Exhibit F

Dep Agreement No. 23PLN37

City of Gainesville

Vulnerability Assessment and Adaptation

City of Gainesville

Final Vulnerability Assessment Report

January 31, 2025

This report is funded in part through a grant agreement from the Florida Department of Environmental Protection. The views, statements, findings, conclusions, and recommendations expressed herein are those of the author(s) and do not necessarily reflect the views of the State of Florida or any of its subagencies.

Part I. Executive Summary

The City of Gainesville applied for and received a Resilient Florida Grant Program (RFGP) planning grant to update the City of Gainesville portion of the Alachua Countywide Vulnerability Assessment (VA) and to develop an Adaptation Plan as part of its continuing efforts to become a more resilient community and leverage grant-funding sources.

The City's grant agreement (work plan) with the Florida Department of Environmental Protection (FDEP) covers the following task and subtasks for the VA:

- Task 1 – City of Gainesville VA and Adaptation Plan:
    - Kickoff Meeting.
    - Assemble Steering Committee.
    - Public Outreach Meeting #1.
    - Acquire Background Data.
    - Exposure and Sensitivity Analyses.
    - Final VA Report (this document).
    - Project Meetings:
        - Steering Committee Meetings.
        - Public Outreach Meeting #2.
        - Public Presentation of the Final VA.
    - Local Mitigation Strategy.
    - Adaptation Plan.

The primary goals/objectives of this VA are to:

- Complete a Citywide VA that satisfies the FDEP RFGP guidelines and requirements in Section 380.093, Florida Statutes (FS).
- Identify critical community infrastructure that is vulnerable to flooding under existing and projected future conditions.
- Develop grant-fundable adaptation projects to protect the City's infrastructure that is most vulnerable to flooding.

Products and outcomes from this VA include:

- Inventory all critical community assets in the City.
- Map Citywide existing and future conditions extreme flood events from rainfall flooding.
- Identify critical community assets that are vulnerable to rainfall flooding.
- Prioritize critical community assets that are vulnerable to flooding.
- Identify focus areas for flood adaptation planning.
- Identify flood adaptation strategies and/or projects.
- Produce tables and flood maps summarizing the results of the VA.
- Provide geographic information system (GIS) deliverables of critical assets, flood depth rasters, and Sensitivity Analysis results.
- Provide documentation of meetings, a signed VA Compliance Checklist Certification, and a letter to FDEP and the Florida Division of Emergency Management (FDEM) Mitigation Bureau Planning Unit.

Topographic data, critical and regionally significant asset data, and flood scenario-related data were compiled to perform the VA as defined in Section 380.093, FS. Critical and regionally significant assets and required background data were assembled from existing local, state, and federal data sources.

The Exposure Analysis identifies the Citywide depth of water caused by rainfall-driven flooding.

For the Sensitivity Analysis, the flood elevations from 12 scenarios were compared to known or estimated critical asset elevations. A high/medium/low (H/M/L) ranking was created for the severity of flooding for each asset for each flood scenario. A prioritization methodology was developed that combined the severity of flooding with the adaptive capacity to rank each predicted flooding problem and assigned the critical assets into a H/M/L priority category.

Focus areas were identified based on stakeholder feedback, equity considerations, and the geographic concentration of vulnerable critical assets.

Part II. Methodology

2.1 Background Data

The topographic data, critical and regionally significant asset data, and flood scenario-related data were compiled to develop the VA as defined in Section 380.093, FS. According to the FS and FDEP guidance, the following are requirements for this task:

- All critical assets owned or maintained by the City are included.
- The most recent publicly available digital elevation model (DEM) is used.
- GIS data must adhere to the RFGP's GIS Data Standards, and data sources shall be defined in the associated metadata.
- Data gaps shall be identified where missing or low-quality information may limit the VA's extent or reduce the accuracy of the results. Gaps in necessary data shall be rectified.

2.2 Topographic Data

Available light detection and ranging (LiDAR) topographic datasets were reviewed, and the most recent available data were determined to be the US Geological Survey's (USGS) 2019 Alachua County dataset. The 2019 DEM was reviewed to ensure that the entire City was covered by the dataset. Minor topographic/bathymetric voids were filled using the best available data.

2.3 Critical and Regionally Significant Asset Inventory

The critical and regionally significant asset data were assembled from existing local, state, and federal data sources for the 39 listed critical asset types that are required to be included in RFGP VAs as defined in Section 380.093, FS. A total of 50,140 critical assets were identified Citywide. An elevation was assigned to each of the critical and regionally significant assets. Where data were available, building assets were assigned finished floor elevations (FFEs) from site-specific surveys, construction plans, and/or as-builts.

Where site-specific FFE data were not available, FFEs were estimated using the 2019 LiDAR DEM and the asset's building footprint. For assets not associated with buildings (i.e., parks, wetlands, surface waters, etc.), elevations were assigned based on the lowest DEM elevation within the asset footprint.

2.4 Exposure Analysis

In accordance with Section 380.093, FS, the City was required to model and map rainfall-induced flooding Citywide for the existing, 2040, and 2070 conditions. To accomplish this, an updated version of the model from Alachua County's VA was developed. The primary updates to the model were culvert updates taken from the recent Hogtown Creek Watershed Management Plan project and changes to initial lake levels in some of the larger lakes in the City. The National Oceanic and Atmospheric Administration (NOAA) Atlas 14 Volume 9, *Precipitation-Frequency Atlas of the United States, Southeastern States*, published in 2013, rainfall data and future-conditions rainfall change factors were collected and used in the update model.

The model covers the entire City, areas outside the City that flow into it, and areas outside the City where flow is discharged from the City and may have a backwater effect in the City. The model uses the TUFLOW HPC modeling software, which includes two-dimensional (2D) flow routing.

Design storm rainfall depths across the City were collected for the 24-hour and 10-day durations 100- and 500-year return-period events from Atlas 14.

To model future conditions rainfall-induced flooding, rainfall change factors were collected from Florida International University's (FIU) Sea-Level Solutions Center (Updating the Statewide Extreme Rainfall Projections | Tableau Public) based on the 50th percentile.

Jones Edmunds ran the TUFLOW HPC model for the existing, 2040, and 2070 rainfall-induced flood scenarios and generated flood-depth rasters and inundation extent polygons for each scenario using the model results and the 2019 LiDAR DEM. The maximum depths of the 24-hour and 10-day storm events were used for each scenario. Table 1 presents the results of those scenarios, excluding road assets.

Table 1 Exposure Analysis Results

Asset Class	Total Number of Critical Assets*	Vulnerability Level	Number of Critical Assets by Vulnerability Level					
			100-YR Rainfall-Induced Flooding			500-YR Rainfall-Induced Flooding		
			Existing Conditions	Intermediate-High		Existing Conditions	Intermediate-High	
				2040	2070		2040	2070
Transportation and Evacuation Routes (excluding major roadway assets)	20	High	4	5	5	5	5	5
		Medium	2	0	0	0	0	1
		Low	7	13	13	13	14	13
Critical Infrastructure	414	High	50	80	88	84	98	111
		Medium	174	42	41	41	38	46
		Low	151	251	250	253	257	233
Critical Community and Emergency Facilities	520	High	61	77	91	82	124	149
		Medium	77	78	85	76	80	72
		Low	256	274	268	275	261	242
Natural, Cultural, and Historical Resources	5,077	High	341	465	517	479	631	756
		Medium	551	509	550	519	730	788
		Low	1,445	1,698	2,556	2,540	2,646	2,576

*Includes assets with vulnerability level of NA

2.5 Sensitivity Analysis

The Sensitivity Analysis measures the impact of flooding on critical and regionally significant assets, applying the data from the Exposure Analysis to the inventory of critical assets. Requirements for this analysis include:

- Evaluating the impact of flood severity on each asset class at each flood scenario with an assignment of risk level based on the percentage and number of critical assets affected.
- Listing critical and regionally significant assets impacted by flooding. The list must be prioritized by area or immediate need and must identify which flood scenario(s) impacts each asset.

For the Sensitivity Analysis, the results from the Exposure Analysis were compared to the elevations of the critical and regionally significant assets. Flood depth was calculated for each critical asset for every flood scenario. A sensitivity level (H/M/L) was assigned to each asset for each scenario based on the asset type and the depth of flooding.

Jones Edmunds then developed a risk-based methodology to rank the assets based on flooding impact using a cumulative scoring of vulnerability to flooding across all Exposure Analysis scenarios. Assets with high vulnerability to flooding across all scenarios received the highest priority risk level, whereas assets without exposure were not included in the ratings. The vulnerability scores across all six Exposure Analysis scenarios were totaled. The assets were classified into five classes representing priority ratings (highest/ high/medium/ low/lowest). We classified these using the Natural Breaks (Jenks) method on the total vulnerability score.

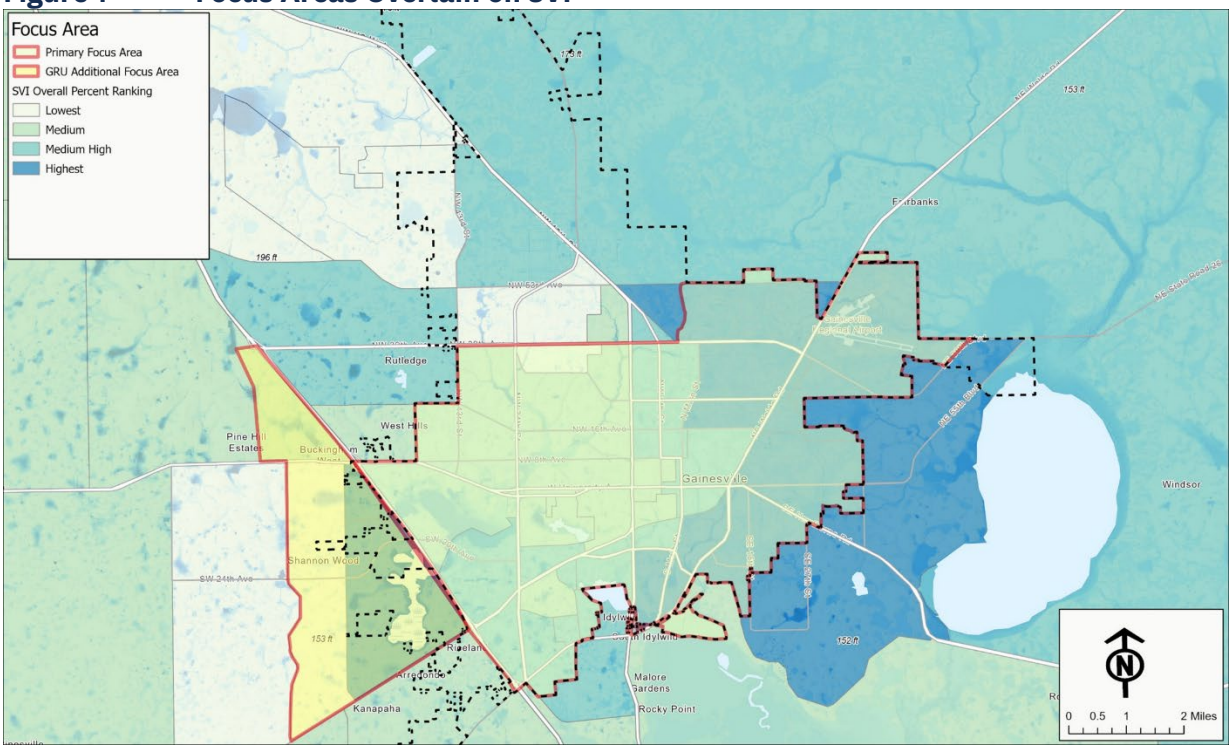
Major roadway critical assets were evaluated based on the impact of flooding events and assigned risk levels differently than the other asset types. Road assets were first segmented into 100-foot sections before being analyzed. Jones Edmunds applied an approach based on connectivity to fire stations across the City using a least-cost path analysis of roadways. A road segment was considered isolated if it was flooded by a depth of 1 foot or more. This was then combined with the road segment's exposure to flooding and run for all Exposure Analysis scenarios. Road assets were prioritized and rated using a methodology that combined connectivity to fire stations and flood exposure. These assets were assigned a H/M/L priority rating value based on whether the asset was isolated from a fire station and exposed (high), just isolated (medium), or just flooded (low). Any isolation or flooding occurrence across the scenarios would assign that appropriate rating value to an asset.

Part III. Outcome

The method for identifying focus areas was discussed at multiple stakeholder, public, and technical group meetings. Consensus guidance was that the method should consider equity and density of high-priority impacted assets and should not be arbitrary. Six methods meeting those criteria were tested, and they generally yielded similar results. The methods generally began by multiplying the sensitivity score previously discussed with the Social Vulnerability Index (SVI) score. The SVI is a method for including equity into identifying focus areas. The SVI value is taken from the Center for Disease Control and Prevention and the Agency for Toxic Substances and Disease Registry (CDC/ATSDR) SVI for 2022 for

Alachua County. A heat map analysis performed in ArcGIS was used to identify clusters of higher-scoring assets. Figure 1 shows the final two focus areas.

Figure 1 Focus Areas Overlain on SVI



Part IV. Further Recommendations

The City's VA grant includes funding to complete an Adaptation Plan. The Adaptation Plan will screen up to 30 projects and develop up to 20 projects primarily or exclusively in the focus areas.