



SECTION 9. JURISDICTIONAL ANNEXES

9.2 City of Arcola

This section presents the jurisdictional annex for the City of Arcola that provides resources and information to assist public and private sectors to reduce losses from future hazard events. This annex is not guidance of what to do when a disaster occurs. Rather, this annex concentrates on actions to reduce or eliminate damage to property and people that can be implemented prior to a disaster. Information presented includes a general overview of the municipality, the City of Arcola representatives who participated in the planning process, an assessment of the City of Arcola's risk and vulnerability, the different capabilities used in the City of Arcola, and an action plan that will be implemented to achieve a more resilient community.

9.1.1 Hazard Mitigation Planning Team

The City of Arcola identified the primary and alternate points of contact and developed this 2023 Hazard Mitigation Plan (HMP) over the course of several months with input from many City of Arcola departments, including the City Administrator. The City Administrator represented the community on the Fort Bend County HMP Planning Partnership and supported the local planning process requirements by securing input from persons with specific knowledge to enhance the plan. All departments were asked to contribute to the annex development through reviewing and contributing to the capability assessment, reporting on the status of previously identified actions, and participating in action identification and prioritization.

The following table summarizes municipal officials that participated in the development of the annex and in what capacity. Additional documentation on the municipality's planning process through Planning Partnership meetings is included in Volume 1, Section 2 (Planning Process) and Appendix C (Meeting Documentation).

Table 9.2-1. Hazard Mitigation Planning Team

Primary Point of Contact		Alternate Point of Contact	
Name/Title:	Dr. Annette Guajardo/City Administrator	Name/Title:	-
Address:	13222 Highway 6, Arcola, TX 77583	Address:	-
Phone Number:	281-431-0606	Phone Number:	-
Email:	aguajardo@arcolatexas.org	Email:	-
NFIP Floodplain Administrator			
Name/Title:	Llarance Turner/FPA and City Engineer*		
Address:	13222 Highway 6 Arcola Texas 77583		
Phone Number:	(281) 341-0808		
Email:	lturner@kaluzainc.com		
Additional Contributors:			
Name/Title:	Dr. Annette Guajardo/City Administrator		
Method of Participation:	Provided critical information in the planning process		
Name/Title:	Sally Cantu/City Secretary		
Method of Participation:	Provided critical information in the planning process		
Name/Title:	Lyneshia Garrette/Permit Administrator		
Method of Participation:	Provided critical information in the planning process		

*Data obtained from <https://www.texasflood.org/flood-basics/fpa.html>



9.1.2 Municipal Profile

The City of Arcola is in the eastern corner of Fort Bend County and borders Fresno. Located 21 miles southeast of Sugar Land and in the far suburbs of Houston, the City of Arcola is known for its proximity to some of Texas' largest cities. The City of Arcola has a total area of 1.9 square miles, of which 0.02 square miles of water.

According to the American Community Survey, the 2021 population for the City of Arcola was 2,593. Data from the 2021 American Community Survey indicates that 6.8 percent of the population is 5 years of age or younger and 5.5 percent is 65 years of age or older. Communities must deploy a support system that enables all populations to safely reach shelters or to quickly evacuate a hazard area.

9.1.3 Jurisdictional Capability Assessment and Integration

The City of Arcola performed an inventory and analysis of existing capabilities, plans, programs, and policies that enhance its ability to implement mitigation strategies. Volume 1, Section 5 (Capability Assessment) describes the components included in the capability assessment and their significance for hazard mitigation planning. The jurisdictional assessment includes the following analyses:

- An assessment of legal and regulatory capabilities
- Development and permitting capabilities
- An assessment of administrative and technical capabilities
- An assessment of fiscal capabilities
- An assessment of education and outreach capabilities
- Classification under various community mitigation programs
- The community's adaptive capacity to withstand hazard events

For a community to succeed in reducing long-term risk, hazard mitigation must be integrated into the day-to-day local government operations. As part of the hazard mitigation analysis, planning/policy documents were reviewed, and each jurisdiction was surveyed to obtain a better understanding of their progress toward plan integration. The updated mitigation strategy provided an opportunity for the City of Arcola to identify opportunities for integration of mitigation concepts that can be incorporated into municipal procedures.

Planning, Legal, and Regulatory Capability and Integration

The table below summarizes the regulatory tools that are available to the City of Arcola. The comment field provides information as to how the capability integrates hazard mitigation and risk reduction.

Table 9.2-2. Planning, Legal, and Regulatory Capability and Integration

	Jurisdiction has this? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual /Department /Agency Responsible
Codes, Ordinances, & Regulations				
Building Code	Yes	International Building Code 2015	Local	Code Enforcement Officer
<i>How does this reduce risk?</i> The City of Arcola adopted the International Building Code in 2015. As a result, the building code does not integrate the current HMP. Upon adoption of the next building code, the City will review the HMP and integrate into the building code where appropriate.				



	Jurisdiction has this? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual /Department /Agency Responsible
Zoning/Land Use Code	Yes	Chapter 22 – Zoning Regulation; adopted May 17, 2022	Local	Code Enforcement Officer
<i>How does this reduce risk?</i> The Zoning Regulation Ordinance identifies rules and regulations for building fences with the floodway of the City.				
Subdivision Ordinance	Yes	Chapter 20 – Subdivision, Development and Platting; amended April 26, 2005	Local	City Council
<i>How does this reduce risk?</i> This ordinance was developed to provide minimum standards that assure adequate water supply and wastewater services to subdivisions within the City and its extraterritorial jurisdiction. The ordinance was last amended in April 2005; therefore, it does not integrate the current HMP. When the ordinance is need of amending, the City will review the HMP and integrate into the ordinance where appropriate.				
Site Plan Ordinance	Yes	Chapter 16 – Buildings and Development in General – Section 16.04.050 – Site Plan for Installing, Constructing or Enlarging ETC.	Local	Mayor
<i>How does this reduce risk?</i> Site Plans Ordinance identifies regulations such as setbacks, in which no building or trailer is located within 25 feet from any state highway or major thoroughfare right of way and cannot be located 10 feet from any other road or street right of way and 5 feet from any property line. There must be direct vehicular access to the site from an adjacent public road or street where there is at least 20 feet of frontage. Easements must be sufficient to extend all utilities and drainage to and across the site and to adjacent sites, allowing services from each direction. The site must consist of one or more whole lots. All manufactured homes must be HUD-code manufactured, not a mobile home. There must be compliance with the drainage criteria manual adopted.				
Stormwater Management Ordinance	No	-	-	-
<i>How does this reduce risk?</i>				
Post-Disaster Recovery/Reconstruction Ordinance	No	-	-	-
<i>How does this reduce risk?</i>				
Real Estate Disclosure	No	-	-	-
<i>How does this reduce risk?</i>				
Growth Management	No	-	-	-
<i>How does this reduce risk?</i>				
Environmental Protection Ordinance	No	-	-	-
<i>How does this reduce risk?</i>				
Flood Damage Prevention Ordinance	Yes	Flood Damage Prevention Ordinance (60.3[b])	Local	Principal Engineer
<i>How does this reduce risk?</i> The City requires all residential and non-residential construction/substantial improvements in the floodplain to be elevated to or above the base flood elevation. The purpose of the ordinance is to protect the public health, safety, and general welfare and to minimize public and private losses due to flood conditions in specific areas by provisions designed to: <ul style="list-style-type: none"> • Protect human life and health • Minimize expenditure of public money for costly flood control projects • Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public • Minimize prolonged business interruptions • Minimize damage to public facilities and utilities such as gas and water mains, electric, communications, and sewer lines, streets, and bridges located in the floodplains 				



	Jurisdiction has this? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual /Department /Agency Responsible
<ul style="list-style-type: none">Help maintain stable tax base by providing for sound use and development of flood-prone areas in such manner to minimize future flood blight areasEnsure that potential buyer are notified that property is in the flood area				
Wellhead Protection	No	-	-	-
<i>How does this reduce risk?</i>				
Emergency Management Ordinance	No	-	-	-
<i>How does this reduce risk?</i>				
Climate Change Ordinance	No	-	-	-
<i>How does this reduce risk?</i>				
Other	-	-	-	-
Planning Documents				
Comprehensive/Master Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Capital Improvement Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Disaster Debris Management Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Floodplain Management or Watershed Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Stormwater Management Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Open Space Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Urban Water Management Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Habitat Conservation Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Economic Development Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Shoreline Management Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Community Wildfire Protection Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Community Forest Management Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Transportation Plan	No	-	-	-
<i>How does this reduce risk?</i>				



	Jurisdiction has this? (Yes/No)	Code Citation and Date (code chapter, name of plan, date of plan)	Authority (local, county, state, federal)	Individual /Department /Agency Responsible
Agriculture Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Climate Action/Resiliency/Sustainability Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Tourism Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Business/Downtown Development Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Other	-	-	-	-
Response/Recovery Planning				
Comprehensive Emergency Management Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Continuity of Operations Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Strategic Recovery Planning Report	No	-	-	-
<i>How does this reduce risk?</i>				
Threat & Hazard Identification & Risk Assessment (THIRA)	No	-	-	-
<i>How does this reduce risk?</i>				
Post-Disaster Recovery Plan	No	-	-	-
<i>How does this reduce risk?</i>				
Public Health Plan	Yes	The Fort Bend County Health and Human Services Department (FBHHS) provides public health services for the City of Arcola. FBCHHS has public health plans as part of Annex H of the Fort Bend County Emergency Operations Plan.	County	FBHHS
<i>How does this reduce risk?</i>				
Other	-	-	-	-
<i>How does this reduce risk?</i>				

Development and Permitting Capability

The table below summarizes the capabilities of the City of Arcola to oversee and track development.

Table 9.2-3. Development and Permitting Capability

Indicate if your jurisdiction implements the following	Yes/No	Comment:
Do you issue development permits?	Yes	Planning and Zoning Board



Indicate if your jurisdiction implements the following	Yes/No	Comment:
<ul style="list-style-type: none"> If yes, what department is responsible? 		
If you do not issue development permits, what is your process for tracking new development?	N/A	-
Are permits tracked by hazard area? (For example, floodplain development permits.)	N/A	-
Do you have a buildable land inventory? <ul style="list-style-type: none"> If yes, please describe 	N/A	-
Describe the level of build-out in your jurisdiction.	N/A	-

Administrative and Technical Capability

The table below summarizes potential staff and personnel resources available to the City of Arcola and their current responsibilities that contribute to hazard mitigation.

Table 9.2-4. Administrative and Technical Capabilities

Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Administrative Capability		
Planning Board	Yes	The City Council is responsible for reviewing overall development, including subdivisions and platting.
Zoning Board of Adjustment	Yes	Planning and Zoning Commission is responsible for reviewing and approving subdivision plat applications, permitting applications, infrastructure permits, and all site plans.
Planning Department	No	-
Mitigation Planning Committee	No	-
Environmental Board/Commission	No	-
Open Space Board/Committee	No	-
Economic Development Commission/Committee	Yes	Economic Development services oversees tourism.
Public Works/Highway Department	Yes	Public Works oversees water utilities.
Construction/Building/Code Enforcement Department	Yes	Environmental and Neighborhood services includes animal services, code enforcement, food inspections, rental licensing and solid waste services.
Emergency Management/Public Safety Department	Yes	The Emergency Management Coordinator is an elected official.
Warning Systems /Services (mass notification system, outdoor warning signals, etc.)	No	-
Maintenance programs to reduce risk (stormwater maintenance, tree trimming, etc.)	No	-
Mutual aid agreements	No	-
Human Resources Manual	No	-
Other	No	-
Technical/Staffing Capability		
Planners or engineers with knowledge of land development and land management practices	No	-
Engineers or professionals trained in building or infrastructure construction practices	No	-
Planners or engineers with an understanding of natural hazards	No	-



Resources	Available? (Yes/No)	Comments (available staff, responsibilities, support of hazard mitigation)
Staff with expertise or training in benefit/cost analysis	No	-
Professionals trained in conducting damage assessments	No	-
Personnel skilled or trained in GIS and/or Hazards United States (HAZUS) – Multi-Hazards (MH) applications	No	-
Environmental scientist familiar with natural hazards	No	-
Surveyor(s)	No	-
Emergency Manager	Yes	See Emergency Management Coordinator.
Grant writer(s)	No	-
Resilience Officer	No	-
Other (this could include stormwater engineer, environmental specialist, etc.)	No	-

Fiscal Capability

The table below summarizes financial resources available to the City of Arcola.

Table 9.2-5. Fiscal Capabilities

Financial Resources	Accessible or Eligible to Use? (Yes/No)
Community development Block Grants (CDBG, CDBG-DR)	Yes
Capital improvements project funding	No
Authority to levy taxes for specific purposes	Yes
User fees for water, sewer, gas or electric service	Yes
Impact fees for homebuyers or developers of new development/homes	Yes
Stormwater utility fee	No
Incur debt through general obligation bonds	No
Incur debt through special tax bonds	No
Incur debt through private activity bonds	No
Withhold public expenditures in hazard-prone areas	No
Other federal or state Funding Programs	Yes
Open Space Acquisition funding programs	No
Other (for example, Clean Water Act 319 Grants [Nonpoint Source Pollution])	-

Education and Outreach Capability

The table below summarizes the education and outreach resources available to the City of Arcola.

Table 9.2-6. Education and Outreach Capabilities

Outreach Resources	Available? (Yes/No)	Comment:
Public information officer or communications office	No	-
Personnel skilled or trained in website development	No	-
Hazard mitigation information available on your website	No	-
Social media for hazard mitigation education and outreach	No	-
Citizen boards or commissions that address issues related to hazard mitigation	No	-
Warning systems for hazard events	No	-
Natural disaster/safety programs in place for schools	No	-



Outreach Resources	Available? (Yes/No)	Comment:
Does the jurisdiction have any public outreach mechanisms /programs in place to inform citizens on natural hazards, risk, and ways to protect themselves during such events? <ul style="list-style-type: none"> If yes, please describe. 	No	-

Community Classifications

The table below summarizes classifications for community programs available to the City of Arcola.

Table 9.2-7. Community Classifications

Program	Participating? (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No	-	-
Building Code Effectiveness Grading Schedule (BCEGS)	No	-	-
Public Protection (ISO Fire Protection Classes 1 to 10)	No	-	-
Storm Ready Certification	No	-	-
Firewise Communities classification	No	-	-
Other	No	-	-

Adaptive Capacity

Adaptive capacity is defined as “the ability of systems, institutions, humans and other organisms to adjust to potential damage, to take advantage of opportunities, or respond to consequences” (IPCC 2014). Each jurisdiction has a unique combination of capabilities to adjust to, protect from, and withstand a future hazard event, future conditions, and changing risk. The table below summarizes the adaptive capacity for each identified hazard of concern and the jurisdiction’s capability to address related actions using the following classifications:

- Strong: Capacity exists and is in use.
- Moderate: Capacity might exist but is not used or could use some improvement.
- Weak: Capacity does not exist or could use substantial improvement.

Table 9.2-8. Adaptive Capacity

Hazard	Adaptive Capacity – Strong/Moderate/Weak
Dam/Levee Failure	Moderate
Disease Outbreak	Moderate
Drought	Moderate
Extreme Temperature	Moderate
Flood	Moderate
Geologic Hazards	Moderate
Hurricane/Tropical Storm	Moderate
Severe Weather	Moderate
Tornado	Moderate
Wildfire	Moderate
Winter Weather	Moderate



9.1.4 National Flood Insurance Program (NFIP) Compliance

This section provides specific information on the management and regulation of the regulatory floodplain, including current and future compliance with the NFIP. The Floodplain Administrator is responsible for maintaining this information and is listed in the Hazard Mitigation Planning Team table at the beginning of this annex.

NFIP Summary

The following table summarizes the NFIP statistics for the City of Arcola.

Table 9.2-9. NFIP Summary

Municipality	Policies in Force ^a	Number of Paid Claims ^a	Amount of Paid Claims ^a	Number of NFIP RL Properties ^b	Number of NFIP SRL Properties ^b
Arcola (C)	47	14	\$626,007.05	0	0

Sources: a BureauNet 2022 (<https://nfip-services.floodsmart.gov/reports-flood-insurance-data>)

b 2018 Fort Bend County HMP

Notes: Due to a contractual agreement with FEMA, detailed information at the municipal level was not available to incorporate into the 2023 HMP Update. The information presented here was collected from data provided by the State of Texas and from FEMA's HUDEX Report.

*Number of RL and SRL properties provided by the State of Texas

**Total policies in force and paid claims collected from FEMA's OpenFEMA Dataset: FIMA NFIP Redacted Claims

***From the Sugar Land Plan 2021

RL Repetitive Loss

SRL Severe Repetitive Loss

Flood Vulnerability Summary

The following table provides a summary of the NFIP program in the City of Arcola.

Table 9.2-10. NFIP Summary

NFIP Topic	Comments
Flood Vulnerability Summary	
Describe areas prone to flooding in your jurisdiction. <ul style="list-style-type: none"> Do you maintain a list of properties that have been damaged by flooding? 	Special Flood Hazard Area The City does not maintain a list.
<ul style="list-style-type: none"> Do you maintain a list of property owners interested in flood mitigation? How many homeowners and/or business owners are interested in mitigation (elevation or acquisition)? 	No
Are any RiskMAP projects currently underway in your jurisdiction? <ul style="list-style-type: none"> If so, state what projects are underway. 	No
<ul style="list-style-type: none"> How do you make Substantial Damage determinations? How many were declared for recent flood events in your jurisdiction? 	Unknown The City is going to be developing Substantial Damage Procedures as a part of their actions.
How many properties have been mitigated (elevation or acquisition) in your jurisdiction? <ul style="list-style-type: none"> If there are mitigated properties, how were the projects funded? 	Unknown
Do your flood hazard maps adequately address the flood risk within your jurisdiction? <ul style="list-style-type: none"> If not, state why. 	No
NFIP Compliance	
What local department is responsible for floodplain management?	City Engineer
Are any certified floodplain managers on staff in your jurisdiction?	No



NFIP Topic	Comments
Do you have access to resources to determine possible future flooding conditions from climate change?	No
Does your floodplain management staff need any assistance or training to support its floodplain management program? • If so, what type of assistance/training is needed?	Staff need additional training.
Provide an explanation of NFIP administration services you provide (e.g., permit review, GIS, education/outreach, inspections, engineering capability)	N/A
How do you determine if proposed development on an existing structure would qualify as a substantial improvement?	City Engineer makes determinations.
What are the barriers to running an effective NFIP program in the community, if any?	Staffing and Funding
Does your jurisdiction have any outstanding NFIP compliance violations that need to be addressed? • If so, state the violations.	Unknown
When was the most recent Community Assistance Visit (CAV) or Community Assistance Contact (CAC)?	Unknown
• What is the local law number or municipal code of your flood damage prevention ordinance? • What is the date that your flood damage prevention ordinance was last amended?	Flood Damage Prevention Ordinance
Does your floodplain management program meet or exceed minimum requirements? • If exceeds, in what ways?	Meets
Are there other local ordinances, plans or programs (e.g. site plan review) that support floodplain management and meeting the NFIP requirements? For instance, does the planning board or zoning board consider efforts to reduce flood risk when reviewing variances such as height restrictions?	The City does have a planning and zoning commission.
Does your community plan to join the CRS program or is your community interested in improving your CRS classification?	No

9.1.5 Growth/Development Trends

Understanding how past, current, and projected development patterns have or are likely to increase or decrease risk in hazard areas is a key component to appreciating a jurisdiction's overall risk to its hazards of concern. The table below summarizes recent and expected future development trends, including major residential/commercial development and major infrastructure development.

Table 9.2-11. Number of Building Permits for New Construction

Type of Development	2018		2019		2020		2021		2022	
Number of Building Permits for New Construction Issued Since the previous HMP* (total/within regulatory floodplain)										
	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA	Total	Within SFHA
Single Family	33	N/A	18	N/A	3	N/A	13	N/A	6	N/A
Multi-Family		N/A		N/A		N/A		N/A		N/A
Other (commercial, mixed-use, etc.)	5	N/A	7	N/A	2	N/A	5	N/A	1	N/A
Total Permits Issued	38	N/A	25	N/A	5	N/A	27	N/A	7	N/A

SFHA Special Flood Hazard Area (1% annual chance flood event)



* Only location-specific hazard zones or vulnerabilities identified.

Note: Information for building permits in the SFHA were unavailable for this planning process.

Table 9.2-12. Recent and Expected Future Development

Property or Development Name	Type (e.g. Res., Comm.)	# of Units /Structures	Address and Parcel ID	Known Hazard Zone(s)	Description/Status of Development
Recent Major Development from 2018 to Present					
None Identified					
Known or Anticipated Major Development in the Next Five (5) Years					
None Identified					

9.1.6 Jurisdictional Risk Assessment

The hazard profiles in Volume 1, Section 4 (Risk Assessment) provide detailed information regarding each plan participant’s vulnerability to the identified hazards. Section 4.1 (Methodology and Tools) and Section 4.4 (Hazard Ranking) provide detailed summaries for the City of Arcola’s risk assessment results and data used to determine the hazard ranking discussed later in this section.

Hazard area extent and location maps provided below illustrate the probable areas impacted within the jurisdiction based on the best available data at the time of the preparation of this plan and are adequate for planning purposes. Maps were generated only for those hazards that can be identified clearly using mapping techniques and technologies and for which the City of Arcola has significant exposure. The maps also show the location of potential new development, where available.



Figure 9.2-1. City of Arcola Hazard Area Extent and Location Map – Dam Inundation

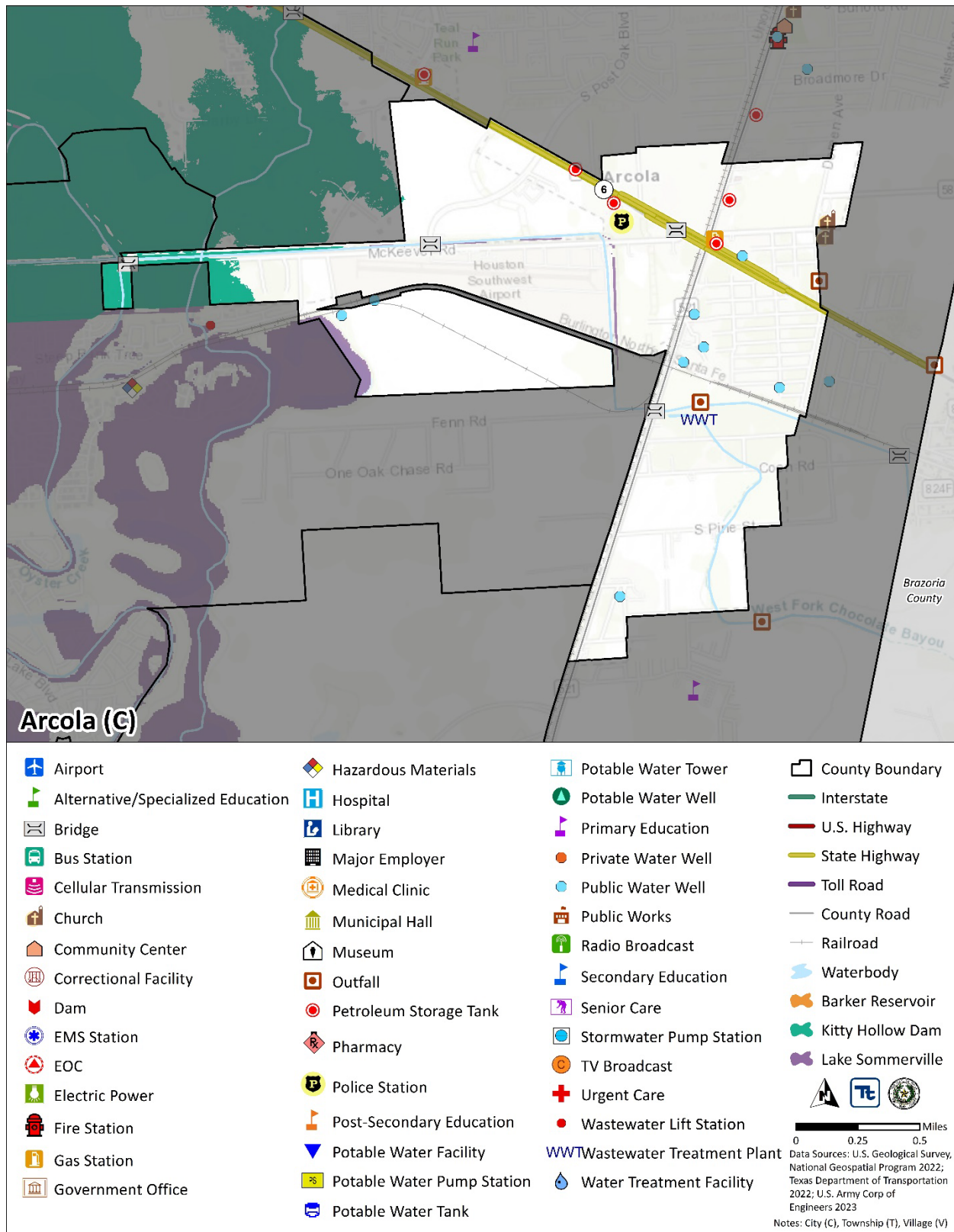




Figure 9.2-2. City of Arcola Hazard Area Extent and Location Map – Expansive Soils

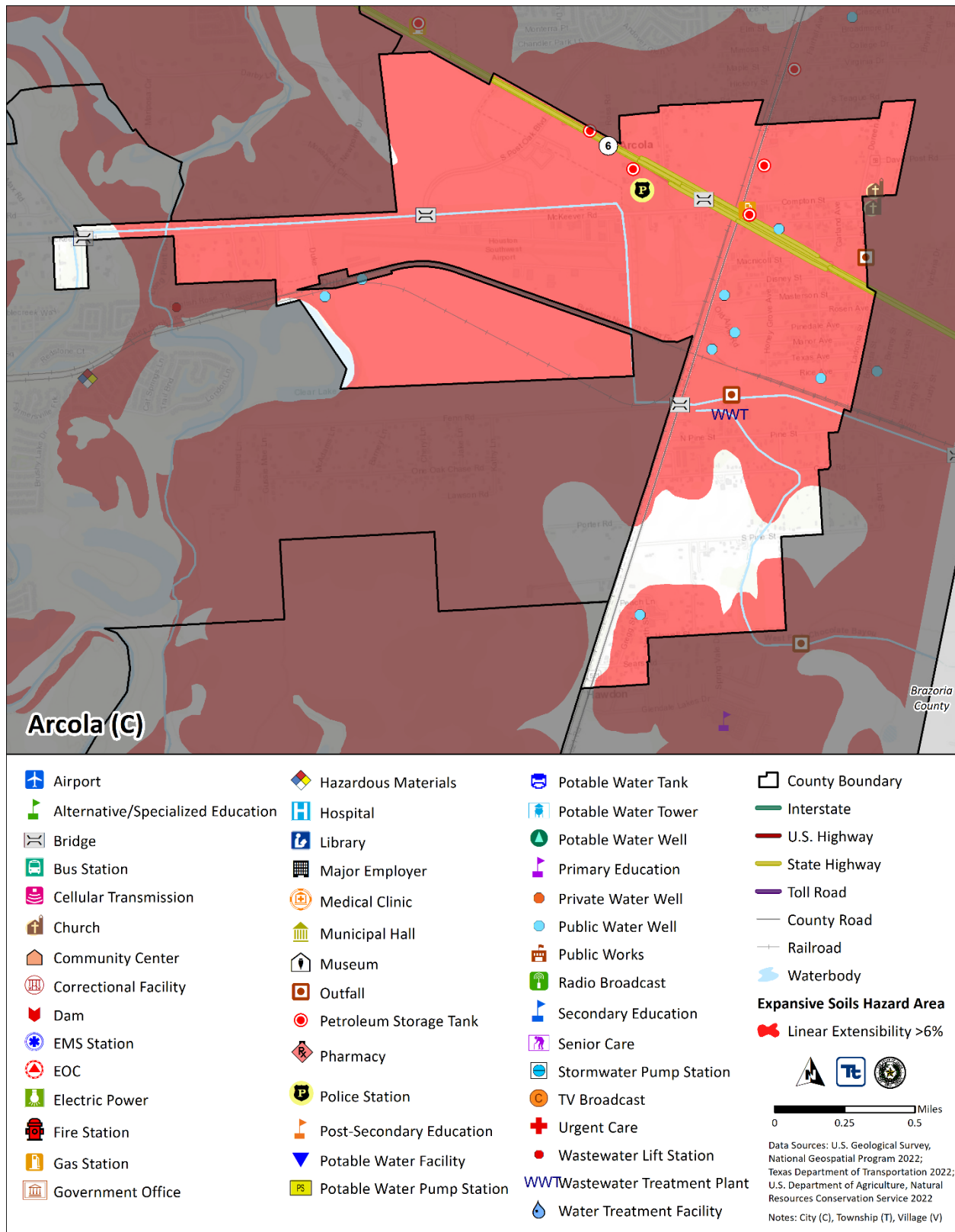




Figure 9.2-3. City of Arcola Hazard Area Extent and Location Map – Flood

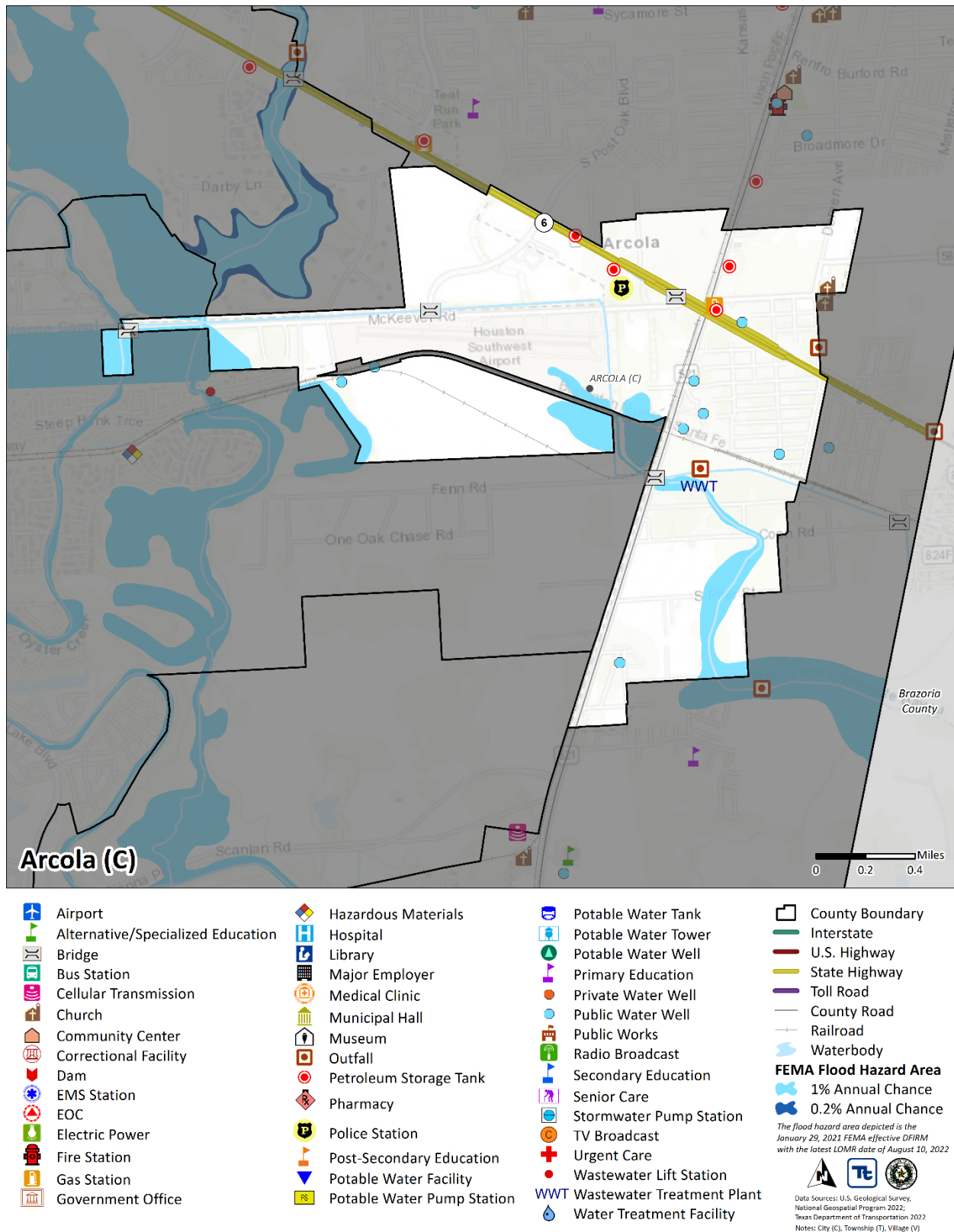




Figure 9.2-4. City of Arcola Hazard Area Extent and Location Map – Inland Erosion

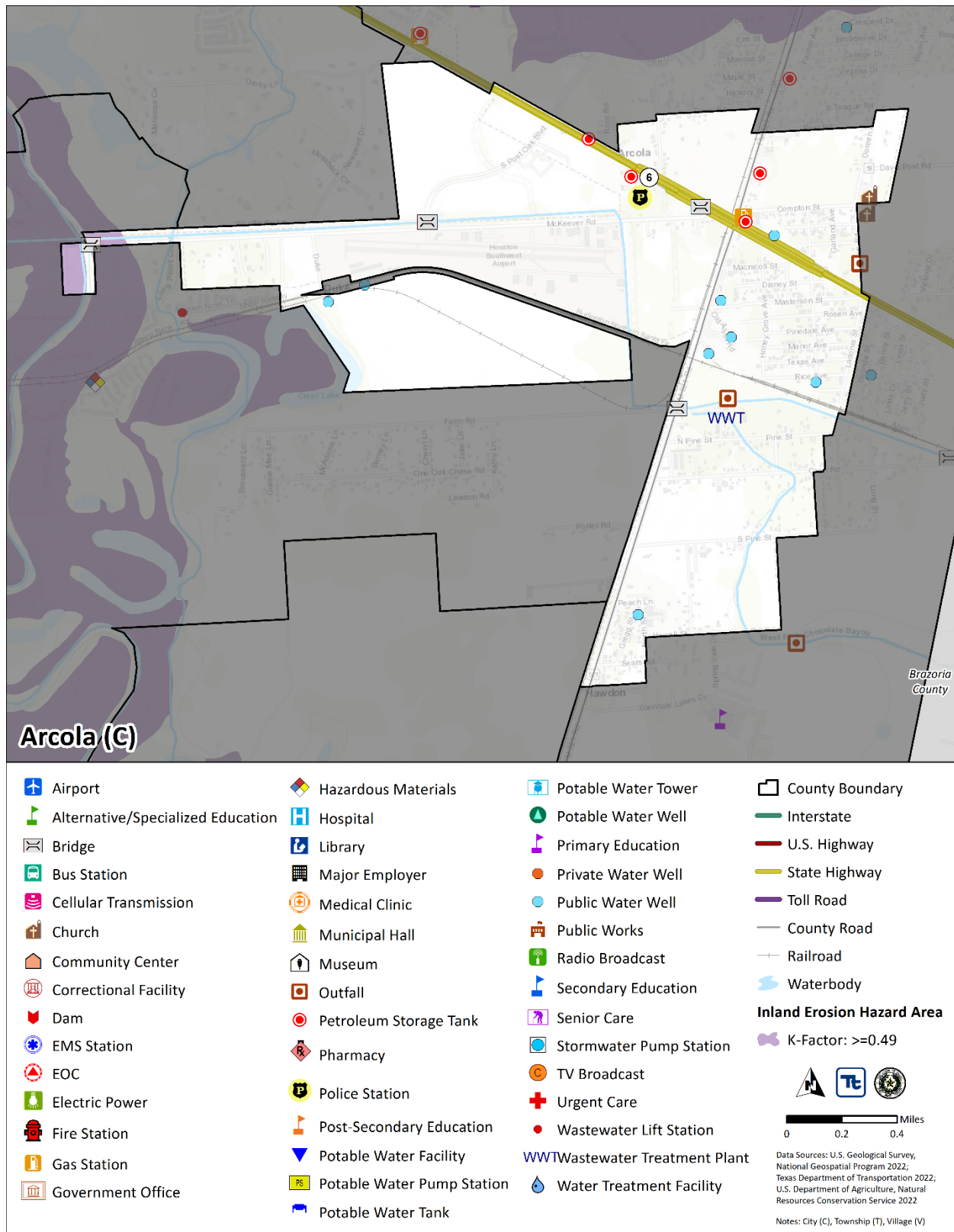
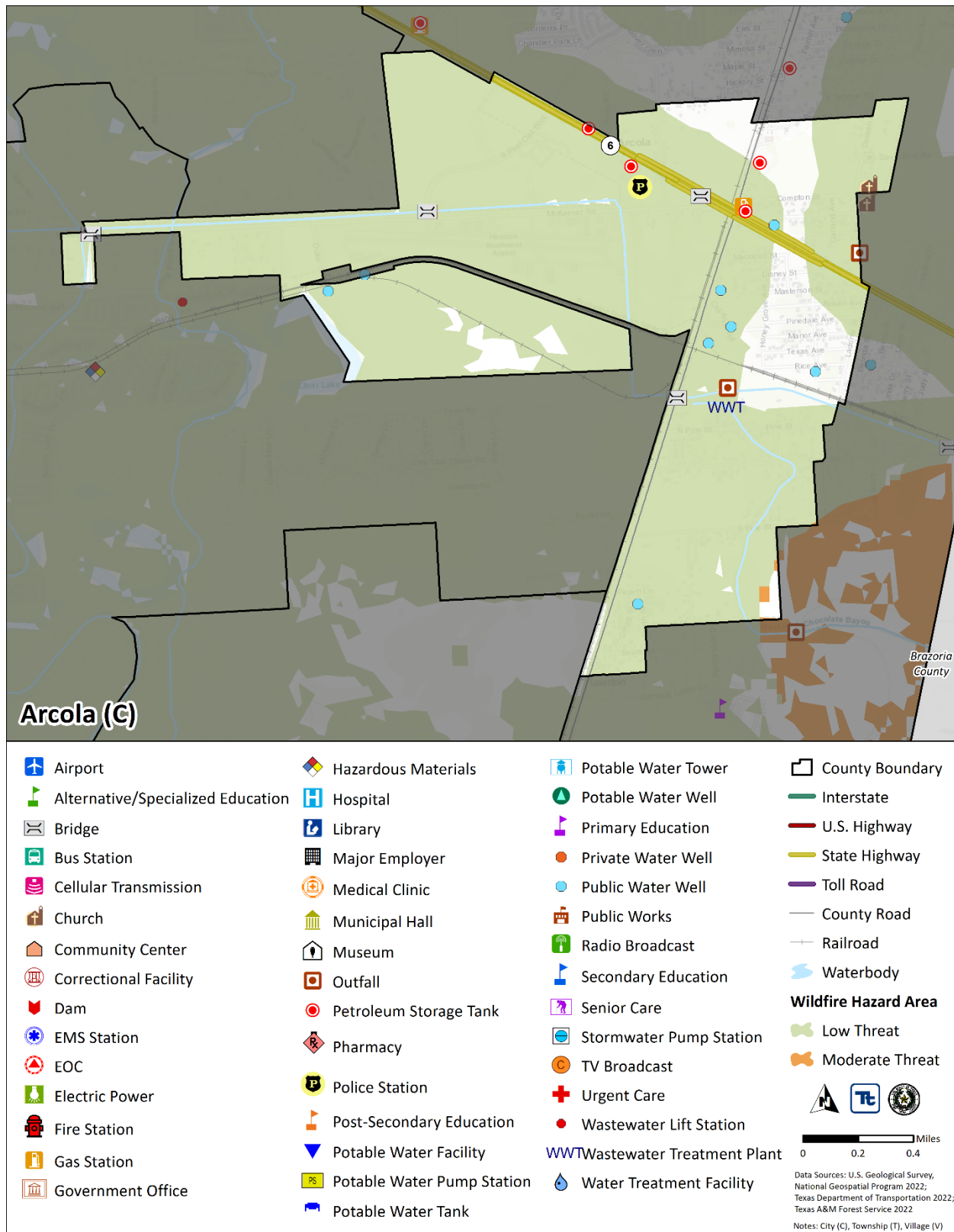




Figure 9.2-5. City of Arcola Hazard Area Extent and Location Map – Wildfire





Hazard Event History

Fort Bend County has a history of natural and non-natural hazard events, as detailed in Volume I, Section 4 (Risk Assessment). A summary of historical events is provided in each of the hazard profiles and includes a chronology of events that have affected the County and its municipalities.

The City of Arcola's history of federally declared (as presented by FEMA) and significant hazard events [as presented in NOAA-National Centers for Environmental Information (NCEI)] is consistent with that of the County. The table below provides details regarding municipal-specific loss and damages the City of Arcola experienced during hazard events since the last hazard mitigation plan update. Information provided in the table below is based on reference material or local sources.

Table 9.2-13. Hazard Event History

Dates of Event	Event Type (Disaster Declaration if applicable)	County Designated?	Summary of Event	Municipal Summary of Damages and Losses
January 20, 2020 – continuing	EM-3458 – Covid-19; DR-4485 – Covid-19 Pandemic	Yes	COVID-19 pandemic	The City was subject to closures and masking/social distancing requirements.
July 25-31, 2020	EM-3530 – Hurricane Hanna	Yes	Hurricane-force winds resulted in significant number of downed trees and utility lines.	Minor damage, tree limbs.
August 23-27, 2020	EM-3540 – Tropical Storms Marco and Laura	Yes	Fort Bend County activated their emergency operations center as fringe impacts of Tropical Storms Marco and Laura impacted the County	The City experienced damages equivalent to the County level.
September 12-18, 2021	EM-3572 Hurricane Nicholas	No	Hurricane Nicholas produced several hours of tropical storm-force sustained winds and gusts. There were numerous power outages and minor to moderate damage to some structures and roofs. Trees down in areas.	Minor wind damage, down fences and trees and limbs and minor power outages.
February 11-21, 2021	DR-4586; EM 3554 – Severe Winter Storms	Yes	Winter Storm Uri distributed a record amount of snow throughout Texas. Snow, ice, and ultra-low temperatures caused widespread road closures.	Moderate infrastructure damage, moderate damage to citizen's homes. Main damage was damage to pipes. Estimated damage over \$500k.

Source: FEMA 2023; NOAA 2023

Notes:

EM Emergency Declaration (FEMA)

FEMA Federal Emergency Management Agency

DR Major Disaster Declaration (FEMA)

N/A Not applicable

Hazard Ranking and Vulnerabilities

The hazard profiles in Volume 1, Section 4 (Risk Assessment) have detailed information regarding each plan participant's vulnerability to the identified hazards. The following summarizes the City of Arcola's risk assessment results and data used to determine the hazard ranking.

Hazard Ranking

This section provides the community specific identification of the primary hazard concerns based on identified problems, impacts and the results of the risk assessment as presented in Volume 1, Section 4 (Risk Assessment). The



ranking process involves an assessment of the likelihood of occurrence for each hazard; the potential impacts of the hazard on people, property, and the economy; and community capabilities to address the hazard and changing future climate conditions. Mitigation action development uses the inputs from the evaluation to target those hazards with highest level of concern.

As discussed in Volume 1, Section 4.4 (Hazard Ranking), each participating jurisdiction has differing degrees of risk exposure and vulnerability compared with the County as a whole. Therefore, each municipality ranked the degree of risk to each hazard as it pertains to their community. The table below summarizes the hazard risk/vulnerability rankings of potential natural hazards for the City of Arcola. The City of Arcola reviewed the County hazard risk/vulnerability risk ranking table and individual results to reflect the relative risk of the hazards of concern to the community.

Table 9.2-14. Hazard Ranking Input

Hazard	Rankings
Dam/Levee Failure	Low
Disease Outbreak	Low
Drought	Low
Extreme Temperature	Low
Flood	Low
Geologic Hazards	High
Hurricane/Tropical Storm	Medium
Severe Weather	High
Tornado	Medium
Wildfire	Low
Winter Weather	Low

Critical Facilities

The table below identifies critical facilities in the community located in the 1 percent and 0.2 percent floodplain and presents Hazus-MH estimates of the damage and loss of use to critical facilities as a result of a 1 percent annual chance flood event.

Table 9.2-15. Potential Flood Losses to Critical Facilities

Name	Type	Exposure	
		1% Event	0.2% Event
City of Arcola WWTP	Wastewater Treatment Plant	X	X
Irrigation Canal	Bridge	X	X
Oyster Creek	Bridge	X	X

Source: Fort Bend County; Hazus v5.1; FEMA 2022; Fort Bend Drainage District 2023

Identified Issues

After review of the City of Arcola's hazard event history, hazard rankings, jurisdiction specific vulnerabilities, hazard area extent and location, and current capabilities, the City of Arcola identified the following vulnerabilities within their community:

- The City did not identify any additional issues as a result of natural hazards.



9.1.7 Mitigation Strategy and Prioritization

This section discusses past mitigations actions and status, describes proposed hazard mitigation initiatives, and prioritizes actions to address over the next five years.

Past Mitigation Initiative Status

The following table indicates progress on the community's mitigation strategy identified in the 2018 HMP. Actions that are in progress are carried forward and combined with new actions as part of this 2023 HMP update and are included in the tables with prioritization. Previous actions that are now ongoing programs and capabilities are indicated as such and previously presented in the Capability Assessment earlier in this annex.



Table 9.2-16. Status of Previous Mitigation Actions

Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2023 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
1	Minimize repetitive loss flooding in Arcola by implementing the following regional drainage improvements (a) Installation of 2 or more detention ponds; (b) installation of 2 or more pump stations; and (c) road grade elevation improvements. This is a multi-jurisdictional project involving Arcola (Fort Bend County), Manvel (Brazoria County) and Pearland (Brazoria County), along with input from Fort Bend and Brazoria Counties.	FBC Engineering, FBC Drainage District, Brazoria Floodplain Administrator, City of Pearland (Public Works – Streets and Drainage)	No Progress – There are no RL or SRL properties in the City	No	-	-
2	Replace existing culverts with larger culverts for better drainage in the North Pine Subdivision and Ladonia at Post Street.	FBC Engineering, FBC Drainage District, City of Arcola	No Progress	No	-	-
3	Reinforcement of critical facilities to withstand high winds from severe weather.	Arcola City Administrator's Office	No Progress	No	-	-
4	Promote flood insurance.	Arcola Mayors Office	No Progress	No	-	-
5	Increase public education of mitigation techniques.	Arcola City's Secretary's Office	No Progress	No	-	-
6	Ensure that the City has adequate evacuation plans and notification procedures in place.	Arcola City Administrator's Office	No Progress	No	-	-
7	Conduct study to determine and map potential wildfire hazard areas.	Fresno Fire Dept.	No Progress	No	-	-
8	Develop and implement drought contingency plan.	Municipal Operations	No Progress	No	-	-
9	Public information campaigns.	Arcola City Secretary's Office	No Progress	No	-	-
10	Evaluate the risks presented by excessive heat and humidity,	Fresno Fire Dept.	No Progress	No	-	-



Project #	Project	Responsible Party	What is the status? (e.g., In Progress, No Progress, Ongoing Capability, or Completed) If in progress or completed, please describe the funding source, cost and who is implementing.	If you did not complete the action, should the action be included in the 2023 HMP (i.e., there is still a need, this is still a priority)?		
				Yes/No	If Yes, please describe the original problem (i.e., hazard, location, historic losses)	If Yes, identify the responsible department/person to implement the project.
	especially in terms of high-risk populations such as the elderly/low income.					
11	In cooperation with County and State officials, ensure that high-risk populations are adequately addressed in response plans that are related to excessive heat risks.	Fresno Fire Dept.	No Progress	No	-	-
12	Review plans and resources to address risk posed by snow and ice hazards during winter storms.	Arcola City Administrator's Officer	No Progress	No	-	-
13	Various mitigation actions to reduce wildfire risk.	Fresno Fire Dept.	No Progress	No	-	-
14	Structural/engineering study of Arcola public facilities.	Arcola City Administrators Office	No Progress	No	-	-
15	Purchase and installation of grounding systems to mitigate lightning hazards in the City of Arcola.	Arcola Contractors (under advisement of City Administrator's Office)	No Progress	No	-	-
16	Restrict and/or prohibit the development in areas of Arcola to mitigate the expansive soils hazard.	Arcola Elected Officials	No Progress	No	-	-
17	Emergency communications - weather radio installation at public buildings and phone tree development.	Arcola Contractors (under advisement of City Administrator's Office)	No Progress	No	-	-

**Additional Mitigation Efforts**

In addition to the mitigation initiatives completed in the table above, the City of Arcola identified the following mitigation efforts completed since the last HMP:

- None identified.

Since the adoption of the County's first HMP, the City of Arcola has made significant mitigation progress in the following areas:

- None identified

Proposed Hazard Mitigation Initiatives for the HMP Update

Fort Bend County participated in a mitigation action workshop in March 2023 and was provided the following FEMA publications to use as a resource as part of their comprehensive review of all possible activities and mitigation measures to address their hazards: FEMA Mitigation Ideas – A Resource for Reducing Risk to Natural Hazards (January 2013) and FEMA Mitigation Assistance Resource Guide for Texas (2020).

The table below indicates the range of proposed mitigation action categories. Both the four FEMA mitigation action categories and the six CRS mitigation action categories are listed in the table to further demonstrate the wide-range of activities and mitigation measures selected.

Table 9.2-17. Analysis of Mitigation Actions by Hazard and Category

Hazard	FEMA				CRS					
	LPR	SIP	NSP	EAP	PR	PP	PI	NR	SP	ES
Dam/Levee Failure	X	-	-	X	X	-	X	-	-	X
Disease Outbreak	X	-	-	X	X	-	X	-	-	X
Drought	X	-	-	X	X	-	X	-	-	X
Extreme Temperature	X	-	-	X	X	-	X	-	-	X
Flood	X	X	-	X	X	-	X	-	X	X
Geologic Hazards	X	-	-	X	X	-	X	-	-	X
Hurricane/Tropical Storm	X	-	-	X	X	-	X	-	-	X
Severe Weather	X	-	-	X	X	-	X	-	-	X
Tornado	X	-	-	X	X	-	X	-	-	X
Wildfire	X	-	-	X	X	-	X	-	-	X
Winter Weather	X	-	-	X	X	-	X	-	-	X

Note: Mitigation categories are described below the Mitigation Initiatives.



The table below summarizes the specific mitigation initiatives the City of Arcola would like to pursue in the future to reduce the effects of hazards. The initiatives are dependent upon available funding (grants and local match availability) and may be modified or omitted at any time based on the occurrence of new hazard events and changes in municipal priorities.

Table 9.2-18. Proposed Hazard Mitigation Initiatives

Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2023-City of Arcola-001	Install a Warning systems for hazard events	<p>Problem: The City does not have a hazard warning system in place that helps protect and warn residents against incoming hazard events.</p> <p>Solution: The City will work to acquire necessary funding to install a hazard warning system that operates using outdoor sirens and notifications on cell phones to protect their residents.</p>	New	Dam/Levee Failure, Disease Outbreak, Drought, Extreme Temperature, Flood, Geologic Hazards, Hurricane/Tropical Storm, Severe Weather, Tornado, Wildfire, Winter Weather	1,2	Less than 5 years	City Administration	BRIC, HMGP, FMA	Residents will have increased warning time before a hazard event affects the City.	\$50,000	High	EAP	ES
2023-City of Arcola-002	Develop a Comprehensive Emergency Management Plan	<p>Problem: The City does not have a Comprehensive Emergency Management Plan to reduce impact of hazard events.</p> <p>Solution: The City will develop a</p>	New	Dam/Levee Failure, Disease Outbreak, Drought, Extreme Temperature, Flood, Geologic Hazards, Hurricane/Tropical Storm, Severe Weather, Tornado, Wildfire, Winter Weather	1,2	1 Year	City Administration	City Budget	The City will have a Plan to reference when met with emergency situations.	\$5,000	High	LPR	ES, PI



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
		Comprehensive Emergency Management Plan that will focus on the natural and manmade hazards that impact the City. This plan will integrate the Hazard Mitigation Plan into it.											
2023-City of Arcola-003	Future Conditions Resources	<p>Problem: The City does not have resources developed to evaluate future conditions of hazards from the effects of climate change, including storm and hazard frequency and intensity.</p> <p>Solution: The City will work with FEMA and the County to develop future condition maps and resources so that the City may keep plans and regulations up to code with projected conditions of population and building stock exposed to increasing hazard events.</p>	New	Dam/Levee Failure, Disease Outbreak, Drought, Extreme Temperature, Flood, Geologic Hazards, Hurricane/Tropical Storm, Severe Weather, Tornado, Wildfire, Winter Weather	1,2	3 Years	City, County and FEMA	FEMA, BRIC, HMGP, FMA, County, City	The City will be better equipped to handle hazards that have been intensified due to Climate Change.	\$25,000	High	LPR	PR



Project Number	Mitigation Initiative Name	Description of Problem and Solution	New or Existing Assets?	Hazard(s) to be Mitigated	Goals Met	Estimated Timeline	Lead and Support Agencies	Potential Funding Sources	Estimated Benefits	Estimated Costs	Priority	Mitigation Category	CRS Category
2023-City of Arcola-004	Critical Facilities Flood Protection	<p>Problem: The following critical facilities are located in the special flood hazard area:</p> <ul style="list-style-type: none">City of Arcola WWTPIrrigation CanalOyster Creek <p>Solution: The City will work with critical facility owners to determine what additional floodproofing measures are needed at these facilities. Options include:</p> <ul style="list-style-type: none">Elevation of facilityFloodproofing of facilityMobile flood barriers <p>Once the most cost effective option is identified, the City will help the critical facility owners carry out the option.</p>	Existing	Flood	2,3	Less than 5 years	City Engineer	FEMA HMGP and PDM, BRIC, USDA Community Facilities Grant Program, Emergency Management Performance Grants (EMPG) Program, City Budget	Ensures that facilities can carry out continuity of operations.	TBD by feasibility assessment	High	SIP	SP

*Mitigation initiative is related to a critical facility and/or community lifeline

Notes: Not all acronyms and abbreviations defined below are included in the table.



Acronyms and Abbreviations:

CRS	Community Rating System
FEMA	Federal Emergency Management Agency
HMA	Hazard Mitigation Assistance
N/A	Not applicable
NFIP	National Flood Insurance Program

Potential FEMA HMA Funding Sources:

FMA	Flood Mitigation Assistance Grant Program
HMGP	Hazard Mitigation Grant Program
BRIC	Building Resilient Infrastructure and Communities Program

Timeline:

The time required for completion of the project upon implementation.

Cost:

The estimated cost for implementation.

Benefits:

A description of the estimated benefits, either quantitative and/or qualitative.

Mitigation Category:

- *Local Plans and Regulations (LPR)*—These actions include government authorities, policies or codes that influence the way land and buildings are being developed and built.
- *Structure and Infrastructure Project (SIP)*—These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures, as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.
- *Natural Systems Protection (NSP)*—These are actions that minimize damage and losses, and also preserve or restore the functions of natural systems.
- *Education and Awareness Programs (EAP)*—These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. These actions may also include participation in national programs, such as StormReady and Firewise Communities.

CRS Category:

- *Preventative Measures (PR)*—Government, administrative or regulatory actions, or processes that influence the way land and buildings are developed and built. Examples include planning and zoning, floodplain local laws, capital improvement programs, open space preservation, and storm water management regulations.
- *Property Protection (PP)*—These actions include public activities to reduce hazard losses or actions that involve (1) modification of existing buildings or structures to protect them from a hazard or (2) removal of the structures from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, storm shutters, and shatter-resistant glass.
- *Public Information (PI)*—Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and educational programs for school-age children and adults.
- *Natural Resource Protection (NR)*—Actions that minimize hazard loss and also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- *Structural Flood Control Projects (SP)*—Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include dams, setback levees, floodwalls, retaining walls, and safe rooms.
- *Emergency Services (ES)*—Actions that protect people and property during and immediately following a disaster or hazard event. Services include warning systems, emergency response services, and the protection of essential facilities.

The prioritization criteria provided in Volume 1, Section 6 (Mitigation Strategy) identify 14 evaluation/prioritization criteria to complete the prioritization of mitigation initiatives. For each new mitigation action, a numeric rank is assigned (-1, 0, or 1) for each of the 14 evaluation criteria to assist with prioritizing actions as High, Medium, or Low. The table below provides a summary of the prioritization of all proposed mitigation initiatives for the HMP update.

Table 9.2-19. Summary of Prioritization of Actions

Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High /Medium /Low
2023-City of Arcola-001	Install Warning Systems for Hazard Events	1	1	1	1	1	1	1	0	1	1	1	1	1	0	12	High



Project Number	Project Name	Life Safety	Property Protection	Cost-Effectiveness	Technical	Political	Legal	Fiscal	Environmental	Social	Administrative	Multi-Hazard	Timeline	Agency Champion	Other Community Objectives	Total	High /Medium /Low
2023-City of Arcola-002	Develop a Comprehensive Emergency Management Plan	1	1	1	1	1	1	1	1	1	1	1	1	1	0	13	High
2023-City of Arcola-003	Future Conditions Resources	1	1	1	1	0	1	1	1	1	1	1	1	1	0	12	High
2023-City of Arcola-004	Critical Facilities Flood Protection	1	1	1	1	1	1	0	1	1	1	0	0	1	1	11	High

Note: Volume 1, Section 6 (Mitigation Strategy) conveys guidance on prioritizing mitigation actions. Low (0-4), Medium (5-8), High (9-14).