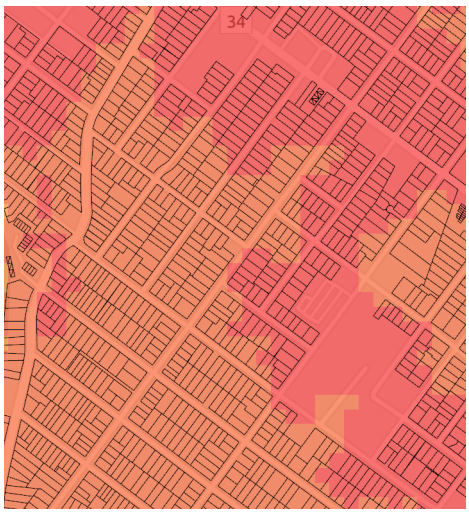






September 2026

Climate Change-Related Hazard Vulnerability Assessment

Borough of Rutherford

RUTGERS–NEW BRUNSWICK
New Jersey Climate Change Resource Center

RESILIENT NJ

This Climate Change-Related Hazard Vulnerability Assessment (CCRHVA) was prepared by the NJ Climate Change Resource Center in collaboration with the Borough of Rutherford and was funded by the New Jersey Department of Environmental Protection through the American Rescue Plan Act. This analysis was conducted in the summer and fall of 2025 and relies upon the best available data and local plans at that time. The version of CCRHVA adopted by the Borough may be different than this document based on updated plans and data.

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I. Introduction

The New Jersey (NJ) Municipal Land Use Law (MLUL) requires NJ municipalities to include a Climate Change-Related Hazard Vulnerability Assessment (CCRHVA) in the Land Use Element of the Municipal Master Plan. The New Jersey Climate Change Resource Center (NJCCRC) at Rutgers University, with funding from the New Jersey Department of Environmental Protection (NJDEP), developed this CCRHVA in coordination with the Borough of Rutherford (henceforth, "Rutherford"), in accordance with the requirements of the MLUL, including the following components:

- Analysis of current and future threats to, and vulnerabilities of, the municipality associated with climate change-related natural hazards, including, but not limited to increased temperatures, drought, flooding, hurricanes, and sea-level rise (Section III);
- A build-out analysis of future residential, commercial, industrial, and other development in the municipality, and an assessment of the threats and vulnerabilities related to that development (Section IV);
- Identification of critical facilities, utilities, roadways, and other infrastructure that is necessary for evacuation purposes and for sustaining quality of life during a natural disaster, to be maintained at all times in an operational state (Section V);
- Analysis of the potential impact of natural hazards on relevant components and elements of the master plan (Section VI);
- A specific policy statement on the consistency, coordination, and integration of the climate change-related hazard vulnerability assessment with any existing or proposed natural hazard mitigation plan, floodplain management plan, comprehensive emergency management plan, emergency response plan, post-disaster recovery plan, or capital improvement plan (Section VII).

The Borough of Rutherford is in Bergen County, New Jersey. Situated between the Passaic and Hackensack Rivers, it is a suburban town, with roughly half of the total land area being residential neighborhoods and the commercial downtown. However, east of Route 17, land uses shift to industrial and commercial. The community has a rich civic and cultural history, it is the birthplace of famous poet William Carlos Williams, whose home is listed on the National Register of Historic Places alongside other local landmarks, including Iviswold Castle, the Kip Homestead, and the historic Rutherford train station. The southeast part of Rutherford, approximately 13 percent of the Borough's total land area, is part of the NJ Meadowlands District and consists predominantly of open space in the form of shrublands and wetlands. Additional details about Rutherford are included in Appendix A.

II. Methodology

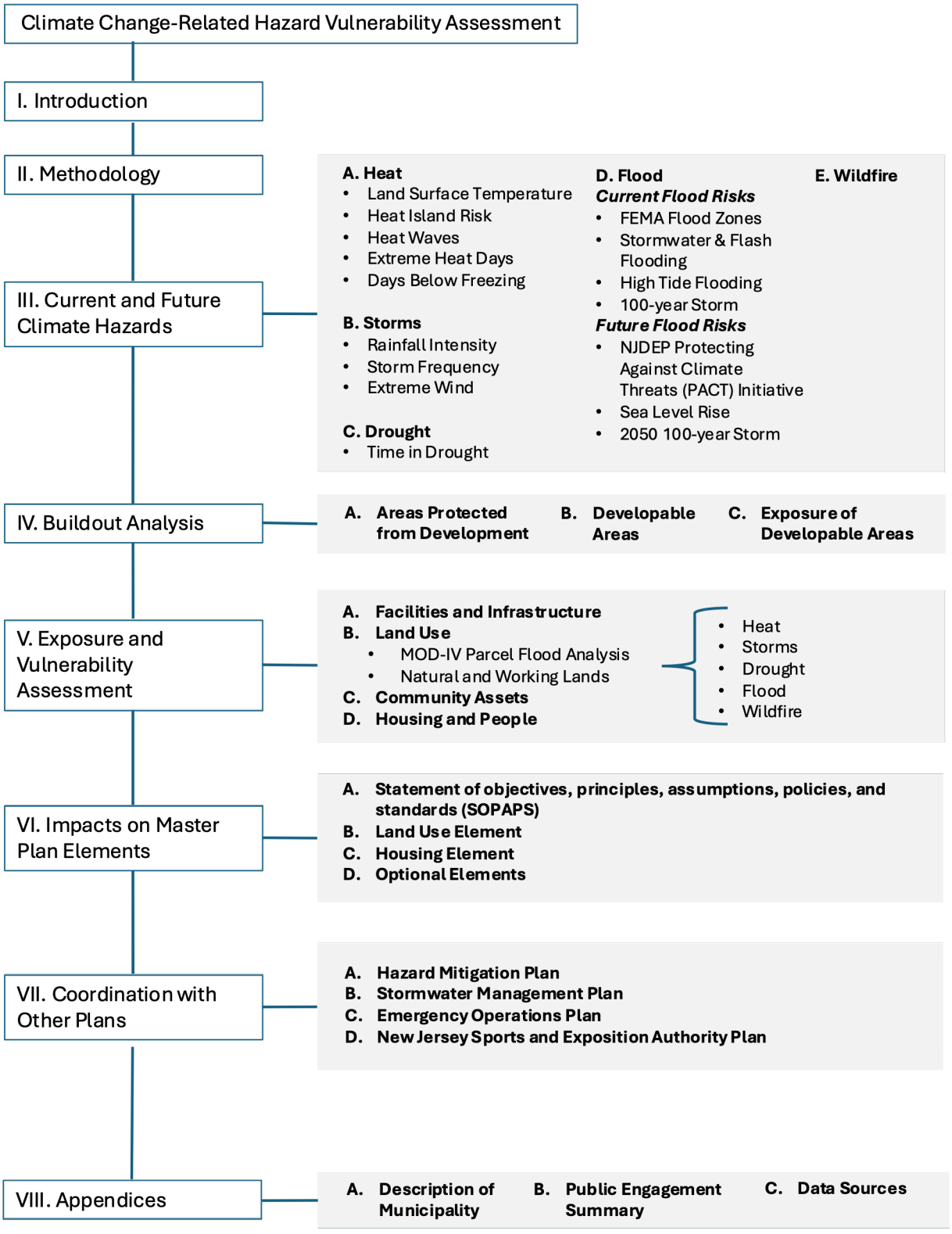
In accordance with the requirements of the MLUL, this assessment relies upon "the most recent natural hazard projections and best available science" provided by the NJDEP. This assessment was conducted in the summer and fall of 2025 and relies upon the best available data at that time. Publicly available datasets and data made available through various tools were utilized to analyze local climate change-related hazards and potential impacts to the Borough at the three planning horizons below. The hazard projections align with a moderate greenhouse gas emissions scenario representing a future with a reduction in fossil fuel use consistent with today's global policies. It should be noted that the hazard projections would be slightly greater under a higher greenhouse gas emissions scenario (i.e., representing a future with continued growth of fossil fuel use). The three planning horizons applied in these analyses include:

- Present day to assess current impacts and align with the shorter-term planning needs of the 10-year Master Plan Re-Examination Report (MPRR) cycle.
- Mid-century to assess future impacts and align with longer-term community planning needs and visioning.
- Late-century to assess long-term planning needs and align with the NJDEP Protecting Against Climate Threats (PACT) initiatives, including the Inland Flood Protection rule and Resilient Environments and Landscapes (REAL) coastal flood rule. These rules are detailed in Section III.D.

The results of the web-based assessment were presented to Rutherford municipal staff and residents to obtain feedback and confirm results. These stakeholders also provided input on hazards for which web-based data was not available, including stormwater and flash flooding. Details on public engagement are included in Appendix B.

This document is organized into eight sections, depicted in Figure II-1. Each section addresses a required component as set forth by the MLUL.

Figure II-1. Rutherford CCRHVA document structure



III. Current and Future Climate Hazards

The New Jersey Municipal Land Use Law (MLUL) requires a CCRHVA to include an "analysis of current and future threats to, and vulnerabilities of, the municipality associated with climate change-related natural hazards, including, but not limited to increased temperatures, drought, flooding, hurricanes, and sea-level rise." This section addresses that requirement and includes an analysis of the additional hazards of extreme precipitation, wind, and wildfire.

Local stakeholders were asked via an online survey to rank their level of personal concern for the Borough from the hazards of heat, drought, flooding, extreme precipitation, wind, and wildfire. Most respondents indicated that flooding was their greatest concern for Rutherford, followed by extreme precipitation and heat. Drought and wildfire were of less concern. Local stakeholders were also asked to report how frequently they are personally affected by each hazard. Respondents indicated being most frequently affected by heat in the Borough, followed by wind, extreme precipitation, and flooding. Less frequent impacts were reported from drought and wildfire (see Appendix B for details).

A. Heat

Average annual temperatures in New Jersey have risen by approximately 4 °F since 1900. By 2100, the annual average temperature is projected to increase an additional 3.7–6.2 °F. [1] Increased temperatures can have adverse impacts on public health, infrastructure, and plants (see Section V). Urbanized areas are disproportionately affected by heat due to higher population density, more impervious surfaces, and less natural landscapes. Heat was ranked as the number one hazard personally affecting local stakeholders. Among local stakeholders who ranked heat as their top-choice, the majority (61%) indicated being personally affected by heat in the Borough "many times" or "a few times" each year (Appendix B).

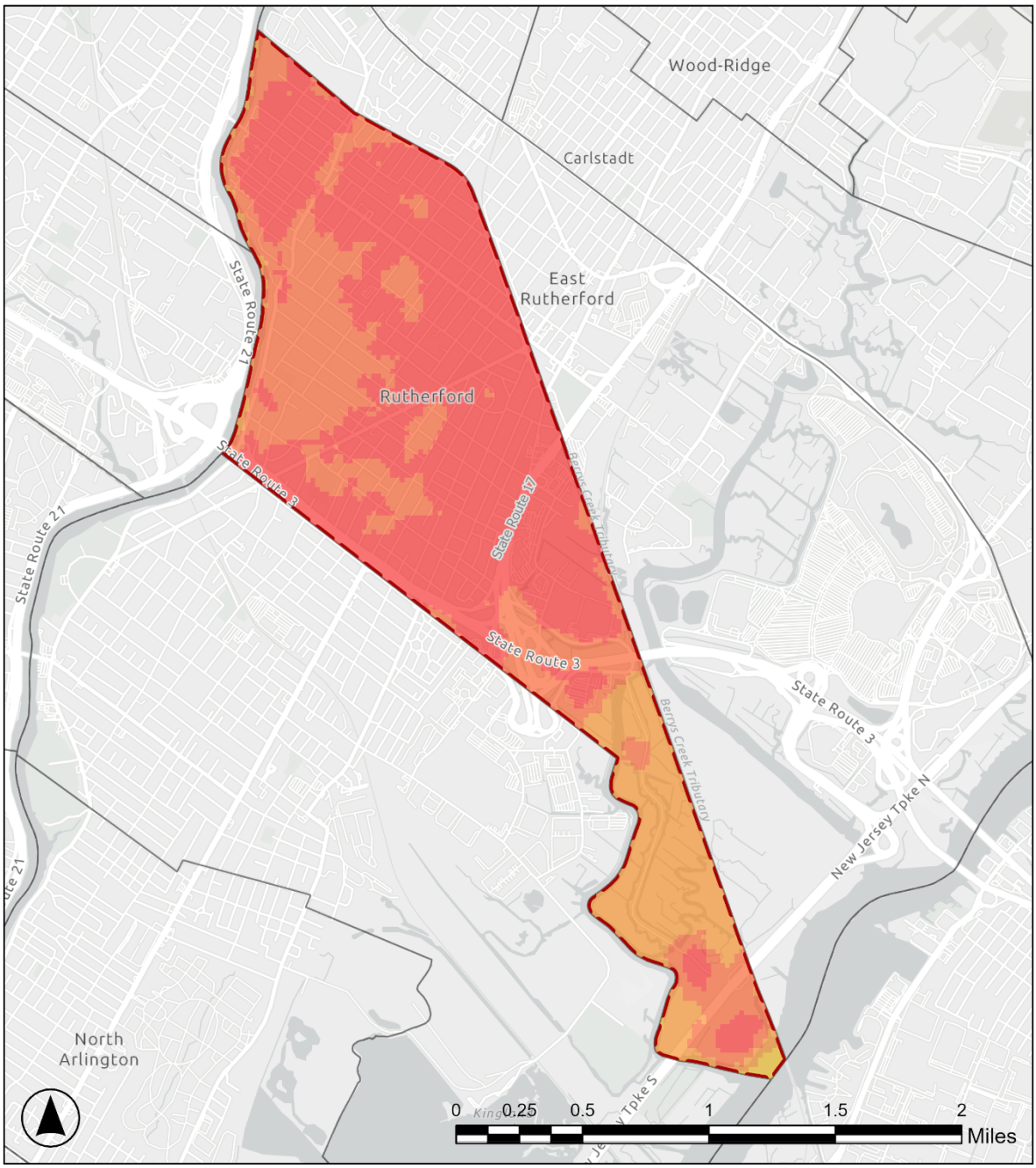
Land Surface Temperature

Map III-1 depicts the land surface temperature (temperature of the ground) in Rutherford in the summer of 2022. This data was collected by satellites at 100 square foot resolution. Impervious surfaces and structures such as buildings and roads absorb more solar radiation, increasing land surface temperature, and emitting more heat than natural surfaces such as trees, vegetation and water.

Land surface temperature (LST) data for Rutherford indicates high heat in developed areas. Residential neighborhoods and the commercial district in the center and north reach surface temperatures over 100 °F. The Meadowlands areas in the south are notably cooler. The LST patterns shown on the map demonstrate that surface heat accumulation is significant, especially during mid-summer, and may contribute to localized thermal discomfort, increased cooling demand, and heat stress for vulnerable populations.

[1] Davies, K., Shope, J., Broccoli, A., Gerbush, M., Kaplan, M., Robinson, D., Nikolopoulos, E., Araujo, D., Kopp, R., Herb, J. & Spector, A. 2025. State of the Climate: New Jersey 2024. Rutgers, The State University of New Jersey, New Brunswick, NJ. DOI: 10.7282/00000539.

Map III-1. Land surface temperature (°F) – Summer 2022



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Land Surface Temperature (F)

- Under 80
- 80 - 90
- 90 - 100
- 100 - 110
- Over 110

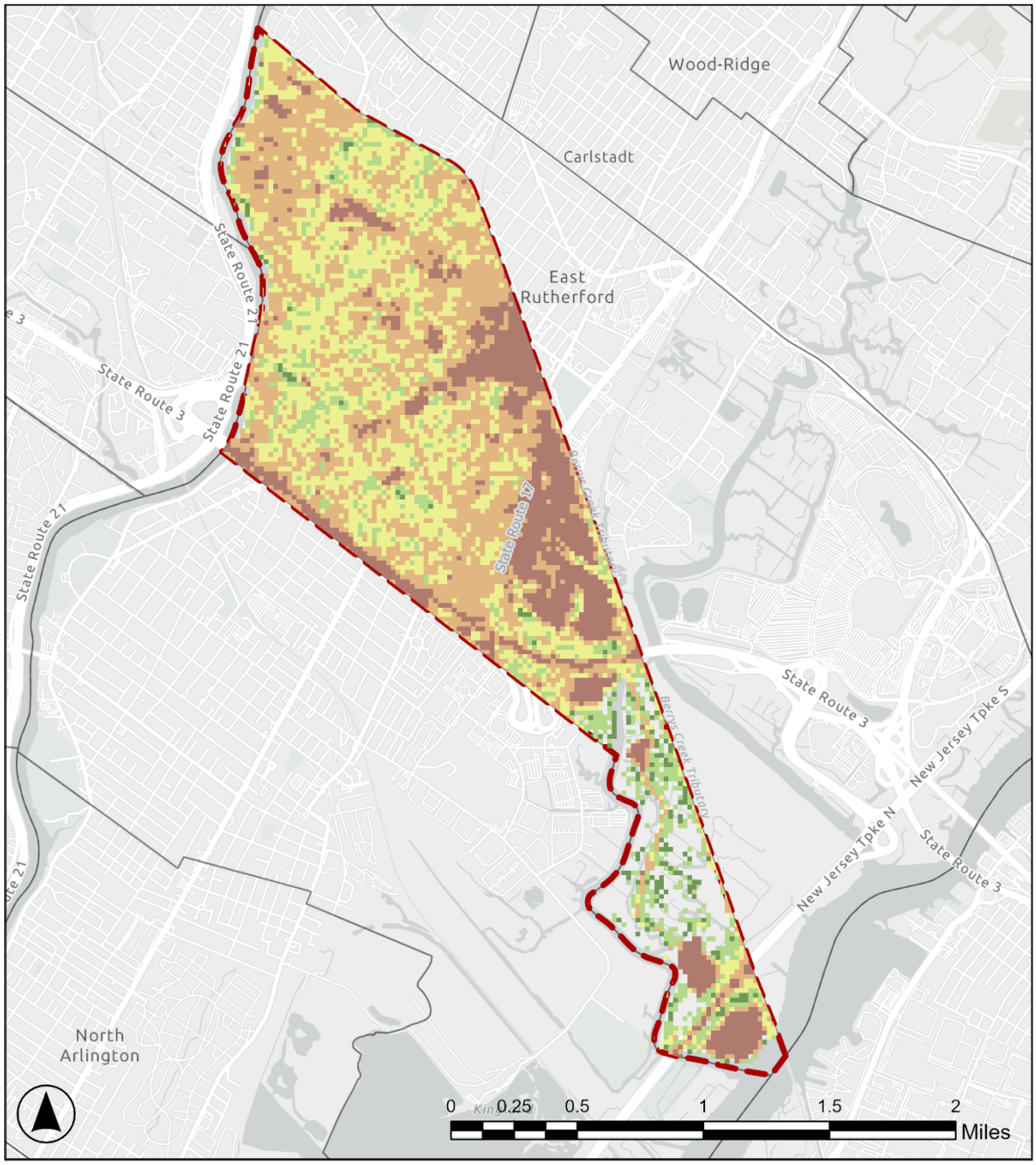
(Sources: NJDEP and NJ Climate Change Resource Center)

Heat Island Risk

While land surface temperature provides a granular depiction of potential heat impacts in the municipality, analysis of heat island risk offers a broader understanding of how heat can impact communities. A heat island is an area that is significantly warmer than the surrounding region. Areas with more impervious surface than tree canopy and vegetative cover are at risk of the heat island effect. Heat islands can increase daytime temperatures, reduce nighttime cooling, and cause greater air pollution. Land use and zoning ordinances can mitigate heat island effects by setting standards for tree cover, vegetation, and impervious surface.

Map III-2 depicts the ratio between tree canopy cover and impervious surface. The analysis provides a ratio of value from negative one (100% impervious cover) to positive one (100% canopy cover). This range of potential values is split evenly into five groups in the map below, ranging from "higher canopy cover" to "higher impervious cover." Heat island risk in Rutherford closely reflects land use patterns. Rutherford is broadly divided into residential, commercial, industrial areas North of Route 3, and the Meadowlands towards the south. The analysis reveals that the impervious cover in residential areas is slightly greater than the tree canopy cover for the most part. Only two block groups in the central part of Rutherford have equal tree cover compared to the impervious surfaces. On the eastern side, where the land use is predominantly commercial and industrial, the tree canopy cover is much lower compared to impervious land. Although Rutherford includes extensive wetlands that can help mitigate heat impacts, this analysis focuses specifically on tree canopy cover as tree canopies directly target microclimates of the built environment. As a result, the limited canopy in the southern portion of the Borough causes these areas to appear more impervious and thus more vulnerable to heat island effects.

Map III-2. Heat island risk



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Ratio Between Canopy Cover and Impervious Surface

- Higher Tree Canopy Cover
- Moderately Higher Tree Canopy Cover
- Equivalent Impervious/Canopy Cover
- Moderately Higher Impervious Cover
- Higher Impervious Cover

(Source: NJ Adapt)

Heat Waves

A heat wave is a period of unusually hot weather. Typically, heat waves are warmer than the historical averages for the area and much warmer than the temperatures before and after the heat wave event. Heat waves have a direct impact on human health, the local environment, and the economy (see Section V). Climate change is projected to drive longer and more frequent heat waves in NJ.[2]

Table III-1 provides a measure of change in future heat wave number and duration compared to a historical period of 1981–2010 at the county level. The threshold for a heat wave in Bergen County is four days with average daily temperature meeting or exceeding 80.6 °F. This threshold is the 95th percentile of 30 years (1981–2010) of daily average temperature during the warm season (May 1 to September 30). Average temperature is a synthesis of the daily maximum and minimum temperatures. Daily maximums emphasize the highest heat conditions a person may experience, but daily minimums have been shown to be more important for heat stress and illness when elevated for an extended period.

Table III-1. Heat waves in Bergen County

	Baseline 1981-2010	Moderate Emissions	
		Mid-century 2036-2065	Late-century 2070-2099
Average annual number of heat waves	1.2	3.7	4.6
Average days of heat wave duration	3.6	8.4	10.9
Maximum days of heat wave duration	7.7	16.9	20.1

(Source: NJ Public Health Adapt – Climate Conditions that Impact Health)

The data for Bergen County indicates that the average number of heat waves annually may increase from about one annually to 4–5 per year by the end of the century. The average length of heat waves is projected to increase from about four days to eight to 11 days by the end of the century. The typical maximum duration of heat waves may increase from around eight days to 17–20 days by the end of the century.

Extreme Heat Days

Table III-2 provides a measure of change in future extreme heat days compared to a historical period of 1981–2010 at the municipal level. July is historically the hottest month in New Jersey.

[2] Davies, K., Shope, J., Broccoli, A., Gerbush, M., Kaplan, M., Robinson, D., Nikolopoulos, E., Araujo, D., Kopp, R., Herb, J. & Spector, A. 2025. State of the Climate: New Jersey 2024. Rutgers, The State University of New Jersey, New Brunswick, NJ. DOI: 10.7282/00000539.

Higher maximum temperatures exceed thresholds of comfort, increasing the occurrence of heat-related illnesses, energy demand, and harmful impacts on plants and animals.

Table III-2. Extreme heat days

	Baseline 1981-2010	Moderate Emissions		
		Change from Baseline		
		2030	2060	2090
Days greater than 95˚F	2	+ 4 - 6	+ 10	+ 14
Average daily high temp. in July (˚F)	85	+ 2	+ 4	+ 4 - 5

(Source: NJ Public Health Adapt – Climate Conditions that Impact Health)

Rutherford experienced an average of two days above 95 °F annually from 1981–2010. By 2030, this may increase by four to six days annually and may increase by 14 days by the end of the century. The Borough experienced an average daily high temperature of 85 °F in July from 1981–2010. By 2030, the average daily high in July may increase by 2 °F and may increase by 4–5 °F by the end of the century.

Days Below Freezing

Table III-3 provides a measure of change in the future annual number of days below 32 °F compared to a historical period of 1981–2010 at the municipal level. Fewer very cold days mean less “code blue” situations, but it also can present potential impacts to agriculture, infrastructure, and disease vectors (e.g. mosquitoes and ticks).

Table III-3. Days below freezing

	Baseline 1981-2010	Moderate Emissions	
		Mid-century 2050-2070	Late-century 2080-2090
Average number of days below freezing	93	70	64

(Source: NJ Adapt Climate Snapshots – Forest Climate Risk Report)

Rutherford experienced an average of 93 days below 32 °F annually from 1981–2010. By the middle of the century, this may decrease to an average of 70 days below freezing each year. By the late century, the average number of days below freezing may further decrease to 64 days annually.

B. Storms

Storms in New Jersey can bring heavy precipitation, flooding, and strong winds. Extreme events are those where conditions substantially exceed what is considered normal for a location. The NJCCRC's *State of the Climate: New Jersey 2024* reports that the frequency and intensity of extreme precipitation in New Jersey is expected to increase with climate change. The total annual rainfall within the state has increased by ~7% since the early 1900s, with the most intense events generating more rainfall compared to historical episodes. An increase in total annual rainfall statewide of about 3–13% may occur by the end of the century with moderate greenhouse gas emissions; additionally, extreme 24-hour rainfall is projected to increase about 5–15%. Heavy rainfall can cause flooding and increase the likelihood of waterborne disease outbreaks. Heavy wind associated with storms can damage structures and vegetation, including impacts on agriculture.

Wind and extreme precipitation ranked second and third, respectively, among hazards personally affecting local stakeholders as reported in survey responses. This ranking suggests that storm-related hazards are among the most frequently experienced impacts in the community (see Appendix B).

Rainfall Intensity

More intense rainfall means more rain within a given timespan, which can overwhelm stormwater infrastructure and cause flash flooding. Table III-4 provides a measure of change in rainfall over a 24-hour period for various annual storm probability events compared to a historical period of 1981–2010 at the municipal level. A storm with a lower percent chance of occurring represents a greater intensity of rainfall (although it occurs less frequently). See Map III-4 in the Flood section below for current stormwater flooding locations reported by local stakeholders.

Table III-4. Rainfall (in inches) over 24-hours by annual storm probability

	Baseline 1981-2010	Moderate Emissions	
		Mid-century 2036-2065	Late-century 2070-2099
50% chance storm	3.32	3.55	3.69
20% chance storm	4.25	4.59	4.72
10% chance storm	5.04	5.44	5.64
4% chance storm	6.22	6.72	7.09
2% chance storm	7.24	7.96	8.32
1% chance storm	8.37	9.37	9.62

(Source: NJ Adapt Local Planning Navigator – Extreme Precipitation)

The baseline amount of rainfall in a 24-hour period in Rutherford ranges from 3.32 inches (50% chance storm) to 8.37 inches (1% chance storm) for the period between 1981–2010. Throughout the century, this may increase by approximately 0.37 inches (50% chance storm in the mid-century) to 1.25 inches (1% storm in the late-century).

Storm Frequency

More frequent rainfall means that a given storm will occur more frequently in the future than it has historically. Table III-5 provides a measure of change in the frequency of the 10% chance (10-year) and 1% chance (100-year) storms compared to a historical period[3] of 1950-2000 at the municipal level.

Table III-5. Increase in probability for the 10% and 1% chance storm

	Historical 1950-2000	Moderate emissions	
		Mid-century 2020-2069	Late-century 2050-2099
10% chance storm	5.04%	5.44%	5.64%
1% chance storm	8.37%	9.37%	9.62%

(Source: Northeast Regional Climate Center, unpublished data)

The frequency of extreme rainfall events in Rutherford is projected to increase throughout the century. The probability of the 10% chance (10-year) storm may increase to a 5.44% chance annually by the mid-century and an approximately 5.64% chance by the late-century. The probability of the 1% chance (100-year) storm may increase to a 9.37% chance annually by the mid-century and a 9.62% chance by the late-century.

Extreme Wind

Extreme wind can be a standalone hazard but often occurs as a secondary effect of other severe weather events, such as thunderstorms, tropical cyclones, tornadoes, and hailstorms. Wind hazards in Rutherford were assessed using historic data on the occurrence of wind events and tornadoes.[4,5] Since 1950, eight tornadoes ranging in magnitude from F0–F2[6] have been documented in Bergen County. Wind events have been recorded on 202 days in Bergen Couty, with only two events reported in Rutherford. These include events designated by NOAA as “High Wind” (speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration),

[3] National Weather Service, National Oceanic and Atmospheric Administration. 2025. Precipitation Frequency Data Server. Atlas 14 precipitation frequency estimates.
[4] Rutgers New Jersey Agricultural Experiment Station. 2025. Tornadoes in New Jersey: 1950 to Present.
[5] NOAA National Centers for Environmental Information (NCEI). 2025. Storm Events Database.
[6] NOAA National Weather Service. 2025. The Fujita Scale.

"Strong Wind" (gusts between 39 to 57 mph), and "Thunderstorm Wind" (speeds equal to or greater than 40 mph in association with a thunderstorm).

Wind ranked second among hazards personally affecting local stakeholders. Residents reported widespread wind damage, with common impacts including downed trees, damage to fences and roofs, and repeated power outages (see Appendix B).

C. Drought

The NJCCRC's *State of the Climate: New Jersey 2024* reports that New Jersey is projected to receive more of its rainfall from extreme precipitation events, with longer and drier periods between these events, resulting in more short-term drought conditions. Drought can have impacts across many sectors including public health, water supply management, agriculture, and the environment. Drought also increases the risk of wildfire (see Section III.E), especially in combination with high temperatures (Section III.A).[7]

Time in Drought

Table III-6 provides a measure of change in the percent time spent in drought conditions annually for Bergen County, compared to a historical period from 1981 to 2014. Droughts occur when evapotranspiration exceeds rainfall over a period that is considered abnormal for the region. Severe drought is when this imbalance becomes even more extreme due to heat or long periods without rainfall. These projections were developed based on modeled changes in precipitation and temperature, and do not account for variables such as soil moisture or reservoir levels.

Table III-6. Annual* percent time in drought in Bergen County

	Historical 1981-2014	Moderate emissions	
		Mid-century 2041-2070	Late-century 2071-2100
Drought	15.3%	+0.3%	+3.2%
Severe Drought	0%	+2.4%	+3.9%

(Source: Forthcoming dataset by Shope. J. Nikolopoulos, E., and Araujo DSD[8])
**In the northern hemisphere, the hydrological "water year" is the 12-month period from October to September.*

Historically, drought conditions have affected Bergen County approximately 15% (1–2 months) of the year. Time spent in drought annually may increase by 0.3% by mid-century and by 3.2% by late-century. Bergen County has not historically experienced severe drought conditions, but future severe droughts may occur 2.4% of the year by mid-century and 3.9% of the year by late-century.

[7] NJ Office of Emergency Management. 2024. 2024 New Jersey State Hazard Mitigation Plan.
[8] Shope, J., Nikolopoulos, E., and Araujo, D.S.D. 2025. DRAFT New Jersey Projected Future Drought Dataset Technical Documentation.

D. Flood

Flooding damages property and infrastructure, disrupts services, and impacts health. Flooding ranked first in local stakeholder concern, as reported in survey responses, underscoring it as the community's top priority hazard (see Appendix B). Flooding in tidally influenced areas is driven by three factors:

- Tidal flooding, caused by twice-daily high-tides (also known as “sunny day” or “nuisance” flooding);
- Storm events, bringing heavy precipitation and/or storm surge; and
- Sea-level rise, increasing the overall height of tidally influenced waterbodies which, in turn, increases the frequency and intensity of tidal and storm flooding.

Rutherford is subject to both coastal flooding and fluvial flooding (when intense rain events cause rivers and streams to overtop their banks). Although this analysis assesses coastal and fluvial flooding as separate risks in Rutherford, it is important to note that the compound effects of these flooding types can be especially hazardous. Further modeling beyond the scope of this analysis is needed to assess the compound impacts.

This assessment identifies current and future flood risks in Rutherford based on the measures listed in Table III-7.

Table III-7. Measures of current and future flood risk

Current flood risk measures	Future flood risk measures
• FEMA flood zones ○ Stormwater and flash flooding ○ High tide flooding ○ Current storm scenario (100-year storm)	• NJDEP Protecting Against Climate Threats (PACT) initiative • Sea-level rise (SLR) - 2050 and 2100 • Future storm scenario (100-year storm in 2050)

Maps for each of these flood measures are included in this section. Section V includes a simplified set of measures to allow map visualization of a range of potential flood extents that approximately correspond with current and future flood scenarios. Table III-8 lists the simplified list of flood measures included in Section V.

Table III-8. Flood measures and approximate corresponding flood scenarios*

Flood Measure	Approximate corresponding scenario(s)**
2 feet coastal inundation	• Current high tide flooding • 2050 sea-level rise permanent inundation
6 feet coastal inundation	• Current 100-year storm coastal flood
FEMA 1% Annual Chance flood zone	• FEMA 1% Annual Chance flood zone
NJDEP Climate Adjusted Flood Elevation (CAFE)	• FEMA 0.2% Annual Chance flood zone in some areas • 2050 100-year storm coastal flood in some areas

**Each flood measure/scenario is defined in its applicable section below.*
***Scenarios approximately correspond with each flood measure in some, but not all, areas.*

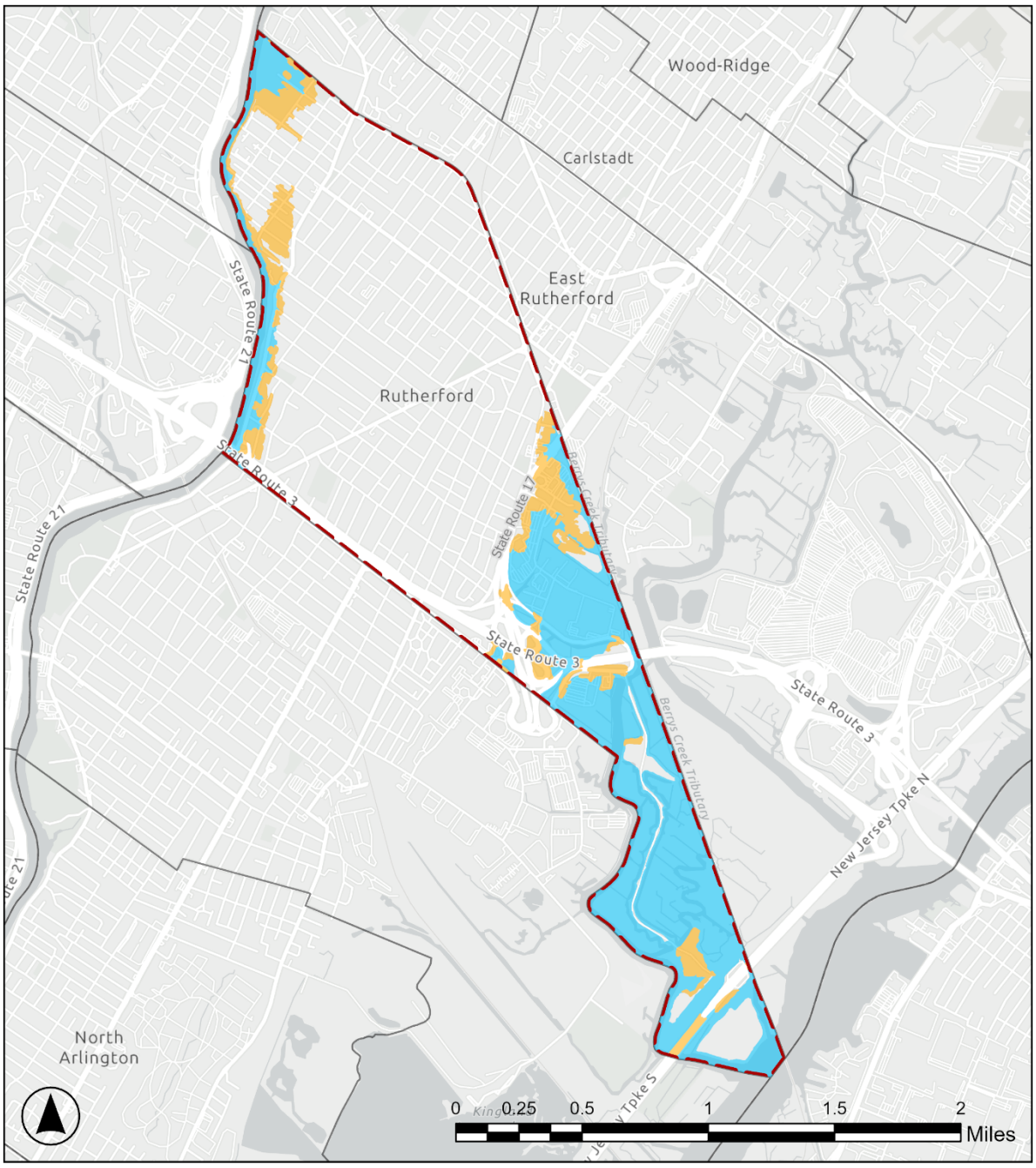
Current Flood Risks

FEMA Flood Zones

The Federal Emergency Management Agency (FEMA) models flood hazards for much of the state. The 1% annual (100-year) flood, also known as the base flood, has a 1% chance of being equaled or exceeded in any given year. The 0.2% annual (500-year) flood has a 0.2% chance of being equaled or exceeded in any given year. The regulatory floodway is a portion of the floodplain that, according to state and federal regulations, must remain unobstructed to safely convey floodwaters; it is an area where development is highly restricted.

Map III-3 depicts the FEMA flood zones in Rutherford. The area south of Route 17 is within the FEMA 1% annual chance flood zone and is primarily characterized by wetlands. A small section of the Borough near the Passaic River in the north is within FEMA 0.2% annual chance flood zone.

Map III-3. FEMA flood zones



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FEMA Flood Zones

- FEMA 1pct Annual Chance Flood Zone
- FEMA 0.2pct Annual Chance Flood Zone

(Sources: FEMA and NJ Climate Change Resource Center)

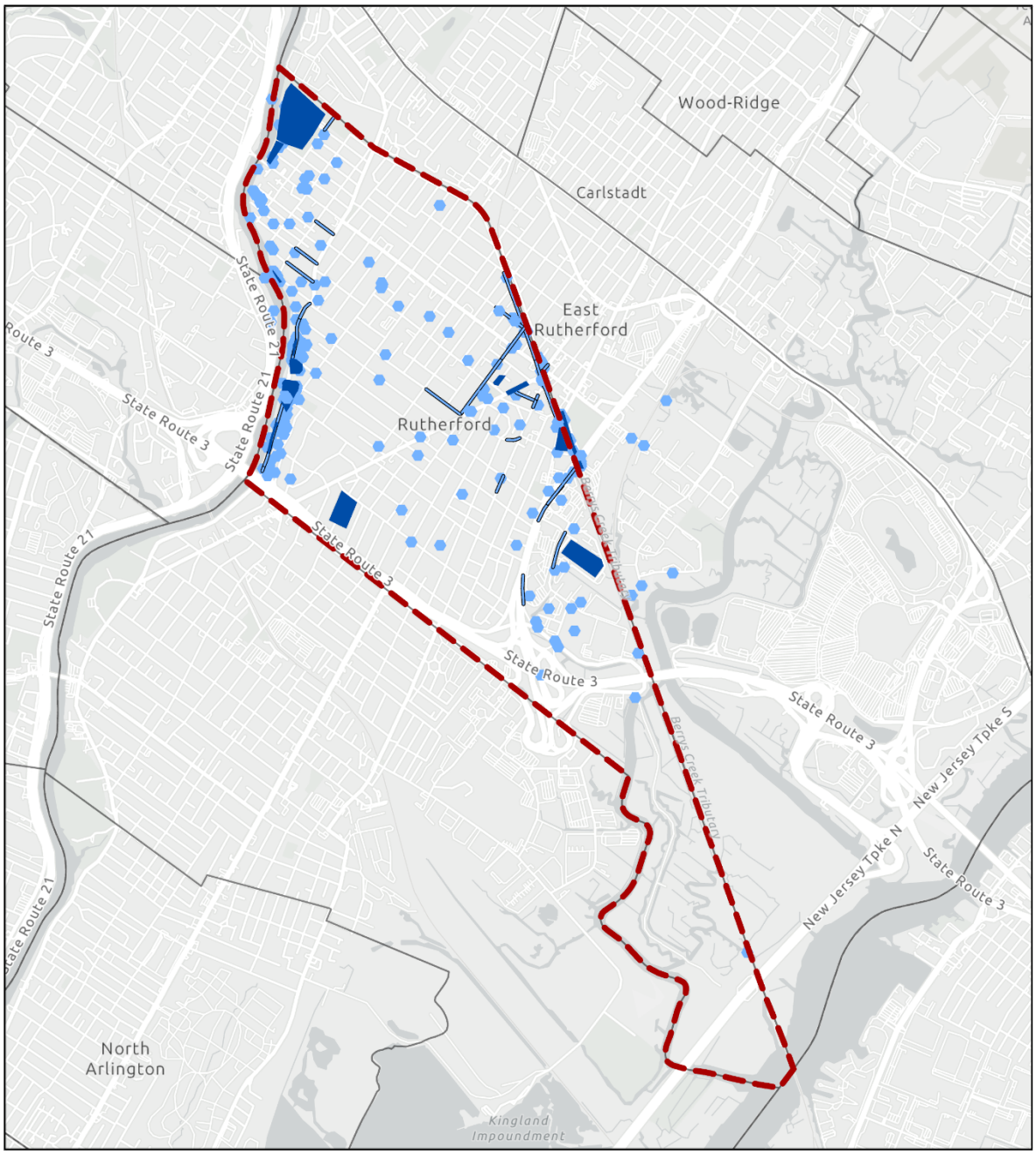
Stormwater and Flash Flooding

Flooding can occur during flash flood events when stormwater infrastructure is overwhelmed by extreme precipitation. Map III-4 depicts the current observed locations of flooding during precipitation events that were identified by community stakeholders through the public engagement process that included an in-person meeting and a public survey (see Appendix B).

Stormwater flood location points identified by stakeholders are scattered across the northern portion of the municipality, with a notable cluster along the waterfront and interior street network. These discrete locations reflect community-reported areas where localized drainage failures, ponding, or surface runoff have been observed. As Routes 3 and 17 serve as the primary evacuation routes for the region (Maps V-2 and V-3), flooding along this corridor can cause serious disruption to emergency egress and the safe evacuation of residents during storm events.

Road sections impacted by stormwater flooding are distributed along several corridors in the northern and central parts of the municipality, including Riverside Ave, Insley Ave, Carneer Ave, Chestnut Street, and sections of Route 17. These road segments indicate recurring or potential disruptions to local transportation networks during storm events, potentially affecting emergency access and daily mobility for residents. Large contiguous areas impacted by stormwater flooding are concentrated predominantly in the open spaces of the municipality, including Rutherford Memorial Park and Tamblyn Field. These areas are likely associated with insufficient drainage infrastructure and low-gradient terrain, making them particularly vulnerable to prolonged inundation following significant precipitation events.

Map III-4. Stormwater and/or flash flooding locations



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- Stormwater flooding points identified by stakeholders
- Road sections impacted by stormwater flooding identified by stakeholders
- Areas impacted by stormwater flooding identified by stakeholders

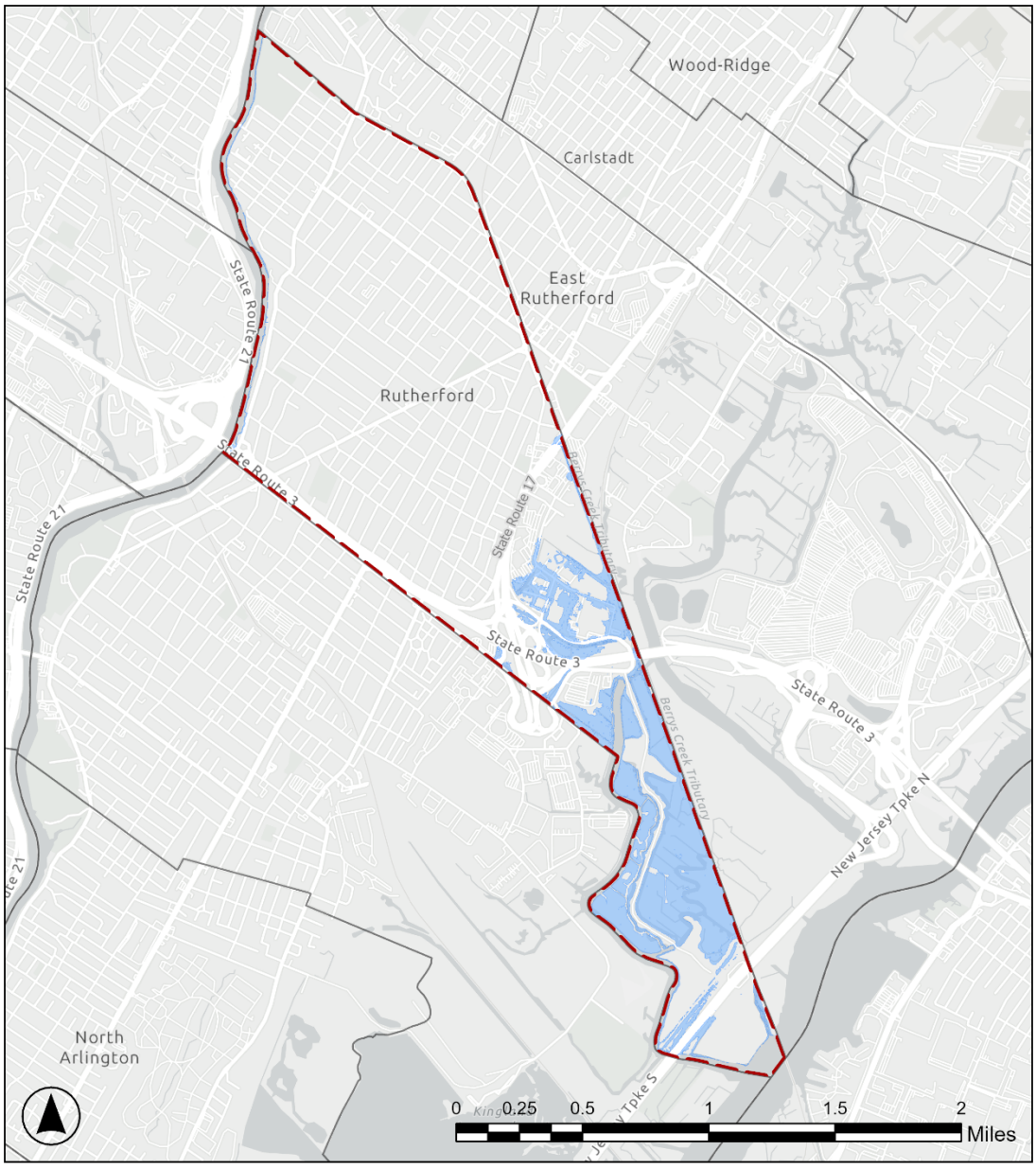
High Tide Flooding

High tide flooding is caused by twice-daily high tides. Although high tide flooding is typically minor, it can disrupt community life and essential services if roadways become impassable. High tide flooding is occurring more frequently as sea level rises.

Areas in Rutherford currently subject to high tide flooding are shown in Map III-5. The map depicts the extent of potential inundation at the National Oceanic and Atmospheric Administration's (NOAA) "minor" coastal flood threshold. Minor tidal flooding typically begins around 1.5–2 feet above the average high tide and is more disruptive than damaging.[9] The area south of Route 17, which is part of the Meadowlands, is subject to tidal flooding. These locations were confirmed by local stakeholders including municipal staff, residents, and community groups during the public engagement meeting (see Appendix B).

[9] Sweet, W. V., Dusek, G., Obeysekera, J., Marra, J. J. National Oceanic and Atmospheric Administration. 2018. Patterns and Projections of High Tide Flooding Along the U.S. Coastline Using a Common Impact Threshold.

Map III-5. High tide flooding locations



LEGEND

High Tide Flooding

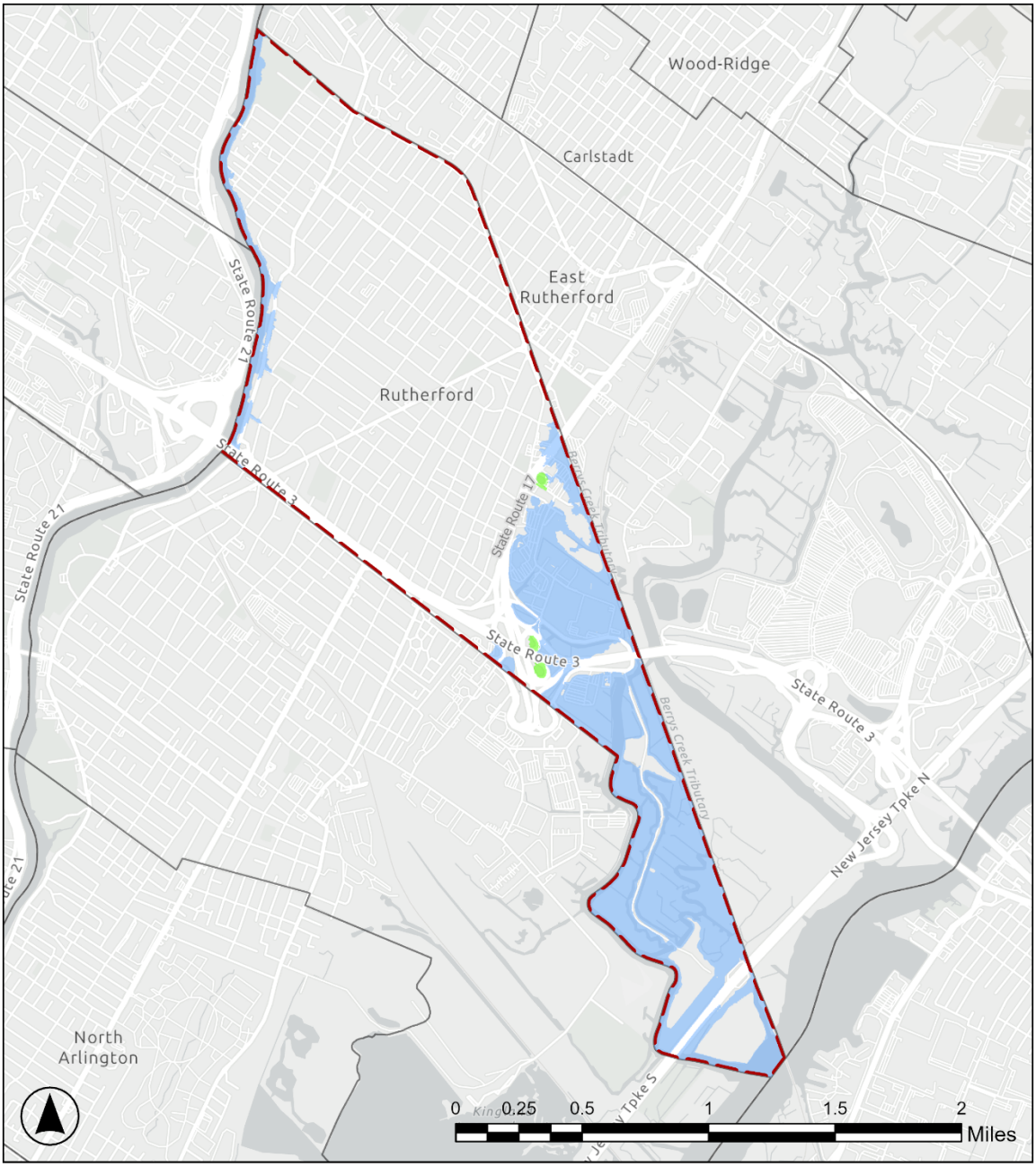
(Source: NOAA Sea-level rise Viewer)

100-Year Storm

The 100-year storm represents the coastal flood event that has a 1% chance of occurring annually according to modeling by NOAA. In Rutherford, today's 100-year storm event is anticipated to cause approximately six feet of coastal inundation. This coastal inundation level may also be described as feet above Mean Higher High Water (MHHW), a tidal datum representing the average height of the highest tide each day over a 19-year period. Map III-6 depicts areas in Rutherford that may be flooded during a 100-year storm event based on coastal storm flooding. It does not incorporate flooding due to rainfall, which may cause compounding impacts. The green "low-lying" areas on the map are below the elevation of the flood extent, and, therefore, have the potential to flood, but are hydrologically disconnected from the rest of the flooded area.

As shown on the map, a 100-year storm event in Rutherford affects a band of land along the Passaic River in the northern part of the Borough. Flooding primarily occurs in the southern portion of Rutherford, which consists largely of wetlands. The industrial and commercial area between Route 17 and Route 3 is also impacted by potential flooding during these events.

Map III-6. Potential inundation from 100-year storm



LEGEND

100 Year Storm (Current Risk without SLR)

6ft Coastal Inundation Extent

6ft Coastal Inundation Extent, Low-lying Areas

(Source: NJ Climate Change Resource Center)

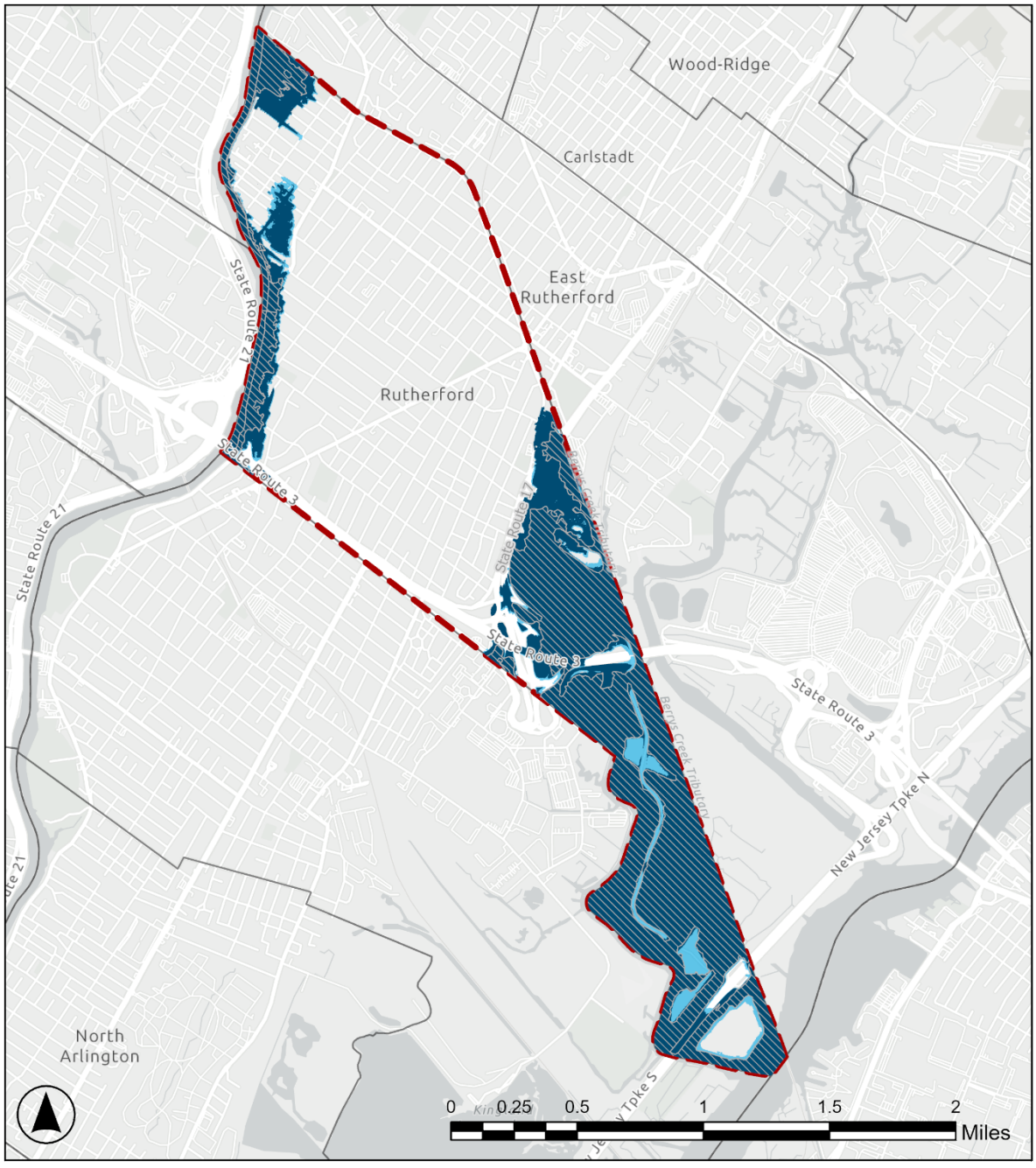
Future Flood Risks

NJDEP Protecting Against Climate Threats (PACT) Initiative

In 2020, NJDEP began a regulatory reform effort called Protecting Against Climate Threats (PACT) to make the state's natural and built environments more resilient to the impacts of climate change. Under this initiative, NJDEP passed two new rules to regulate development and redevelopment in areas of current and future flood risk in both fluvial and tidal areas. Adopted in July 2023, the Inland Flood Protection Rule established a new Design Flood Elevation (DFE) for specific types of new construction and redevelopment in inland/fluvial areas at risk of flooding. The new DFE is three feet above the elevation of the FEMA 1% Annual Chance Flood or, where NJDEP flood mapping is available, two feet above NJDEP's flood hazard area DFE if that is higher. Adopted in January 2026, the Resilient Environments and Landscapes (REAL) coastal flood rule adjusts Coastal Flood Hazard Areas to account for rising sea-level by establishing a new Climate-Adjusted Flood Elevation (CAFE) equal to the FEMA 1% Annual Chance Flood's Base Flood Elevation plus four feet to account for projected sea-level rise by 2100. On June 1, 2026, the NJDEP paused the implementation of the REAL rules by one year to consider additional public comment. Most coastal municipalities have both tidal areas subject to CAFE and fluvial areas subject to the Inland Flood Protection Rule.

Map III-7 depicts areas in Rutherford that may be subject to each of the NJDEP rules. It should be noted that the map is for planning purposes only, and a site-specific survey is needed for flood impact analyses, permitting, or other legal or regulatory purposes. This information can support local efforts to safeguard community facilities, infrastructure, and assets.

Map III-7. Areas potentially subject to the NJDEP Protecting Against Climate Threats (PACT) initiatives



LEGEND

FEMA 1Pct Annual Chance Flood

Approx. extent of REAL Climate Adjusted Flood Elevation

Approx. extent of Inland Flood Protection Rule

(Source: NJ Climate Change Resource Center and NJDEP)

Sea-level rise

The NJCCRC's *State of the Climate: New Jersey 2024* reports that sea level has been increasing in NJ at a rate of 2.2 inches per decade since 1980 due to global sea-level rise and land subsidence. Global sea-level rise is caused primarily by the added water from melting land-based ice and the expansion of seawater as it warms. Land subsidence, or sinking, is caused primarily by "glacial isostatic adjustment" (the ongoing response of the earth's crust to the melting of the great ice sheets after the last ice age) and compaction of sediments due to natura processes and groundwater withdrawal.

Heightened sea levels present a greater likelihood of flooding during coastal storms or high tides and can salinate freshwater ecosystems, resulting in impacts to aquatic communities, fresh groundwater, and water quality.[10] Based on *New Jersey's Rising Seas and Changing Coastal Storms: Report of the 2025 Science and Technical Advisory Panel*, under an intermediate greenhouse gas emissions scenario (approximately consistent with current global policies) and excluding potential rapid ice sheet loss, sea level in New Jersey is projected to increase 0.9 to 1.7 feet by 2050 and 2.2 to 3.8 feet by 2100. Including potential rapid ice-sheet loss processes could extend these ranges to 1.9 feet by 2050 and 4.5 feet by 2100.[11]

For planning purposes, statewide guidance recommends relying on conservative estimates of two feet of sea-level rise by 2050 and four feet of sea-level rise by 2100. Map III-8 depicts the potential extent of this projected permanent inundation in Rutherford. Despite the gradual nature of sea-level rise, permanent inundation means that these areas may be impacted by each daily high tide by the end of the century.

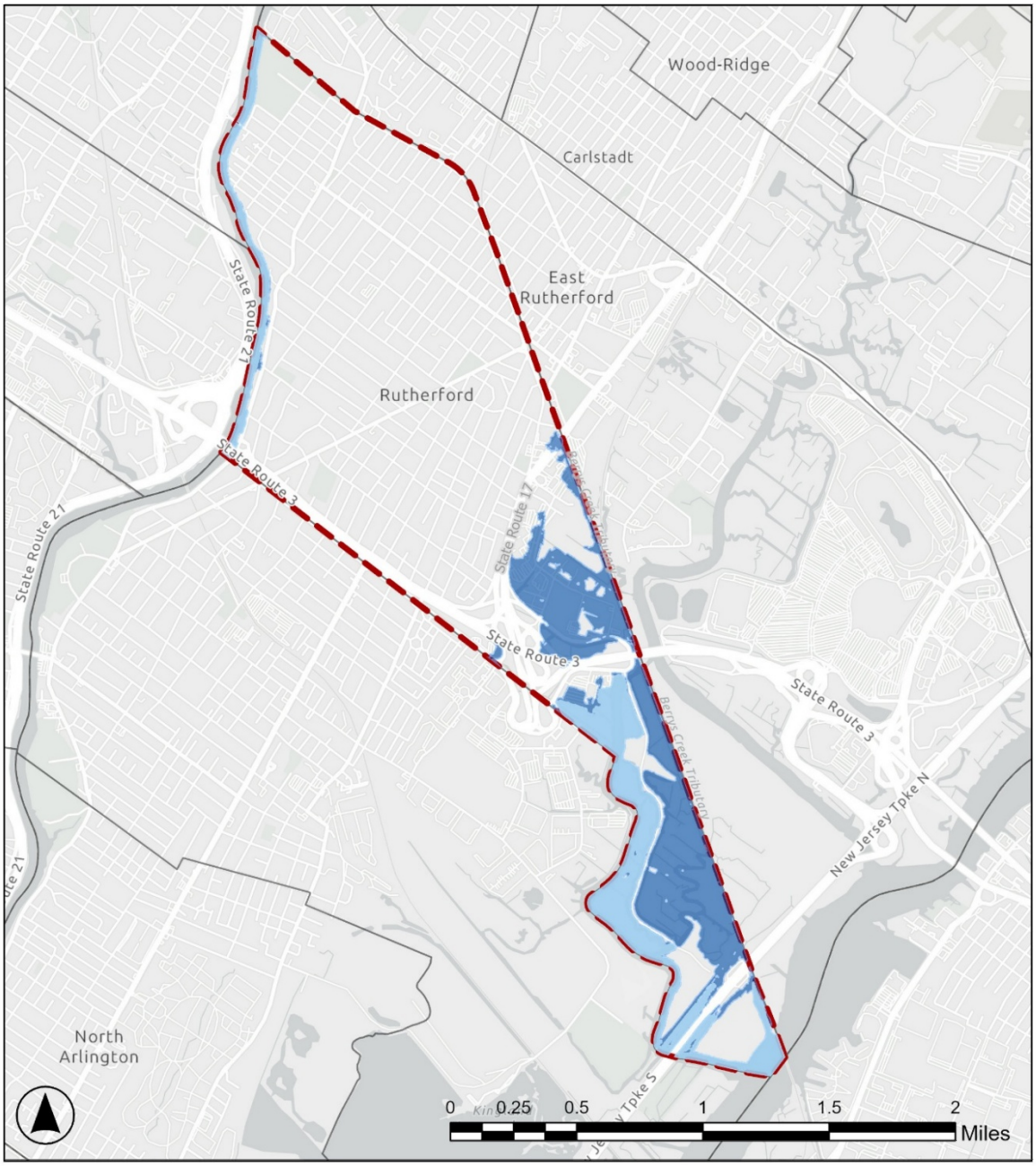
Under the 2050 scenario, with two feet of coastal inundation, some daily flooding may be experienced along the Passaic River in the north. More significant flooding is anticipated in the wetlands areas in the southern part of the Borough. Under the 2100 scenario, with four feet of coastal inundation, potential flooding follows a similar pattern, with additional impacts in the commercial/industrial areas between Route 17 and Route 3.

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[10] NJDEP. 2025. New Jersey Scientific Report on Climate Change. (Eds. B. Wiley, K. Raper, J. Bonventre, R. Hill, L.A. Lester, N.A. Procopio). Trenton, NJ. 275 pp

[11] Kopp, R. E., A. Broccoli, G. Carleton, S. Dangendorf, R. DeConto, R. Frederiks, A.J. Garner, E. GroverKopec, L. Haaf, B. Hamlington, N. Lin, J. Lorenzo-Trueba, J. Miller, D. Robinson, G. Vecchi, T. Wahl, J. Walker, J.M. Barr, J. Shope, D.K. Apoznanski, P. Kumar, L. Marxen, A. Spector, K. O'Neill, L. Auermuller, and M. Kaplan. New Jersey's Rising Seas and Changing Coastal Storms: Report of the 2025 Science and Technical Advisory Panel. Rutgers, The State University of New Jersey. Prepared for the New Jersey Department of Environmental Protection. Trenton, New Jersey.

Map III-8. Projected permanent inundation from future sea-level rise in 2050 and 2100



LEGEND

Inundation from 2050 SLR — 2ft Coastal Inundation Extent

Inundation from 2100 SLR — 4ft Coastal Inundation Extent

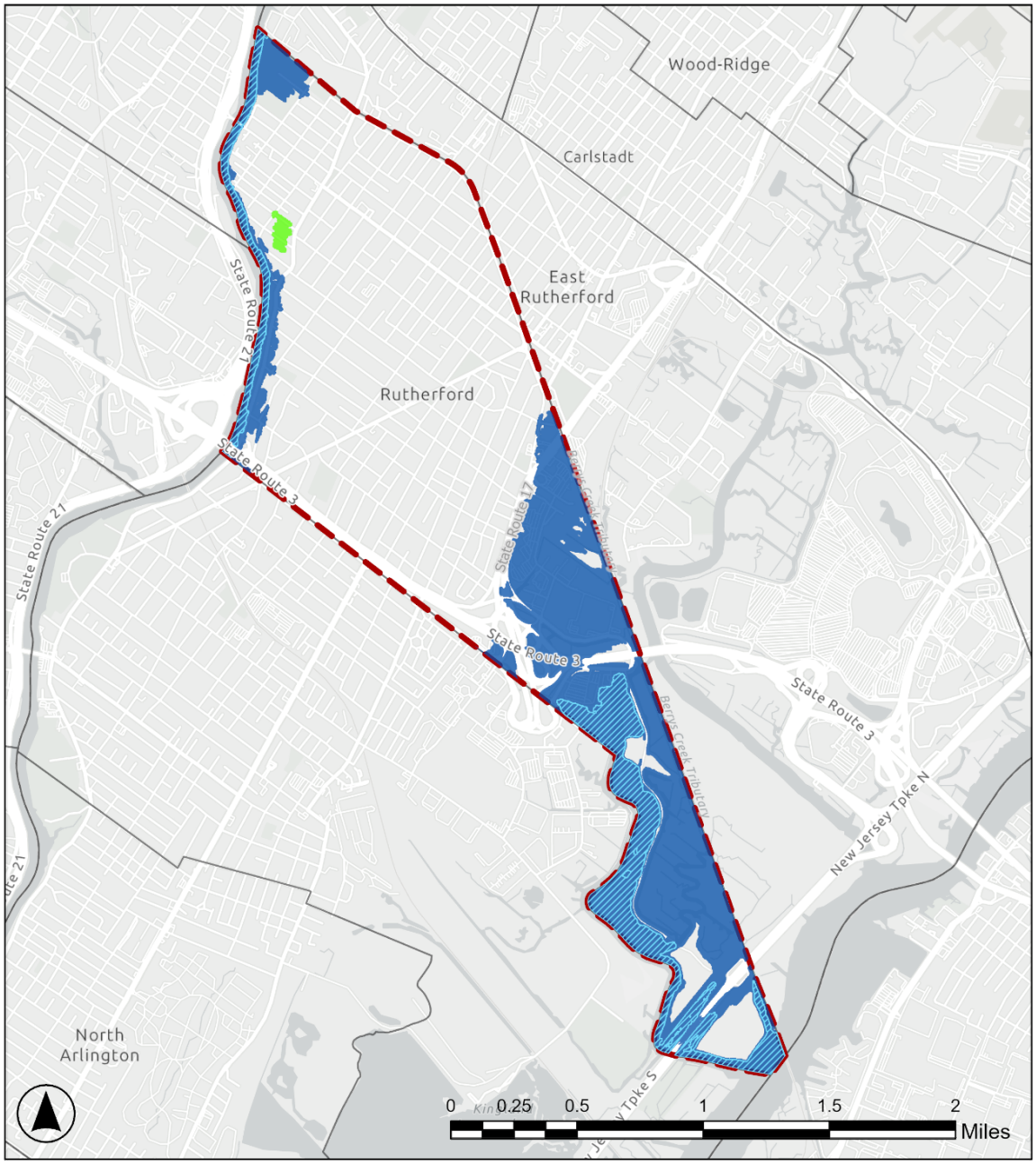
(Source: NJ Climate Change Resource Center)

2050 100-Year Storm

While sea-level rise inundation represents a permanent condition, additional analysis of the 100-year storm compounded with sea-level rise helps to understand a future temporary, extreme event. Map III-9 depicts the extent of potential inundation in Rutherford from a 100-year (1% chance) storm in 2050, including two feet of projected sea-level rise, resulting in approximately eight feet of coastal inundation. The flood extent does not incorporate flooding due to rainfall, which may cause compounding impacts. The green "low-lying" areas on the map are below the elevation of the flood extent, and, therefore, have the potential to flood but are hydrologically disconnected from the rest of the flooded area.

In 2050, projected inundation from a 100-year coastal storm event would cause flood impacts in the north along the Passaic River and south of Route 17, including potential impacts to the commercial/industrial area between Route 17 and Route 3.

Map III-9. Potential inundation from coastal flooding from 100-year storm in 2050



LEGEND

100 Year Storm in 2050

- 8ft Coastal Inundation Extent
- 8ft Coastal Inundation Extent, Low-Lying Areas

Inundation from 2050 SLR

- 2ft Coastal Inundation Extent

(Source: NJ Climate Change Resource Center)

E. Wildfire

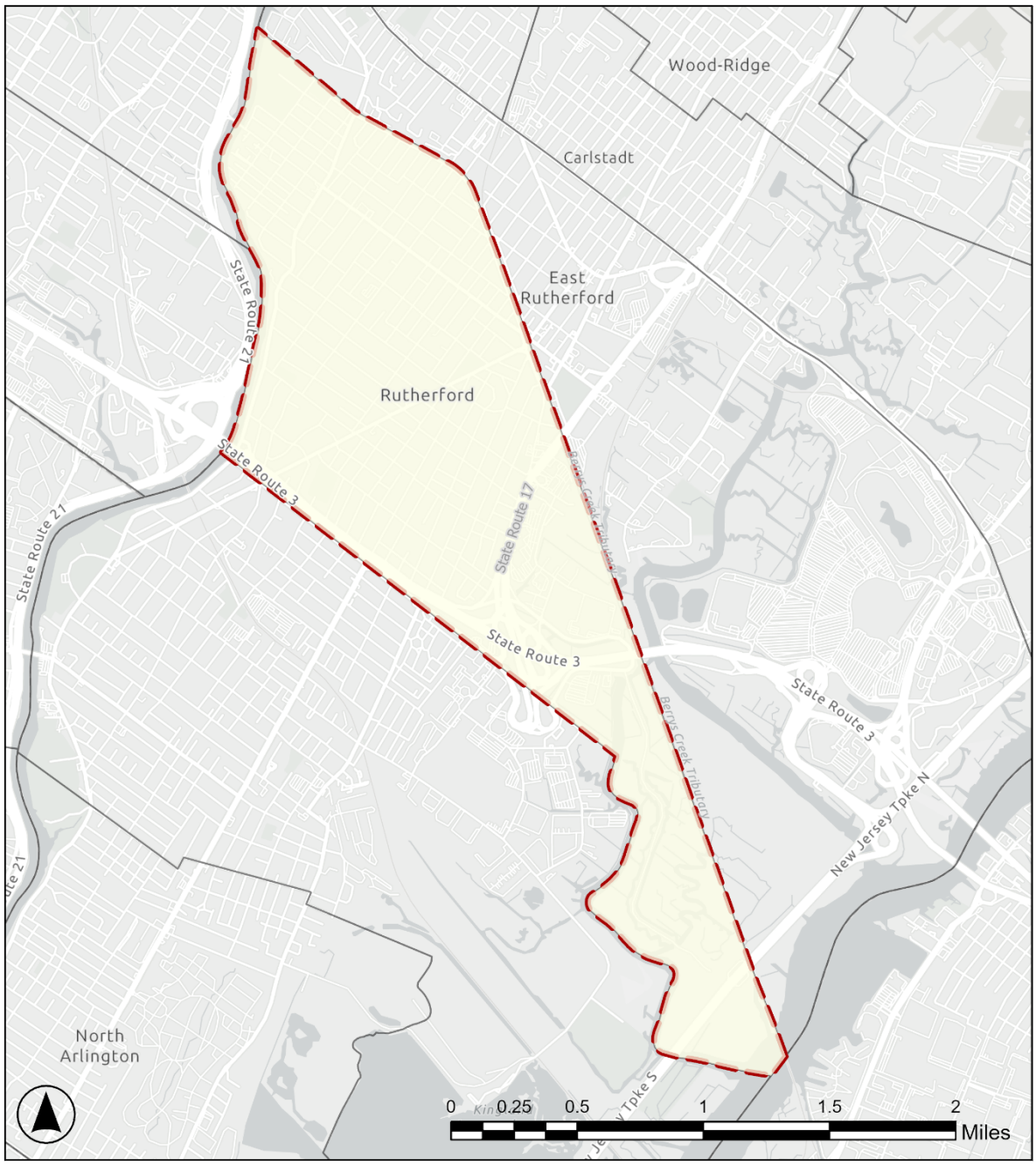
Wildfires are unplanned fires in natural areas including forests or grasslands. The NJCCRC's *State of the Climate: New Jersey 2024* reports that 798 wildfires burned 4,847 acres in New Jersey during the exceptionally dry 2024 fall season. Increasing temperatures are anticipated to cause greater evaporation and drier vegetation, exacerbating conditions contributing to wildfires. Wildfire smoke contains air pollutants that decrease air quality and pose risks to human health.

Wildfire hazards in Rutherford were assessed using historic wildfire data from the National Interagency Fire Center (NIFC)[12] and NOAA[13] and data on risk to potential structures from the NJ Wildfire Risk Assessment Portal.[14] The risk to potential structures dataset integrates modeled wildfire likelihood and intensity with generalized consequences to a structure on every pixel, allowing comparison of wildfire risk in locations with existing or future development.

Map III-10 depicts wildfire risk to potential structures in Rutherford. Wildfire does not pose a significant risk to the Borough or adjacent municipalities. All areas of the municipality are classified as low risk to potential structures. Local stakeholders rank wildfire as having the lowest frequency of personal impact, consistent with its occasional and localized nature in the Borough (Appendix B). As such, wildfire is not included for further analysis in Section V – Exposure and Vulnerability Assessment.

[12] National Interagency Fire Center. 2025. NIFC Open Data Site.
[13] National Centers for Environmental Information, National Oceanic and Atmospheric Administration. 2025. Storm Events Database.
[14] NJ Forest Fire Service. 2025. New Jersey Wildfire Risk Assessment Portal.

Map III-10. Wildfire risk to potential structures and select historic wildfires



LEGEND

Risk to Potential Structures

Low High

(Source: NJ Wildfire Risk Explorer and National Interagency Fire Center)

IV. Buildout Analysis

This section addresses the MLUL requirement that the CCRHVA include a "build out analysis of future residential, commercial, industrial, and other development in the municipality, and an assessment of the threats and vulnerabilities identified above related to that development." Certain areas within a municipality are not fit for development, including wetlands, water bodies, and buffers around protected lands or species. This section identifies and analyzes the developable areas within the municipality with respect to the current zoning designations and exposure to current and future climate hazards. This analysis is a high-level planning exercise and should not be substituted for site-specific determinations of developability, which require field survey and professional engineering evaluation. This analysis differs from other applications of buildout analyses, such as those used in determining a municipality's realistic development potential to comply with affordable housing obligations.

The methodology used in this section includes the following steps:

- Identifying the developable areas within Rutherford by determining and removing all areas that are protected from development;
- Analyzing these areas with the current zoning districts and any areas identified by the municipality for redevelopment, then calculating the total potential development for these areas;
- Analyzing the exposure of developable areas to heat and flooding. Rutherford experiences high land surface temperatures within the borough and flooding mostly in the southern section. This analysis details varying levels of exposure for potential lots and units; and
- Finally, identifying the developable areas and potential development least exposed to flooding.

A. Areas Protected from Development

Areas protected from development were identified based on two broad categories, detailed in Table IV-1 and represented in Map IV-1:

- Non-developable areas include already developed lands (based on land use categories), water features, or wetlands.
- Constrained areas are those with development limitations due to environmental sensitivities.

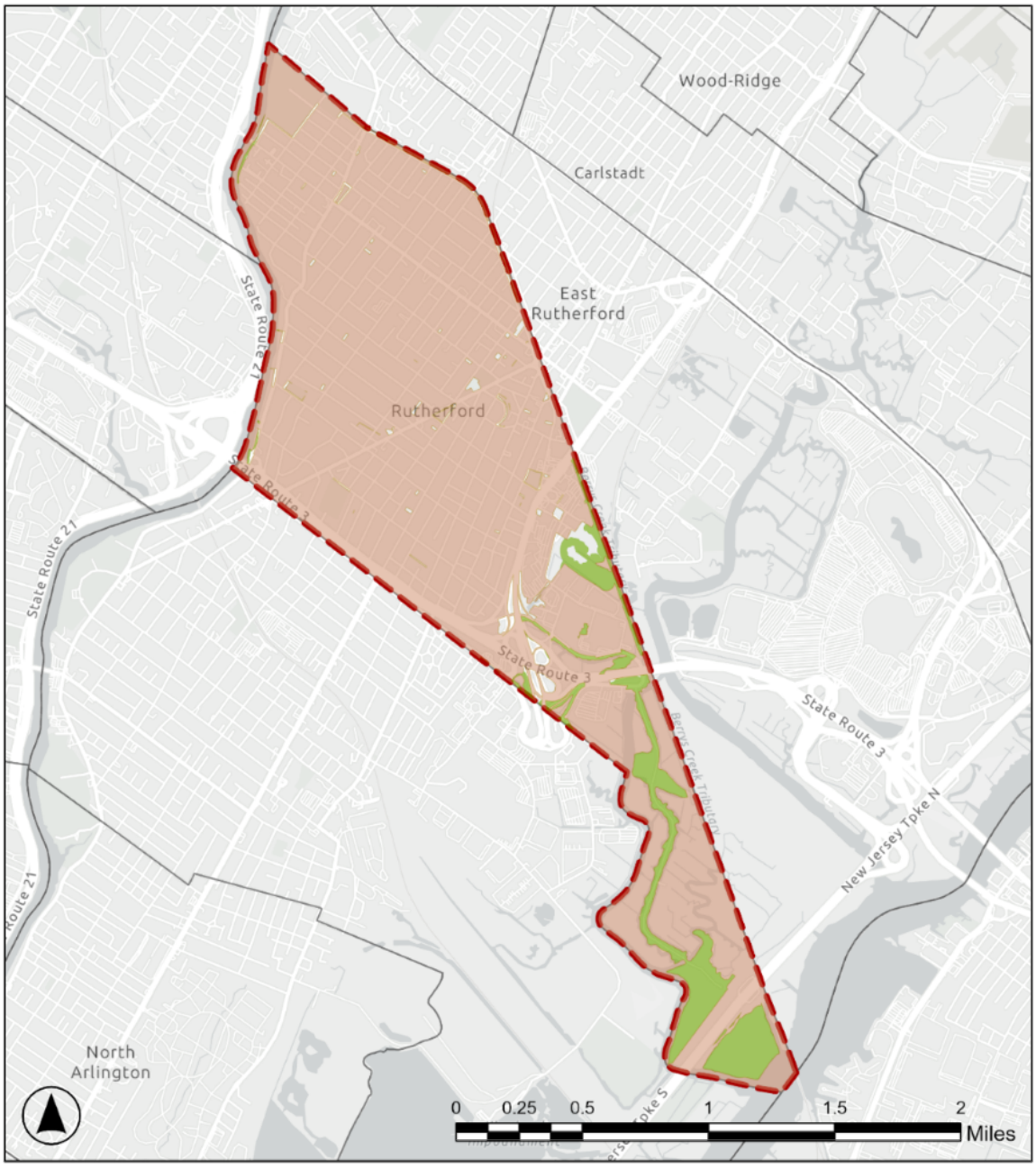
Table IV-1. Areas protected from development

Areas Protected from Development	Land Types	Datasets
Non-Developable Areas	Water, wetlands, transportation, barren land with extractive mining*, non-vacant urban land, publicly owned recreational lands, and open space/conserved land	• 2020 Land Use Land Cover Dataset • 2023 Parcel MOD-IV Composite • Protected Areas Database (PAD-US 4.1) • State, Local and Nonprofit Open Space of New Jersey • Preserved Farmland of New Jersey
Constrained Areas	• Riparian buffers for inland and coastal waters • Threatened and endangered species habitat • Regional Commissions, where applicable (Pinelands Management area, Highlands Preservation area, Hackensack Meadowlands District)	• Landscape Project v3.4 • Category One (C1) Waters of New Jersey • Preservation and Planning Area • Open Water Protection Area

Note: All land type categories and associated datasets identified in this table should be reviewed on a case-by-case basis to verify the nature, extent, and permanence of development restrictions.

** Barren land with extractive mining was included as a non-developable area due to the highly disruptive nature of these practices to the landscape. It is possible that future conditions after remediation of such sites may revert them to developable land and should be evaluated on a case-by-case basis.*

Map IV-1. Areas protected from development



LEGEND

Not Developable

Constrained

B. Developable Areas

Developable areas were broadly identified through GIS-based mapping analysis to exclude the non-developable and constrained areas. The remaining developable areas consist primarily of undeveloped lands that are not subject to regulatory or environmental development restrictions. To further refine the developable areas, Rutherford's zoning ordinance was analyzed.

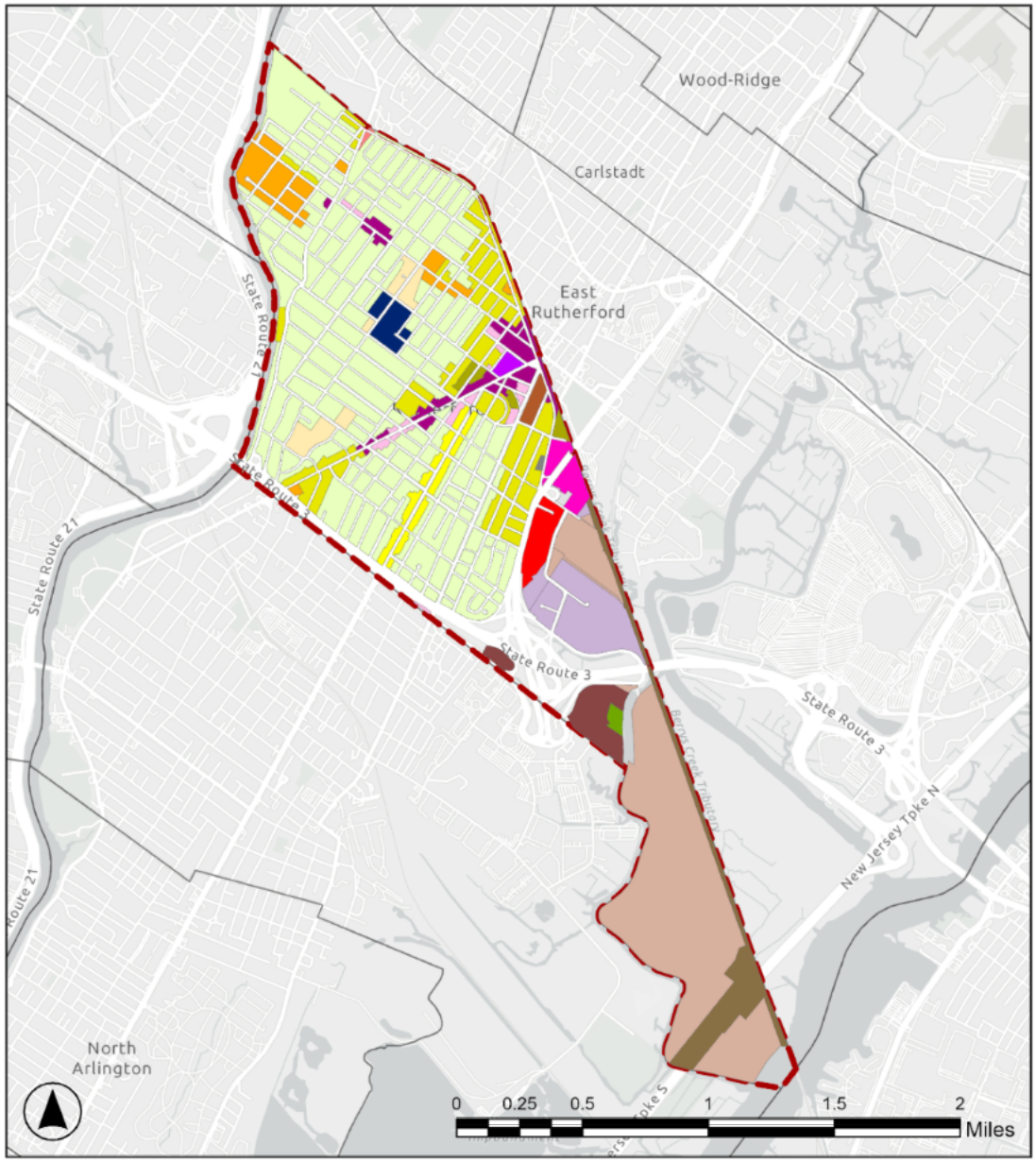
Zoning Analysis

Situated between the Passaic and Hackensack Rivers, Rutherford is a suburban borough consisting mainly of residential neighborhoods and a commercial downtown. Map IV-2 presents the zoning districts within the borough. Because the southern section of the borough lies within the New Jersey Meadowlands District, a regional planning area, zoning in that section must comply with the regulations of the regional governing authority. Zoning districts ending in RU (Rutherford) fall under municipal jurisdiction, whereas those ending in NJMC (New Jersey Meadowlands Commission) fall under regional jurisdiction. The New Jersey Meadowlands Commission merged into the New Jersey Sports and Exposition Authority (NJSEA) in 2015; because the NJMC designation continues to appear on Rutherford's zoning map, the designation is used as part of these analyses as well. The NJMC zoning districts include Redevelopment Area (RA); Commercial Park (CP); Environmental Conservation (EC); Light Industrial (LI); Roads, Rail, and Right-of-Way (RRR); and Transportation Center (TC).

Decision-making authority within Rutherford's zoning framework varies depending on whether a district falls within or outside the Meadowlands District boundary. The regional commission retains primary jurisdiction over zoning and development decisions within Rutherford's portion of the District, and the borough's role in this area is limited to advisory input and coordination with the regional planning process.

Table IV-2 lists key developmental controls and minimum lot sizes permitted in each zoning district. Six residential zoning districts cover most of the borough and permit single-family homes, two-family homes, garden apartments, and multifamily dwellings. Four business zoning districts, which permit offices, banks, and financial institutions, are located primarily along Park Avenue, with a smaller section along Union Avenue near Sunset Park. The corridor along the southern side of Route 17 falls under municipal zoning, and permitted uses include restaurants, hotels, offices, research facilities, and distribution centers. The University/Residential 1A (UR1-A) zoning district encompasses Felician University and permits university and single-family residential uses.

Map IV-2. Zoning



LEGEND

Zoning Districts

- R1-RU
- R1A-RU
- R1B-RU
- R2-RU
- R3-RU
- R4-RU
- B1-RU
- B2-RU
- B3-RU
- B3/SH-RU
- HC-LI-RU
- HC-RU
- ORD-RU
- PCD-RU
- NC-RU
- UR1A-RU
- RA - NJMC
- CP - NJMC
- EC - NJMC
- LIA - NJMC
- RRR - NJMC

Table IV-2. Rutherford zoning ordinance

Zone	Description	Permitted Uses	Notable Restrictions/ Exclusions	Min Lot Size
R-1	Residential 1 (Single-Family)	Single-family detached dwellings	No multifamily or commercial uses	5,000 sq ft
R-1A	Residential 1A (Single-Family)	Single-family detached dwellings	No multifamily or commercial uses	7,500 sq ft
R-1B	Residential 1B (Single-Family)	Single-family detached dwellings	No multifamily or commercial uses	6,500 sq ft
R-2	Residential 2 (Two-Family)	Single-family and two-family dwellings	No commercial uses	5,000 sq ft
R-3	Residential 3 (Three-Story Apartments)	Single-family, two-family, garden apartments, multifamily	Buffer required near R-1/R-2; site plan approval	25,000 sq ft (garden apt) / 10,000 sq ft (townhouse)
R-4	Residential 4 (Five-Story Apartments)	Multifamily dwellings	Buffer required near lower-density zones	30,000 sq ft
B-1	Business 1 (Three-Story Office)	Offices, banks, financial institutions	Some uses conditional	10,000 sq ft
B-2	Business 2 (Five-Story Office)	Restaurants (125+ seats), hotels	Large-lot requirements	30,000 sq ft (restaurant) / 85,000 sq ft (hotel)
B-3	Business 3 (Three-Story Office-Retail)	Office and retail uses	Two bulk categories depending on use	5,000 sq ft (business) / 30,000 sq ft (other)
B-3/SH	Business 3/Senior Housing	Senior housing	Separate bulk line	16,000 sq ft
HC	Highway Commercial Zone	Highway commercial uses	Large-lot, auto-oriented uses	85,000 sq ft
HC-LI	Highway Commercial Light Industrial Zone	Highway commercial uses	Large-lot, auto-oriented uses	85,000 sq ft

Continued on next page

ORD	ORD (Ten-Story Office, Research and Distribution)	Office, research, distribution	Large employment district	85,000 sq ft
PCD	Planned Commercial Zone	Office and retail uses	Two bulk categories depending on use	5,000 sq ft (business) / 30,000 sq ft (other)
PMU	Planned Mixed Use Overlay Zone	Office and retail uses	Overlay zone	5,000 sq ft (business) / 30,000 sq ft (other)
NC	Neighborhood Commercial	Neighborhood commercial	Some uses conditional	10,000 sq ft
TO	Townhouse Overlay Zone	Townhouse overlay	Uses R-3 townhouse standards	10,000 sq ft
U-R1A	University/Residential 1A (Single-Family)	University + single-family	No multifamily or commercial uses	7,500 sq ft

(Source: Borough of Rutherford, NJ, Code, Chapter 131 Zoning)

Buildout Analysis

After broadly identifying the developable areas, the GIS-based zoning analysis resolved spatial discrepancies. Large parcels spanning multiple zoning districts were split by the district to ensure compliance with its zoning regulations. Irregular parcels that did not conform to the minimum lot size requirements of the applicable zoning designation were thoroughly reviewed before removing them from the analysis. Minimum lot sizes for each zoning district were used to determine how many potential lots could be developed within Rutherford.

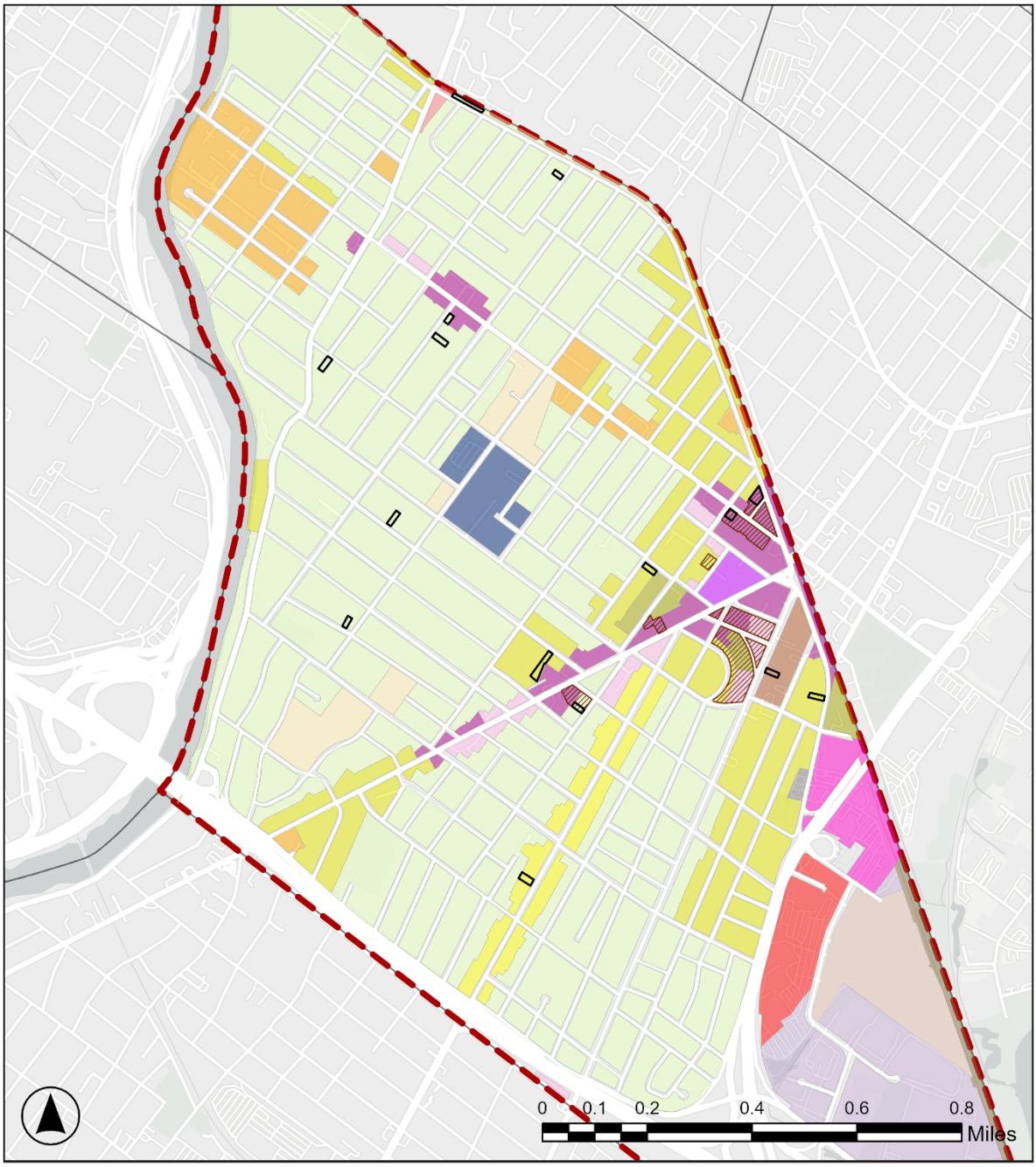
Map IV-3 illustrates the developable areas resulting from this analysis along with the zoning districts of Rutherford. The areas vary in shape and size and may not be individual tax parcels. There are 15 developable areas highlighted with a black outline spread across the borough. Along with developable areas, the areas in need of redevelopment identified by Rutherford are also shown on this map which are primarily along Park Avenue within the Business 3 (Three-Story Office-Retail) zoning district.

Table IV-3 shows the total available areas for development along with their development potential, calculated by applying an 80% gross-to-net conversion factor[15] to account for roads, stormwater

[15] Lathrop, R.G., and Myers, J. 2023. Buildout analysis for the Southern Barnegat Bay Watershed. Center for Remote Sensing and Spatial Analysis, Rutgers University.

infrastructure, and utility easements. After calculating the net area, the minimum lot size requirement was used to determine the number of potential lots. As the permitted use within the R1 and R1B residential zone in Rutherford is single-family housing, the number of lots is equivalent to the number of potential units for development. As such, they are labeled “lots” in the subsequent tables. Table IV-3 identifies 15 developable areas across five municipal zoning districts, with a combined gross developable area of 133,490 square feet and a net developable area of 106,792 square feet, yielding a potential of 21 additional lots. The R1 residential district accounts for the largest share of this capacity, with eight developable areas and a potential of 10 new lots. The R2 residential and B3 business districts follow, offering three and two developable areas, respectively, with potential yields of five and three lots. The R1B residential and PCD districts each contain a single developable area, contributing one potential lot for each.

Map IV-3. Developable areas and zoning districts in Rutherford



LEGEND

Developable Areas

Developable Areas

Areas in need of Redevelopment

Zoning Districts

R1-RU
R1A-RU
R1B-RU
R2-RU
R3-RU
R4-RU
B1-RU
B2-RU
B3-RU
B3/SH-RU
HC-LI-RU
HC-RU
ORD-RU
PCD-RU
NC-RU
UR1A-RU
RA - NJMC
CP - NJMC
EC - NJMC
LIA - NJMC
RRR - NJMC

Table IV-3. Developable areas and development potential

Zoning District	Description	Number of Developable Areas	Gross Developable Area (Sq. Ft.)	Net Developable Area (Sq. Ft.)	Minimum Lot Size (Sq. Ft.)	Potential Number of Lots
R1	Residential 1 (Single-Family)	8	61,421	49,137	5,000	10
R1B	Residential 1B (Single-Family)	1	9,890	7,912	6,500	1
R2	Residential 2 (Two-Family)	3	33,559	26,847	5,000	5
B3	Business 3 (Three-Story Office-Retail	2	21,602	17,282	5,000	4
PCD	Planned Commercial Zone (Office and Retail)	1	7,018	5,614	5,000	1
Grand Total		**15**	**133,490**	**106,792**		**21**

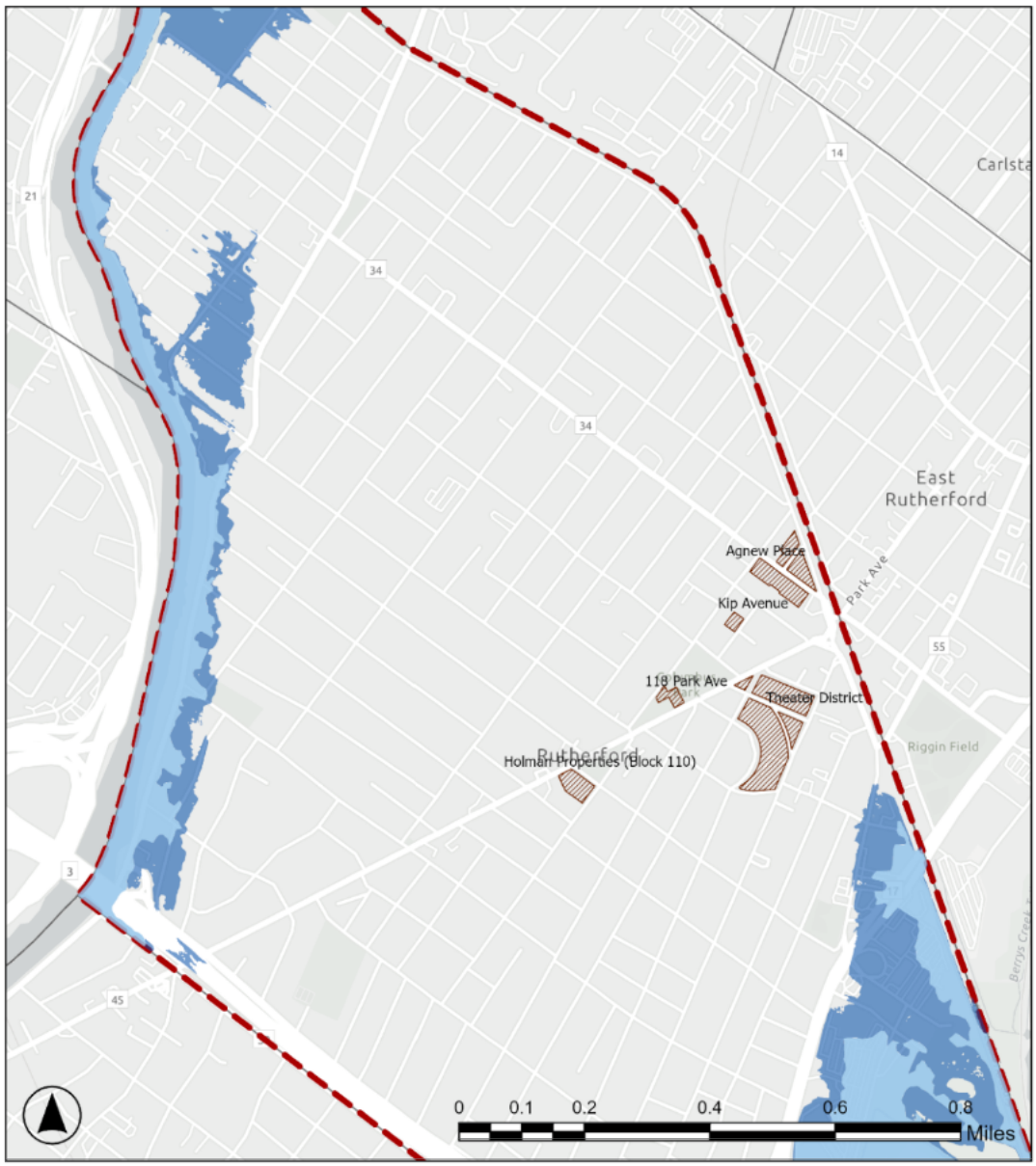
Areas in need of Redevelopment

New Jersey's Local Redevelopment and Housing Law (LRHL) authorizes municipalities to designate underutilized or substandard properties as areas in need of redevelopment and to transform them into healthier, more vibrant, or economically productive spaces. The redevelopment process has its own regulatory requirements and approvals under the LRHL, and hence, the development potential for these areas is not included within this buildout analysis, unless a developable area from the buildout analysis is a part of this area. There are three developable areas within the redevelopment area in Rutherford, as noted in Map IV-3, and the development potential is included in Table IV-3.

Map IV-4 shows the areas in need of redevelopment within Rutherford along with FEMA 1% chance flooding and the approximate extent of NJDEP climate adjusted flood elevation (CAFE). The areas in need of redevelopment are mostly along Park Avenue and are designated as Agnew Place, Kip Avenue, Theatre District, 118 Park Avenue, and Holman properties. These areas are not exposed to any of the flooding scenarios and provide Rutherford with an opportunity and greater control to shape future development with respect to land uses, and zoning controls such as permitted and prohibited uses, lot coverage, parking requirements, streetscape, etc.

The Redevelopment Areas within the Meadowland Districts are shown on Maps IV-5 and IV-6 with respect to coastal flooding and FEMA flood zones. All redevelopment areas are significantly impacted by the flooding scenarios, and any future development should be thoroughly evaluated for current and future flood impacts. Although these areas fall outside Rutherford's direct jurisdiction and are subject to the regional commission's land-use authority, flood risk in this section carries implications that extend beyond regional boundaries, potentially affecting shared infrastructure, stormwater systems, and emergency access routes relied upon by Rutherford residents. As such, the borough should continue to monitor proposed development within these Redevelopment Areas and use its advisory role in the regional planning process to encourage flood-resilient design standards, the use of updated floodplain data, and the incorporation of climate adaptation measures into any future redevelopment approved by the regional commission.

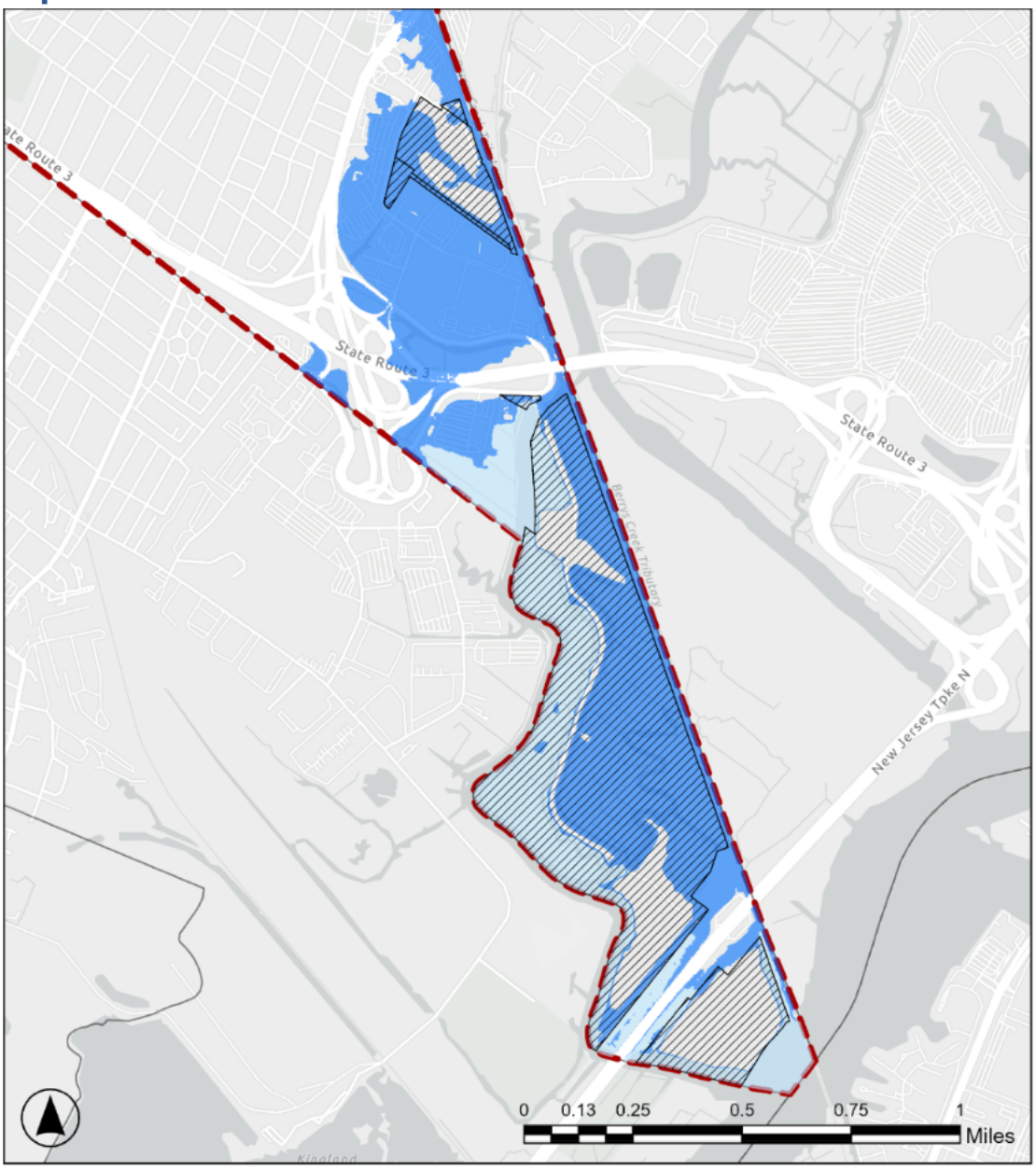
Map IV-4. Areas in need of redevelopment within FEMA flood zones



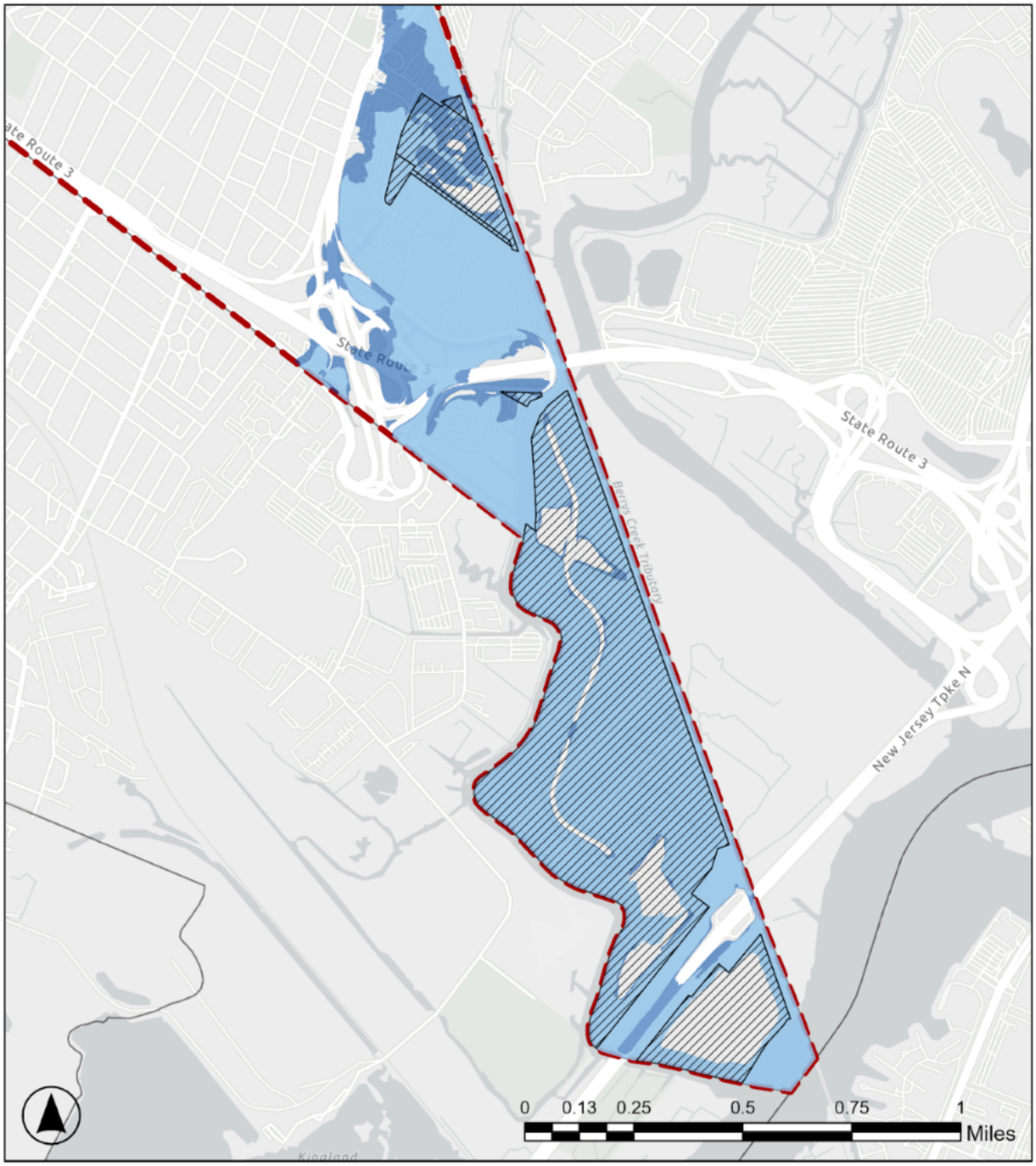
LEGEND

- Areas in need of Redevelopment
- 1pct Annual Chance Flood
- Approx. extent of REAL CAFE

Map IV-5. NJ Meadowland District Redevelopment Areas exposed at 2 feet and 6 feet coastal inundation



Map IV-6. NJ Meadowland District Redevelopment Areas within FEMA flood zones



LEGEND

Zoning Districts

RA - NJMC

Flood Scenario

1pct Annual Chance Flood

Approx. extent of REAL CAFE

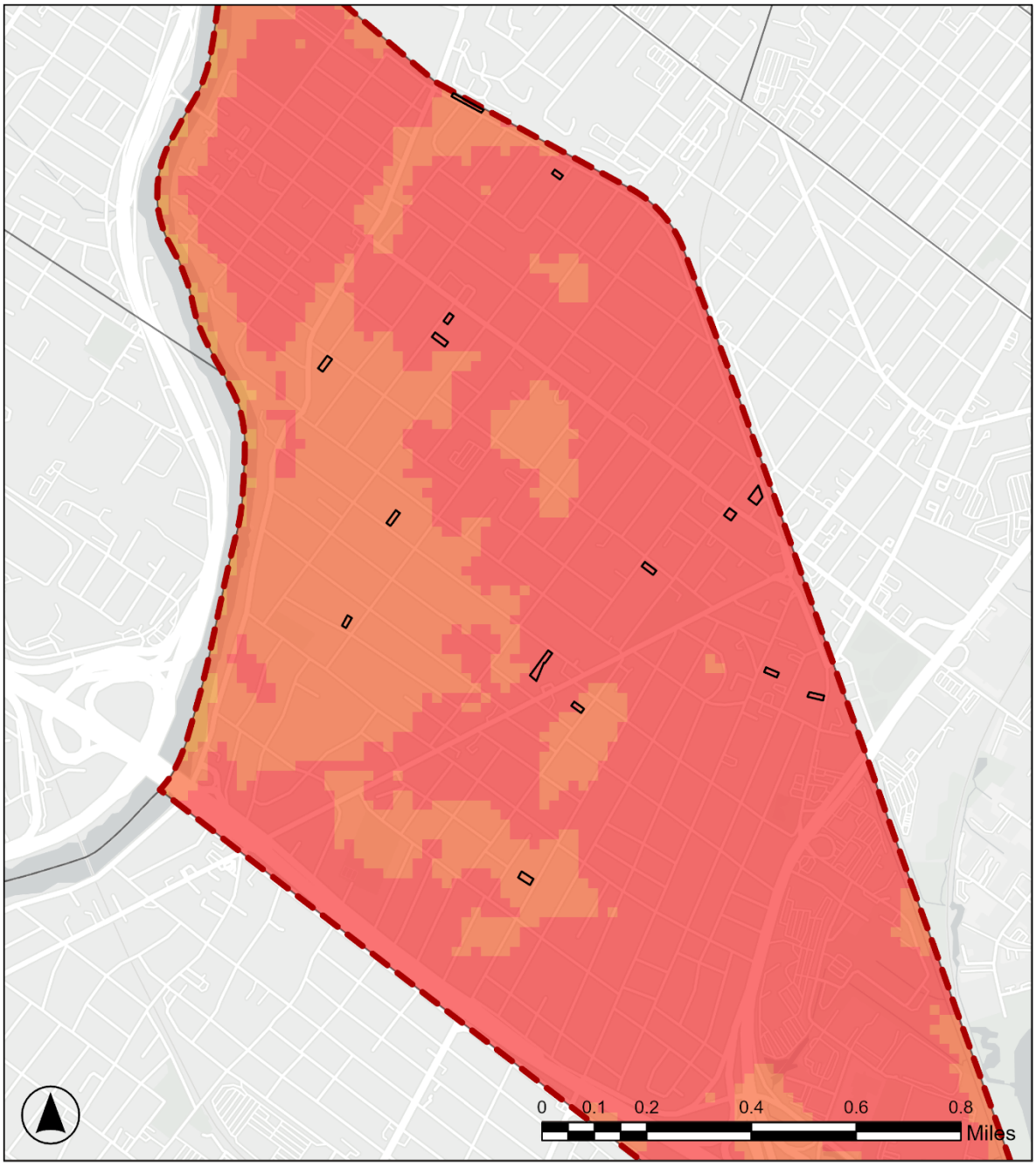
C. Exposure of Developable Areas

Identifying the climate hazard exposure of developable areas is the critical component of this build-out analysis to support decisions about where future development may face significant risk. This exposure analysis identifies how heat and flooding are projected to impact the development potential identified in Table IV-3.

Map IV-7 shows the developable areas with respect to land surface temperature. As detailed in Section III.A, temperature projections indicate that Rutherford may experience increasing heat throughout the century. This warming is compounded by the urban heat island effect, a phenomenon in which impervious surfaces, such as buildings, parking lots, and streets, absorb and retain more solar heat than vegetated or naturally permeable surfaces. Because Rutherford is a largely built-out community with limited remaining open land, the borough already exhibits a pattern of elevated surface temperatures.

The developable areas identified in this section are scattered throughout these warmer zones, and any future development within them should incorporate heat mitigation strategies to avoid intensifying existing temperature patterns. Because green spaces help moderate surface and air temperatures through shading and evapotranspiration, opportunities to reduce impervious coverage and to incorporate additional trees, green roofs, permeable paving, and landscaped buffers within these developable parcels should be explored, including as part of redevelopment scenarios. Such measures would not only help offset projected temperature increases but could also improve stormwater management, reduce building energy demand, and enhance the quality of life for residents in surrounding neighborhoods.

Map IV-7. Developable areas and land surface temperature



LEGEND

Developable Areas

Developable Areas

Land Surface Temp (F)

Under 80

80 - 90

90 - 100

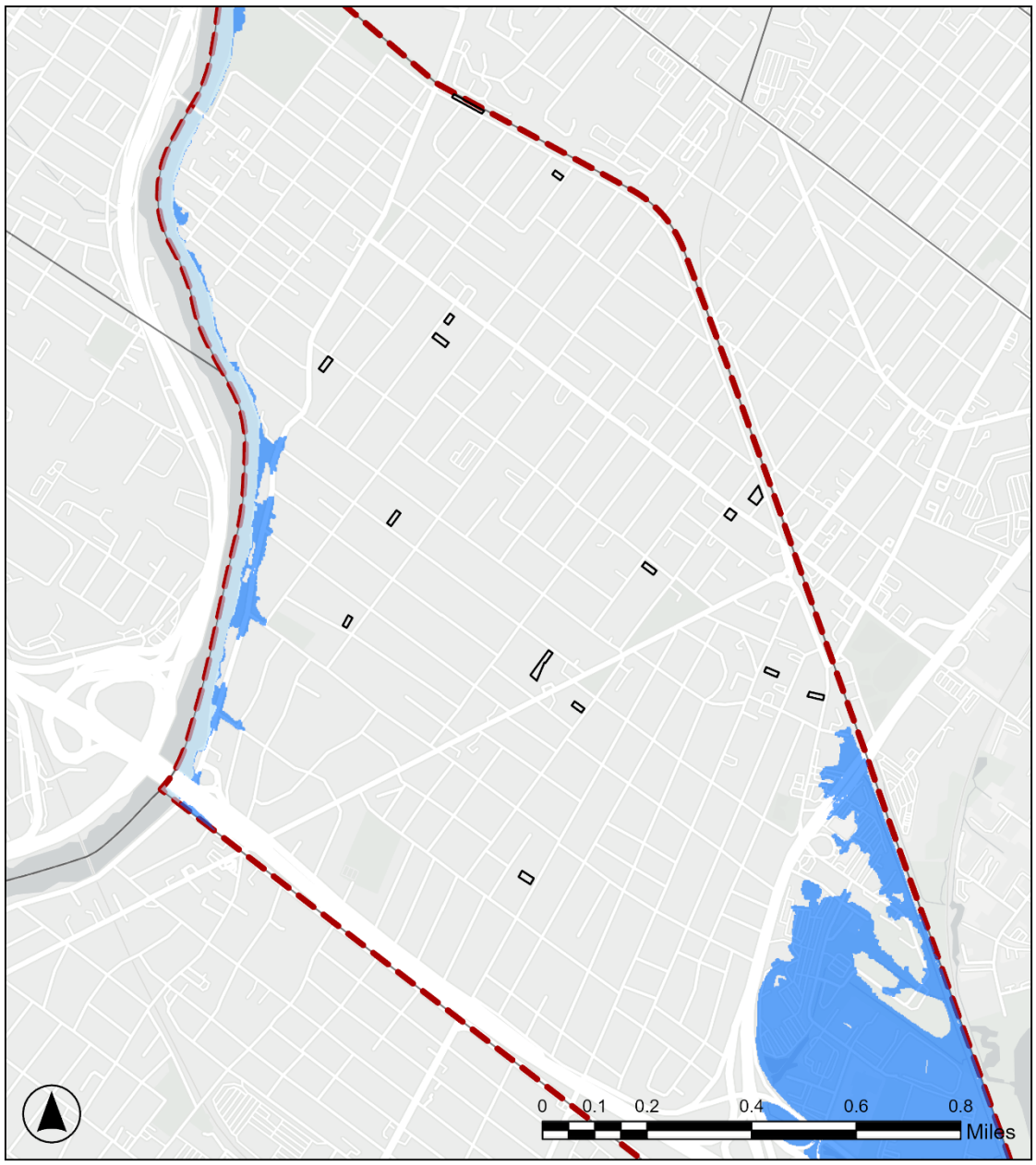
100 - 110

Over 110

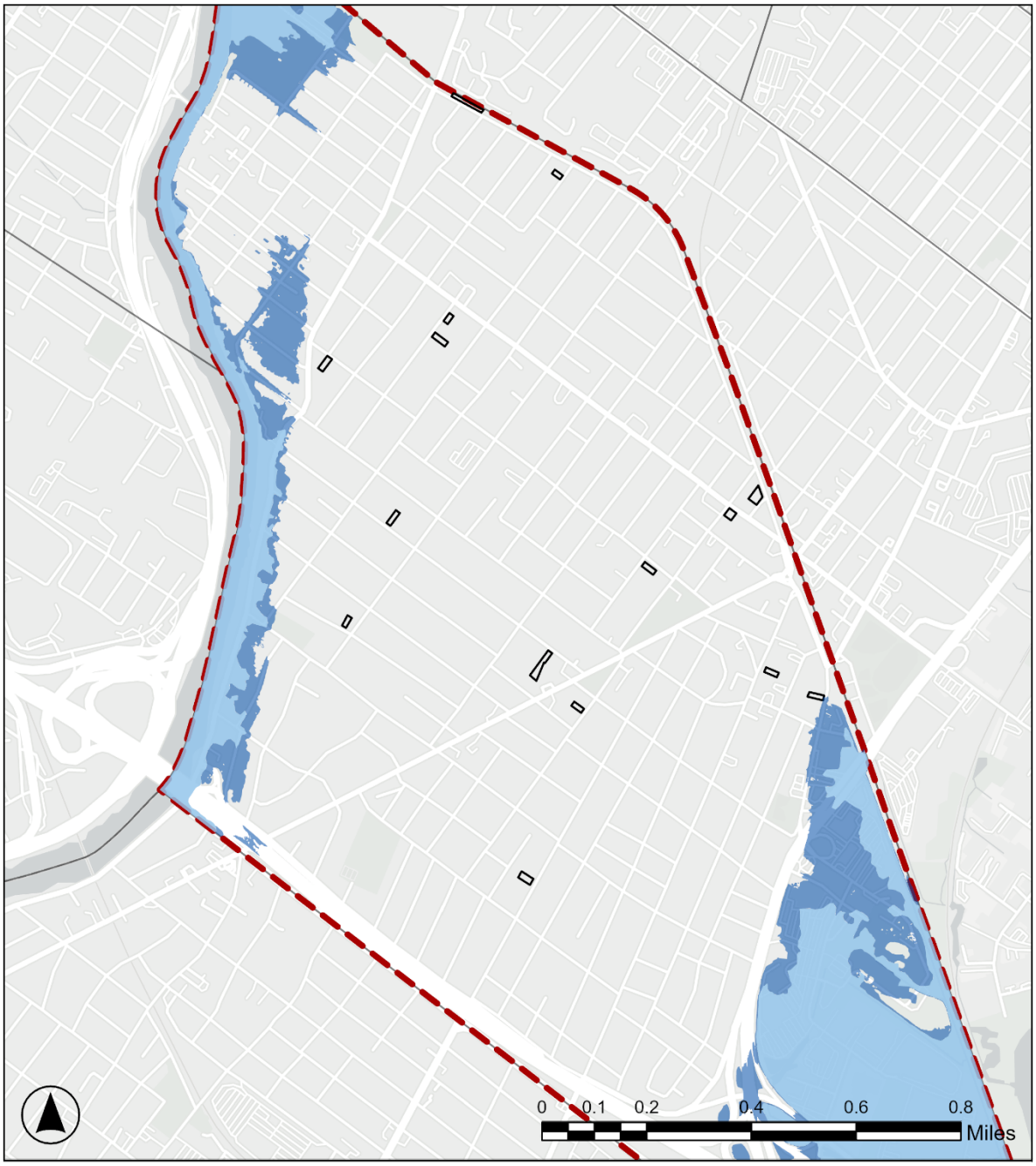
Maps IV-8 and IV-9 depict the flood exposure of developable areas for each of the four flood measures listed in Table III-8 (two feet coastal inundation, six feet coastal inundation, FEMA 1% annual chance flood zone, and NJDEP Climate Adjusted Flood Elevation (CAFE)). None of the 15 developable areas are impacted by flooding under these scenarios. However, given Rutherford's location between the Passaic and Hackensack Rivers and its largely built-out, impervious landscape, the borough experiences stormwater flooding, as shown in Map III-4. As such, these developable areas, though outside the mapped flood zones, may present opportunities for future design standards, such as green infrastructure, permeable surfaces, and on-site stormwater retention, to help absorb and mitigate flash flooding impacts within Rutherford's residential and business districts.

The buildout analysis presented in this section establishes a planning-level baseline for understanding future development potential within Rutherford and its relationship to the climate-related hazards of heat and flooding. The analysis may help inform the evaluation of potential strategies, such as exploring rezoning opportunities along established commercial corridors, including Park Avenue and the Route 17 corridor, for mixed-use development in areas with lower flood exposure, or identifying underutilized developed parcels within Rutherford's residential and business zones for redevelopment. Opportunities for risk-informed density transfer, the reallocation of development potential from areas of higher flood risk, such as the Redevelopment Areas within the Meadowlands District, to areas of comparatively lower flood risk within Rutherford's municipal zoning districts, may also be worth exploring as part of a broader resilience strategy. Additionally, proactive land-use policies, investment in stormwater and coastal resilience infrastructure, and zoning approaches that balance development opportunities with long-term flood risk management could be considered as Rutherford looks toward its future growth. Exploration of any of these approaches would need to be undertaken in conjunction with the NJSEA.

Map IV-8. Developable Areas exposed at 2 feet and 6 feet coastal inundation



Map IV-9. Developable Areas within FEMA flood zones



LEGEND

Developable Areas

Developable Areas

Flood Scenario

1pct Annual Chance Flood

Approx. extent of REAL CAFE

V. Exposure and Vulnerability Assessment

New Jersey's MLUL requires a CCRHVA to identify "critical facilities, utilities, roadways, and other infrastructure that is necessary for evacuation purposes and for sustaining quality of life during a natural disaster, to be maintained at all times in an operational state." This section addresses and significantly expands upon that requirement, analyzing the climate hazard exposures of additional community facilities, assets, and population groups of importance to local planning. Where applicable, for consistency with Hazard Mitigation Planning, this section is categorized to facilitate alignment with FEMA Community Lifelines.

A. Facilities and Infrastructure

This sub-section addresses the MLUL's requirement for a CCRHVA to identify "critical facilities, utilities, roadways, and other infrastructure that is necessary for evacuation purposes and for sustaining quality of life during a natural disaster." It includes analysis of the following:

- Critical facilities that are essential to maintain quality of life. These include facilities related to education (e.g. schools and child care centers), safety and security (e.g. law enforcement, fire stations, and emergency operation centers), and health and medical care (e.g. hospitals, dialysis centers, VA medical facilities, and nursing homes). Commercial facilities that provide the community with essential shopping and service (e.g. grocery stores, pharmacies, urgent care facilities, and banks) are included in Section V-C. Community Assets.
- Infrastructure and utilities necessary to maintain services. These include facilities related to transportation and evacuation routes (e.g. roads, public transit, aircraft landing facilities, ferry terminals, gas stations, EV charging stations, and rail lines), energy (e.g. power plants), and water systems (e.g. wastewater treatment plants).
- Facilities that handle hazardous materials and known contaminated sites from which climate hazards may cause releases of hazardous materials.

These facilities, sites, and assets fall within the following FEMA Community Lifelines: Safety and Security; Health and Medical; Food, Water, Shelter; Transportation; Energy; Communications; Water Systems; Hazardous Materials. Climate risks to facilities and infrastructure are related to the asset's exposure to hazards and its ability to operate during or despite climate-related weather events. Risks also depend upon the ability of responders to provide services to the community from the asset and the ability of residents to access the services they provide.

Heat

As detailed in Section III.A, temperature projections indicate that Rutherford may experience increasing heat throughout the century. Increasing temperatures have a variety of impacts on facilities and infrastructure. While heat will not necessarily impact critical facilities themselves, increasing temperatures will require greater health and medical services response. This may include planning for increased mobilization to and from health facilities and cooling centers. Although the public library on Park Ave (Map V-10) serves as a cooling center, there are no designated cooling centers within Rutherford. The nearest Bergen County designated cooling

center is Southwest Bergen Senior Activity Center, located in East Rutherford. Additionally, schools have experienced operational challenges related to extreme heat. Older facilities often are not equipped with central air conditioners and may not be safe during extreme heat events.

Extreme heat also acts as a stressor on New Jersey's energy systems due to increased demand for electricity for cooling and heating.[16] Heat can impact energy infrastructure, increasing the likelihood of mechanical issues or service disruptions. To meet peak energy demand, particularly during extreme heat events, "peaker plants" are sometimes operated, but they can have negative impacts on local air quality and are a cost-burdensome solution. Rutherford does not have any power plants or electric substations within its borders.

Communications infrastructure is critical to the daily functions of municipalities and is especially vital to emergency response and management. Communication infrastructure can be physical or cyber and is vital to the functionality of other infrastructure systems like utilities and transportation. Extreme heat can be a threat to telecommunications or data centers that are already high heat generators with temperature thresholds that may not be designed to endure extreme heat. Intense heat waves can cause overheating of machinery, increase fire risks, and lead to malfunctions in cooling systems. Failure or degradation of equipment catalyzes a slowdown of services across all other facilities and infrastructure. There are several communications towers spread across Rutherford, and they are within the areas of elevated land surface temperature.

Hazardous materials are also of concern during extreme heat events since nearly all chemicals are affected by heat. Extreme temperatures can impact the storage and transport of hazardous materials, especially if they are volatile.[17]

Heat also impacts transportation. High temperatures can warp materials and reduce the reliability of air, land, and maritime systems. This impacts how goods and people move across all travel modes, including roads, railways, public transit, active transportation, water transport, and aviation infrastructure. More specifically, extreme heat could accelerate the degradation of roads, lead to power system failures due to overheating, and increase public safety risks for pedestrians and transit riders in areas with limited shade or tree canopy.

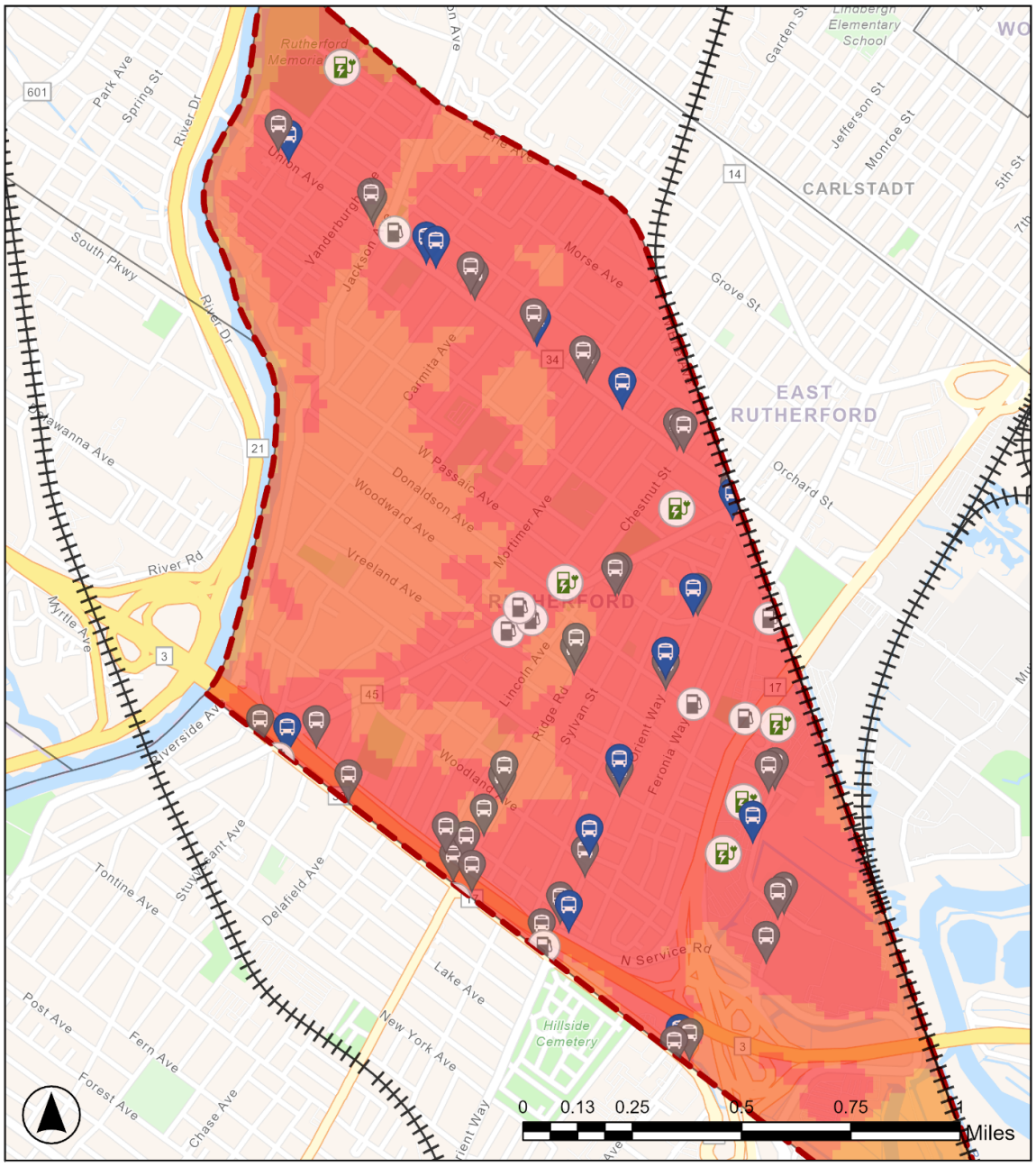
Map V-1 depicts transportation assets in Rutherford that may be impacted by increasing temperatures. Much of the Borough experiences elevated land surface temperatures exceeding 100 °F, with potential effects on key transportation infrastructure. Only 12 of Rutherford's 46 NJ Transit bus stops are equipped with shelters, mostly located along Orient Way and Union Avenue, posing heat stress risks for waiting riders. The Meadowlands area, towards the south of the Borough, is notably cooler and does not have any transportation infrastructure other than a small section of Rt 95 along the southern edge.

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[16] Filión, N.A., Knutsen, M., and Phillips, S. New Jersey Department of Environmental Protection. 2025. New Jersey Extreme Heat Resilience Action Plan.

[17] New Jersey Office of Emergency Management. 2024. State of New Jersey All-Hazards Mitigation Plan.

Map V-1. Land surface temperature and transportation infrastructure



LEGEND

Land Surface Temp (F)

- Under 80
- 80 - 90
- 90 - 100
- 100 - 110
- Over 110

Transportation Infrastructure

- North American Rail Network Lines
- Gas Service Stations
- EV Charging Stations
- Bus Stops with No Shelters
- Bus Stops with Shelters

Storms

As detailed in Section III.B, the frequency and intensity of extreme precipitation events are anticipated to increase throughout the century. Extreme precipitation and wind affect the built environment across all sectors. Storm-driven extreme precipitation directly impacts stormwater management and water quality when overloaded water and sewage systems flood, with untreated water posing public health risks.

For transportation, extreme precipitation events have been linked with increased risk of traffic accidents, road inaccessibility and/or closures, inability to use active transportation modes (e.g. biking and walking), inability to use active modes, pavement buckling, and material erosion on the base of bridges in water due to faster stream flow. Additionally, increased frequency of extreme precipitation leads to faster rates of degradation and can disrupt maintenance of energy and transportation infrastructure.

Historically, high winds in New Jersey have caused damage to power, communication, transportation, water, and other lifeline systems.[18] Extreme winds can cause structural damage to facilities, including the breakage or collapse of compromised components such as building materials like roofs, signage, or windows and outdoor components like fencing or cooling systems. Facilities and infrastructure are also vulnerable to indirect hazards such as falling trees and downed power lines. Transportation, utilities, and communication infrastructure are also vulnerable, as high winds can lead to disruptions in public transit service, create hazardous conditions for road users, interrupt emergency communications, and catalyze water and power outages. Roadways, railways, and bridges can be shut down due to structural compromise or blockage from trees and/or debris. Extreme winds can also contribute to the spread of wildfires and contaminant dispersal.

Drought

As detailed in Section III.C, Rutherford's time in drought each year is anticipated to increase throughout the century. Given that drought is closely connected with the quantity and quality of water, the facilities and infrastructure that are most affected by drought are those most dependent on water. For example, within the energy sector, drought primarily impacts hydropower facilities and the regions dependent on those facilities' energy production. Other forms of energy production may be affected as well since water is utilized to cool down infrastructure during periods of high temperatures.[19]

During drought, water use patterns may shift to higher rates of groundwater pumping, which can have implications both for water quality and increased risk of land subsidence, particularly in sandy coastal soils.[16] Land subsidence can damage infrastructure such as sidewalks, roads, rail lines, and exacerbate local sea-level rise flooding.

[18] New Jersey Office of Emergency Management. 2024. State of New Jersey All-Hazards Mitigation Plan.
[19] Resilient NJ. 2022. A Resilience Action Plan for the Raritan River and Bay Communities Region.

Flood

Transportation infrastructure is particularly vulnerable to flooding when roads and railways become impassible, disrupting daily life, emergency and healthcare services, and the food supply chain. Flooded energy and communications infrastructure can impact emergency response coordination and hinder oil, gas, and electricity production. For hazardous sites, flooding can mobilize pollutants and lead to acute and chronic health effects.[20] Potential public health impacts from mobilized pollutants include respiratory illnesses from mold exposure and infectious disease spread from microorganism contamination of clean water. The pollution impacts of flooding can continue after flood waters recede. Finally, flooding impacts in water systems can include damaged wells, contaminated aquifers and wells, and backed-up sewage systems that can overflow and discharge sewage into communities and water sources.

Maps V-2 and V-3 depict potential flood exposure of Rutherford's facilities and infrastructure (including critical facilities, transportation infrastructure, hazardous sites, and industrial parcels) for each of the four flood measures listed in Table III-8 (two feet coastal inundation, six feet coastal inundation, FEMA 1% annual chance flood zone, and approximate extent of climate adjusted flood elevation (REAL CAFE)). Table V-1 summarizes the number of each type of facility and infrastructure exposed at each flood measure.

Rutherford has no infrastructure exposed at the two feet flooding scenario. At six feet of inundation, one child care center (Lightbridge Academy on Route 17) may be impacted. Seven NJ Transit bus stops and two EV charging stations may be impacted by this flooding scenario, mostly located in the commercial/industrial area between Route 17 and Route 3. There are 28 Known Contaminated Sites within Rutherford, six of which are impacted by the six feet flood scenario. The Architectural Window Manufacturing facility on Veterans Boulevard is a Community Right-to-Know site and is impacted by this flooding scenario as well. Table V-2 provides details on the four industrial parcels exposed at the six feet flood scenario, representing a total of three acres at risk with a net equalized value of approximately $6 million. The net equalized value includes the land and improvement value and is further explained in Section V.B of the report.

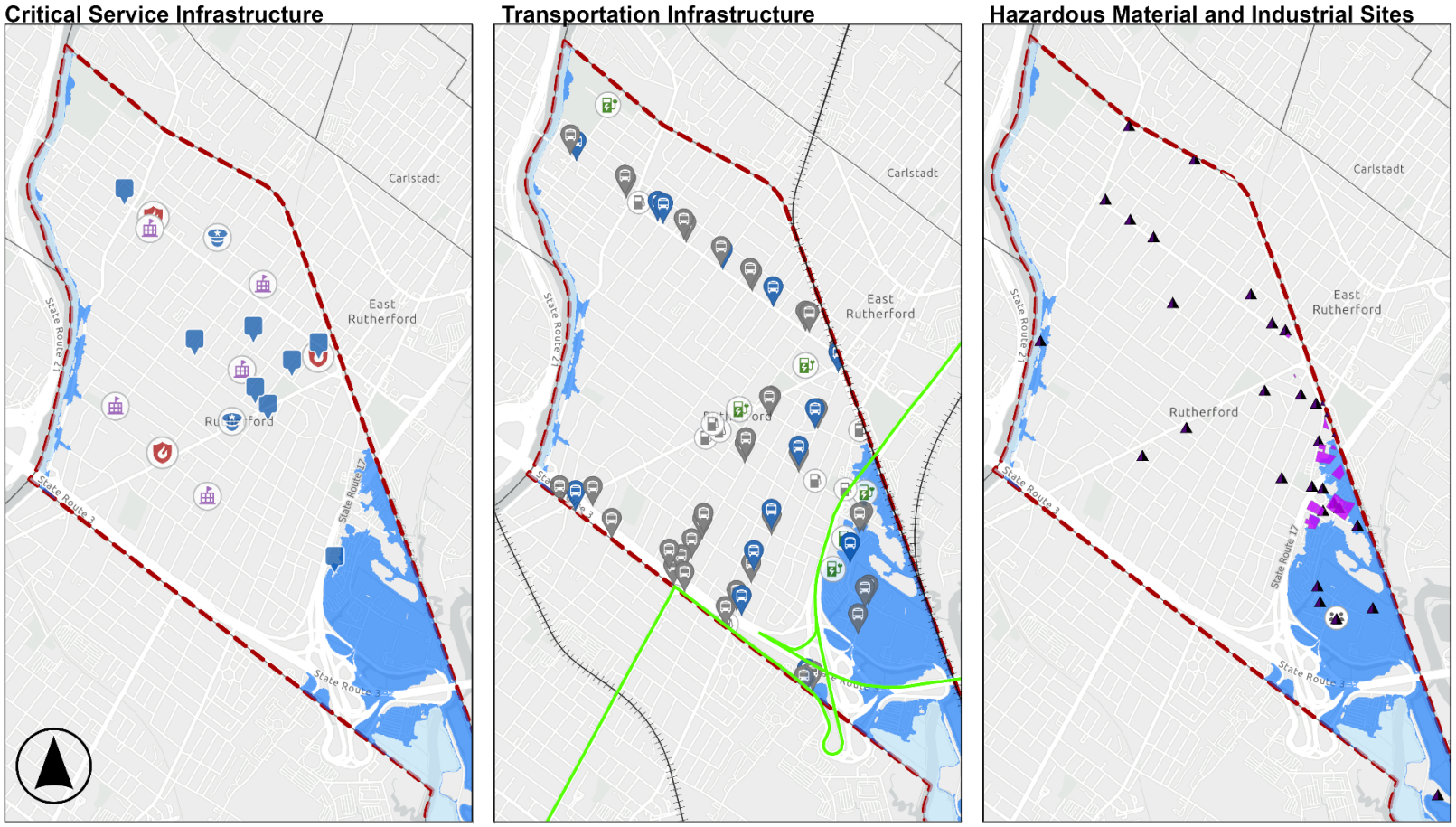
Exposure within the FEMA 1% annual flood zone is similar to the six feet coastal flood scenario and impacts most of the same facilities. The exposed land area and number of facilities is larger within the approximate extent of REAL CAFE, with 11 of 28 Known Contaminated Sites potentially impacted. Table V-3 provides details on industrial parcels within the FEMA flood zones. Only one of Rutherford's 14 industrial parcels is within the FEMA 1% annual chance flood zone. Future flood risk to industrial land use is greater, with nine parcels within the approximate extent of REAL CAFE, with a total net equalized value exceeding $15 million. No schools are impacted by the four flood scenarios discussed above; three schools, Union School, Rutherford High School and Pierrepont School serve as the evacuation shelters for the borough.

[20] New Jersey Office of Emergency Management. 2024. State of New Jersey All-Hazards Mitigation Plan.

To identify commercial facilities that provide essential shopping and services, Homeland Infrastructure Foundation-Level Data (HIFLD)[21] and USDA SNAP Retailers[22] datasets were reviewed. Although these facilities were not mapped for this analysis because their locations frequently change, they include five banks, one grocery store, and two pharmacies located along Park Avenue. None of these locations are exposed to any of the flood scenarios discussed in this report. These commercial facilities are important for post-storm continuity of services and are typically analyzed in the Hazard Mitigation Plan (HMP). See Section VII.A for discussion of the Bergen County HMP. From a land use perspective, Rutherford may consider overall impacts to commercial zoning, which is detailed in Section V.C.

[21] U.S. Department of Homeland Security. 2025. Homeland Infrastructure Foundation-Level Data (HIFLD).
[22] U.S. Department of Agriculture. 2026. Snap Retailer Location data.

Map V-2. Facilities and infrastructure exposed at 2 feet and 6 feet coastal inundation



Map V-3. Facilities and infrastructure within FEMA flood zones

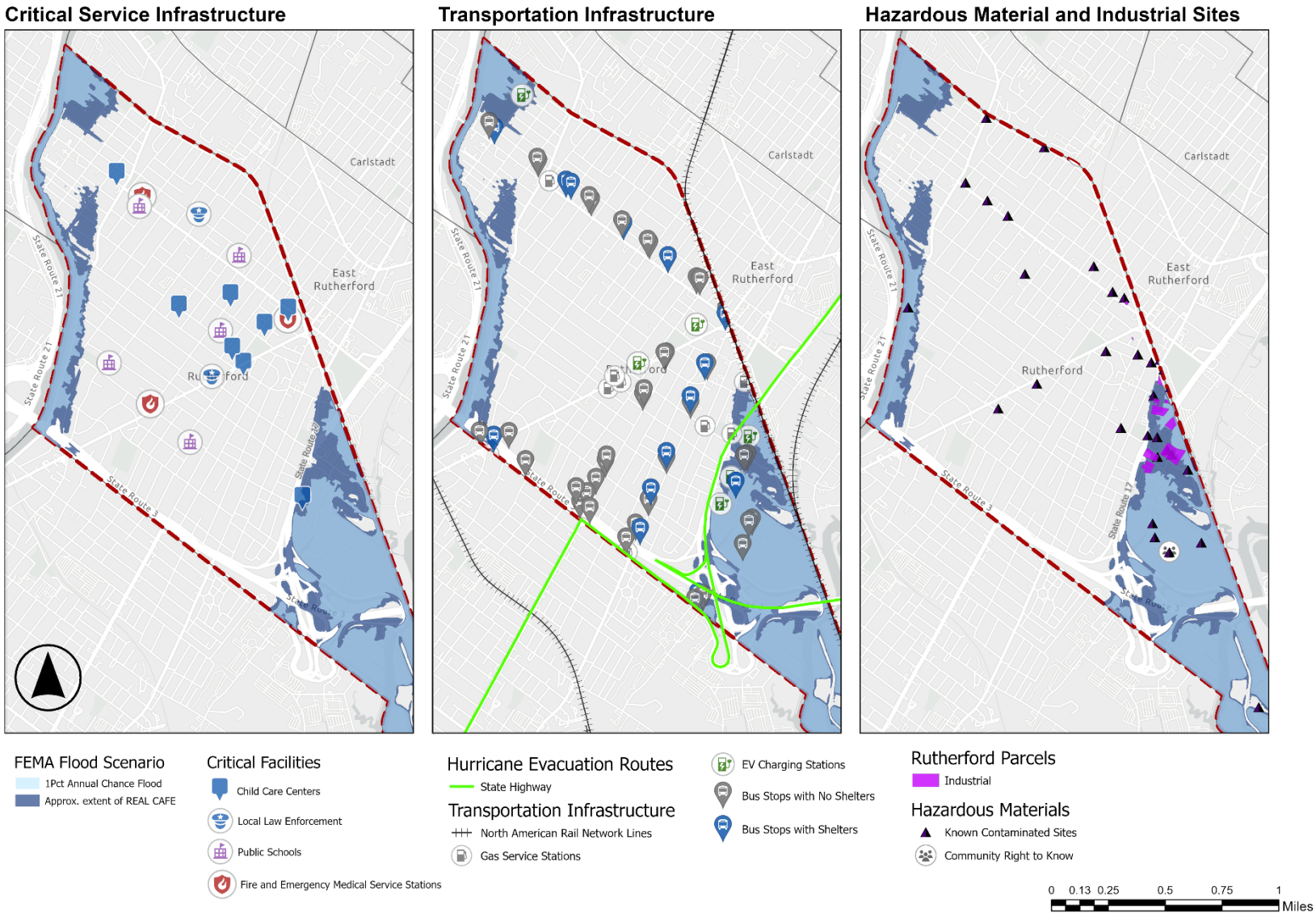


Table V-1. Flood exposure of facilities and infrastructure

	Total #	# Exposed in...			
		2 feet coastal inundation	6 feet coastal inundation	FEMA 1% Annual Chance Flood	Coastal flood rule (CAFE)
Safety and Security					
Child care centers	8	0	1	0	1
Fire stations	3	0	0	0	0
Local law enforcement	2	0	0	0	0
Public schools *	5	0	0	0	0
Transportation					
Public transit stations	46	0	7	6	7
EV charging stations	8	0	2	3	5
Hazardous sites					
Known Contaminated Sites	28	0	6	5	11
Community Right to Know	1	0	1	1	1

**Although public schools are included in this section as critical facilities, school property parcels (Public School Property-15A and Other School Property-15B) are analyzed with the other public property classes in Section V.C)*

Table V-2. Flood exposure of industrial parcels at 2 feet and 6 feet coastal inundation

		Number / land area exposed in...					
		2 feet coastal inundation			6 feet coastal inundation		
MOD IV Property Class	Total # parcels	# Parcels	Acres	Net Equalized Value ($)	# Parcels	Acres	Net Equalized Value ($)
Industrial (4B)	14	0	0	0	4 (3%)	3	6,097,005

Note – Net Equalized Value is the sum of land and improvement values, adjusted to reflect market value.

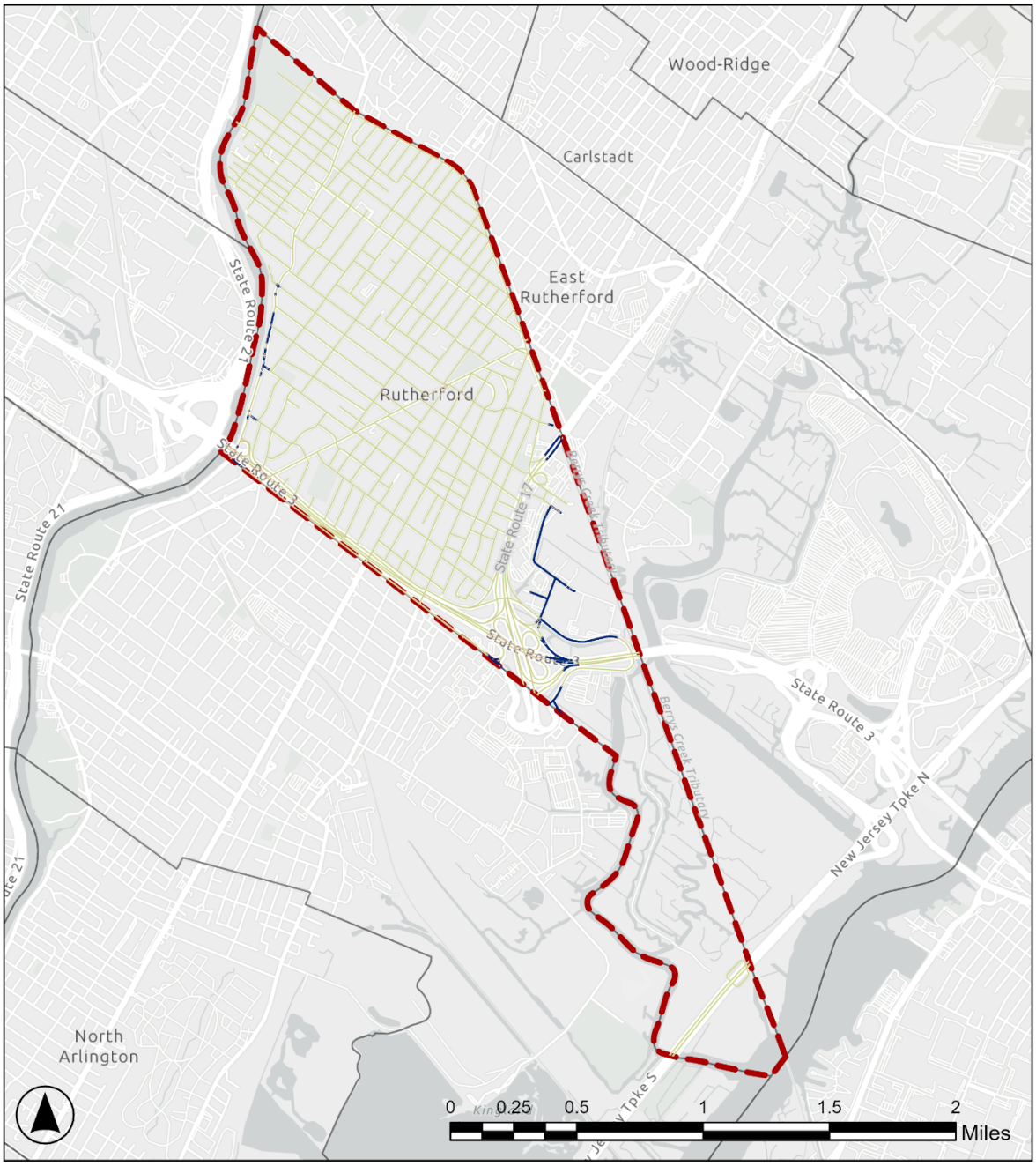
Table V-3. Flood exposure of industrial parcels to FEMA Flood Zones

		Number / land area exposed in...					
		FEMA 1% Annual Chance Flood			Coastal flood rule (CAFE)		
MOD IV Property Class	Total # parcels	# Parcels	Acres	Net Equalized Value ($)	# Parcels	Acres	Net Equalized Value ($)
Industrial (4B)	14	1 (7%)	1	2,630,869	10 (71%)	9	15,222,612

In addition to direct flood risk to facilities and infrastructure, it is important to understand potential impacts to access due to flood exposure of surrounding roads and/or evacuation routes. Map V-4 depicts roadways in Rutherford that are expected to be impacted by scenarios of two and six feet coastal inundation. The dark blue roads may flood at and beyond two feet coastal inundation. The light blue roads may be inundated at and beyond six feet coastal inundation. Consistent with the flooding pattern discussed above, the roads that flood are parts of Riverside Avenue in the north and Veterans Boulevard in the commercial/industrial section south of Route 17.

Roadway jurisdictions are shown on Map V-5. The map distinguishes roads by color depending on jurisdiction of the Highway Authority, State, County, Municipal, Private, or other entities. This information can support planning of flood adaptation strategies for roadways by understanding which entity is responsible for road maintenance, improvement, funding, and regulation. It should be noted that this roadway analysis accounts only for coastal (tidal) flooding and does not incorporate the compound effects of fluvial flooding or rainfall, which may cause more significant impacts.

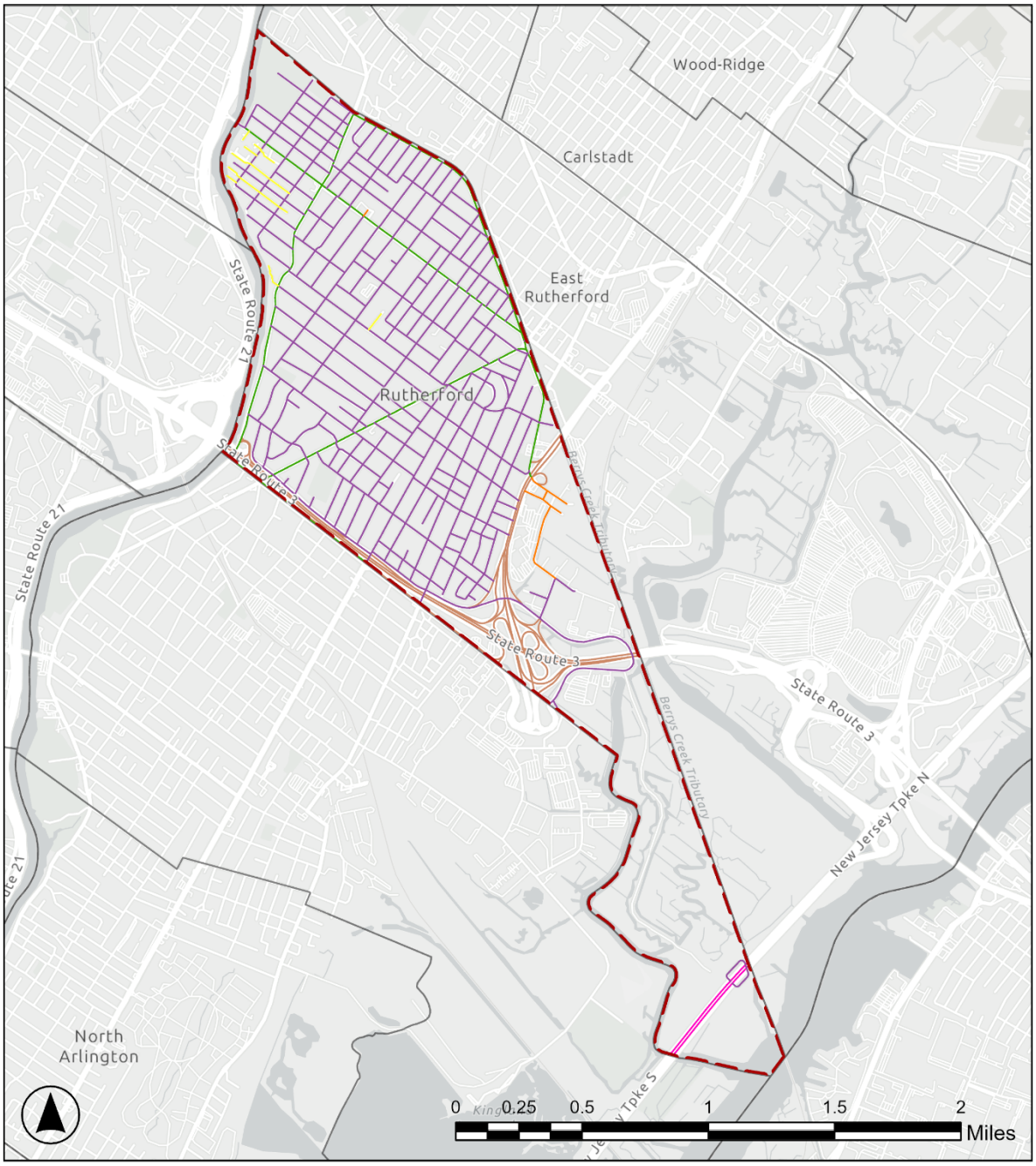
Map V-4. Potential roadway flooding at 2 feet and 6 feet coastal inundation



LEGEND

- Inundated at 2ft and above
- Inundated at 6ft and above
- Roads not flooded

Map V-5. Roadway jurisdictions



LEGEND

Road Jurisdiction

- Highway Authority
- State
- County
- Municipal
- Private
- Other

B. Land Use

MOD-IV Parcel Flood Analysis

The Parcels and MOD-IV Composite of NJ dataset provides basic information regarding property location, class, and tax value and taxation for each tax parcel in New Jersey.[23] This dataset was intersected with flood data to calculate the percentage of each parcel exposed under various flood scenarios. For the purposes of this assessment, a parcel is considered exposed if at least 50% of the land area is inundated or within the FEMA flood zone. Structures are likely to be impacted on most parcels at this threshold, although exceptions may include large parcels with limited development. Municipal equalized valuation ratios, from the NJ Division of Taxation's NJ 2023 Table of Equalized Valuations,[24] were applied to reflect assessment values that were closer to true market value. This information is useful when considering costs to repair, rebuild, or relocate after flood losses.

This assessment analyzed flood exposure for each property class for each of the four flood measures listed in Table III-8 (two feet coastal inundation, six feet coastal inundation, FEMA 1% annual chance flood zone, and approx. extent of REAL CAFE). The results are included in each relevant sub-section: Industrial property is included in Section V.A – Facilities and Infrastructure; Farm property is included in Section V.B – Natural and Working Lands; Commercial, schools, and other public property is included in Section V.C – Community Assets; Residential and apartments property is included in Section V.D – Housing and People.

As an overview, this section includes an analysis of all parcels in Rutherford within the FEMA 1% Annual Chance flood zone, detailed in Table V-4 and depicted in Map V-6. Only about one percent of Rutherford's 5,047 residential/apartments parcels are within the FEMA 1% annual chance flood zone, with a net equalized value of over $32 million at risk. The net equalized value is the sum of land value and improvement value, divided by municipal equalized valuation ratios to reflect assessment values that are closer to true market value.[25] While improvement value captures the value of buildings and infrastructure most directly exposed to physical flood damage, the impact on land value is reflected directly in property taxes. Land values in flood-prone areas may decline independently of any improvements made to individual structures. Therefore, net value has been used in this assessment to reflect both fiscal and physical dimensions of flood risk.

One of Rutherford's fourteen industrial parcels are within the flood zone, with about one acre with a net equalized value of nearly $2 million at risk. Two commercial parcels encompassing ten acres are exposed, with a net equalized value of over $112 million at risk.

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[23] NJ Office of GIS. 2025. Parcel and MOD-IV Composite of New Jersey.

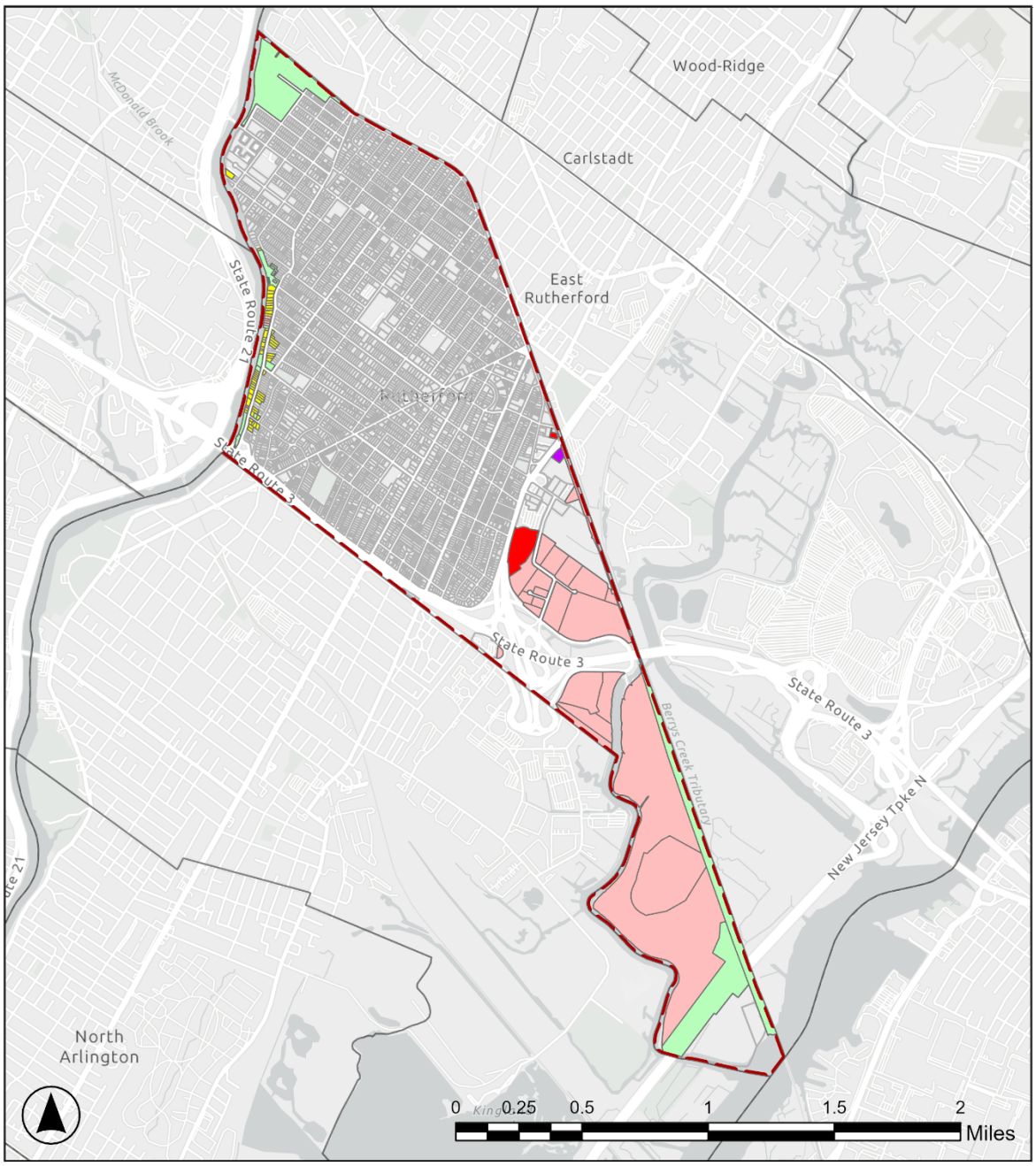
[24] https://www.nj.gov/treasury/taxation/pdf/lptval/2023/allcounties.pdf

[25] Marxen, L., A. Spector, J. DeLura, K. Reddy, and M. Kaplan. 2025. Current and Future Flood Exposure to New Jersey Properties and Associated Assessed Property Value at Risk. Rutgers University. https://doi.org/10.7282/00000502

Table V-4. Property parcels within FEMA 1% annual chance flood zone

		Number / land area exposed in...		
		FEMA 1% Annual Chance Flood		
MOD IV Property Class	Total # parcels	# Parcels	Acres	Net Equalized Value ($)
Residential (2)	5,013	64 (1%)	10	32,448,057
Apartments (4C)	34	0 (0%)	0	0
Commercial (4A)	224	2 (1%)	10	112,974,906
Industrial (4B)	14	1 (7%)	1	2,630,869
Public Property (15A through 15F)	138	13 (9%)	100	34,582,164
Railroad Property (5A)	2	0 (0%)	0	0
Farm (3A and 3B)	0	0 (0%)	0	0
Vacant Land (1)	50	2 (4%)	0.12	237,588
Unclassified Land	113	32 (28%)	317	-
Total	**5,588**	**114 (2%)**	**437**	**182,873,583**

Map V-6. Property parcels within FEMA 1% annual chance flood zone



LEGEND

Rutherford

Parcels above 50% Inundation, 1% FEMA Flood Zone

- Residential
- Apartments
- Commercial
- Industrial
- Farm
- Schools and Other Public Property
- Railroad Property
- Vacant
- No Value

Natural and Working Lands

Natural and working lands include wetlands, forests, agricultural land, and other open spaces with vegetative cover. These lands benefit communities in many ways. They are especially important for addressing climate change for their capacity to absorb carbon from the atmosphere and mitigate the impacts of increasing temperatures.

Heat

As detailed in Section III.A, temperature projections indicate that Rutherford may experience increasing heat throughout the century. Warmer temperatures may extend the length of the growing season and the types of crops that are viable in New Jersey. However, warmer winter temperatures can disrupt chilling time necessary for many perennial crops and allow more insects to overwinter, increasing growing season pest pressure. Extreme heat can damage crops before harvest or lead to early season development that can be damaged by later frosts. Warmer temperatures may also exacerbate drought conditions that can limit groundwater irrigation and stress rain-fed crops. In wetlands, extreme heat can disrupt ecosystems by contributing to habitat loss, changes in wildlife diversity and behavior, and degrading soil and water quality. It can also lead to hypoxia (low dissolved oxygen levels). In forests and areas with vegetative cover, high temperatures can degrade soil health, increase the frequency and duration of wildfires, and accelerate the life cycles of insect pests, allowing them to mature and spread more rapidly.[26] When combined with extreme precipitation, heat can also increase the temperature of runoff entering waterways, resulting in water quality issues.

Storms

The increasing frequency of extreme precipitation events (see Section III.B) may impact natural and working lands across urban and rural areas, contributing to heightened risks from pests, diseases, invasive species, and storm-related damage.[27] Heavy precipitation and associated runoff increases the rate of streambank erosion and destabilization, which may damage surrounding areas and impact water quality.[28]

Extreme precipitation can also negatively impact agriculture, including planting delays, root disease, and limited access to pastures for livestock.[29] Increased soil erosion and agricultural

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[26] New Jersey Office of Emergency Management. 2024. State of New Jersey All-Hazards Mitigation Plan.

[27] NJ Climate Change Alliance. 2022. Forest Resource Considerations for A New Jersey Natural and Working Lands Strategy.

[28] New Jersey Department of Environmental Protection. 2025. New Jersey Scientific Report on Climate Change. (Eds. B. Wiley, K. Raper, J. Bonventre, R. Hill, L.A. Lester, N.A. Procopio). Trenton, NJ. 275 pp.

[29] Hristov, A. N., Degaetano, A. T., Rotz, C. A., et al. 2018. Climate change effects on livestock in the Northeast US and strategies for adaptation. *Climatic Change*, 146, 33-45.

runoff may result in increased manure, fertilizer, and pesticides entering local waterways and contaminating surface and groundwater.[30]

High winds in New Jersey have historically caused significant agricultural losses and economic setbacks due to the impact of projectile debris (e.g. hail), damaging crops and killing livestock.[31] In forested areas and open spaces, extreme winds can cause tree failure, such as breakage or uprooting. This damage makes trees more susceptible to disease or pests, weakening overall forest health and making canopies less resistant to additional threats like wildfires.

Flood

Natural and working lands serve as important natural resources that help absorb excess rainwater and buffer storm surge, thereby reducing flooding in surrounding areas. However, flooding can cause significant impacts to these landscapes.

In watersheds, flooding can increase sedimentation and bank erosion, introducing hazardous materials into nearby water bodies and creating conditions favorable to waterborne pollution that may affect local water supplies. In addition to these human health and water quality concerns, flooding threatens ecosystems. Flooding can contribute to the inundation of forests and vegetated lands, damaging vegetation and flora and negatively affecting forest health and the agricultural industry.

In coastal areas, tidal marshes are expected to migrate landward or "retreat" as sea level rises. Areas of current tidal marsh could convert to mud flats or open water and areas of existing dry land located landward of tidal marshes could be converted to new tidal marsh over time. For example, inundation could result in the loss of up to 92% of the state's brackish marshes, 32% of its tidal swamps, and 6% of its tidal freshwater marshes in the Delaware Estuary by 2100.[32] Additionally, sea-level rise and other environmental stressors can accelerate beach and dune erosion, increasing the vulnerability of inland areas to overland flooding from coastal storm surges.

Map V-7 and Map V-8 depict flood risk to natural and working lands in Rutherford for each of the four flood measures listed in Table III-8 (two feet coastal inundation, six feet coastal inundation, FEMA 1% annual chance flood zone, and approx. extent of REAL CAFE). Flooding primarily impacts recreational lands along the Passaic River (e.g. Memorial Park, Van Winkle Park and Rutherford Waterfront Park) and forest and wetlands in the southern section of the Borough. Rutherford does not have any agricultural lands.

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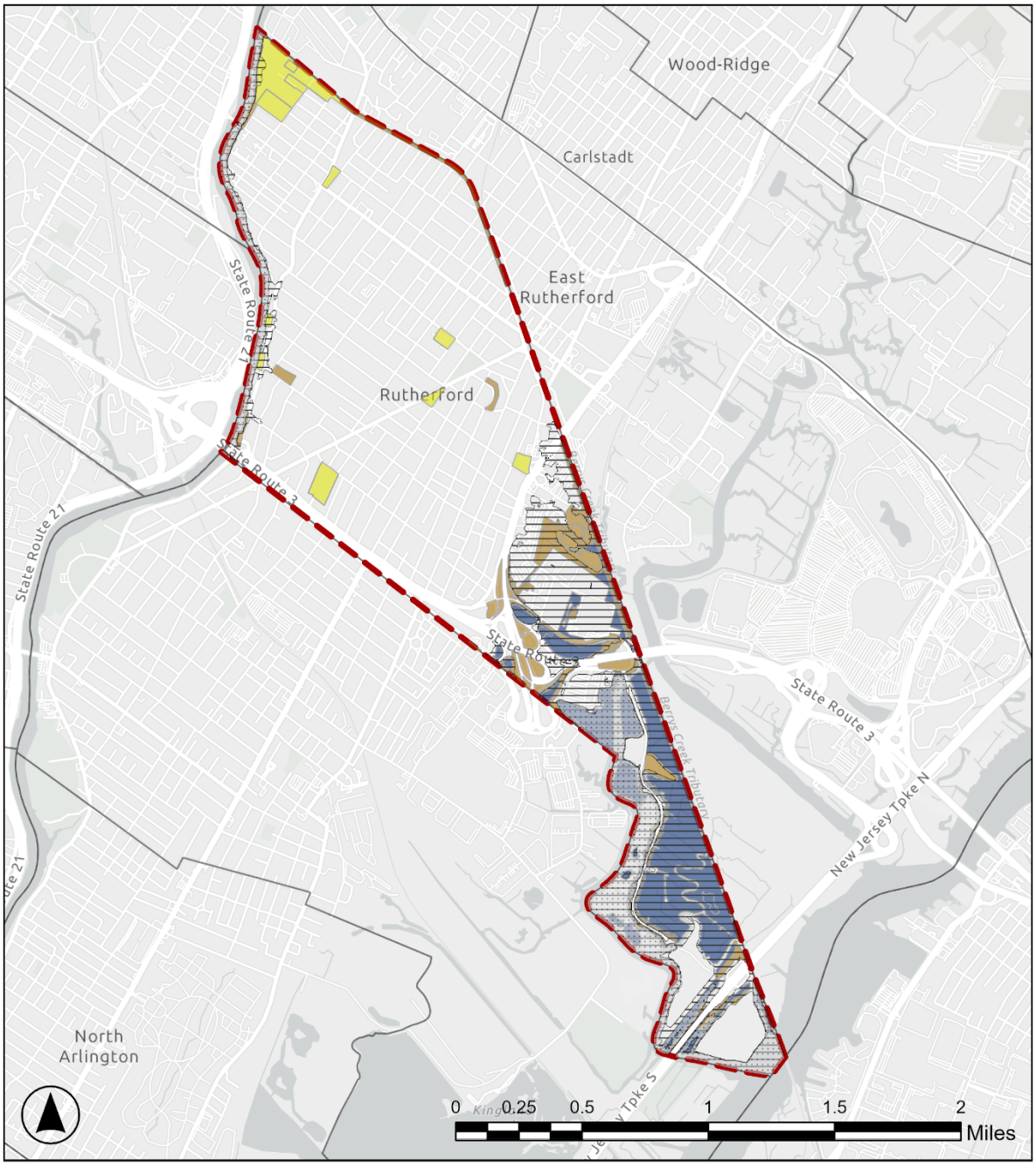
[30] U.S. Global Change Research Program. 2016. The impacts of climate change on human health in the United States: A scientific assessment. Pages 1–312 in A. Crimmins, J. Balbus, J. L. Gamble, C. B. Beard, J. E. Bell, D. Dodgen, R. J. Eisen, N. Fann, M. D. Hawkins, S. C. Herring, L. Jantarasami, D. M. Mills, S. Saha, M. C. Sarofim, J. Trtanj, and L. Ziska, editors. U.S. Global Change Research Program, Washington, DC.

[31] New Jersey Office of Emergency Management. 2024. State of New Jersey All-Hazards Mitigation Plan.

[32] Lathrop, R. G., and A. A. Love. 2007. Vulnerability of New Jersey's coastal habitats to sea-level rise. Grant F. Walton CRSSA. Pages 1–17. Rutgers University, New Brunswick, NJ. https://doi.org/doi:10.7282/T3F18ZRZ

Map V-9 depicts a time progression of potential marsh retreat from current day to 2050 (two feet of sea-level rise), to 2100 (four feet of sea-level rise). Large portions of land area the southern section of the Borough consist of wetlands and are subject to marsh retreat. As sea level rises throughout the century, existing wetland area may gradually change into saltwater marsh and unconsolidated shore which are the areas of loose, unstable sediment that can easily erode and rebuild from tidal action.

Map V-7. Coastal flood exposure of natural and working lands



LEGEND

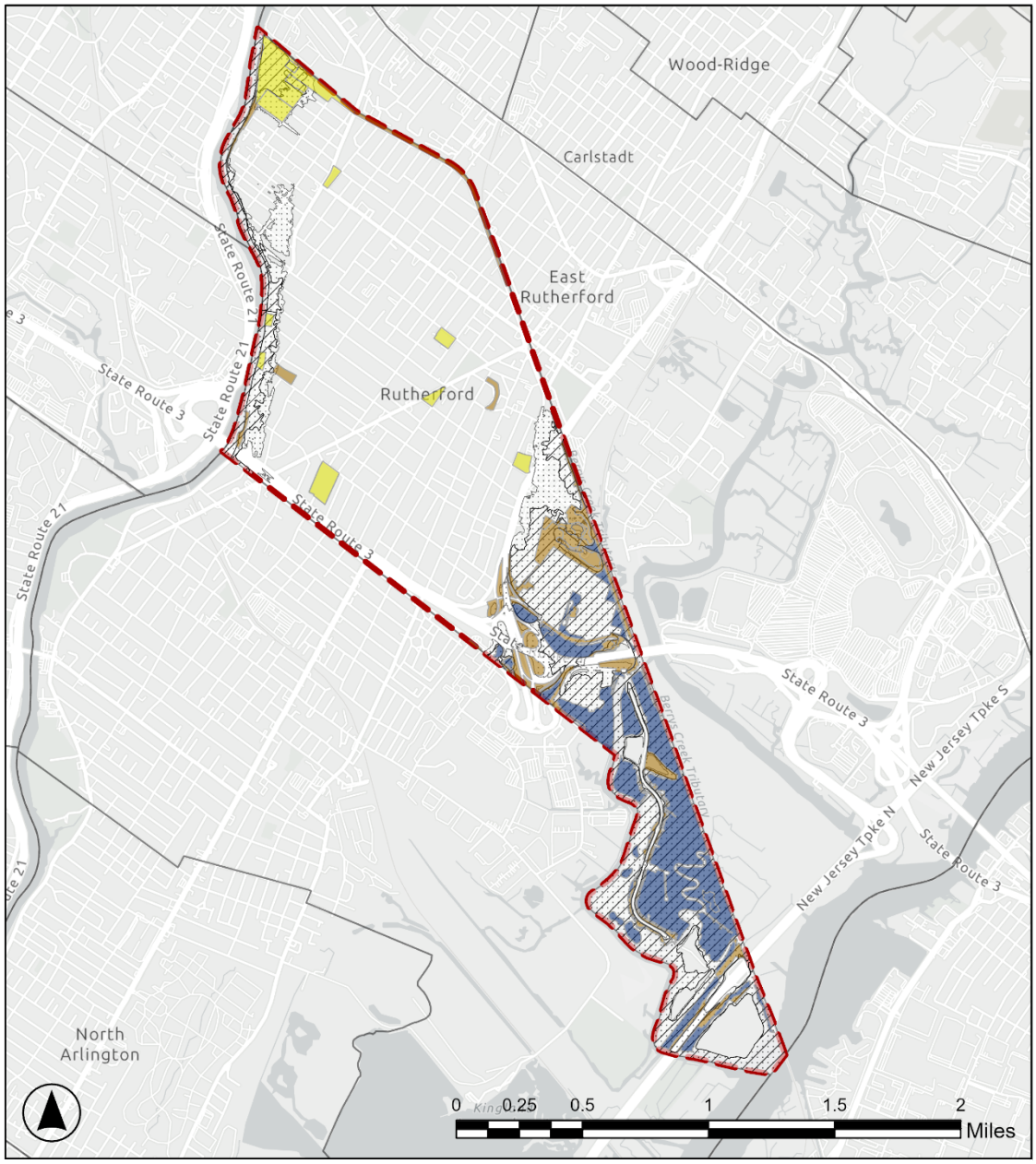
Land Use 2020 Working Lands

- Recreational
- Agricultural
- Forestland
- Wetlands

Coastal Flood Scenario

- 2ft Coastal Inundation Extent
- 6ft Coastal Inundation Extent

Map V-8. FEMA flood exposure of natural and working lands



LEGEND

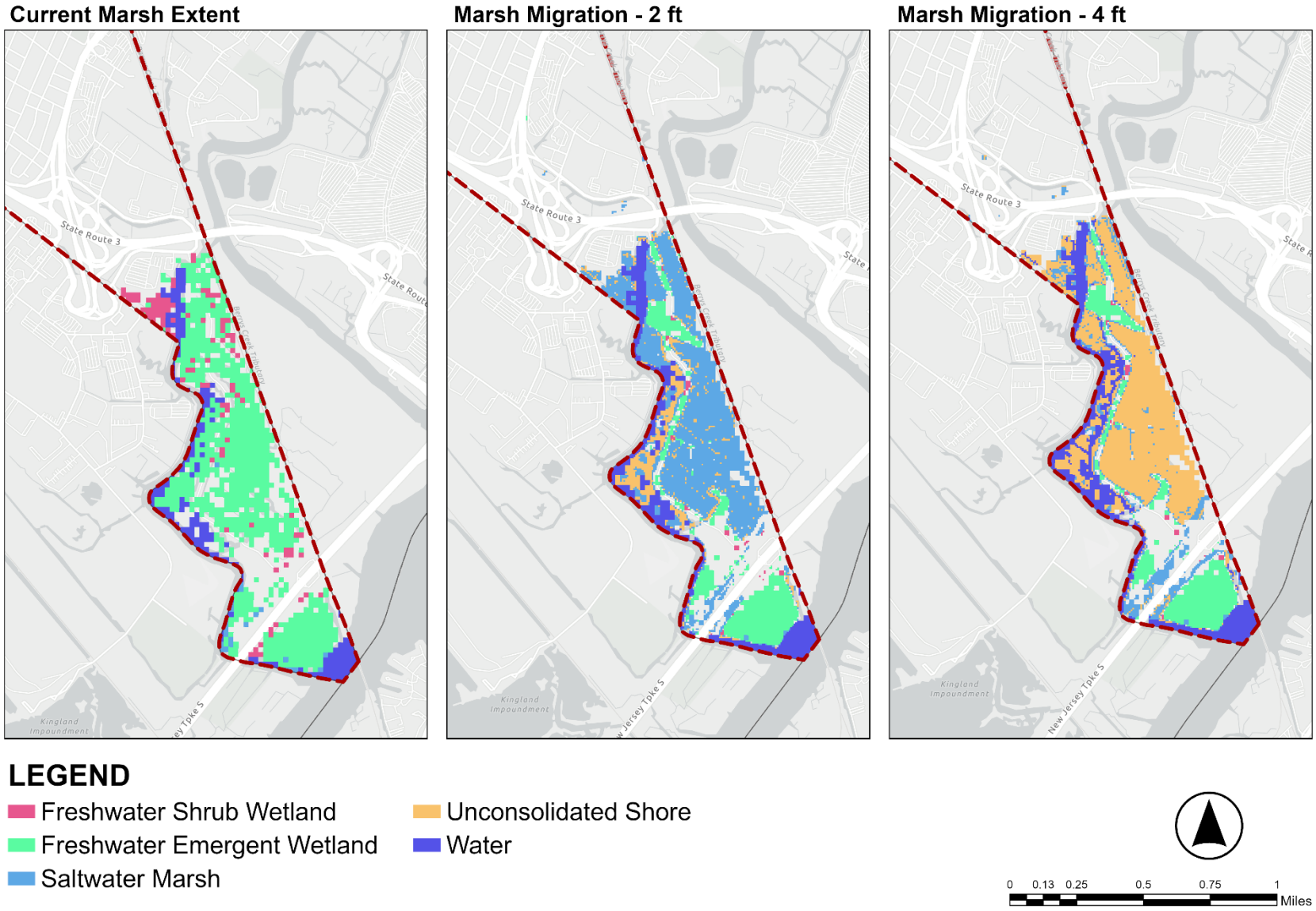
Land Use 2020 Working Lands

- Recreational
- Agricultural
- Forestland
- Wetlands

FEMA Flood Scenario

- 1Pct Annual Chance Flood
- Approx. extent of REAL CAFE

Map V-9. Marsh retreat



Drought

As detailed in Section III.C, Rutherford's time in drought each year is anticipated to increase throughout the century. Droughts can affect wetlands, forests, agriculture, and other areas with vegetative cover. Agriculture-related droughts are common, with the most recent declared disaster occurring in Cumberland and Sussex Counties from August to November 2022.[33] Agricultural drought occurs when there is not enough water available for a particular crop to grow at a particular time due to soil moisture deficiencies, lack of groundwater, and precipitation. Agricultural drought may result in a reduction in crop yields, economic loss, livestock stress, an increased demand for irrigation, and soil degradation.

Drought may also compound risks from other climate hazards. For example, drought may exacerbate saltwater intrusion due to increased groundwater pumping and decreased freshwater input via precipitation. Additionally, drought in combination with high temperatures can increase the risk of wildfires in natural and working lands, due to an increase in evaporation, dry soil conditions, and large-scale loss of trees and vegetation.

C. Community Assets

There are other assets in a community that may not be "critical" as defined by a CCRHVA. Assets with local value may be places that:

- Represent community identity;
- Are important to quality of life;
- Have significance for cultural reasons; and/or
- Provide community recreation.

Local planning can benefit from understanding impacts to these assets that shape everyday life in the community. Climate hazards may pose immediate and/or direct risks based on the exposure of the asset itself, as well as indirect and/or long-term risks associated with potential loss of the value provided to the community. Community assets in Rutherford were identified through publicly available datasets and input from municipal staff, residents, and other local stakeholders. Public datasets included locations of: (a) libraries, (b) art venues, (c) entertainment and sporting venues, (d) public access points to tidal waterways, and (e) historic properties. Community assets identified by local stakeholders were categorized as follows (see Appendix B for a list of each place identified):

[33] New Jersey Office of Emergency Management. 2024. State of New Jersey All-Hazards Mitigation Plan.

- **Civic & Community** - Organizations focused on community needs such as social connections, advocacy, including senior centers, youth centers, etc.
- **Commercial/Activity Centers** - Shops, restaurants, and other commercial entities providing community services.
- **Cultural and Historical** - Museums, galleries, theaters, etc.
- **Parks and Recreation** - Playgrounds, parks, trails, ball fields, etc.
- **Religious** - Churches, temples, and other spiritual centers.

Although essential commercial services (e.g. groceries, banks, hardware stores, etc.) may also be considered community assets, some of these facilities are included in Section V.A because of their importance to recovery after natural disasters. In this section, overall exposure analysis of commercial property parcels is included to support consideration of risks to commercially zoned areas.

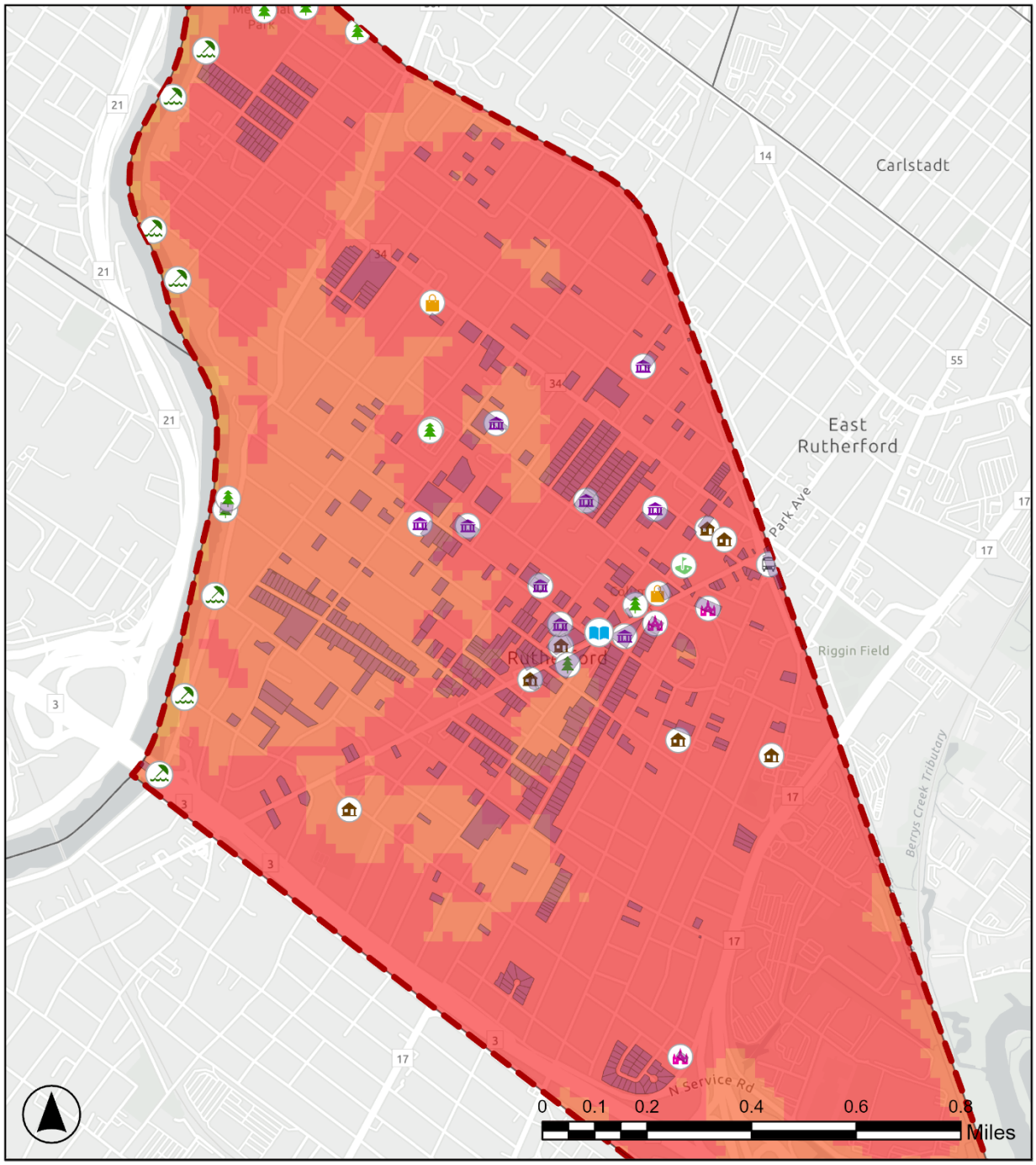
Heat

As detailed in Section III.A, temperature projections indicate that Rutherford may experience increasing heat throughout the century. Increasing temperatures limit a community's ability to access and use various indoor and outdoor community assets, thus impacting social well-being and public health. On the other hand, places of gathering such as parks, libraries, and community centers can provide heat relief. Parks and green spaces can provide heat relief, but these outdoor assets can become unsafe without available shaded areas, trees, and water. Indoor facilities with air conditioning such as libraries, local shops, community centers, and event venues can also serve as cooling spaces. Yet, these locations risk facing increased demand that can exceed their capacity. Ensuring such facilities are properly equipped, accessible, and resilient to extreme temperatures is essential for protecting public health and maintaining social and community well-being.[34]

Map V-10 depicts land surface temperature in summer 2022 in relation to Rutherford's community assets. Given the built-out nature of Rutherford, the entire borough experiences high temperatures during summer. All the community assets, therefore, are in the areas experiencing high heat. Given the library's central location, it serves as a cooling center, but there are no designated cooling centers within Rutherford. The nearest Bergen County designated cooling center is Southwest Bergen Senior Activity Center, located in East Rutherford.

[34] Filión, N.A., Knutsen, M., and Phillips, S. New Jersey Department of Environmental Protection. 2025. New Jersey Extreme Heat Resilience Action Plan.

Map V-10. Land surface temperature (°F) and community assets



LEGEND

Land Surface Temp (F)
- Under 80
- 80 - 90
- 90 - 100
- 100 - 110
- Over 110

Community Assets from Data Sources
- Libraries
- Public Access to Tidalways
- Historic Properties

Community Assets Identified by Stakeholders
- Civic & Community Organizations
- Commercial / Activity Centers
- Cultural & Historical
- Parks & Recreation
- Religious Institutions
- Senior & social services
- Train station

Storms

As detailed in Section III.B, the frequency and intensity of extreme precipitation events are anticipated to increase throughout the century. Extreme precipitation impacts community assets and economic well-being. Extreme precipitation can limit access to outdoor recreation when parks and other outdoor spaces flood and the impacts can last for extended periods. Additionally, extreme precipitation can drive biodiversity loss, impacting recreational fishing and hunting.[35] Cultural and recreational assets like beaches, boardwalks, and others vital to tourism are some of the most at risk of extreme precipitation. In coastal communities where the tourist season lasts only a few months, even a few additional days of rain or storm can result in revenue losses.[36]

Drought

As detailed in Section III.C, Rutherford's time in drought each year is anticipated to increase throughout the century. Community assets can have varying water supply demands, which can place stress on water infrastructure, the local economy, quality of life, and natural resources during droughts. Water-based recreational activities (e.g. boating, kayaking, water skiing, fishing, etc.) often depend on specific water levels. These activities can be restricted when water levels drop, negatively impacting local tourism and quality of life.[37]

Agricultural droughts hinder the irrigation of farms, limiting the availability of fresh produce for farmers' markets. Reduced water supply has also been linked with lower water quality, impacting recreation, and water-based jobs. Drought watches may trigger mandatory water conservation measures including restrictions on landscaping, gardening, outdoor recreation, and household water use. Spray parks and other water-based recreational amenities may face temporary closures to conserve water.[38]

Flood

Flood risk to community assets include short-term, temporary impacts from coastal storm events, as well as the potential for long-term losses associated with permanent inundation from sea-level rise (see Section III.D).

Maps V-11 and V-12 depict potential flood exposure of community assets in Rutherford for each of the four flood measures listed in Table III-8 (two feet coastal inundation, six feet coastal inundation, FEMA 1% annual chance flood zone, and approx. extent of REAL CAFE). Table V-5 summarizes the number of each type of asset exposed at each flood measure. Tables V-6 and V-7 provide details on the number of community asset parcels, land area, and value of property exposed.

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[35] NJDEP. 2023. Outside, Together! A statewide comprehensive outdoor recreation plan for New Jersey.

[36] Leichenko, R., M. McDermott, E. Bezborodko, M. Brady, E. Namendorf. 2014. Economic Vulnerability to Climate Change in Coastal New Jersey: A Stakeholder-Based Assessment. Journal of Extreme Events, Volume 1.

[37] NOAA. 2025. National Integrated Drought Information System. By Sector: Recreation & Tourism.

[38] State of NJ. 2024. 2024 New Jersey Water Supply Plan.

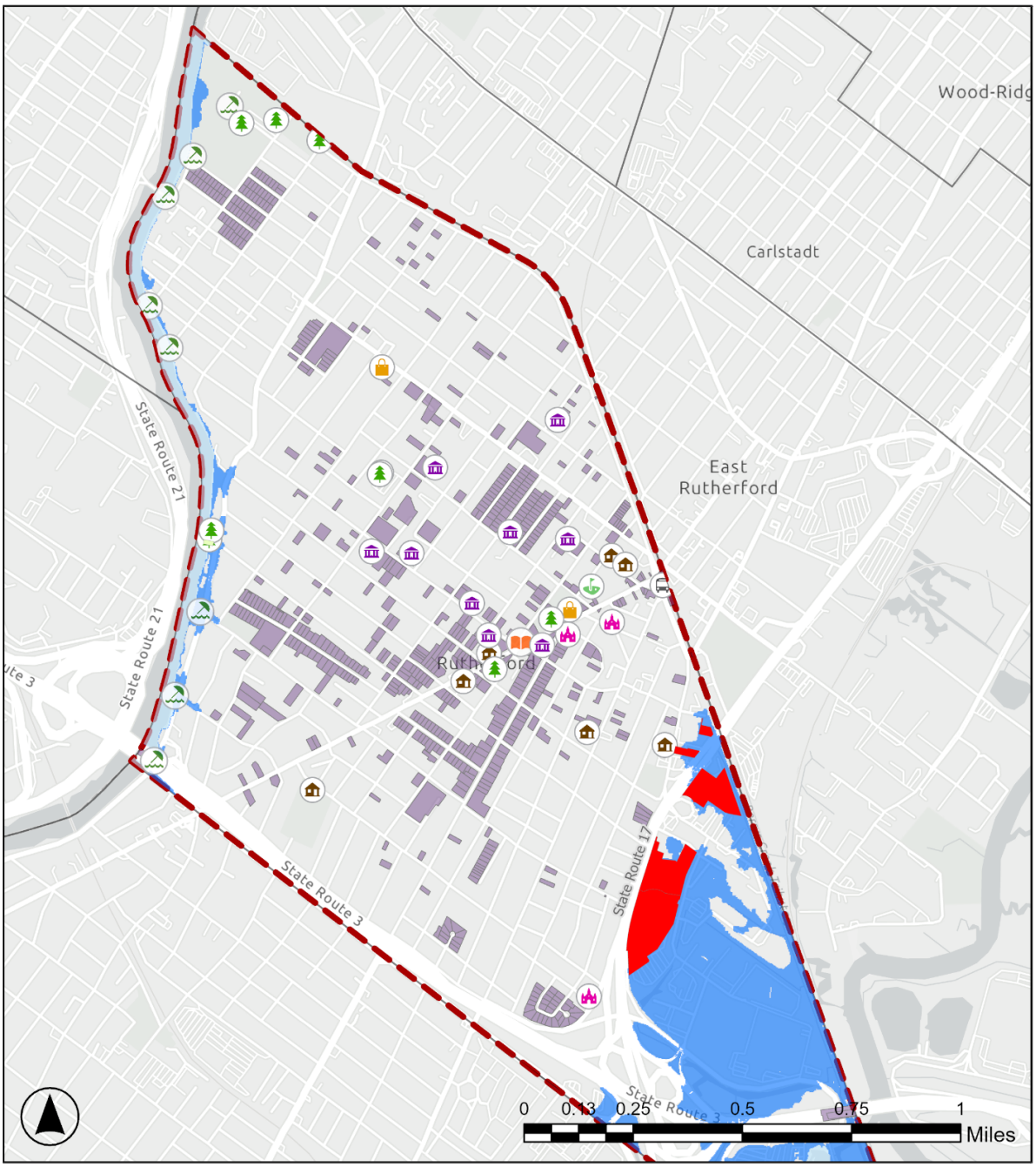
Overall, Rutherford's community assets have relatively low flood risk, with the exception of public access points to tidal waterways along the Passaic River. The most impacted community asset parcels are the commercial parcels along Route 17, being exposed to six feet coastal flooding, FEMA 1% annual chance flooding, and approximate extent of REAL CAFE, and having about $130 million of net equalized value at risk.

Table V-5. Flood exposure of community assets

	Total #	# Exposed in...			
		2 feet coastal inundation	6 feet coastal inundation	FEMA 1% Annual Chance Flood	Coastal flood rule (CAFE)
Libraries	1	0	0	0	0
Entertainment and Sporting Venues	1	0	0	0	0
Public Access Points to Tidal Waterways	8	3	4	7	8
Civic & Community Organizations*	8	0	0	0	0
Commercial / Activity Centers*	2	0	0	0	0
Cultural & Historical*	3	0	0	0	0
Parks & Recreation*	8	0	2	3	5
Religious Institutions*	9	0	0	0	0
Senior & social services*	1	0	0	0	0
Train station*	1	0	0	0	0

**Community assets identified by stakeholders*

Map V-11. Community assets exposed at 2 feet and 6 feet coastal inundation



LEGEND

Coastal Inundation

- 2ft Coastal Inundation Extent
- 6ft Coastal Inundation Extent

Community Assets from Data Sources

- Libraries
- Public Access to Tidalways
- Historic Properties

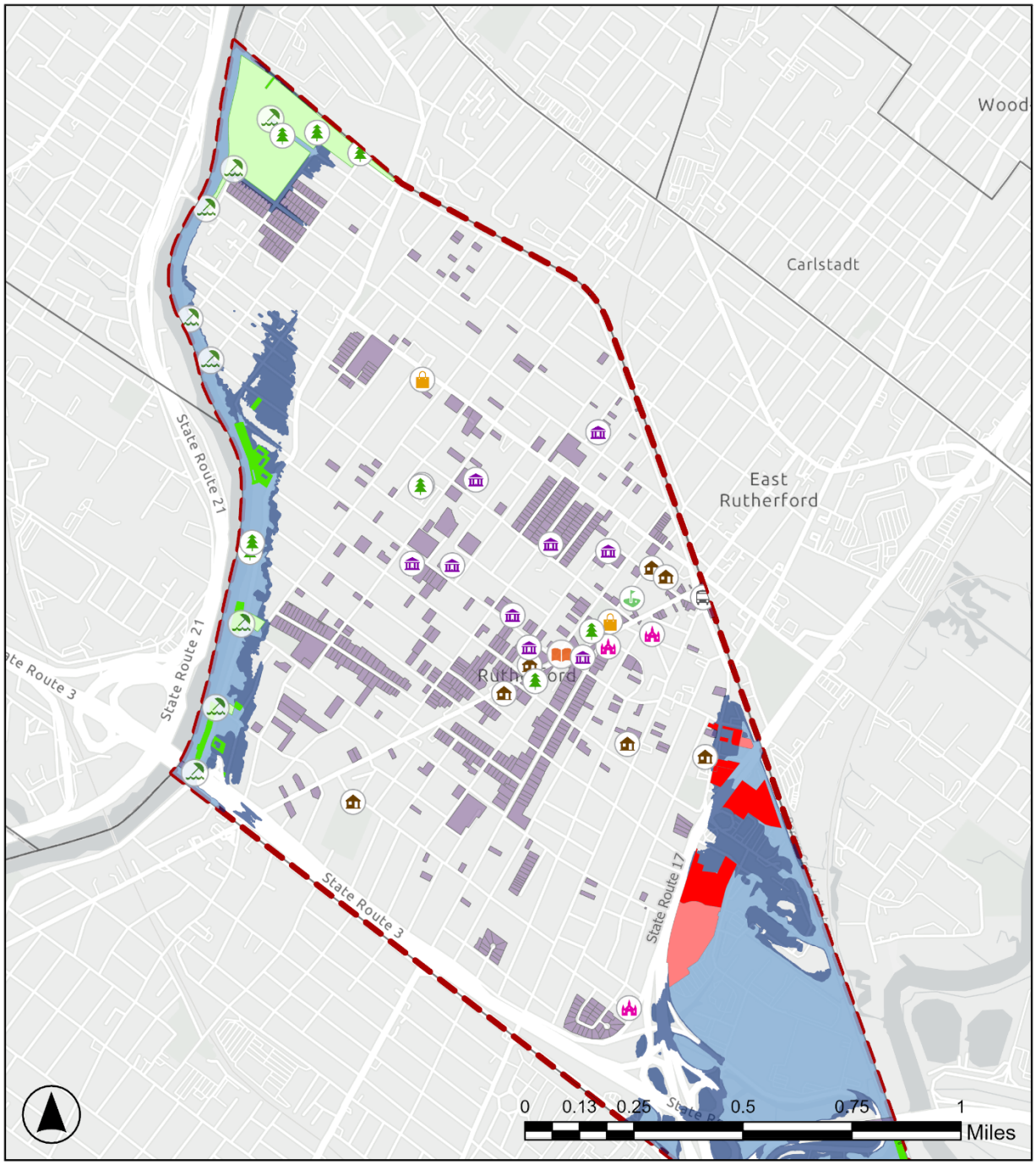
Community Assets Identified by Stakeholders

- Civic & Community Organizations
- Commercial / Activity Centers
- Cultural & Historical
- Parks & Recreation
- Religious Institutions
- Senior & social services
- Train station

Parcels Impacted at 6ft

- Public Property
- Commercial Parcels

Map V-12. Community assets within FEMA flood zones



LEGEND

FEMA Flood Scenario
- 1Pct Annual Chance Flood
- Approx. extent of REAL CAFE

Community Assets from Public Data Sources
- Libraries
- Public Access to Tidalways
- Historic Properties

Community Assets Identified by Stakeholders
- Civic & Community Organizations
- Commercial / Activity Centers
- Cultural & Historical
- Parks & Recreation
- Religious Institutions
- Senior & social services
- Train station

Parcels Impacted by FEMA1pct
- Public Property and Other Exempt
- Commercial

Parcels impacted by REAL CAFE
- Public Property and Other Exempt
- Commercial

Table V-6. Flood exposure of community asset parcels at 2 feet and 6 feet coastal inundation

		Number / land area exposed in...					
		2 feet coastal inundation			6 feet coastal inundation		
MOD IV Property Class	Total # parcels	# Parcels	Acres	Net Equalized Value ($)	# Parcels	Acres	Net Equalized Value ($)
Commer-cial (4A)	224	0	0	0	4 (1%)	21	124,170,939
Public Properties (15C)	46	0	0	0	1 (2%)	0.15	1,631,678
Total	**362**	**0**	**0**	**0**	**5 (1%)**	**21.15**	**125,802,617**

Note: Class 15 properties with no improvement value were excluded from the count of exposed parcels.

Table V-7. Flood exposure of community asset parcels within FEMA flood zones

		Number / land area exposed in...					
		FEMA 1% Annual Chance Flood			Coastal Flood Rule (CAFE)		
MOD IV Property Class	Total # parcels	# Parcels	Acres	Net Equalized Value ($)	# Parcels	Acres	Net Equalized Value ($)
Commercial (4A)	224	2 (0.8%)	10	112,974,906	11 (5%)	23	128,300,594
Public Properties (15C)	46	2 (4%)	32	22,149,217	10 (22%)	96	32,966,945
Other Exempt (15E and 15F)	49	2 (4%)	0.74	1,387,075	7 (14%)	4	2,706,017
Total	**362**	**6 (2%)**	**42.74**	**136,511,198**	**28 (8%)**	**123**	**163,973,556**

Note: Class 15 properties with no improvement value were excluded from the count of exposed parcels.

D. Housing and People

Climate hazards can exacerbate existing housing issues such as escalating housing costs, displacement of lower-income people, and aging infrastructure. Although everyone who lives in New Jersey is vulnerable to climate change, some population groups are more vulnerable than others. Assessing the disproportionate impacts faced by these populations is necessary to assess the impacts of climate change on a community as a whole. Table V-8 provides data[39] on Rutherford's vulnerable population groups.

Table V-8. Overburdened populations in Rutherford

	Population/Household Estimate	Population Percent in Rutherford	Pop. in OBC census blocks
Low-income	2,124	11.3%	1,449
Minority	10,626	56.7%	6,040
American Indian or Alaska Native	34	0.1%	
Asian	2,768	14.7%	
Black or African American	612	3.3%	
Native Hawaiian or Pacific Islander	11	<0.1%	
Some other race	476	2.5%	
Two or more races	2,666	14.2%	
Hispanic	4,059	21.6%	
Limited English proficiency households	2,803	40.3% (Total households - 6,955)	198

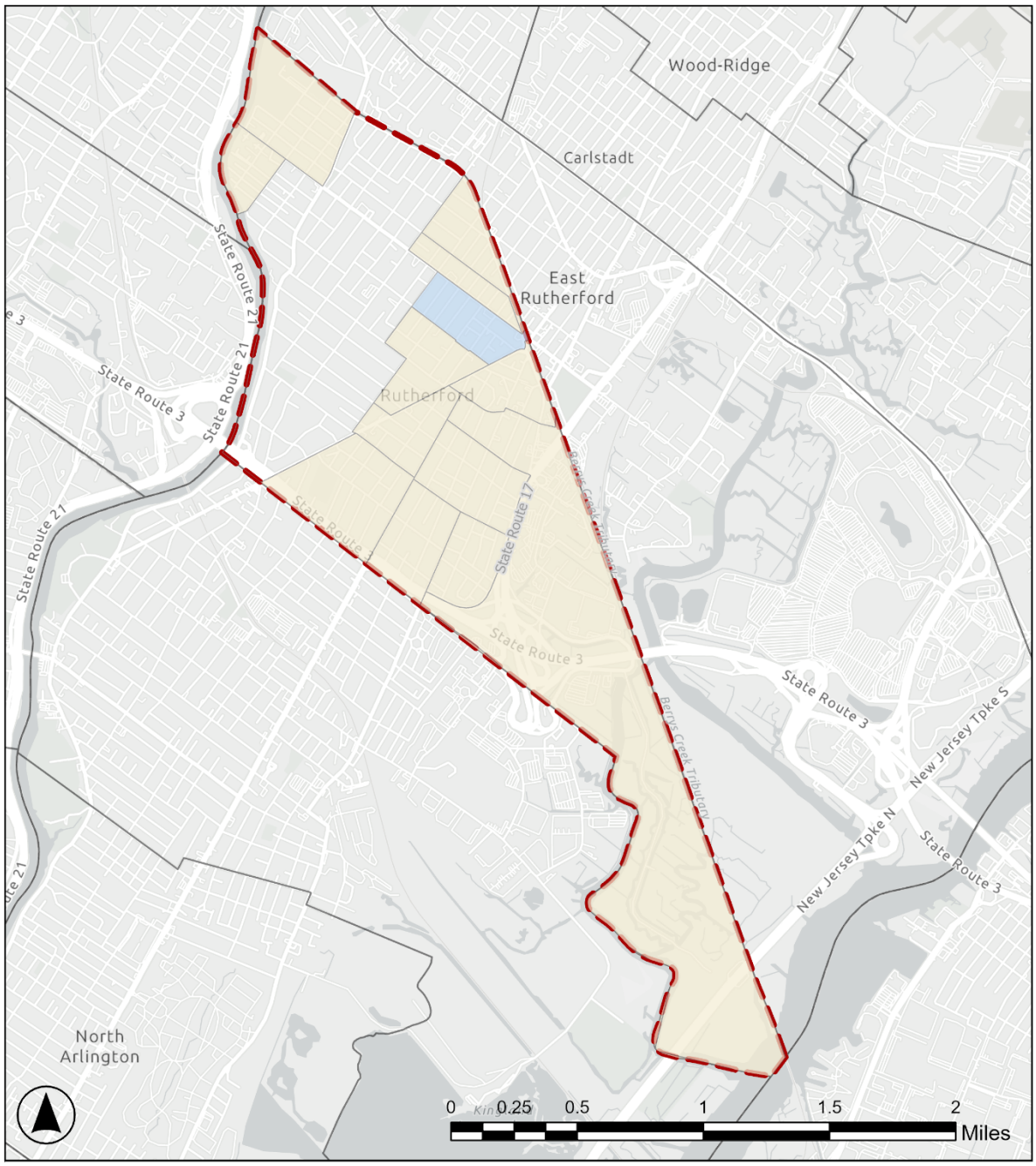
[39] U.S. Census Bureau. 2024. American Community Survey Five Year Estimates.

Additionally, New Jersey Environmental Justice Law (N.J. Stat. Ann. 13:1D-157) defines as census block groups with:

- At least 35 percent low-income households (at or below twice the poverty threshold as determined by the United States Census Bureau); or
- At least 40 percent of the residents identify as minority or as members of a State recognized tribal community; or
- At least 40 percent of the households have limited English proficiency (without an adult that speaks English "very well" according to the United States Census Bureau)

The Overburdened Community (OBC) designation facilitates mapping of these vulnerable populations within each municipality statewide. As depicted on Map V-13, most of Rutherford's census block groups are defined as OBC due to the percentage of minority households, and one centrally located census block group is designated as both low-income and minority.

Map V-13. Overburdened communities



LEGEND

- Low Income and Minority
- Minority

Heat

As detailed in Section III.A, temperature projections indicate that Rutherford may experience increasing heat throughout the century. Hot days, in combination with poor housing conditions and lack of climate control can have significant impacts on health. Lack of air conditioning and crowded living spaces can cause heightened anxiety, disrupt sleep patterns, and stress cardiovascular systems.[40] Housing with insufficient building insulation located in areas of high surface temperature or potential heat islands may expose residents to temperatures that can exceed outside temperatures. In New Jersey, heat-related hospital admissions during the warm season (May to September) increased approximately 156% between 2004 and 2013.[41] Children, elderly people, and those with pre-existing conditions are especially at risk. In Rutherford, 35% of the population is either over 65 years old (15%) or under 17 years old (20%).

Additionally, the combination of high heat with high humidity increases risk to outdoor occupational groups for heat-related illnesses like heat stroke.[42] Occupational groups that are particularly vulnerable because of the amount of time spent outside include workers in construction, agriculture, forestry, and natural resource management. 7% of Rutherfords's employed labor force is employed in agriculture, construction, and transportation and warehousing sectors[43] which makes them vulnerable to heat-related health risks during extreme heat events. High temperatures also increase the concentration of ground-level ozone in the air. This is particularly harmful for individuals with chronic respiratory conditions.[44]

To better understand potential heat stress challenges to residents, Map V-14 depicts housing parcels relative to land surface temperature. Most of Rutherford's housing is located in higher-temperature areas, partly because impervious surface (i.e. buildings, roofs, sidewalks, parking lots, streets, etc.) trap heat. Map V-15 depicts heat island risk relative to the Census Block Groups designated as OBCs. Overall, Rutherford has higher impervious surface coverage than tree canopy, presenting potential heat island risks to OBCs. For the borough, the nearest Bergen County designated cooling center is Southwest Bergen Senior Activity Center, located in East Rutherford. Rutherford may consider designating the Public Library and other appropriate locations as cooling centers to provide relief for residents of all ages who are unable to travel to neighboring towns during heat waves.

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[40] Filión, N.A., Knutsen, M., and Phillips, S. New Jersey Department of Environmental Protection. 2025. New Jersey Extreme Heat Resilience Action Plan.

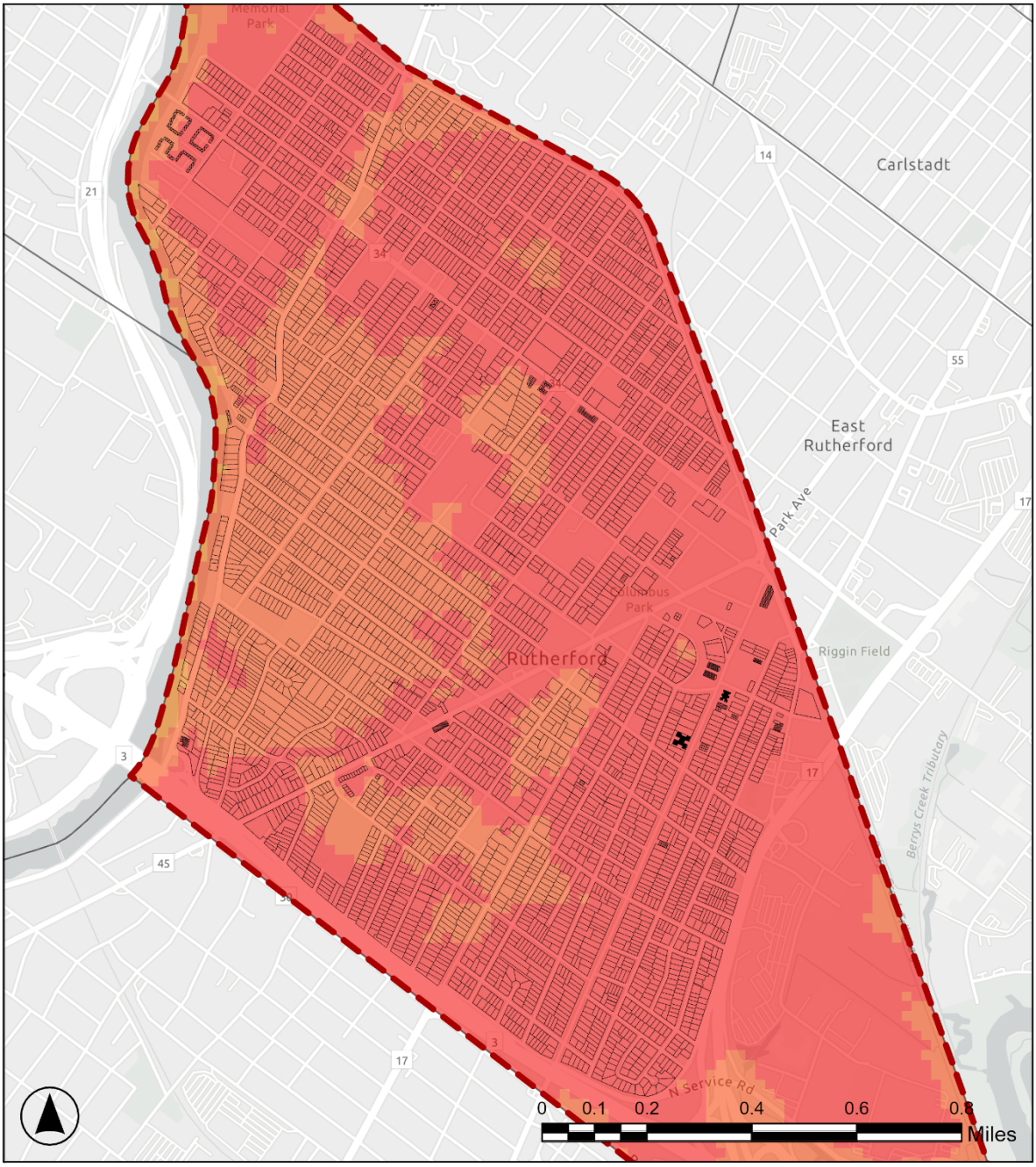
[41] Moran, D., J. Whytlaw, J. Herb, M. Kaplan, J. Madrigano, and P. Kinney. 2017. New Jersey Climate and Health Profile Report. New Jersey Climate Adaptation Alliance. New Brunswick, NJ: Rutgers University.

[42] NJDEP. 2022. Climate Change Impacts on Human Health & Communities: Addendum to the 2020 New Jersey Scientific Report on Climate Change. Version 1.0. (Eds. J.A. Bonventre, L.A. Lester). Trenton, NJ. 54 pp.

[43] Borough of Rutherford. 2025. Fourth Round Housing element and Fair Share Plan

[44] Center for Disease Control. 2022. Heat and chronic conditions.

Map V-14. Land surface temperature (°F) and housing



LEGEND

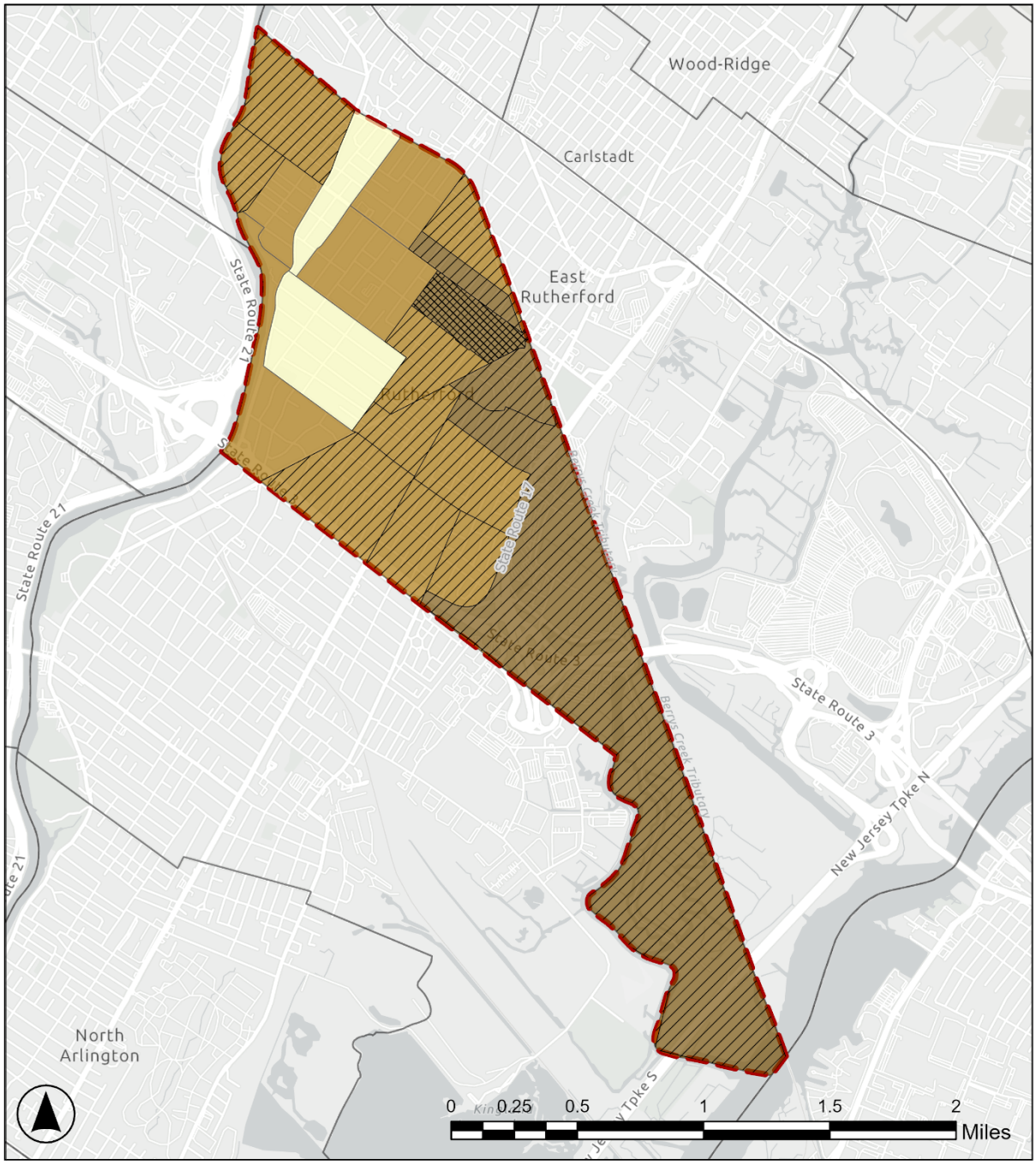
Rutherford Parcels

- Residential and Apartments

Land Surface Temp (F)

- Under 80
- 80 - 90
- 90 - 100
- 100 - 110
- Over 110

Map V-15. Heat island risk to Overburdened Communities



LEGEND

Tree Canopy to Impervious Surface Ratio

- Higher Canopy Cover
- Moderately Higher Canopy Cover
- Equivatent Impervious/Canopy Cover
- Moderately Higher Impervious Cover
- Higher Impervious Cover

Overburdened Community Criteria

- Low Income and Minority
- Minority

Storms

As detailed in Section III.B, the frequency and intensity of extreme events are anticipated to increase throughout the century. The public health impacts of storms are well documented in New Jersey. For example, extreme rainfall during the warm season has been connected to increases in hospitalizations for gastrointestinal illness.[45] In the aftermath of Superstorm Sandy, adults exposed to mold in their homes were more likely to be diagnosed with asthma and more likely to report mental health distress. Children living in homes that experienced even minor damage were at higher risk for psychological and emotional issues.[46] According to data from the US Census Bureau, approximately 5% of Rutherford's population does not have health insurance and may be at particular risk of health impacts.

Tropical storms and hurricanes may damage residential buildings, including impacts from tree debris and the loosening of windows or roof shingles. Mobile homes are especially susceptible to damage or loss. Financially burdened households are also at particular risk as their response to extreme weather is constrained by limited resources. These constraints may prevent evacuation, the purchase of backup energy systems, access to emergency services, and/or insurance uptake. Review of summary data on the National Flood Insurance Program in Rutherford indicates that there are 54 Repetitive Loss properties and 17 Severe Repetitive Loss properties with a total of 187 claims paid on these structures since 1978.[47]

Power outages during winter months pose additional risks to vulnerable populations, including the elderly and medically frail, who are more susceptible to cold temperature exposure in homes and facilities without air conditioning or heat. The loss of power can have serious health implications for New Jersey residents, where approximately 15.8% of homes rely on electricity for heating and cooling. Beyond residential settings, individuals in medical facilities may face life-threatening situations if critical equipment fails due to storm-induced outages. Vulnerable populations, like the elderly, especially in coastal communities, are considered the most vulnerable due to the direct exposure to high-impact storms, limited adaptive capacity, and the need for additional time or assistance during evacuations.[48]

Drought

Rutherford's time in drought each year is anticipated to increase throughout the century (see Section III.C). Drought can exacerbate climate-related effects on social systems. While the built environment, including housing, is not directly damaged by drought, a home's dependence on the public water supply can influence its livability during drought periods.

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[45] Gleason, J. & Fagliano, J. 2017. Effect of drinking water source on associations between gastrointestinal illness and heavy rainfall in New Jersey. https://doi.org/10.1371/journal.pone.0173794

[46] Abramson, D., Alst, D., Merdjanoff, A., Piltch-Loeb, R., Beedasy, J., Findley, P., Peek, L., Mordy, M., Moroso, S., Ocasio, K., Park, Y.S, Sury, J., Tobin, J. 2015. Sandy Child and Family Health Study PERSON Report.

[47] FEMA. 2026. NFIP Multiple Loss Properties.

[48] New Jersey Office of Emergency Management. 2024. State of New Jersey All-Hazards Mitigation Plan.

During periods of heightened demand on public water systems, increasing operational costs may be passed down to the consumer. Increasing water supply rates may restrict water access for financially constrained households. In rural communities, droughts are felt more acutely due to the reliance on private wells, their susceptibility to drying up, and the costly nature of maintaining them. Limitations to financial and technical resources further exacerbate a community's vulnerability to drought-related hazards.[49]

Flood

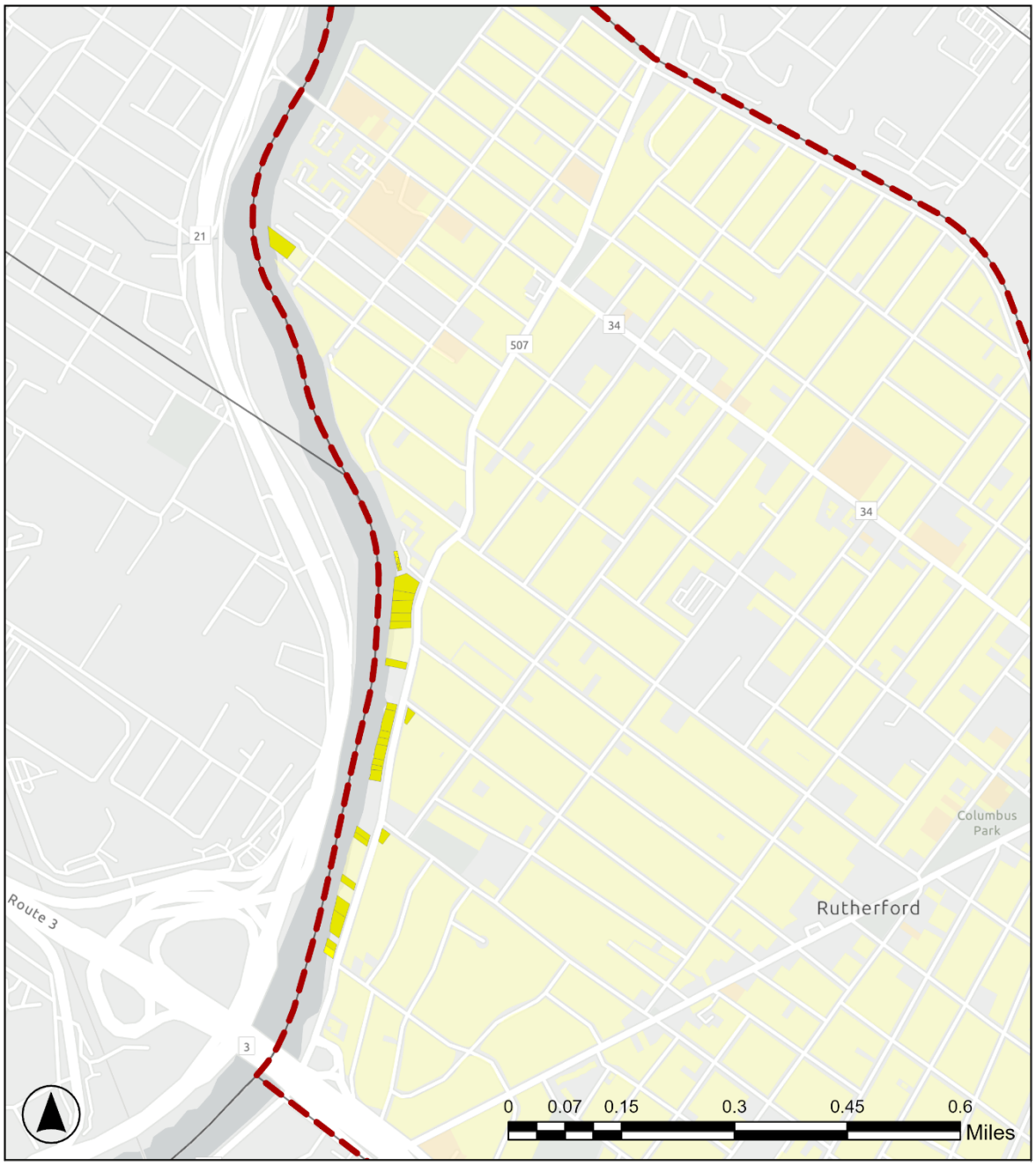
New Jersey has the largest number of affordable-housing units exposed to sea-level rise among all coastal states, with 1,640 affordable housing units subject to coastal flooding at least once a year.[50] Flooding impacts vulnerable populations by exacerbating existing underlying inequities. In addition to impacts to property, flooding causes physical and mental health impacts. The most direct health impact from flooding is drowning and trauma. Other health impacts from flooding can be the result of increased risk of exposure to contaminants such as bacteria, mold, parasites and chemical pollutants that can cause gastrointestinal, respiratory and other conditions. Costly repairs and displacement resulting from flood damages can create financial burdens that disproportionately impact low- to moderate-income families.[51]

Maps V-16 and V-17 depict the potential flood exposure of housing parcels in Rutherford for each of the four flood measures listed in Table III-8 (two feet coastal inundation, six feet coastal inundation, FEMA 1% annual chance flood zone, and approx. extent of REAL CAFE). Tables V-9 and V-10 provide details on the number of residential parcels, land area, and value of property exposed.

Flood risk to Rutherford's residential development is limited to the area along the Passaic River, except for two multi-unit parcels north of Route 17 within the approximate extent of REAL CAFE zone. Thirty residential parcels are exposed at six feet of coastal flooding ($14 million in net equalized value) and 64 parcels fall within the FEMA 1% annual chance flood zone ($32 million in net equalized value). Future flood risk is more significant, with 211 residential parcels located within the approximate extent of REAL CAFE (nearly $110 million in net equalized value). The fact that Rutherford's main development experiences limited flood exposure points to sound land use decisions made by the Borough thus far. Because the low elevation areas of Rutherford within the Meadowlands region are the most prone to flooding, the Borough may continue to prioritize development and infrastructure investment in its historically safe areas of higher elevation, while limiting new construction in the flood vulnerable Meadowlands section.

[49] New Jersey Office of Emergency Management. 2024. State of New Jersey All-Hazards Mitigation Plan.
[50] Buchanan, Maya K. et al. 2020. Sea-level rise and coastal flooding threaten affordable housing. Environmental Research Letters, Volume 15.
[51] Interagency Council on Climate Resilience. 2025. New Jersey Statewide Flood Resilience Initiatives.

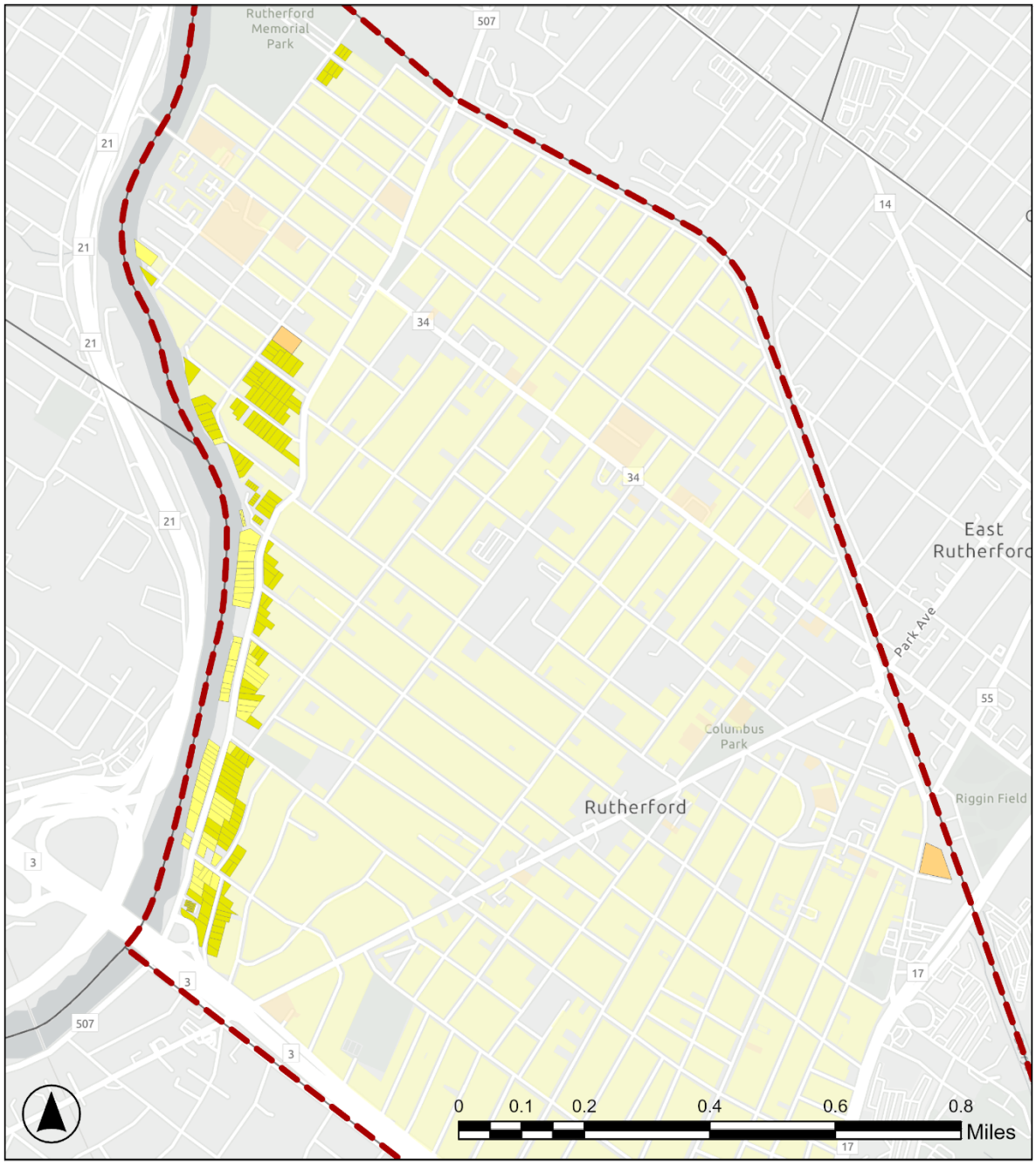
Map V-16. Housing parcels exposed at 2 feet and 6 feet coastal inundation



LEGEND

Parcels not Flooded	Parcels Impacted by 2ft	Parcels Impacted by 6ft
Residential	Residential	Residential
Apartments	Apartments	Apartments

Map V-17. Housing parcels within FEMA Flood Zones



LEGEND

Parcels Not Flooded	Parcels Impacted by FEMA1pct	Parcels impacted by REAL CAFE
Residential	Residential	Residential
Apartments	Apartments	Apartments

Table V-9. Flood exposure of housing parcels at 2 feet and 6 feet coastal inundation

		Number / land area exposed in...					
		2 feet coastal inundation			6 feet coastal inundation		
MOD IV Property Class	Total # parcels	# Parcels	Acres	Net Equalized Value ($)	# Parcels	Acres	Net Equalized Value ($)
Residential (2)	5,013	4 (0%)	0.13	1,492,040	30 (0.6%)	4	14,644,765
Apartment (4C)	34	0	0	0	0	0	0
Total	**5,047**	**4 (0%)**	**0.13**	**1,492,040**	**30 (0.6%)**	**4**	**14,644,765**

Table V-10. Flood exposure of housing parcels within FEMA Flood Zones

		Number / land area exposed in...					
		FEMA 1% Annual Chance Flood			Coastal flood rule (CAFE)		
MOD IV Property Class	Total # parcels	# Parcels	Acres	Net Equalized Value ($)	# Parcels	Acres	Net Equalized Value ($)
Residential (2)	5,013	64 (1%)	10	32,448,057	211 (4%)	30	110,514,031
Apartment (4C)	34	0	0	0	2 (0%)	2	51,540,475
Total	**5,047**	**64 (1%)**	**10**	**32,448,057**	**213 (4%)**	**32**	**162,054,506**

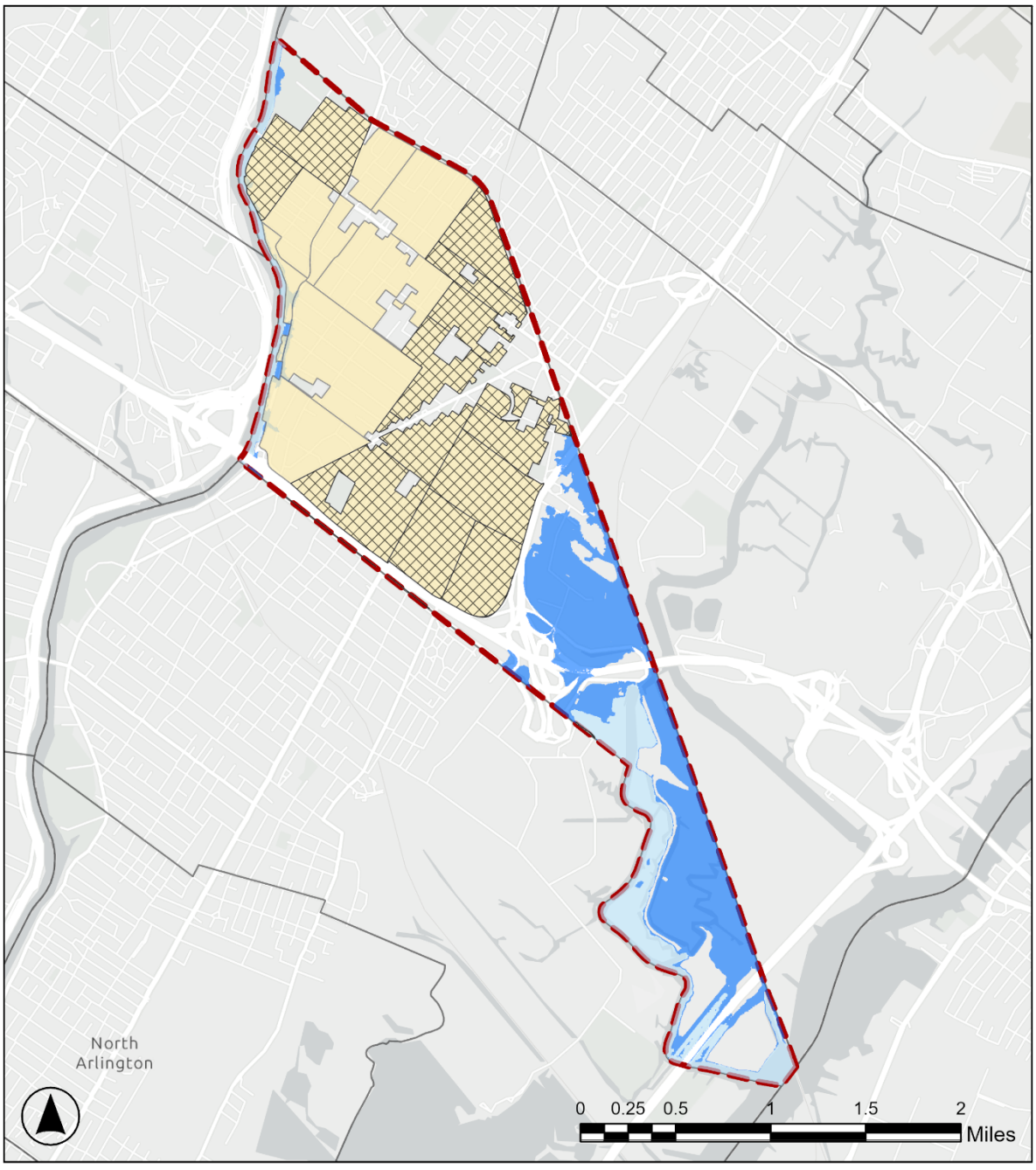
Maps V-18 and V-19 depict potential flood exposure of OBCs in Rutherford for each of the flood measures. These maps depict the residential areas within the OBCs to better illustrate the flood risks where vulnerable populations reside. Rutherford has a total of 6,040 residents belonging to minority groups, 1,449 residents living below the poverty line, and 198 households with limited English proficiency. Table V-11 summarizes the number of people exposed within Rutherford's OBC census blocks for each flood measure. Flood risk to the places where Rutherford's vulnerable populations live is relatively low.

Table V-11. Flood exposure of Overburdened Communities

	Total # in OBC census blocks	Estimated number of people exposed in...			
		2 feet coastal inundation	6 feet coastal inundation	FEMA 1% Annual Chance Flood	Coastal Flood Rule (CAFE)
Low-income*	1,449	0	2	1	16
Minority	6,040	0	19	15	107
Limited English proficiency households	198	0	1	1	4

**At or below twice the poverty threshold as determined by the United States Census Bureau*

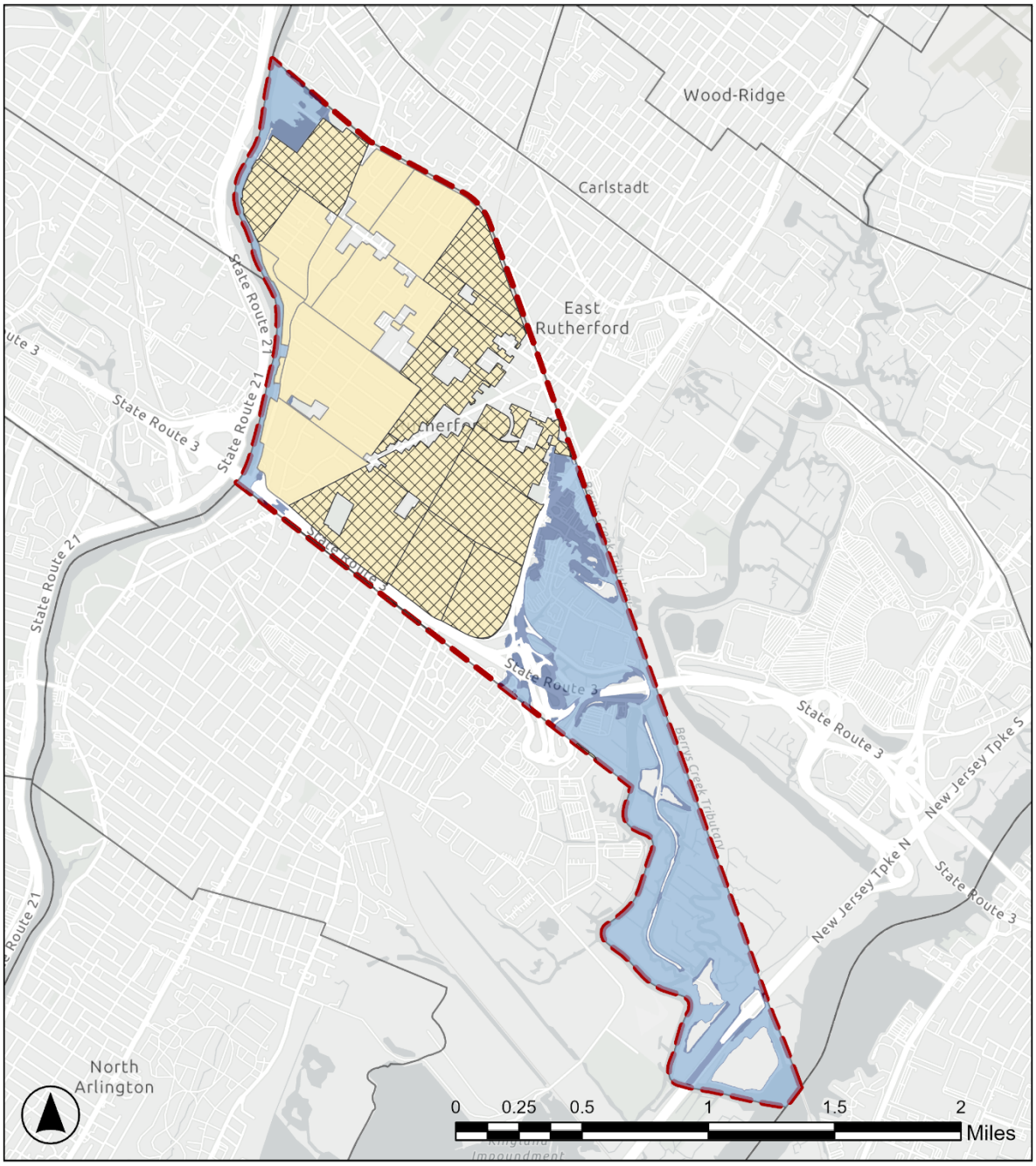
Map V-18. Overburdened Communities exposed at 2 feet and 6 feet coastal inundation



LEGEND

- 2ft Coastal Inundation Extent
- 6ft Coastal Inundation Extent
- Census Block Group by Residential Land Use
- Residential Areas in Overburdened Communities

Map V-19. Overburdened Communities within FEMA flood zones



LEGEND

- 1Pct Annual Chance Flood
- Approx. extent of REAL CAFE
- Census Block Group by Residential Land Use
- Residential Areas in Overburdened Communities

VI. Impacts on Master Plan Elements

The New Jersey Municipal Land Use Law (MLUL) requires a CCRHVA to analyze "the potential impact of natural hazards on relevant components and elements of the master plan." Table VI-1 lists the master plan documents and elements reviewed and analyzed for Rutherford Borough.

Table VI-1. Rutherford Borough master plan documents and elements analyzed

Master plan documents	Master plan elements
• 2007 Borough Master Plan • 2018 Master Plan Reexamination	**Mandatory Elements** • Statement of Objectives, Principles, Assumptions, Policies and Standards (SOPAPS) • Land Use • Housing **Optional Elements (included in the Master Plan)** • Community Facilities • Economic Plan • Circulation • Utilities • Historic Preservation

For each element, this section includes a summary of relevant components, connections with the current and future climate hazards and exposures identified in this CCRHVA, and potential considerations for the Borough to improve resilience. Each element is analyzed with reference to the 2018 master plan reexamination, although earlier plan versions are referenced where relevant.

A. Statement of Objectives, Principles, Assumptions, Policies and Standards (SOPAPS)

Although the 2007 Master Plan does not contain a separate section formally titled Statement of Objectives, Principles, Assumptions, Policies and Standards (SOPAPS), the required components are incorporated throughout the Introduction and Goals and Objectives chapter. Among the plan's most important goals are preserving the Borough's residential character while providing convenient commercial and retail opportunities; capitalizing on the downtown's role as a transportation hub to support an accessible, mixed use village center; maintaining a balanced and diverse housing stock for all generations; and preserving natural resources to manage stormwater, reduce flood damage risk, and protect open space.

B. Land Use Element

The land use element of the master plan is a core component of a municipal government's master plan. It is the guiding force determining which land uses are appropriate for different areas within a municipality. Its objectives include preserving the character and quality of residential neighborhoods, identifying suitable locations for multi-unit housing, and promoting mixed-use, pedestrian-oriented downtown development with access to public transportation.

The land use element also encourages commercial development that emphasizes shared access to infrastructure, efficient parking, and transit compatibility. While many of these objectives align with the goals of the CCRHVA, any incompatible policies can be adjusted to best mitigate climate change-related hazards.

Climate Hazard Connections

The major cause for concern in the Borough is flooding along the Passaic River and in areas contained within the Meadowlands District. There are a number of homes within the residential area, near the Passaic River, which are susceptible to flooding, and a number of them have begun the process of elevating the structures. There is currently little development within the NJSEA governed Meadowlands, except for a few warehousing facilities.

Potential Resilience Considerations

- The Borough should encourage new development in areas which are not prone to flooding risks.
- Given redevelopment and development pressure within the Borough, Rutherford would benefit from considering the implementation of rules that require developers to provide proportionate financial contributions for projects in flood-prone areas. These funds would support the delivery and maintenance of infrastructure essential for mitigating anticipated climate change impacts. Use of the Rutgers University NJADAPT suite of data mapping and visualization tools could be helpful in this regard.
- Locating multi-unit residential development in already built-up areas of the Borough, particularly near public transportation, commercial corridors, and municipal services would help to reduce potential future exposure to climate hazards.

C. 2025 Housing Element and Fair Share Plan for the Fourth Round

The Borough's Fourth Round Housing Element and Fair Share Plan (2025 - 2035) outlines how Rutherford will meet its affordable housing obligations, primarily through redevelopment and infill sites.

The Fourth Round Housing Element seeks to ensure that housing in the Borough remains accessible to residents of all generations, both current and future. This includes identifying appropriate locations for multi-unit housing while preserving the character of existing residential neighborhoods through compatible renovations and new construction. The housing element also encourages a healthy mix of land uses that fosters residential quality alongside convenient access to commercial and retail opportunities, with growth and development guided by the capacity of existing and planned infrastructure.

Redevelopment Assumptions

Redevelopment is already underway or advancing in multiple parts of the Borough, indicating that growth pressures are current rather than hypothetical. The 2018 master plan reexamination identifies completed projects at 106 Park Avenue and 118 Park Avenue, construction underway at Highland Cross, approved residential development at Agnew Place Area B, a pending developer plan for Agnew Place Area A, and adopted redevelopment frameworks for the Williams Center/Theatre District and Kip Avenue areas.

Current and future redevelopment can be an important mechanism for the Borough to implement CCRHVA findings, especially through site design, stormwater controls, infrastructure contributions, tree canopy requirements, emergency access, and hazard screening.

Climate Hazard Connections

Given the near built-out land use patterns in Rutherford, site availability is limited, and some parcels are affected by environmental constraints; the CCRHVA can help provide clarity when evaluating potential developable sites. In practice, this means using climate hazard information to avoid placing new affordable housing in higher-risk areas wherever feasible, while also encouraging basic resilience measures in project design. The Housing Element and Fair Share Plan assigns Rutherford a Present Need obligation of 16 units and a Prospective Need obligation of 210 units, while also considering land capacity, infrastructure availability, and realistic development potential. As potential sites are evaluated, CCRHVA mapping can help identify whether any locations are affected by current or future flood exposure, drainage limitations, or other environmental constraints.

Potential Resilience Considerations

No changes to the 2025 Housing Plan Element are recommended. However, the Borough would benefit from considering the following potential resilience strategies as part of its continuing comprehensive housing planning efforts:

- The Borough should consider discouraging concentration of affordable housing in flood-prone or environmentally constrained locations.
- Rutherford should encourage resilient design measures such as the elevating of structures above base flood elevation, protection of mechanical systems, and on-site stormwater management particularly through low impact strategies. The NJDEP Stormwater Management Best Management Practices Manual can provide the Borough with helpful resources in this regard.

D. Optional Elements

Community Facilities Plan Element

This element found in the 2007 master plan, readopted in the 2018 master plan reexamination, encapsulates the entirety of assets for the community of Rutherford; including, but not limited to: public schools, government buildings, parks, places of cultural relevance, and the Meadowlands. Beyond physical structures, the community facilities element also includes tree maintenance, tree canopy coverage, and forestry community health as outlined in the forestry management plan.

Climate Hazard Connections

Current objectives of this element outline the utilization of LEED Green Building Rating System for renovated and future public buildings, expansion of parks within the borough, and providing better access to waterfront properties and the Meadowlands area. Because NJSEA maintains land use jurisdiction over the Meadowlands, Rutherford's agency in implementing changes pertaining to the space is limited to an advisory role.

Potential Resilience Considerations

- Allocation of future resources to implement flooding and stormwater mitigation efforts for existing parks and waterfront properties, specifically Memorial Park.
- Continuation of prioritization for LEED Certification Programs with all community facilities wherever possible.
- Encourage active use of resources that promote nature-based infrastructure strategies that can contribute to mitigation of flooding and heat impacts. This can include:
    - Continue implementation of the Community Forestry Management Plan.

- Expansion of tree canopies throughout the Borough. Monitor funding opportunities to support expanded nature-based infrastructure throughout the Borough, particularly expansion of tree canopy. The New Jersey Urban and Community Forestry Program routinely announces grant programs for communities that are seeking to expand community tree initiatives.

- Consider more expansive requirements for nature-based infrastructure as part of development and redevelopment applications.

Economic Plan Element

The 2007 Rutherford Master Plan presents the Borough's economy as a traditional, small-scale local economy centered primarily on its downtown core and Union Avenue commercial district, where service-oriented businesses dominate. In contrast, the Route 17 and Meadowlands-adjacent areas are characterized by more industrial and regionally oriented economic activity, including warehousing, transportation, and light industrial uses. The plan emphasizes that Rutherford's role is not to control broader economic trends, but to create a supportive physical and policy environment that encourages stable, sustainable business growth.

Climate Hazard Connections

To reinforce downtown as the center of town and support compact, mixed-use, transit-oriented development near the train station, the plan should seek to reduce automobile dependence, lower emissions, and limit development pressure in more hazard-prone areas. These redevelopment areas also create opportunities to incorporate climate-adaptive design, including stormwater management, green infrastructure, shade trees, permeable surfaces, and flood-resilient building practices.

For Union Avenue/West End, neighborhood-scale commercial development and adaptive reuse of the old fire station should support local access while reducing vehicle trips and limit embodied carbon from new constructions. For the Meadow Road and Route 17 commercial districts, redevelopment should address potential exposure to flooding, stormwater runoff, extreme heat, and traffic-related environmental hazards.

Potential Resilience Considerations

- The Borough could treat redevelopment sites as opportunities for resilient site design, including elevation above base flood elevation where needed, and on-site stormwater management with an emphasis on low impact development strategies.

- Consider tying redevelopment intensity to infrastructure capacity, including utilities, transportation access, and emergency access routes.

- Consider vulnerable populations in redevelopment decisions, especially for housing, and evacuation needs.

- Promote context-sensitive infill and redevelopment in lower-risk areas; rather than encourage growth in environmentally constrained locations.

- The Borough should continue its existing efforts to encourage commercial redevelopment with climate resilient architectural standards, shared parking, transit-friendly facilities, pedestrian circulation, landscaping, and controlled highway access points.

Circulation Plan Element

The 2007 circulation plan element describes the movement of automobiles, bicycles, pedestrians, and public transit in the Borough of Rutherford. The 2018 reexamination made no changes. The objectives in this plan element emphasize the creation of a trail system, creative approaches to problematic intersections, creation of a bicycle friendly environment, and the implementation of traffic calming measures. Many of the objectives presented in this element overlap with other goals of the CCRHVA.

Climate Hazard Connections

No roadways are inundated in 2-foot floodwaters and few are inundated in 6-foot floodwaters, as shown in Map V-4. To best mitigate roadway flooding and to enhance drainage during storm events, the Borough could consider expanding permeable pavement minimums and including green stormwater infrastructure when performing roadway improvements. Green stormwater infrastructure involves utilization of approaches for stormwater management primarily using plants and soil that mimic the natural environment, as opposed to gray infrastructure which primarily utilizes concrete and pipes; these include rain gardens, bioswales, and tree trenches. These stormwater mitigation strategies could be coupled with the objective of traffic calming in high pedestrian areas. Enhancement of bicycle infrastructure would aid in reduction of motor vehicle related pollution, thus reducing contamination events when flooding occurs.

Map III-1 shows land surface temperatures in Rutherford while Map III-2 shows heat island risk as a function of the tree canopy to impervious surface ratio. Data suggests that Rutherford's more urbanized neighborhoods may experience extreme heat on sunny summer days, increasing exposure risk for pedestrians, outdoor workers, and vulnerable populations such as older adults. The Borough could mitigate heat effects through the expansion of tree coverage ordinances, especially in relation to redevelopment projects which would have an impact on existing tree canopies. An increased tree coverage would help promote stormwater infiltration; and provide a larger tree canopy resulting in less heat absorption. Tree canopies would also provide pedestrians and bicyclists with important shade during the summer months. Partnering with the Green Team can be an effective way to advance strategies that mitigate climate change-related hazards.

Potential Resilience Considerations

- Encourage alternative transportation methods by utilizing traffic calming and expanded bicycle facilities.
- Consider including tree trenches, bioswales, and bioretention planters in new roadway projects.
- Explore permeable pavement potential for municipal owned lots as well as permeable pavement minimum ordinances.
- Consider expanding tree coverage ordinances and continue to update the Community Forestry Management Plan.
- Partner with the Borough's Green Team to identify opportunities to further expand the tree canopy.

Utilities

This element of the 2007 master plan, affirmed by the 2018 master plan reexamination, outlines the utility needs of the Borough, some of which are expanded upon in the Stormwater Management Plan. This section of the master plan emphasizes that all redevelopment projects provide, and bear the cost of necessary water, sewerage, and drainage facilities.

Climate Hazard Connections

There are critical pieces of infrastructure within vulnerable areas of the Borough that could potentially lead to serious quality of life implications for the residents of Rutherford if adversely impacted by climate change-related hazards.

Redevelopment projects should consider their impact on existing utility infrastructure and existing tree coverage in light of current an anticipated climate related hazards, to ensure that they do not create capacity issues for the borough's stormwater infrastructure.

Potential Resilience Considerations

- Encourage developers to incorporate tree trenches, bioswales, rain gardens, and other green infrastructure into their site plans.
- Ensure that proportional contributions are made by developers to fund the construction and maintenance of infrastructure.
- Consider pursuing stricter tree canopy rules for redevelopment projects to ensure that existing trees are not removed, and that additional are planted where possible.

- Identify critical infrastructure in the Borough and formulate plans for provision of services during hazard events.

- Continue to ensure that projects meet stormwater infrastructure standards.

Historic Preservation

The historic preservation element in the 2007 master plan, and reaffirmed in the 2018 reexamination, identifies and protects historic buildings, sites, and districts which reflect Rutherford's culture, architecture, and heritage. It establishes policies to guide the preservation, rehabilitation, and adaptive reuse of these resources which integrate them into ongoing and future development.

Objectives of this element include encouraging the use and preservation of historic resources while discouraging unnecessary demolition, promoting development that complements historically and architecturally significant properties, and supporting private reinvestment to preserve and maintain original architectural character. Many of these objectives are in line with the goals of the CCRHVA.

Climate Hazard Connections

Rutherford contains six individual sites listed on the National Register of Historic Places but does not include a designated historic district. Some of these sites, including the Yeardley-Berry House, are located in flood prone areas along the Meadowlands NJSEA region.

Potential Resilience Considerations

- The Borough could evaluate potential climate change-related hazards affecting historic resources and consider the allocation of funding and technical resources towards appropriate mitigation and adaptation strategies.

- The Borough would benefit from monitoring funding opportunities, such as the New Jersey Historic Trust, that could focus on implementing features that protect historic structures from future weather events while maintaining their historic character.

VII. Coordination with Other Planning

The MLUL requires a CCRHVA to include a "policy statement on the consistency, coordination, and integration of the climate change-related hazard vulnerability assessment with any existing or proposed natural hazard mitigation plan, floodplain management plan, comprehensive emergency management plan, emergency response plan, post-disaster recovery plan, or capital improvement plan." This section addresses and expands upon that requirement by reviewing and analyzing how the hazard exposures identified in this CCRHVA may impact the Borough's following plans:

- Bergen County Hazard Mitigation Plan
- Stormwater Management Plan
- Emergency Operations Plan
- New Jersey Sports and Exposition Authority (NJSEA) Plan

For each element, this section includes a summary of relevant findings, connections with the current and future climate hazards and exposures identified in this CCRHVA, and potential considerations for the Borough to improve resilience.

A. Bergen County Hazard Mitigation Plan

The Bergen County Hazard Mitigation Plan identifies weather and climate-related risks that may affect Rutherford's residents, infrastructure, economy, and essential services. Hazards include fluvial and stormwater flooding, severe storms, hurricanes, winter storms, extreme heat, power outages, and infrastructure disruptions. The Bergen County Hazard Mitigation Plan connects the aforementioned hazards to potential economic losses, community lifeline disruptions, and infrastructural vulnerabilities through analysis using the National Risk Index.

Climate Hazard Connections

Overall, the Bergen County HMP provides a framework for understanding Rutherford's exposure to climate hazards and for prioritizing mitigation measures such as stormwater improvements, flood protection, heat reduction strategies, and infrastructure resilience.

Hazard	Expected Annual Loss (per Building)	Expected Annual Loss (Total)
Heat Wave	$0.11	$62,865.22
Coastal Flood	$1,690,773.62	$1,694,563.30
Wildfire	$169.80	$172.34

Potential Resilience Considerations

- Integrate extreme heat mitigation measures into land use and redevelopment plans. Mitigation measures may include expansion of tree canopy, and investment in shading in public spaces.
- Include protections for socially vulnerable populations in hazard preparedness and recovery planning.
- Expand backup power and emergency continuity measures for critical municipal facilities.
- Prioritize flood mitigation and stormwater resilience in flood-prone and drainage-constrained areas.

B. Stormwater Management Plan

Created in 2005 and revised in 2006, Rutherford's Stormwater Management Plan addresses groundwater recharge, stormwater quantity, and the prevention of general water quality impacts. The document establishes design and performance standards mandated by the state of New Jersey. Ultimately, the plan aims to reduce all forms of flood damage, minimize stormwater runoff, and diminish localized pollution.

The stormwater management plan outlines the prevention of nonpoint pollution, the minimization of runoff pollution from new and existing developments, to protect public health, to safeguard all aquatic life, and to enhance the use of water in the Borough.

Climate Hazard Connections

Alongside the reduction of stormwater impacts and pollution, the stormwater management plan encompasses updating infrastructure to protect public safety from potential stormwater impacts as outlined in the New Jersey Best Management Practices; including, but not limited to culverts, bridges, and future housing/commercial developments.

Potential Resilience Considerations

- The Borough should encourage the incorporation of nature-based stormwater infrastructure into existing facilities, redevelopment plans, and future development projects; such as: bioswales, permeable pavement, extensive vegetated roof features, and design of parking areas that rely on permeable, pervious, or porous pavement and that are engineered to drain directly into integrated organic systems like bioswales or rain gardens.
- Identification and categorization of critical stormwater infrastructure based on municipal prioritization in the case of future hazard events.
- Ensure proportional economic contribution to fund construction and maintenance of stormwater infrastructure.
- Continue to ensure that the Borough of Rutherford meets state stormwater standards.

C. Emergency Operations Plan

The Borough's Emergency Operations Plan establishes the local response framework for emergencies that may be intensified by climate change, including severe storms, flooding, extreme heat, and winter weather events, infrastructure failures, and public health disruptions. The plan's all hazards approach helps ensure that Rutherford can coordinate emergency response with and across departments, such as police, fire, EMS, public works, social services, Borough administration, and county agencies.

Climate Hazard Connections

The Emergency Operations Plan contains annexes on communication, evacuation, medical response, public information, disaster recovery, and resource management to support preparedness for climate-related events by clarifying roles, protecting vulnerable populations, maintaining critical services, and improving continuity of operations during and after hazard events.

Potential Resilience Considerations

- Bergen County also notes recent declarations tied to Covid-19, Tropical Storm Isaias, and Hurricane Ida, underscoring the need for multi-hazard planning.
- Incorporate CCRHVA findings directly into hazard response protocols so that emergency actions reflect projected climate-driven increases in flooding, heat events, and storm intensity.
- Update response strategies to account for how climate change can exacerbate existing hazards, such as heavier rainfall, worsening flood impacts or extreme heat intensifying power demand and grid stress.
- Continue working on integration of climate-related infrastructure failure scenarios into emergency planning, including risks to power, drainage, transportation, communications, and water systems during extreme weather events.

D. New Jersey Sports and Exposition Authority (NJSEA) Plan

The 2007 Master Plan, reaffirmed in 2018, highlights the importance of coordination with regional entities, including the New Jersey Sports and Exposition Authority (NJSEA), which regulates portions of the Meadowlands within Rutherford. The CCRHVA offers a shared reference point that can support more consistent planning and review across jurisdictions.

The NJSEA plan emphasizes that the Borough should monitor and participate in the New Jersey Sports and Exposition Authority (NJSEA) Economic Growth Plan, while also working to improve access to the Meadowlands area and waterfront properties.

Climate Hazard Connections

The Meadowlands region is particularly sensitive to flooding and drainage conditions; the Borough would benefit from ongoing coordination with the NJSEA to ensure that NJSEA planning and decision-making adequately addresses climate-related risks of the Borough.

Potential Resilience Considerations

- Ensure Borough policy is congruent with NJSEA floodplain and drainage requirements.
- Monitor planning and decision-making of NJSEA as it affects the portions of the Borough within the Meadowlands District to ensure that climate-related hazards of the CCRHVA are taken into account.
- Encourage the use of CCRHVA hazard mapping as a shared reference in both the Borough and NJSEA review processes.
- Develop a guideline for future Meadowlands area projects which align both NJSEA standards and CCRHVA findings.

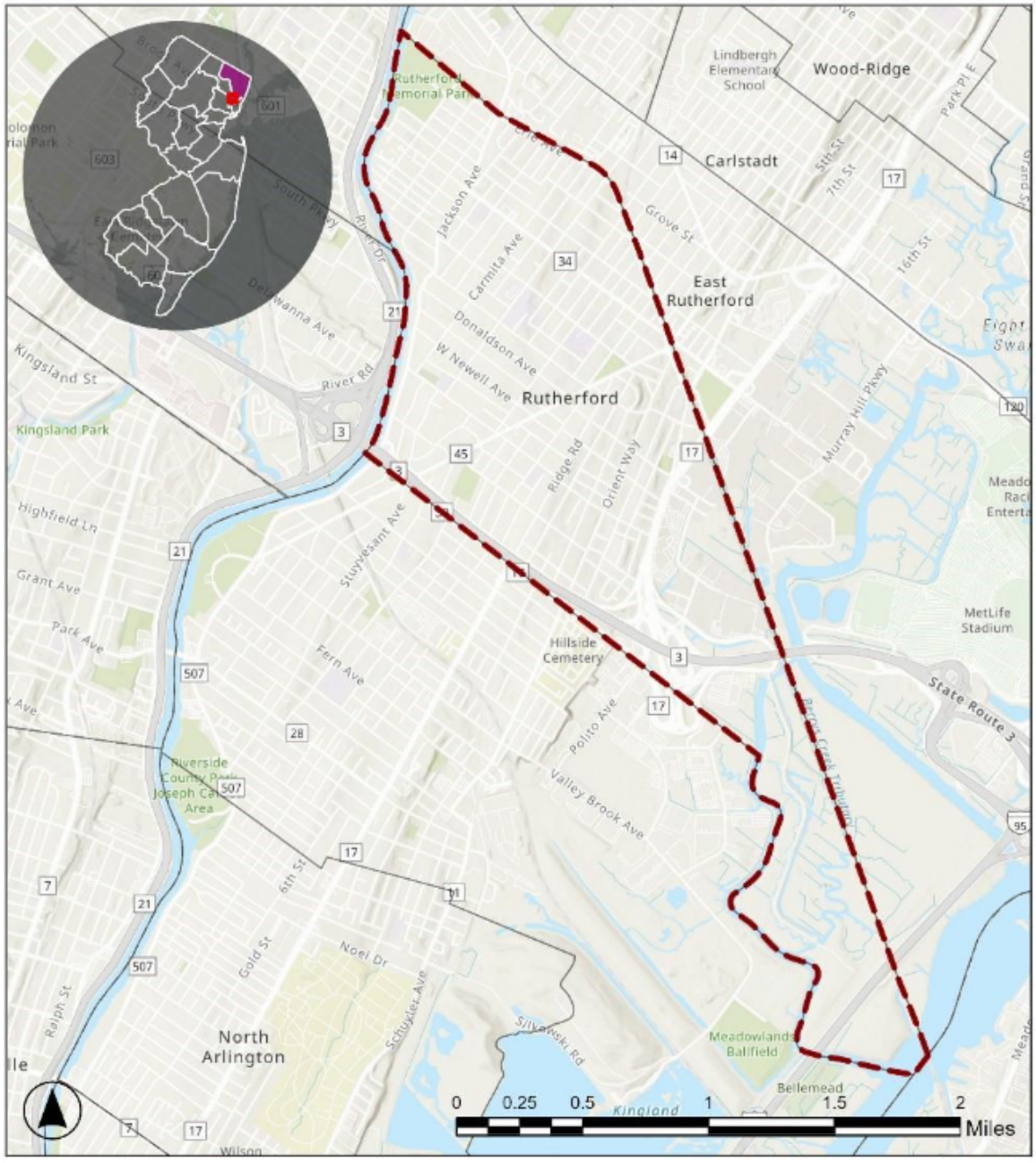
VIII. Appendices

Appendix A: Description of Rutherford Borough

Rutherford Borough (henceforth, "Rutherford") is located in Bergen County, New Jersey. Rutherford is bordered to the west by the Passaic River and to the southeast by the Hackensack River and the New Jersey Meadowlands District. Surrounding municipalities include East Rutherford to the north and east, Lyndhurst to the south and west, Passaic to the northwest, and Clifton to the west across the Passaic River, and a small border with Secaucus across the Hackensack River. Rutherford spans 2.9 square miles and has various transportation networks: NJ State Route 17 and 3, Interstate 95, and the Rutherford Train Station, serviced by the NJ Transit Bergen Line.

Rutherford is characterized by standard suburban development typical of "ring suburbs" commonly found in New Jersey in proximity to New York City. It offers a pedestrian-focused walkable downtown near the train station and has been referred to as the "Borough of Trees." The borough is a popular place to reside within proximity to New York City and New Jersey cities such as Jersey City and Newark.

Map A-1. Rutherford Borough



LEGEND

NJ

Municipal Boundaries

Rutherford

Demographics

According to the 2023 American Community Survey,[52] Rutherford's residential population is 18,748. The population density is approximately 6,487 people per square mile. The borough is similar in median age to the state and has a higher median household income than both the state and the county. Table A-1 includes detailed demographic information for Rutherford.

Table A-1. Demographic data for Rutherford, Bergen County, New Jersey

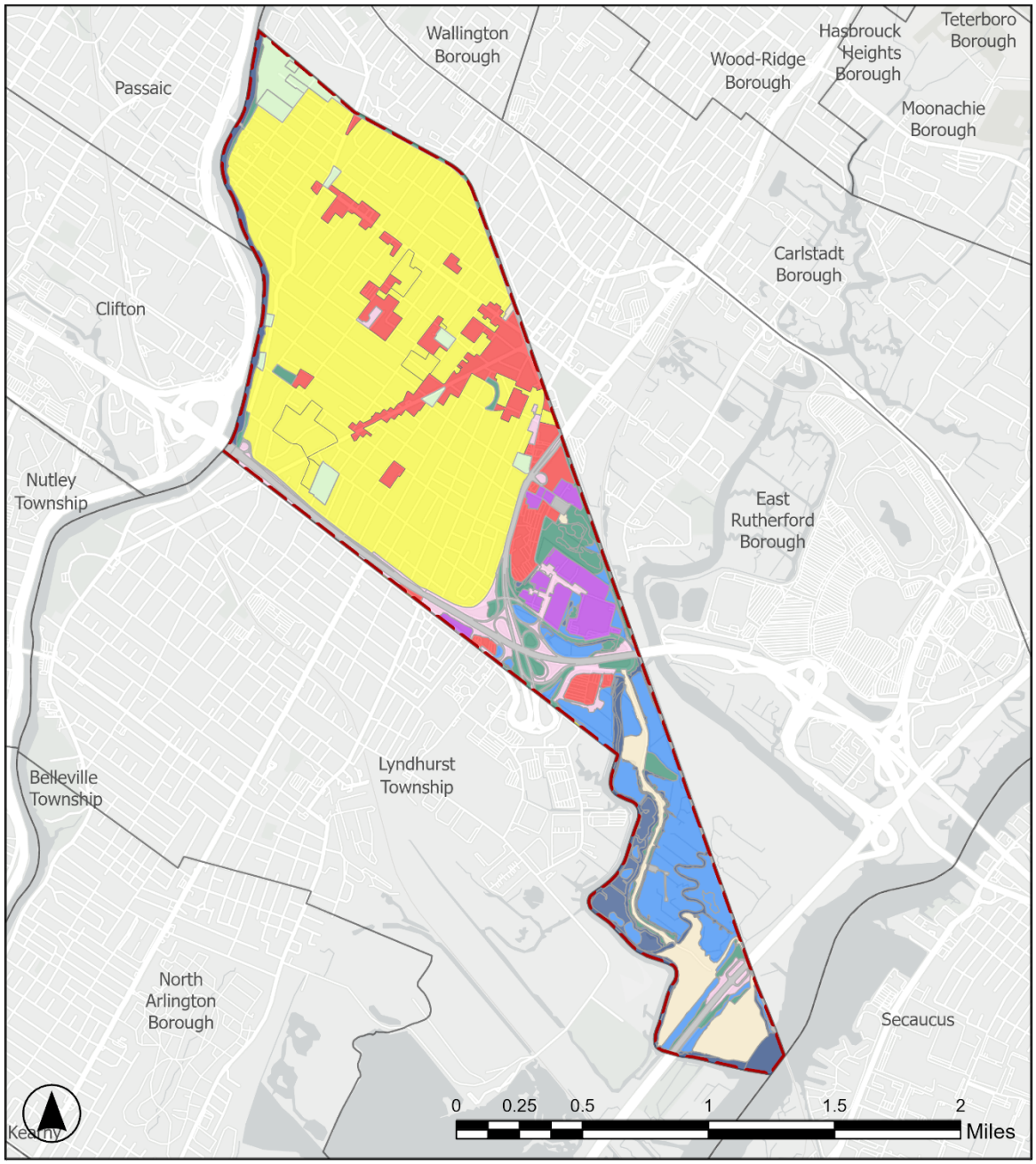
	NJ	County	Rutherford
Total Population	9,290,841	957,736	18,748
Population Density	1,065 people/mi^2	3,885 people/mi^2	6,487 people/mi^2
Population change (2020 to 2023)	+ 405,423	+ 26,461	+ 372
Median age	40.4	42.2	40.7
Population below 18	2,009,165	198,240	3,560
Population above 65	1,646,777	178,972	2,937
Median Household Income	$99,781	$116,709	$136,069
Persons in poverty	886,772	61,987	883

Land Uses

Roughly half of Rutherford's total land area consists of residential neighborhoods and the commercial downtown. However, east of Route 17, the land uses shift to distinctly industrial and commercial uses. The southeast part of Rutherford is part of the NJ Meadowlands District and consists predominantly of open space in the form of shrublands and wetlands. Map A-2 depicts Rutherford's land use-land cover. Table A-2 and Map A-3 detail property parcels and classes.

[52] U.S. Census Bureau. 2023. American Community Survey Five Year Estimates.

Map A-2. Land Use-Land Cover (2020)



LEGEND

Rutherford

Land Use and Land Cover 2020

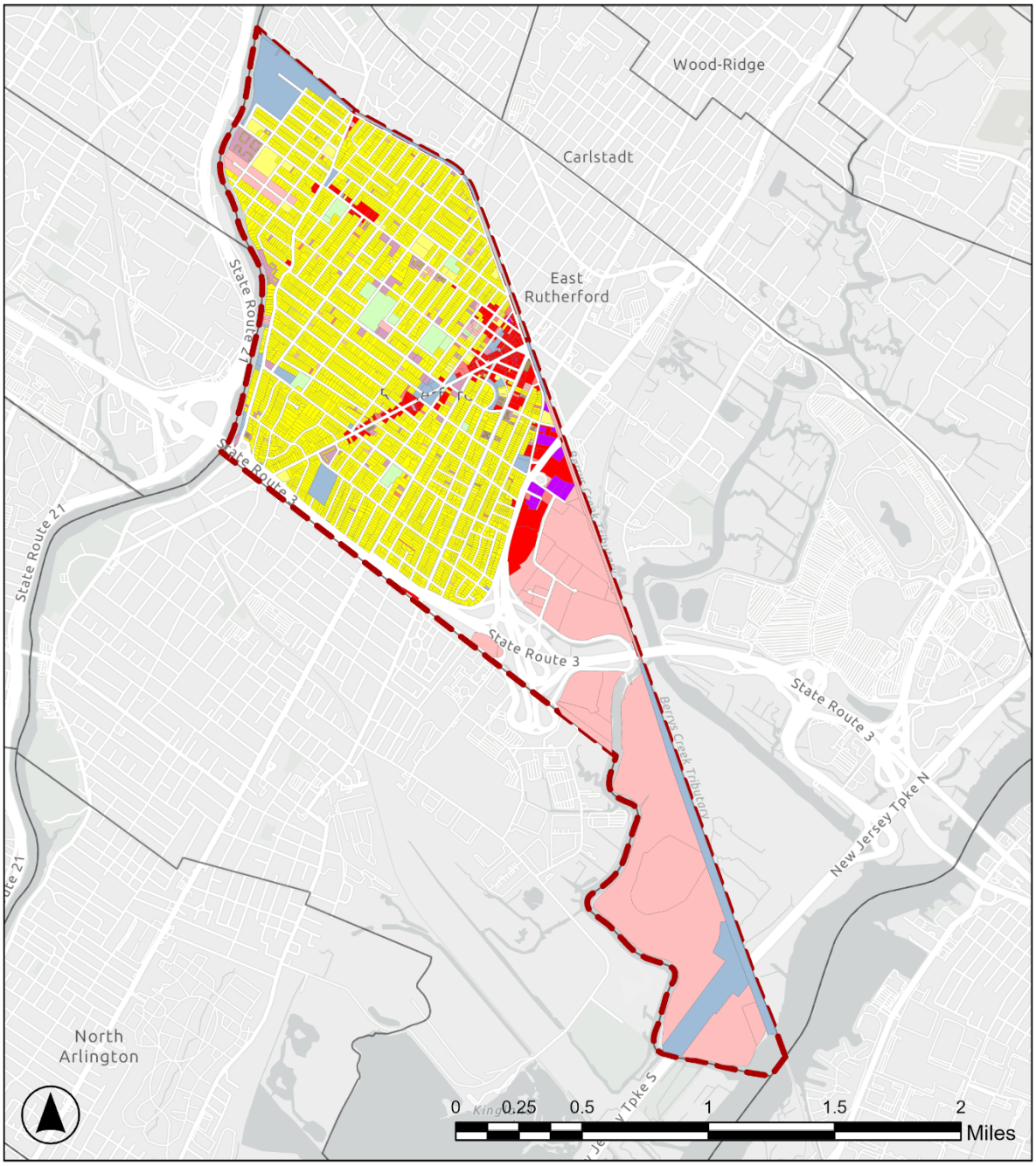
- Residential
- Commercial
- Industrail and Commercial
- Industrial
- Mixed or Other Urban
- Transportation, Communication and Utilities
- Recreational
- Agricultural
- Forestland
- Water
- Wetlands
- Barren Lands

Table A-2: Rutherford parcels by property class

Property Class	Number of Parcels	Area in acres
Residential (2)	5,013	656
Apartments (4C)	34	22
Commercial (4A)	224	59
Industrial (4B)	14	10
Public Property (15A through 15F)	138	177
Railroad Property (5A)	2	4
Farm (3A and 3B)	0	0
Vacant Land (1)	50	8
Unclassified Land	113	404
Total	**5,588**	**1,341**

(Source: Parcels and MOD-IV Composite of NJ)

Map A-3. Rutherford Borough parcels and property classes



LEGEND

Rutherford Parcels

- Residential
- Apartments
- Commercial
- Industrial
- Education
- Public Property
- Church/Charitable and Other Exempt
- Railroad Property
- Vacant
- Unclassified Land

(Source: Parcels and MOD IV Composite of NJ)

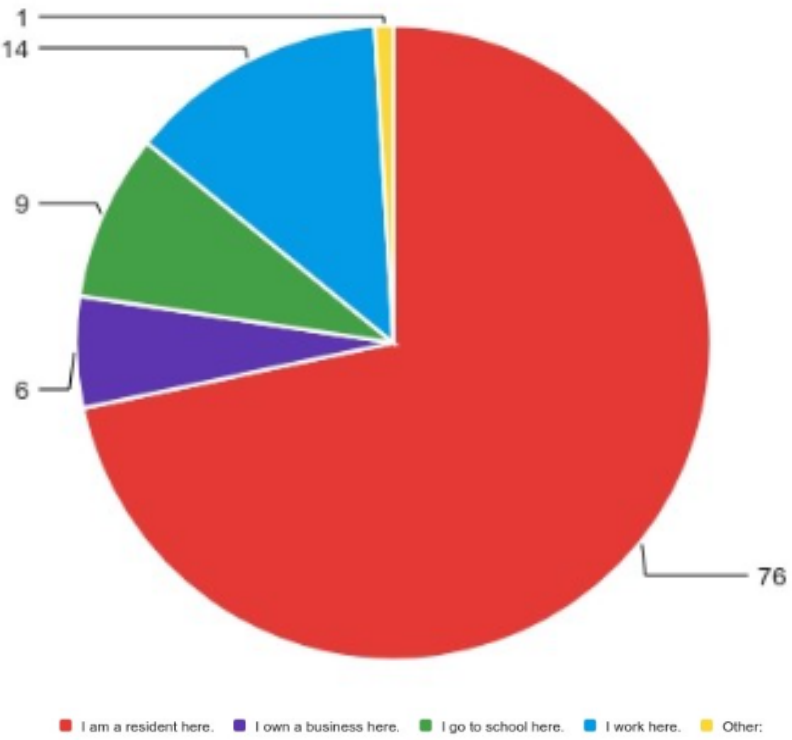
Appendix B: Public Engagement Summary

Rutherford advertised the CCRHVA public engagement opportunities on the municipal website and social media starting on February 26, 2026. The in-person meeting was held on March 9, 2026, at the municipal building. Approximately twenty local stakeholders (residents) attended. The meeting included a brief presentation by Rutgers to explain the overall CCRHVA project (process, goals, etc.) and an overview of hazard assessment findings, followed by participants visiting "stations" with large printed maps to share locations and experiences with high tide flooding, stormwater and/or flash flooding, community assets, other climate hazards (heat, wind, drought, wildfire), and any other questions or concerns. The online survey was designed to replicate the opportunities for input provided at the in-person meeting. To this end, respondents were asked to mark digital maps and provide details about the locations of climate hazards and community assets. The survey was open for five weeks from February 26 to April 6, 2026, and had 81 responses. Input from the in-person meeting and the survey was used to refine the hazard analyses and maps in Sections III and V.

Survey Results

Q1 – How would you describe your relation to Rutherford Borough? Select all that apply. – Selected Choice

81 responses



Q1 Other: - Text

Other: - Text

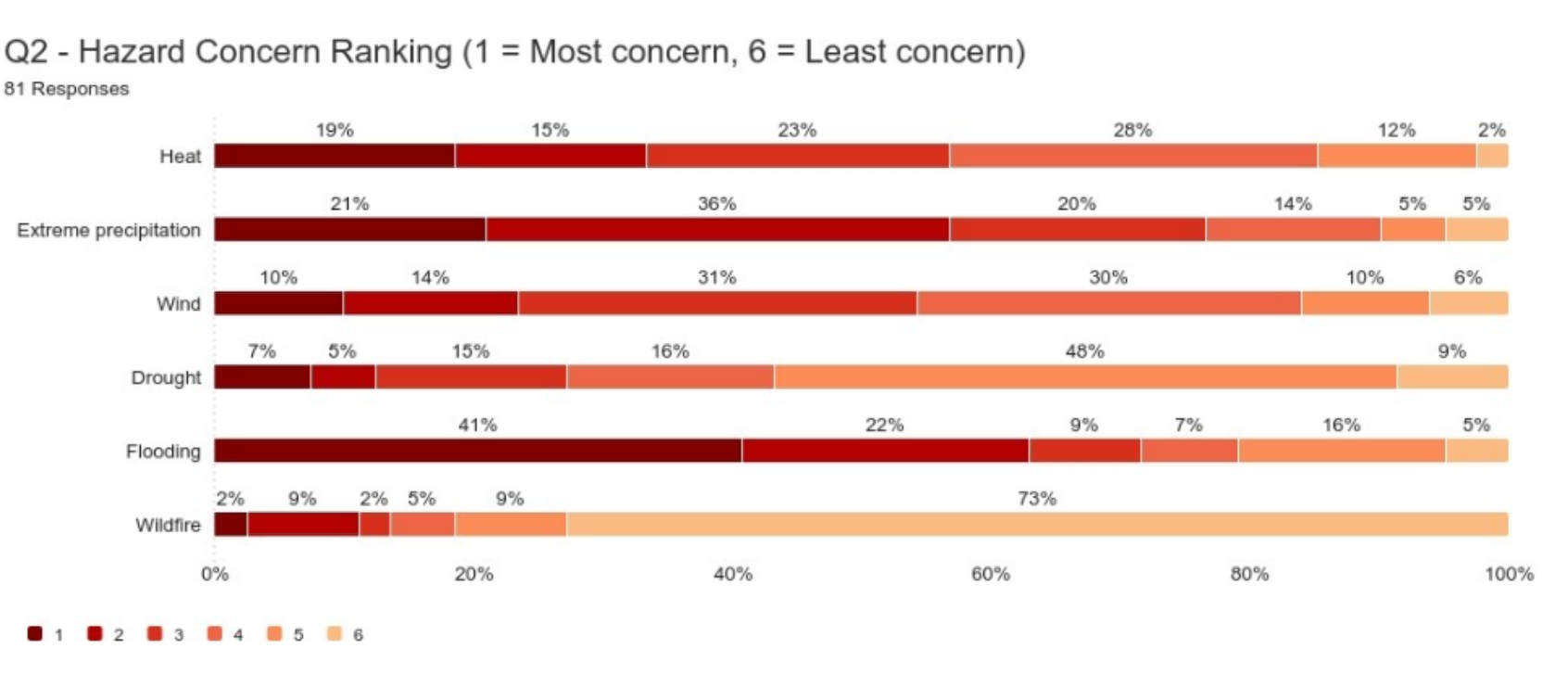
My ancestors lived here

Q2 - Rank each hazard according to your level of personal concern for Rutherford Borough, with 1 being the most concern and 6 being the least concern.

Note: Lower average rank indicates greater level of personal concern.

Rank	Hazard	Average Rank
1	Flooding	2.51
2	Extreme Precipitation	2.60
3	Heat	3.09
4	Wind	3.35
5	Drought	4.19
6	Wildfire	5.27

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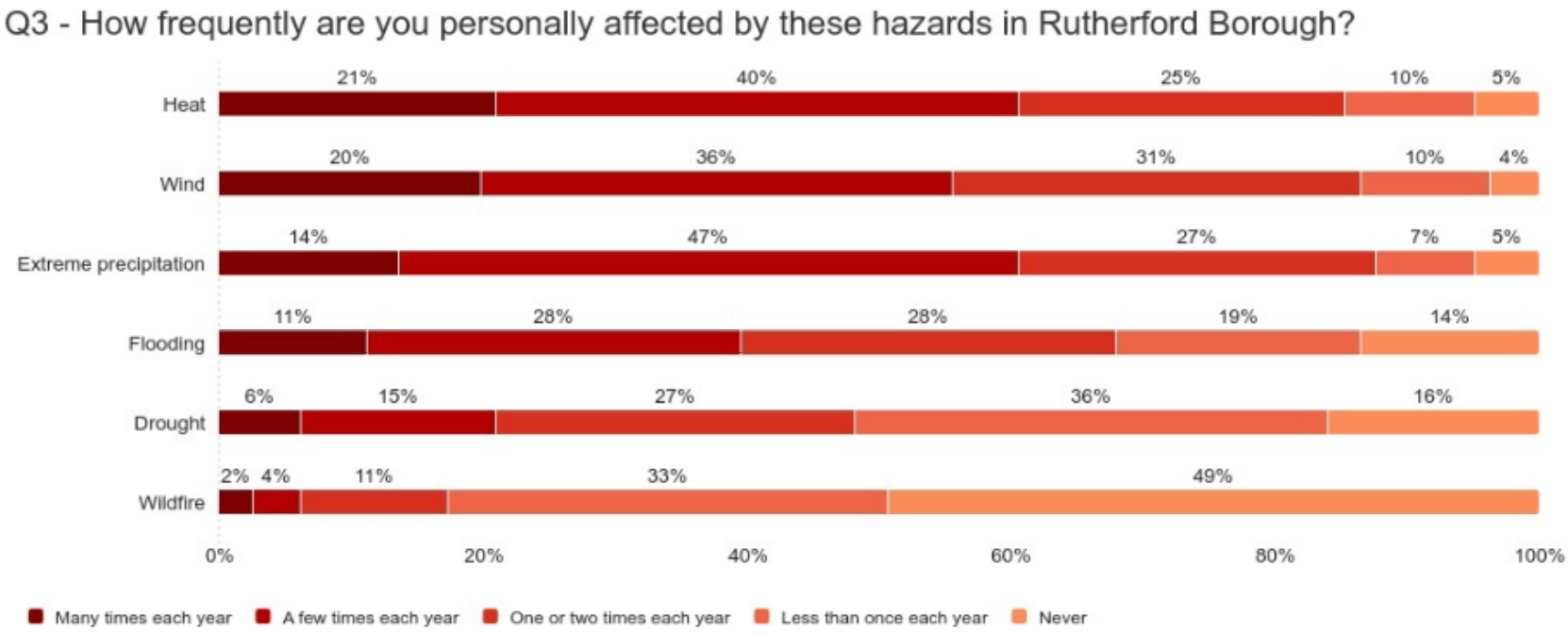

Q2 - Hazard Concern Ranking (1 = Most concern, 6 = Least concern)
81 Responses
Heat
19%
15%
23%
28%
12%
2%
Extreme precipitation
21%
36%
20%
14%
5%
5%
Wind
10%
14%
31%
30%
10%
6%
Drought
7%
5%
15%
16%
48%
9%
Flooding
41%
22%
9%
7%
16%
5%
Wildfire
2%
9%
2%
5%
9%
73%
0%
20%
40%
60%
80%
100%
1
2
3
4
5
6

Q3 – How frequently are you personally affected by these hazards in Rutherford Borough?

Note: Higher average indicates more frequently impacted. (Scale: Many times each year=5, A few times each year=4, 1 or 2 times each year=3, Less than once each year=2, Never=1).

Rank	Hazard	Average
1	Heat	3.62
2	Wind	3.58
3	Extreme Precipitation	3.57
4	Flooding	3.05
5	Drought	2.59
6	Wildfire	1.77

Continued on next page


Q3 - How frequently are you personally affected by these hazards in Rutherford Borough?
Heat
21%
40%
25%
10%
5%
Wind
20%
36%
31%
10%
4%
Extreme precipitation
14%
47%
27%
7%
5%
Flooding
11%
28%
28%
19%
14%
Drought
6%
15%
27%
36%
16%
Wildfire
2%
4%
11%
33%
49%
0%
20%
40%
60%
80%
100%
Many times each year
A few times each year
One or two times each year
Less than once each year
Never

Q4 - Please share details below about up to three important places in Rutherford Borough. The CCRHVA will recommend ways to protect the places most important to the community.

(Examples include recreational facilities, entertainment venues, museums, shops, places of worship, etc. We have already identified government facilities like schools and fire stations, so there is no need to share those.)

Please include:

- Place name
- Address or description of location
- Why it's important

Note: Responses to Q4 were categorized and added to the community assets maps in Section V.C.

American Legion Post
Ann Street
Atkins
Borough Hall
Briar Hall
Carlton Avenue
Childcare Union
Commercial Distill Park Ave
Community Garden
Congregation Beth El
Elks Club
Episcopal Church / Montessori
Felician University College
First Presbyterian Church
Iviswold Castle
Kidspot Playground / Memorial Park

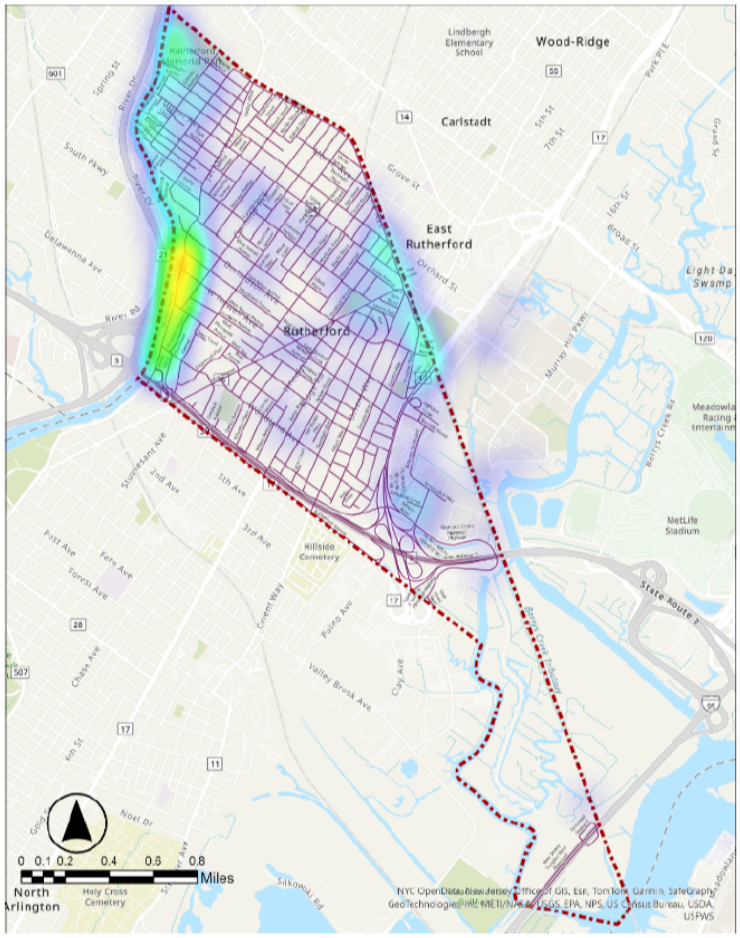
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Kip Center and Rutherford Senior Manor On Kip Ave
Kip Homestead 12 Meadow Road
Lincoln Park
Lincoln Woods
Living Gospel Baptist Church
Masonic Lodge
Meadowlands Museum
Methodist Church
Mt Ararat Baptist
Nereid Boat Club
Noor Va Paresh
Orient Way
Park Avenue Business Center
Presbyterian Church
Rutherford Bible Chapel
St. John’s Lutheran
St. Mary's Church
St. Mary's School
Tamblyn Civic Center
Tamblyn Field
The Coffee Corner
Veterans of Foreign Wars Murray
West End Commercial District Union Ave
William Carlos Williams House
Williams Center
Womens Club
World War 1 Monument

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Q5 - Click on the map below to add locations where you have observed flooding in Rutherford Borough.

Note: The heat map colors represent the concentration of points added to the map in a location with highest concentration=yellow/red, medium-high=green, medium-low=light blue, lowest=purple.



LEGEND
Concentration of flooding locations

Low----------Medium----------High

Q6 - Please share details about each location you added to the map, including:

- **Names of flooded roads, intersections, and/or neighborhoods,**
- **How often it floods**
- **Causes of flooding (high tide, rain, storm surge)**
- **Damage or effects**

Note: Responses to Q6 were used to refine the flood map(s) in Section III. Stormwater flooding locations were added to Map III-4.

Q7-Q10 - If you have experienced any of the climate hazards below [heat, wind, drought, wildfire] in Rutherford Borough, please share details about the event(s) including:

- **Approximate location, if applicable**
- **Year (and month/season, if known) of event(s)**
- **Observed impacts**

Heat
Extreme heat, summer 2025, entire town, breathing hazards
Throughout the community during the summer, the heat can be oppressive
Detrition of vegetation and Tree Canopy. Economic decrease
All Rutherford, especially around new construction where mature trees have been removed for new construction or individuals putting in swimming pools. Especially brutal during the summer months.
Everywhere, especially unshaded roads. Summer, Spring, Fall,
Heat is a big dea - Location? (e.g., near Lincoln Park, downtown) - Impacts? (e.g., heat-related illnesses, power outages)
Yearly in July and August. We do not have central AC and the summer heat and humidity have been more consecutive in days. Relying on window AC cannot cool an old house.
Approximate location: Haworth and Newark Year/Season: July 2024 (100*F), July-August 2022. I could remember it lasted for 33 consecutive days

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Impact: Public health- heat stress and respiratory issues due to ground level ozone. My old grandfather suffered some issues then
In June 2022, there was a water shortage and water restrictions were imposed, which limited community irrigation and cleaning activities.
Approximate location: All residential and public park areas Year: July 2024 Observed impacts: Unsafe outdoor conditions for children and elders, stress on local green spaces, and increased risk of heat-related illness.
This is an issue for whole town when we have a run of summer days that are in the 90 degrees
Year: 2024 (Hottest year on record globally) / July 2025 (Regional Heat Wave) They was a record-breaking heat wave of July 2024/2025. Location: Downtown Rutherford (Park Ave area) and areas with high pavement concentration. Impact: Public health concerns
It can get very hot in summer
General location: Central area and residential areas of Rutherford Event year/season: July 2023 Observed effects: For several consecutive days, the highest temperature exceeded 35C, posing a risk of heatstroke for the elderly and children. Public libraries and community centers were opened as cooling shelters, some outdoor work was suspended, and electricity consumption by residents increased significantly.
Every summer
Whole town, especially my home (no central A/C). Time: July 2022, a week-long event. Impacts: Poor sleep, high electric bills, had to restrict kids' outdoor play.
General location: The old building of Rathford High School (without central air conditioning). Time: Every summer, especially in July and August of 2022 and 2024. Observed effects: Students have difficulty concentrating in class in the afternoon; concerns about the health of students and staff and their academic performance.

Wind
Hurricanes, tornados, seasonal, high areas of Rutherford, tornado pathways
Tree limbs through my garage roof during Hurricane Sandy.
Over the past 5 years, we have had many windstorms or high winds accompanying rain or snow. The frequency of high wind warnings has increased dramatically as we rarely had high winds unless we were having a hurricane.
no climate issues

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Loss of Tree Canopy, economic and infrastructure destruction
Everywhere, any season
October November December 2025 and January February 2026
Summer 2025, wind knocked down tree branches all around Washington Ave, cars damaged.
- Location? (e.g., near the Meadowlands) - When? (year, month, or season) - Impacts? (e.g., downed trees, power outages)
Wind event details: - Location in Rutherford? (e.g., near the Meadowlands) - Impacts? (e.g., downed trees, power outages)
We have had 2 trees fall, both destroyed our garage on separate occasions.
Approximate location: Rutherford Borough (impacts are often seen borough-wide, especially in the tree-lined "Bellevue" and residential areas). Year/Season: December 2022, when that major winter storm brought wind gusts up to 58mph recorded in Lyndhurst August 2020 tropical storms Impact: Power outages. Property damage. Blocked roads hindering transportation
In September 2021, there was extremely short-term heavy rainfall (with a rainfall of over 10 centimeters in one hour) combined with strong winds.
I encountered a severe wind and thunderstorm event in September 2022 across residential neighborhoods near Montross Avenue. Strong winds downed multiple trees and power lines, resulting in widespread power outages that lasted over 12 hours. The outage affected electricity, internet, and traffic signals, creating public safety risks and disrupting daily life.
Approximate location: Montross Avenue and surrounding neighborhoods Year: September 2022 Observed impacts: Fallen tree branches, damaged power lines, and power outages lasting more than 12 hours.
Approximate location: Lincoln Park and downtown area Year: Spring 2024 Observed impacts: Damaged Park structures, blocked sidewalks, and interrupted community events.
Coastal Storm / Nor'easter Approximate location: Western Rutherford near the Passaic River Year: March 2023 Observed impacts: Increased River water levels, localized flooding, and closed pedestrian paths near the water.

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Winter Storm & Snow Approximate location: Entire Rutherford Borough Year: January 2022 Observed impacts: Dangerous Road conditions, blocked driveways, and brief disruptions to local business operations.
Storms lately seem to include much more wind and impact our trees
Southern Ridge Road
Year: 2020 (Tropical Storm Isaias) / 2012 (Superstorm Sandy) Tropical Storm Isaias (August 2020). Location: Residential streets (e.g., near Lincoln Park) and mature tree-lined neighborhoods. Impact: Plenty properties were damaged and public utility outages
February Blizzard
It can get very windy especially during storm
General location: Eastern residential area of Rutherford and wooded areas. Event year/season: September 2022. Observed impacts: Strong winds blew down many trees, damaged some fences and roofs, caused partial power outages, blocked multiple roads with fallen trees, and required urgent clearing by the municipal authorities.
Wind is an issue in this town, and it is townwide. We are the borough of trees; however, we don't seem to be the borough that cares for and watches those trees. High winds during any storm bring down branches throughout the town. I had a tree fall directly across the road in front of me on East Erie Ave just before Orient Way & the circle about 3 years ago. Erie Ave is a main roadway for getting across town, and it is lined with trees for most of it.
Erratic
Western neighborhood is near wooded area. Time: A storm in March 2023. Impacts: Neighbor's tree fell on our shared fence, power outage for 8 hours.

Drought
High heat in the summer has occasionally created drought conditions, but the frequency has not increased. It has been occasional. However, the high summer temperatures do create very dry conditions leading to dead grass.
Everywhere, Summertime
Drought details: - Location in Rutherford? (e.g., local parks, neighborhoods) - Impacts? (e.g., water restrictions, crop damage)
Each summer water cost is high and with longer, drier summers like in summer 2024 it is difficult to keep vegetation alive.

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Approximate location: Rutherford and the wider North Jersey region Year/Season: Happened late 2024, summer of 2022: drought watch from August through December Impact: water restrictions, landscaping
In June and July of 2022, high temperatures combined with drought led to the withering of lawns and trees
We seem to hit possible drought in spring and summer more frequently We don't care about our lawn, but we do grow our own vegetables and that we care about
Ridge Road
Year: 2024 2025 (Current/Recent Drought Warning) Late 2024 Statewide Drought. Location: Borough-wide, specifically impacting private lawns and public parks like Memorial Park. It impacted Water restrictions, agricultural/landscaping and soil contractions in many areas in Meadowlands
Haven't experienced drought
General location: Rutherford Park and Community Green Space Event year/season: Summer of 2022 Observed effects: The continuous lack of rainfall has caused the grass and trees to turn yellow, the park's irrigation system has been restricted, some landscape plants have withered, the municipal department has issued an outdoor watering restriction order, and residents need to conserve water.

Wildfire
Smoke from Canadian wildfires, entire town air quality, late Spring, 2024
No climate issues
Meadowlands
I've never seen one in Rutherford
Wildfire details: - Location in Rutherford? (e.g., near the Meadowlands, a specific park) - When? (year, month, or season) - Impacts? (e.g., evacuations, air quality issues)
Approximate location: impact by smoke drift from the NJ Palisades, the Pine Barrens, and Canadian wildfires Year/Season: June 2023: from those Canadian wildfires. Oct-Nov 2024 during the record drought, Northern NJ saw a 1,300% increase in local brush fires.

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Impact: Air quality was bad, Health issues, Visibility during driving like Route 17 and the NJ Turnpike due to smoke
Never been an issue
Year: 2023 (Canadian Wildfire Smoke) / Ongoing 2025 (Local Brush Fires) June 2023 Canadian Wildfire Smoke Event. Location: Skyline/Atmospheric impact felt throughout the entire Borough. Impact: Air quality and many respiratory issues were recorded
Haven't experienced wildfire
I have never experienced a wildfire in the Rutherford area. This area is located in the outskirts of the city and has a humid climate, so there is almost no risk of wildfires.
Last few summers

Q11 - Below are examples of strategies related to land use and zoning that can help reduce the impacts of climate hazards. Rank their importance for your municipality, with 1 being most important and 5 being least important.

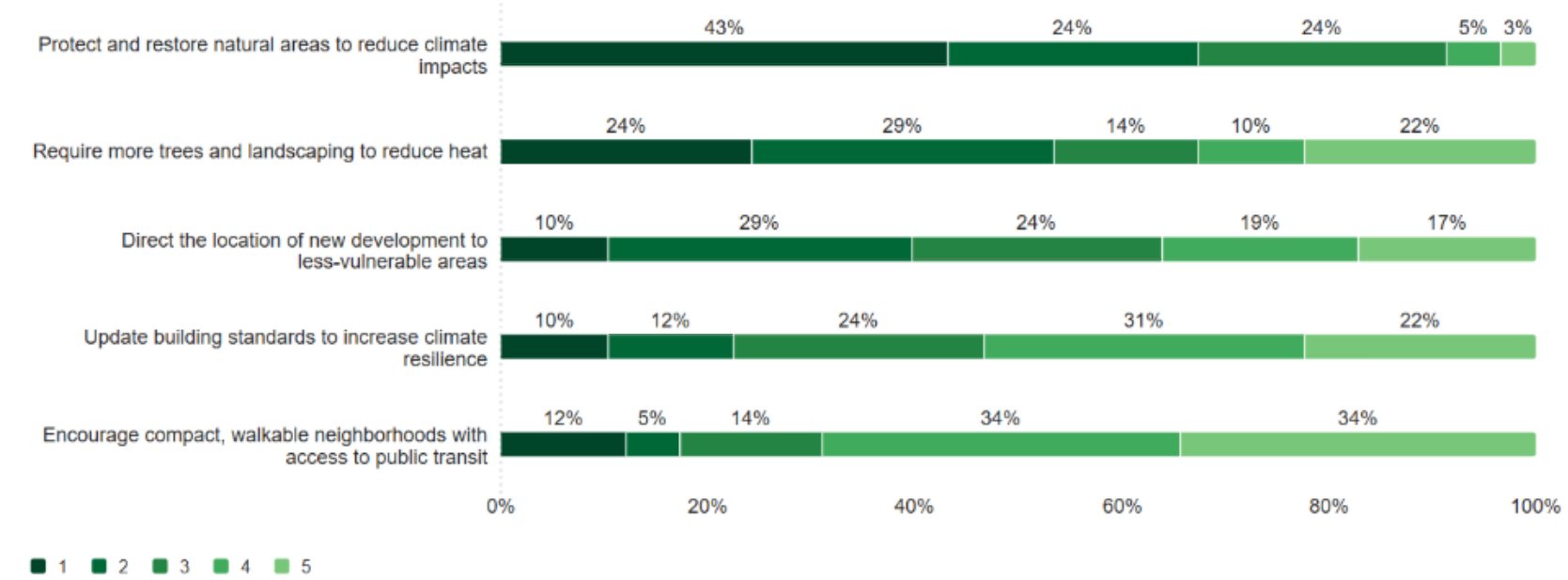
Note: Lower average rank = higher priority.

Rank	Strategy	Average Rank
1	Protect and restore natural areas to reduce climate impacts	2.02
2	Require more trees and landscaping to reduce heat	2.78
3	Direct the location of new development to less-vulnerable areas	3.03
4	Update building standards to increase climate resilience	3.43
5	Encourage compact, walkable neighborhoods with access to public transit	3.74

Continued on next page

Q11 - Strategies ranking (1 = Most Important, 5=Least Important)

58 Responses



Appendix C: Data Sources

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Section III Detailed Data Sources

Tables

Table III-1. Heat waves - https://njhealthadapt.rutgers.edu/ , Public Health Report, Table 1

Table III-2. Extreme heat days - https://njhealthadapt.rutgers.edu/ , Public Health Report, Table 2

Table III-3. Days below freezing - https://njhealthadapt.rutgers.edu/ , Forest Climate Risk Report

Table III-4. Rainfall (in inches) over 24-hours by annual storm probability - https://njhealthadapt.rutgers.edu/ , Public Health Report, Table 3

Table III-5. Increase in annual probability for the 10% and 1% chance storm - Northeast Regional Climate Center, unpublished data

Table III-6. Annual percent time in drought - Shope, J., Nikolopoulos, E., and Araujo, D.S.D. 2025. DRAFT New Jersey Projected Future Drought Dataset Technical Documentation, unpublished data

Maps

Map III-1. Land surface temperature – Summer 2022 – https://rutgers.maps.arcgis.com/apps/mapviewer/index.html?webmap=4d8f6d249e394357827fecd5312fc861

Map III-2. Heat island risk - https://rutgers.maps.arcgis.com/home/item.html?id=fc1878a4cb3f432da15a030d63896076#overview

Map III-3. FEMA flood zones - https://rutgers.maps.arcgis.com/apps/mapviewer/index.html?webmap=cba402bdd0334334b6c2f2568d7e5443

Map III-5. High tide flooding locations - Rutgers University (2026). *NOAA Minor High Tide Flooding for New Jersey (Rutgers Modified)*. https://rutgers.maps.arcgis.com/home/item.html?id=dadbb5799a0a45cba87c87e9649e82b3#overview

Map III-6. Potential inundation from 100-year storm - https://njfloodmapper.org/, Total Water Levels Tool, Accessed May 2025

Map III-7. Areas potentially subject to the NJ PACT regulatory reforms – https://services1.arcgis.com/ze0XBzU1FXj94DJq/arcgis/rest/services/NJ_FEMA_FP3_4_9_2024/FeatureServer, https://gisdata-njdep.opendata.arcgis.com/datasets/njdep::tidal-climate-adjusted-flood-elevation-cafe-slr-4ft-for-new-jersey/about

Map III-8. Projected permanent inundation from future sea-level rise in 2050 and 2100 - https://njfloodmapper.org/, Total Water Levels Tool, Accessed May 2025

Map III-9. Potential inundation from coastal flooding from 100-year storm in 2050 - https://njfloodmapper.org/, Total Water Levels Tool, Accessed May 2025

Map III-10. Wildfire risk to potential structures and select historic wildfires - NJ Wildfire Risk Explorer and Wildland Fire Incident Locations | National Interagency Fire Center

Map V-15. Heat island risk to Overburdened Communities - https://rutgers.maps.arcgis.com/apps/mapviewer/index.html?webmap=9f8adca918b0467bbcf74f5c06918e22