher density
- Lower energy and environmental footprint
- Minimal parking concerns

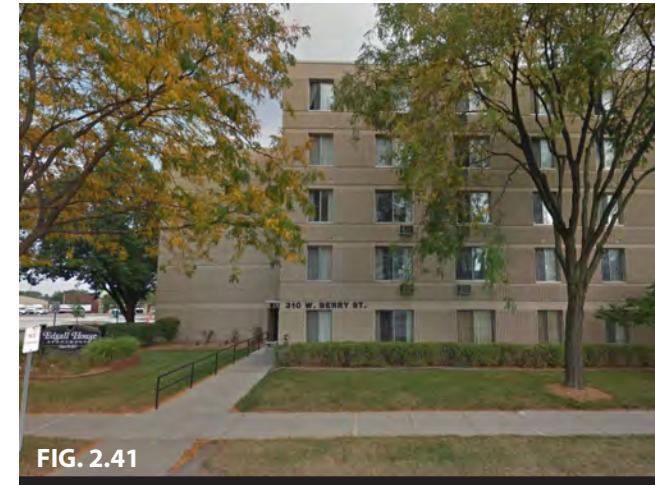


FIG. 2.41

APARTMENT MULTIPLEX

Pictured: Edsall House Apartments, Fort Wayne, IN

Apartment multiplexes can vary in scale and either be situated as stand-alone buildings or, as typical of contemporary development, they can be grouped as a series of residential complexes. If developed as part of a grouping, usually a community building with property superintendent/manager, recreation amenities, or other public uses is included. Developed as an individual building, public resources are typically included on the first floor near a common entrance.

Pros/Cons

- Highest density
- Lower energy and environmental footprint
- Some parking concerns



FIG. 2.42



FIG. 2.43



FIG. 2.44

PROCESS

Kicking off in January 2018 and building off of the 2016 Environmental Center Master Plan, the Sterling East planning process featured internal and external stakeholder meetings to gain insight to physical and social contexts. Combined with feedback from the City of Elkhart, participating businesses, and key stakeholders, an initial inventory of physical conditions and features, as well as the social context provided a baseline understanding of assets and liabilities of the neighborhood.

City Personnel Planning Meeting

Representing various City Departments, including Engineering, Planning, and Parks, Elkhart's City team met at the Environmental Center with the following goals:

- Site development improvement recommendations
- Determine contextual connection recommendations
- Discuss potential project priorities and any phases for implementation

An exercise to engage the staff members was used to prompt feedback regarding a handful of key lenses. Featuring five (5) stations with project boards that had the prompts clearly labeled, city personnel rotated to each station and used "sticky notes" to record information within each category

on the boards. That individual feedback was compiled and inventoried (refer to appendix).

The following lenses were utilized, broken down further into more specific prompts to provide the necessary background information needed to provide direction to the participants. The prompts were developed prior to the meeting with the project team. Each was determined to be an important area, with some overlaps that ensured full coverage of the project goals. The boards for each station included the following information:

Built Environment:

- Housing Types, Architectural Styles, Building Size, and Streetscape Scale
- Transition Zones and Buffers
- Neighborhood Experience
- Lighting, Signage, Landmarks, and Gateways

Infrastructure:

- Utilities, CSO, stormwater, and sanitary sewers
- Water mains and stormwater management
- Green infrastructure
- Transportation improvements, including streets and sidewalk condition

Land Use:

- Single Family Residential, Multifamily Residential, Infill Priorities, Limited Manufacturing, and Industrial Expansion

- Green Space: Parks and Buffers
- Commercial, Retail, Schools, and Grocery

Mobility:

- Access, Connectivity, and Walkability
- Interurban Trolley
- Bicycle and Pedestrian Networks
- Passive and Active Recreation
- Proximity to Amenities

Context:

- Zoning
- Acquisition
- Resources
- Partnerships
- History
- Neighborhood Perception
- Related Activities
- Safety

Strengths, Weaknesses, Opportunities, and



FIG. 2.45



FIG. 2.46



FIG. 2.47

Threats (SWOT Analysis)

A SWOT analysis of the study area was developed using the feedback from the internal and external stakeholder meetings, as well as through background inventory and analysis. The points listed in each category represent those with the highest frequency discovered during the analysis portion of the process.

Strengths

- Proximity (to downtown, employment centers, and neighborhood amenities)
- Large Number of Parcels Acquired
- Dedicated Industrial Community
- Engaged Neighborhood

Weaknesses

- Physical Condition of the Neighborhood
- Physical Barriers and Boundaries
- Perception of the Area
- Visibility and Accessibility
- Missing Amenities
- Flooding

Opportunities

- Landuse Consolidation
- Connections
- Transition Zones
- River

Threats

- Overcoming Perception
- Vandalism
- Flooding

Internal Stakeholder Process Conclusions

Each of these aspects served as the backdrop to the master plan, with considerations, priorities, and goals arising from the feedback. Throughout the process, the City staff provided ample resources, both expertise and data resources such as GIS files, to assist in the complete understanding of the Sterling East Neighborhood.

In addition to the background information and analysis, additional thought was given to the following project considerations and priorities:

Key Considerations

- Strengthen Neighborhood
- Build Parks with Character, Not Just More Open Space
- Engage Industrial Users

Priorities and Objectives

- Develop an Infill Strategy
- Build On Contemporary Efforts
- Improve Visibility and Connectivity
- Highlight River

FIG. 2.42 - FIG. 2.47: Photos of the stakeholder planning meeting, held at the Elkhart Environmental Center in January 2018.

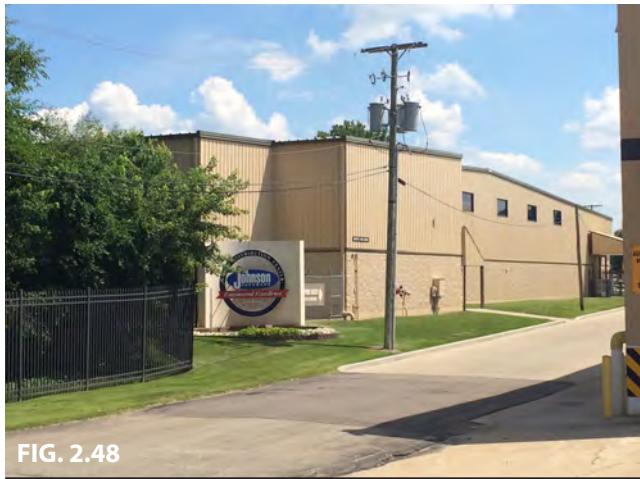


FIG. 2.48



FIG. 2.49



FIG. 2.50

BUSINESSES MEETINGS

As part of the planning process, staff also engaged industrial businesses in the neighborhood to better understand their long-term goals and needs. These businesses represent important partners in outlining the strategy to make the neighborhood more successful.

The three businesses engaged during the SEAP process-- Elkhart Bedding, MORryde International, and LE Johnson-- combined with Dynamic Metals and ATS Manufacturing represent 20% of the total acreage of the Sterling East study area, or approximately 44 acres. The daily influx of approximately 610 people that these businesses bring (excluding Dynamic and ATS), is 150% of the total population of the project study area (410 people).

Accommodating the flow of people from industrial businesses, as well as their land use needs, both current and future, will help ensure that these needs are coordinated in a manner sensitive to residents' concerns and long-term visions for the neighborhood.

The following sections summarize the feedback from each of the stakeholder meetings.

ELKHART BEDDING

Elkhart Bedding was founded in 1919 and has been a family-owned business throughout its history. The business currently employs approximately 15 people, all of which work 1st shift. These employees primarily stay onsite during the day, but are open to using Sterling East neighborhood amenities, should the need arise.

In general, the existing building footprint meets the current operational needs. If future expansion is needed, Elkhart Bedding owns an adjacent parcel to the south that could accommodate an addition. With minimal retail square footage, Elkhart Bedding has explored alternative locations for the retail portion of their business. However, the current space allocations are sufficient for that use. The off-campus parking across Sterling Avenue meets all customer and employee parking needs.

Some improvements along both sides of Sterling Avenue have been completed recently. These helped to clean up the main entrance, which serves retail customers while also solving some minor onsite drainage issues.

MORRYDE INTERNATIONAL, INC.

MORryde has experienced intense growth since the company was founded.

The company has operated at this location since 1966. There are 395 employees at the Sterling campus, or just over 34% of MORryde's workforce. The company's shift breakdown is as follows: 184 employees on 1st Shift [5am-1pm], 75 employees on 2nd Shift [1pm – 9pm], 36 employees on 3rd Shift [9pm – 5am], and 100 employees on "Day Shift" [roughly 8-5]. These employees often take advantage of neighborhood amenities, such as sidewalks and bike lanes, for the company's "More Fit" challenges. From that perspective, a community garden might be a welcome addition to the neighborhood.

The company recently acquired 80 acres of land at another location in the City. Future expansions for the company will likely occur at that location. At the Sterling Avenue location, barring changes in adjacent building availability, no expansion is currently planned because it would exacerbate existing parking conflicts. These conflicts typically occur at the shift changes outlined above.

Other feedback from MORryde included improving a perceived graffiti issue at the viaduct south of Hively Avenue.

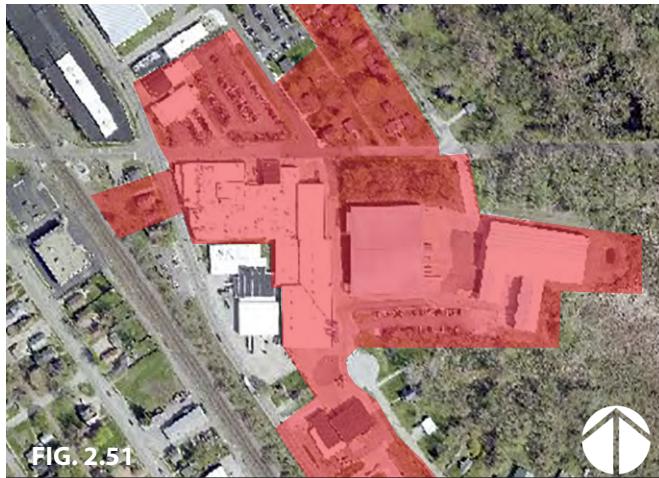


FIG. 2.51

LE JOHNSON PRODUCTS

LE Johnson, or Johnson Hardware, was founded 1958, and similar to MORryde has expanded several times over its history.

Johnson employees 200 full-time equivalent people over two shifts. These employees come throughout the region, including some from within the neighborhood. Some of these employees use neighborhood amenities, such as Sterling Park, during their lunch time, with some walking or biking to work.

Johnson has explored a few expansion possibilities, from further east, toward the Environmental Center, to northeastward within the neighborhood. This would be done to address additional facility needs, such as a punch press, or additional parking. The company owns a rental company, Hudson Sterling, which owns several rental residential properties north of Lusher Avenue.

Additional feedback included an interest in housing development in the neighborhood.



FIG. 2.52

DYNAMIC METALS, LLC

STAKEHOLDER FEEDBACK N/A

ATS MANUFACTURING, LLC

STAKEHOLDER FEEDBACK N/A

FIG. 2.48: LE Johnson Products is located in the southern portion of the Sterling East Neighborhood.

FIG. 2.53: Elkhart Bedding, located on Sterling Ave., has improved their frontage for both aesthetic and functional purposes.

FIG. 2.54: MORryde's neighborhood campus is bounded by Sterling Ave. to the West, Folsom St. to the South, Bar St. to the North, and is primarily on the west side of Elizabeth St.

FIG. 2.55: MORryde has expanded several times at the Sterling East campus with limited to no future expansion planned here at the time of this study.



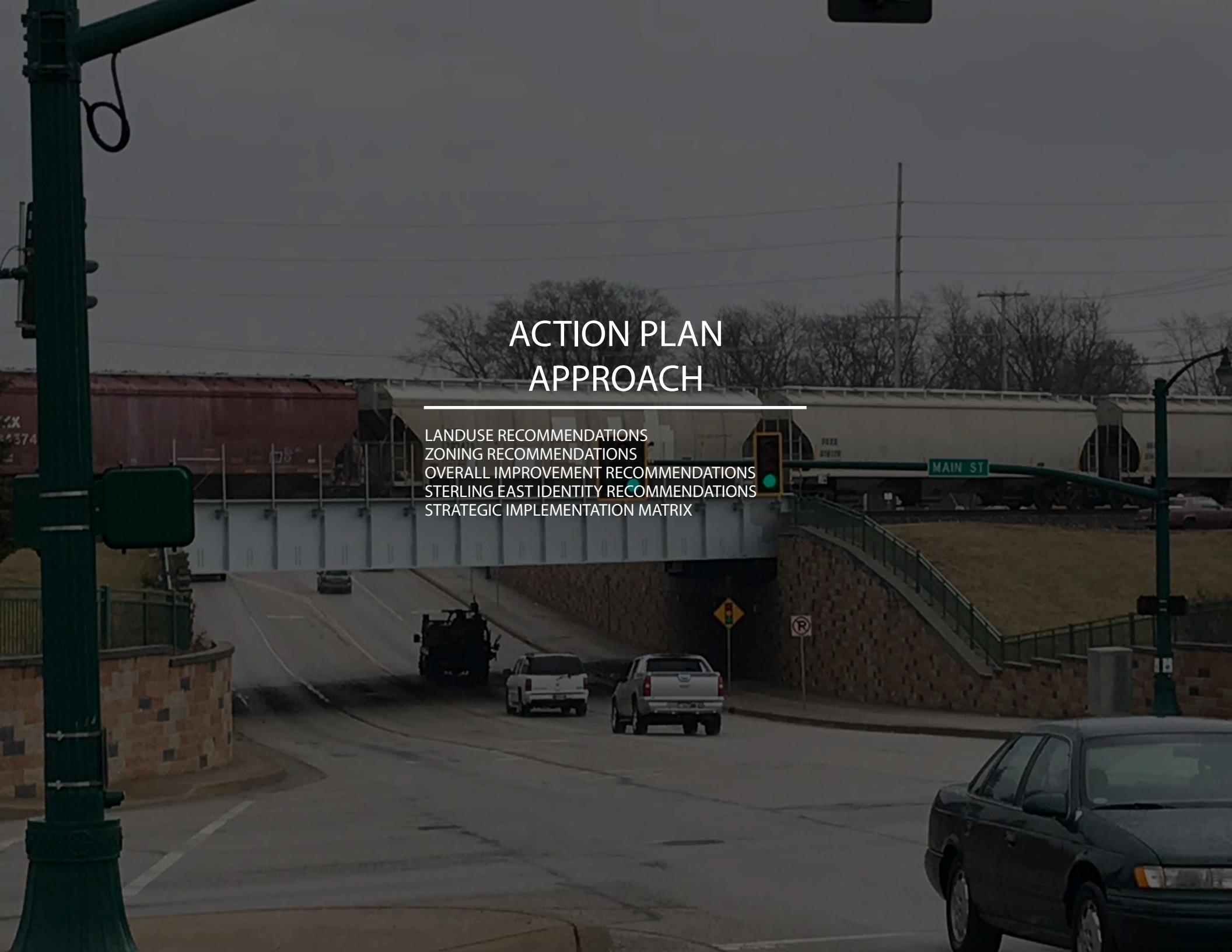
FIG. 2.53



FIG. 2.54



FIG. 2.55



ACTION PLAN APPROACH

LANDUSE RECOMMENDATIONS
ZONING RECOMMENDATIONS
OVERALL IMPROVEMENT RECOMMENDATIONS
STERLING EAST IDENTITY RECOMMENDATIONS
STRATEGIC IMPLEMENTATION MATRIX

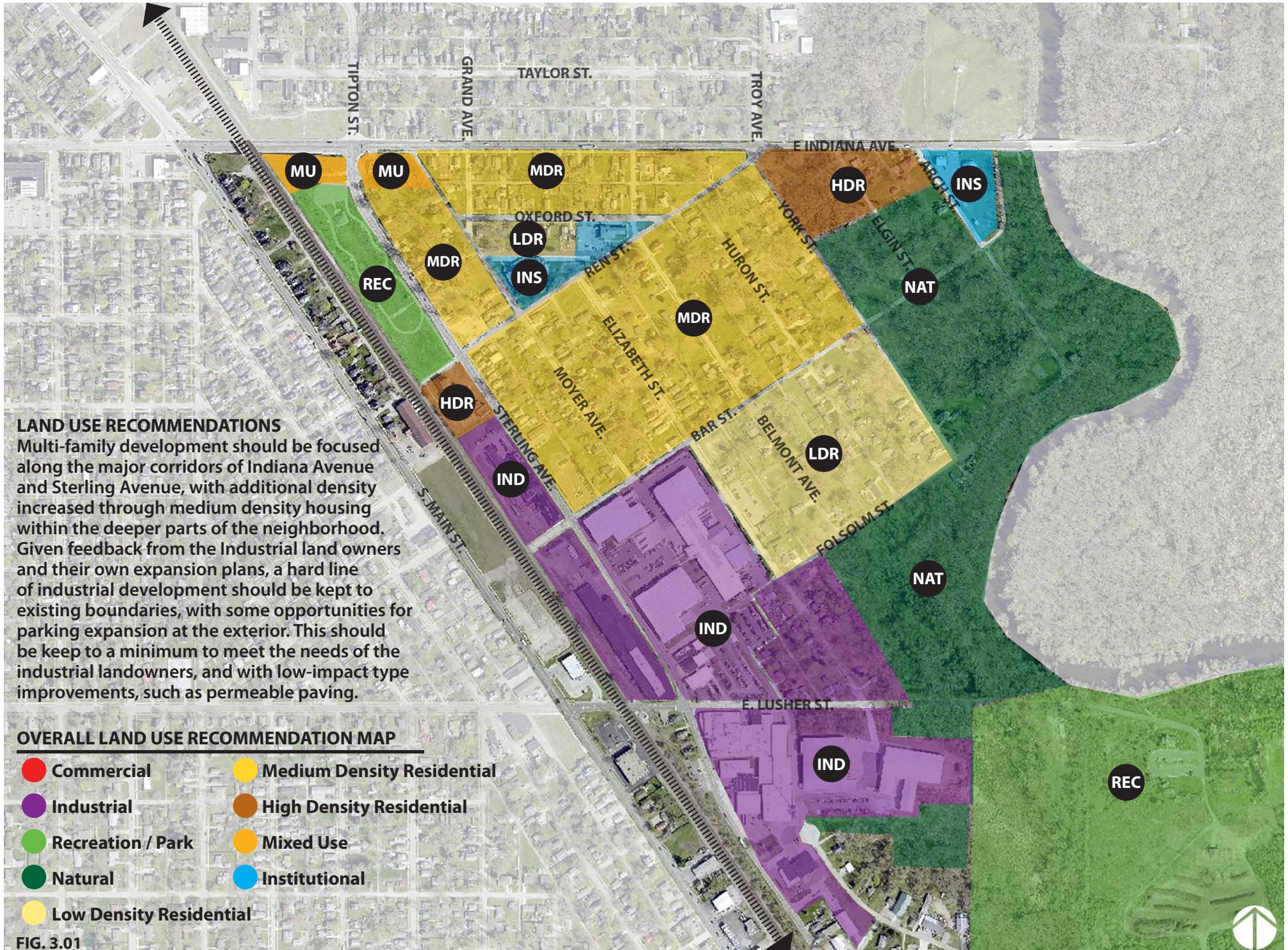




FIG. 3.02



R-2 ONE FAMILY DWELLING DISTRICT

The R-2 District is designed to provide for low density single family residential development on narrower lots in urbanized or urbanizing areas.

Permitted uses include Any use permitted in the R-1, One-Family Dwelling District and Single family detached residences located on a permanent foundation with a minimum width of 24 feet and a minimum of nine hundred fifty (950) square feet of dwelling unit space, in which case the ground floor shall consist of no less than 600 square feet of such dwelling unit space. The primary façade of the structure shall face a public street

R-3 TWO FAMILY DWELLING DISTRICT

The R-3 District is designed to provide for low to medium density single and two family residential development in urbanized areas.

Permitted uses include any use permitted in the R-2 One-Family Dwelling District and Two-Family dwellings, with a minimum width of 24 feet and a minimum of seven hundred fifty (750) square feet of dwelling unit space per dwelling unit. The primary façade of the structure shall face a public street.

R-4 MULTIPLE FAMILY DWELLING DISTRICT

The R-4 District is designed to provide for new multiple family residential development.

Permitted uses include any use permitted in the R-3, Two-Family Dwelling District, except one- and two family dwellings and Multiple-family dwellings, dormitories, sorority and fraternity houses, and radio towers owned by federally licensed amateur ham radio operators

R-5 URBAN RESIDENTIAL DISTRICT

The R-5 District is designed to control development and redevelopment in existing older residential neighborhoods originally created primarily for single family residences. Over the years many of these neighborhoods have experienced an increase in the intensity of use due to the conversion of older single family residences to two or more residential unit structures. The goal of this district is to ensure this development does not create a detriment to the neighborhood due to inadequate parking and infrastructure, undersized lots and general

incompatibility with the surrounding neighborhood. Limitations on permitted uses and specific criteria for increasing use intensities are incorporated to protect the integrity and viability of these older established neighborhoods.

Permitted uses include One-family dwellings located on a permanent foundation with a minimum width of 24 feet and a minimum of nine hundred fifty (950) square feet of dwelling unit space, in which case the ground floor shall consist of no less than 600 square feet of such dwelling unit space. The primary façade of the structure shall face a public street. The permitted uses also include home occupations, temporary structures, used for construction site purposes for a period not to exceed six (6) months, accessory structures and uses, sheltered living homes licensed by the State of Indiana., radio towers owned by federally licensed amateur radio operators, and two-family dwellings and multiple-family dwellings up to and including six (6) units

B-1 NEIGHBORHOOD BUSINESS DISTRICT

The B-1 District is designed to accommodate convenient and accessible business and service establishments with less than seven thousand five hundred (7,500) square feet of floor area. The intent is to serve the daily convenience needs of surrounding residential neighborhoods.

Permitted uses include bakery Shop, Barber and beauty shops, book store, candy/ice cream shop, delicatessen, drug store, dry cleaning, florist, food store, retail, laundromat, medical and dental offices and clinics, business and professional offices, one residential dwelling located above or to the rear of a commercial use if occupied by the owner of the commercial use or the owner of the property, restaurant or cafe, excluding drive-in restaurant, serving non-alcoholic beverages only, and including outdoor dining, police and fire stations, located on a primary or thoroughfare street, post office branch, other retail sales and service businesses serving the immediate neighborhood, funeral homes, crematories and similar services, and therapeutic massage.

M-1 MULTIPLE FAMILY DWELLING DISTRICT

The M-1 District is designed to accommodate

limited manufacturing uses having a minimal impact on surrounding areas. The intent is to allow manufacturing development by reason of location and the availability of adequate transportation and infrastructure systems, while protecting the surrounding uses from negative external effects. Refer to section 18 of Elkhart Zoning Code for schedule of permitted uses.

M-2 MULTIPLE FAMILY DWELLING DISTRICT

The M-2 District is designed to accommodate a broad range of industrial activities, diverse in products, operational techniques, and size, which have a greater impact on the surrounding environment than the M-1 District. The uses permitted in this district generally include those manufacturing and industrial activities which cannot be operated economically without creating some conditions which may be objectionable to the occupants of adjoining properties and which, for that reason, must be grouped in areas where similar industrial uses are now located or where the permitted uses will be best located in accordance with the comprehensive land use plan of the City, which is designed to protect the welfare of the community. Refer to section 19 of Elkhart Zoning Code for schedule of permitted uses.

FHA FLOOD HAZARD AREAS

The flood hazard areas are subject to periodic inundation which results in Loss of life and property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare. These flood losses are caused by the cumulative effect of obstructions in floodplains causing increases in flood heights and velocities, and by the occupancy in flood hazard areas by uses vulnerable to floods or hazardous to other lands which are inadequately elevated, flood proofed, or otherwise unprotected from flood damages. The purpose of this ordinance to promote the public health, safety, and GENERAL welfare and to minimize public and private losses due to flood conditions in specific areas.

LIMITATIONS OF ZONING RECOMMENDATIONS

The zoning recommendations highlighted in the previous section utilize existing City of Elkhart classifications that best fit the intention of the SEAP.

It is understood that updates to the zoning code language may include new sections that better address the needs of the Sterling East neighborhood. These sections may more appropriately address mixed use developments and parks. Currently, these include areas such as the B-1 recommendations at the corner of Indiana Avenue and Sterling Avenue as well as the existing M-1 designation at Sterling Park. As zoning is updated across the City, these areas should be updated to more appropriately reflect the intentions of the SEAP.

ADDITIONAL STUDY RECOMMENDATIONS

The City of Elkhart can proactively start investing in infrastructure that will support the development projects. In order to effectively phase those projects into the redevelopment of Sterling East, additional study and engineering analysis would be beneficial for the following:

- Intersection Safety Improvements, such as a study of the intersection at Troy Ave. / York St. / Ren St.
- Repaving Projects
- Utility Upgrades and Service Improvements
- Projects within the Floodplain, on a case-by-case basis
- Connection of multi-use trail along Sterling Avenue to Hively Avenue Intersection



FIG. 3.03: HIVELY AVE AT STERLING AVE. INTERSECTION

FIG. 3.03: Connecting to the Mapleheart Greenway at the Sterling Avenue and Hively Avenue intersection needs further analysis to appropriately address safety concerns.

GENERAL STRATEGY AND APPROACH

OVERALL IMPROVEMENTS

FIG. 3.04



FIG. 3.05

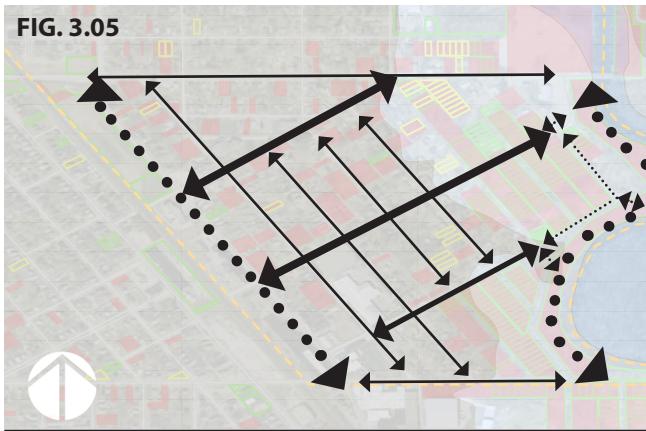
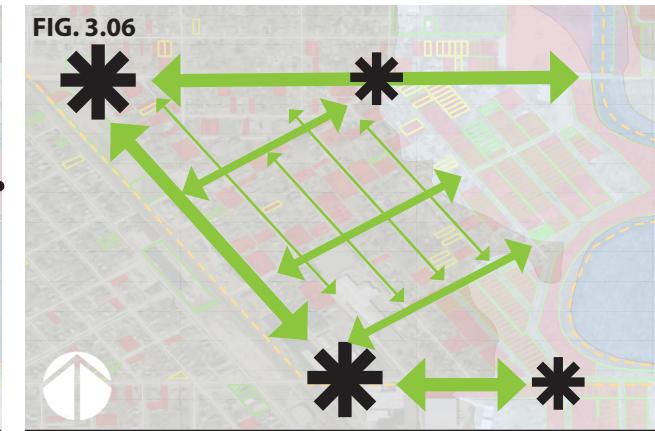


FIG. 3.06



OPEN SPACE STRATEGY

- Infill opportunities:** Increase density through housing and commercial facility infill on appropriate vacant and undefined parcels throughout the neighborhood.
- Open views:** Improve visibility of the natural amenities in the neighborhood.
- Green infrastructure:** Consolidate larger naturalized areas and implement low impact management tactics throughout.



CONTEXTUAL CONNECTIONS

- Mobility improvements:** Increase neighborhood accessibility and pedestrian connectivity by adding new (and improving existing) sidewalks, crosswalks, curb ramps.
- Trail Connections:** Develop multi-use trails, boardwalks, informal walking trails.
- Neighborhood signage and gateways:** Increase visibility at key locations to facilitate better neighborhood awareness and perception.



SITE DEVELOPMENT + IMPROVEMENTS

- Infrastructure Improvements:** Implement intersection safety improvements, repaving projects, and utility improvements.
- Green infrastructure:** Separate from the broad strategies of the Open Space Strategy, site improvement strategies will address stormwater management and floodplain issues by supporting the implementation of rain gardens and larger stormwater storage areas.
- Streetscape improvements:** New street trees and pedestrian scale lighting additions.

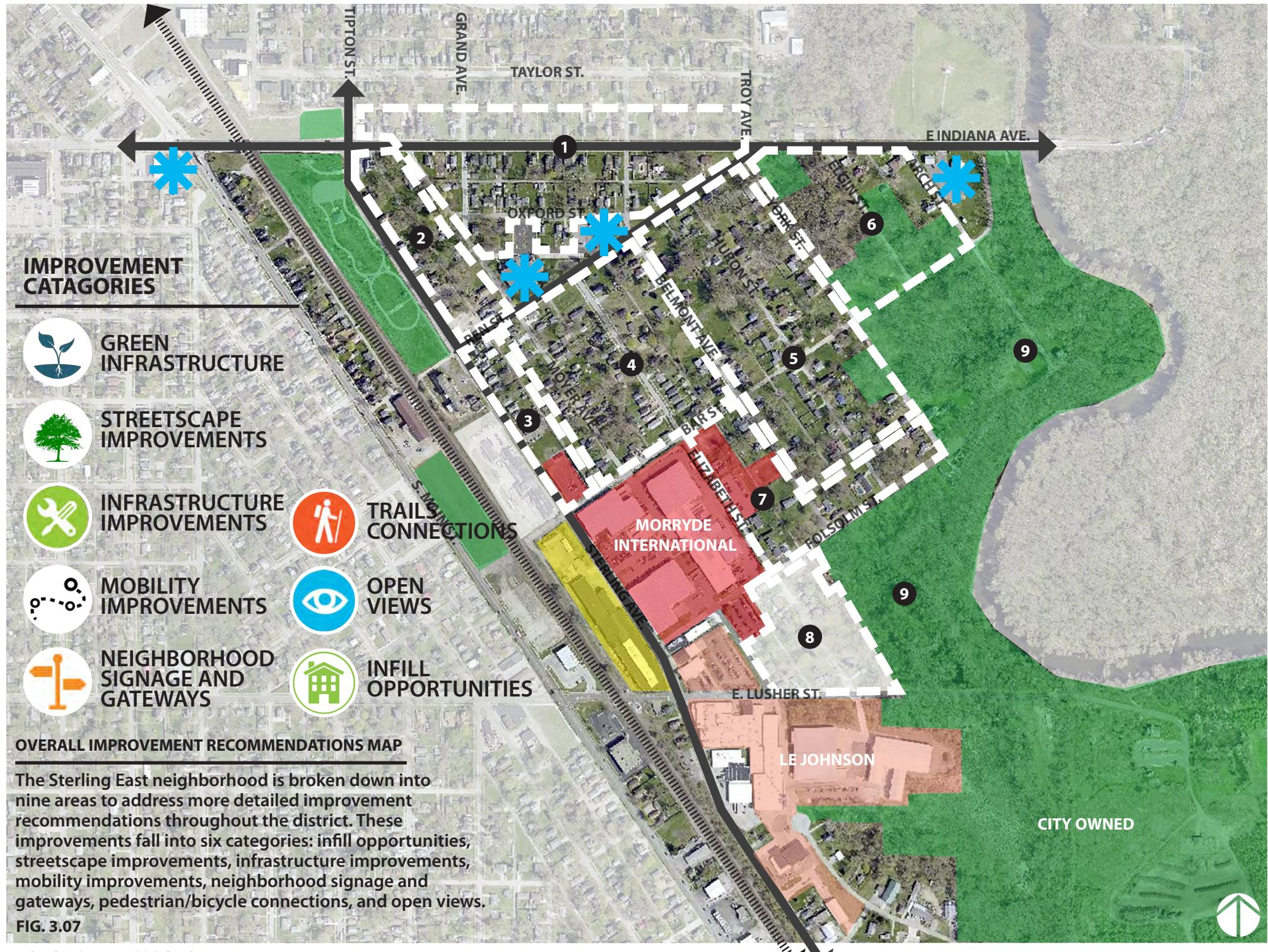


FIG. 3.07: ZONE 1

With well-maintained single family houses that line each side of the street, this zone boasts low vacancy rates and has fewer undefined lots. Infill where possible over time will strengthen the neighborhood "feel" and streetscape improvements will help better connect this zone to the district amenities.



GREEN INFRASTRUCTURE

- 1.1 In-street rain garden bump-outs

STREETSCAPE IMPROVEMENTS

- 2.1 New Street Trees
- 2.2 Pedestrian Scale Lighting

INFRASTRUCTURE IMPROVEMENTS

- 3.1 Intersection Safety Improvement
- 3.2 Repaving Project
- 3.3 Utility Improvements

MOBILITY IMPROVEMENTS

- 4.1 Pedestrian Crossings
- 4.2 New Sidewalks / Curb Ramps

NEIGHBORHOOD SIGN./GATEWAYS

- 5.1 Monument Signage

INFILL OPPORTUNITIES

- 6.1 Undeveloped parcels in this area should be reacquired over time to introduce density to the neighborhood.

↔ STREETSCAPE IMPROVEMENTS ALONG STREET CORRIDOR



GREEN INFRASTRUCTURE

- 1.1 In-street rain garden bump-outs



STREETSCAPE IMPROVEMENTS

- 2.1 New Street Trees

- 2.2 Pedestrian Scale Lighting



INFRASTRUCTURE IMPROVEMENTS

- 3.1 Intersection Safety Improvement
- 3.2 Repaving Project
- 3.3 Utility Improvements



MOBILITY IMPROVEMENTS

- 4.1 Pedestrian Crossings
- 4.2 New Sidewalks / Curb Ramps
- 4.3 New Multi-Use Pathway



NEIGHBORHOOD SIGN./GATEWAYS

- 5.1 Monument Signage



PEDESTRIAN ROUTE AND CONNECTIONS



INFILL OPPORTUNITIES

- 6.1 Undeveloped parcels in this area should be reacquired over time to introduce density to the neighborhood.

- 6.2 Parcels adjacent to the Indiana and Sterling Intersection are highly visible and serve as defacto gateways to the neighborhood. Coordinating with current land owners to redevelop parcels into mixed use would help fill housing and commercial needs of the neighborhood while also improving aesthetics and perception.



FIG. 3.09

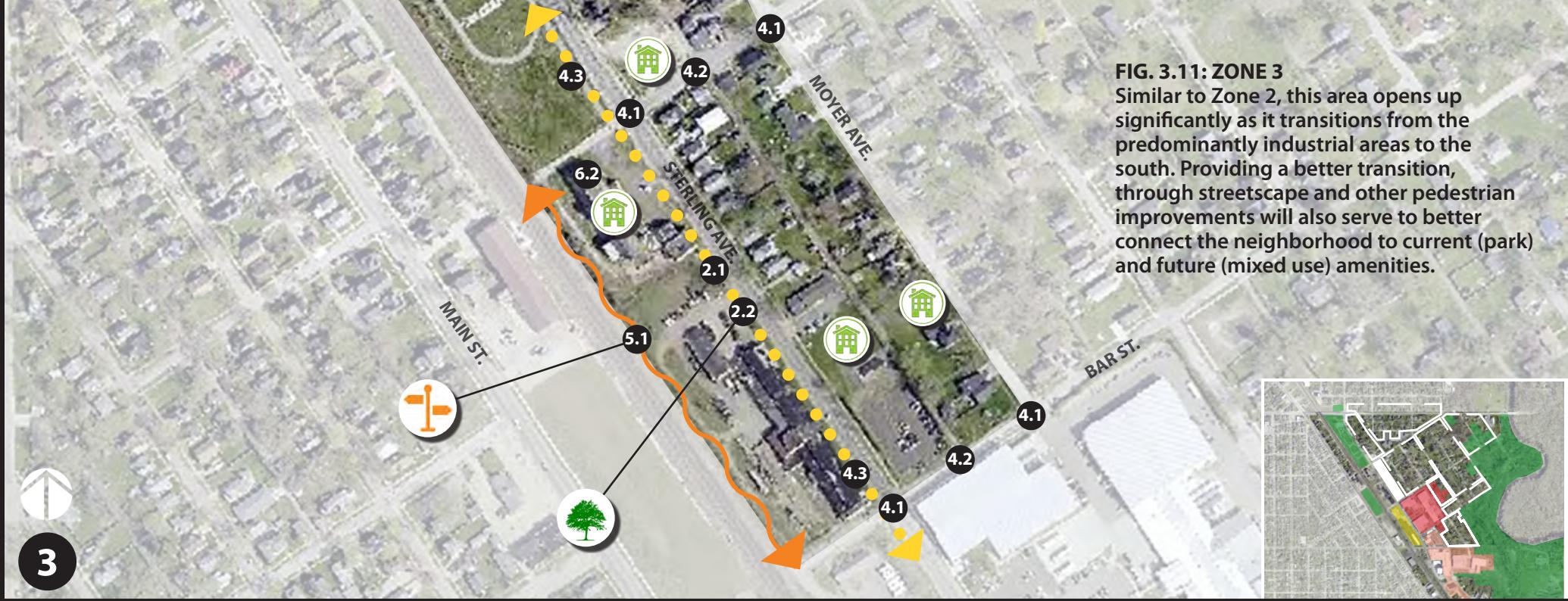
Mixed Use of at-least 3 stories takes advantage of the highly visible corner at Indiana and Sterling.

FIG. 3.09: The existing southwest corner at the Sterling Indiana Intersection is an open field that abuts Sterling Park. The parcel currently has AEP electric infrastructure.

FIG. 3.10: The proposed corner improvements involve a mixed-use parcel, with pedestrian amenities throughout. These include a narrowed Sterling Corridor, a bus stop/ bicycle racks, collection points for adjacent trails, and various streetscape improvements.



FIG. 3.10



GREEN INFRASTRUCTURE

- ①.1 In-street rain garden bump-outs



STREETSCAPE IMPROVEMENTS

- ②.1 New Street Trees
- ②.2 Pedestrian Scale Lighting



INFRASTRUCTURE IMPROVEMENTS

- ③.1 Intersection Safety Improvement
- ③.2 Repaving Project
- ③.3 Utility Improvements



MOBILITY IMPROVEMENTS

- ④.1 Pedestrian Crossings
- ④.2 New Sidewalks / Curb Ramps
- ④.3 New Multi-Use Pathway



NEIGHBORHOOD SIGN./GATEWAYS

- ⑤.1 Sound wall buffer/neighborhood "billboard"

PEDESTRIAN ROUTE AND CONNECTIONS

BUFFER SYSTEM



INFILL OPPORTUNITIES

- ⑥.1 Undeveloped parcels in this area should be reacquired over time to introduce density to the neighborhood.
- ⑥.2 With adjacency to the park and trail, developing this parcel as multiplex (shown in the rendering as four-plex) provides a multifamily integration into the neighborhood at the appropriate scale.



FIG. 3.12

FIG 3.12: The existing southwest corner at the Sterling / Ren Intersection is a large abandoned industrial facility.

FIG. 3.13: The proposed corner improvements involve the introduction of multiplex housing, continuation of the Sterling East Trail and various other streetscape and pedestrian improvements.



FIG. 3.13



FIG. 3.14: ZONE 4

The parcel status assessment map shows a high number of "undeveloped" lots, with only one showing up on the 2017 tax sale. Over time, the City should work with landowners to infill the neighborhood with similar scale residential buildings-- either single family or duplex-- to improve the perception and density of the neighborhood.



GREEN INFRASTRUCTURE

- ①.1 In-street rain garden bump-outs



STREETSCAPE IMPROVEMENTS

- ②.1 New Street Trees
- ②.2 Pedestrian Scale Lighting



INFRASTRUCTURE IMPROVEMENTS

- ③.1 Intersection Safety Improvement
- ③.2 Repaving Project
- ③.3 Utility Improvements



MOBILITY IMPROVEMENTS

- ④.1 Pedestrian Crossings
- ④.2 New Sidewalks / Curb Ramps



INFILL OPPORTUNITIES

- ⑥.1 Undeveloped parcels in this area should be reacquired over time to introduce density to the neighborhood.

PEDESTRIAN ROUTE AND CONNECTIONS



-  **GREEN INFRASTRUCTURE**
1.1 Pocket Park Rain Gardens
-  **STREETSCAPE IMPROVEMENTS**
2.1 New Street Trees
2.2 Pedestrian Scale Lighting
-  **INFRASTRUCTURE IMPROVEMENTS**
3.2 Repaving Project
3.3 Utility Improvements
-  **MOBILITY IMPROVEMENTS**
4.1 Pedestrian Crossings
4.2 New Sidewalks / Curb Ramps
-  **TRAILS CONNECTIONS**
-  **OPEN VIEWS**
-  **INFILL OPPORTUNITIES**
6.1 Undeveloped parcels in this area should be reacquired over time to introduce density to the neighborhood.

 **PEDESTRIAN ROUTE AND CONNECTIONS**

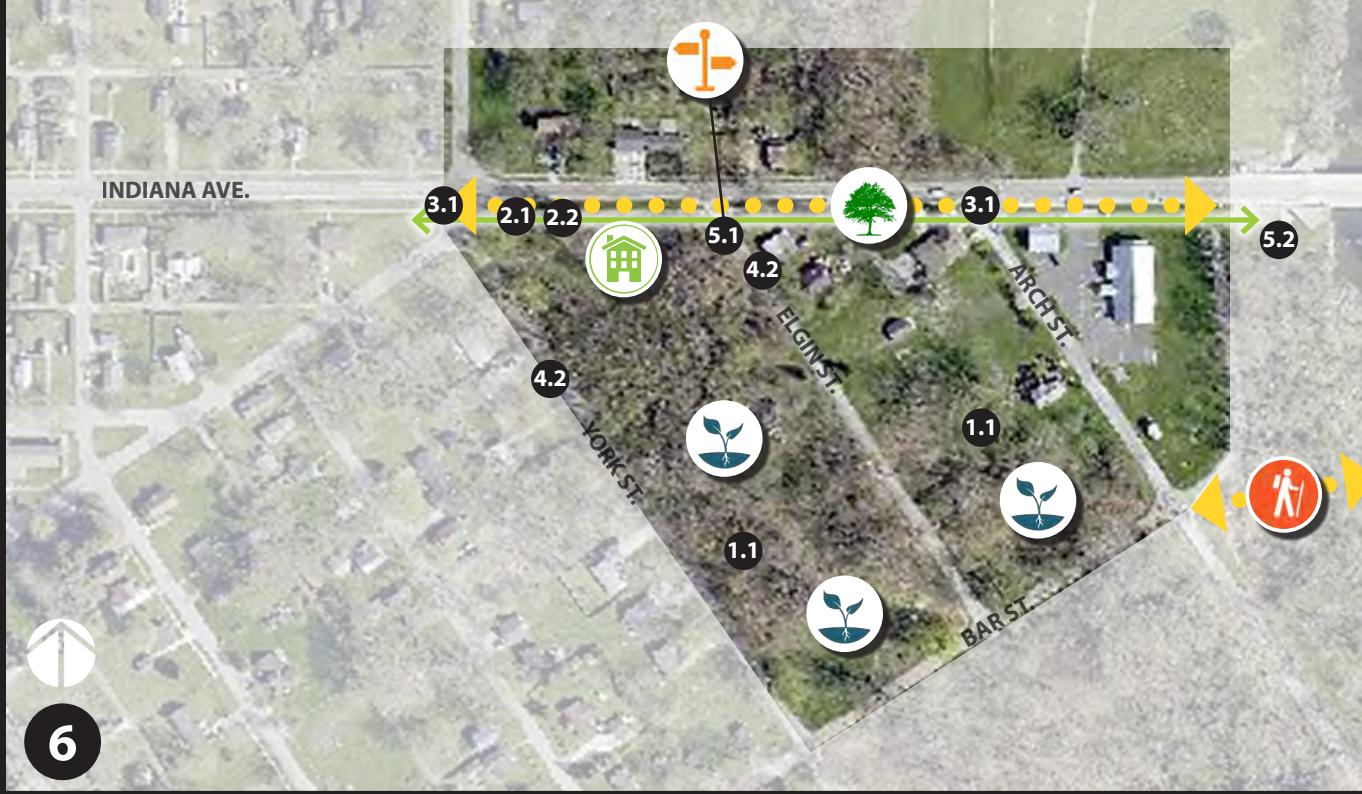


FIG. 3.16: ZONE 6
 The entire zone 6 falls within the floodplain. The City has acquired over two-thirds of the parcels for a flood protection zone. The limited development within this area should be focused toward Indiana Avenue with mitigation measures taken for fill or impervious surfaces added, per FEMA recommendations. Streetscape and neighborhood edge improvements should be focused on the Indiana Avenue corridor, with pedestrian and green infrastructure amenities added further into the neighborhood to manage flood waters.



GREEN INFRASTRUCTURE

- ①.1 Stormwater Storage Area



STREETSCAPE IMPROVEMENTS

- ②.1 New Street Trees
- ②.2 Pedestrian Scale Lighting



INFRASTRUCTURE IMPROVEMENTS

- ③.1 Intersection Safety Improvement
- ③.2 Repaving Project
- ③.3 Utility Improvements



MOBILITY IMPROVEMENTS

- ④.1 Pedestrian Crossings
- ④.2 New Sidewalks / Curb Ramps



NEIGHBORHOOD SIGN./GATEWAYS

- ⑤.1 Monument Signage
- ⑤.2 Trailhead/Gateway



TRAILS CONNECTIONS



OPEN VIEWS



INFILL OPPORTUNITIES

- ⑥.1 Undeveloped parcels along Indiana Avenue could be various types of rowhouses/townhomes (with no basements). Structures should face Indiana Avenue with limited parking amenities added behind. Green infrastructure should be added to the parking.

↔↔↔ PEDESTRIAN ROUTE AND CONNECTIONS

↔↔↔ STREETSCAPE IMPROVEMENTS ALONG STREET CORRIDOR



FIG. 3.17

FIG. 3.17: The existing Indiana Ave Streetscape has dense vegetation interspersed with single family housing. The aging infrastructure within the right-of-way does not contribute to a positive perception of the neighborhood.

FIG. 3.18: An improved streetscape, with new pedestrian amenities, as well as residential infill along the corridor will help improve the perception of the entire neighborhood.

FIG. 3.18



GREEN INFRASTRUCTURE

- 1.1 Pocket Park Rain Gardens



STREETSCAPE IMPROVEMENTS

- 2.1 New Street Trees
- 2.2 Pedestrian Scale Lighting



INFRASTRUCTURE IMPROVEMENTS

- 3.1 Intersection Safety Improvement
- 3.2 Repaving Project
- 3.3 Utility Improvements
- 3.4 Shared Use Parking Area



MOBILITY IMPROVEMENTS

- 4.1 Pedestrian Crossings
- 4.2 New Sidewalks / Curb Ramps



TRAILS CONNECTIONS



OPEN VIEWS



INFILL OPPORTUNITIES

- 6.1 Undeveloped parcels in this area should be reacquired over time to introduce density to the neighborhood.

↔ PEDESTRIAN ROUTE AND CONNECTIONS

↔ STREETSCAPE IMPROVEMENTS ALONG STREET CORRIDOR



FIG. 3.20: ZONE 8

There is high vacancy and undeveloped parcels along the eastern edge of this zone, though it only partially touches the floodplain. Landowners vary from the City to private residents and Industrial businesses. Development here should be limited, given proximity to open space amenities.



GREEN INFRASTRUCTURE

- 1.1 Native Planting / Habitat Dev.



STREETSCAPE IMPROVEMENTS

- 2.1 New Street Trees
- 2.2 Pedestrian Scale Lighting



INFRASTRUCTURE IMPROVEMENTS

- 3.1 Intersection Safety Improvement
- 3.2 Repaving Project
- 3.3 Utility Improvements
- 3.4 Industrial User Parking Area



MOBILITY IMPROVEMENTS

- 4.1 Pedestrian Crossings
- 4.2 New Sidewalks / Curb Ramps



NEIGHBORHOOD SIGN./GATEWAYS

- 5.1 Monument Signage
- 5.2 Trailhead/Gateway for EEC



TRAILS CONNECTIONS



OPEN VIEWS

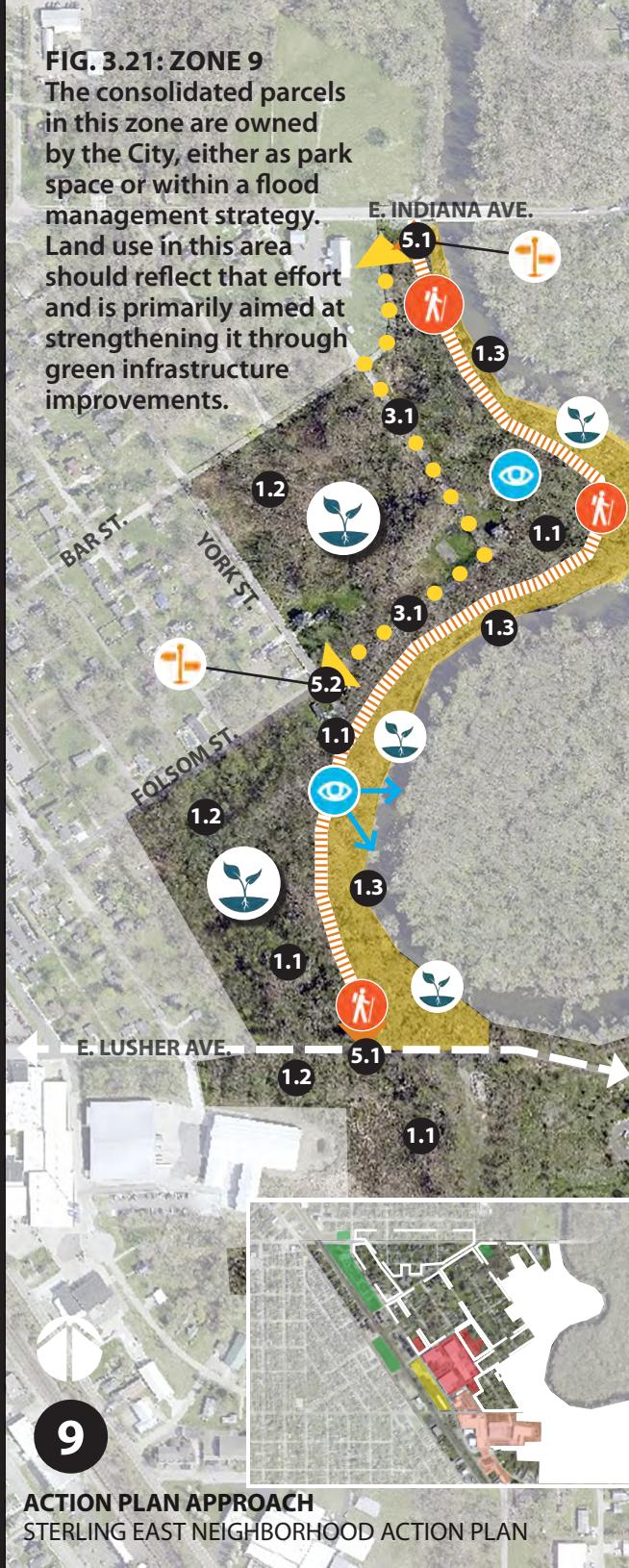


INFILL OPPORTUNITIES

- 6.1 Undeveloped parcels in this area should be reacquired over time to introduce density to the neighborhood, but any future infill should proceed cautiously given potential for future industrial expansion, however limited.

FIG. 3.21: ZONE 9

The consolidated parcels in this zone are owned by the City, either as park space or within a flood management strategy. Land use in this area should reflect that effort and is primarily aimed at strengthening it through green infrastructure improvements.



GREEN INFRASTRUCTURE

- 1.1 Native Planting / Habitat Develop.
- 1.2 Stormwater Storage areas
- 1.3 Elkhart River Bank Stabilization and Erosion Control



STREETSCAPE IMPROVEMENTS

- 2.1 New Street Trees
- 2.2 Pedestrian Scale Lighting



INFRASTRUCTURE IMPROVEMENTS

- 3.1 Create Limited Access Roads
- 3.2 Cap Utilities



MOBILITY IMPROVEMENTS

- 4.1 Pedestrian Crossings
- 4.2 New Sidewalks / Curb Ramps



NEIGHBORHOOD SIGN./GATEWAYS

- 5.1 Gateway/Trail Head
- 5.2 Trail Signage



TRAILS CONNECTIONS



OPEN VIEWS



ENHANCE CONNECTION TO EEC.



PEDESTRIAN ROUTE



BOARDWALK / MULTIUSE PATH

FIG. 3.22: Bank stabilization efforts using terraced coir mats.



FIG. 3.26



FIG. 3.27



FIG. 3.28



FIG. 3.29

FIG. 3.23: Live stakes for bank stabilization.

FIG. 3.24: Bulkhead/steel piling for trail heads and other strategic locations.

FIG. 3.25: Minor trail connections in this area could be reinforced through crusher fines.



FIG. 3.31: The Riverwalk Trail is frequently flooded and has safety perception issues.

FIG. 3.32: The proposed boardwalk would serve as a continuation of the proposed EEC boardwalk from the South and connect to the City Riverwalk at the Indiana underpass. The underpass trail connection could then serve as a highly visible trailhead/overlook opportunity that also functions as the pedestrian gateway to Sterling East.



FIG. 3.32

STERLING EAST NEIGHBORHOOD

2018 Action Plan for Implementation of the Sterling East Redevelopment Area Activities

656 TOTAL
PARCELS

282 VACANT
UNIDENTIFIED
UNDEVELOPED

142 CITY
OWNED
PROPERTIES

200 TOTAL
ACRES
(APPROX.)

404 TOTAL
NEIGHBORHOOD
POPULATION

118 INDIVIDUAL
STAKEHOLDER
COMMENTS



**9 ZONING
CHANGE
RECOMMENDATIONS**

**8 LAND USE
CHANGE
RECOMMENDATIONS**

**7 PROJECT
RECOMMENDATION
TYPES**

CONCLUSIONS

From the onset, this 2018 Action Plan for Implementation of the Sterling East Redevelopment Area Activities sought to address infill opportunities and public infrastructure recommendations. Infill opportunities totaled just over half of the vacant or undeveloped parcels, with the remaining portion being consolidated to address floodplain concerns. The resulting infill, primarily multifamily residential, from duplex to multiplex, with some mixed use are all geared to fit into the existing neighborhood fabric and respond to needed transition zones and scale issues of the neighborhood.

Project recommendations contained in this plan balance meeting the needs of the existing neighborhood, while aiming to attract new (and younger) residents. Improvements such as multifamily residential infill as well as infrastructure improvements, such as multi-use pathways and a riverfront boardwalk, are all aimed to revitalize the neighborhood.

After conducting an inventory and analysis phase that included one of the worst natural disasters

in recent City history (significant flooding Feb. 2018), this Action Plan incorporated several environmental management strategies to address stormwater capacity and address flood concerns.

This SEAP sets a bold vision for the future of the Sterling East Neighborhood, building on previous plans and extensive efforts from the City to strengthen the health, safety, and welfare of the community.

			Lead Role(s)
Improvement Strategy	Zone 1:		
Project Recommendations	Land Use Recommendation Change: Low Density Residential (LDR) to Medium Density Residential (MDR)	Planning and Zoning	
	Zoning Recommendation Change: One Family Dwelling District (R-2) to Two Family Dwelling District (R-3)	Planning and Zoning	
	1.1 In-street rain garden bump-outs/traffic calming	Street Dept.	Eng
	2.1 New street trees (both sides of Indiana Ave)	Buildings/Grounds	Eng
	2.2 Pedestrian Scale Lighting Installation	Street Dept.	Eng
	3.1 Intersection Safety Improvement	Street Dept.	Eng
	3.2 Repaving Project	Street Dept.	Eng
	3.3 Utility Improvements	Street Dept.	Eng
	4.1 Pedestrian Crossings	Street Dept.	Eng
	4.2 New Sidewalks / Curb Ramps	Street Dept.	Eng
	5.1 Monument Signage	Community Development	Nei
	6.1 Neighborhood Infill	Community Development	Nei
Improvement Strategy	Zone 2:		
Project Recommendations	Land Use Recommendation Change: LDR and IND to MDR, REC, and MU	Planning and Zoning	
	Zoning Recommendation Change: R-2/M-1 to R-3 and B-1	Planning and Zoning	
	1.1 In-street rain garden bump-outs/traffic calming	Street Dept.	Eng
	2.1 New street trees (both sides of Indiana Ave)	Buildings/Grounds	Eng
	2.2 Pedestrian Scale Lighting Installation	Street Dept.	Eng
	3.1 Intersection Safety Improvement	Street Dept.	Eng
	3.2 Repaving Project	Street Dept.	Eng
	3.3 Utility Improvements	Street Dept.	Eng
	4.1 Pedestrian Crossings	Street Dept.	Eng
	4.2 New Sidewalks / Curb Ramps	Street Dept.	Eng
	4.3 New Multi-use Pathway	Engineering, Parks Dept.	Stre
	5.1 Monument Signage	Community Development	
	6.1 Neighborhood Infill	Community Development	
	6.2 Infill at Intersection of Indiana and Sterling Ave.	Community Development	

Potential Partners	Priority Level			Potential Implementation Timeline (in years)
	Low	Medium	High	
Engineering				< 1 year
Engineering, Street Dept.				< 1 year
Engineering				2-5 years
Engineering				2-5 years
Engineering				2-5 years
Engineering				5+ years
Engineering				5+ years
Engineering				< 1 year
Engineering				2-5 years
Neighborhood Association				5+ years
Neighborhood Association				5+ years
Engineering				< 1 year
Engineering, Street Dept.				< 1 year
Engineering				5+ years
Engineering				2-5 years
Engineering				2-5 years
Engineering				5+ years
Engineering				5+ years
Engineering				< 1 year
Engineering				2-5 years
Street Dept.				5+ years
				2-5 years
				5+ years
				5+ years

STRATEGIC IMPLEMENTATION MATRIX

Each of the improvement zones identified in the approach utilized eight (8) project categories to break down project implementation recommendations. Within the matrix, those projects were analyzed and given priorities based on potential impact and cost, as well as City input. Lead roles, as well as internal partners in the process, were then identified, as well as a potential timeline for implementation. Given the overall longevity of the Action Plan, the information provided in the matrix provides a snapshot and general framework to improve the Sterling East Neighborhood and its surrounding area.

			Lead Role(s)
Improvement Strategy	Zone 3:		
Project Recommendations	Land Use Recommendation Change: IND to HDR and IND		Planning and Zoning
	Zoning Recommendation Change: M-2 to M-1 and R-4		Planning and Zoning
	1.1 In-street rain garden bump-outs/traffic calming		Street Dept.
	2.1 New street trees (both sides of Indiana Ave)		Buildings/Grounds
	2.2 Pedestrian Scale Lighting Installation		Street Dept.
	3.2 Repaving Project		Street Dept.
	3.3 Utility Improvements		Street Dept.
	4.1 Pedestrian Crossings		Street Dept.
	4.2 New Sidewalks / Curb Ramps		Street Dept.
	4.3 New Multi-use Pathway		Engineering, Parks Dept.
	5.1 Soundwall Buffer		Community Development
	6.1 Neighborhood Infill		Community Development
	6.2 Infill at Intersection of Ren St. and Sterling Ave.		
Improvement Strategy	Zone 4:		
Project Recommendations	Land Use Recommendation Change: LDR to MDR		Planning and Zoning
	Zoning Recommendation Change: R-2 to R-3		Planning and Zoning
	1.1 In-street rain garden bump-outs/traffic calming		Street Dept.
	2.1 New street trees (both sides of Indiana Ave)		Buildings/Grounds
	2.2 Pedestrian Scale Lighting Installation		Street Dept.
	3.2 Repaving Project		Street Dept.
	3.3 Utility Improvements		Street Dept.
	4.1 Pedestrian Crossings		Street Dept.
	4.2 New Sidewalks / Curb Ramps		Street Dept.
	6.1 Neighborhood Infill		Community Development

Potential Partners	Priority Level			Potential Implementation Timeline (in years)
	Low	Medium	High	
Engineering				< 1 year
Engineering, Street Dept.				< 1 year
Engineering				5+ years
Engineering				2-5 years
Engineering				2-5 years
Engineering				5+ years
Engineering				5+ years
Engineering				2-5 years
Engineering				2-5 years
Street Dept.				5+ years
				5+ years
Engineering				< 1 year
Engineering, Street Dept.				< 1 year
Engineering				5+ years
Engineering				2-5 years
Engineering				2-5 years
Engineering				5+ years
Engineering				5+ years
Engineering				2-5 years
Engineering				5+ years
Engineering				5+ years

			Lead Role(s)
Improvement Strategy	Zone 5		
Project Recommendations	Land Use Recommendation Change: LDR to MDR and LDR		Planning and Zoning
	Zoning Recommendation Change: R-2 to R-2 and R-3		Planning and Zoning
	1.1 Pocket park rain garden installations		Street Dept.
	2.1 New street trees (both sides of Indiana Ave)		Buildings/Grounds
	2.2 Pedestrian Scale Lighting Installation		Street Dept.
	3.2 Repaving Project		Street Dept.
	3.3 Utility Improvements		Street Dept.
	4.1 Pedestrian Crossings		Street Dept.
	4.2 New Sidewalks / Curb Ramps		Street Dept.
	6.1 Neighborhood Infill		Community Development
	Create trail connections at strategic locations from neighborhood to rivertrail		Parks Dept.
	Open views to Elkhart River at strategic locations		Parks Dept.
Improvement Strategy	Zone 6		
Project Recommendations	Land Use Recommendation Change: LDR to HDR, NAT, and INS		Planning and Zoning
	Zoning Recommendation Change: R-2 to R-4, R-3, and FHA		Planning and Zoning
	1.1 Stormwater storage area		Street Dept.
	2.1 New street trees (both sides of Indiana Ave)		Buildings/Grounds
	2.2 Pedestrian Scale Lighting Installation		Street Dept.
	3.1 Intersection Safety Improvement		Street Dept.
	3.2 Repaving Project		Street Dept.
	3.3 Utility Improvements		Street Dept.
	4.1 Pedestrian Crossings		Street Dept.
	4.2 New Sidewalks / Curb Ramps		Street Dept.
	5.1 Monument Signage		Community Development
	6.1 Neighborhood Infill Along Indiana Ave.		Community Development

Potential Partners	Priority Level			Potential Implementation Timeline (in years)
	Low	Medium	High	
Engineering				< 1 year
Engineering, Street Dept.				< 1 year
Engineering				2-5 years
Engineering				2-5 years
Engineering				2-5 years
Engineering				5+ years
Engineering				5+ years
Engineering				2-5 years
Engineering				2-5 years
Engineering				5+ years
Engineering, Community Dev.				2-5 years
Community Dev.				2-5 years
Engineering				< 1 year
Engineering, Street Dept.				< 1 year
Engineering				< 1 year
Engineering				2-5 years
Engineering				2-5 years
Engineering				5+ years
Engineering				5+ years
Engineering				5+ years
Engineering				2-5 years
Engineering				2-5 years
Engineering				5+ years
Engineering				5+ years

			Lead Role(s)	Potential Partners
Improvement Strategy	Zone 7			
Project Recommendations	Land Use Recommendation Change: None		Planning and Zoning	
	Zoning Recommendation Change: None		Planning and Zoning	
	1.1 In-street rain garden bump-outs/traffic calming		Street Dept.	Engineering
	2.1 New street trees (both sides of Indiana Ave)		Buildings/Grounds	Engineering, Street Dept.
	2.2 Pedestrian Scale Lighting Installation		Street Dept.	Engineering
	3.2 Repaving Project		Street Dept.	Engineering
	3.3 Utility Improvements		Street Dept.	Engineering
	3.4 Shared Use Parking Area		Street Dept.	Engineering, Community Dev.
	4.1 Pedestrian Crossings		Street Dept.	Engineering
	4.2 New Sidewalks / Curb Ramps		Street Dept.	Engineering
	6.1 Neighborhood Infill		Community Development	
	Create trail connections at strategic locations from neighborhood to rivertrail		Parks Dept.	Engineering, Community Dev.
	Open views to Elkhart River at strategic locations		Parks Dept.	Forestry, Community Dev.
Improvement Strategy	Zone 8			
Project Recommendations	Land Use Recommendation Change: LDR to IND		Planning and Zoning	
	Zoning Recommendation Change: R-2 to M-1		Planning and Zoning	
	1.1 Native Planting / Habitat Development - Support naturalization		Parks Dept.	Engineering, Community Dev.
	2.1 New street trees (both sides of Indiana Ave)		Street Dept.	Engineering
	2.2 Pedestrian Scale Lighting Installation		Street Dept.	Engineering
	3.2 Repaving Project		Street Dept.	Engineering
	3.3 Utility Improvements		Street Dept.	Engineering
	3.4 Industrial User Parking Expansion		Community Development	
	4.1 Pedestrian Crossings		Street Dept.	Engineering
	4.2 New Sidewalks / Curb Ramps		Street Dept.	Engineering
	6.1 Neighborhood Infill		Community Development	
Improvement Strategy	Zone 9			
Project Recommendations	Land Use Recommendation Change: From LDR to NAT and REC		Planning and Zoning	
	Zoning Recommendation Change: R-2 and City Parks to FHA		Planning and Zoning	
	Green Infrastructure: Native Planting / Habitat Development		Parks Dept.	Engineering, Community Dev.
	Green Infrastructure: Create Stormwater Storage Areas		Buildings/Grounds	Engineering, Community Dev.
	Green Infrastructure: Elkhart River Bank Stabilization and Erosion Control		Street Dept.	Engineering, Community Dev.
	Streetscape Improvements: New Street Trees		Street Dept.	Engineering
	Streetscape Improvements: Pedestrian Scale Lighting (along pedestrian routes)		Street Dept.	Engineering
	Infrastructure Improvements: Limited Access Roadways (where no longer adjacent to residential areas)		Street Dept.	Engineering
	Infrastructure Improvements: Cap Utilities That Are No Longer In Residential Zones		Street Dept.	Engineering
	Mobility Improvements: Pedestrian Crossings		Street Dept.	Engineering
	Mobility Improvements: Pedestrian Boardwalk Along Existing River Trail		Parks Department	Engineering
	Mobility Improvements: Enhance Connections To Elkhart Environmental Center (EEC)		Parks Department	Engineering
	Mobility Improvements: New Sidewalks Along Residential Abutment Areas		Street Dept.	Engineering

APPENDIX

APPENDIX CONTENTS

ADDITIONAL SITE PHOTOGRAPHS

FEMA FLOOD MITIGATION RECOMMENDATIONS

Additional Site Photographs

other information gathered via aerial photography
and field study



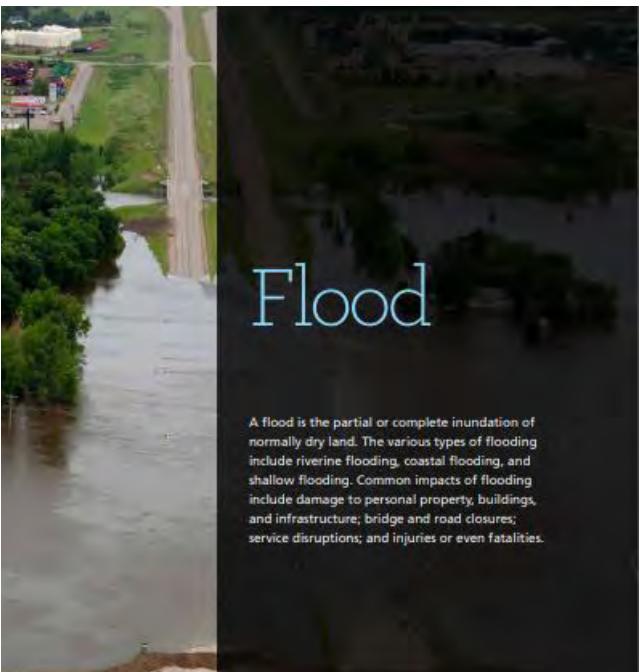




Mitigation Ideas

A Resource for Reducing Risk to Natural Hazards

January 2013



A flood is the partial or complete inundation of normally dry land. The various types of flooding include riverine flooding, coastal flooding, and shallow flooding. Common impacts of flooding include damage to personal property, buildings, and infrastructure; bridge and road closures; service disruptions; and injuries or even fatalities.

F-1 Incorporate Flood Mitigation in Local Planning

FEMA Resources/Publications
FEMA 100, 268, 473

Comprehensive planning and floodplain management can mitigate flooding by influencing development. Strategies include:

- Determining and enforcing acceptable land uses to alleviate the risk of damage by limiting exposure in flood hazard areas.
- Floodplain and coastal zone management can be included in comprehensive planning.
- Developing a floodplain management plan and updating it regularly.
- Mitigating hazards during infrastructure planning. For example, decisions to extend roads or utilities to an area may increase exposure to flood hazards.
- Adopting a post-disaster recovery ordinance based on a plan to regulate repair activity, generally depending on property location.
- Passing and enforcing an ordinance that regulates dumping in streams and ditches.
- Establishing a "green infrastructure" program to link, manage, and expand existing parks, preserves, greenways, etc.
- Obtaining easements for planned and regulated public use of privately-owned land for temporary water retention and drainage.

F-2 Form Partnerships to Support Floodplain Management

Partnerships between local, state, and regional entities help expand resources and improve coordination. Consider the following actions:

- Developing a stormwater committee that meets regularly to discuss issues and recommend projects.
- Forming a regional watershed council to help bring together resources for comprehensive analysis, planning, decision-making, and cooperation.
- Establishing watershed-based planning initiatives to address the flood hazard with neighboring jurisdictions.
- Forming a citizen plan implementation steering committee to monitor progress on local mitigation actions. Include a mix of representatives from neighborhoods, local businesses, and local government.



F-3 Limit or Restrict Development in Floodplain Areas

FEMA Resources/Publications
FEMA 100, 268, 473

Flooding can be mitigated by limiting or restricting how development occurs in floodplain areas through actions such as:

- Prohibiting or limiting floodplain development through regulatory and/or incentive-based measures.
- Limiting the density of developments in the floodplain.
- Requiring that floodplains be kept as open space.
- Limiting the percentage of allowable impervious surface within developed parcels.
- Developing a stream buffer ordinance to protect water resources and limit flood impacts.
- Prohibiting any fill in floodplain areas.

F-4 Adopt and Enforce Building Codes and Development Standards

FEMA Resources/Publications
FEMA 100, 268, P-762

The use of building codes and development standards can ensure structures are able to withstand flooding. Potential actions include:

- Adopting the International Building Code (IBC) and International Residential Code (IRC).
- Adopting ASCE 24-05 *Flood Resistant Design and Construction*. ASCE 24 is a referenced standard in IBC that specifies minimum requirements and expected performance for the design and construction of buildings and structures in the flood hazard areas to make them more resistant to flood loads and flood damage.
- Adding or increasing "freeboard" requirements (feet above base flood elevation) in the flood damage ordinance.
- Prohibiting all first floor enclosures below base flood elevation for all structures in flood hazard areas.
- Considering orientation of new development during design (e.g., subdivisions, buildings, infrastructure, etc.).
- Setting the design flood elevation at or above the historical high water mark if it is above the mapped base flood elevation.
- Using subdivision design standards to require elevation data collection during platting and to have buildable space on lots above the base flood elevation.
- Requiring standard tie-downs of propane tanks.

F-5 Improve Stormwater Management Planning

Rainwater and snowmelt can cause flooding and erosion in developed areas. Stormwater management practices to prevent this include:

- Completing a stormwater drainage study for known problem areas.
- Preparing and adopting a stormwater drainage plan and ordinance.
- Preparing and adopting a community-wide stormwater management master plan.
- Regulating development in upland areas in order to reduce stormwater run-off through a stormwater ordinance.
- Linking flood hazard mitigation objectives with EPA Stormwater Phase II initiatives.
- Developing engineering guidelines for drainage from new development.
- Requiring a drainage study with new development.
- Encouraging the use of Low Impact Development techniques

F-6 Adopt Policies to Reduce Stormwater Runoff

In addition to stormwater management, techniques to reduce rain runoff can prevent flooding and erosion, such as:

- Designing a "natural runoff" or "zero discharge" policy for stormwater in subdivision design.
- Requiring more trees be preserved and planted in landscape designs to reduce the amount of stormwater runoff.
- Requiring developers to plan for on-site sediment retention.
- Requiring developers to construct on-site retention basins for excessive stormwater and as a firefighting water source.
- Encouraging the use of porous pavement, vegetative buffers, and islands in large parking areas.
- Conforming pavement to land contours so as not to provide easier avenues for stormwater.
- Encouraging the use of permeable driveways and surfaces to reduce runoff and increase groundwater recharge.
- Adopting erosion and sedimentation control regulations for construction and farming.

Local Planning and Regulations

Heighten awareness of flood risk with the following:

- Incorporating the procedures for tracking high water marks following a flood into emergency response plans.
- Conducting cumulative impact analyses for multiple development projects within the same watershed.
- Conducting a verification study of FEMA's repetitive loss inventory and developing an associated tracking database.
- Regularly calculating and documenting the amount of flood-prone property preserved as open space.
- Requiring a thorough watershed analysis for all proposed dam or reservoir projects.
- Developing a dam failure study and emergency action plan.
- Using GIS to map areas that are at risk of flooding.
- Obtaining depth grid data and using it to illustrate flood risk to citizens.
- Incorporating digital floodplain and topographic data into GIS systems, in conjunction with Hazus, to assess risk.
- Developing and maintaining a database to track community exposure to flood risk.
- Revising and updating regulatory floodplain maps.

F-8 Join or Improve Compliance with NFIP

FEMA Resources/Publications
FEMA 100, 209, FIA-15A,
NFIP Technical Bulletins

The National Flood Insurance Program (NFIP) enables property owners in participating communities to purchase insurance protection against flood losses. Actions to achieve eligibility and maintain compliance include:

- Participating in NFIP.
- Adopting ordinances that meet minimum Federal and state requirements to comply with NFIP.
- Conducting NFIP community workshops to provide information and incentives for property owners to acquire flood insurance.
- Designating a local floodplain manager and/or CRS coordinator who achieves CFM certification.
- Completing and maintaining FEMA elevation certificates for pre-FIRM and/or post-FIRM buildings.
- Requiring and maintaining FEMA elevation certificates for all new and improved buildings located in floodplains.

F-9 Manage the Floodplain Beyond Minimum Requirements

FEMA Resources/Publications
FEMA 100, 209, 213, 268, 480;
FIA-15A

In addition to participation in NFIP, implementing good floodplain management techniques that exceed minimum requirements can help minimize flood losses. Examples include:

- Incorporating the ASCE's "No Adverse Impact" policy into local floodplain management programs.
- Revising the floodplain ordinance to incorporate cumulative substantial damage requirements.
- Adopting a "no-rise" in base flood elevation clause for the flood damage prevention ordinance.
- Extending the freeboard requirement past the mapped floodplain to include an equivalent land elevation.
- Including requirements in the local floodplain ordinance for homeowners to sign non-conversion agreements for areas below base flood elevation.
- Establishing and publicizing a user-friendly, publicly-accessible repository for inquirers to obtain Flood Insurance Rate Maps.
- Developing an educational flyer targeting NFIP policyholders on increased cost of compliance during post-flood damage assessments.
- Annually notifying the owners of repetitive loss properties of Flood Mitigation Assistance funding.
- Offering incentives for building above the required freeboard minimum (code plus).

F-10 Participate in the CRS

FEMA Resources/Publications
FEMA 100, 209, 213, 268, 480;
FIA-15A

The Community Rating System (CRS) rewards communities that exceed the minimum NFIP requirements. Depending upon the level of participation, flood insurance premium rates are discounted for policyholders. Potential activities that are eligible to receive credit include:

- Advising the public about the local flood hazard, flood insurance, and flood protection measures.
- Enacting and enforcing regulations that exceed NFIP minimum standards so that more flood protection is provided for new development.
- Implementing damage reduction measures for existing buildings such as acquisition, relocation, retrofitting, and maintenance of drainageways and retention basins.
- Taking action to minimize the effects of flooding on people, property, and building contents through measures including flood warning, emergency response, and evacuation planning.

Potential methods to develop local funding sources for flood mitigation include:

- Using taxes to support a regulatory system.
- Using impact fees to help fund public projects to mitigate impacts of land development (e.g., increased runoff).
- Levying taxes to finance maintenance of drainage systems and capital improvements.

F-11 Establish Local Funding Mechanisms for Flood Mitigation

Structure and Infrastructure Projects

F-12 Remove Existing Structures from Flood Hazard Areas

Communities may remove structures from flood-prone areas to minimize future flood losses by acquiring and demolishing or relocating structures from voluntary property owners and preserving lands subject to repetitive flooding.

F-13 Improve Stormwater Drainage System Capacity

Rainwater and snowmelt can cause flooding and erosion in developed areas. Structural stormwater management projects that prevent this include:

- Installing, re-routing, or increasing the capacity of a storm drainage system.
- Increasing drainage or absorption capacities with detention and retention basins, relief drains, spillways, drain widening/dredging or rerouting, logjam and debris removal, extra culverts, bridge modification, dike setbacks, flood gates and pumps, or channel redirection.
- Increasing capacity of stormwater detention and retention basins.
- Increasing dimensions of drainage culverts in flood-prone areas.
- Using stream restoration to ensure adequate drainage and diversion of stormwater.
- Requiring developers to construct on-site retention basins for excessive stormwater and as a firefighting water source.
- Providing grassy swales along roadsides.

F-14 Conduct Regular Maintenance for Drainage Systems and Flood Control Structures

Regular maintenance will help drainage systems and flood control structures continue to function properly. Potential activities include:

- Performing regular drainage system maintenance, such as sediment and debris clearance, as well as detection and prevention of discharges into stormwater and sewer systems from home footing drains, downspouts, or sewer pumps.
- Implementing an inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams and levees.
- Routinely cleaning debris from support bracing underneath low-lying bridges.
- Routinely cleaning and repairing stormwater drains.
- Regularly clearing sediment build-up on riverbanks near aerial lines.
- Inspecting bridges and identifying if any repairs or retrofits are needed to prevent scour.
- Incorporating ice jam prevention techniques as appropriate.

F-15 Elevate or Retrofit Structures and Utilities

FEMA Resources/Publications
FEMA 54, P-85, 114, P-259, 347, P-348, P-499

Structures and utilities can be elevated to reduce flood damage, including:

- Elevating structures so that the lowest floor, including the basement, is raised above the base flood elevation.
- Raising utilities or other mechanical devices above expected flood levels.
- Elevating and anchoring manufactured homes or, preferably, keeping manufactured homes out of the floodplain.
- Relocating utilities and water heaters above base flood elevation and using tankless water heaters in limited spaces.

F-16 Floodproof Residential and Non-Residential Structures

FEMA Resources/Publications
FEMA P-55, 114, P-259

Floodproofing techniques may protect certain structures from flood damage, including:

- Wet floodproofing in a basement, which may be preferable to attempting to keep water out completely because it allows for controlled flooding to balance exterior and interior wall forces and discourages structural collapse.
- Encouraging wet floodproofing of areas above base flood elevation.
- Using water resistant paints or other materials to allow for easy cleanup after floodwater exposure in accessory structures or in a garage area below an elevated residential structure.
- Dry floodproofing non-residential structures by strengthening walls, sealing openings, or using waterproof compounds or plastic sheeting on walls to keep water out.



F-17 Protect Infrastructure

FEMA Resources/Publications
FEMA P-259, 345, 543, B-797

Mitigation techniques can be implemented to help minimize losses to infrastructure from flood events, such as:

- Elevating roads and bridges above the base flood elevation to maintain dry access. In situations where flood waters tend to wash roads out, construction, reconstruction, or repair can include not only attention to drainage, but also stabilization or armoring of vulnerable shoulders or embankments.
- Raising low-lying bridges.
- Floodproofing wastewater treatment facilities located in flood hazard areas.
- Floodproofing water treatment facilities located in flood hazard areas.
- Depending on its infrastructure capabilities, using check valves, sump pumps, and backflow prevention devices in homes and buildings.
- Using bioengineered bank stabilization techniques.

F-18 Protect Critical Facilities

FEMA Resources/Publications
FEMA P-259, 345, 543, B-797

Techniques to protect critical facilities from flood events include:

- Requiring that all critical facilities including emergency operations centers (EOC), police stations, and fire department facilities be located outside of flood-prone areas.
- Requiring all critical facilities to meet requirements of Executive Order 11988 and be built 1 foot above the 500-year flood elevation.
- Installing/upgrading stormwater pumping stations.
- Raising electrical components of sewage lift stations above base flood elevation.
- Raising manhole openings using concrete pillars.
- Installing watertight covers or inflow guards on sewer manholes.
- Installing flood telemetry systems in sewage lift stations.
- Installing back-up generators for pumping and lift stations in sanitary sewer systems along with other measures (e.g., alarms, meters, remote controls, and switchgear upgrades).
- Building earthen dikes around flood-threatened critical facilities.
- Using bioengineered bank stabilization techniques.

F-19 Construct Flood Control Measures

Small flood control structures can be built to prevent flood damage. Examples include:

- Using minor structural projects that are smaller and more localized (e.g., floodwalls or small berms) in areas that cannot be mitigated through non-structural activities or where structural activities are not feasible due to low densities.
- Using revetments (hardened materials placed atop existing riverbanks or slopes) to protect against floods.
- Using bioengineered bank stabilization techniques.

Natural Systems Protection

F-20 Protect and Restore Natural Flood Mitigation Features

FEMA Resources/Publications
FEMA 100, 268

Natural resources provide floodplain protection, riparian buffers, and other ecosystem services that mitigate flooding. It is important to preserve such functionality with the following:

- Protecting and enhancing landforms that serve as natural mitigation features (i.e., riverbanks, wetlands, dunes, etc.).
- Using vegetative management, such as vegetative buffers, around streams and water sources.
- Protecting and preserving wetlands to help prevent flooding in other areas.
- Establishing and managing riparian buffers along rivers and streams.
- Retaining natural vegetative beds in stormwater channels.
- Retaining thick vegetative cover on public lands flanking rivers.

F-21 Preserve Floodplains as Open Space

FEMA Resources/Publications
FEMA 100, 268

Preserving natural areas and vegetation benefits natural resources while also mitigating potential flood losses. Techniques include:

- Developing an open space acquisition, reuse, and preservation plan targeting hazard areas.
- Developing a land banking program for the preservation of the natural and beneficial functions of flood hazard areas.
- Using transfer of development rights to allow a developer to increase densities on another parcel that is not at risk in return for keeping floodplain areas vacant.
- Compensating an owner for partial rights, such as easement or development rights, to prevent a property from being developed.

F-22 Increase Awareness of Flood Risk and Safety

Ideas for increasing flood risk awareness include the following:

- Encouraging homeowners to purchase flood insurance.
- Annually distributing flood protection safety pamphlets or brochures to the owners of flood-prone property.
- Educating citizens about safety during flood conditions, including the dangers of driving on flooded roads.
- Using outreach programs to advise homeowners of risks to life, health, and safety.
- Offering GIS hazard mapping online for residents and design professionals.
- Establishing a Program for Public Information (PPI) with a PPI committee (as suggested by Activity 332 of the CRS Coordinator's Manual).

Education and Awareness Programs

F-23 Educate Property Owners about Flood Mitigation Techniques

FEMA Resources/Publications
FEMA Building Code Toolkit (FEMA CD)

Educate property owners regarding options for mitigating their properties from flooding through outreach activities such as:

- Using outreach activities to facilitate technical assistance programs that address measures that citizens can take or facilitate funding for mitigation measures.
- Encouraging homeowners to install backflow valves to prevent reverse-flow flood damages.
- Encouraging residents in flood-prone areas to elevate homes.
- Educating the public about securing debris, propane tanks, yard items, or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters.
- Asking residents to help keep storm drains clear of debris during storms (not to rely solely on Public Works).

Other flooding-related mitigation actions may also apply to other hazards. See the sections entitled "Storm Surge," "Erosion," and "Multiple Hazards" for other possible ideas.

