NJTPA
NORTH JERSEY
TRANSPORTATION
PLANNING AUTHORITY

UNION COUNTY

2023 Electric Vehicles Infrastructure Study

FPA
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FHI studio

AECOM

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ABBREVIATIONS & ACRONYMS

AA	Affirmative Action
ACS	American Community Survey
ADA	Americans with Disabilities Act
AFC	Alternative Fuel Corridor
AFDC	Alternative Fuel Data Center
BEV	Battery Electric Vehicle (Electric only fuel source)
CSMR	Customer Side Make Ready
DCFC, L3	Direct Current Fast Charger
EJ	Environmental Justice
EV	Electric Vehicle
EVSE	Electric Vehicle Supply Equipment
FR	Federal Regulation
FHWA	Federal Highway Administration
FY	Fiscal Year
GIS	Geographic Information Systems
GSP	Garden State Parkway
IBC	International Building Code
IIJA	Bipartisan Infrastructure Bill/Infrastructure Investment and Jobs Act
IPPI	It Pay$ to Plug In (Grant Program)
kW	Kilowatt
L2	Level 2 (Charging Station)
LEP	Limited English Proficiency
MPO	Metropolitan Planning Organization
MUD	Multi-Unit Dwelling
NEVI	National Electric Vehicle Infrastructure
NHFN	National Highway Freight Network
NJBPU	New Jersey Board of Public Utilities
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJEDA	New Jersey Economic Development Authority
NJTP	New Jersey Turnpike
NJTPA	North Jersey Transportation Planning Authority
NJZIP	New Jersey Zero Emission Incentive Program
OBC	Overburdened Communities
OEM	Office of Energy Management
PHEV	Plug-in Hybrid Electric Vehicle
RGGI	Regional Greenhouse Gas Initiative
TAC	Technical Advisory Committee
USAB	United States Access Board
USDOE	United States Department of Energy
USMR	Utility Side Make Ready
VMT	Vehicle Miles Traveled
ZEV	Zero Emission Vehicle

DISCLAIMER

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I. INTRODUCTION

The purpose of the *Union County Electric Vehicles Infrastructure Study* is to plan the expansion of EVSE throughout the County in order to assist present and future EV drivers. As EV adoption rises, it will promote better air quality and improve community health by reducing emissions from gasoline-powered vehicles.

This Study was funded with Union County and federal funds through a grant from the NJTPA through the Subregional Studies Program. The firm of French & Parrello Associates, together with FHI Studio and AECOM, was retained by Union County to advance the work.

The popularity of EVs and plug-in hybrids is growing as improving technology make them more reliable and government incentives make them more affordable. While many EV drivers typically charge at home, not all households have a privately owned parking space or convenient alternative charging locations. Additionally, EV drivers need public charging when traveling long distances. As a result, the opportunity exists to meet the needs of an increasing number of EV drivers both localy and those traveling through the region. This Study serves as an opportunity to determine where and how to expand the EV infrastructure network in a way that is efficient, convenient, and equitable.

In addition to meeting overall demand for convenient EV charging sites, the Study aims to place the County in position to have the needed infrastructure with respect to traditionally underserved communities. The Study attempts to address the challenge of sufficient charging equipment locations for residents renting in multi-family residences and larger developments, regardless of income and/or neighborhood.

Union County has a population of about 575,000 residents and covers an area of 103 square miles, making it the third most densely settled county in New Jersey. The 21 municipalities within Union County range in size from cities to small boroughs. The County is crossed by major highways, serves as host to the Elizabeth Marine Terminal, a portion of Newark Liberty International Airport, and is served by four (4) NJ TRANSIT rail lines, with at least one train station in over half the municipalities. In this rich transportation landscape, a sufficient number of well-located EV chargers will serve as another vital link to connect people to destinations both within and outside the County.

The Study included several steps including data collection, data analysis and public outreach. Public outreach included two meetings of a TAC and a final Public Meeting. A project webpage was created with information on EVs, grant opportunities, State P.L. 2021, c. 171 model ordinance, and promoted the activities of the project. The project page included a survey and mapping tool to gather information from the public.

The Study shows where EVSE can be located during the next 10 years by considering areas of highest demand and need, as defined by the four categories of equity, land use/built environment, EV network gap, and early adoption. These EV charging opportunities reflect both public input and technical analysis.

The framework for the EV network reflects the December 2025 goal for the State of New Jersey to have 330,000 registered passenger EVs and at least 400 DCFC throughout the state. The DCFC chargers are to be distributed to at least 200 locations.

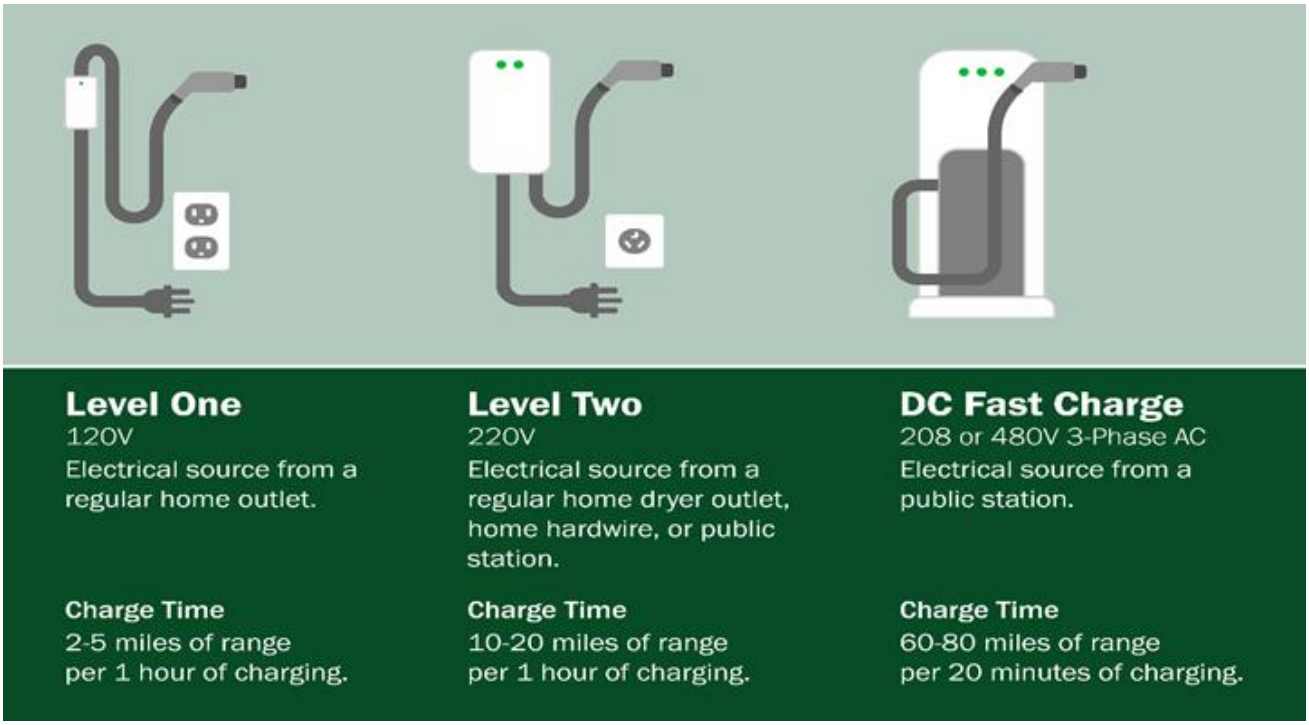


FIGURE I.1 EV CHARGER TYPES

There are currently three different EV charging options, depending on the driver's needs. Drivers who charge their EVs at home can use a Level 1 charger. These take several hours to fully recharge a battery, but they are relatively inexpensive and can charge using an ordinary household outlet. The faster Level 2 chargers are more appropriate for public use. L2 chargers require a heavy-duty outlet. This is the type used by refrigerators and other large appliances. The fastest charger currently available is Level 3, DCFC, which requires three-phase power. Level 3 is the most expensive EVSE to install.

Three-phase power is a three-wire alternating current (AC) power circuity. Residential homes are usually served by single-phase power. Voltage in a single-phase power supply system may reach up to 220 volts, but on a three-phase power supply system voltage can go up to 480 volts. Three-phase power supply is not available everywhere and it cannot be assumed that three-phase power supply is available at all locations with existing electrical service.

An overview of the process for developing the network of chargers, including setting goals, suitability scores, and recommended locations, is shown in the below figure.

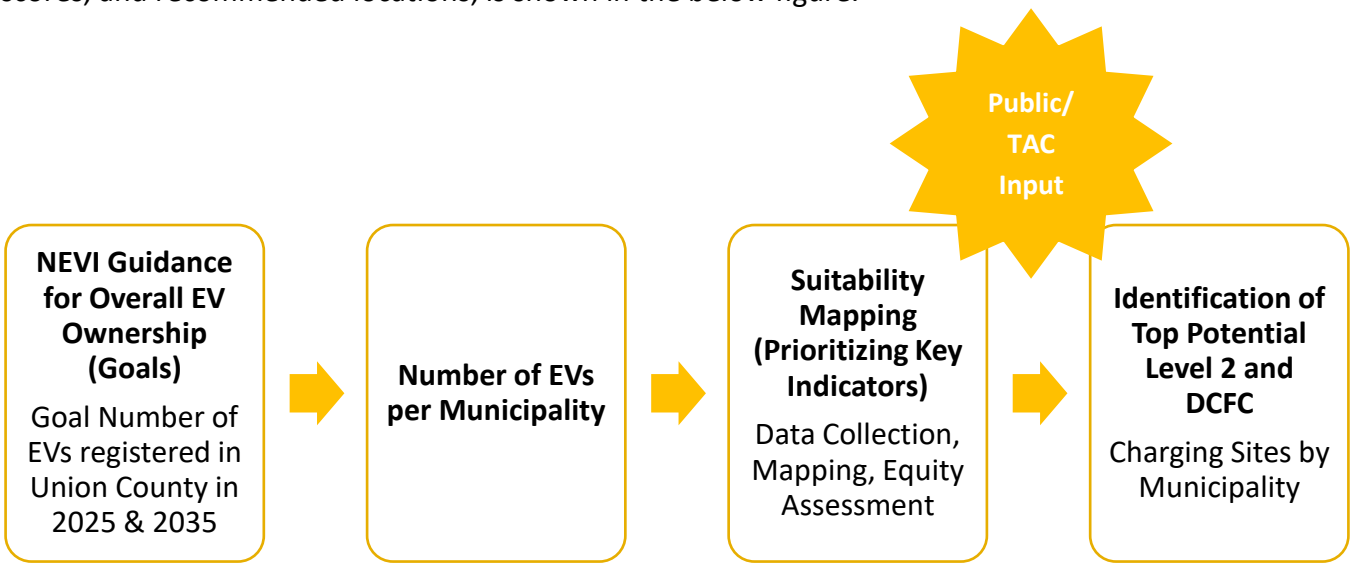


FIGURE I.2 DEVELOPING A NETWORK OF CHARGERS

This process combines datasets, public outreach, and comprehensive mapping to create a suitability score that can be used to help individual municipalities, developers, and businesses to identify best locations to place EV charging infrastructure.

The purpose of this study is to provide a toolkit for Union County public and private entities alike to determine suitable EV charging locations throughout the County, while identifying the steps needed for site selection, implementation and determining their eligibility for funding.

II. DATA COLLECTION

Data References

The following sources were referenced in the preparation of this study:

- NJTPA Alternative Fuel Vehicle Readiness Guide (2017)
- NJTPA Long Range Transportation Plan 2050: Transportation, People, Opportunity
- NJDEP Electric Vehicle Charging Infrastructure Guidelines for Cities (2017)
- NEVI Formula Program
- New Jersey's NEVI Deployment Plan
- New York State Energy Research and Development Authority (NYSERDA) - Site Owners of Electric Vehicle Charging Stations on Commercial Properties Best Practices Guide (2015)
- United States Department of Energy (US DOE) - Costs Associated with Non-Residential Electric Vehicle Supply Equipment (2015)
- United States Access Board Design Recommendations for Accessible Electric Vehicle Charging Stations (2022)

These guides, plans, and standards indicate that most EV drivers charge either at home or work. However, for people who live in MUDs, charging at home is not a likely option; especially if they use public on-street parking. This gap in charging infrastructure provides opportunities to install publicly available chargers in a variety of publicly accessible locations.

Information was gathered from a wide range of resources to gain a comprehensive understanding of the County's existing EVSE infrastructure. Using data and guidelines from both public and private entities at national, regional, and local levels, industry's best practice was researched, and the County's current and planned charging facilities were collected. Local land use, zoning, and demographic characteristics were then examined. A variety of GIS data from municipal, county, state, and federal sources were compiled to create a project-specific mapping tool organized by corresponding layers.

Geographic Information System Mapping

ArcGIS Pro, an ESRI software, was utilized to develop and deploy a public and secure web mapping application to track and collect data collection efforts. The approach is rooted in the understanding that there is no one-size-fits-all approach for locating EVSE sites, but focus should be on local conditions and sociodemographic characteristics to plan for the best EVSE infrastructure possible. A thorough understanding of existing conditions related to vehicle electrification within the County is an essential step in assessing existing public and private charging infrastructure, EV registrations and locations, electric capacity information as available, housing characteristic data, and equity considerations, among others.

As part of this effort, a geodatabase was prepared from the following sources:

- Union County
- NJTPA
- New Jersey Office of Geographic Information Systems (NJOGIS)
- NJDOT
- NJDEP
- USDOE
- U.S. Census ACS 2015-2019
- 2022 Major Commercial Development in Union County Report
- Union County's 21 Municipalities
- It Pay$ to Plug In Grant Program
- PSE&G's EV Hosting Capacity Map
- NJDEP Community Fast Charger Solicitation Mapping Tool

The information collected included:

- Census Data at Tract Level
- Road Centerlines
- Boundary Lines
- Zoning Information
- Existing, Future Planned, and Proposed EV Charger Locations (as of August 2022)
- School and University Locations
- Tax Parcels
- Equity Assessment Data
- Land Use Data
- Planned Major Commercial/High Density Developments
- Transit Centers

Existing/Planned EVSE Locations

The USDOE Alternative Fuels website provides an interactive GIS web mapping application of all known EV charging stations throughout the country. This resource served as a starting place for mapping existing EV infrastructure in the County.

Private hosts, such as ChargePoint, Volta Charging, Tesla, and Wawa, provide locations of their charging stations on their websites.

The locations of any known future planned EVSE were requested from each of the County's 21 municipalities. All the municipalities responded and provided the addresses of any pending or approved EVSE based upon municipality public installation plans, grant applications, planning board applications, and zoning board applications. These sites were added to a list of planned chargers, located in the appendix of this report, and these locations were represented with a unique marker on the GIS geodatabase discussed above.

The map also identifies locations in the County that have recently received funding through NJDEP funding opportunities, such as the *It Pay$ to Plug In* Grant Program.

Information on the location of any planned chargers was obtained from JCP&L and PSE&G, the two electric companies servicing the County. JCP&L is part of First Energy Corporation. They were both invited to serve on the TAC.

FIGURE II.1 CHARGING STATION IN WESTFIELD PUBLIC PARKING, AUGUST 8, 2022

A sampling of the existing EV charging locations throughout the County was visited to observe use, measure their effectiveness, and to gain understanding of the needs and current uses in the County. A photo log of visited sites is included in the Appendices.

Zoning

Data collection efforts also involved outreach to each of the County's 21 municipalities to identify approved zoning classifications, redevelopment zones, and to understand active development projects. The State P.L. 2021, c. 171 model ordinance[1] signed into law on July 9, 2021, affords municipalities the ability to expand their EVSE charging infrastructure. Data collection was conducted to identify locations of future developer-related expansion.

In general, the law requires that at least 15 percent of required off-street parking spaces be "Make-Ready" and that EVSE be installed in at least one-third of the 15 percent. The term "Make Ready" means that all necessary electrical infrastructure to operate the charging stations; all conduit and wire is pulled to the station location(s); all concrete work is completed properly so the stations can be mounted; and any cellular repeaters[2] are installed, if required. This is important for this Study, as developers are now legally required to provide EVSE on their site parking lots. Therefore, comparing existing land use to future planned land use is important to properly site EVSE equipment that can make an impact. Part of the goal is to maximize the investment available and minimize gaps in EVSE throughout the County.

Each municipality provided zoning maps to create an overview of the County's commercial, industrial, residential, recreational, and other uses. All municipalities provided zoning maps or zoning information in formats ranging from GIS shapefiles and AutoCAD files to PDF documents. The zoning data was converted, digitized, and imported into the project GIS database. Since each municipality uses its own unique zoning classifications, the zones were generalized into the following standard categories, referred to as *Generalized Zoning Data* in maps:

- Single Family Residential
- Multi-Family Residential
- Commercial
- Industrial
- Mixed Use
- Conservation and Open Space
- Municipal/Government Use
- Office/Professional
- Recreational/Cemetery
- Education
- Health Care
- Redevelopment Zones

The result of this data collection is presented in Appendix K in a map titled "Generalized Zoning."

[1] P.L. 2021, c.171 Model Ordinance

[2] A cell phone repeater (also known as cellular repeater, amplifier, or cell signal booster) is a device used to improve cell phone reception in an indoor-outdoor environment.

III. EQUITY ASSESSMENT

The Study utilized the NJTPA Equity Analysis tool and its corresponding US Census ACS 2015-2019 data to replicate the equity assessment mapping conducted by the NJTPA. The following criteria were mapped in accordance with the County and NJTPA requirements for the Equity Analysis and six factors out of nine were determined to be applicable to EV Suitability.

NJTPA Equity Factors

Disabilities
Female Population
Foreign Born
Limited English Proficiency
Low Income
Minorities
Population Age 5 to 17
Population Age 65 and Over
Population Under Age 5
Zero Vehicle Household

Equity Factors Applicable to EV Suitability

Minority
Low-Income
Disability
Foreign-Born
Limited English Proficiency
Female Head of Household

An Equity Assessment report included in Appendix F was prepared to identify the presence and location of communities that have been traditionally underserved and underrepresented in the planning process. The network of EVSE recommended through this Study includes locations within underrepresented communities that improve access and reduce barriers to EV use.

IV. STUDY METHODOLOGY

The world of EVs is new and evolving. Innovative technologies, expanded ranges, and federal support for EV adoption are accelerating the change from fossil fuel dependent transportation to renewable electrified transportation. Employing projections based on the latest data and guidance from federal and state policies, this Study provides a road map for the expansion of EV charging infrastructure in the County.

NEVI Program Overview and Goals

The NEVI program was established as part of the IIJA of 2021 or otherwise known as the Bipartisan Infrastructure Law, or BIL, with the goal to provide funding to states for deploying EV charging infrastructure and establishing a nationwide, interconnected charging network. This EV network will accelerate equitable adoption of EVs, including those who cannot reliably charge at home, reduce transportation-related greenhouse gas emissions, and position US industries to lead global transportation electrification efforts by creating jobs that cannot be outsourced.

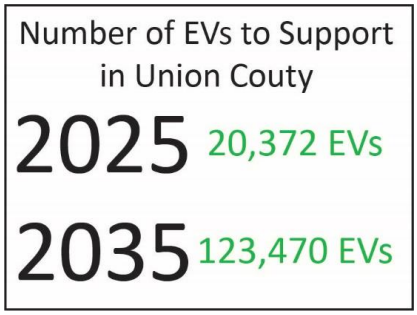
The NEVI program includes a Formula Program and Discretionary Grant Program[3]. The Formula Program has $5 billion dedicated to strategically deploying EV charging infrastructure along AFC, which primarily follow the US Interstate system. The Discretionary Program for Charging and Fueling Infrastructure has $2.5 billion to support rural charging, build resilient infrastructure, mitigate climate change, and increase EV charging access in disadvantaged communities. Half of the discretionary funds are to be deployed along AFCs while the other half are for local communities, and this program supports the Justice40 Initiative. Justice40 was created by Executive Order 14008, with the goal of distributing at least 40 percent of benefits from federal investments in climate/clean energy infrastructure to disadvantaged communities.

To qualify for federal funding, each state was required to submit an EV Infrastructure Deployment Plan by August 1, 2022, describing how the state intends to use NEVI funds. NJDOT, in partnership with NJDEP, NJBPU, NJEDA, and the Governor's Office, submitted the New Jersey NEVI Deployment Plan to the FHWA and the Joint Office of Energy and Transportation (JOET) on July 30, 2022. The NJ NEVI Plan was approved on September 27, 2022.

[3] NEVI Fact Sheet

Number of EVs to Support

The population for all of New Jersey and within each of the County's 21 municipalities was pulled from the US Census[4] [5] to calculate the number of EVs to be supported by each municipality. This process estimated that 6.17 percent of New Jersey's population resides in the County.



The New Jersey NEVI Deployment Plan[6] set a goal of 330,000 EVs on the road statewide by 2025 and 2 million EVs by 2035. The plan goals also included 400 DCFCs by 2025, over 1,000 L2 chargers by 2025, and 85 percent of light duty vehicle sales to be plug-in EVs by 2040. The plan goals for 2025 and 2035 were multiplied by the 6.17 percent factor to determine the number of EVs within the County to support these goals — 20,372 EVs in 2025 and 123,470 in 2035. The plan is the only 'standard' that sets goals for adoption based upon requirements communicated to each state from the NEVI Program.[7] The funding filtering down through these programs is one of the largest investments into transportation infrastructure ever. As this Study was intended to target available funding, New Jersey's NEVI Deployment plan has become the "target to meet."

To determine the number of EVs each municipality would need to support the 2025 and 2035 goals, the percentage of the population within each municipality relative to all of the County was multiplied by the County's number of EVs for each goal year. The number of vehicles to support Phase 1 is approximately 3.5 percent of the population and Phase 2 is approximately 21.54 percent of the population. The results are shown in the table below.

[4] https://www.census.gov/quickfacts/NJ

[5] The current percentage of registered EV's per municipality was an alternative methodology, in lieu of population, to determine the number of EV's to support. However, this study did not find that the percentage of registered EV's represented an equitable distribution of charging equipment. As current EV adoption has a number of barriers such as affordability and reliability, that are anticipated to improve over the next decade, current EV registrations is not a recommended method of predicting EV support.

[6] https://www.fhwa.dot.gov/environment/nevi/ev_deployment_plans/nj_nevi_plan.pdf

[7] https://www.fhwa.dot.gov/environment/nevi/

TABLE IV.1 NUMBER OF EVS TO SUPPORT GOALS

Municipality	Population	Phase 1 (2025) Goal: Vehicles to Support	Phase 2 (2035) Goal: Vehicles to Support
Winfield	1,471	52	317
Garwood	4,327	154	934
Mountainside	7,014	250	1,514
Fanwood	7,699	274	1,662
Kenilworth	8,335	297	1,799
Berkeley Heights	13,169	469	2,842
New Providence	13,617	485	2,939
Roselle Park	13,911	495	3,002
Clark	15,393	548	3,322
Springfield	16,979	605	3,664
Hillside	22,180	790	4,787
Roselle	22,432	799	4,841
Summit	22,526	802	4,861
Cranford	23,983	854	5,176
Scotch Plains	24,676	879	5,325
Rahway	29,911	1,065	6,455
Westfield	30,754	1,095	6,637
Linden	43,594	1,552	9,408
Plainfield	54,936	1,956	11,856
Union	59,800	2,129	12,906
Elizabeth	135,407	4,822	29,223
TOTAL	**572,114**	**20,372**	**123,470**
NJ NEVI Plan Goal		**330,000**	**2,000,000**

EV Registrations

The County obtained the most current data available on the number of EV registrations by municipality from Atlas Public Policy EV HUB provided by NJDEP through the Open Registration Initiative. As of December 1, 2022, there were 7,035 EVs registered in the County, as shown in the following table with registrations by zip code.

To estimate the growth rate of BEV and PHEV adoption, EV registration as of June 30, 2022 was also gathered from Atlas Public Policy EV HUB[8]. Comparing that to the registrations as of December 1, 2022, it can be extrapolated that Union County is on track to meet and possibly exceed the goals of the NJ NEVI Deployment Plan. For the five-month period between July 1, 2022 and December 1, 2022, BEV registrations in Union County increased by nearly 74 percent, from 4,047 to 7,035. In addition, PHEV registrations increased 30 percent for the same time period, from 4,236 to 5,505.

[8]https://www.atlasevhub.com/materials/state-ev-registration-data/

TABLE IV.2 EV REGISTRATIONS BY ZIP CODE

Municipality	Zip Code	Registered BEVs	Registered PHEVs
Cranford	07016	427	392
Fanwood	07023	197	190
Garwood	07027	72	26
Kenilworth	07033	142	66
Winfield	07036	336	271
Linden	07036		
Plainfield	07060	298	275
Plainfield	07061	5	0
Plainfield	07062	118	97
Plainfield	07063	182	35
Rahway	07065	309	216
Clark	07066	233	179
Scotch Plains	07076	594	423
Springfield	07081	343	282
Union	07083	443	327
Vauxhall, Union	07088	34	20
Westfield	07090	667	583
Mountainside	07092	305	180
Elizabeth	07201	130	84
Elizabeth	07202	113	127
Roselle	07203	119	128
Roselle Park	07204	119	114
Hillside	07205	159	164
Elizabeth	07206	52	84
Elizabeth	07207	25	8
Elizabeth	07208	158	123
Summit	07901	689	564
Summit	07902	7	3
Berkeley Heights	07922	428	297
New Providence	07974	331	247
Cranford	07016	427	392
Total		**7,035**	**5,505**

Typical Land Use Types

The table below shows the typical land uses for the three types analyzed: Workplace, Public (L2), and Public (DCFC). Single family homes were excluded as they can serve as at-home charging locations with lower-cost Level 1 charging equipment. The targets by municipality assume a sufficient level of home charging to service EV drivers.

TABLE IV.3 EV INFRASTRUCTURE TYPES OF TYPICAL LAND USES

Workplace (L2)	Public (L2)	Public (DCFC)
Schools	Commercial Corridors	NEVI Corridors
Hospitals	Shopping Centers/Strip Malls	High Trip Destination with Public L2
Office Buildings	Commuter Parking Lots	
Office Parks	Town Halls	
Heavy Industrial/Port	Public Parks	
	Recreation Centers	
	Public Libraries	
	Other High Trip Destinations/Origins	
	Nearby to Multifamily Residential	

Estimating Number of Chargers Required

The United State Department of Energy's Alternative Fuels Data Center released the EV Infrastructure Projection Tool (EVI-Pro) Lite in 2016 to provide a simple way to estimate how many EV plugs are required to support the desired number of EVs on the road.[9] This tool can be used to help local jurisdictions plan for deploying charging infrastructure based on localized priorities, changing key assumptions, and localized data.

It should be noted that EVI-Pro uses EV counts from 2016 and assumptions are based on three factors:

- Vehicle mix (PHEVs vs BEVs)
- Full, partial, or no support of PHEVs
- Percentage of EV drivers with access to home charging

Changes to any of these variables results in a different projection of the number of EVSE needed.

It is worth mentioning that the EVI-Pro Lite tool is geared toward supporting EV use in major transportation corridors and as such the tool's formula tends to result in a high number of DCFCs.

[9] https://afdc.energy.gov/evi-pro-lite

Other key inputs into the EVI-Pro Lite Tool include the state or urban area and number of vehicles to support. The EVI-Pro Lite Tool requires that the region or state be selected, it is recommended that Union County municipalities also select the "New York-Newark urban area."

The number of vehicles to support can be based on each individual municipality's goal as shown in FIGURE IV.1 and FIGURE IV.2.

The percentage of EV drivers with access to home charging will vary among municipalities but those with a high proportion of residential neighborhoods of single-family homes, as compared to MUDs, will typically have a higher percentage with access to home charging.

To determine the level of PHEV support to use and the vehicle mix percentages, it is important to understand the difference between PHEVs and BEVs. PHEV models have limited all-electric range but may also run on gasoline after the all-electric range is used, which enables travel distances commensurate with traditional internal combustion engine (ICE) vehicles. These types of vehicles are being sold and manufactured in large numbers and many car makers are producing their own versions of PHEV.[10] The gasoline hybrid nature of a PHEV allows reliability and can be considered a gateway vehicle to BEV adoption because it offers the best of both worlds.

These inputs can vary by municipality and target year and therefore it is suggested that each municipality evaluate the market and their localized conditions to determine what input to use. The outputs of the EVI-Pro Lite Tool are the number of Workplace (L2), Public (L2), and Public (DCFC) recommended based on the input assumptions to achieve the number of vehicles to support. The resulting estimate would then be compared to the various site characteristics discussed under the Evaluation Criteria section of this report to determine whether a site could accommodate the number of chargers estimated.

Within the County, there were 103 Public L2 chargers and five DCFCs (as of February 16, 2023) and 7,035 BEVs registered (as of December 2022). While the tool's outputs provide a target number of chargers to achieve, it is important to avoid overbuilding charging infrastructure by monitoring demand at existing charging stations in coordination with local EV registrations to determine when and how many additional charging stations should be added.

[10] https://www.technologyreview.com/2022/12/22/1065830/why-evs-wont-replace-hybrid-cars-anytime-soon/

Figure iV.1 Map of Phase 1 (2025) EV Goals

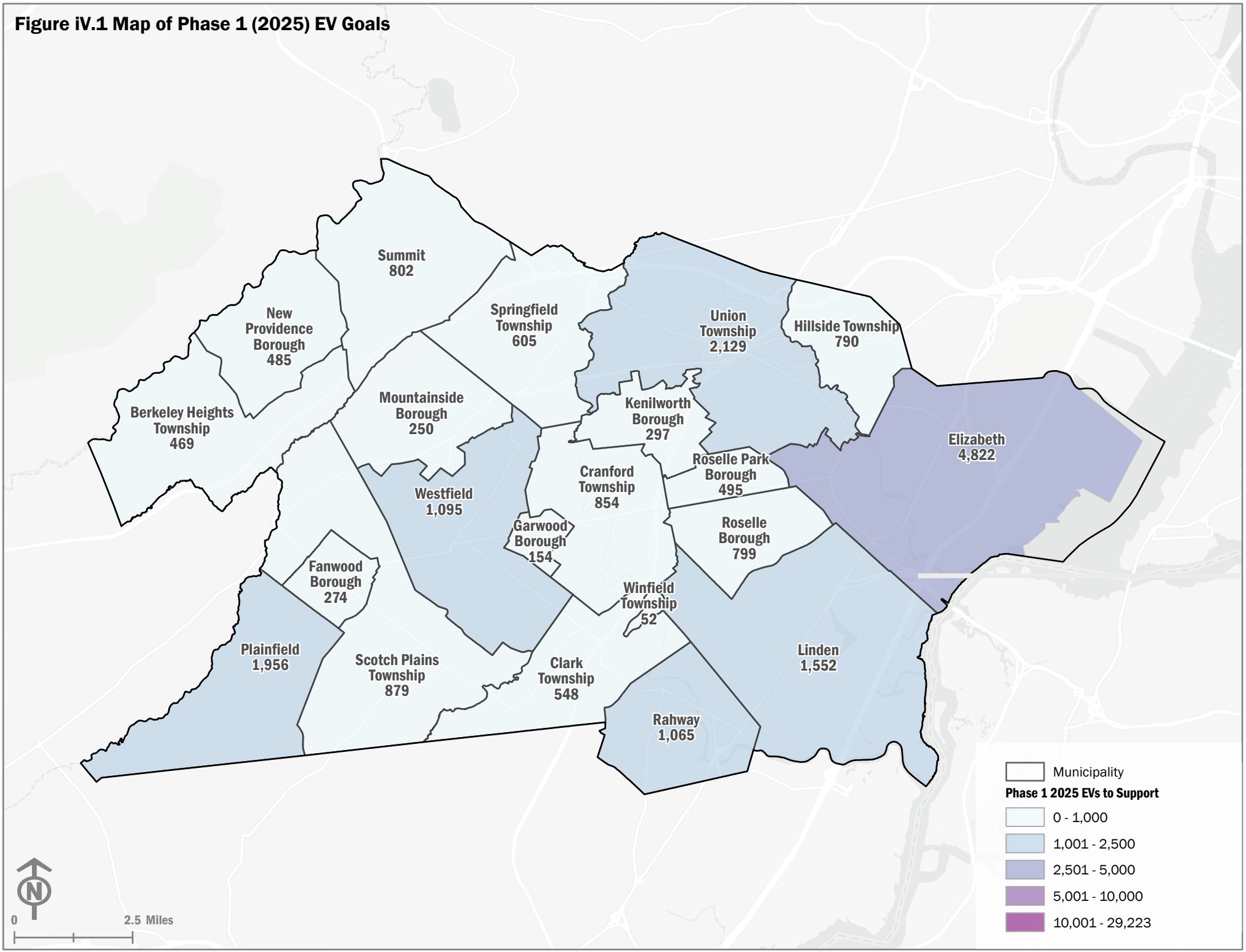
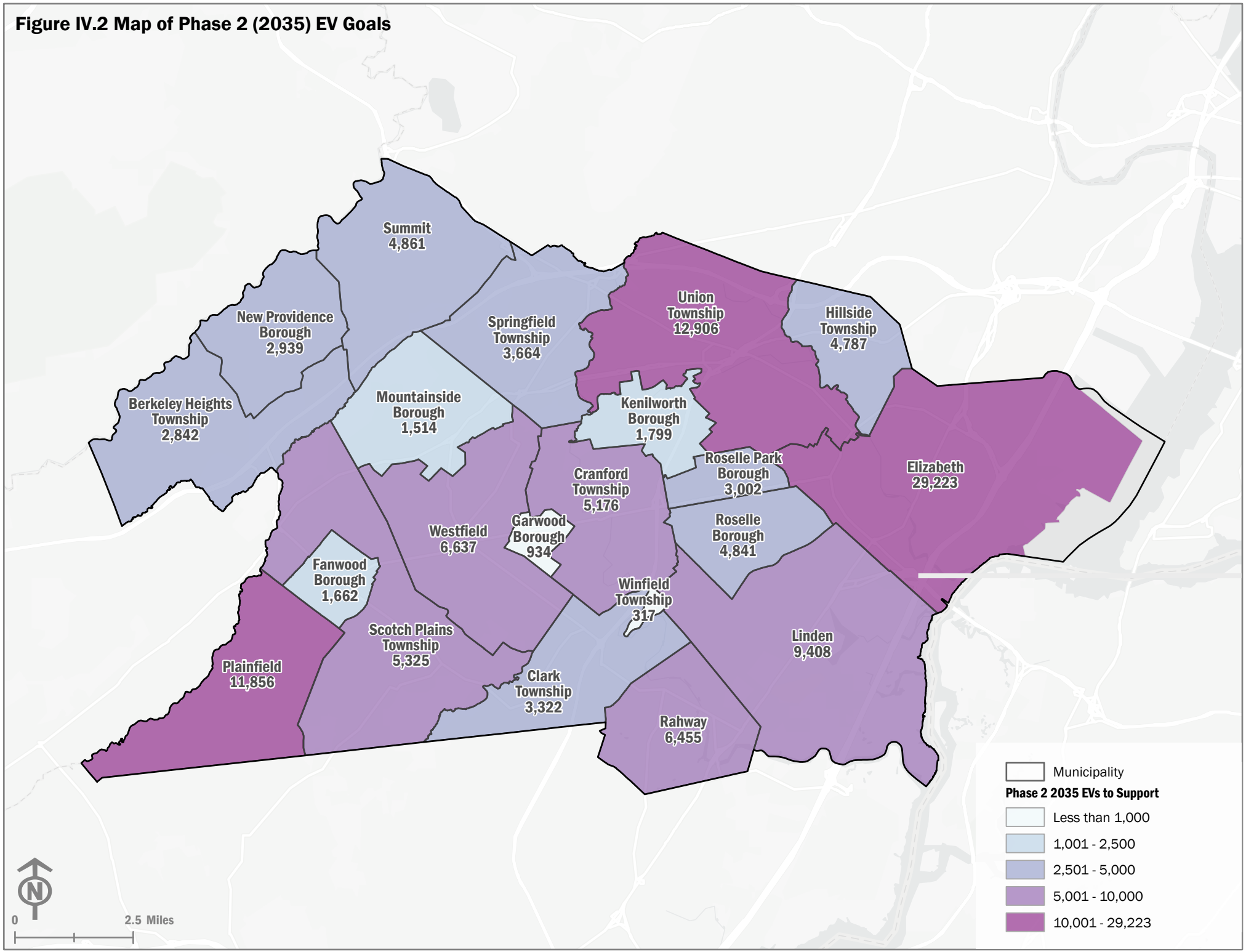


Figure IV.2 Map of Phase 2 (2035) EV Goals



V. SITE SELECTION PROCESS

The below factors were considered as part of the site selection process and ultimately evaluated for suitability.

Prime Location

The study referenced the NJDEP recommendations for determining ideal EV charging locations, which include:

- Public Spaces (Parks, Recreation, Cemetery, Healthcare, Education)
- MUDs (Multi-Family)
- Workplaces (Professional Office)
- Shopping Centers (Commercial)
- Cafes and Restaurants (Commercial)
- Highways (Municipal/Government Use)
- Commuter Parking Lots (Municipal/Government Use)
- Public/Private Parking Facilities

The generalized zoning data categories were added in parentheses adjacent to the EV charging location description.

The length of time that a driver remains at a specific location, also known as dwell time, is an important factor in evaluating prime locations. It can help select the type of charging provided at a location (L2 versus DCFC), for instance, a longer dwell time may mean that L2 charging in lieu of DCFC may be applicable. However, dwell time must also be considered within the context of demand and number of EV charging units to determine the correct combination of EVSE to provide at a site.

Gap

Gap is defined as the distance between charging stations or can be considered a location where demand exceeds availability. Gap sites also lack an existing EVSE charger appropriate for its zone/location type. Conversely, placing new chargers in an oversaturated area is not an economical use of resources, even if the location is considered ideal based on other criteria. The geodatabase was utilized to locate gap areas where charging was absent. The goal of reviewing the EV charging network in the County in relation to gap was to ensure that drivers feel a sense of reliability without experiencing range anxiety, which is a fear they will run out of battery or fuel before reaching the next charging/fueling station.

High Trip Destination

A high trip destination is a location which generates a high volume of visits. Ideally EVSE will be placed in areas where they will be frequently utilized (high demand), to support the cost-benefit of installation. GPS traffic volumes and traffic data was collected county-wide to determine proposed locations that

generate a high volume of trips – either as a destination (such as shopping, dining, etc.) or an origin (such as a MUD). High trip destinations ensure that there is a business case for installation and maintenance costs for chargers. The higher the utilization rate, the more suitable a location is for charging.

Shovel Ready

An important consideration is how quickly an EVSE location can be installed. The cost of installation, existence of power, and existing site infrastructure are all components of being shovel ready. Locations with available power supply were rated more suitable than locations without. Locations have also been prioritized that have existing paved parking areas where EVSE can be added, without major environmental, stormwater, or permitting required outside normal installation requirements. Shovel ready also means that there are no significant barriers preventing installation and the guidelines for ADA accessibility may be accomplished.

Visibility

Visibility is a factor when selecting sites for chargers as there are opportunities for municipalities, governments, or private entities to use EVSE for advertising. For instance, companies like Volta will lease parking spaces and pay for the cost of installation of EVSE in highly visible locations where they can benefit from advertising dollars. The high visibility of a location offers public and private entities the ability to install more EVSE as they are able to offset the cost with advertising revenue.

Safety

EV drivers are more likely to use a charger if the location feels safe and secure. Safety factors include whether the location has adequate site lighting, are visible to pass-by police patrol, and can be considered active — a planning concept that indicates the area may have public amenities, activities or events that encourage people to use or visit parks, public spaces, or neighborhoods.

VI. PUBLIC OUTREACH

A Public Information Plan was developed to outline how the Study would inform and seek broadcommunity input. The Study sought input from agencies and organizations, local businesses and community members, property owners, and the public, in addition to representatives from the Union County staff, the consultants, and the NJTPA. A variety of opportunities for education, discussion, comment and meaningful input were used to inform interested parties throughout the planning process. The process was designed with the following principles:

- *Engage people.* The outreach approach was designed with multiple opportunities to provide input. These included TAC meetings, a public meeting, virtual interactive mapping and survey initiatives, and a project webpage to provide project background and updates.
- *Seeing is believing.* Project materials, including newsletters, flyers, and presentations were graphically rich, and time was spent explaining EV charging at each meeting. Interactive survey questions were pursued at each meeting for stakeholders to express input.
- *Reach the community*. People of different ages, ethnicities, races, and incomes learn about and participate in community engagement activities and events in different ways. According to Pew Research Center data, the share of U.S. adults who say they do not use the internet at home, but own smartphones is highest among low-income households, with about 30 percent of households earning less than $30,000 per year relying on smartphones. Moreover, 17 to 25 percent of Black and Hispanic adults and households earning $30,000 to $49,999 per year also rely on smartphones for internet access at home. The webpage and virtual community engagement activities were developed to be mobile-friendly. Engagement materials were prepared in Spanish and English. Spanish-speaking language interpreters were available at public outreach events.

The following public involvement efforts helped ensure that residents, workers, and stakeholders could shape the recommendations in this plan:

- A project website, https://ucnj.org/ev-study/, provided a wealth of information related to EVs - incentives available, legislative priorities, and an overview of EV charging considerations. It housed a link to the online map and survey during the first phase of outreach for the Study, and later in the Study process, provided information on the public meeting timing.
- A project newsletter provided an overview of the project and its findings.
- An online survey was published on the project website and 215 people submitted responses.
- An online interactive map was published concurrently with the survey. It allowed the opportunity to provide place-based feedback, specifically recommending potential charging locations. Users suggested 78 locations for charging equipment.
- Two TAC meetings were held comprised of municipal and elected officials, regional stakeholders, and power company representatives (PSEG and JCP&L).
- A public meeting was conducted virtually providing the opportunity for a formal presentation and interactions with local constituents. This afforded residents and other stakeholders the opportunity to dive deeper into study findings and contribute to the development of the EVSE network.
- In addition to these opportunities to collect feedback, County staff presented to three County Advisory Committees: Human Services, Senior Citizens and Disabled Residents; and Transportation.

Attendees were also urged to share the EV Study with those they represent, visit the website periodically, and participate in the survey.

Technical Advisory Committee 1

The first TAC meeting in September 2022 focused on providing an overview of the Study and soliciting data collection, as necessary. As EV technology is a moderately new topic for many, background was shared on EVSE equipment and site selection. It was important to understand the level of engagement each of the municipalities have had to date with planning for EV charging infrastructure during this meeting. There was significant interest in capitalizing on this planning effort to pursue additional support, whether through partnerships with private companies looking to install EV charging facilities, or through federal grant opportunities. Importantly, a number of municipal representatives highlighted recent engagement with private EV charging companies, such as Volta, which offers free installation and charging, but recoups the cost through advertising. This suggested a higher priority be placed on highly visible locations for charging equipment.

At this meeting, the recent launch of the Study website and online survey/map was also highlighted. Through discussion on the project purpose and goals, the importance of highlighting long-term planning for a future where EVs have achieved price parity with gasoline-powered vehicles was reiterated.

Survey/Map

The online survey and map solicited public and stakeholder concerns and priorities related to the type and location of EV infrastructure throughout the County. The results offered resident perspectives on EV adoption, common trips for County residents, and suggested charging locations. Key themes are highlighted below and detailed results for each question are provided in Appendix A.

The survey responses indicated the level of awareness of EV infrastructure, and whether survey respondents are frequently using EVs. About one-third of respondents already have an EV, and of those, nearly all have access to a home charger. An additional one-third of respondents are considering an EV for their next purchase/lease. Respondents chose an EV largely based on value judgments (environmental benefits, reduced reliance on fossil fuels), as opposed to more practical considerations such as incentives or reduced maintenance costs. On the other hand, the cost to own or lease was the most popular reason given for not owning an EV. Many respondents without an EV also selected “other,” and generally seemed to disagree with the prioritization of EVs, EV charging equipment, or indicated overall hesitancy with the technology.

Based on the need to identify dwell times and trip frequencies for certain location types, the survey asked participants to identify a frequent trip, and answer some details about the trip. Most respondents described a work trip, with 56 percent of respondents describing a trip where they typically spend 4 to

8 hours at one destination. Half of respondents said their selected destination was under 10 miles from home; an additional 28 percent were destined for a location 11 to 25 miles away.

A variety of locations were suggested, mostly focused on the western side of the County, largely at shopping centers, office parks, or recreational facilities. The most common zip codes for survey/map participation were from communities on the western side of the County, representing the Town of Westfield, Township of Scotch Plains, and the City of Summit. Cities like Elizabeth and Linden were underrepresented in the survey responses, as were largely non-white and younger (under 35) populations.

Technical Advisory Committee 2

At the second TAC meeting held in December 2022, results of the public survey and mapping were shared, and there was a discussion on the weighting of evaluation criteria. There was an extensive explanation of how the project employed criteria for the siting of future charging locations. And as a second step, the relative weight assigned to each criterion. The four major categories/modules were described, with polling questions used to gauge feedback on the relative importance of each. While nearly each of the polls resulted in fairly even split results, the results were key questions to address in the technical analysis.

The first question for group feedback was on the relative importance of high utilization of the recommended chargers versus reduction of network gaps. In support of high utilization, some participants suggested that bringing EV into mass consumption will rely on investment from the private sector, so visibility and utilization are important. On the other hand, some participants noted that from the consumer perspective, range anxiety is a significant barrier to EV purchase, so gap reduction should be prioritized.

Another critical question discussed during this meeting involved the comparison of locations that would support EV early adoption versus the locations that would promote equity. Attendees discussed the merits of weighting and scoring locations that would promote EV early adoption versus promoting equity. Some participants suggested that it was important to create the network for the early adopters who would be building EV market share. Counter to that, some participants suggested that most early adopters will have access to home charging and rely less on public chargers. Discussions like these led to the development of a suitability model on a municipal level, versus a county-wide level, to ensure an equitable distribution of EVSE equipment. For instance, if analyzed on a County-wide basis versus municipal level, the majority of chargers would be proposed in the western side of the County to promote EV early adoption or on the eastern side of the County to support equitable distribution. In the end, the need for a reliable, evenly distributed, network of chargers was determined to be most important.

Regarding the third question, defining network gaps for the purpose of the analysis, the impact of local areas of congestion was flagged. Discussion at this meeting also underscored the equity benefits of planning for an EVSE network with this Study. Participants noted that overnight charging is not as readily available for residents of MUDs, as compared to potential access to home charging units for those living in single-family homes, necessitating publicly available chargers.

Overall, the EV driver experience was a key topic at this meeting. EV drivers within the TAC raised concerns about reliability and range anxiety.

Public Outreach Meeting

The final public feedback on the Study was conducted in April 2023 toward its conclusion. The meeting provided EV charging background, the Study methodology, employed poll questions to inspire participation, presented the suitability mapping and scoring, as well as provided an overview of how the Study could be used in the future by public and private entities. Public input collected at this meeting was used to vet the results of this Study and to ensure it provided the necessary information to support EV adoption and deployment throughout the County.

While the public meeting served a mostly informational purpose to aid in answering the public's questions about EV adoption, funding and implementation, there were notable results from polling that support the need for reliability, selection of proper charging equipment, and ensuring that demand is met at high trip destinations.

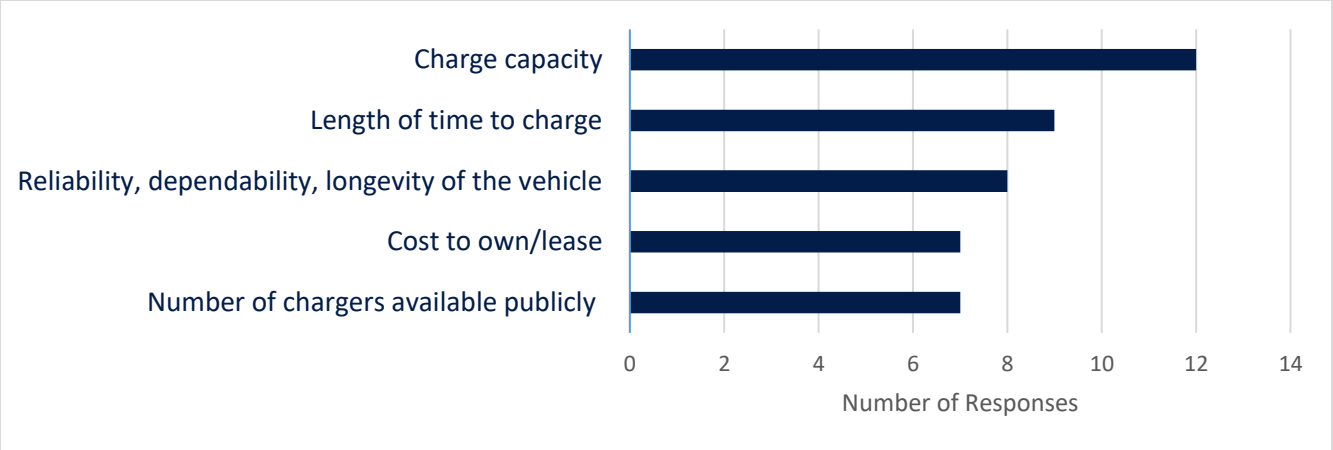


FIGURE VI.1 EV ADOPTION CONCERNS

Equally notable was the desire of the public to utilize private driveways for charging, but looking to workplace charging as the primary source of charging outside the home. The need for public charging is more evident for those without access to a private driveway, signifying that to equitably promote EV Adoption, options outside the home need to exist for those living in multi-family homes.

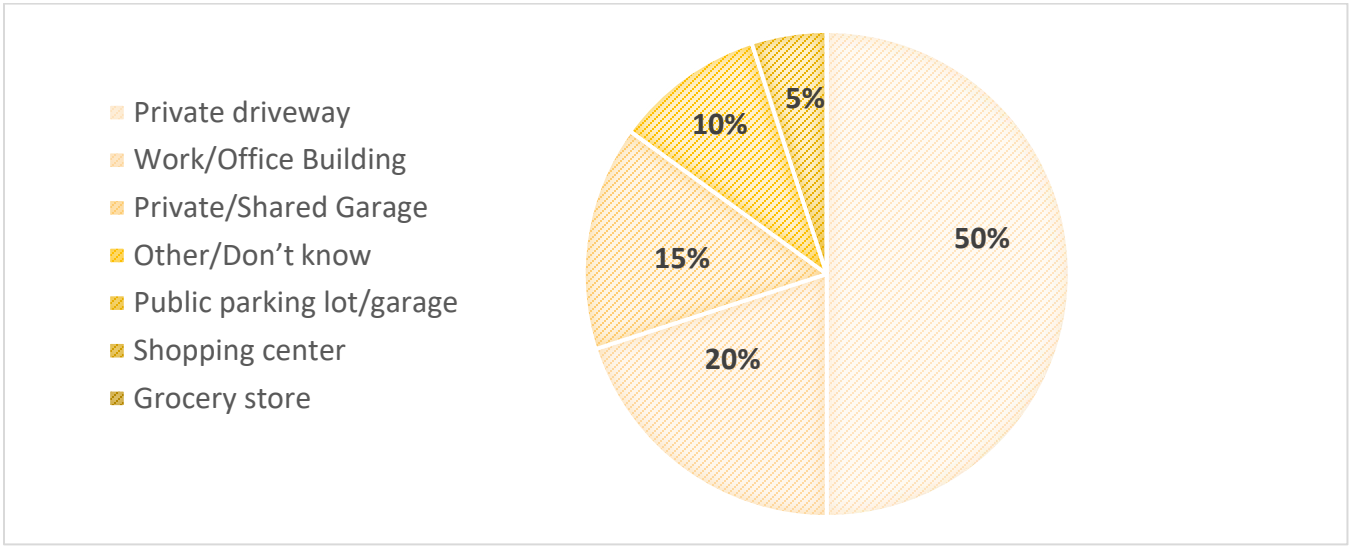


FIGURE VI.2 PREFERRED CHARGING LOCATIONS

Attendees also noted the importance of charging speed in relation to EVSE infrastructure.

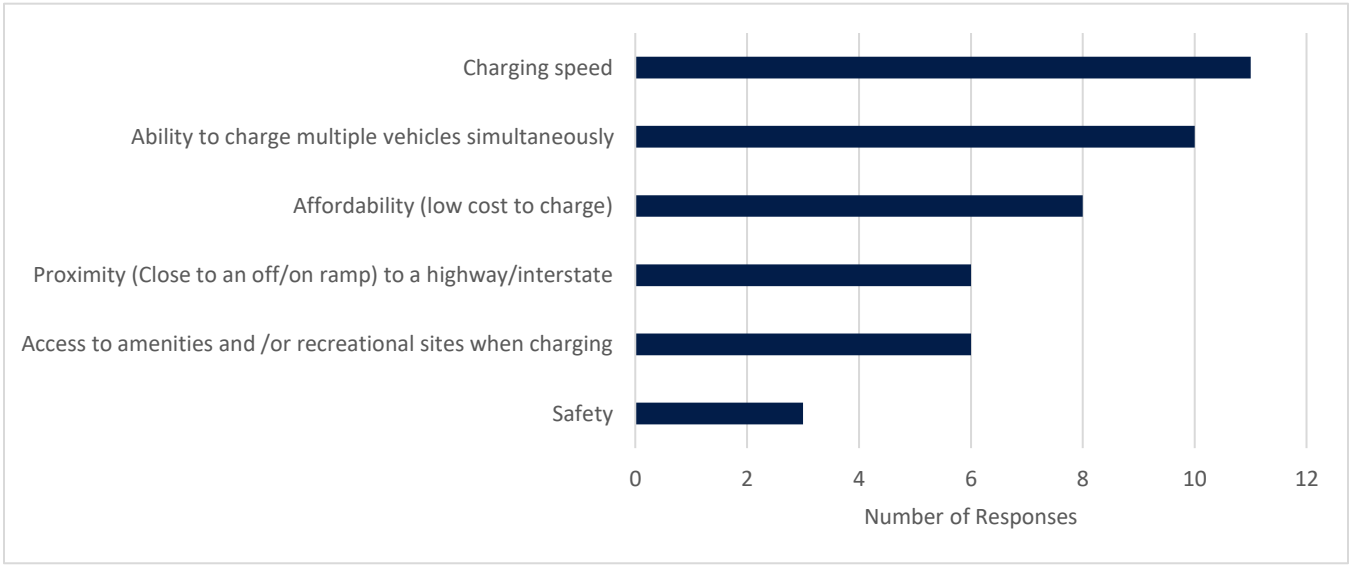


FIGURE VI.3 EVSE PRIORITIES

VII. SUITABILITY MODEL

The Study utilized a modeling tool called EV.Readi, a data-driven tool that supports transportation electrification-related efforts and helps to identify the most strategic areas for EV charging infrastructure deployment. It utilizes GIS to help identify optimal EV charger siting locations based on key datasets by calculating a suitability score that was further refined by public feedback. The default inputs used in the suitability model are from publicly available sources for the geographic area being studied, but any GIS data can be incorporated into the model for analysis based on localized needs.

The data is grouped into **four modules** (or categories) that have been identified through research to impact EV adoption and EV infrastructure usage. These include Equity, Early EV Adopters, EV Network Gap, and Land Use and Built Environment, and are described within the next subsections followed by a description of the individual metrics used and how the model is applied in this Study. These modules were used to provide holistic analysis. Inputs and modules were weighed to provide a context-sensitive approach to achieve optimized solutions for the County.

Equity Module

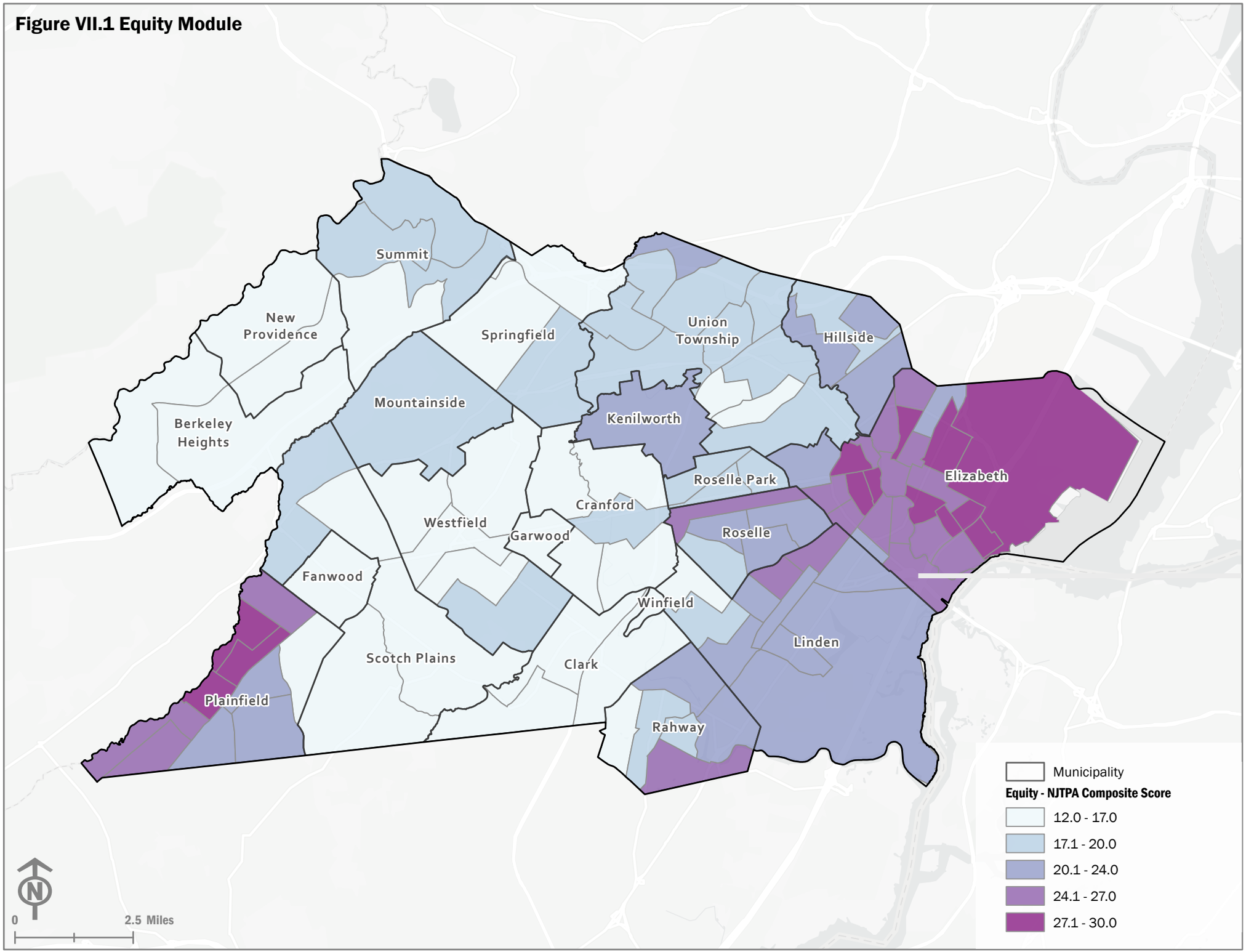
The Equity Module provides an overview of socioeconomic community disparities that can aid in targeting EV infrastructure investment to enhance equity among vulnerable populations. For this Study, the NJTPA Equity Analysis tool data[11] was used to identify protected populations. Based on the County's request, socioeconomic data inputs to the suitability model focused on minority populations, income, limited English proficiency, people with disabilities, foreign-born residents, and sex. A higher score indicates a greater percentage of disadvantaged populations within each municipality. Equity Module inputs also included the following:

- NJTPA Equity Factors
- Unemployment
- Social Vulnerability Index (SVI)
- Pollution Exposure
- Asthma Indicators
- Housing Burden
- Lack of Access to Transit

Figure VII.1 shows the NJTPA equity composite score for the included metrics in the County.

[11] NJTPA Equity Analysis Tool

Figure VII.1 Equity Module



Land Use and Built Environment Module

The Land Use and Built Environment Module provides an overview of existing land use and opportunities where land use can be leveraged to support EV infrastructure and increase EV adoption. Metrics evaluated as part of this module are used to target areas of higher population and housing density where households may not have access to charging within the home. Single family homes were excluded as potential locations as they would serve individuals instead of the public, and the targets by municipality assume a sufficient level of homes able to serve their individual charging needs. Additionally, to support EV adoption, this module incorporates trip destination data, data sourced from Replica[12], to identify areas within the County that have higher numbers of origin/destination trips within that area, referred to as a high trip destination. These areas have a higher density of workplaces and/or commercial areas that require the presence of public charging. The County zoning data was also used to identify areas of favorable zoning codes that can support additional EV infrastructure to allow public charging outside of the home. Population data was derived from the US Census ACS. The module inputs included the following:

- Population Density as referenced in the ACS
- Multi-Family Residences as referenced in ACS
- Generalized Zoning Data
- Origin/Destination Traffic Volume Data

Figure VII.2 highlights workplace and commercial land uses within each municipality to show generally where charging infrastructure should be placed, while Figure VII.3 displays high trip destination data to show where people are traveling.

[12] Replica data represents mobility patterns and activities by combining census data, proprietary regional location data from telecommunications and other IT infrastructure, and field observations data from customer public agencies. It is used within this Study to identify the number of trip destinations within each census tract to identify high trip destinations.

Figure VII.2 Land Use & Built Environment Module

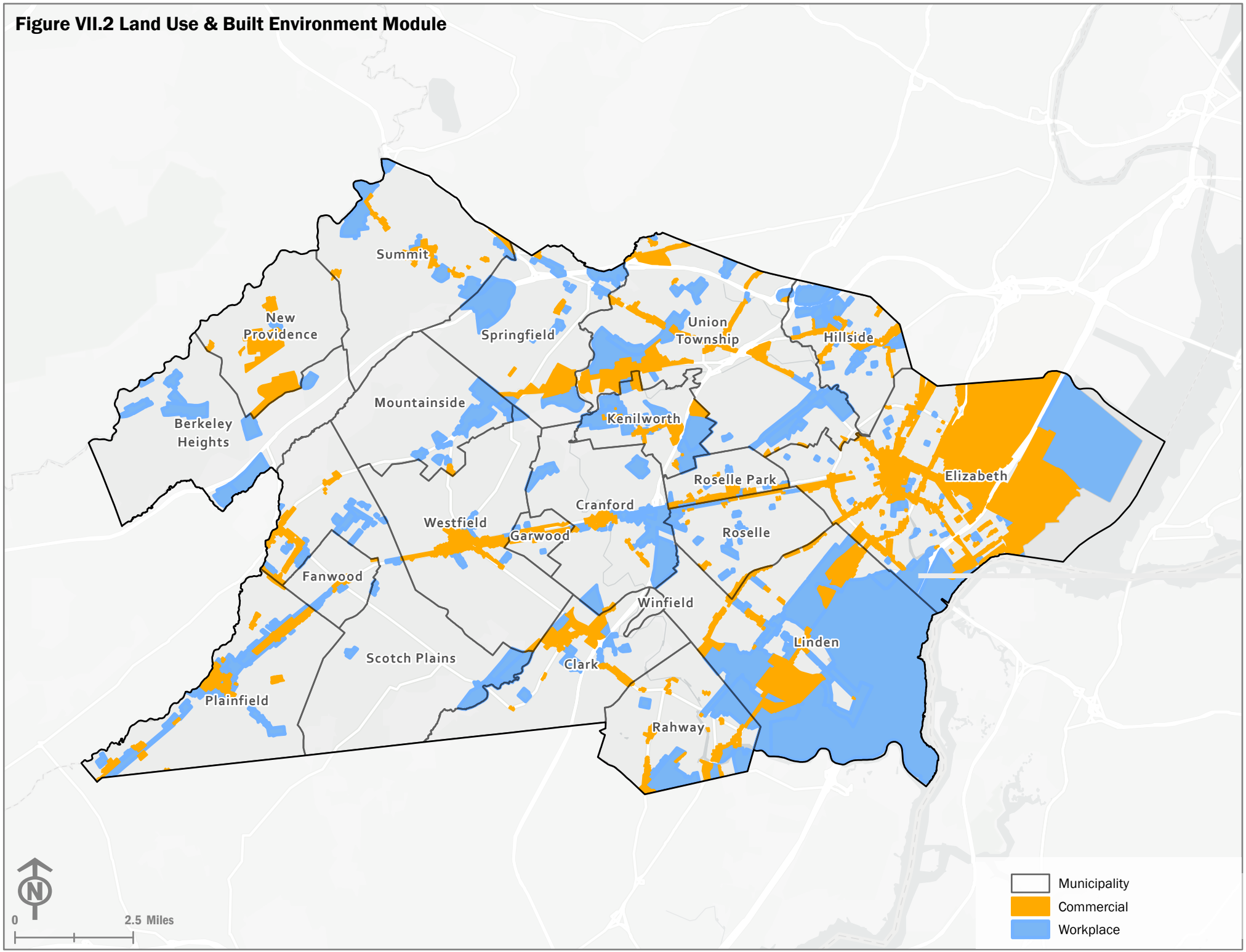
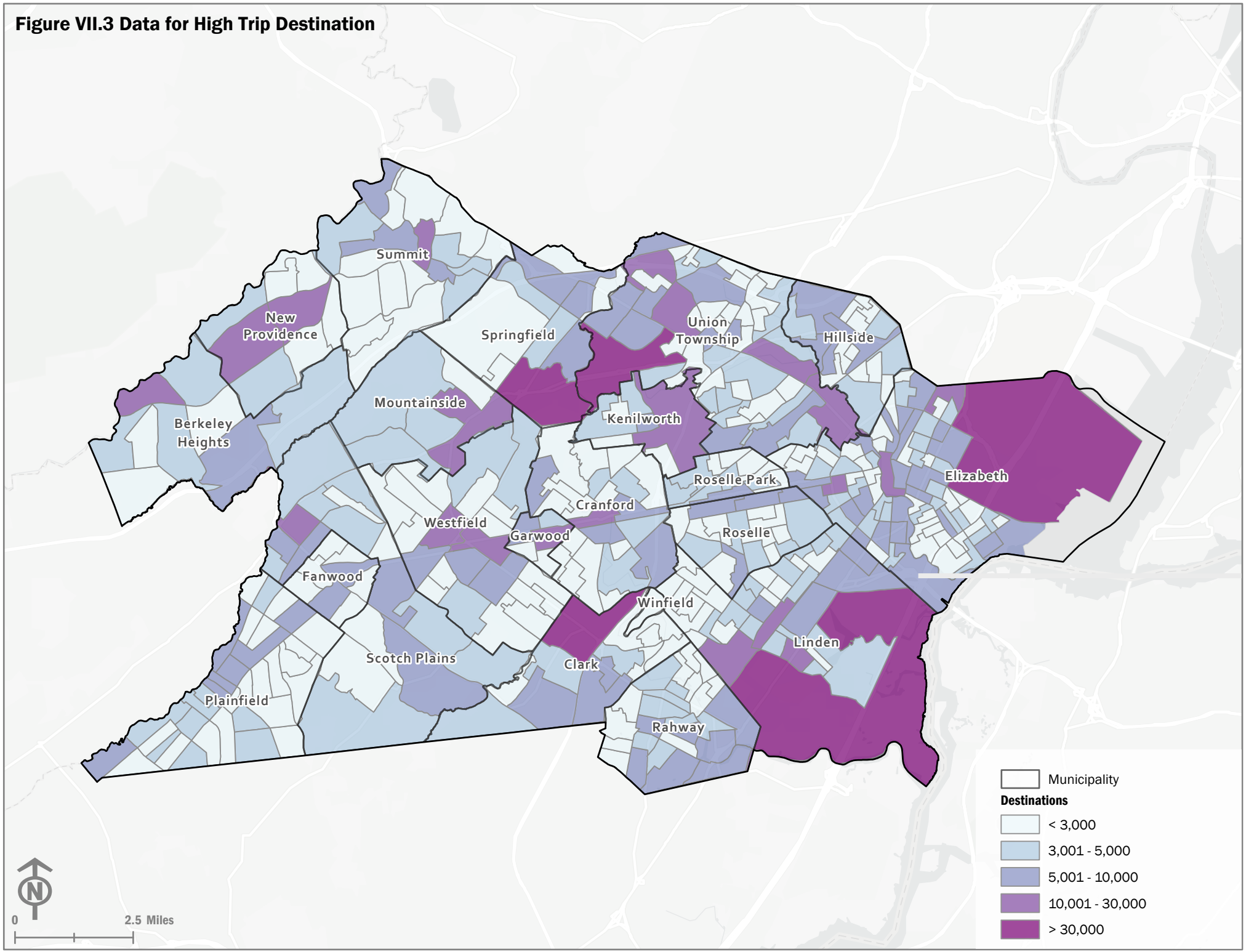


Figure VII.3 Data for High Trip Destination



EV Network Gap Module

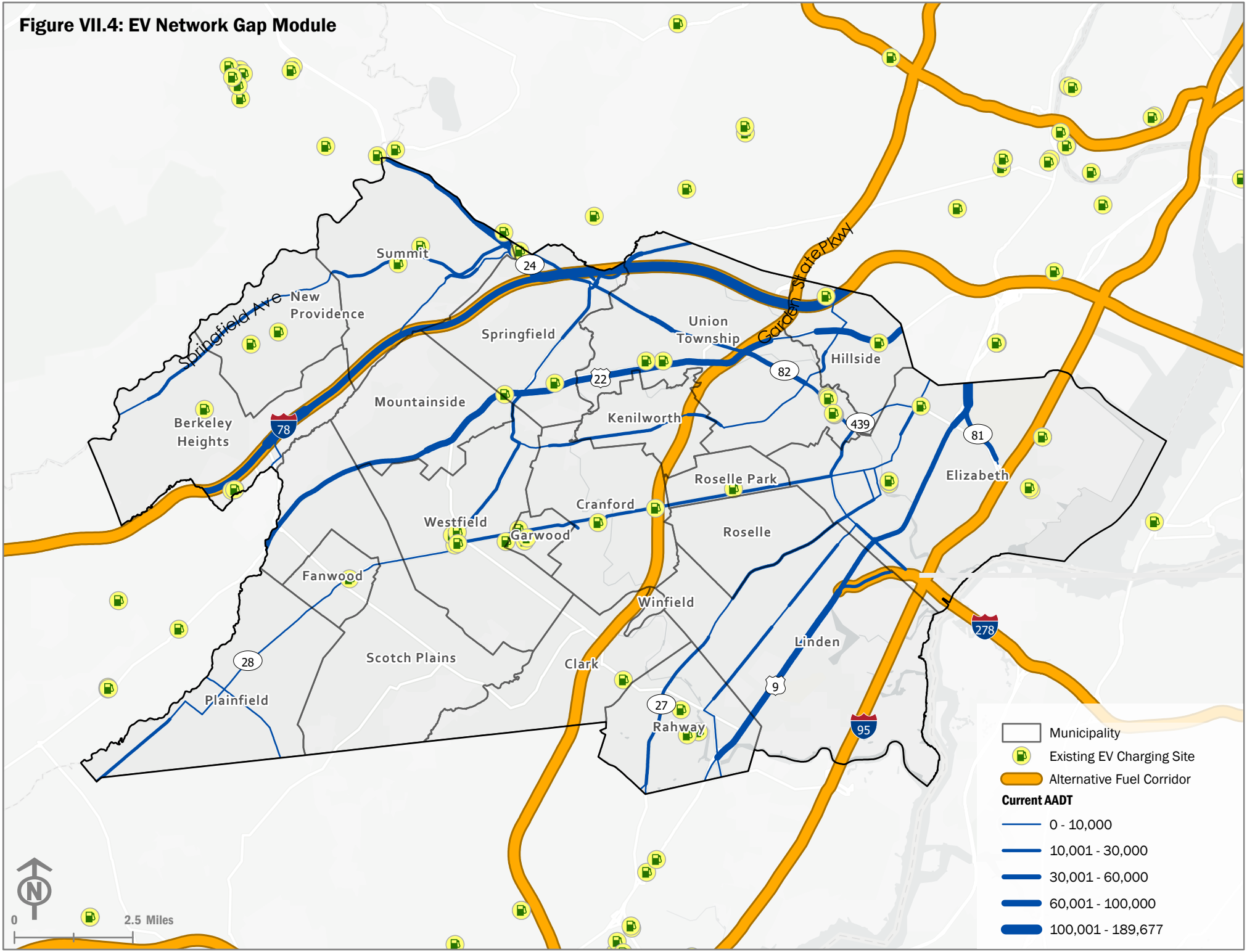
The EV Network Gap Module provides insight into potential gaps within the existing charging network, especially in areas of high-traffic volumes. As previously described, a gap in the network is defined as the distance between charging station locations to minimize range anxiety or the concern that someone driving an EV will run out of battery before reaching a charging station.

Metrics used in this module include the locations of existing public-access charging facilities, traffic volumes, existing power supply availability, and Alternative Fuel Corridors identified as part of the NEVI program. Traffic volumes are included in this module as higher volume roads and existing charging locations are representative of the existing EV network. Module inputs include:

- NJDOT AADT Volumes
- Alternative Fuels Data Center Charger Locations by Type

Figure VII.4 shows the locations of existing EV charging and Alternative Fuel Corridors within the County, as well as traffic volumes along major roadways, represented by AADT. The line thickness on the maps represents the range of volumes of traffic, for example, a thicker line implies where more vehicles travel, and public charging infrastructure may be needed.

Figure VII.4: EV Network Gap Module



Early Adopters

The Early EV Adopters Module provides an overview of indicators associated with EV adoption to highlight where initial EV adoption is likely to occur and require an EV charging network. Indicators of early EV adoption include household income and educational attainment, with households with higher income and college education currently more likely to purchase an EV, especially in the near-term.

Although EVs currently have a price premium over their gas-powered counterparts, this is anticipated to decrease during the upcoming decade due to declining battery prices, rebates/incentives, policies to create more fuel-efficient vehicles, as well as economies of scale to produce more EVs. There has also been a national push toward electrification of transportation and making EVs more accessible through consumer rebates, such as the Inflation Reduction Act, and significant funding for infrastructure, such as IIJA. Early EV adopter indicators shift as vehicles become more affordable and mainstream. Module inputs include:

- Median Household Income as referenced in the ACS factoring in the Living Wage Calculator from Massachusetts Institute of Technology
- Environmental Concern - 2020 Precinct-Level Election Results
- 2+ Car Households as referenced in the ACS
- College Education as referenced in the ACS
- EV Registration acquired from NJ Motor Vehicle Commission
- Urban Areas acquired from Tiger Data from US Census Bureau-Geography Division

FIGURE VII.5 illustrates median household income and FIGURE VII.6 illustrates percentage of population over 25 with at least a college degree within Union County.

Figure VII.5 Median Household Income

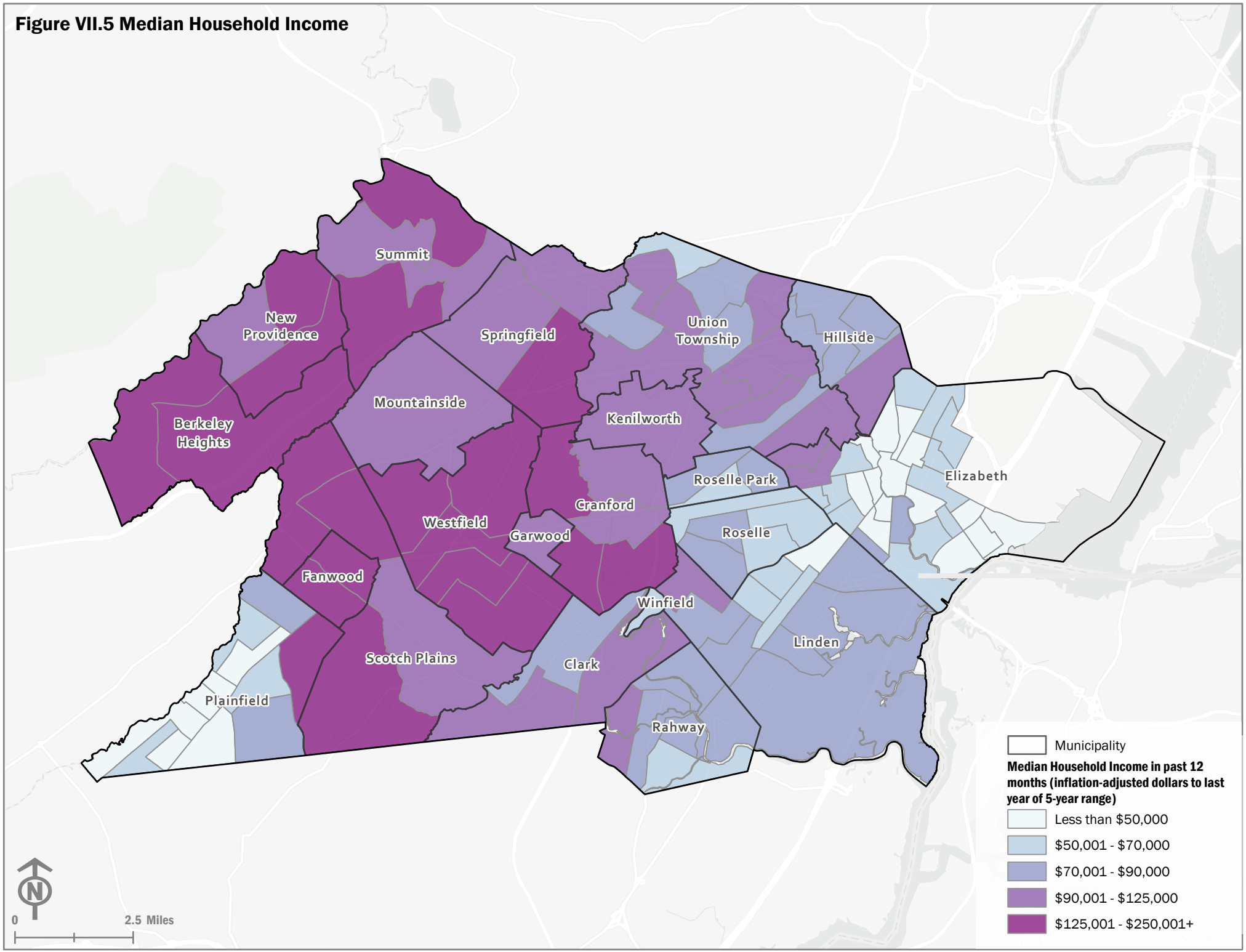
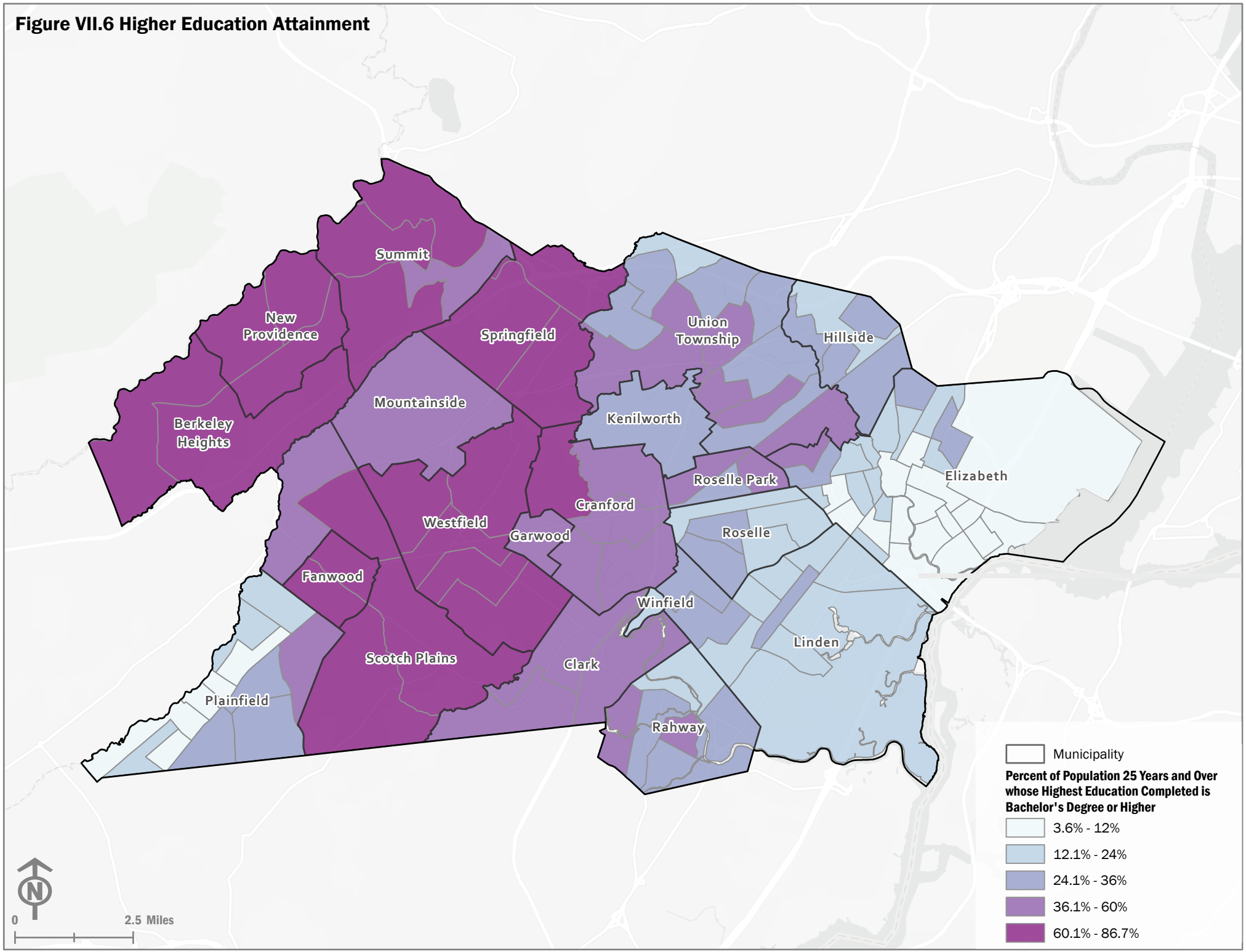


Figure VII.6 Higher Education Attainment



Composite Suitability Model

The below table shows the individual data points within each module, the data source, and basis of scoring used for this Study.

TABLE VII.1 SUITABILITY MODEL MODULES

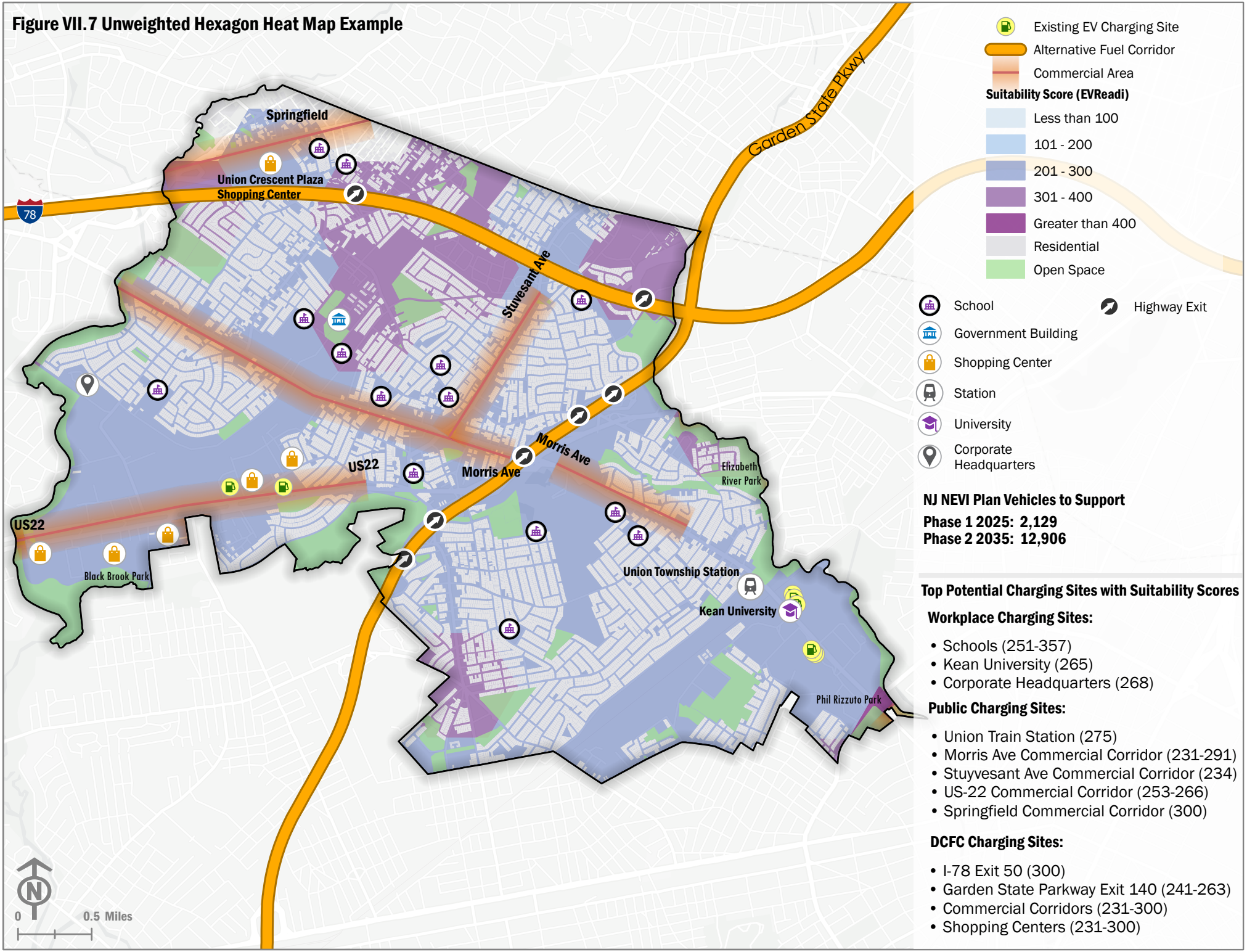
Module	Metric	Source	Basis of Scoring
Equity	NJTPA Equity Composite Score	NJTPA Equity Analysis tool (ACS 2015-2019)	A higher composite score from the NJTPA Equity Analysis Tool identifies populations that may benefit from additional support to increase equity and inclusion within the County.
Early EV Adopters	Median Household Income	ACS (2017-2021) and Living Wage Calculator MIT	Areas with a median household income that is significantly higher than the living wage within the community are more likely to purchase EV.
	Environmental Concern	MIT Election Lab (2020 Presidential Election)	Presidential voting results as a stand in for environmental concern, people who identify as Democrats more likely to consider purchasing EV for environmental concerns.
	Car Ownership	ACS (2017-2021)	Areas with a high percentage of households with 2+ cars have potentially higher EV sales due to reduced range anxiety because of the presence of another vehicle in the household.
	Higher Education Attainment	ACS (2017-2021)	Higher education is correlated with greater EV adoption rates so areas within the County with higher education attainment are more likely to purchase an EV.
	Existing EV Registration	NJ Motor Vehicle Commission	Identify locations with higher levels of existing EV ownership within the County.
EV Network Gap	Existing L2 Charging Infrastructure	AFDC, with verification from provided dataset developed during project	Identify gaps of L2 charging.
	Existing DCFC Infrastructure	AFDC, with verification from provided dataset developed during project	Identify gaps of DCFC charging.
	NEVI/Alternative Fuel Corridors	FHWA	Proximity to the Alternative Fuel Corridors may facilitate funding to deploy EV charging.
	Existing Power Supply	PSE&G Current EV Capacity	Lowest scores assigned to areas with no available electrical capacity, highest scores assigned to areas with ample available capacity. Those areas with unknown or at capacity are given a neutral score.
	Roadway Average Annual Daily Traffic	NJDOT	Areas of higher AADT will require more EV infrastructure as they will get utilized more. Charging infrastructure within proximity to busier roads will minimize network gaps for a greater number of vehicles.

Module	Metric	Source	Basis of Scoring
Existing Land Use and Built Environment	Multi-Family Housing	ACS (2017-2021)	Identify areas with a higher percentage of multi-family housing, since people in multi-family residences are more likely to require publicly located charging stations.
	Favorable Zoning	Generalized Zoning compiled from individual municipal zoning maps	Public and workplace charging are more likely to be required in areas zoned Commercial, Office and Multi-Family Residential.
	High Trip Destination	Replica Fall 2021 Destination	Areas of higher trip destinations per square mile will require higher levels of public charging. Examples of trip destinations include workplaces, commercial and social trips.
	Population Density	ACS (2017-2021)	More charging infrastructure is needed in areas of denser population.

The model subdivided the County into equal zones, of approximately ¼ square miles each, covering the entire geography. The zones allow for a uniform presentation of the data layers which each represent different units of geography, from specific point locations to census tracts and zip codes. The suitability scores were reviewed for each municipality to locate areas that are most appropriate for installing charging infrastructure and to help geographically distribute chargers more evenly and equitably throughout the County.

Each of the metrics, see Table above, within each module were initially assigned a score of 0 to 10, with higher scores representing more desirable locations for EV charging infrastructure. A weighted formula is then applied to the model based on user inputs (high, medium, low priority) that adjust the assigned scores by layer. These values can then be consolidated by each module individually or as a combination of all four modules. The score was then represented in a GIS rasterized heat map for each module. The darker colors represent higher scoring, or more suitable locations. Example output is depicted in FIGURE VII.7.

Figure VII.7 Unweighted Hexagon Heat Map Example



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 2,129
Phase 2 2035: 12,906

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (251-357)
- Kean University (265)
- Corporate Headquarters (268)

Public Charging Sites:

- Union Train Station (275)
- Morris Ave Commercial Corridor (231-291)
- Stuyvesant Ave Commercial Corridor (234)
- US-22 Commercial Corridor (253-266)
- Springfield Commercial Corridor (300)

DCFC Charging Sites:

- I-78 Exit 50 (300)
- Garden State Parkway Exit 140 (241-263)
- Commercial Corridors (231-300)
- Shopping Centers (231-300)

Suitability Score Weightings

A priority weighting (low, medium, high) level of importance was assigned to each factor based upon the needs and priorities identified by the project stakeholders through the online survey, public outreach, and TAC meetings. The NEVI funding objectives were also considered. These weightings, detailed below, impacted the results of the suitability model and resulting EVSE recommended locations.

The Equity Module is set to have "high" weighting as encouraged as a priority from NJTPA, in addition to being a focus of funding for EV charging stations. There are typically more multi-family dwellings in equity-focused areas that do not have access to home charging, so these drivers rely on public charging infrastructure. Charger locations that are close to multi-family dwellings can serve those residents.

The Early EV Adopters Module is set to "medium" weighting in Phase 1 (2025) as EV adoption drives infrastructure expansion, so early adopters are needed to reach critical mass. Early adopters are also more likely to have their own home chargers to satisfy personal charging needs. This weighting shifts in Phase 2 (2035) when this module is set to a "low" weighting. The basis for this shift was determined during a polling exercise during the second TAC meeting, as a majority of participants agreed that EV Early Adoption may no longer have the same priority in the Phase 2 period of time.

The EV Network Gap Module has been ranked overall as "medium" weighting to reflect both the important metric of AADT (traffic volumes) as well as the relative lower emphasis on filling in the gaps of the charging network. The module includes AADT along major corridors and the NEVI AFCs. Higher AADT indicates where a greater number of drivers are traveling. NEVI AFC corridors are designated locations where State and Federal funding is earmarked to more chargers to support EV reliability and adoption. This module takes into consideration existing Public L2 and DCFC for identifying gaps. Gap was defined as five miles or more between chargers, as determined during the second TAC meeting.

During the TAC meeting, stakeholders discussed how the distance between charging sites does not necessarily indicate that a charger is required in a gap area, for example the low-volume Watchung Reservation in Union County. There is more of a need to support EVs in areas where there are higher trip destinations and more activity than focusing on filling in gaps of the existing network; therefore, existing L2 and DCFC charging infrastructure has been ranked as "low" weighting within the EV Network Gap Module.

The Land Use and Built Environment Module is set to "high" because zoning and high trip destination play critical roles in determining EV charger use, especially when placing Workplace and Public L2 chargers. The locations that have higher utilization such as hospitals/clinics, municipal/county sites, and weekly trip generators, like groceries, gyms, libraries, and transit hubs, are all strong possible EV charging

locations. Reliability and demand are important for adoption, so data like Replica's[13] Trip Destination Data has been used and ranked high to ensure key locations are identified for charging infrastructure deployment that can serve people at high trip destinations.

TABLE VII.2 displays the results of those discussions. It is important to note that each module has a weighting towards the overall suitability score, but each individual metric is weighted individually within each module to get to that module's suitability score. The two equations below summarize this process.

Module Suitability Score = Σ [Individual Metric with the Module* Metric Weighting with the Module]

Total Suitability Score = Σ [Module Suitability Score* Module Weighting]

TABLE VII.2 MODULE AND METRIC WEIGHTING

Module	Initial Module Weight	Metric	Weight
Equity	High	NJTPA Equity Composite Score	High
Early EV Adopters	Medium (2025) Low (2035)	Median Household Income	High
		Environmental Concern	High
		Car Ownership	Low
		Higher Education Attainment	Low
		Existing EV Registrations	Low
EV Network Gap	Medium	Existing L2 Charging Infrastructure	Low
		Existing DCFC Infrastructure	Low
		NEVI/Alternative Fuel Corridors	High
		Existing Power Supply	Low
		Average Annual Daily Traffic	High
Land Use and Built Environment	High	Multi-Family Housing	High
		Favorable Zoning	High
		High Trip Destination	Medium
		Population Density	High

Initial reviews of the data showed that if the target is Early EV Adopters, then the trend would show more need for EVSE in the western side of the County, but if the primary target is Equity, then EVSE need would steer towards the eastern side of the County. As the goal for this project was an equitable distribution of chargers throughout the County, the focus was placed determining the most suitable

[13] https://documentation.replicahq.com/docs/auto-tnc-trips

locations on a municipality level. Determining the prioritization for each module was the goal for the second TAC meeting and the public meeting.

The scores associated with the four modules are added together based on module weightings to get the total suitability score for a zone. The scores indicate which areas are most suitable for placing infrastructure. The thickness of the arrows in Figure VII.8 represents the determination of the module weighting.

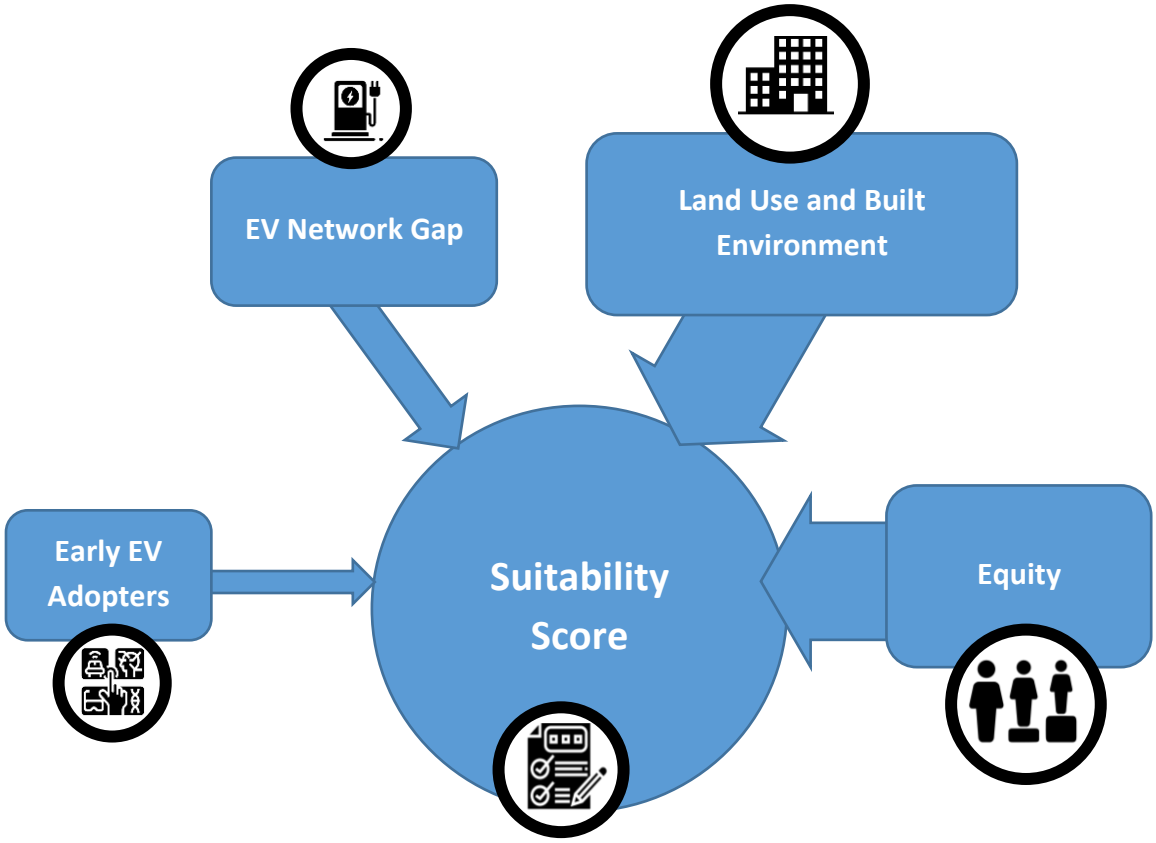


FIGURE VII.8 SUITABILITY WEIGHTING DIAGRAM

VIII. SUITABILITY RECOMMENDATIONS AND MAPPING

The site selection process works in conjunction with Section V, identifying prime locations, EV network gaps, high trip destinations, shovel-ready locations, visibility, and safety. Using suitability scores and the data collected in Section V, key sites were identified within each municipality for potential EV charging infrastructure at the typical land uses as previously discussed. The research efforts comprised of overlaying the detailed zoning data and parcels with the suitability score results to then identify a mix of areas and key land uses that would represent opportunities for placing Workplace, Public L2, and/or Public DCFC infrastructure.

Some key sites were identified when looking for locations in regions with high suitability scores based upon NJDEP recommended location types. Schools/universities, office parks, town halls, libraries, shopping centers, and transit hubs were selected to satisfy workplace or public charging needs. The locations are displayed with their respective suitability score within each individual municipality's suitability map to help identify generally where charging infrastructure is best suitable but still allow flexibility for the local municipality to determine exact placements.

Commercial areas are a good example of where commercial corridors or strip malls are identified for public chargers, but the specific locations of those chargers should be developed in coordination with the local municipality and those property owners. This Study is only meant to identify general targets and potential priority areas. Specific deployment locations depend on a variety of factors, such as, but not limited to, property ownership and desire to add charging infrastructure, community support, potential partnerships, electrical infrastructure upgrades needed, and funding.

This section describes top EV deployment locations within each municipality and includes suitability maps for each municipality to provide an overview of potential Public L2, Public DCFC, and Workplace L2 charging infrastructure locations to assist municipalities with future planning efforts. Land uses have been identified within each municipality and concentrations of commercial areas and other land uses that would serve charging infrastructure well.

Residential land uses, like single-family homes, offer EV drivers home charging, especially in suburban towns such as Township of Berkeley Heights, Borough of Fanwood, Borough of Mountainside, Borough of New Providence, Township of Scotch Plains, and Town of Westfield. Single-family homes were mapped based upon zoning data and not rated for suitability.

Generally, commercial land uses are strong potential Public L2 and DCFC opportunity locations to serve EV drivers as they shop – especially near congregated commercial land uses, like a commercial corridor or shopping center. The typical parking times at these types of land uses facilitate charging to obtain enough charge to travel back home with L2 or receive a significant charge with DCFC.

Community facilities such as parks, libraries, and recreation centers have similar dwell times and charging infrastructure at these locations can provide a public benefit.

Other DCFC locations could include supermarkets, pharmacies, and land uses adjacent to designated AFCs.

Workplace charging is recommended at corporate business parks and/or industrial offices as well as schools where employees, teachers, and students leave their vehicle parked for multiple hours at a time. Locations where commuters are parked for more than a few hours can be provided with a significant charge with L2 EVSE. Workplace charging can also be located in large commercial areas to serve the employees commuting to those businesses.

Places of worship are not called out individually within each municipality but could be used for Workplace charging or Public L2 charging, especially if a school or activity center is associated with the facility.

As various schools and parks are discussed generally within each municipality and these land uses are usually spaced evenly throughout each municipality, the individual school or park suitability scores vary based on proximity to other land uses and metrics analyzed in determining suitability scores; therefore, specific suitability scores for schools and parks should be identified using the interactive map below.

The figures on the following pages present maps for each individual municipality that shows the suitability scores calculated. The figures also display commercial corridors/areas, schools, parks, community hubs, AFCs, existing charging infrastructure, transit centers and other key destinations to assist with planning charging infrastructure. These maps can be used in future planning to begin identifying where to deploy charging infrastructure based on suitability and adjacent land uses.

Interactive Map

An interactive map showing the County's suitability scores and locations identified on the static maps within this section has been developed and can be accessed at www.ucnj.org/ev-study/interactivemap.

Township of Berkeley Heights

The Township of Berkeley Heights is in western Union County. It is primarily residential with commercial land uses towards the northwest along Springfield Avenue, with the Berkeley Heights Shopping Center located near the intersection of Springfield Avenue/Snyder Avenue. These locations present opportunities for Public L2 and DCFC charging, especially at the shopping center where EV drivers can charge while visiting the stores.

Other potential public charging sites include community hubs such as the YMCA, the Berkeley Heights Recreation Center, and the Berkeley Heights Community Pool, as well as the public parks such as Snyder Avenue Park and Passaic River Park, for people to charge their vehicles while utilizing these resources. Workplace charging within Berkeley Heights could be served at the various Berkeley Heights schools, L'Oreal New Jersey Headquarters, the office park south of I-78, and the Summit Health Medical Center as teachers, students, and commuters go to those locations and stay parked most of the day. As I-78 is a designated AFC, the exits within Berkeley Heights (Exit 43 and Exit 44) have potential opportunities to place Public DCFC stations that could be funded with NEVI funds.

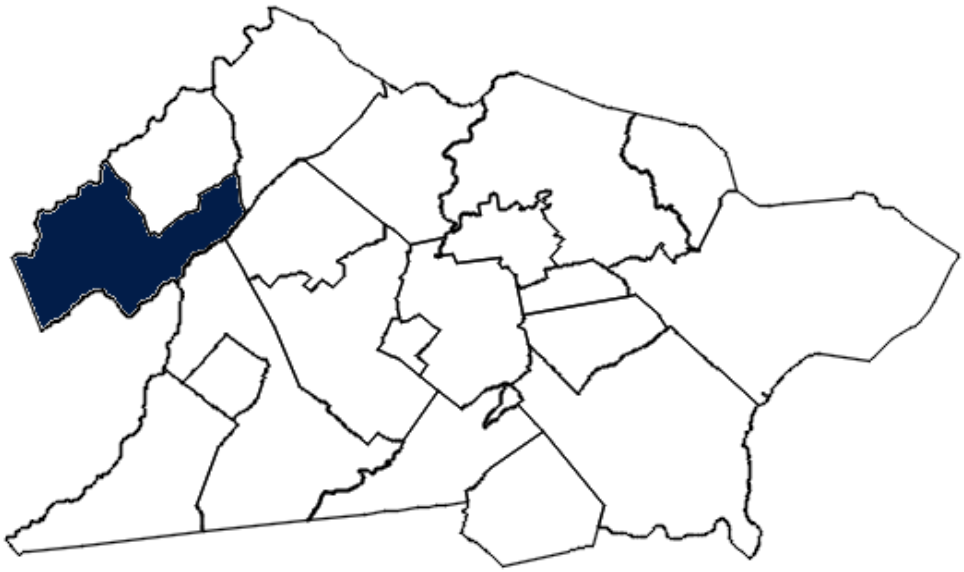
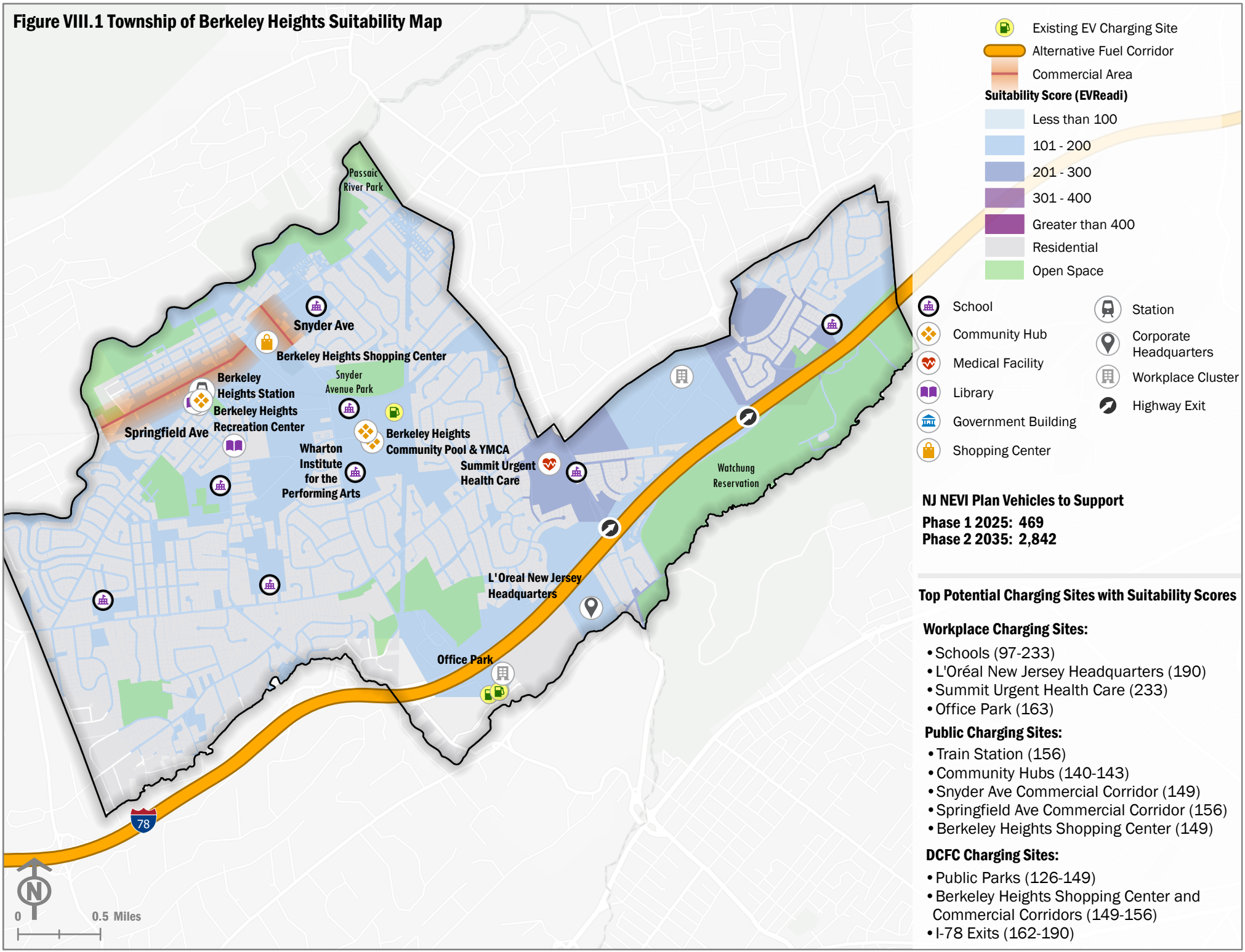


Figure VIII.1 Township of Berkeley Heights Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 469
Phase 2 2035: 2,842

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (97-233)
- L'Oréal New Jersey Headquarters (190)
- Summit Urgent Health Care (233)
- Office Park (163)

Public Charging Sites:

- Train Station (156)
- Community Hubs (140-143)
- Snyder Ave Commercial Corridor (149)
- Springfield Ave Commercial Corridor (156)
- Berkeley Heights Shopping Center (149)

DCFC Charging Sites:

- Public Parks (126-149)
- Berkeley Heights Shopping Center and Commercial Corridors (149-156)
- I-78 Exits (162-190)

Township of Clark

The Township of Clark is in the southern portion of the County. The northern part of Clark has commercial land uses and workplaces that can serve charging infrastructure as EV drivers shop and employees commute to those destinations. Commercial land uses are concentrated along Raritan Road and Central Avenue with supermarkets and big box stores that could serve both Public L2 and DCFC infrastructure due to typical dwell times while shopping at those stores. Other top potential public charging sites include public parks within Clark, such as Peter Esposito Park/Clark Playground, Oak Ridge Park, and Bartell Field, and community hubs, such as Clark Public Library, Clark Recreation Center, and Dr. Robinson Museum, where EV drivers can charge while using these public resources.

The GSP is a designated AFC and therefore presents an opportunity for DCFC infrastructure near Exit 135 that could be funded with NEVI funds if the state selects this location, such as one of the big box store parking lots just west of the GSP. Top potential workplace chargers include the Clark schools, Union College, L'Oreal Corporate offices, and at various governmental agency locations, especially along Westfield Avenue.

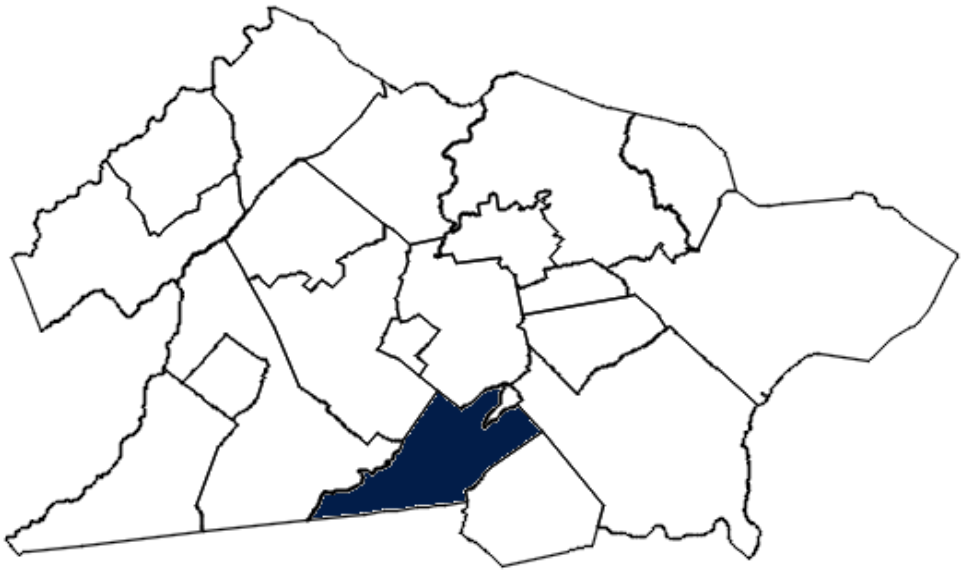
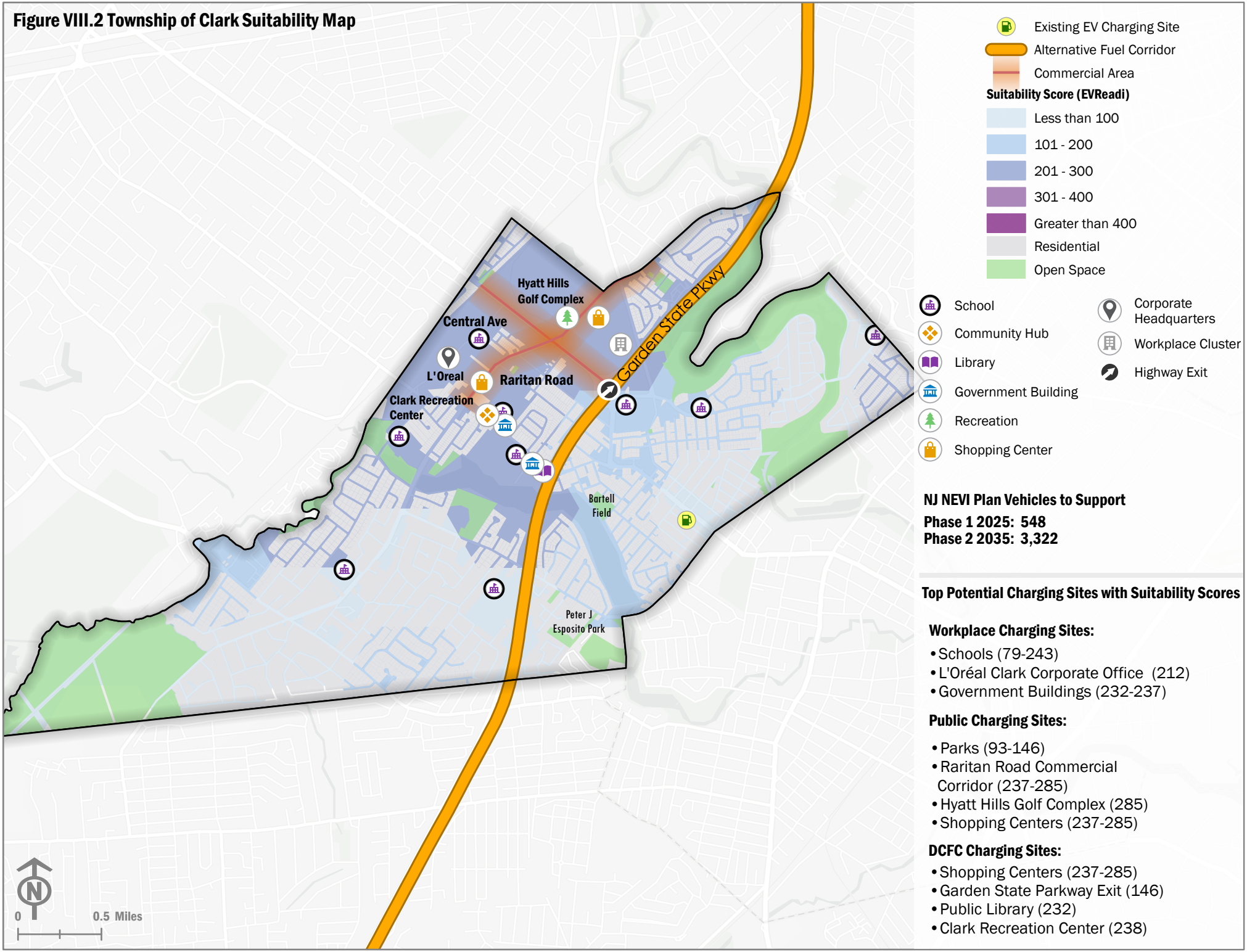


Figure VIII.2 Township of Clark Suitability Map



Existing EV Charging Site
Alternative Fuel Corridor
Commercial Area

Suitability Score (EVReadi)

- Less than 100
- 101 - 200
- 201 - 300
- 301 - 400
- Greater than 400
- Residential
- Open Space

- School
- Community Hub
- Library
- Government Building
- Recreation
- Shopping Center
- Corporate Headquarters
- Workplace Cluster
- Highway Exit

NJ NEVI Plan Vehicles to Support

Phase 1 2025: 548
Phase 2 2035: 3,322

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (79-243)
- L'Oréal Clark Corporate Office (212)
- Government Buildings (232-237)

Public Charging Sites:

- Parks (93-146)
- Raritan Road Commercial Corridor (237-285)
- Hyatt Hills Golf Complex (285)
- Shopping Centers (237-285)

DCFC Charging Sites:

- Shopping Centers (237-285)
- Garden State Parkway Exit (146)
- Public Library (232)
- Clark Recreation Center (238)

Township of Cranford

The Township of Cranford is in central Union County with residential land uses in the northern and southern portions of the municipality that can serve at-home charging needs. North Avenue traverses the center of Cranford with a concentration of commercial land, public parking lots, and the Cranford Train Station on the Raritan Valley Line. This area provides opportunities for Public L2 and DCFC infrastructure as people shop in the commercial area and/or commute via the train station.

Other potential public charging sites include public parks within Cranford, such as the Cranford Recreation Center/Pool and Memorial Fields, Mohawk Park, Unami Park, Nomahegan Park, and Lincoln Park, and community hubs such as Sperry Observatory, Public Library, Cranford Recreation Center, and Cranford Community Center.

The GSP is a designated AFC that traverses the east side of Cranford with two exits (Exits 136 and 137) with Exit 137 to Route 28 presenting a stronger opportunity for DCFC infrastructure as it connects with a major east-west roadway to access regional destinations throughout the County.

Another potential DCFC location is Union College, due to the shorter dwell time and higher demand. Those chargers could serve students and employees. Potential workplace chargers include those traveling to Cranford schools, Verizon Corporate offices, the Commerce Office Park, and the Cranford Business Park. These workplace locations have vehicles parked for the majority of the workday.

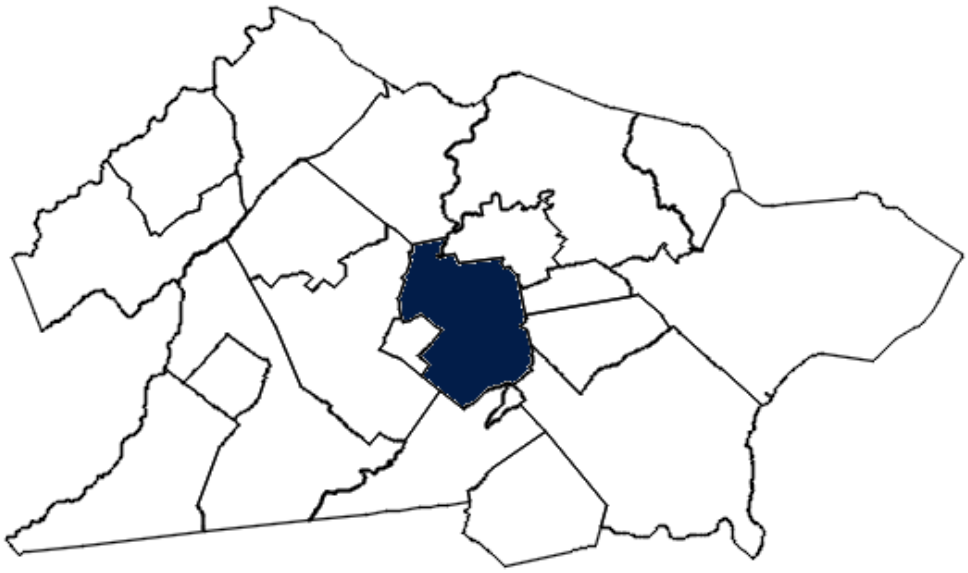
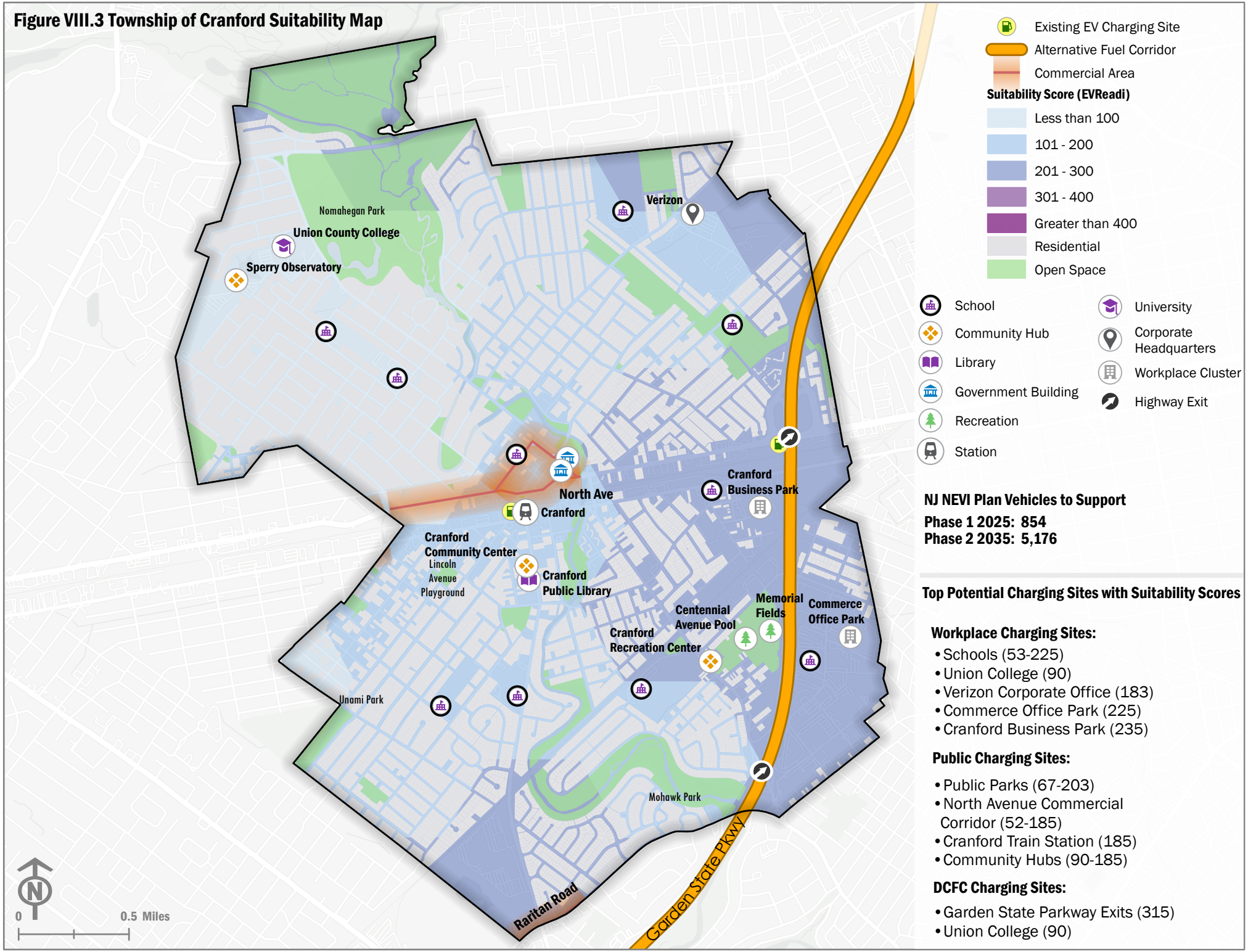


Figure VIII.3 Township of Cranford Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 854
Phase 2 2035: 5,176

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (53-225)
- Union College (90)
- Verizon Corporate Office (183)
- Commerce Office Park (225)
- Cranford Business Park (235)

Public Charging Sites:

- Public Parks (67-203)
- North Avenue Commercial Corridor (52-185)
- Cranford Train Station (185)
- Community Hubs (90-185)

DCFC Charging Sites:

- Garden State Parkway Exits (315)
- Union College (90)

City of Elizabeth

The City of Elizabeth is the fourth most populous city in New Jersey and located in eastern Union County. Elizabeth has a variety of land uses. Elizabeth has port and airport facilities, as well as a large shopping center, The Mills at Jersey Gardens, and a significant number of single-family and multi-family residential areas that can serve some at-home charging. Most of Elizabeth has high suitability scores. The major retail, business and commercial land uses in Elizabeth are within Midtown and surround the Elizabeth Train Station, serving the NJ TRANSIT Northeast Corridor and North Jersey Coast lines.

Other commercial land uses are to the east near The Mills at Jersey Garden, one of the largest outlet malls on the East Coast. These commercial land uses present strong opportunities for Public L2 and DCFC infrastructure as travelers' shop in these commercial areas and/or commute. North Elizabeth Train Station, also serving the NJ TRANSIT Northeast Corridor and North Jersey Coast lines, could also be a good opportunity for Public L2 chargers as it would mostly serve local commuters who park their vehicles in the adjacent surface lots while they are at work. Other public charging locations could include public parks within Elizabeth. The Elizabeth Marine Terminal and Newark Liberty International Airport are major shipment points and travel destinations. South of the airport and between North Avenue and Magnolia Avenue are small business and light industrial areas that present workplace charging opportunities. These areas have a high job concentration that could allow commuters to charge their EVs while at work. Other potential workplace charging locations include the Elizabeth schools, PSE&G Headquarters, and various governmental buildings. Finally, potential DCFC charging sites within Elizabeth include the two local exits (Exits 13 and 13A) off the New Jersey Turnpike, a designated AFC, as those could qualify for federal funding available as part of the NEVI Plan if the state selects this section of the AFC as a priority.

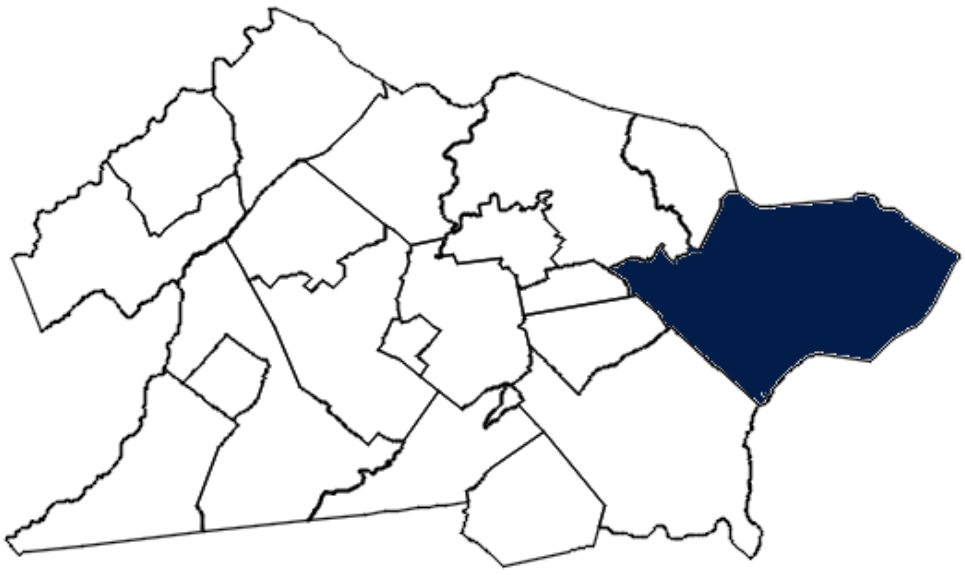
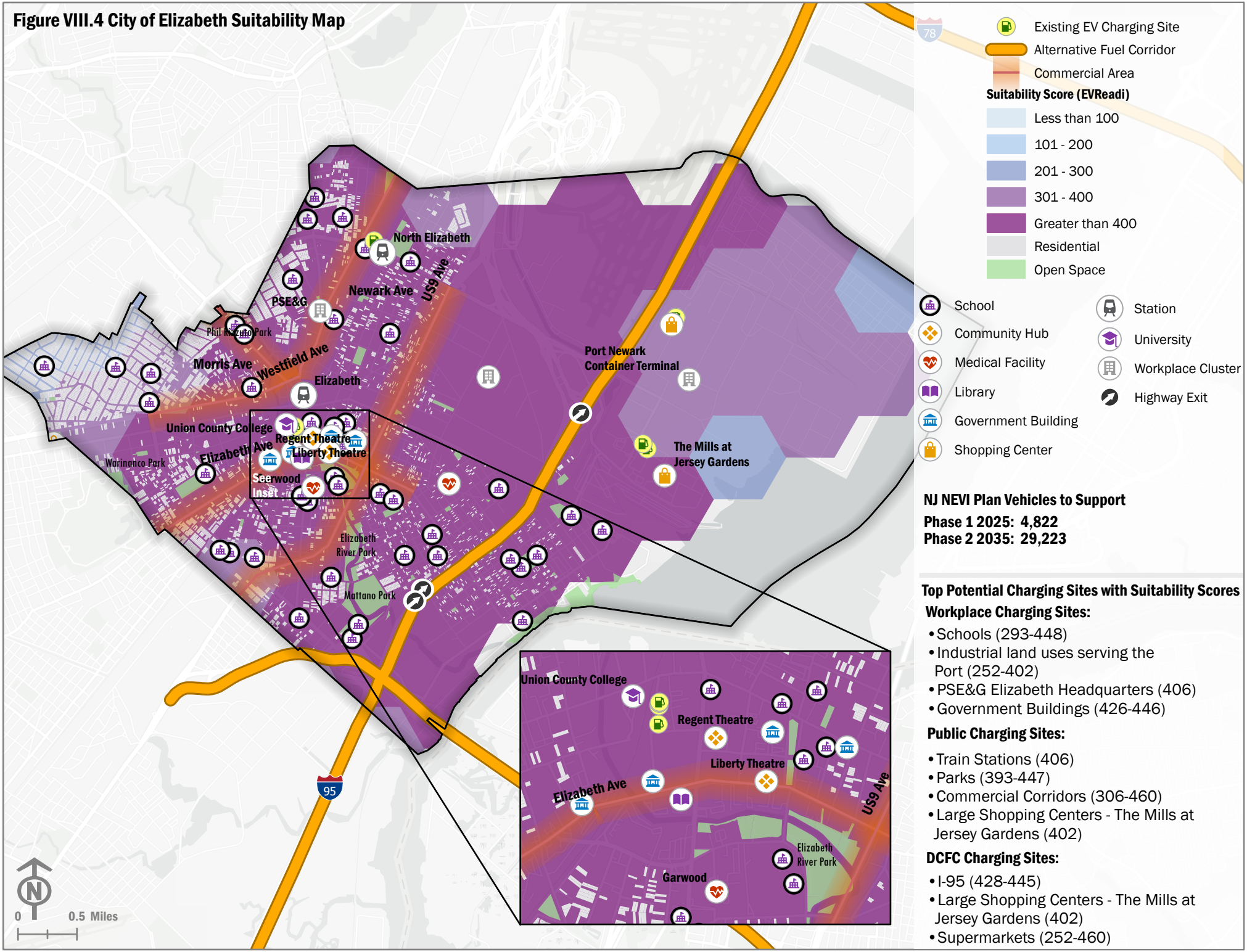


Figure VIII.4 City of Elizabeth Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 4,822
Phase 2 2035: 29,223

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (293-448)
- Industrial land uses serving the Port (252-402)
- PSE&G Elizabeth Headquarters (406)
- Government Buildings (426-446)

Public Charging Sites:

- Train Stations (406)
- Parks (393-447)
- Commercial Corridors (306-460)
- Large Shopping Centers - The Mills at Jersey Gardens (402)

DCFC Charging Sites:

- I-95 (428-445)
- Large Shopping Centers - The Mills at Jersey Gardens (402)
- Supermarkets (252-460)

Borough of Fanwood

The Borough of Fanwood is located in western Union County and is primarily residential, where at-home charging needs can be served, with the commercial corridor of South Avenue traversing east-west through Fanwood.

These commercial uses are focused near the Fanwood Train Station on the Raritan Valley Line near the intersection of South Avenue and Martine Avenue and could serve as sites for Public L2 and DCFC infrastructure to serve train commuters as well as EV drivers as they shop at these establishments. There is a large, shared parking lot located to the south of the train station that can house the public charging station and could also benefit the multi-family residences located adjacent to this parking lot.

Additional public charging infrastructure could be installed at public parks, such as Fanwood Nature Center, Forest Road Park, and La Grande Park, and public facilities, such as Fanwood Memorial Library. Workplace charging infrastructure within Fanwood could be installed at schools for teachers and students as well as at workplaces along the South Avenue commercial corridor, including Fanwood Medical Building, for commuting employees.

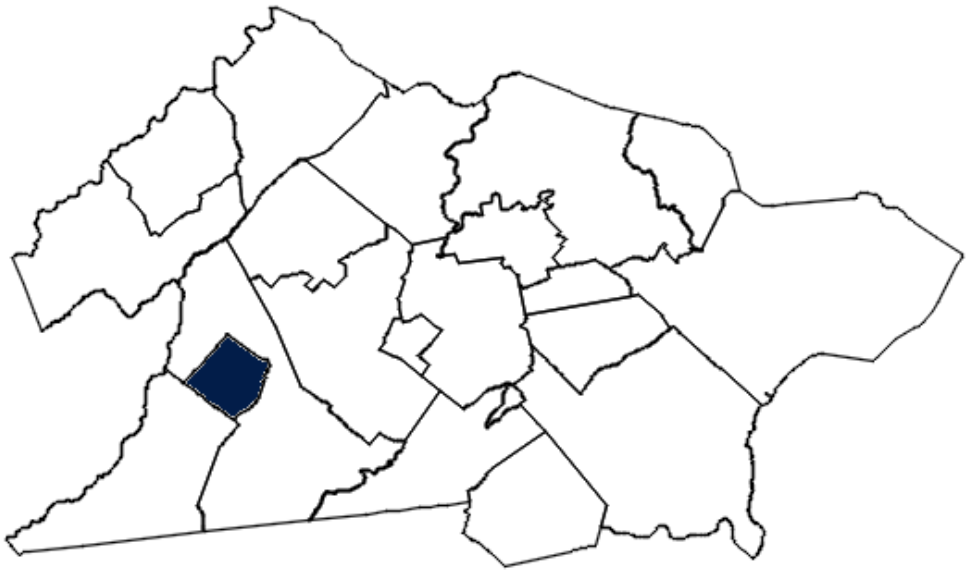
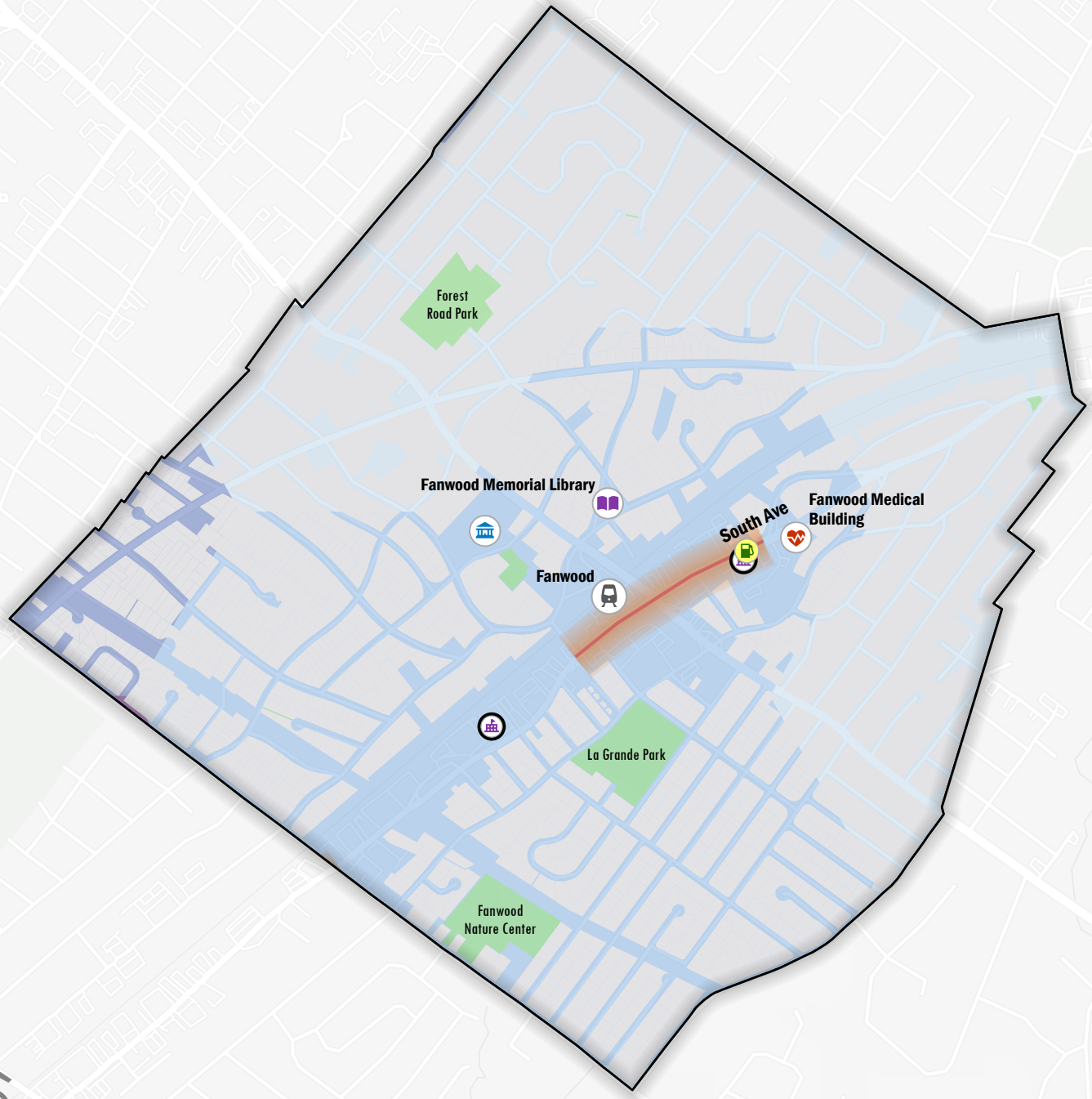


Figure VIII.5 Borough of Fanwood Suitability Map



Existing EV Charging Site
Alternative Fuel Corridor
Commercial Area

Suitability Score (EVReadi)

Less than 100
101 - 200
201 - 300
301 - 400
Greater than 400
Residential
Open Space

School
Medical Facility
Library
Government Building
Station

NJ NEVI Plan Vehicles to Support

Phase 1 2025: 274
Phase 2 2035: 1,662

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (52-194)
- Workplaces along South Ave (115)
- Fanwood Medical Building (115)

Public Charging Sites:

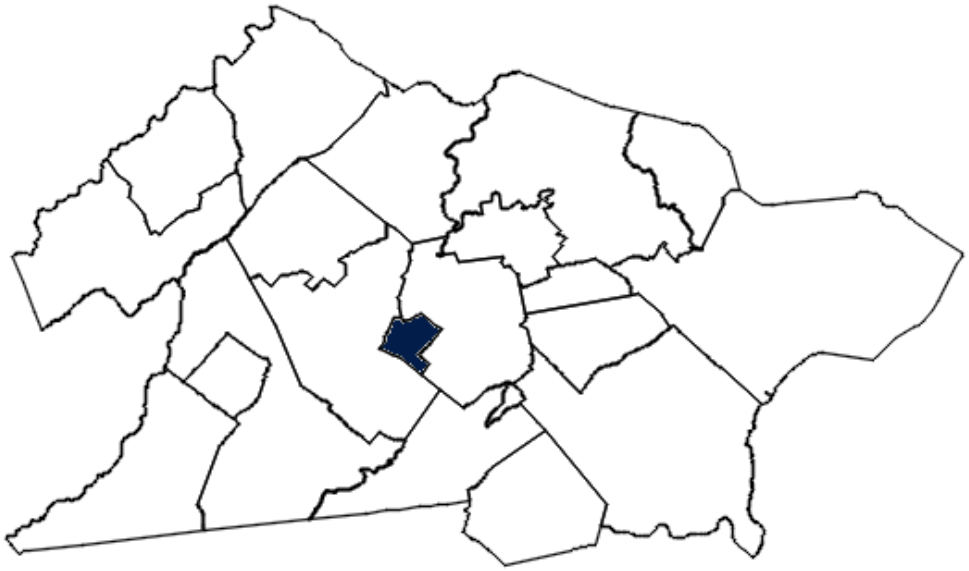
- South Ave Commercial Corridor (115)
- Fanwood Train Station (115)
- Public Parks (80-149)
- Public Facilities - Fanwood Memorial Library (115)

DCFC Charging Sites:

- South Ave Commercial Corridor (115)
- Public Parks (80-149)

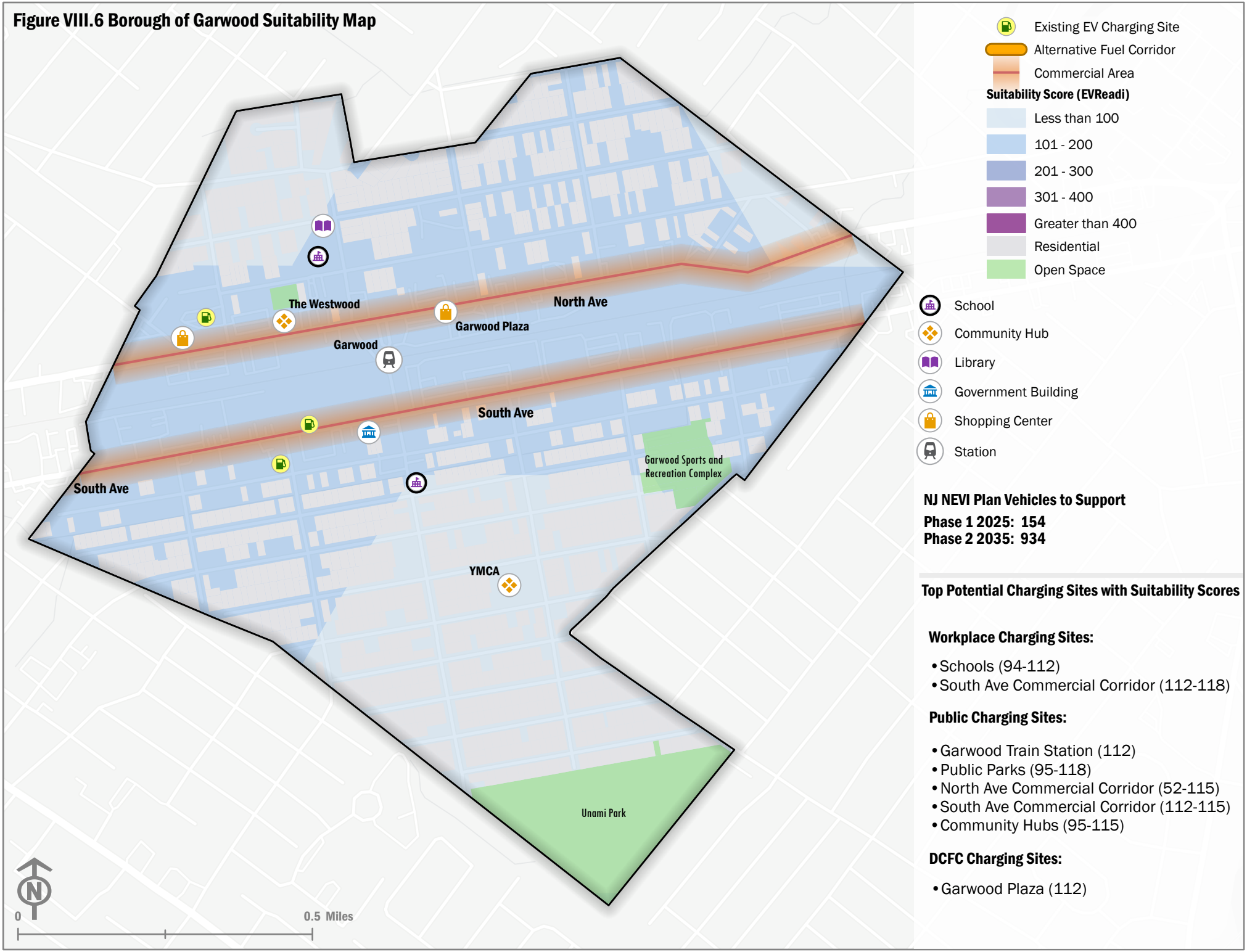
Borough of Garwood

The Borough of Garwood is a smaller municipality in central Union County that is mostly residential with a commercial corridor along North Avenue and South Avenue with NJ TRANSIT's Raritan Valley Line running between these two roadways. All Public L2 and DCFC chargers would best be situated along this east-west corridor that serves the adjacent commercial land uses as well as the Garwood Train Station as travelers come for shopping and/or commuting trips. Other potential public charging sites include public parks, such as Unami Park, Garwood Sports and Recreation Complex and community hubs, such as the YMCA, Westwood event space, and the Borough of Garwood Public Library. Garwood Plaza represents a potential DCFC site as it serves multiple commercial land uses with a shared parking lot amongst stores. Top potential workplace chargers include the Garwood Public Schools and the cluster of light industrial-commercial area on South Avenue. The larger industrial-commercial areas along North and South Avenue have been replaced with multifamily projects and more are expected to be completed by 2024. Newer developments in Garwood have EV chargers already installed as a benefit to residents and due to the State P.L. 2021, c. 171 model ordinance[14] previously discussed.



[14] P.L. 2021, c.171 Model Ordinance

Figure VIII.6 Borough of Garwood Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 154
Phase 2 2035: 934

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (94-112)
- South Ave Commercial Corridor (112-118)

Public Charging Sites:

- Garwood Train Station (112)
- Public Parks (95-118)
- North Ave Commercial Corridor (52-115)
- South Ave Commercial Corridor (112-115)
- Community Hubs (95-115)

DCFC Charging Sites:

- Garwood Plaza (112)

Township of Hillside

The Township of Hillside is located in northeastern Union County, bordering the City of Newark. It has a mix of residential, industrial, and commercial land uses. Industrial land uses are focused on the northwest portion of Hillside with commercial land uses along major thoroughfares (Route 22 and Liberty Avenue). The southern end of Liberty Avenue has the Hillside Shopping Center, which can provide public L2 and DCFC infrastructure in the shared parking lot while people shop.

Other potential public charging sites include Hillside public parks, such as Paul Korlesky Park, Elizabeth River Park, Sanford Park, Rutgers Avenue Park, and Conant Park), and community hubs, such as Hillside Community Center, and Hillside Public Library, to serve EV drivers as they utilize these resources. Given the cluster of light industrial land uses near Hillside Avenue, between Route 22 and I-78 and east of Bloy Street, this area presents an opportunity for workplace chargers in addition to the various Hillside schools and Kean University East Campus to serve teachers and students at those educational facilities. Potential DCFC charging sites include commercial areas along Route 22 and the Hillside Shopping Center. As both I-78 and GSP are designated AFCs, an opportunity exists to utilize NEVI Program funds to install DCFC charging infrastructure at GSP Exit 142, located at the boundary between Union Township and Hillside.

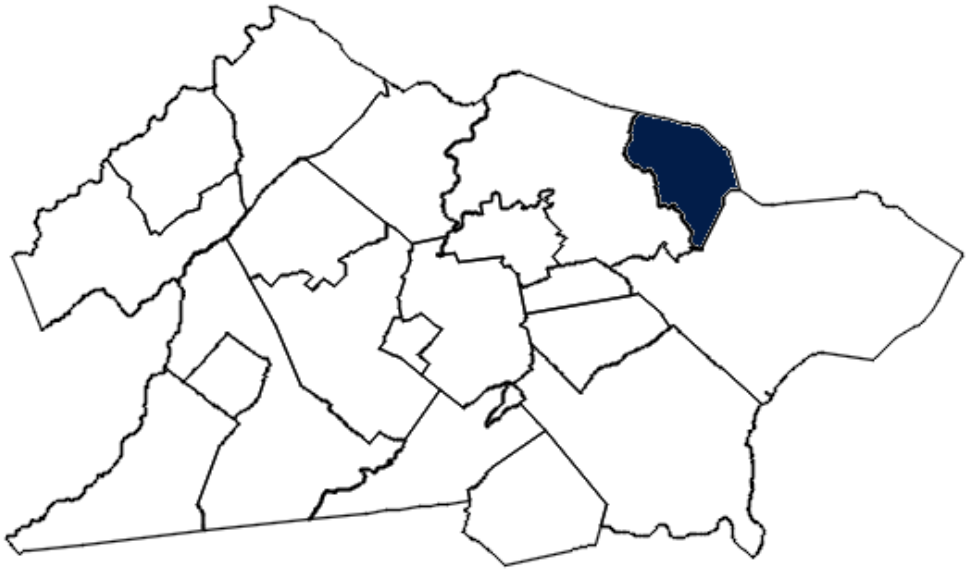
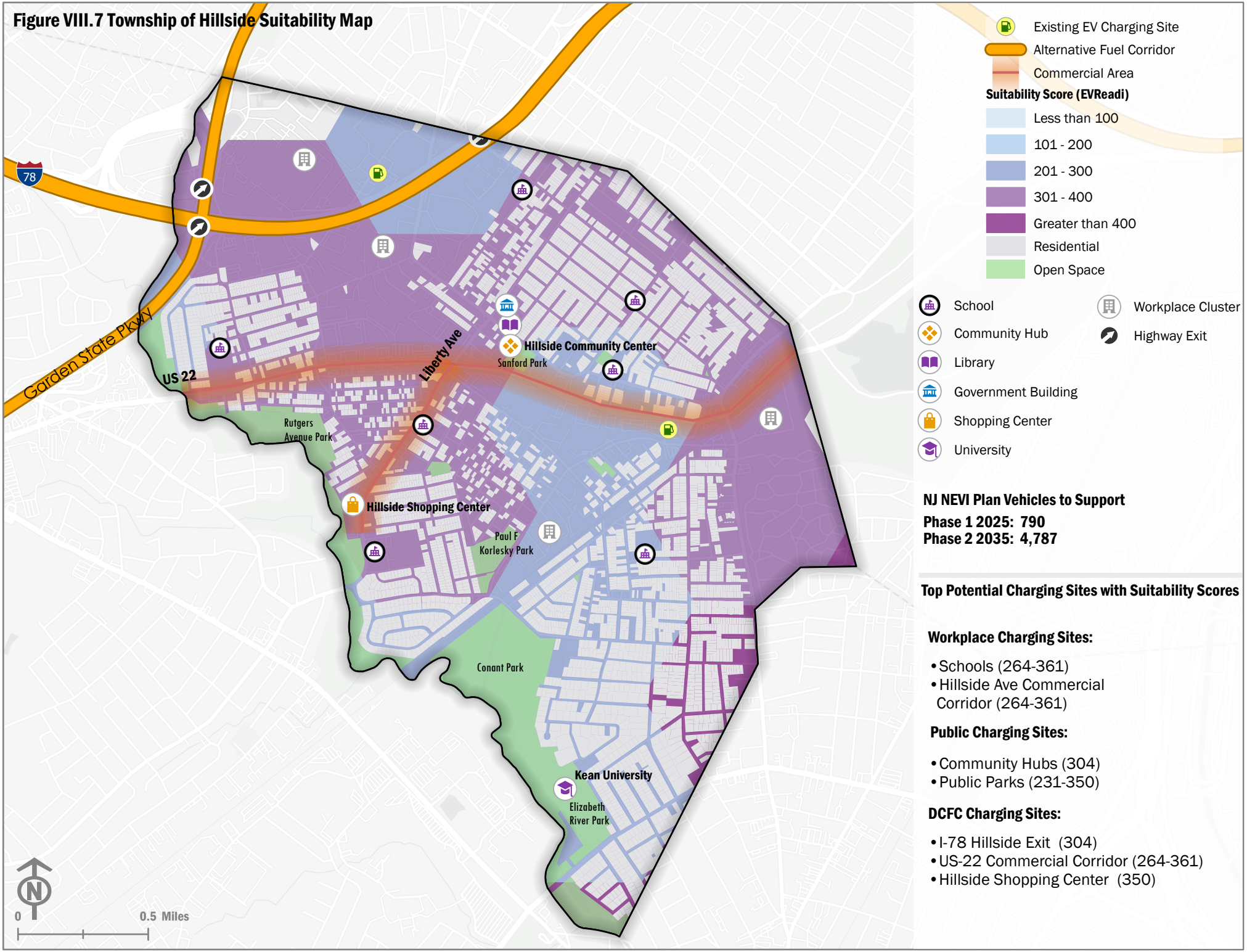


Figure VIII.7 Township of Hillside Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 790
Phase 2 2035: 4,787

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (264-361)
- Hillside Ave Commercial Corridor (264-361)

Public Charging Sites:

- Community Hubs (304)
- Public Parks (231-350)

DCFC Charging Sites:

- I-78 Hillside Exit (304)
- US-22 Commercial Corridor (264-361)
- Hillside Shopping Center (350)

Borough of Kenilworth

The Borough of Kenilworth is located in central Union County and has a mix of residential, commercial, and light industrial land uses. Commercial land uses are focused in the eastern part of Kenilworth along Boulevard and Market Street and present opportunities for Public L2 and DCFC infrastructure that EV drivers can utilize while visiting and/or shopping at these establishments. DCFC would be best implemented at locations such as coffee shops and markets based on their anticipated dwell time. As the GSP is a designated AFC, Exit 138 in Kenilworth at Boulevard/Galloping Hill Road could qualify for NEVI funds if chosen as a site at one of the adjacent commercial establishments, such as the large supermarket.

There are some additional commercial areas off Michigan Avenue in the very northern part of Kenilworth; while Public L2 charging could be provided here, these larger buildings could also serve as workplace charging. Other Public L2 charging locations could include public community facilities, such as Kenilworth Board of Education, Kenilworth Public Library, and Kenilworth Recreation Center, and public parks, such as Black Brook Park, DiMario Park, Galloping Hills Park and Golf Course, as residents use these facilities. Additional workplace charging could be provided at the light industrial land uses in the northwest part of Kenilworth with concentration along Lafayette Avenue, as well as near the intersection of Monroe Avenue and 8th Street. Similarly, Onyx Equities, formerly the Merck corporate office, presents an opportunity for workplace charging.

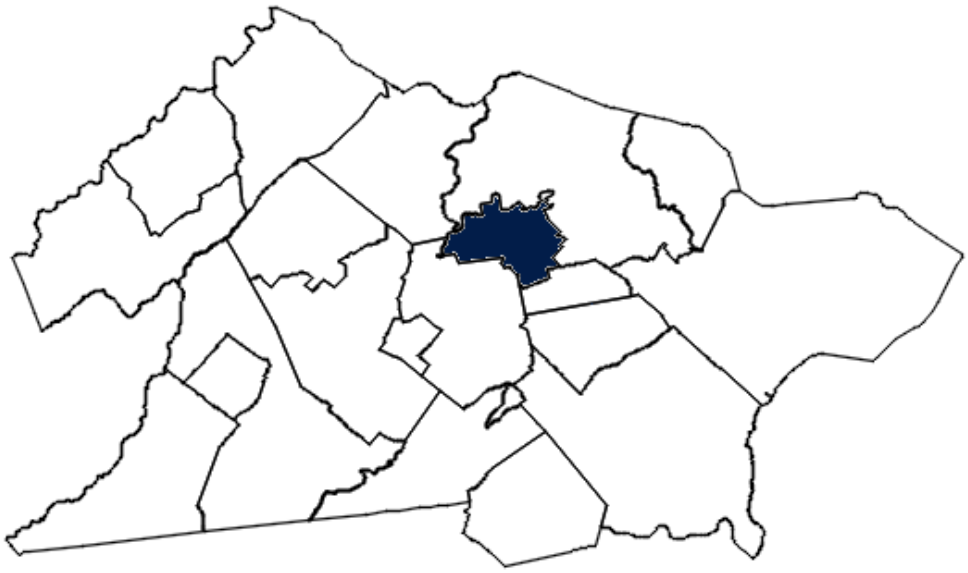
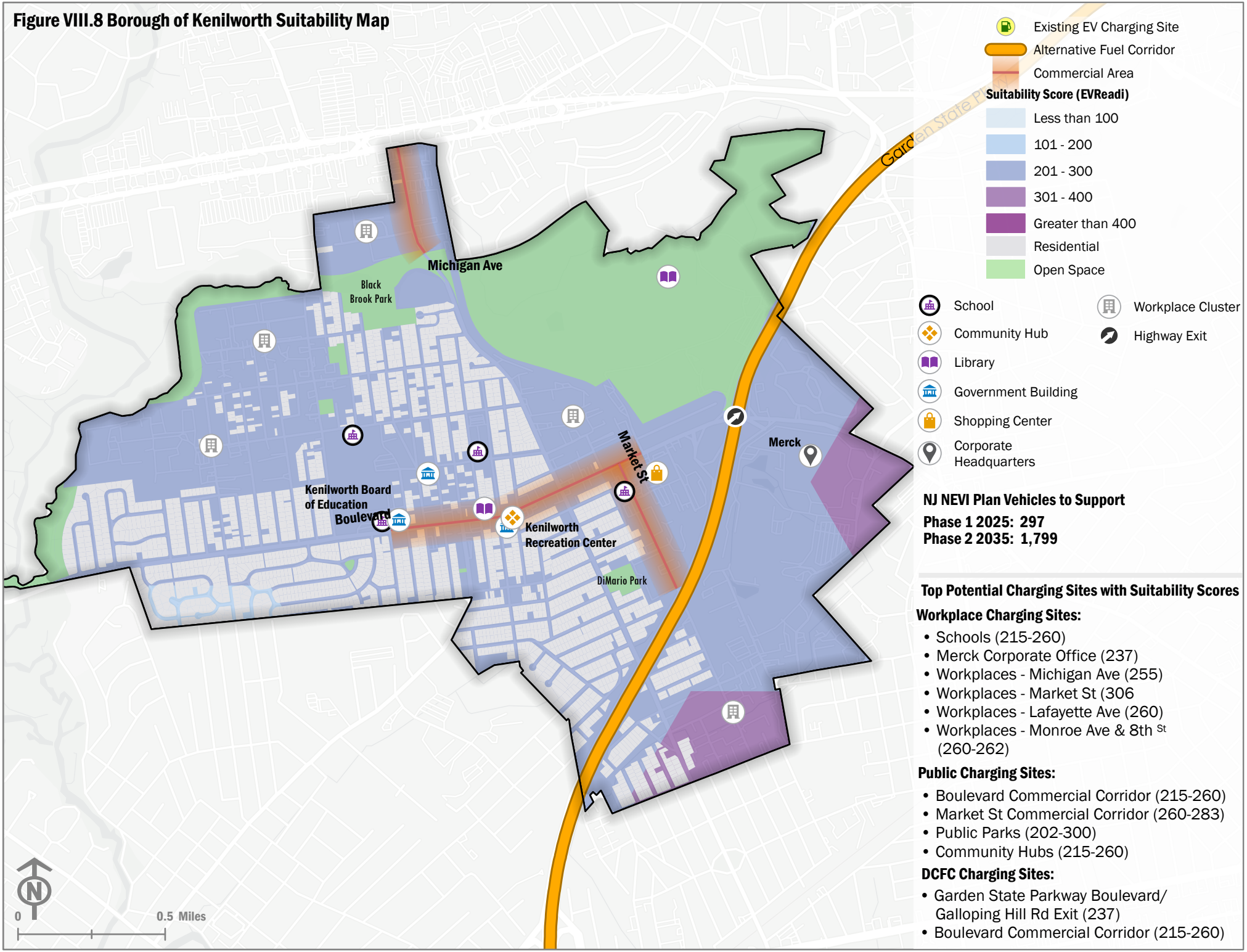


Figure VIII.8 Borough of Kenilworth Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 297
Phase 2 2035: 1,799

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (215-260)
- Merck Corporate Office (237)
- Workplaces - Michigan Ave (255)
- Workplaces - Market St (306
- Workplaces - Lafayette Ave (260)
- Workplaces - Monroe Ave & 8th St (260-262)

Public Charging Sites:

- Boulevard Commercial Corridor (215-260)
- Market St Commercial Corridor (260-283)
- Public Parks (202-300)
- Community Hubs (215-260)

DCFC Charging Sites:

- Garden State Parkway Boulevard/ Galloping Hill Rd Exit (237)
- Boulevard Commercial Corridor (215-260)

City of Linden

Linden is a city in southeastern Union County. Route 1 & 9 (Edgar Road) traverses the middle of Linden with residential land uses mostly to the west of Route 9 and industrial land uses to the east that include Linden Airport. There are numerous commercial corridors, including Route 9 (including Aviation Plaza Shopping Mall), Wood Avenue, St. Georges Avenue (along the south side of the street), Elizabeth Street, and Stiles Street. All of these corridors present opportunities for Levevl 2 and DCFC infrastructure to serve customers as they shop, especially at Aviation Plaza which has a large, shared parking lot for the various businesses there.

The Linden Train Station serves two NJ TRANSIT lines,Northeast Corridor and North Jersey Coast,and is located along the Wood Avenue corridor. It has a large surface parking lot that can serve Public L2 infrastructure for commuters as well as the nearby multi-family housing. Similarly, public facilities, such as Linden City Hall, Linden Public Library, and John Gregorio Recreation Center, and public parks could serve Public L2 charging infrastructure as residents use those facilities.

Workplace charging infrastructure could be placed at schools, any of the industrial land uses along or east of Route 1 & 9, and any of the other commercial corridors. Phillips 66 (Bayway Refinery) is located within Linden and could provide workplace charging as a large employment area attracting numerous commuters. Additionally, there are light industrial and manufacturing workplaces west of Route 1 & 9, and south of Stiles Street where workplace charging infrastructure could serve a variety of workplaces. Although I-95 is a designated AFC, it passes through industrial land use, and does not have any exits within Linden and therefore does not present an opportunity for DCFC infrastructure.

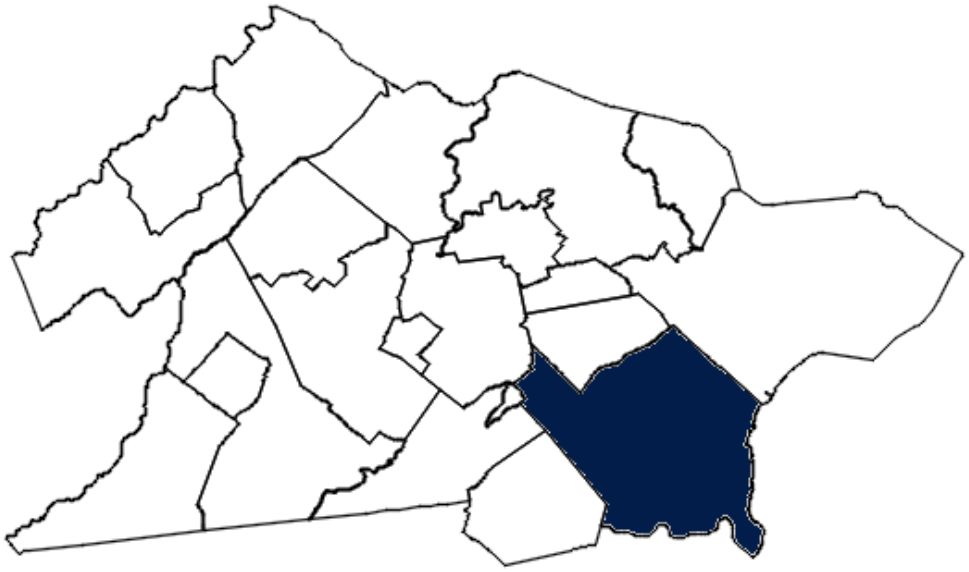
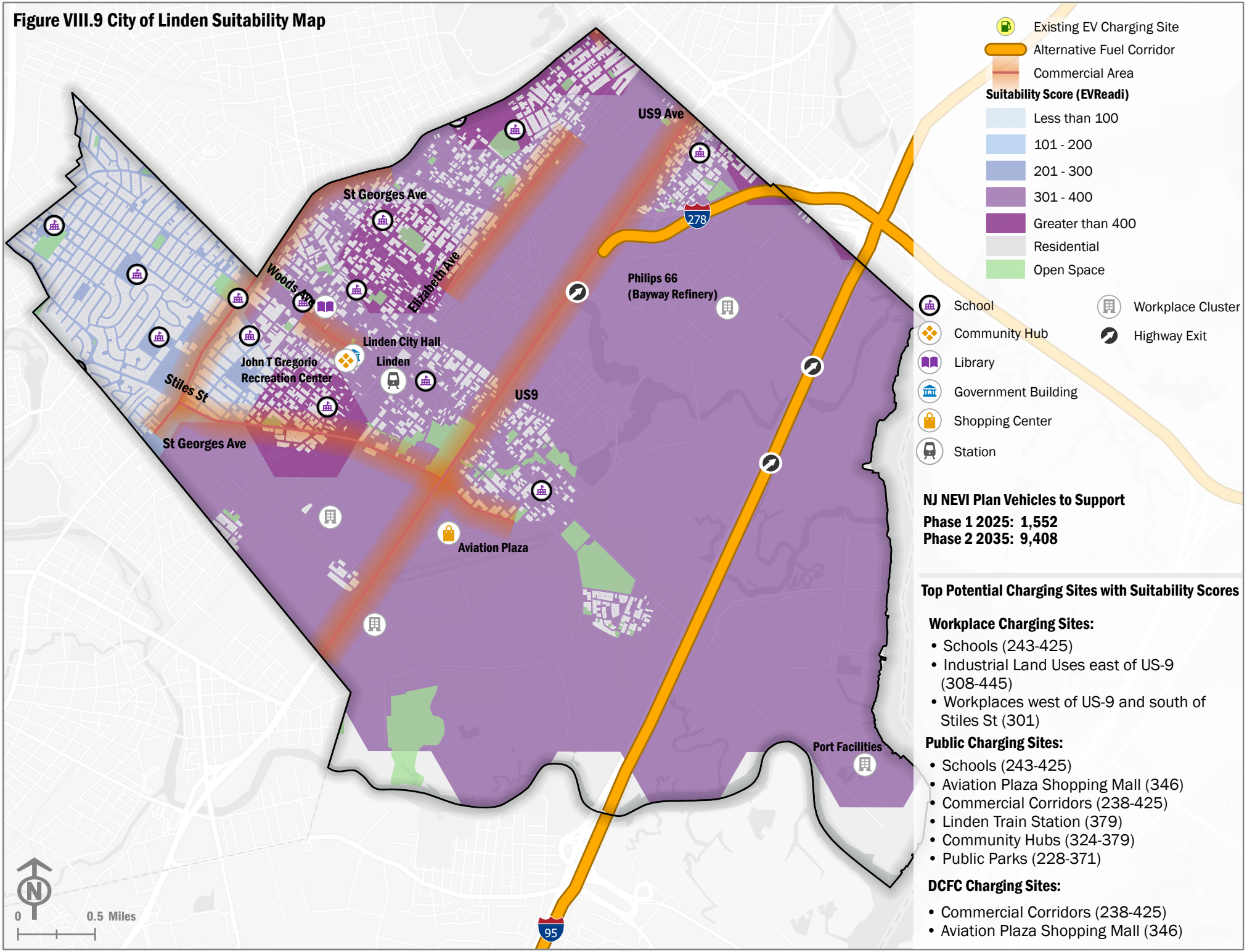


Figure VIII.9 City of Linden Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 1,552
Phase 2 2035: 9,408

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (243-425)
- Industrial Land Uses east of US-9 (308-445)
- Workplaces west of US-9 and south of Stiles St (301)

Public Charging Sites:

- Schools (243-425)
- Aviation Plaza Shopping Mall (346)
- Commercial Corridors (238-425)
- Linden Train Station (379)
- Community Hubs (324-379)
- Public Parks (228-371)

DCFC Charging Sites:

- Commercial Corridors (238-425)
- Aviation Plaza Shopping Mall (346)

Borough of Mountainside

Mountainside is a borough located in central northwestern Union County. Mountainside is almost entirely residential and can be served by at-home charging. However, there are some commercial land uses and workplaces on the eastern part of Mountainside along Route 22 and a small commercial area in southern Mountainside on Mountain Avenue near its border with Westfield. Public L2 and DCFC infrastructure could be placed in these commercial areas to serve travelers visiting these establishments. Just off Route 22 in the northeast part of Mountainside is Sheffield Street, which has some commercial land uses that could also be served by public charging infrastructure but could be better served for workplace charging for employees.

There is a collection of community resources, such as Mountainside Public Library, City Hall, community pool and tennis courts, located near Route 22's intersection with New Providence Road and can serve Public L2 charging infrastructure as community members utilize these facilities and services. Workplace charging can be served at schools for employees and students, as well as the commercial areas and the Medical Center on New Providence Road at Knightsbridge Road. The northwestern part of Mountainside contains the Watchung Reservation.

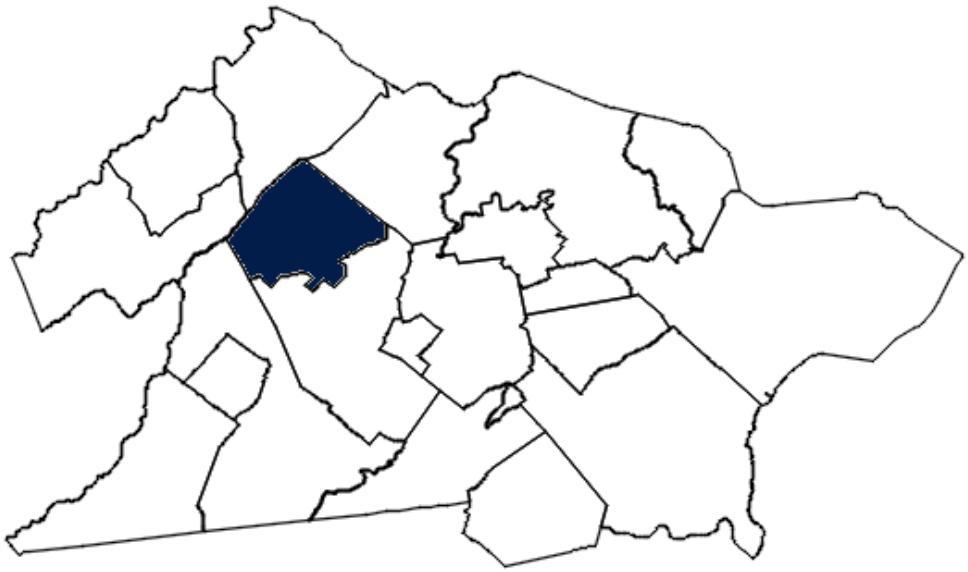
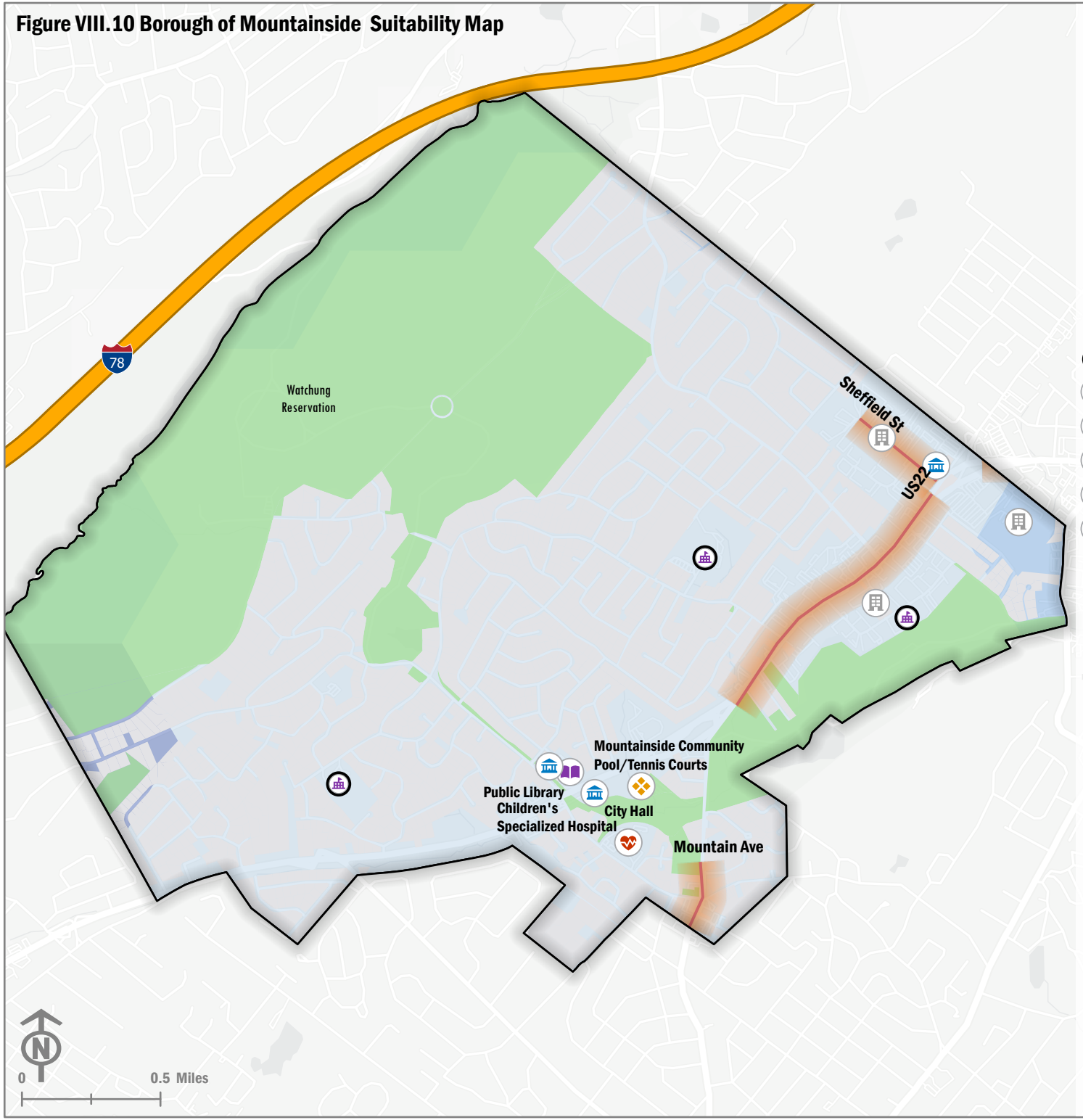


Figure VIII.10 Borough of Mountainside Suitability Map



Existing EV Charging Site
Alternative Fuel Corridor
Commercial Area

Suitability Score (EVReadi)

Less than 100
101 - 200
201 - 300
301 - 400
Greater than 400
Residential
Open Space

School
Community Hub
Medical Facility
Library
Government Building
Workplace Cluster

NJ NEVI Plan Vehicles to Support

Phase 1 2025: 250
Phase 2 2035: 1,514

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (75-98)
- Workplaces on Sheffield St (98)
- Children's Specialized Hospital (63)

Public Charging Sites:

- US-22 Commercial Corridor (95-98)
- Mountain Ave Commercial Corridor (95)
- Community Resources - Public Library, City Hall, Park (63)

DCFC Charging Sites:

- US-22 Commercial Corridor (95-98)
- Mountain Ave Commercial Corridor (95)

Borough of New Providence

The Borough of New Providence is located in the northwestern portion of Union County and has a mix of residential, recreational, commercial, institutional, and light industrial land uses. There are two primary commercial areas that present opportunities for Public L2 and DCFC infrastructure. The Village Shopping Center Mall is located towards the northern part of the municipality and serves numerous stores and a supermarket with a centralized, shared parking lot where charging infrastructure could be installed to serve travelers while they shop.

The other commercial area is smaller and located in the center of New Providence, just north of the Murray Hill Train Station on the Gladstone Line. This train station presents an opportunity for L2 charging infrastructure for commuters, but also could serve the multi-family residences that surround the train station. Other potential public charging sites include public parks within New Providence, such as Passaic River Park, Lincoln Field, Oakwood Park, and community centers, such as Jersey Aquatic Center/Murray Hill Tennis and Fitness, New Providence Community Pool, and the New Providence Municipal Center. Top potential workplace charging sites include New Providence schools, the office parks near Mountain Avenue (both east and west of Glenside Road), Summit Health Medical Center, and at the workplaces along South Avenue between Springfield Avenue and Central Avenue as these have higher concentration of jobs and workplaces and could serve commuters there.

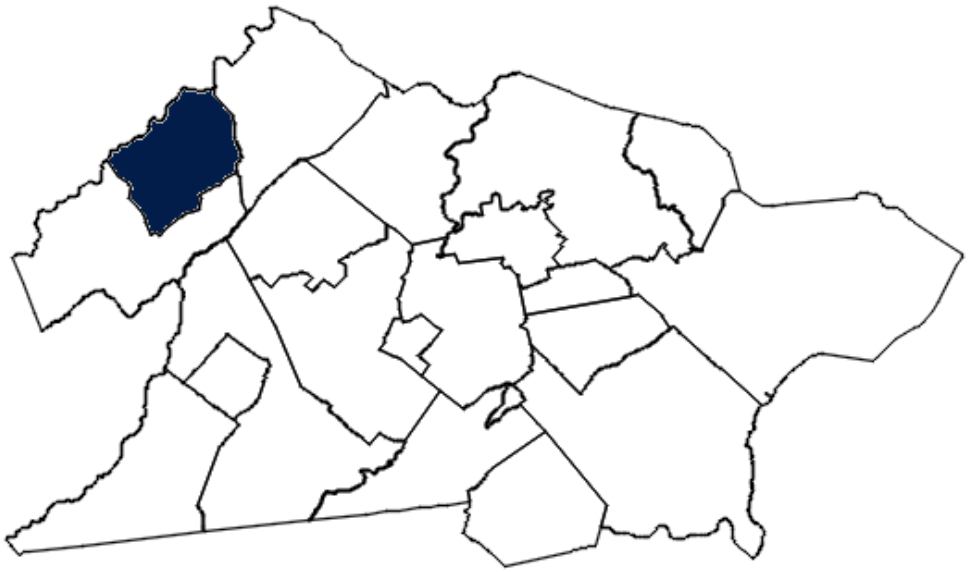
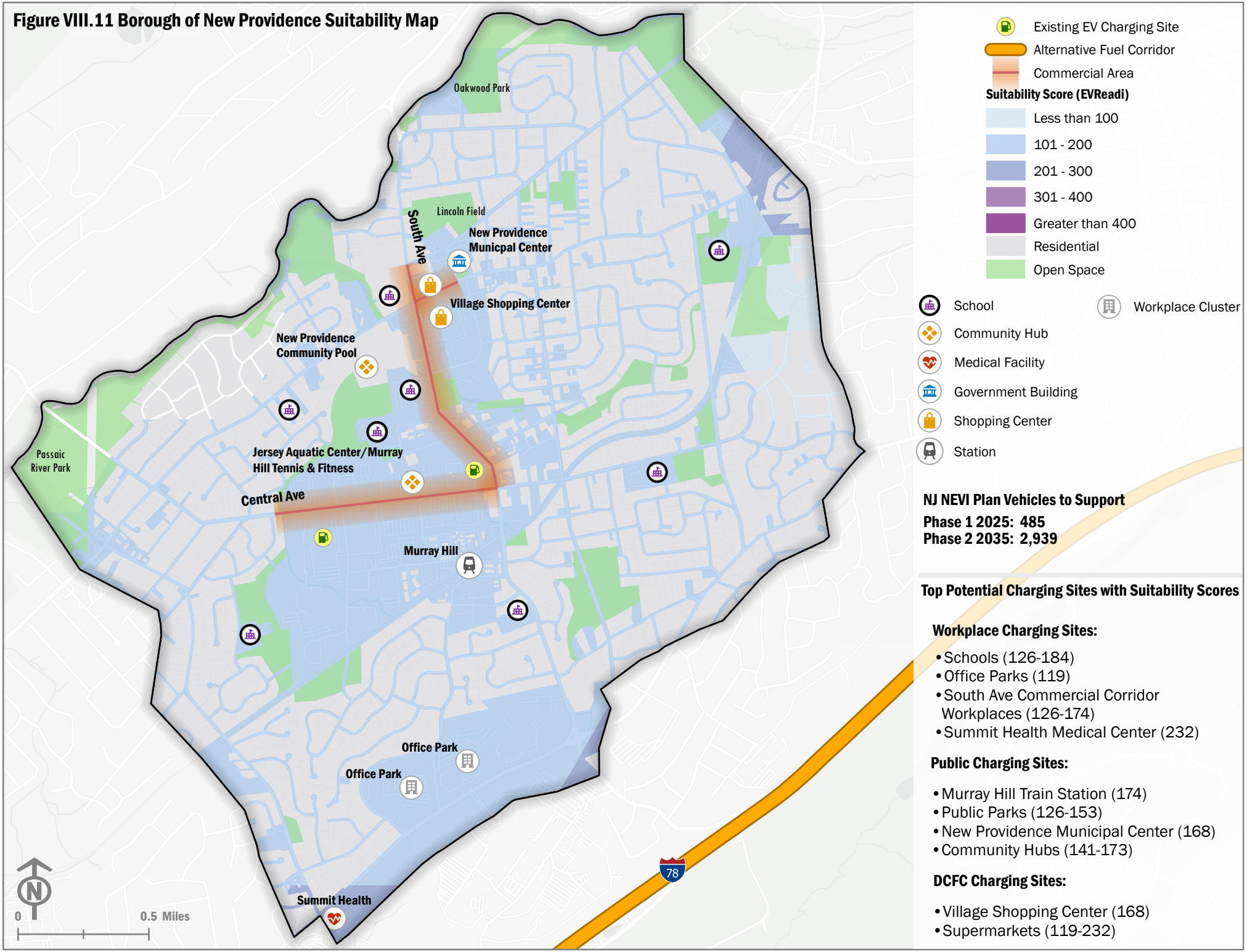


Figure VIII.11 Borough of New Providence Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 485
Phase 2 2035: 2,939

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (126-184)
- Office Parks (119)
- South Ave Commercial Corridor Workplaces (126-174)
- Summit Health Medical Center (232)

Public Charging Sites:

- Murray Hill Train Station (174)
- Public Parks (126-153)
- New Providence Municipal Center (168)
- Community Hubs (141-173)

DCFC Charging Sites:

- Village Shopping Center (168)
- Supermarkets (119-232)

City of Plainfield

Plainfield is a city in southwest Union County with mostly residential and commercial land uses. NJ TRANSIT Raritan Valley Line traverses through the city with two train stations (Plainfield and Netherwood). South Avenue (SR-28) runs adjacent and parallel to the railroad tracks throughout Plainfield and has a majority of the commercial land uses adjacent to South Avenue. A bigger commercial area surrounds the Plainfield Train Station where Public L2 and DCFC infrastructure can be placed to serve NJ TRANSIT commuters, as well as EV drivers shopping at the nearby establishments. The large surface lots adjacent to the transit station could have public charging infrastructure, especially at supermarkets and pharmacies in the area, for either L2 or DCFC based on typical dwell time.

There is a nearby cluster of government buildings, such as City Hall, NJ Department of Human Services, Plainfield Police Department, and Plainfield Municipal Court, that can house public charging infrastructure for these facilities and nearby commercial land uses. Public charging infrastructure could be placed along South Avenue to serve patrons while they shop along the corridor. Although Netherwood Station is smaller, it can also be used for Public L2 charging for commuters, as well as serve residents at the nearby apartment buildings. Other public charging infrastructure could be placed at Plainfield's public parks, such as Green Brook Park, Cedar Brook Park, and Milton Campbell Field.

Workplace charging can be placed near commercial clusters to serve employees of those businesses, as well as schools around the city and Union College (Plainfield Campus) for teachers and students to utilize. Additionally, the JFK Muhlenberg Satellite Emergency Department is located in the southern part of the City and could be used for workplace charging as well as Public L2 to serve the multi-family housing within a block of the medical center. PSE&G's South Plainfield facility is located in the southwest corner of Plainfield and can serve workplace charging needs for commuters.

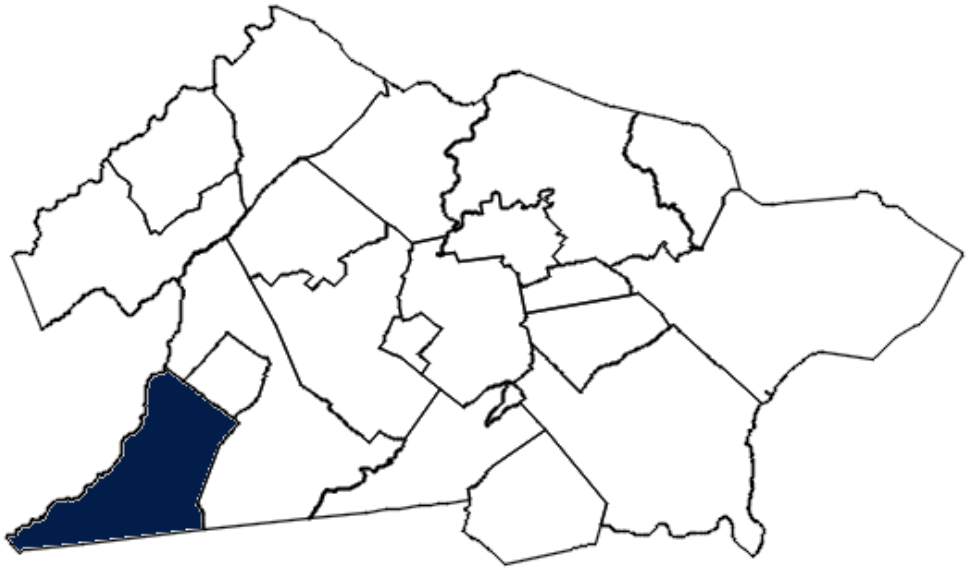
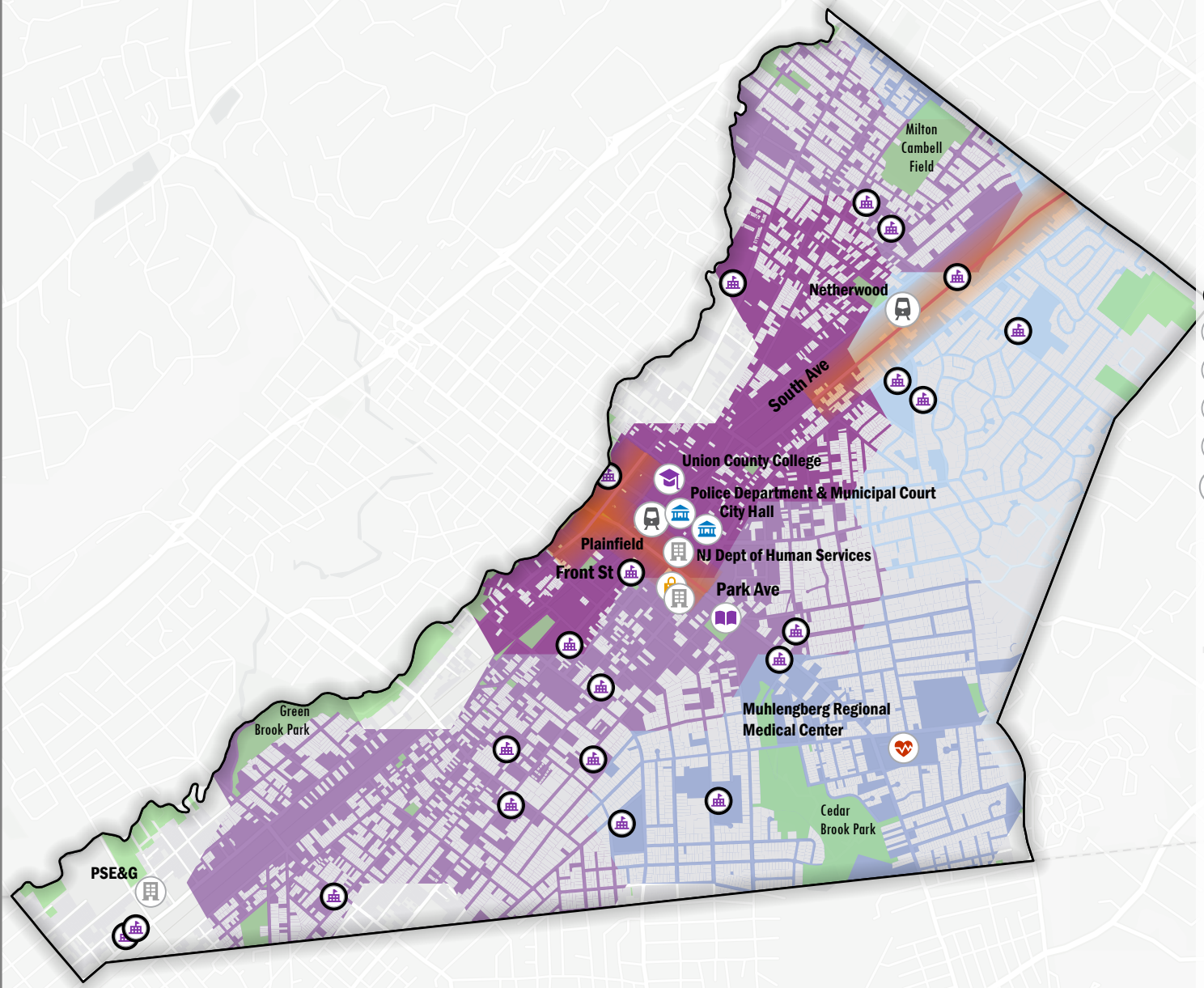


Figure VIII.12 City of Plainfield Suitability Map



Existing EV Charging Site
Alternative Fuel Corridor
Commercial Area

Suitability Score (EVReadi)

- Less than 100
- 101 - 200
- 201 - 300
- 301 - 400
- Greater than 400
- Residential
- Open Space

- School
- University
- Medical Facility
- Workplace Cluster
- Library
- Government Building
- Shopping Center
- Station

NJ NEVI Plan Vehicles to Support

Phase 1 2025: 1,956
Phase 2 2035: 11,856

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (148-414)
- Union College (414)
- PSE&G Plainfield Facility (414)

Public Charging Sites:

- Plainfield Train Station (414)
- Netherwood Train Station (166)
- Park Ave Commercial Corridor (414)
- Plainfield Ave Commercial Corridor (414)
- Parks (57-414)
- Government Offices (414)
- Muhlenberg Regional Medical Center (280)

DCFC Charging Sites:

- Park Ave Commercial Corridor (414)
- Plainfield Ave Commercial Corridor (414)
- Supermarkets and Pharmacies (57-414)

City of Rahway

Rahway is a city in southern Union County with a mix of residential, commercial, and some light industrial land uses. The commercial areas include St. Georges Avenue corridor and around the Rahway Train Station, which serves the Northeast Corridor and North Jersey Coast lines. The commercial corridor could provide Public L2 and DCFC charging infrastructure, especially where there is a concentration of businesses that attract shoppers. The Rahway Train Station could have public L2 chargers for commuters whose vehicles remain parked there why they are at work.

There is a cluster of government buildings just to the southeast of the train station that includes the Town Hall, Recreation Center, Police Department and Fire Department, as well as an urgent care business. This area could have workplace chargers and Public L2 charging infrastructure to serve these land uses, as well as the apartment building adjacent to this area. Other workplace charging could serve commuters travelling to Merck's industrial facilities in the eastern part of Rahway, Rahway schools for teachers and students, as well as Robert Wood Johnson University Hospital Rahway, where infrastructure could also serve patients and visitors.

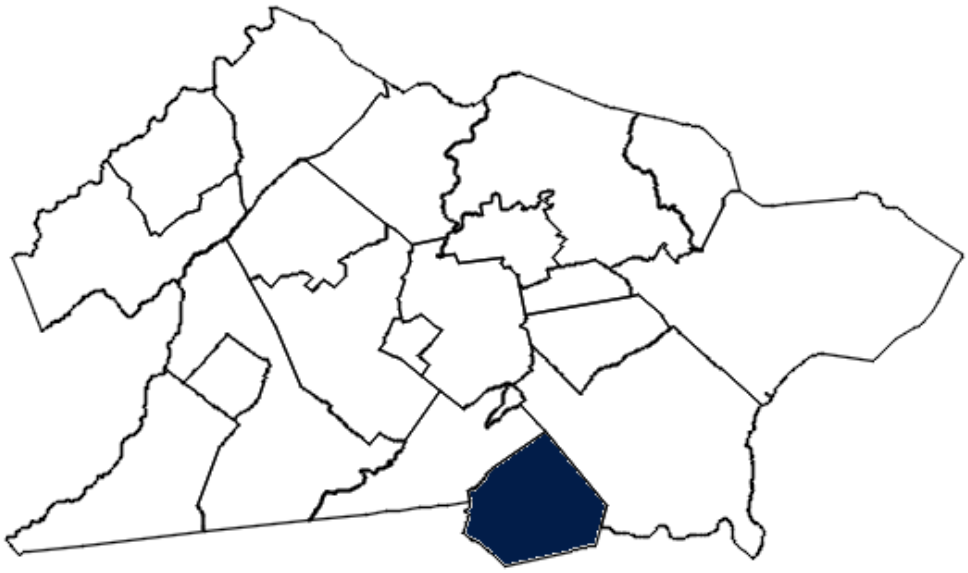
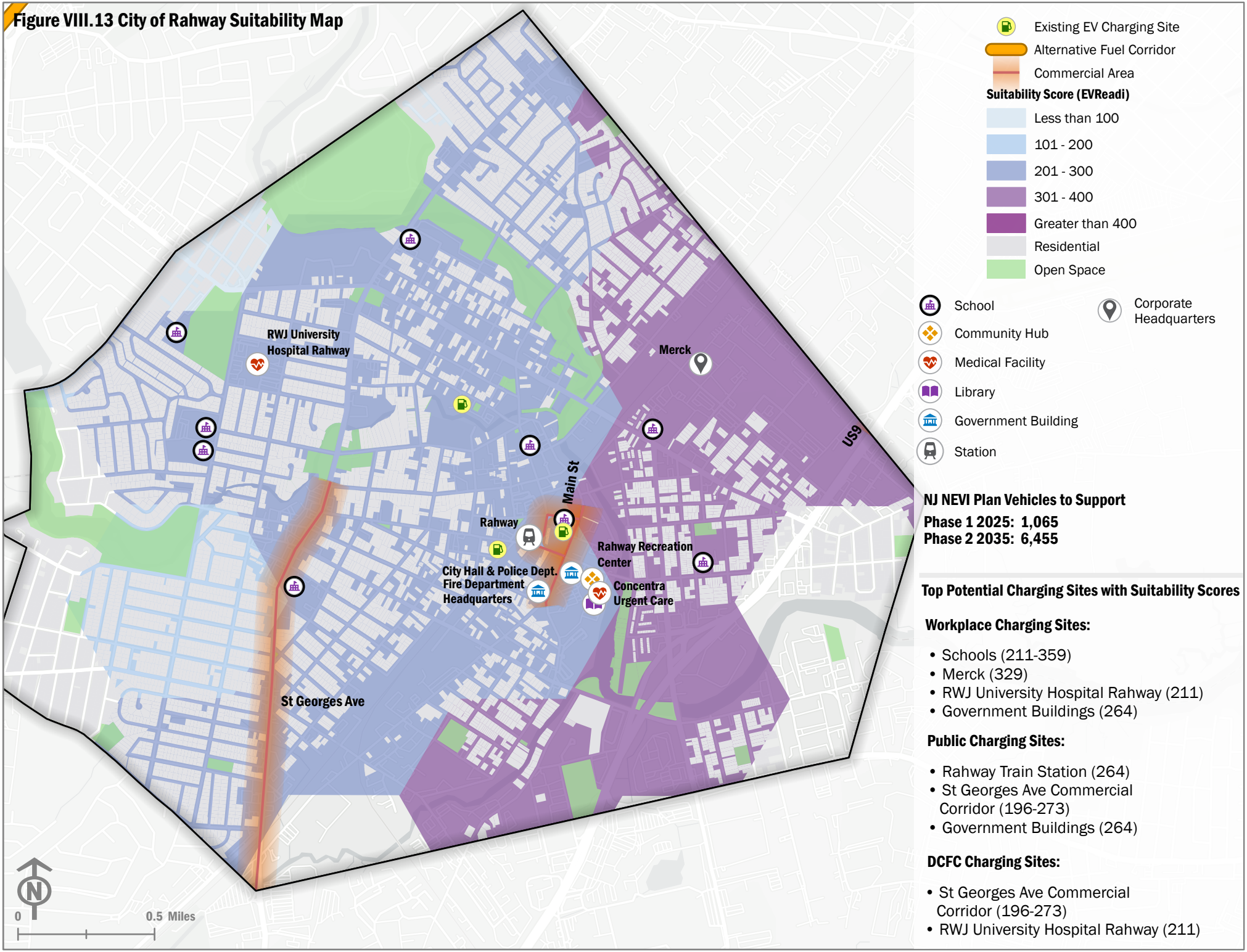


Figure VIII.13 City of Rahway Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 1,065
Phase 2 2035: 6,455

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (211-359)
- Merck (329)
- RWJ University Hospital Rahway (211)
- Government Buildings (264)

Public Charging Sites:

- Rahway Train Station (264)
- St Georges Ave Commercial Corridor (196-273)
- Government Buildings (264)

DCFC Charging Sites:

- St Georges Ave Commercial Corridor (196-273)
- RWJ University Hospital Rahway (211)

Borough of Roselle

The Borough of Roselle is located in central Union County. Most of its commercial uses are located along the northern and southern edges of Roselle with residential land use in the center that can serve at-home charging needs. The northern commercial area is on 1st Avenue and the first few blocks south of 1st Avenue along Locust Street and Chestnut Street. The southern commercial corridor is along St. Georges Avenue (Route 27) along the north side of the street. St. Georges Avenue acts as a boundary between the Borough and the City of Linden, with the south side of the street in Linden, but both municipalities benefit from this business district. Both the Roselle downtown and the St. Georges commercial strip present opportunities for Public L2 and DCFC charging infrastructure as they attract a high number of pass-by trips. Both L2 and DCFC infrastructure could be placed at various markets in the commercial areas, especially at any shared parking facilities.

This southern corridor also has some multi-family residences that could benefit from nearby Public L2 charging infrastructure. Other public charging locations could include public parks and the Warinanco Sport Center for EV drivers to use while doing recreational activities. DCFC infrastructure could be placed at drug stores and fast-food locations near commercial areas where dwell time is typically shorter to facilitate a quick charge for EV drivers. Workplace charging can occur at schools and near these commercial areas as they can serve the workers of those areas. Additional workplace chargers can be placed at the industrial land uses near the western borough limits and those adjacent to the railroad tracks in southern Roselle, between Chestnut Avenue and St. Georges Avenue.

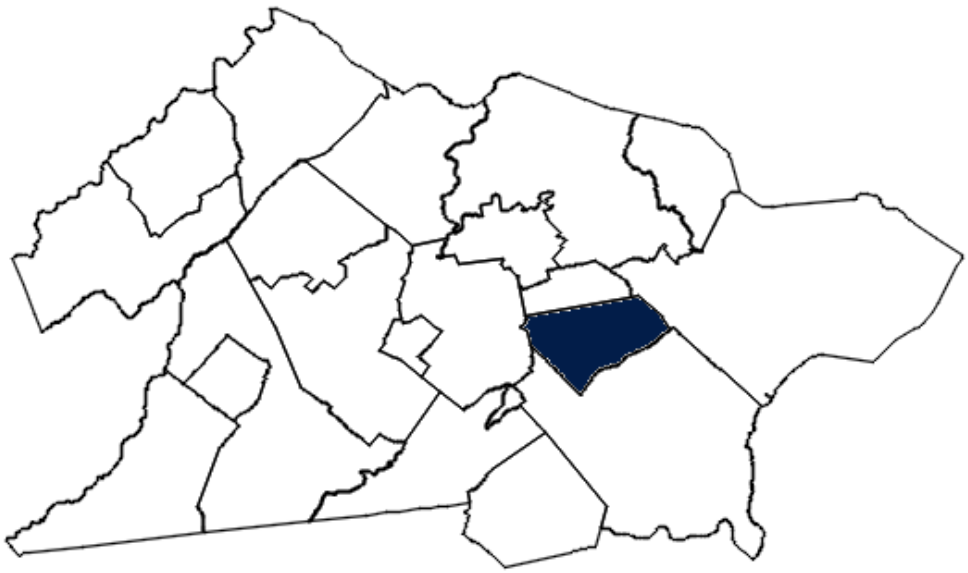
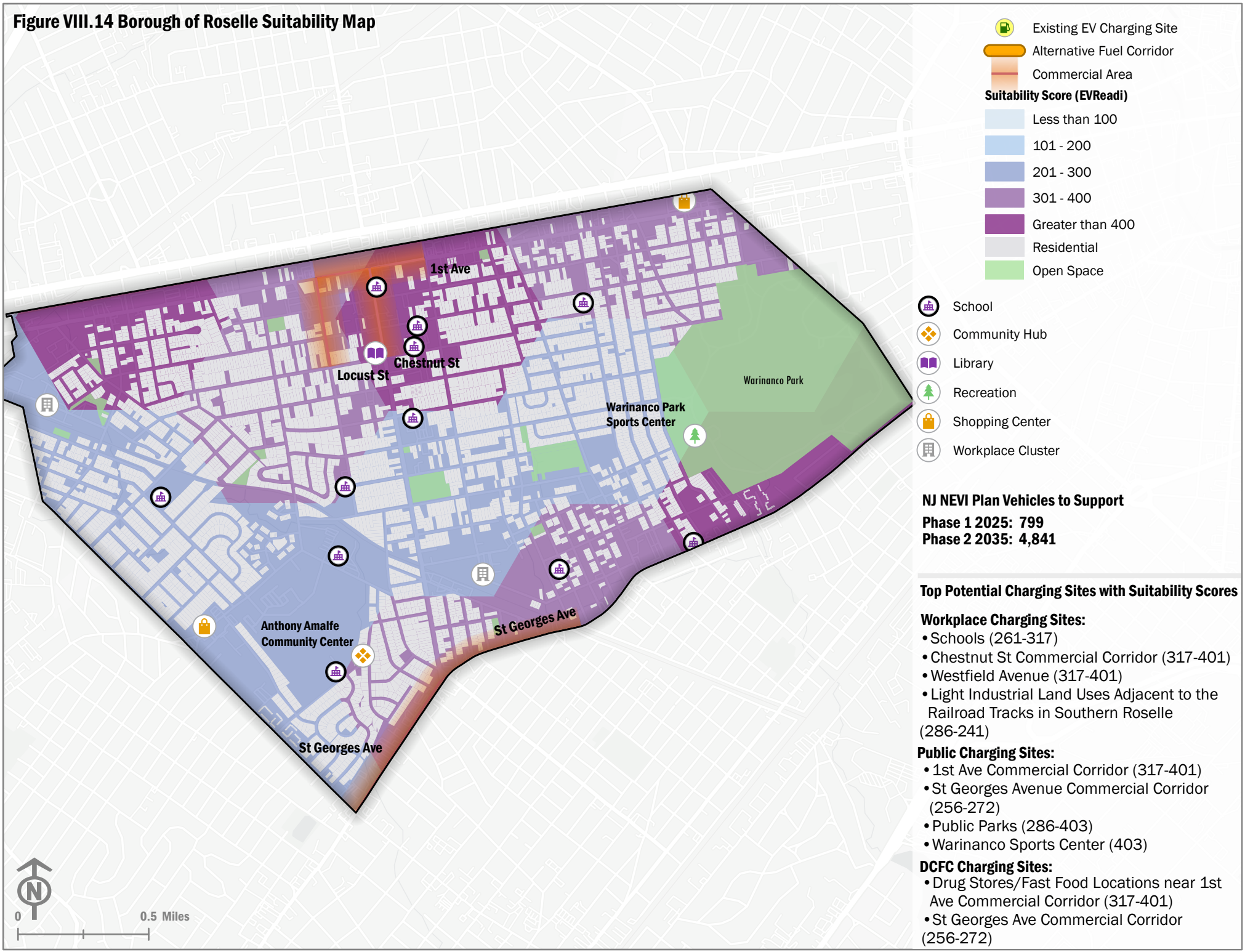


Figure VIII.14 Borough of Roselle Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 799
Phase 2 2035: 4,841

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (261-317)
- Chestnut St Commercial Corridor (317-401)
- Westfield Avenue (317-401)
- Light Industrial Land Uses Adjacent to the Railroad Tracks in Southern Roselle (286-241)

Public Charging Sites:

- 1st Ave Commercial Corridor (317-401)
- St Georges Avenue Commercial Corridor (256-272)
- Public Parks (286-403)
- Warinanco Sports Center (403)

DCFC Charging Sites:

- Drug Stores/Fast Food Locations near 1st Ave Commercial Corridor (317-401)
- St Georges Ave Commercial Corridor (256-272)

Borough of Roselle Park

Borough of Roselle Park is located in central Union County and is primarily residential with some commercial land uses. Westfield Avenue is the main commercial corridor that runs east-west across the entire municipality and could provide great locations for Public L2 and DCFC infrastructure to serve travelers visiting these establishments, as well as residents of adjacent multi-family buildings. Ideal DCFC site opportunities are otherwise limited in Roselle Park, but could be placed at public resources, such as public parks and the Roselle Park Veterans Memorial Library. Although the designated AFC of GSP does not traverse directly within Roselle Park, Exit 137 at Westfield Avenue is adjacent to the western edge of Westfield Avenue's commercial corridor and therefore could qualify for NEVI Program funds if the state selects a site there.

There are a few commercial areas adjacent to the Roselle Park Train Station on the Raritan Valley Line; this area presents an opportunity for Public L2 charging for train commuters and those visiting nearby establishments. There are no office parks or large corporate offices located in Roselle Park and therefore workplace charging infrastructure would be limited to schools and along Westfield Avenue to serve employees at those commercial land uses.

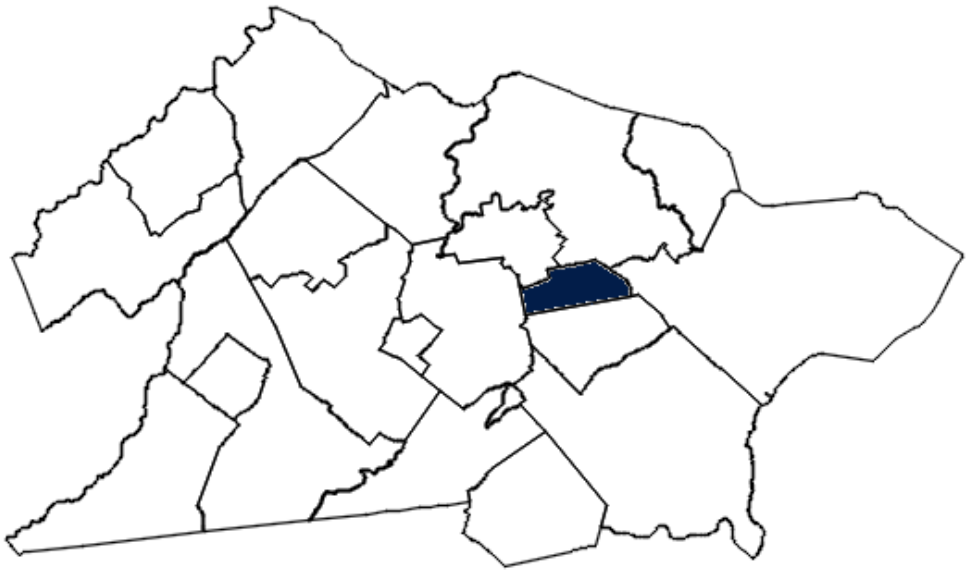
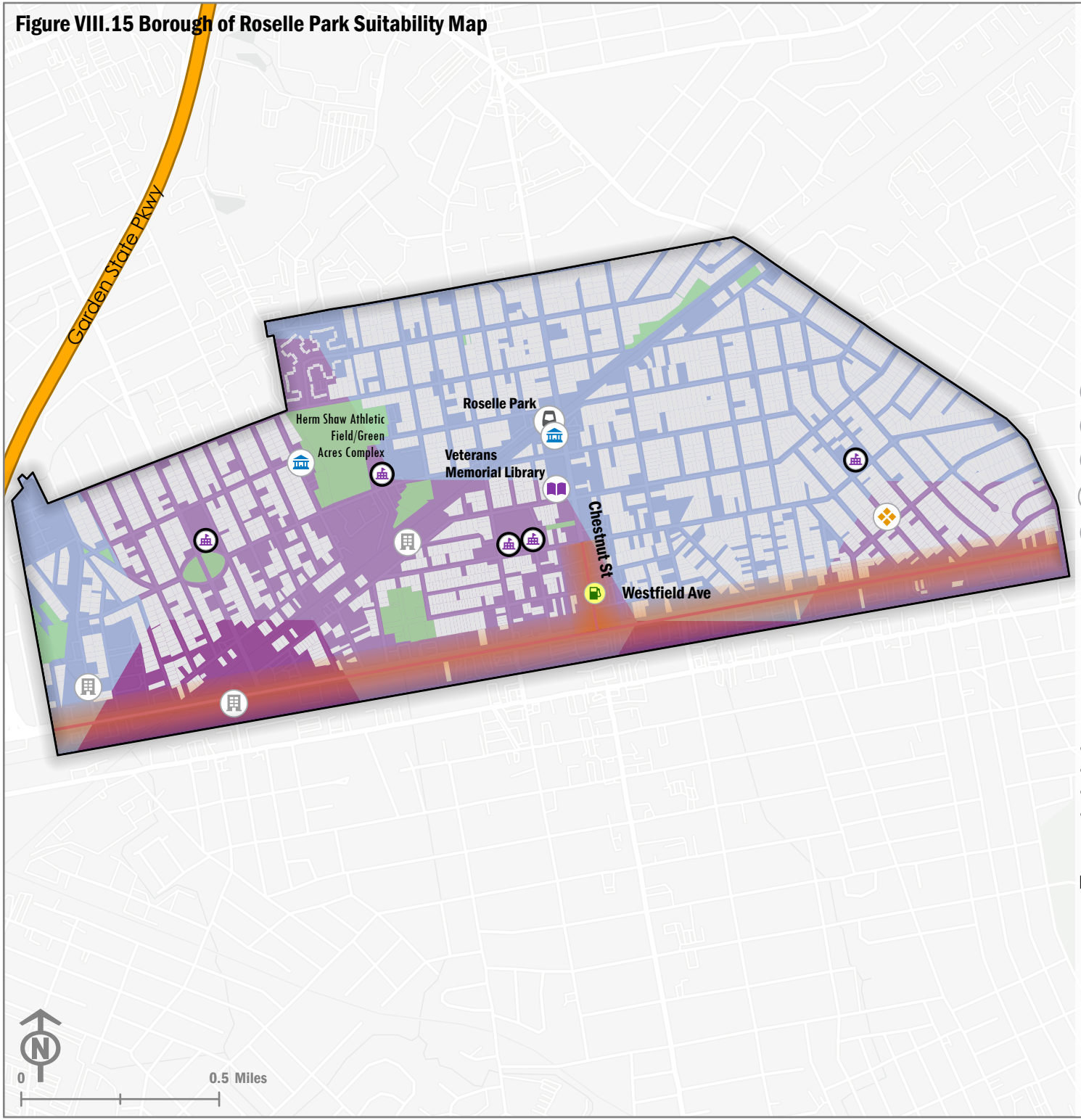


Figure VIII.15 Borough of Roselle Park Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 495
Phase 2 2035: 3,002

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (261-317)
- Chestnut St Commercial Corridor (317-401)
- Westfield Avenue (317-401)
- Light Industrial Land Uses Adjacent to the Railroad Tracks in Southern Roselle (286-241)

Public Charging Sites:

- Roselle Park Station and nearby Commercial Land Uses (276)
- Westfield Ave Commercial Corridor (387-467)
- Public Parks (214-306)

DCFC Charging Sites:

- Westfield Ave Commercial Corridor (387-467)
- Public Resources - Parks and Roselle Park Veterans Memorial Library (306-317)
- Westfield Avenue Adjacent to Garden State Parkway (214-468)

Township of Scotch Plains

The Township of Scotch Plains is located in southwest Union County and is mostly residential with commercial land uses in the northwestern portions of Scotch Plains off Park Avenue and 2nd Street. These concentrated commercial corridors present opportunities for Public L2 and DCFC infrastructure for travelers to utilize as they shop at these businesses. Other potential public charging sites include the Ash Brook Golf Course, community hubs, such as YMCA and Jewish Community Center, a cluster of government buildings concentrated near Park Avenue and Front Street, such as Scotch Plains Town Hall, Municipal Court, and Public Library, and public parks, such as Jerseyland Park, Forest Road Park, and Farley Avenue Park, which can have Public L2 and DCFC infrastructure to serve those public land uses, as well as the commercial corridor along Park Avenue.

Potential workplace charging sites include the Scotch Plains-Fanwood schools and workplaces near Terrill Road and Cooper Road, which could serve teachers, students, and commuters to those workplaces as they remain parked most of the day. Potential DCFC charging sites include the various public parks within Scotch Plains, and cluster of government buildings off Park Avenue to serve both those land uses and the commercial corridor.

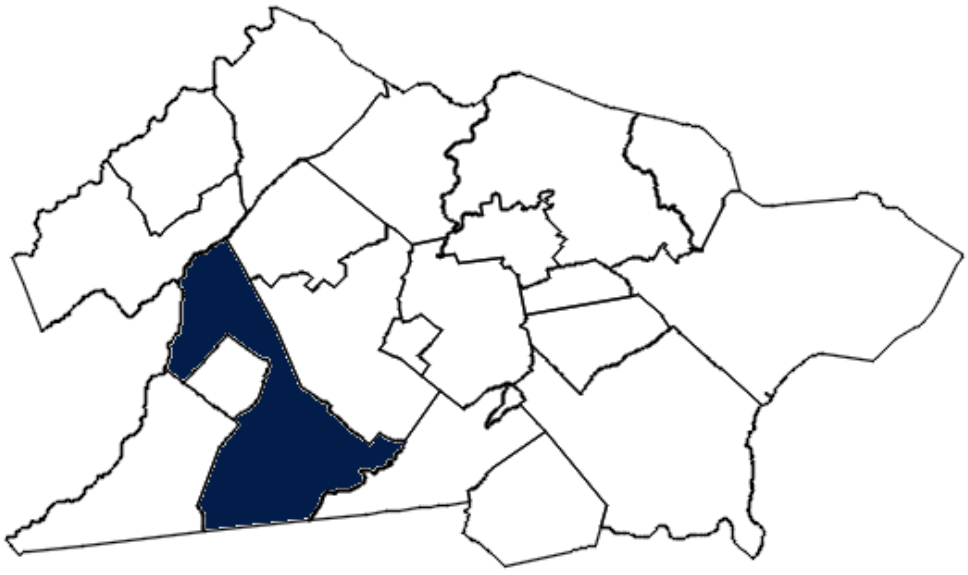
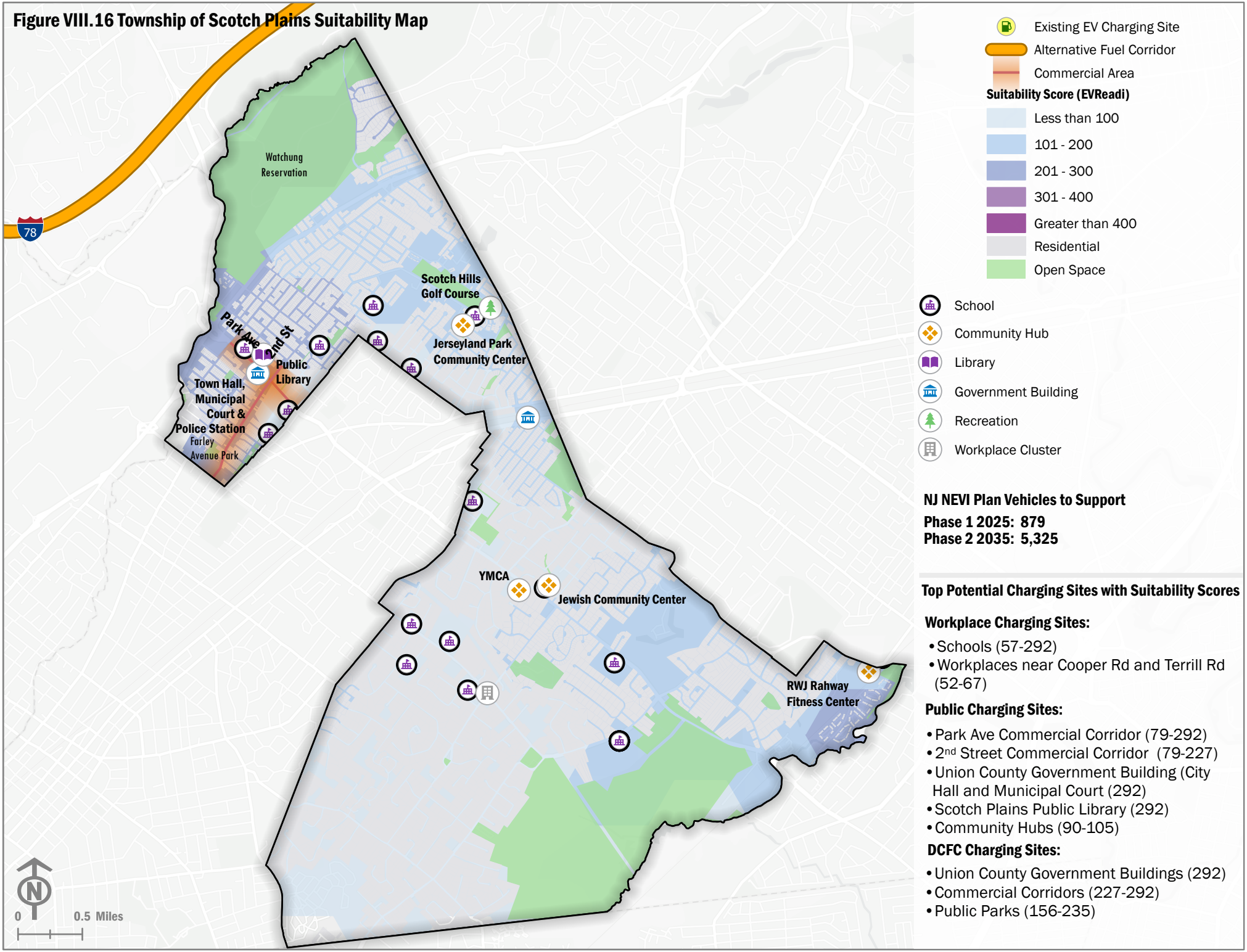


Figure VIII.16 Township of Scotch Plains Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 879
Phase 2 2035: 5,325

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (57-292)
- Workplaces near Cooper Rd and Terrill Rd (52-67)

Public Charging Sites:

- Park Ave Commercial Corridor (79-292)
- 2nd Street Commercial Corridor (79-227)
- Union County Government Building (City Hall and Municipal Court (292)
- Scotch Plains Public Library (292)
- Community Hubs (90-105)

DCFC Charging Sites:

- Union County Government Buildings (292)
- Commercial Corridors (227-292)
- Public Parks (156-235)

Township of Springfield

The Township of Springfield is located in the northern portion of Union County and has a mix of commercial, light industrial, and residential land uses. US Route 22 runs east-west near the southern edge of Springfield and has various commercial and light industrial land uses that present opportunities for both public charging and workplace charging to serve customers and workers at those locations.

The other commercial uses are in northern Springfield along Morris Avenue and Mountain Avenue that include restaurants, pharmacies, and markets that could allow people to charge their EVs while shopping at those establishments. This area, as well as the commercial area just northwest on Morris Turnpike, presents opportunities for Public L2 and DCFC infrastructure as they not only serve those adjacent land uses, but also provide good regional access to the highways (Route 24 and I-78). I-78 is a designated AFC and therefore could be a site for NEVI Program deployment of DCFCs just off Exit 48, but there are no strong potential sites just off I-78 Exit 49 within northeastern Springfield. Other potential public charging sites include public parks, such as Meisel Avenue Park, Ruby Park, and Henshaw Playground, for EV drivers to charge while utilizing these public resources, as well as the medical centers within Springfield.

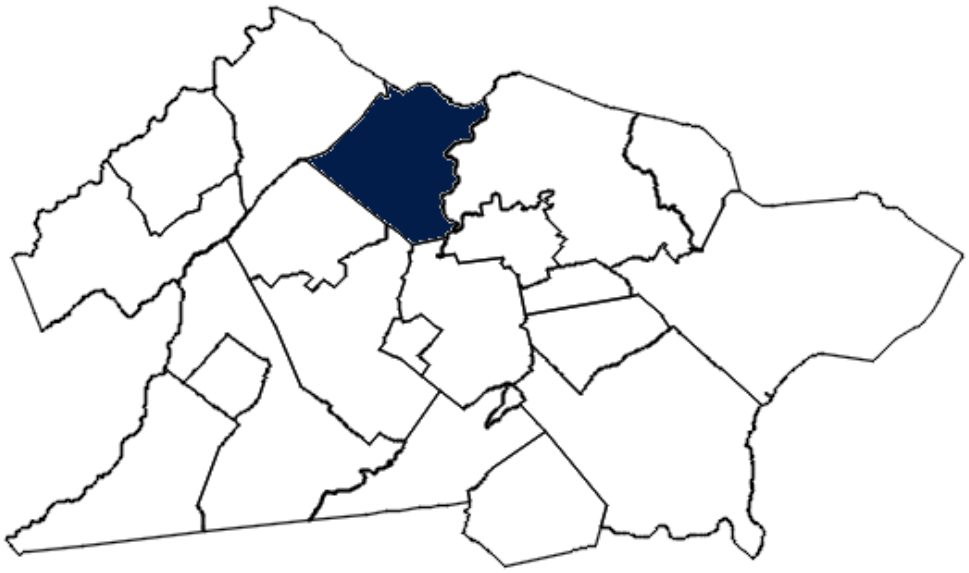
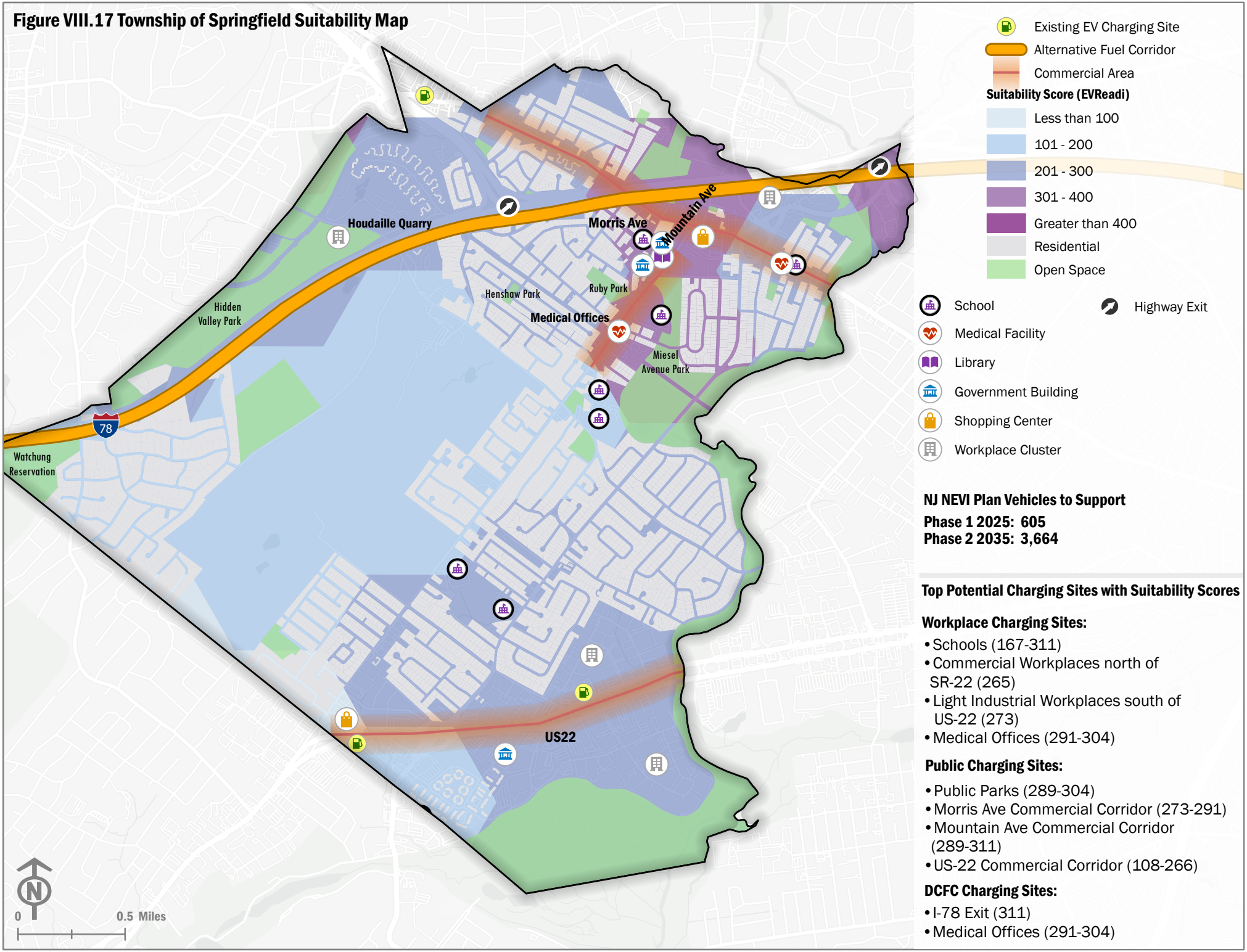


Figure VIII.17 Township of Springfield Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 605
Phase 2 2035: 3,664

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (167-311)
- Commercial Workplaces north of SR-22 (265)
- Light Industrial Workplaces south of US-22 (273)
- Medical Offices (291-304)

Public Charging Sites:

- Public Parks (289-304)
- Morris Ave Commercial Corridor (273-291)
- Mountain Ave Commercial Corridor (289-311)
- US-22 Commercial Corridor (108-266)

DCFC Charging Sites:

- I-78 Exit (311)
- Medical Offices (291-304)

City of Summit

Summit is located in the northern portion of Union County. The primary commercial area is in the center of the municipality, just north of the Summit Train Station along Springfield Avenue and Summit Avenue, but the Morris Avenue corridor also has commercial land uses in northern Summit. There are multiple concentrations of workplaces throughout Summit, but the remainder of the municipality is residential that can serve at-home charging needs. Potential workplace charging sites include the Summit schools, corporate offices near Passaic Avenue, north of Kent Place Boulevard, and the Overlook Medical Center. These sites attract many daily commuters and could benefit from providing workplace L2 chargers to serve these workers throughout the day.

Potential public charging locations include the NJ TRANSIT's Summit Train Station on the Morris and Essex Line, the various parks within Summit, such as Memorial Field, Hidden Valley Park, and Passaic River Park, and throughout the commercial and retail areas near Springfield Avenue and Summit Avenue. Other potential public charging sites include community hubs, such as the YMCA, Visual Arts Center of New Jersey, Summit Public Library, and Summit Community Center, as travelers utilize these land uses for a couple of hours at a time and therefore represent good public use charging opportunities. As I-78 is a designated AFC and Exit 45 is within the municipality's southern border, it represents a potential DCFC site that could be funded through the federal NEVI Program. However, if this site is chosen, it would primarily serve through traffic vehicles rather than the residents of Summit.

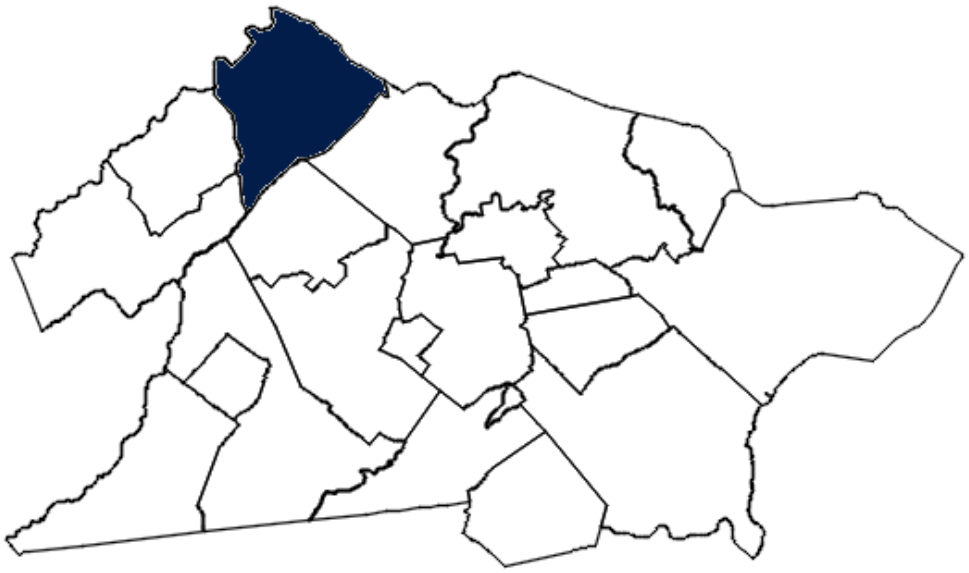
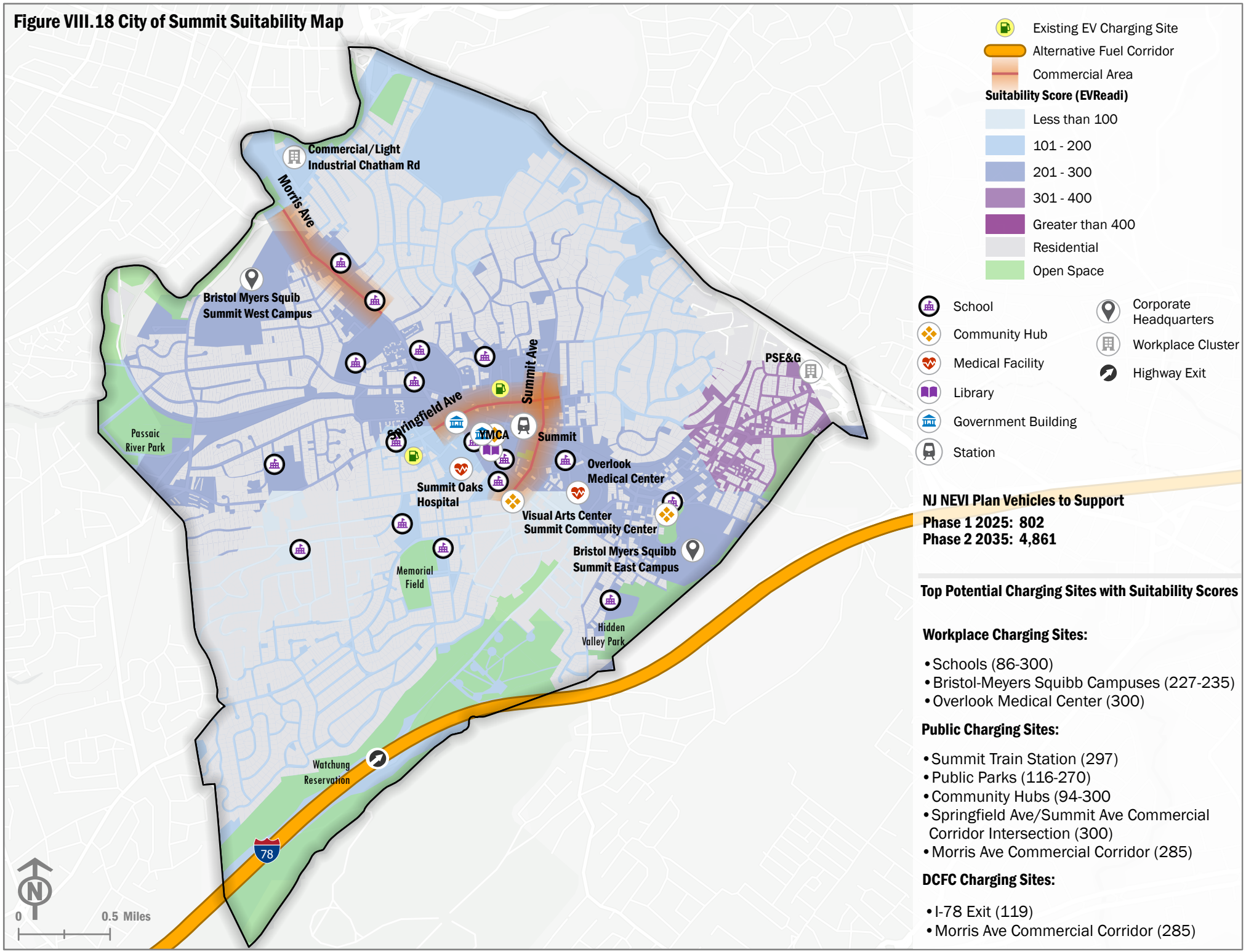


Figure VIII.18 City of Summit Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 802
Phase 2 2035: 4,861

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (86-300)
- Bristol-Meyers Squibb Campuses (227-235)
- Overlook Medical Center (300)

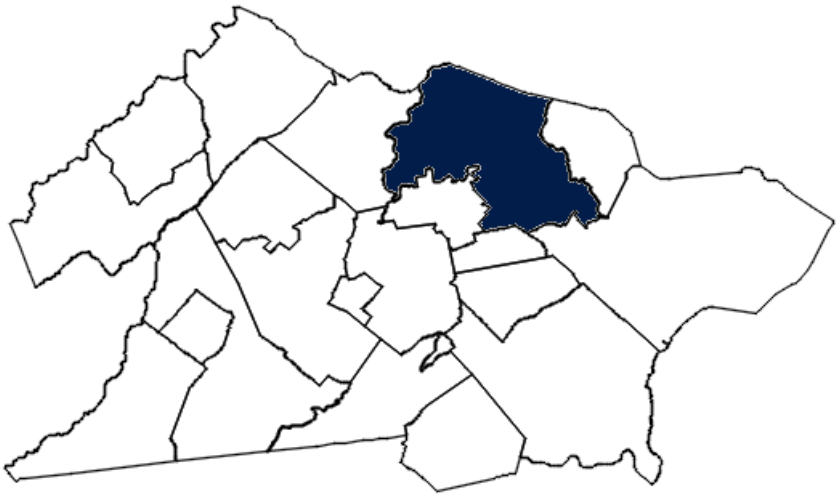
Public Charging Sites:

- Summit Train Station (297)
- Public Parks (116-270)
- Community Hubs (94-300
- Springfield Ave/Summit Ave Commercial Corridor Intersection (300)
- Morris Ave Commercial Corridor (285)

DCFC Charging Sites:

- I-78 Exit (119)
- Morris Ave Commercial Corridor (285)

Township of Union



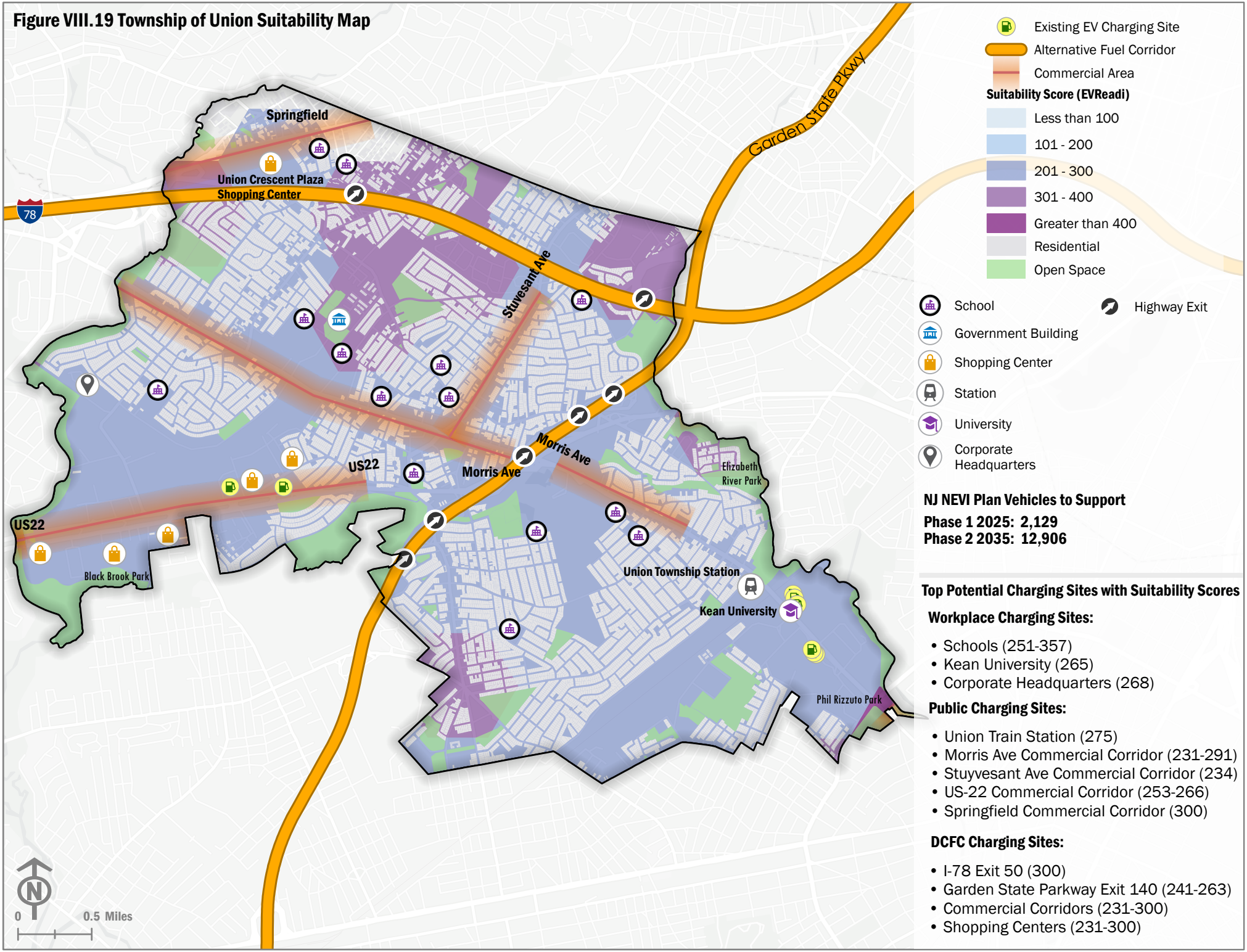
The Township of Union is located in eastern Union County and just west of Newark Liberty International Airport. Union has a mix of residential and commercial land uses spread throughout the township. Morris Avenue runs east-west through the township with small- to mid-size commercial land uses adjacent to most of the corridor. Stuyvesant Avenue branches off to the north of Morris Avenue in the center of Union with some restaurants, convenience stores, a supermarket, the Union Public Library, and other small- to mid-size retail stores. The commercial corridor along Route 22 in the southwest part of the township has larger stores and multiple shopping centers. All three of these commercial corridors present Public L2 and DCFC infrastructure opportunities for EV drivers as they shop at these establishments, especially at shopping centers. At shared parking lots a single deployment of chargers could serve multiple businesses.

Union Station on the Raritan Valley Line is located in the southeastern part of the Township of Union by Kean University. It has a large surface parking lot that could be utilized for public charging infrastructure to serve commuters using this station as well as some of the nearby apartment buildings. The nearby apartment buildings have some existing charging infrastructure, but this can be expanded as more EVs are registered within the Township of Union.

Both I-78 and GSP are designated AFCs and run throughout the Township of Union. GSP Exit 140 provides an opportunity for DCFC if selected as a site by the state for NEVI Program funds, due to the large parcels and surface parking lots with adjacent commercial land uses right off the exit. Additionally, Exit 50 of I-78 has similar land uses and the parking area north of I-78 at Union Crescent Plaza Shopping Center could be an opportunity for NEVI Program funds. Springfield Avenue in the northern part of Union is another commercial corridor, but it only has small and spread-out commercial land uses so this area would be better suited for DCFC at Union Crescent Plaza Shopping Center. Additionally, schools throughout the township could present workplace charging opportunities for teachers and students. Similarly, Kean University facilities could serve their faculty, staff and student population as a workplace charging facility.

In addition to the educational facilities, workplace L2 charging could be implemented at multiple large corporate headquarters in western Union (at Liberty Avenue/Rahway Avenue).

Figure VIII.19 Township of Union Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 2,129
Phase 2 2035: 12,906

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (251-357)
- Kean University (265)
- Corporate Headquarters (268)

Public Charging Sites:

- Union Train Station (275)
- Morris Ave Commercial Corridor (231-291)
- Stuyvesant Ave Commercial Corridor (234)
- US-22 Commercial Corridor (253-266)
- Springfield Commercial Corridor (300)

DCFC Charging Sites:

- I-78 Exit 50 (300)
- Garden State Parkway Exit 140 (241-263)
- Commercial Corridors (231-300)
- Shopping Centers (231-300)

Town of Westfield

Westfield is a town located in central Union County. North and south of the NJ TRANSIT railroad tracks, Westfield is mostly single-family residential, which can serve at-home charging needs. Commercial land uses are concentrated just north of the Westfield Train Station, which serves the Raritan Valley Line, as well as on North Avenue to the east of the train station, and on South Avenue east and west of the train station. The commercial area just north of the train station has a collection of restaurants and retail that could be served by Public L2 and DCFC infrastructure for EV drivers as they shop at these establishments, as well as some multi-family housing nearby. There are also multiple supermarkets and pharmacies that present DCFC opportunities due to typical dwell time at these types of land uses.

Other public charging infrastructure locations could include public facilities and parks, such as the Westfield Memorial Library, Fairview Arboretum, Brightwood Park, Westfield Pool, and Tamaques Park, as well as the train station parking lot for commuters and visitors. Workplace charging can be provided at schools for faculty and students who commute, as well as the commercial corridors of North Avenue and South Avenue.

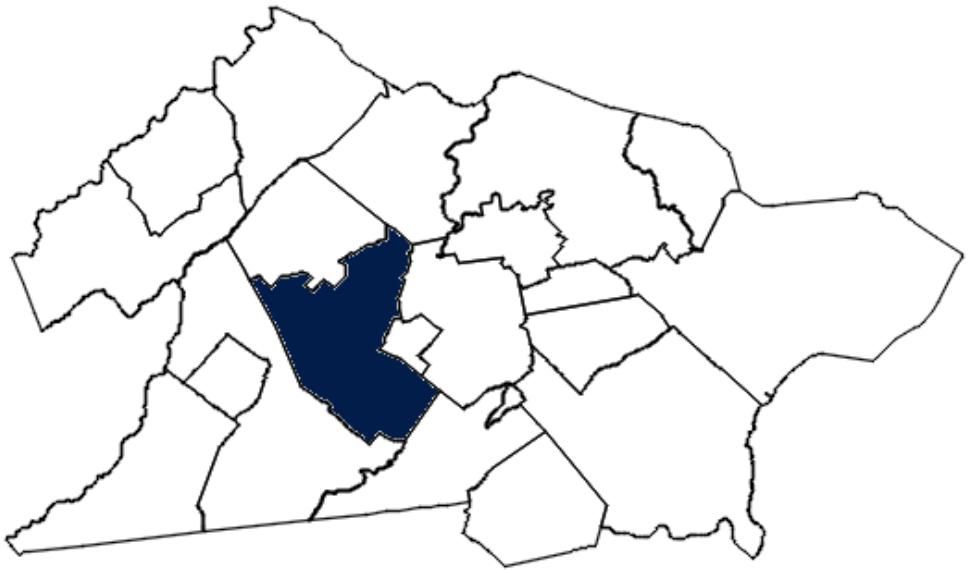
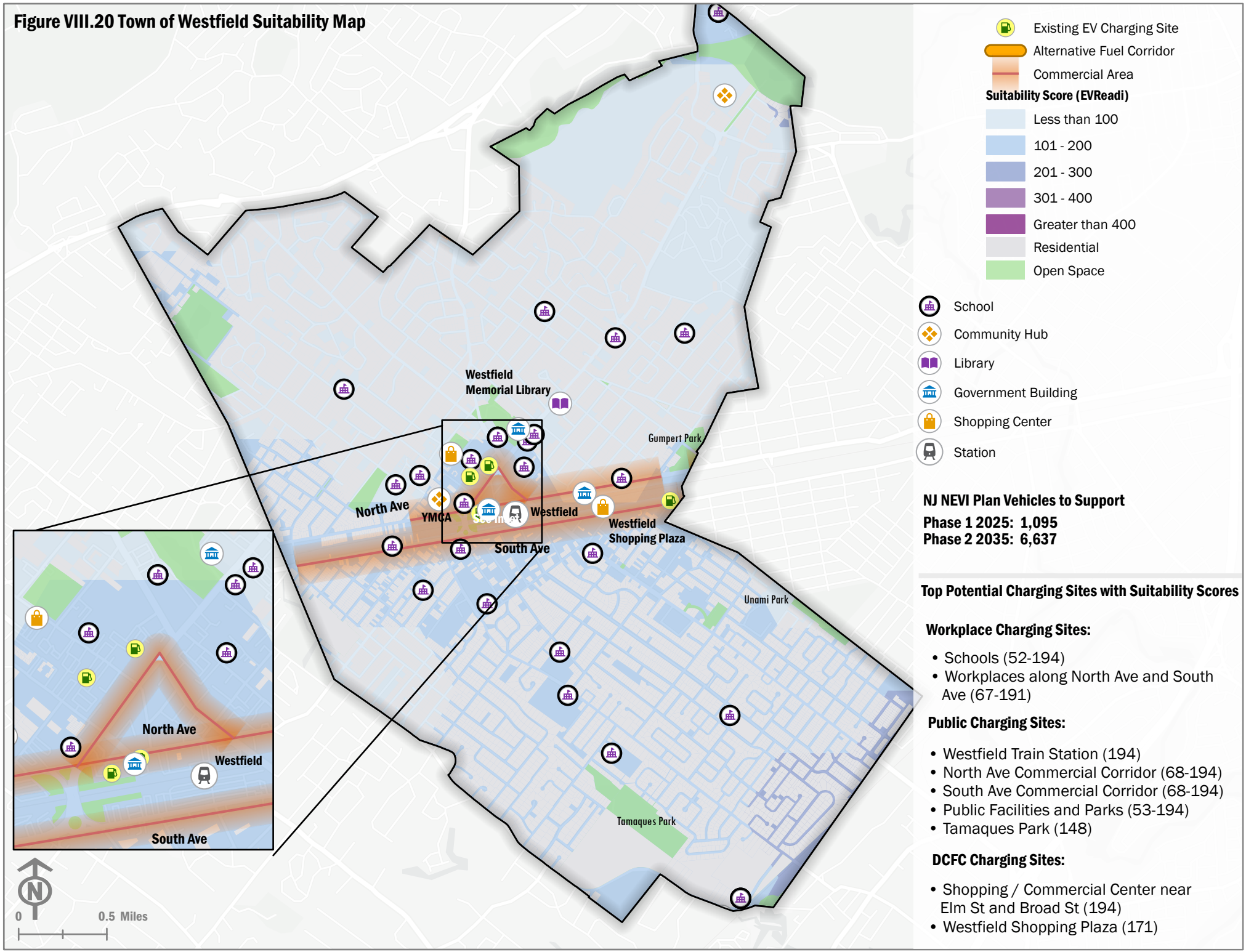


Figure VIII.20 Town of Westfield Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 1,095
Phase 2 2035: 6,637

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Schools (52-194)
- Workplaces along North Ave and South Ave (67-191)

Public Charging Sites:

- Westfield Train Station (194)
- North Ave Commercial Corridor (68-194)
- South Ave Commercial Corridor (68-194)
- Public Facilities and Parks (53-194)
- Tamaques Park (148)

DCFC Charging Sites:

- Shopping / Commercial Center near Elm St and Broad St (194)
- Westfield Shopping Plaza (171)

Township of Winfield

Winfield is a small township in southern-central Union County. It is almost entirely residential and is served by on-street parking. While it is physically possible to run a charger from a residence to on-street parking, it creates safety and tripping hazards as a charging cord would need to run across sidewalks to plug into the vehicles. Therefore, Public L2 chargers could potentially be placed on vacant land within Winfield to operate as community chargers for nearby residents to safely charge their vehicles. Alternatively, charging equipment and dispensers could be installed within the grass strip between the curb and sidewalk, but would need to be publicly owned/operated and all electrical wiring would need to be installed underground to avoid unsafe conditions and not violate any ADA requirements that could occur if cables are laid across the sidewalks.

There are a few commercial businesses at Wavecrest Avenue/Roosevelt Drive that can have Public L2 and DCFC for visitors to these businesses. A few chargers could be dedicated to the employees of those businesses for workplace charging in addition to Winfield Elementary School for teachers who drive EVs. Winfield is adjacent to the GSP, which is a designated AFC, and therefore could qualify for NEVI funds due to proximity to Exit 136. However, no specific sites within Winfield would be a strong candidate.

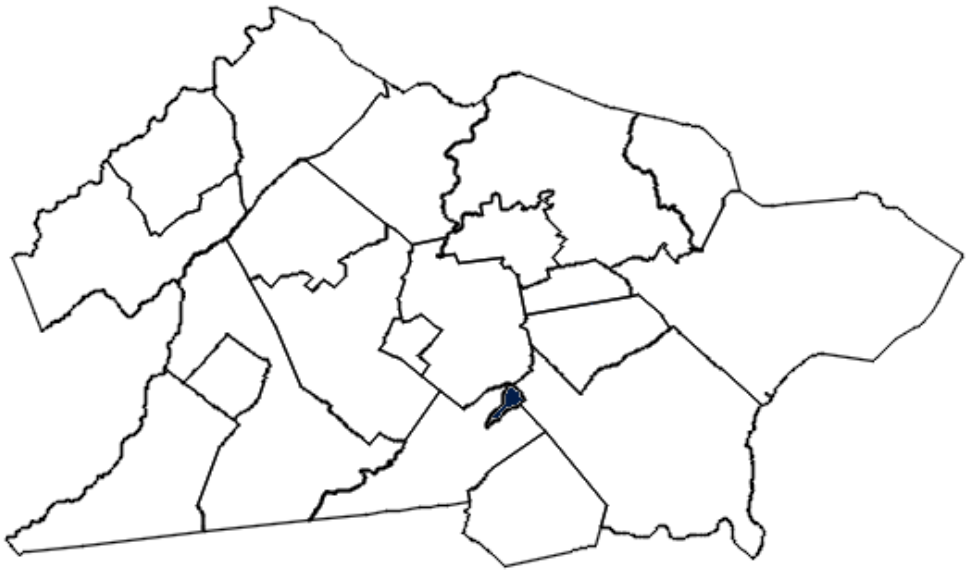
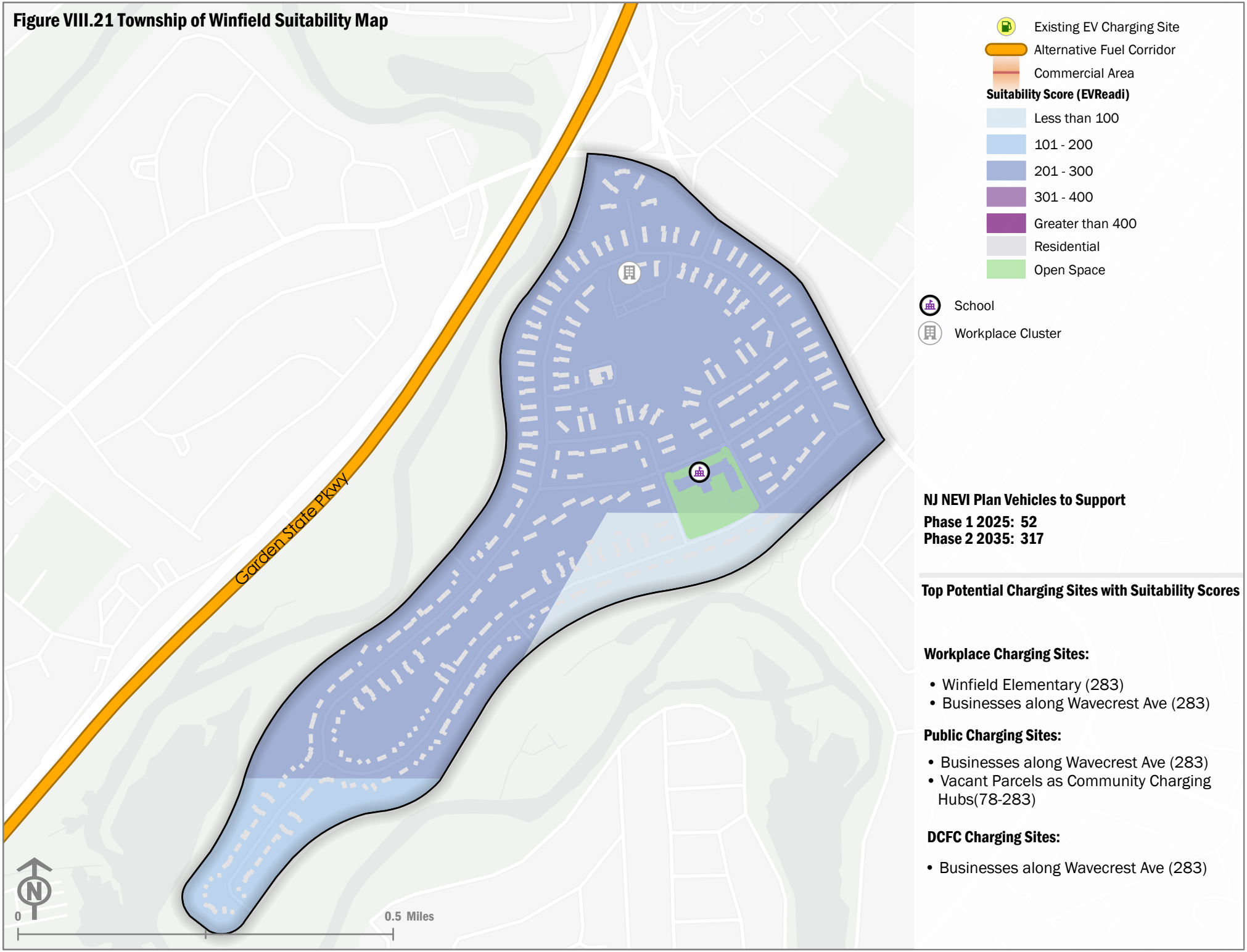


Figure VIII.21 Township of Winfield Suitability Map



NJ NEVI Plan Vehicles to Support

Phase 1 2025: 52
Phase 2 2035: 317

Top Potential Charging Sites with Suitability Scores

Workplace Charging Sites:

- Winfield Elementary (283)
- Businesses along Wavecrest Ave (283)

Public Charging Sites:

- Businesses along Wavecrest Ave (283)
- Vacant Parcels as Community Charging Hubs(78-283)

DCFC Charging Sites:

- Businesses along Wavecrest Ave (283)

IX. EVSE DESIGN CONSIDERATIONS

Currently the EV charging industry is in the early stages of development with ongoing private research and development, along with multiple business models occurring in third-party charging system equipment. As a State, New Jersey is focused on reducing barriers to adoption. Some charging systems require long-term contracts and annual subscriptions and can include proprietary agreements, maintenance issues, parts availability, and software agreements.

One approach is to streamline the point of contact for equipment/software suppliers and use of Shared Service Agreements. These optional approaches could make equipment maintenance and contract agreement negotiations smoother and more cost effective.

The importance of maintenance and reliability of current charging equipment was highlighted during one of the Study's TAC meetings, when a current EV user commented that about 30 percent of the time the charging station located along their travel route is damaged or out of service. This concern has also been identified at the federal level and is incorporated into the NEVI Standards and Requirements.[15] Reliability is a critical issue in EV adoption. People need to feel confident that the charging network can support them.

Charger Requirements

Installation of charging stations requires a number of decisions. Installation of an electrical supply line between the appropriate electrical panel and the charging station requires available electrical capacity at the proposed site. Another consideration is whether the charging station is mounted on an existing wall or on a ground-mounted pedestal, and then whether or not to provide network connectivity for the charging station. If there is insufficient electrical capacity at a site to handle the addition of charging infrastructure, then electrical upgrades will need to be coordinated with the local utility company to upgrade the local transformer and have a contractor install any switchboards or other site upgrades necessary to install the charging infrastructure.

Number of Chargers

The State P.L. 2021, c. 171 model ordinance[16] signed into law on July 9, 2021, identifies at least 15 percent of required off-street parking spaces be "Make-Ready" and that EVSE be installed in at least one-third of the 15 percent. The term "Make Ready" means that all necessary electrical infrastructure to operate the charging stations, all conduit and wire is pulled to the station location(s) and all concrete

[15] FHWA National Electric Vehicle Infrastructure Standards and Requirements
[16] DCA Model Statewide Municipal EV Ordinance

work is completed properly, allowing the stations to be mounted, and any cellular repeaters are installed if required.

New Jersey has generally identified 15 percent of parking spaces provided to be the target number of EV charging spaces. Municipalities are recommended to start with this as the goal for EV deployment and continue to analyze demand and availability as time continues. For instance, if demand of chargers on site shows that they are occupied 90 percent or more of the time, then additional charges may be warranted for a site to meet demand needs. Installations should always consider future growth and expansion, by providing additional conduit and/or "Make-Ready" spaces to minimize civil and electrical work, and associated disruption, required to add additional charging stations.

Refer to the section below "Accessible Electric Vehicle Charging Stations" for more considerations related to the numbers of chargers that should be accessible on a site.

Electrical Service for the Chargers

EVs use about 7 kW when connected to a L2 charger. DCFC is currently the fastest charging available. DCFCs range from about 50 kW to up to 350 kW. Thus, the electrical load added to the building or site affects demand charges on electric bills. In addition, some sites may not have access to the Phase 3 power that DCFCs require and therefore would need electrical upgrades. Consultation with utility providers and electrical engineers is recommended to determine site feasibility.

The distances between the charger and electrical panel are also a contributing factor. Designers can mitigate cost by comparing installation of power supply using roadway trenching and pavement repair or installation of service within a grass area adjacent to a parking space. Trenching is also a consideration as to whether a charger is installed in-ground, on a pedestal, or wall mounted. If an EV Charger can be installed within a wall with wiring running through the building, this can significantly reduce cost for running electrical supply lines. The less pavement disturbed for power supply, the lower the cost of installation. Thus, placing it at the edge of a lot in a grass area may be a good option. It is generally a good idea to provide extra electrical conduits to allow for anticipated or potential additional charging stations to minimize further work and disruption.

Additional factors, such as environmental permitting related to sites adjacent to Freshwater Wetlands, in Flood Hazard Areas or other protected areas, need to be considered in electrical design. For instance, the Borough of Kenilworth and the townships of Cranford, Union, Springfield, and Winfield are all located along the Rahway River with potential charging sites located in Flood Hazard Areas (FHA). Electrical

installation must be a minimum of one (1) foot above the FHA design flood elevation (100-year storm) [17] .

Networked or Not Networked

Charging equipment can be equipped with communications hardware and software that will allow charging to be remotely monitored. It is also needed if the municipality wishes to have the charger equipped to accept credit cards or other payment devices.

It should be noted that that networked connected chargers have a higher initial cost than non-networked chargers. In addition, there is a cost for a vendor to provide the ongoing communications service. Some municipalities have found that the annual cost for the communications service was greater than the benefit they received. This may be particularly true for small deployment.

How to Find a Charger

Many EVs have charging station locators programmed into their on-board navigation system. Apps and websites can also help drivers find chargers and plan trips. Some even let the driver know if a charger is available now, if there is a waiting time, and allows drivers to make a reservation. Some of the apps and websites include:

- Chargeway
- Plugshare
- ChargeHub
- ChargePoint
- Blink Mobile
- SemaConnect
- OnStar My Link
- NissanConnect EV
- U.S. Department of Energy's Alternative Fueling Station Locator

Compliant Network Service Providers

The State's NJDEP publishes up to date information on its DriveGreen Website including a pre-qualified list of network service providers.[18] It is a valuable source for the County and its municipalities.

[17] FEMA Hurricane and Flood Mitigation Handbook for Public Facilities
[18] NJDEP Pre-Qualified List of Network Service Providers

Ongoing Research

New technologies are developing in the EV industry such as those that utilize solar power, store electricity, microgrid expansion[19], and provide mobile/emergency charging technologies, amongst others. Readers of this Study should consider the date of this Study in relevance to the development of technology.

Selecting a Charger Type

EVSE will continue to change and evolve over the next decade. One source to consistently cite as chargers are selected will be the US EPA's ENERGY STAR program certified EV charging equipment[20] based on energy efficiency. Selection of equipment should be context sensitive to the site, need and owner requirements. There are many companies that offer Software as a Service (SaaS)[21] platforms to install and maintain equipment and service customers. This list is constantly changing and evolving, so the following companies are offered as a starting point for exploring charger station equipment and turnkey solutions:

- ChargePoint
- Volta
- Dynamic EV Charging
- TurnOnGreen
- United Chargers
- Giradin Energy
- The Mobility House
- Xeal
- Loop
- Monta
- PIONIX
- AmpUp
- FLO
- EVPassport
- Ever Charge

Design and Implementation Support

It is suggested that municipalities consult an expert in EV deployment for additional information. This expert should generally not be a vendor of charging equipment, who would have an inherent conflict of interest. A good resource to start with is the local US Department of Energy Clean Cities' representative or the state resource.

[19] A microgrid is a self-contained electrical network that allows the site to generate their own electricity on-site and use it when needed most. A microgrid is thus a type of distributed energy resource. Microgrids can be operated while connected to the utility grid or in disconnected "island" mode. Examples of this include hospitals, refineries and universities with their own geothermal, nuclear, solar, natural gas, coal, or petroleum power generation.

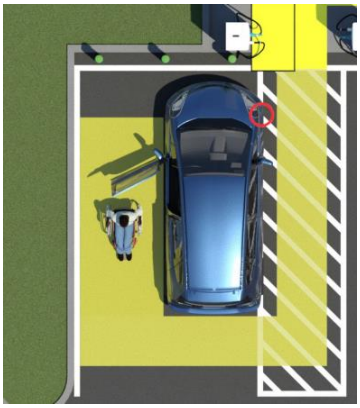
[20] Energy Star Certified EV Chargers

[21] What is SaaS

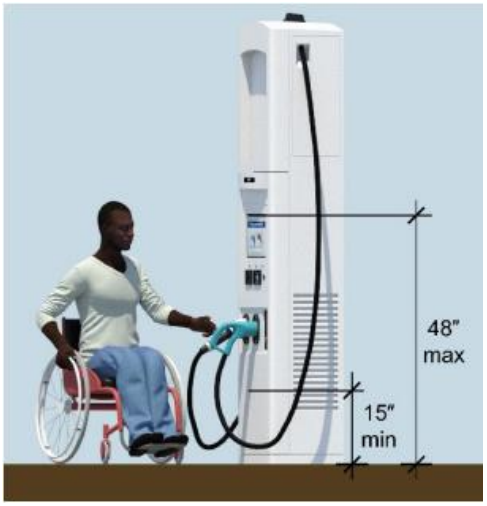
Accessible EV Charging Stations

On July 21, 2022, the USAB issued Design Recommendations for Accessible Electric Vehicle Charging Stations.[22] Some design recommendations are summarized below.

All parts of the charging station must be accessible, including the charger and the connector.



- Card readers and contactless payment systems with a display screen and/or speech output that are enabled if payment is required. All user interfaces should be accessible.
- All connectors (plugs) should be able to be operated with one hand, with no tight grasping, pinching, or twisting of the wrist, with no more than 5 pounds of force needed to operate the connector.
- All maintenance of vehicle charging stations should be kept up to date so that there is less risk of causing obstructions to people with disabilities.
- Long-term, consideration for cable management systems, automatic connection devices, and wireless charging can help mitigate issues. Lightweight charging cables are preferable.
- Mobile applications must also meet accessible communication feature requirements.

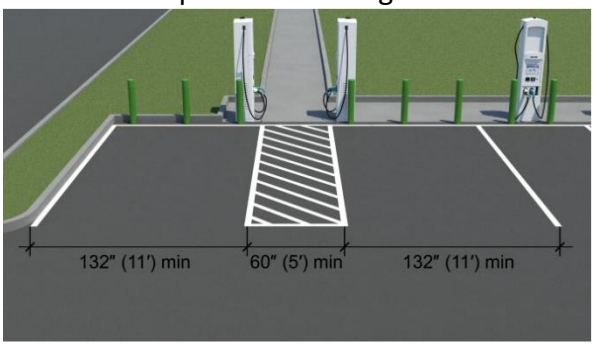


EV charging stations should comply with technical requirements for floor and ground surfaces, clear floor, or ground space, reach ranges, operable parts, and accessible routes.

- The clear floor or ground space should be level (2 percent maximum slope) around the charging station and should have an accessible route from the parking space.
- EV charging stations and parking spots are required to have enough space around the parking space and station that someone with a disability can get out of their car, go to the charging station, and be able to bring the connector back to their car even if their inlet is on the opposite side from which they exited.
- A parking lot should have a reasonable amount of EV chargers that must be physically accessible by people with a disability within the space itself, which includes the size of the charging space, access aisles, how and where the charger is located, and the physical operability of the charger itself.
- The vehicle charging spaces must be at least 11 feet wide and 20 feet long with an adjacent access aisle at least 5 feet wide.

[22] United States Access Board Design Recommendations for Accessible Electric Vehicle Charging Stations

- The access aisle must not be blocked or obstructed by curbs, wheel stops, bollards, or charging cable slack.
- Maximum slope of floor and ground surfaces should not exceed 2 percent.



Within a site, ADA parking spaces must connect from an accessible route to an accessible entrance for the building/facility on the same site. This requirement also applies to Accessible Electric Vehicle Charging Spaces.

The USAB is currently soliciting comments from the public related to the minimum number of chargers that must be accessible at EV charging stations. The following approaches are identified in the current design recommendations:

- A minimum number based on the table in 208.2 of the ADA Standards[23] issued by the DOJ and DOT for accessible parking spaces.
- Aligning with the 2021 IBC that requires 5 percent of parking spaces.
- A "use last" approach where a higher percentage have accessible mobility features but are not reserved or restricted to people with disabled parking placards/license plates.
- A hybrid approach of "use last" and reserved (available for drivers with legal ADA placards).

Once the USAB determines the appropriate methodology through public comment for determining the number of required ADA accessible EV chargers, it is recommended that the EVSE owner follow those standards. Whenever possible, all chargers should be designed to be accessible to the maximum extent feasible.

[23] ADA Standards

X. GRANT FUNDING

There are various grants for public and private entities interested in purchasing and installing EV charging stations. The below grants have been identified and summarized. Additional resources on grants can be found on the NJDEP's Drive Green website such as current incentives and funding opportunity details[24] as well as FHWA's Alternative Fuel Corridor website[25] and in the NEVI Program Guidance[26] found on FHWA's website.

- NEVI Formula Program
- NJDEP It Pays to Plug In: NJ's Electric Vehicle Charging Grant Program
- New Jersey's 2020 RGGI eMobility Program
- PSE&G Electric Vehicle Charging Program
- CFI Discretionary Grant Program
- NJ Zero Emission Vehicle Tax Exemption
- BPU Clean Fleet EV Incentive Program
- BPU Charge Up New Jersey
- NJDEP MHD Electrification Grants
- NJ EDA Zero Emission Vehicle Incentive Program (NJ ZIP)
- NJ Clean Cities Coalition
- Private Sector Investment

National Electric Vehicle Infrastructure Formula Program

The U.S. Department of Transportation's (DOT) FHWA NEVI Formula Program will provide funding to states to strategically deploy EV charging stations and to establish an interconnected network to facilitate data collection, access, and reliability. Funding is available for up to 80 percent of eligible project costs, including:

- The acquisition, installation, and network connection of EV charging stations to facilitate data collection, access, and reliability.
- Proper operation and maintenance of EV charging stations.
- Long-term EV Charging station data sharing.

The NEVI program is currently working at the state level with states and DOTs to prioritize AFC's. If a state and DOT determine that all AFCs in the state have been fully developed, then the state can propose alternative public locations and roads for EV charging station installation[27] .

[24] NJDEP New Jersey Electric Vehicle & Charging Infrastructure Incentives Summary
[25] FHWA's EV Funding Report 2022
[26] NEVI Formula Program Guidance
[27] New Jersey Electric Vehicle Infrastructure Deployment - Request for Information

NJDEP It Pays to Plug In: NJ's Electric Vehicle Charging Grant Program

This program receives funding from various funds to provide grants that offset the cost of purchasing and installing EV charging stations in hopes to expand NJ's growing network of EV infrastructure. This expansion is hopefully taking place, allowing residents, businesses, and government agencies to purchase and drive EVs. The eligible parties to apply for this grant are businesses, governments, non-profit organizations, and educational institutions. The application for Level 1/L2 chargers is accepted on an ongoing basis while DCFC applications are only accepted during competitive solicitation periods.

New Jersey's 2020 RGGI eMobility Program

This program receives funding from the proceeds of New Jersey's 2020 RGGI auction, which provided approximately $5 million for eMobility projects. These funds are received to help with the cost of a proposed project that will benefit low- to moderate-income communities disproportionately impacted by air pollution through carshare and ride-hailing programs, electric taxis, shuttle services EV charging stations, and more. This is an annual grant opportunity.

PSE&G Electric Vehicle Charging Program

The PSE&G Clean Energy Future-Electric Vehicle Charging Program are awarded to applicants for residential smart charging, L2 mixed-use commercial charging, and public DCFC. If a customer is accepted to receive the residential smart charging grant, customers are eligible for an on-bill credit of up to $1,500 towards the cost of upgrading CSMR assets for the installation of a residential L2 smart charger. If there are any customer costs associated with upgrading services, customers are eligible for a reduction of up to $5,000 in any required customer deposit for USMR work performed by PSE&G. If a customer is accepted to receive the L2 mixed-use commercial charging grant, customers are eligible for an on-bill credit up to $30,000 towards the cost of upgrading CSMR for the installation of commercial L2 smart chargers. If there are any customer costs associated with upgrading services, customers are eligible for a reduction of up to $10,000 in any required customer deposit for USMR work performed by PSE&G.

If a customer is accepted to receive the public DCFC grant, customers are eligible for an on-bill credit of up to $100,000 per site towards the cost of upgrading CSMR for the installation of DCFC chargers. If there are any customer costs associated with upgrading services, customers are eligible for a reduction of up to $50,000 in any required customer deposit for USMR work performed by PSE&G. These same customers may be eligible for Demand Change Rebates to help lower electricity costs.

CFI Discretionary Grant Program

The new CFI Discretionary Grant Program established by the IIJA will provide $2.5 billion over five years to strategically deploy EV charging infrastructure and other fueling infrastructure projects in urban and rural communities. The Biden-Harris Administration announced on February 15, 2023, that cities, towns, tribes, and states will soon be able to apply for the first round of $2.5 billion in competitive grants to build EV charging stations.

NJ Zero Emission Vehicle Tax Exemption

The New Jersey Zero Emission Vehicle Tax Exemption Program provides an annual sale and use tax exemption in weight classes 1-8 to approved applicants. For an applicant to be eligible for the tax exemption, they must have a vehicle that is a certified pursuant to the California Air Resources Board zero emission standards for the model year. The tax exemption no longer applies to hybrid vehicles, only fully EVs that are bought, leased, or rented new or used on or after May 1, 2004.

BPU Clean Fleet EV Incentive Program

The BPU Clean Fleet EV Incentive Program is an annual program that provides grants towards EVs purchases and charging stations. Local and state government parties in New Jersey can apply. The three grants in this program currently include a $4,000 grant towards the purchase of BEVs, a $5,000 grant for public L2 chargers, and a $4,000 grant towards the purchase of a fleet L2 EV charging station(s). There are award caps based on population for this grant program. If the applying state and local governments, entities, and schools have a population less than 20,000 there is a two-vehicle maximum, if the population is between 20,000 and 50,000 there is a five-vehicle maximum, if the population is between 50,000 and 100,000 there is a seven-vehicle maximum, and if the population is more than 100,000 then there is a 10-vehicle maximum. Along with award caps, overburdened municipalities are eligible for bonus incentives.

BPU Charge Up New Jersey

The BPU Charge Up New Jersey Program provides incentives for light-duty EVs and at-home electric charging infrastructure. New Jersey residents can take advantage of the incentive at participating car dealerships and showrooms when purchasing or leasing a new eligible zero-emission vehicle that has a manufacturer suggested retail price (MSRP) less than $55,000. If the vehicle has an MSRP of $45,000 or less, the applicant is eligible for $25 per all-electric mile up to $5,000, and if the vehicle has an MSRP between $45,000 and $55,000, the applicant is eligible for $25 per all-electric mile up to $2,000.

NJDEP Medium Heavy Duty (MHD) Electrification Grants

The NJDEP is annually providing funding to 12-16 statewide projects that plan to replace diesel vehicles with EVs. For an applicant to be deemed eligible for the funding, the project must be replacing a diesel local government vehicle, a local government school bus, or a privately owned school bus that is in contract with a public school district. This purchase incentive covers all of the incremental cost of the EV that will be replacing the medium- and heavy-duty diesel vehicle along with the cost of the charging infrastructure needed. Once the diesel vehicle is replaced by an EV, the vehicle that is being replaced can no longer be used.

NJ EDA NJ ZIP

The NJEDA is using the proceeds that were allocated from New Jersey's RGGI to create the NJ EDA NJ ZIP. This incentive program is providing vouchers with base values ranging between $20,000 to $175,000 to eligible purchasers and vendors. The eligible purchasers and vendors must be in the greater Camden,

greater Newark, greater New Brunswick, and greater Shore area. The voucher is given to businesses and institutions that are purchasing new medium-dutyZEVs. The base value of the voucher awarded to an applicant is determined off of the Gross Vehicle Weight Rating (GVWR). There are also bonuses that an applicant can be eligible for that can be stacked and added to the base voucher value.

NJ Clean Cities Coalition

NJ Clean Cities supports clean energy programs through grants and by connecting members to grant opportunities, working closely with organizations like the State, NJDEP, NJ EDA, and BPU. This coalition is a strong organization to be a member of if an applicant is interested in finding outside funding for installation of EV charging stations and other clean fuel projects.

Private Sector Investment

When feasible, the County and their municipalities might consider public-private partnerships or support private sector investment in EV charging stations. Consideration should be made to reduce barriers to installation and deployment by streamlining point of contact and installation procedures. Standardization of design and construction protocols would assist local entities in reviewing EVSE deployment and reduce planning board/zoning board approval red tape at the local level. Installation along state highways and turnpikes, within service areas for instance, allows a streamlined point of contact within those entities, but when looking to install EVSE in non-public owned/agency owned areas, it would be prudent for deployment to be managed by the County or municipality to prevent barriers at time of application review.

Grant Writing Sample

The final report can be utilized as a tool and reference in obtaining grant funding. By referencing this Study, applicants can demonstrate data-backed analysis was performed for their proposed charging station. The grant writer can reference the maps presented in this Study with site-specific information in the Study's accompanying Suitability Map.[28] Below is a sample project description that can be used by an applicant to site portions of this Study:

(#) EV Charging stations are proposed with *(#)* plugs for charging vehicles at *(Name and Address of Project Site, Municipality, County).* Charging stations shall be *(DC Fast or L2).* The project site was selected based upon review of "Union County's Electric Vehicles Infrastructure Study" completed in 2023 with funding from the North Jersey Transportation Planning Authority. The goal of the Study was to plan the County-wide deployment of EV charging stations to encourage EV adoption by ensuring reliability and equitable distribution of chargers. The County established suitability scoring criteria in the range of 0 to 500 points, 301 to 500 points being considered most suitable and the highest priority for installation. The project

[28] www.ucnj.org/ev-study/interactivemap

site has an overall suitability score of *(Suitability Score).* The following variables have been considered *(grant writer should identify the site-specific information of the list below and provide descriptions/detail where applicable):*

1. Site Selection
    a. Composite Equity Score
    b. General Description of Zoning/Land Use:
2. Single-Family Residential
3. Multi-Family Residential
4. Commercial
5. Industrial
6. Mixed Use
7. Conservation and Open Space
8. Municipal/Government Use
9. Office/Professional
10. Recreational/Cemetery
11. Education
12. Health Care
13. Redevelopment Zone
    a. # of Existing Chargers on Site
    b. Site Visibility
    c. Site Safety
    d. ADA Accessibility of EV Charging Parking Space, Access Route, and Charger Equipment
    e. Shovel Ready
        i. Existing, Proposed, or Planned (Approved by Planning Board) Parking Lot
        ii. Review of potential conflicts
            1. Environmental Permitting
            2. Utility Impacts/Relocation
            3. Power Supply Availability
14. EV Network Gap
    a. Traffic Volume of Adjacent Roadways
    b. Trip Origin/Destination Volumes Anticipated
    c. Demand Discussion (Anecdotal or quantitative evidence that EV Chargers are needed at this site)
    d. Gap Discussion: Distance from the Nearest Charging Stations

15. Implementation
    a. Equipment Selected
    b. Pricing Model
    c. Charger Requirements
    d. Number of Chargers
    e. Electrical Service for Chargers
    f. Networked or Not Networked
        i. Identify Proposed Network Service Providers Considered.
    g. EVSE Ownership
    h. Design Support
        i. Is the Project Designed and Ready To Bid?

XI. NEXT STEPS

The suitability model provides direction to focus investment on EVSE. The model, as highlighted in Section VII, accounts for various factors identified by the project stakeholders. The municipal review and mapping above help the County, municipalities, developers, and private investors, to determine where to prioritize charging locations. While investment in EV charging is needed throughout the County and the study considered a balanced approach to weighting the factors, the results reveal an initial focus on high trip destinations and proximity to AFC would benefit most from initial deployment of public charging stations.

Next steps include the County sharing the municipal maps with each municipality, as well as working with the priority communities that were identified as high in suitability. Also important is to identify where the County can provide charging opportunities for their own fleet and staff, as well as reviewing potential public charging locations at County owned facilities such as parks, parking lots, parking garages, and administrative buildings.

This study helped identify the number of chargers needed to meet the NEVI goals. Implementation of the State P.L. 2021, c. 171 model ordinance by all municipalities and the County will ensure EV charging is considered for future developments and to accommodate future growth.

The County will continue to maintain EV guidance resources and funding opportunities on their website, www.ucnj.org/ev-study to assist municipalities and the community on evolving trends, policies, and best practices.

APPENDIX A

Survey, Map Questions and Responses

MEMORANDUM

To: Sara Irick

From: Hannah Brockhaus

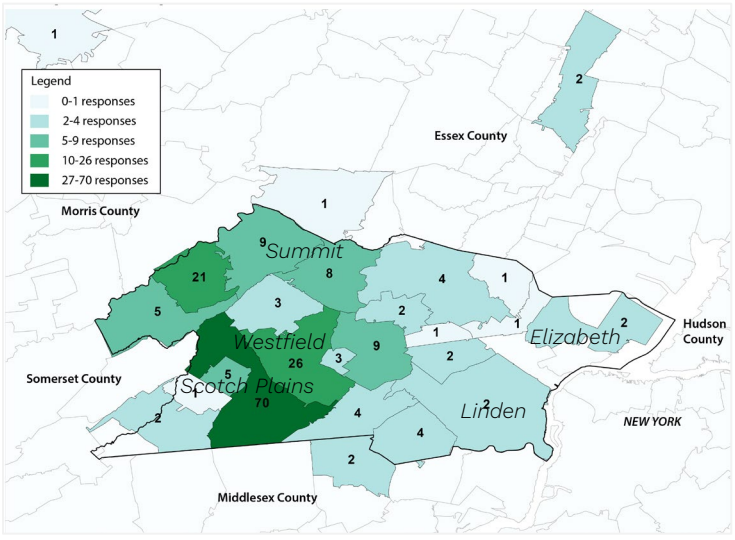
Date: 1/27/2023

Project: P1878 Union County Electric Vehicles Infrastructure Study

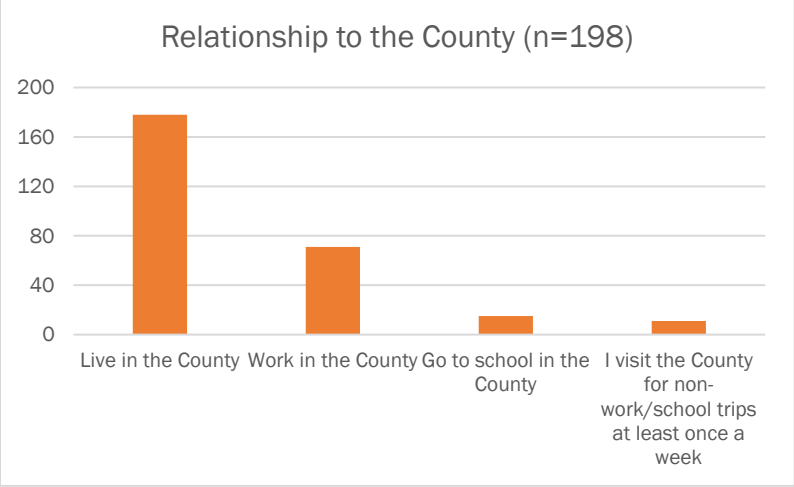
Subject: **Survey and Interactive Map Results**

QUESTIONS AND ANSWERS

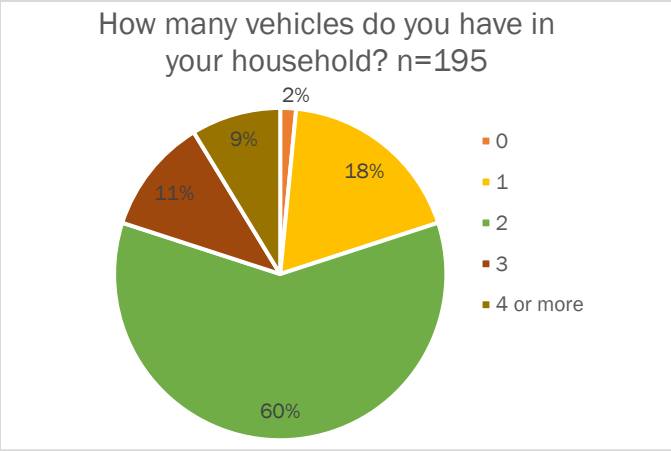
Questions 1- 2: Relationship to the County



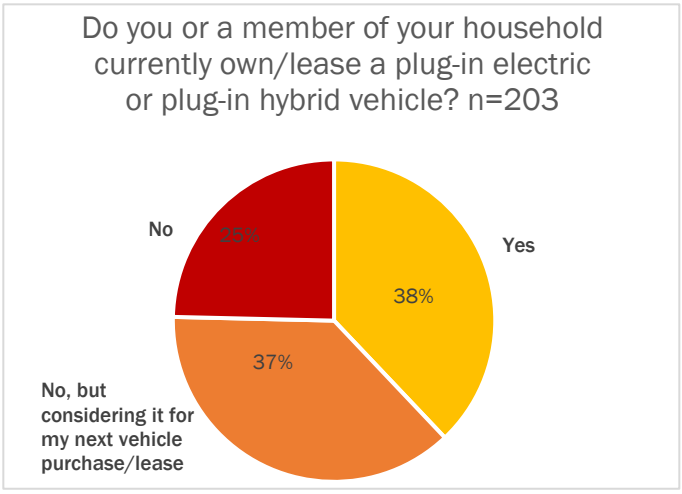
Most respondents were concentrated in the western portion of the county, with the top three respondents being 07076, 07090, and 07974. Nearly all respondents live or work in the county.

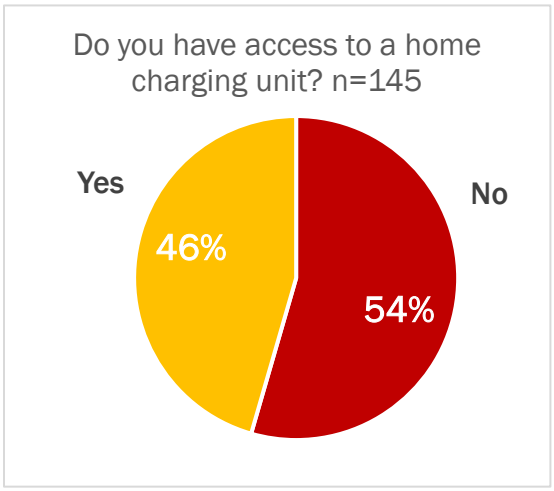


Questions 3-7: Vehicle Access, EV Use, Home Charging Access, and Perspectives on EVs



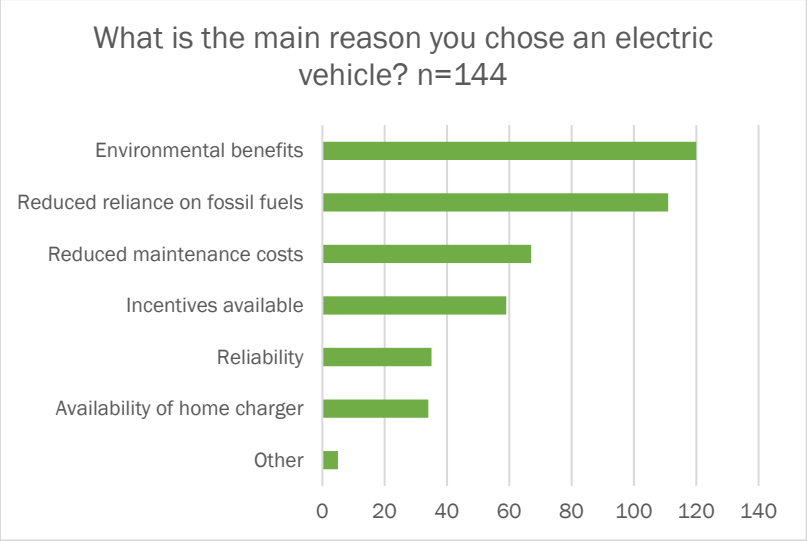
Nearly all respondents had access to a vehicle in their household, with the majority having 2 cars per household. Only about a third of respondents already owned an electric vehicle. Another 37 percent were considering it for their next purchase or lease, and 25 percent were not. Most respondents who are currently EV owners have access to a home charger, but most who were considering a future EV purchase or lease do not (yet) have home chargers.



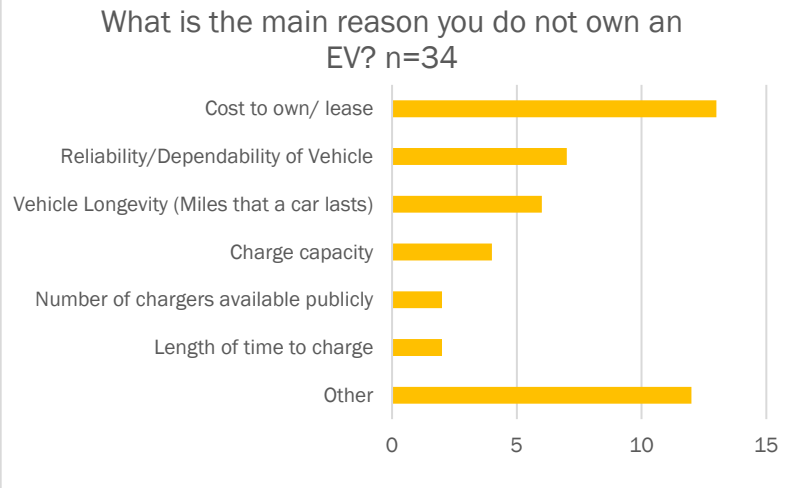


Participants who selected yes or considering it for the next vehicle purchase were asked about access to a home charge.

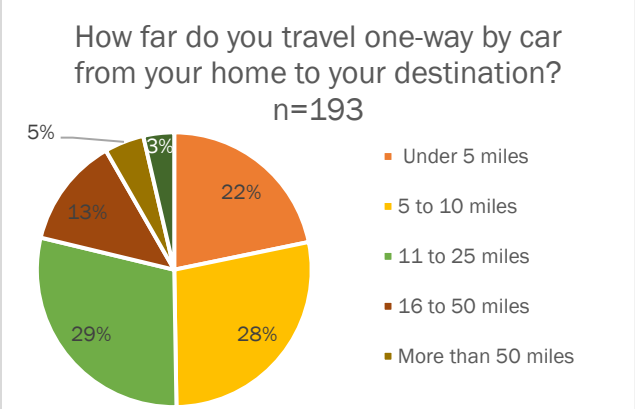
Additionally, questions asked about the reasons participants had or had not purchased (or leased) an EV. EV owners/leasers prioritized environmental benefits and reduced reliance on fossil fuels, whereas cost to own/lease was the top priority for non-EV owners/leasers.



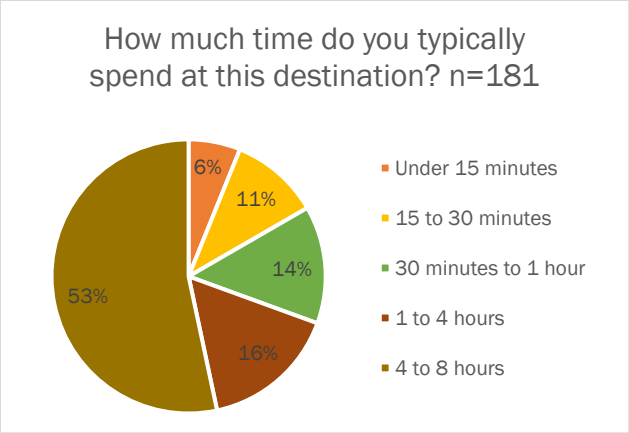
Number of selections across all responses; participants could select multiple responses.



Question 8: Typical Trip Pattern



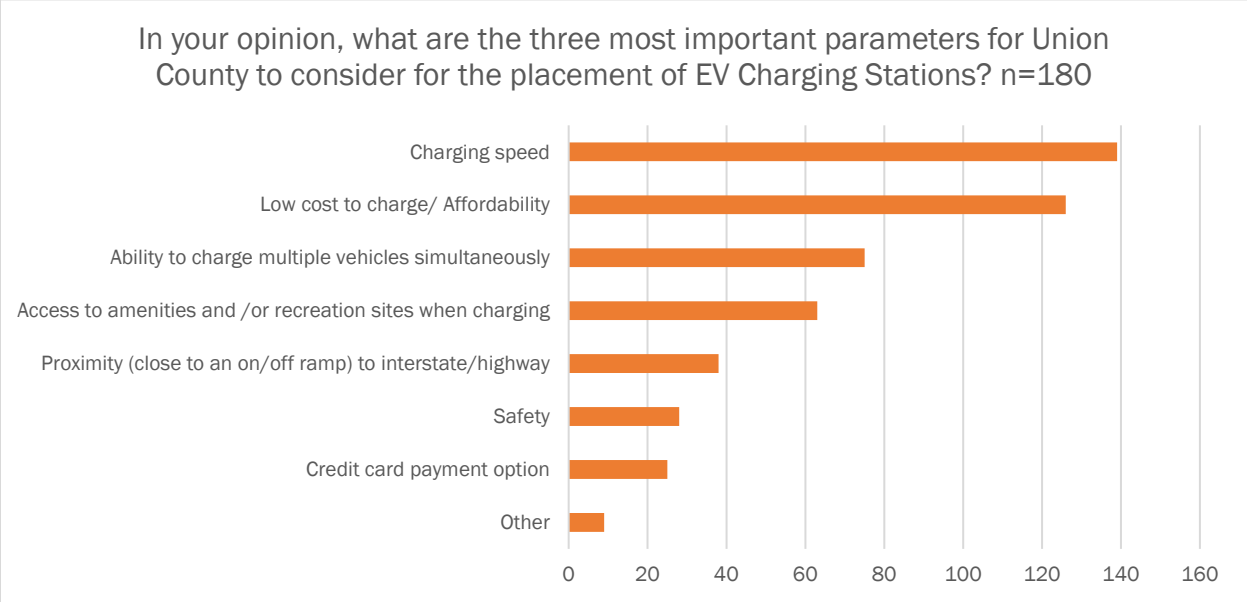
In order to gather more detail about trip patterns, respondents were asked a series of questions about a common daily trip. These included travel distance and dwell time. About one-quarter of responses traveled less than 5 miles away; with about another quarter traveling 5-10 miles, and a third-quarter



traveling 11-25 miles. This is somewhat expected. Of note, only 3% of respondents said that they work or go to school from home. Over half of the respondents described a trip to a destination where they spend a significant portion of their day (4 to 8 hours).

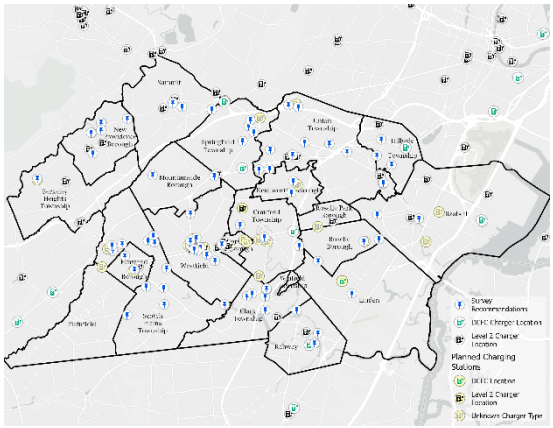
Question 9:

Respondents were also asked about the parameters to prioritize for the network of charging locations. Charging speed and affordability were of critical importance.

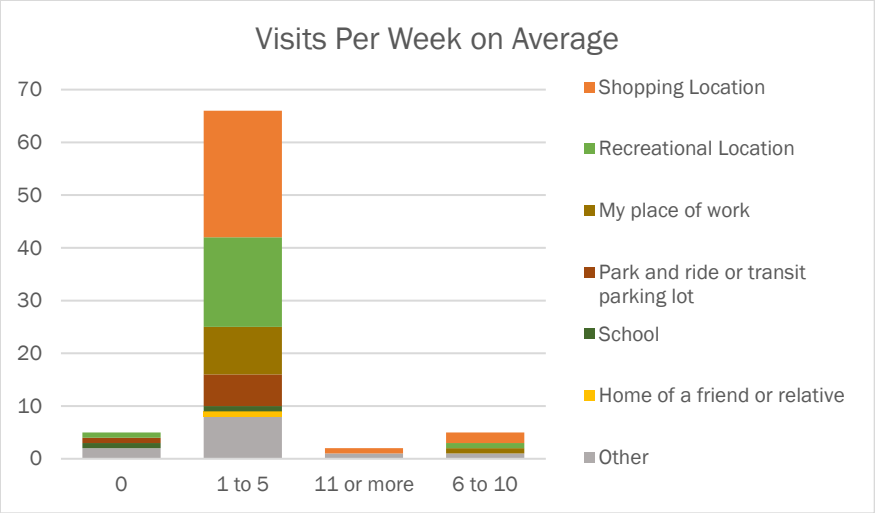


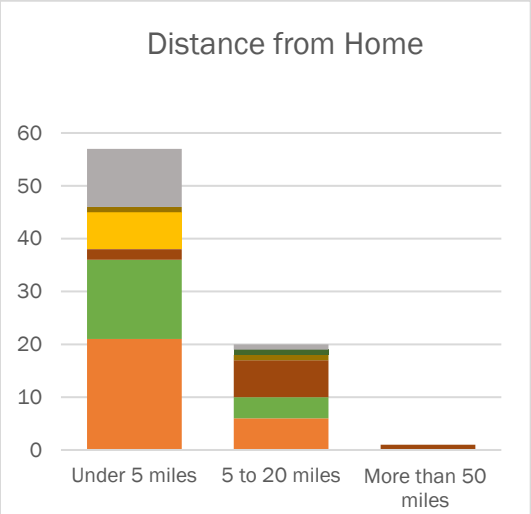
Interactive Map

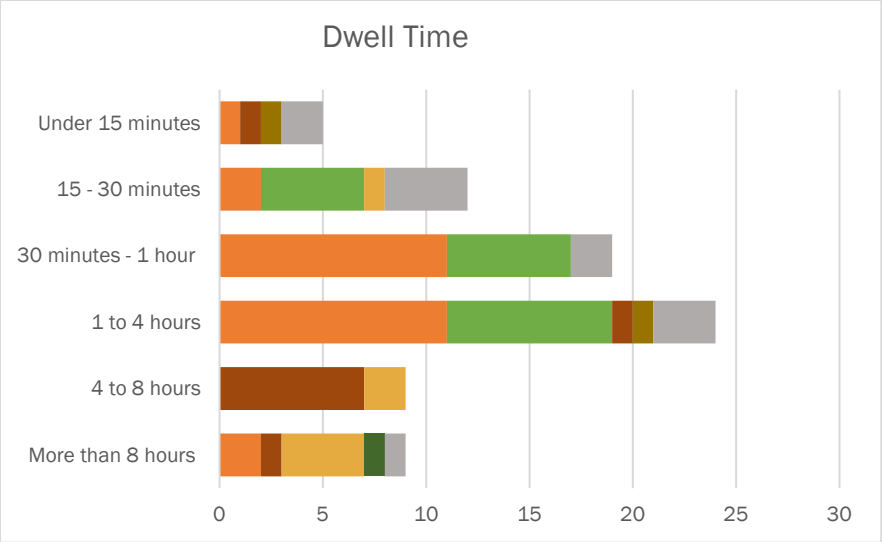
A number of locations were flagged, including shopping, recreational, work, and school locations. Respodents were asked about the dwell time, distance from home, and frequency of visits to these locations.



Respondents selected locations, with the context of existing and planned charging locations.



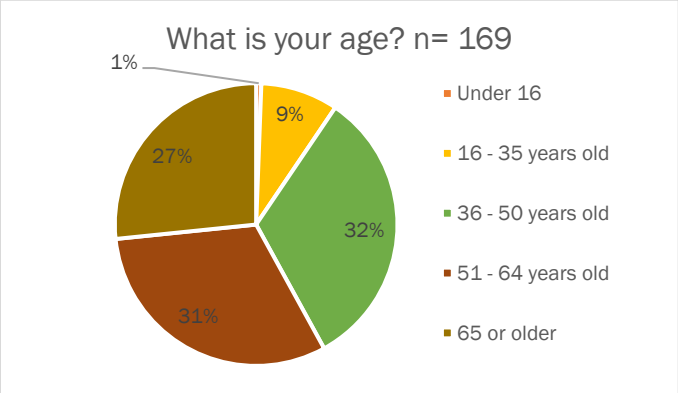


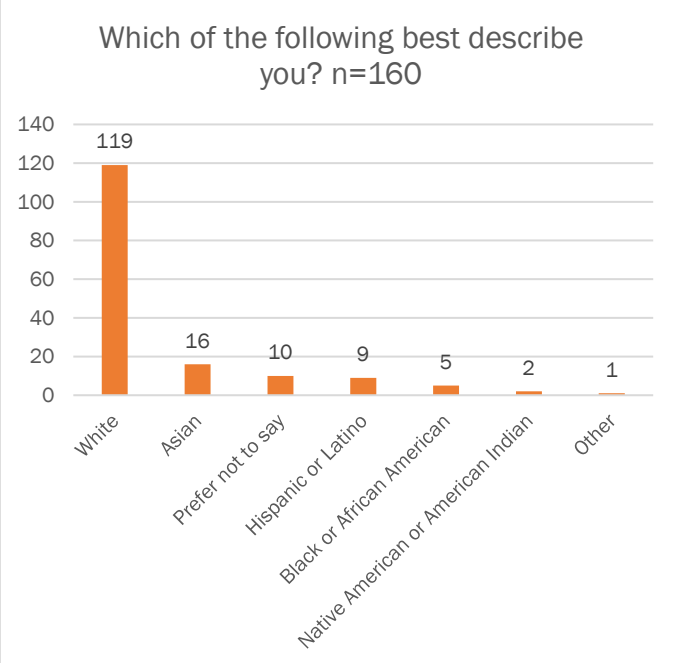


Results demonstrated that most locations highlighted were visited at least once a week, highlighting the importance of the locations.

Most locations were under 5 miles from home. Almost no locations were suggested that were more than 50 miles away.

Questions 11- 13: Demographics





The demographic data collected suggests that the survey overrepresented white, English-speaking populations and seniors. According to U.S. Census Bureau, Population Estimates Program, white-only residents comprise 66 percent of the population of Union County, compared to 74 percent of survey respondents. Additionally, according to the same source, residents over 65 comprise 14.9 percent of the County, compared to 27 percent of the survey respondents.[1]

As a study focused on electric vehicles, it is expected that children under 16 would be underrepresented, since they are not legally allowed to drive. It is not uncommon for planning surveys to overrepresent older populations as they tend to be engaged residents of their communities. Younger people, especially 36- to 50-year-olds but also people over 65, were especially motivated by environmental benefits and reduced reliance on fossil fuels, to purchase EVs. For most questions, responses did not differ substantially among various age or race groups.

[1] Quick Facts Union County New Jersey; New Jersey. Census Bureau. Accessed December 21, 2022. https://www.census.gov/quickfacts/fact/table/unioncountynewjersey,NJ#

APPENDIX B

Technical Advisory Committee (TAC)

Union County Electric Vehicles Infrastructure Study
Technical Advisory Committee Membership

Name	Affiliation
David Biunno	Borough of Roselle, Grant Writer
Jin Blade	City of Summit, Assistant Director, Department of Community Services and Engineering
Jennifer Blumenstock	Borough of Garwood, Council President
Steve Brodman	City of Linden, Department of Community Services, Division of Engineering
Andrew Casias	Roselawn Park
Nicole Castelluchi	Confidential Secretary, Clark Township
Bernedette Cuccaro	Borough Administrator, Borough of New Providence
Terrence Currance	Cranford Township, Green Team
Eric Derer	Facilities Planner, NJ Transit
Manuel Figueiredo	Union Township
Haley Graff	NJ Transit
James Gildea	Town of Westfield, Town Administrator,
Phillip Haderer	Union Township,Asst. Municipal Engineer (Colliers)
Delia Hamlet	City of Summit, City Council
Margaret Heisey	Township of Scotch Plains, Deputy Township Manager
Nicole Iannarone	Municipal Contact, PSE&G
Bette Jane Kowalski	Union County Commissioner
Daniel Lee	City of Rahway, City Engineer
Lisa Lee	EZRide TMA, Deputy Director, Bike & Pedestrian Programs
Kent Lucas	Cranford Township, Zoning Board
Ricardo Matias	Union County, County Engineer
Tom McCarren	Office of Planning Strategies, New Jersey Department of Environmental Protection
Donald Shaw	Borough of Roselle, Mayor
Tom Strowe	Township of Scotch Plains
Antonios Panagopoulos	Borough of Fanwood, Borough Engineer
Nick Pantima	City of Linden, City Engineer
Steve Rinaldi	City of Elizabeth
Amy Wagner	Union County Deputy Manager

APPENDIX C

TAC Presentations

Union County Electric Vehicle Infrastructure Study

Technical Advisory Committee Meeting #1

September 29, 2022

Agenda

- *Introductions*
- *Study Overview*
  - *Background*
  - *Goal*
- *Work Plan and Schedule*
- *Discussion and Next Steps*

Westfield Train Station

Study Background

“The increase in hybrid and electric vehicles will require more charging stations and may reduce gasoline consumption and emissions.”

- Union County Transportation Master Plan (2016)

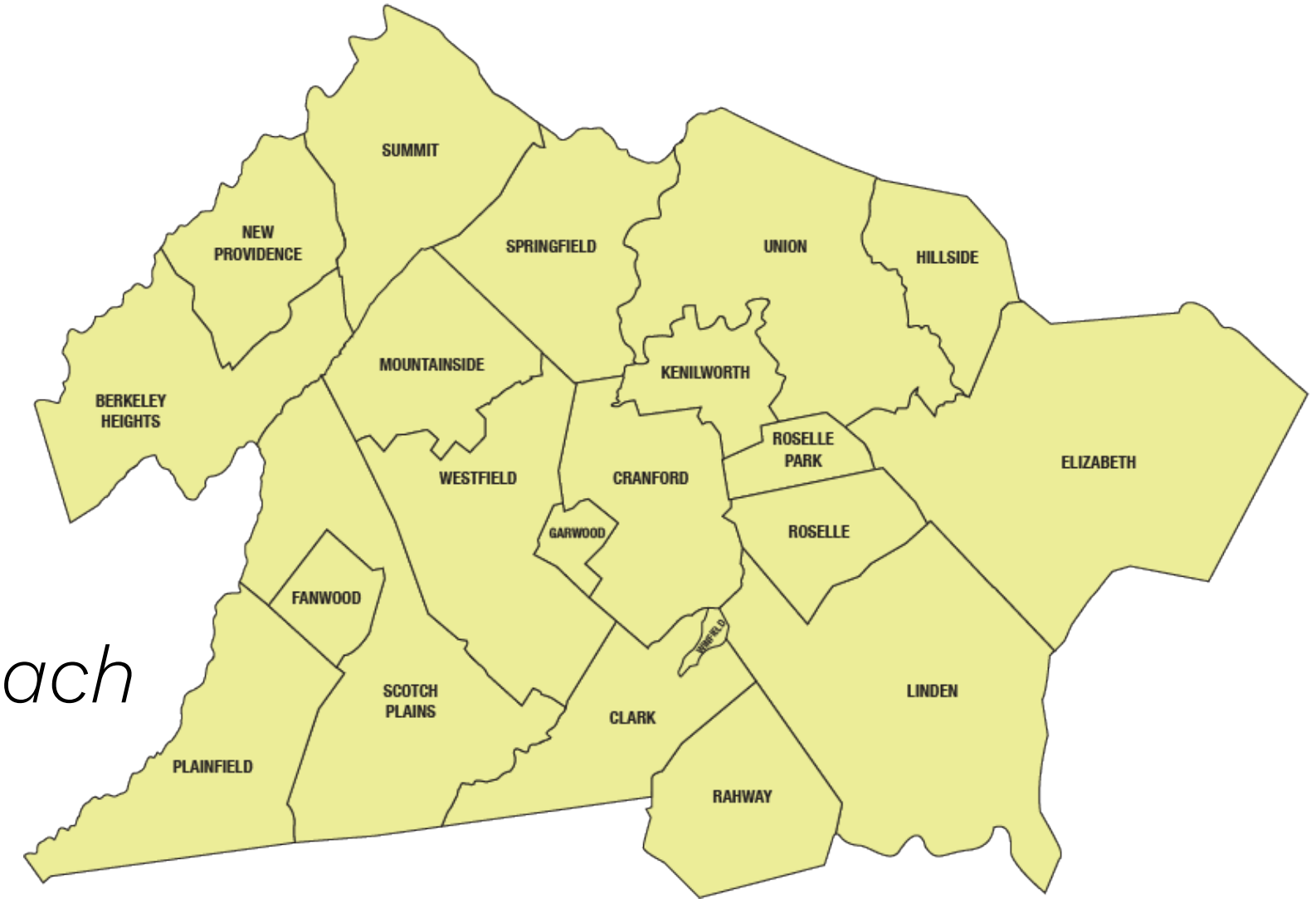
- *Electric vehicle adoption is rising in the US and New Jersey with grant funding being directed towards electrification.*
- *As electric vehicle ownership continues to grow, so will the infrastructure needed to support it.*

Study Goal

To support electric vehicle use in Union County by planning an equitable expansion of the network of electric vehicle supply equipment.

Role of Technical Advisory Committee

- *Advise the Team*
- *Feedback*
- *Community Outreach*



Outreach & Partnerships

- *Interactive map and survey*

www.fhistudio-apps.com/uc-ev-study

- *Website*

ucnj.org/ev-study

Work Plan & Schedule

Spring 2022

- *Kick-Off Study*
- *Equity assessment*

Summer 2022

- *Data collection and develop quantification of need*
- *Launch survey and interactive mapping tool*

Fall 2022

- *TAC #1*
- *Analysis Of Potential Charging Locations*

Winter 2023

- *TAC #2*
- *Public outreach meeting*
- *Study findings reported*

Spring 2023

- *Final report*

Data Collection, Analysis & Mapping

- *Equity Assessment*
- *Mapping*
- *Evaluation Criteria*
  - *a. Equity Criteria*
  - *b. Zoning/Location Type*
  - *c. Population Density*
  - *d. Traffic Volume*
  - *e. Destination Type*
  - *f. Dwell Time/Trip Duration*
  - *g. Safety*
  - *h. Proximity to Major Roadways*
  - *i. Gap in EV Charging Infrastructure*
  - *j. Power Supply*
  - *k. Recommended by Public*

Discussion

Any additional comments, thoughts, guidance for the study team?

Next Steps

- *Public Outreach Meeting*

- *Analysis of potential charging locations*

- *Contact*

Liza Betz, AICP, PP
Union County
Department of Economic Development/Division of Strategic Planning
ebetz@ucnj.org
(908) 558-2273

Thank you!

Technical Advisory Committee Meeting #1

September 29, 2022

Union County Electric Vehicles Infrastructure Study

Technical Advisory Committee Meeting #2

December 13, 2022

Agenda

- *Introductions*
- *Study Overview*
- *Survey Results*
- *Evaluation Criteria – Focus*
- *Work Plan and Schedule*
- *Discussion and Next Steps*

Westfield Train Station

Study Background

“The increase in hybrid and electric vehicles will require more charging stations and may reduce gasoline consumption and emissions.”

- Union County Transportation Master Plan (2016)

- *As electric vehicle ownership continues to grow, so will the infrastructure needed to support it.*
- *In Union County we are seeing more charging stations but not enough.*

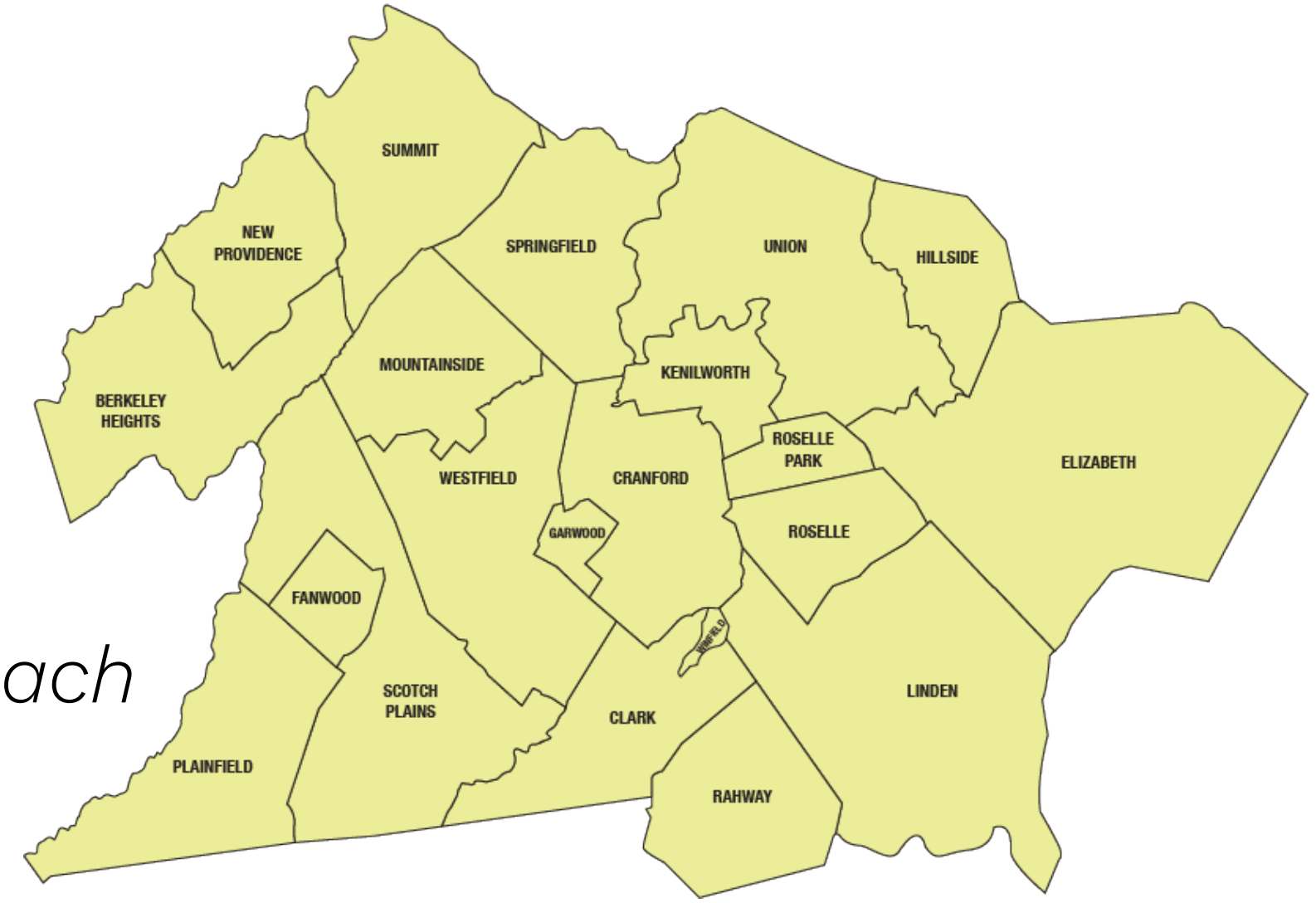
Study Goal

To support electric vehicle use in Union County by planning an equitable expansion of the network of electric vehicle supply equipment.

ucnj.org/ev-study

Role of Technical Advisory Committee

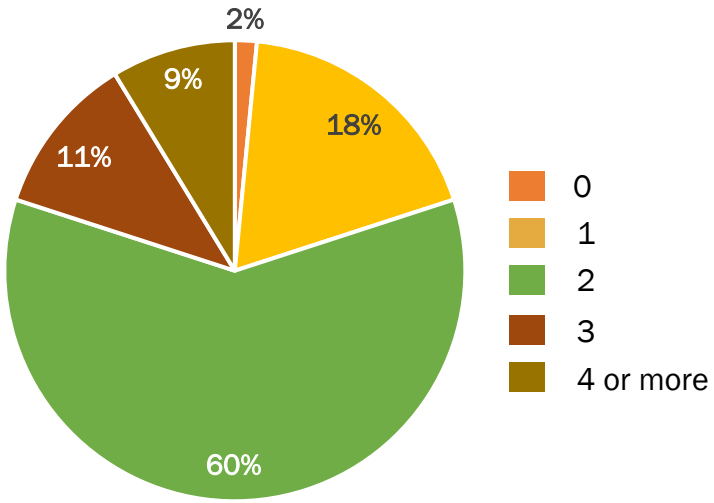
- *Advise the Team*
- *Feedback*
- *Community Outreach*



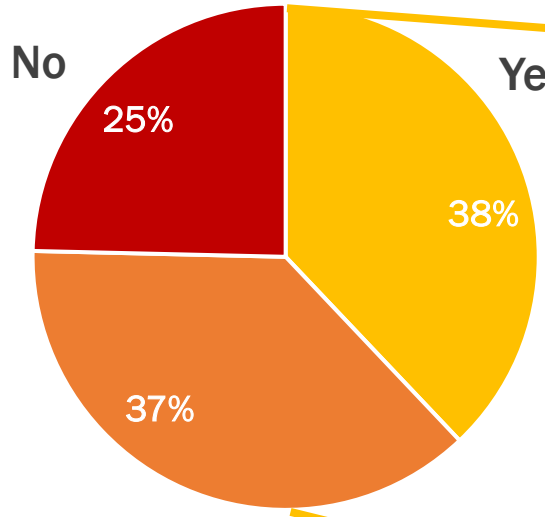
Survey Results

EV Ownership

How many vehicles do you have in your household? n=195

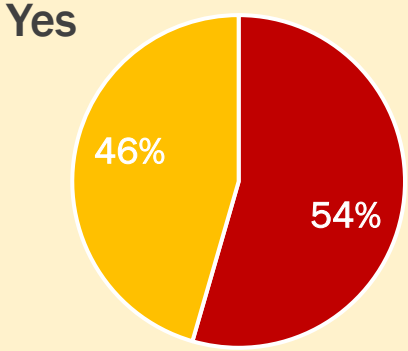


Do you or a member of your household currently own/lease a plug-in electric or plug-in hybrid vehicle? n=203



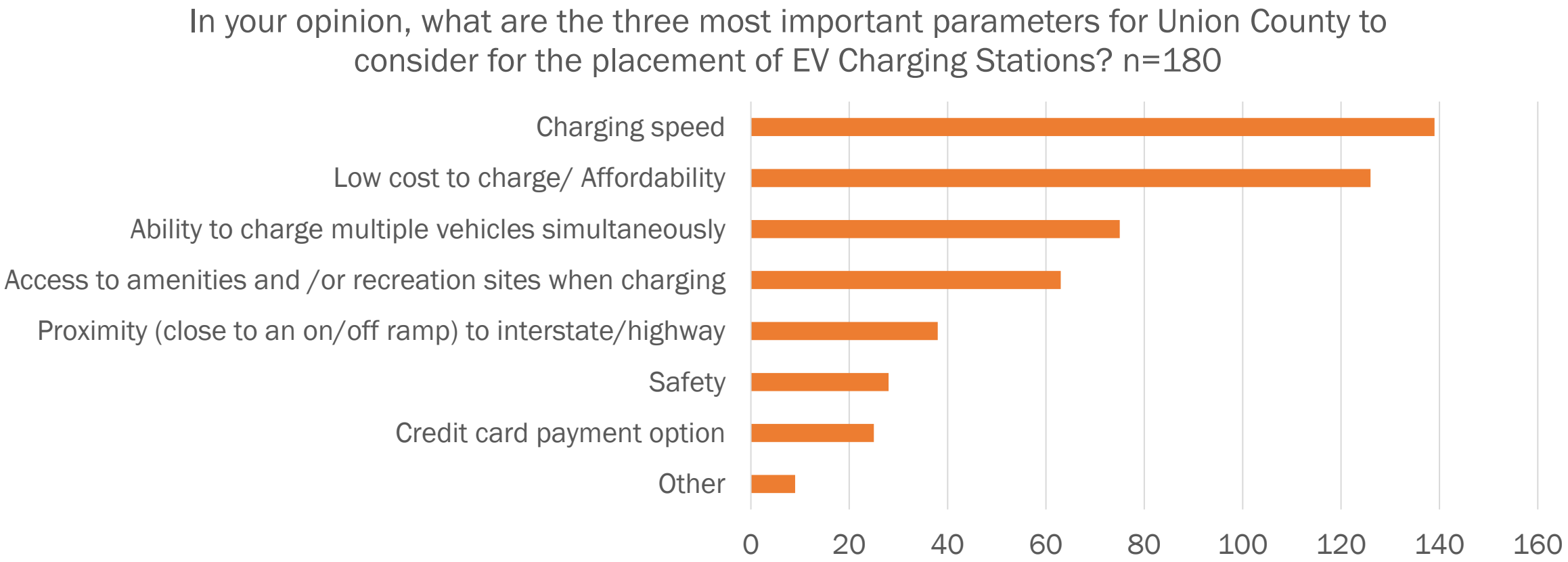
No, but considering it for my next vehicle purchase/lease

Do you have access to a home charging unit? n=145



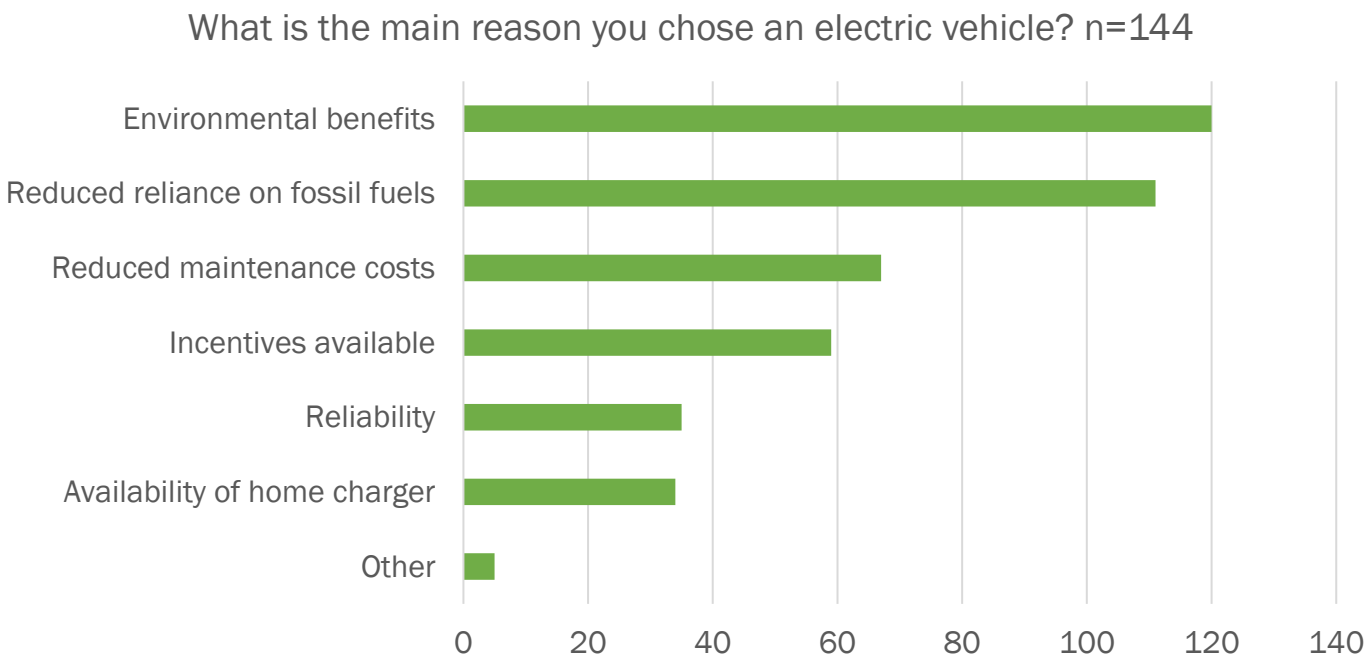
Survey Results

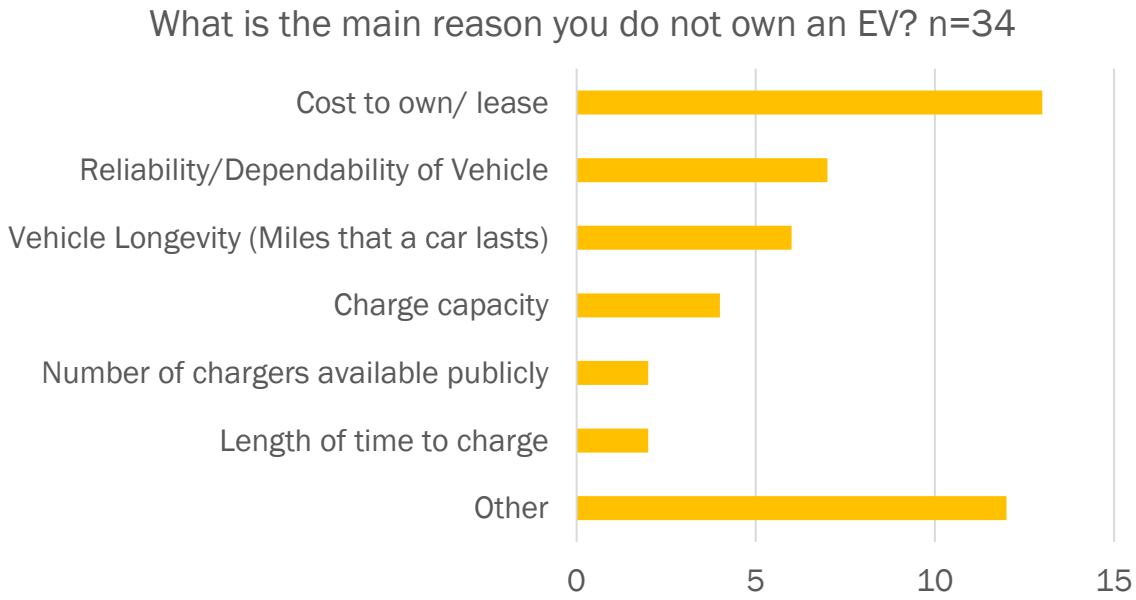
Charging Location Priorities



Survey Results

Top Priorities for Union County residents





Number of selections across all responses; participants could select multiple responses.

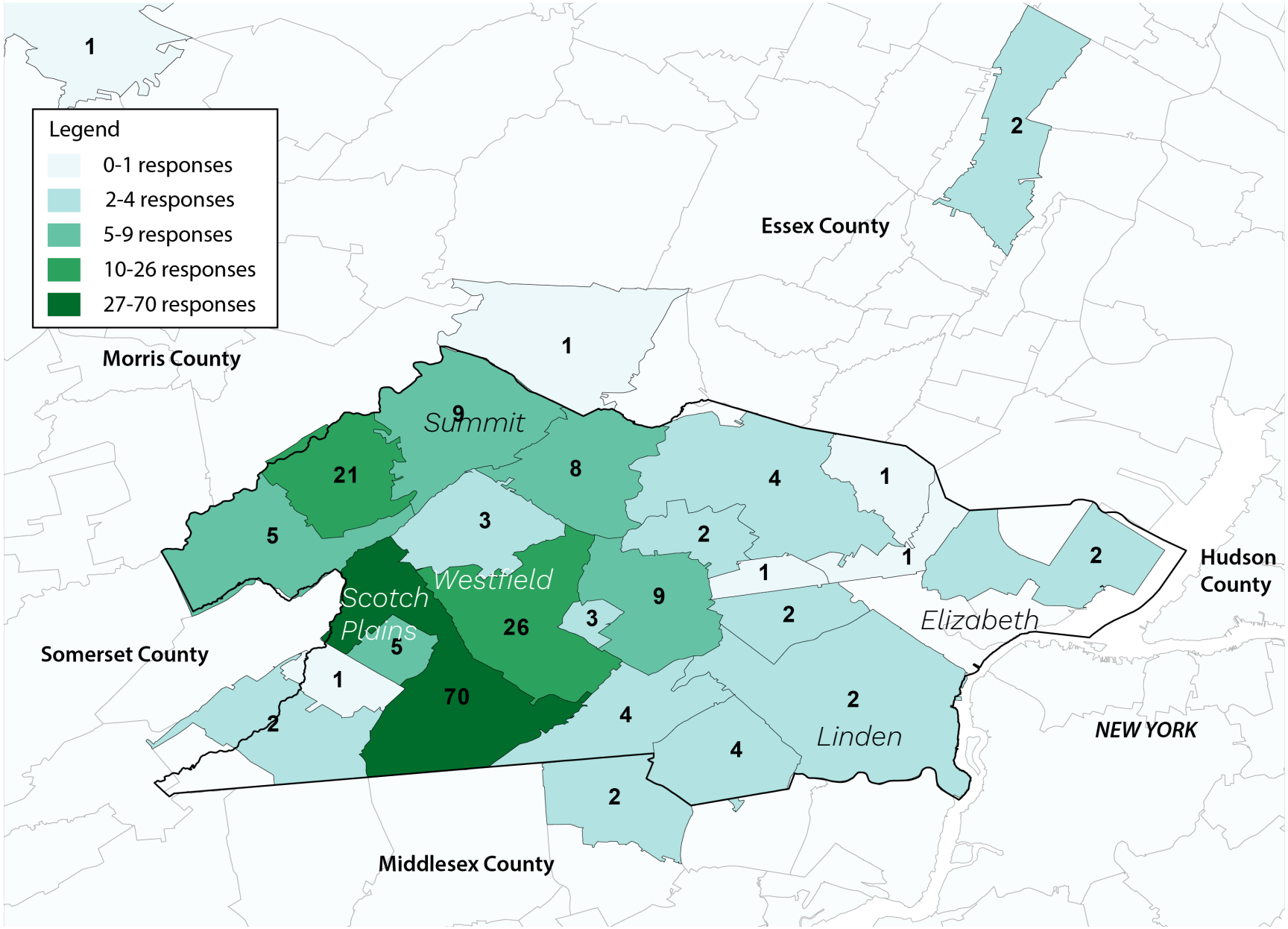
Survey

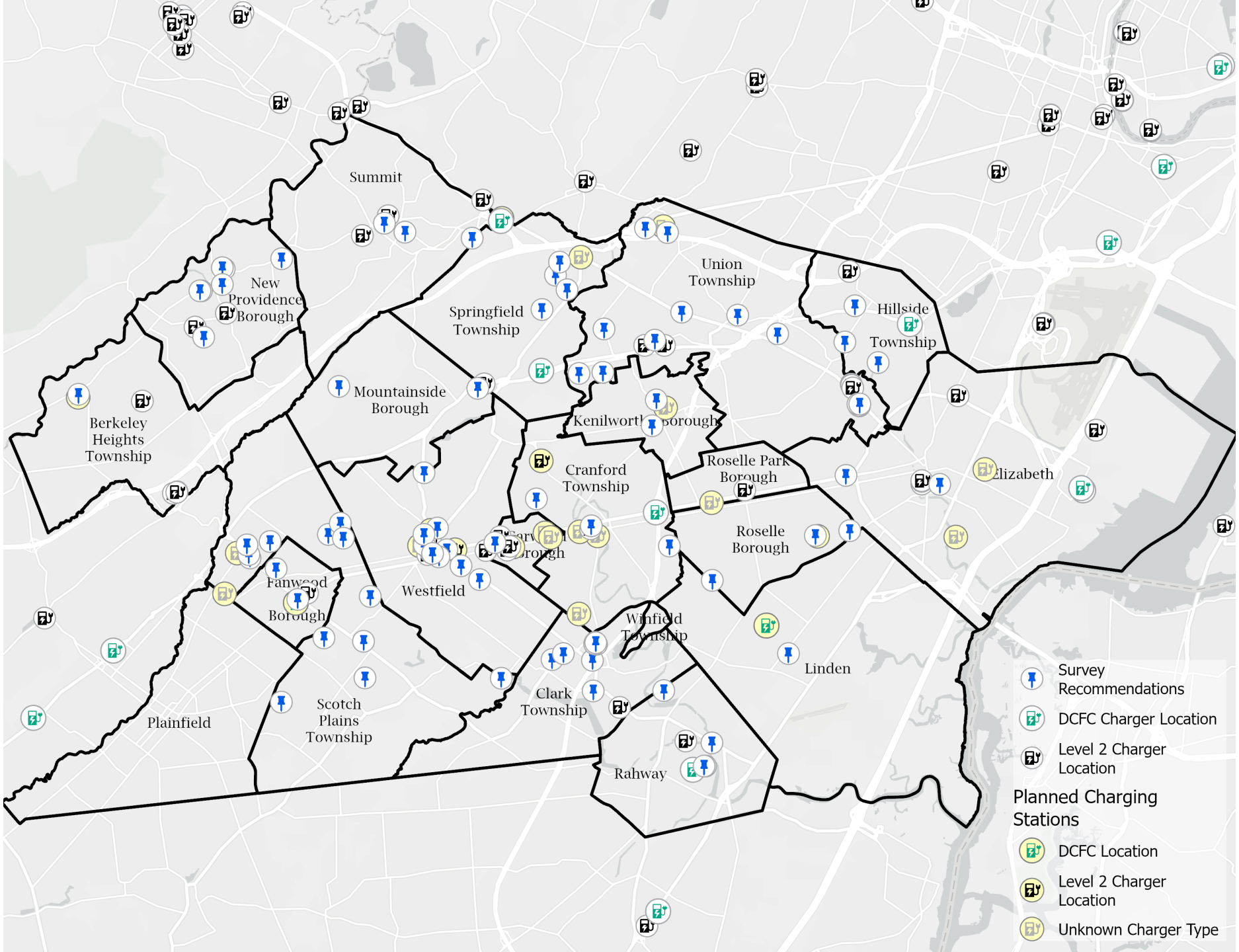
Who did we hear from?

07076 (70)
07090 (26)
07974 (21)

n=201
30 additional zipcodes of less than 10 participants each

Respondent Zip Codes



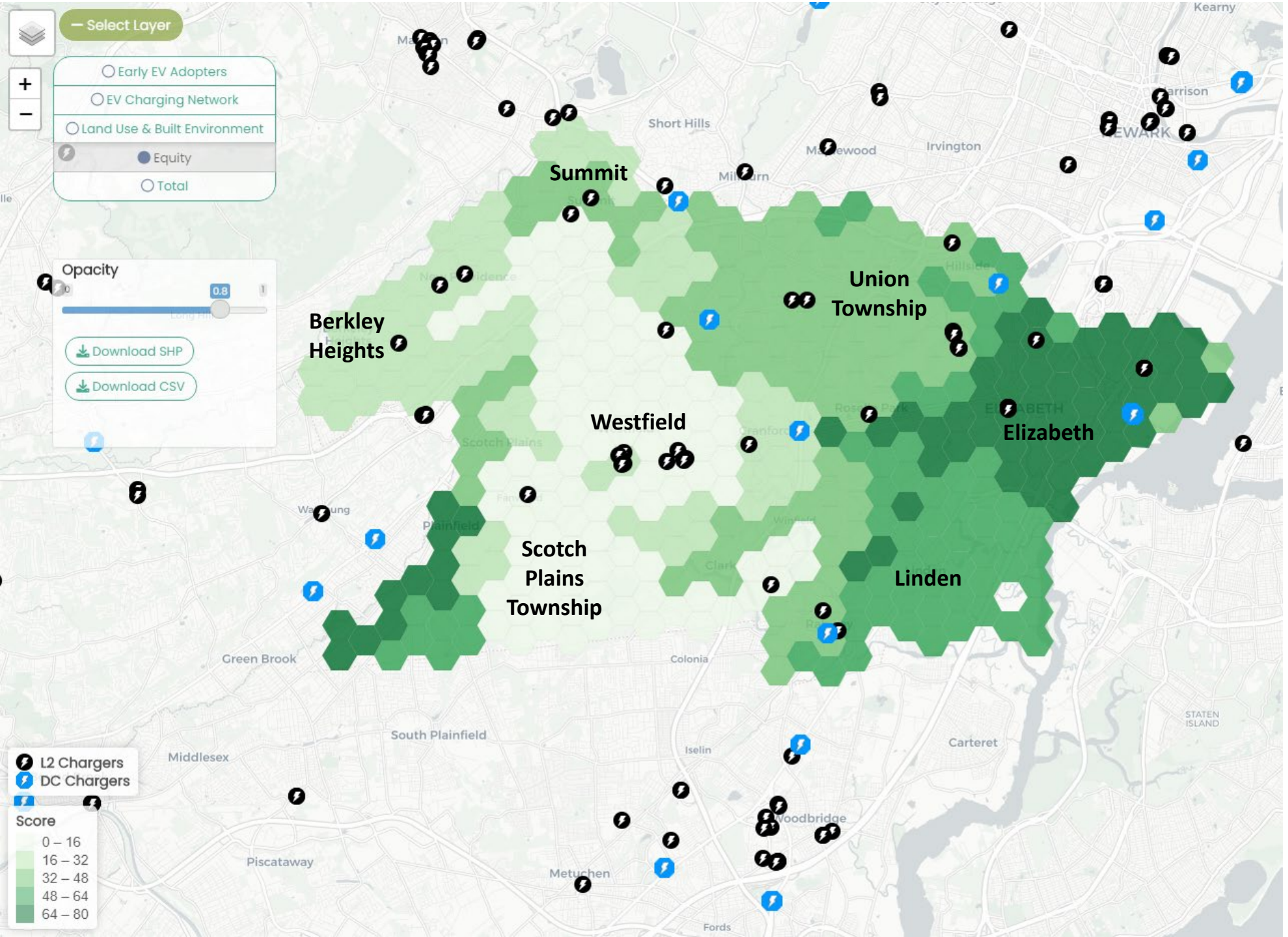

Summit
New Providence Borough
Springfield Township
Union Township
Hillside Township
Mountainside Borough
Berkeley Heights Township
Kenilworth Borough
Cranford Township
Roselle Park Borough
Roselle Borough
Elizabeth
Fanwood Borough
Westfield
Winfield Township
Linden
Clark Township
Scotch Plains Township
Plainfield
Rahway
Survey Recommendations
DCFC Charger Location
Level 2 Charger Location
Planned Charging Stations
DCFC Location
Level 2 Charger Location
Unknown Charger Type

Data Collection, Analysis & Mapping

- *Equity Assessment*
- *Mapping*
- *Evaluation Criteria*
  - *a. Equity Criteria*
  - *b. Zoning/Location Type*
  - *c. Population Density*
  - *d. Traffic Volume*
  - *e. Destination Type*
  - *f. Dwell Time/Trip Duration*
  - *g. Safety*
  - *h. Proximity to Major Roadways*
  - *i. Gap in EV Charging Infrastructure*
  - *j. Power Supply*
  - *k. Recommended by Public*

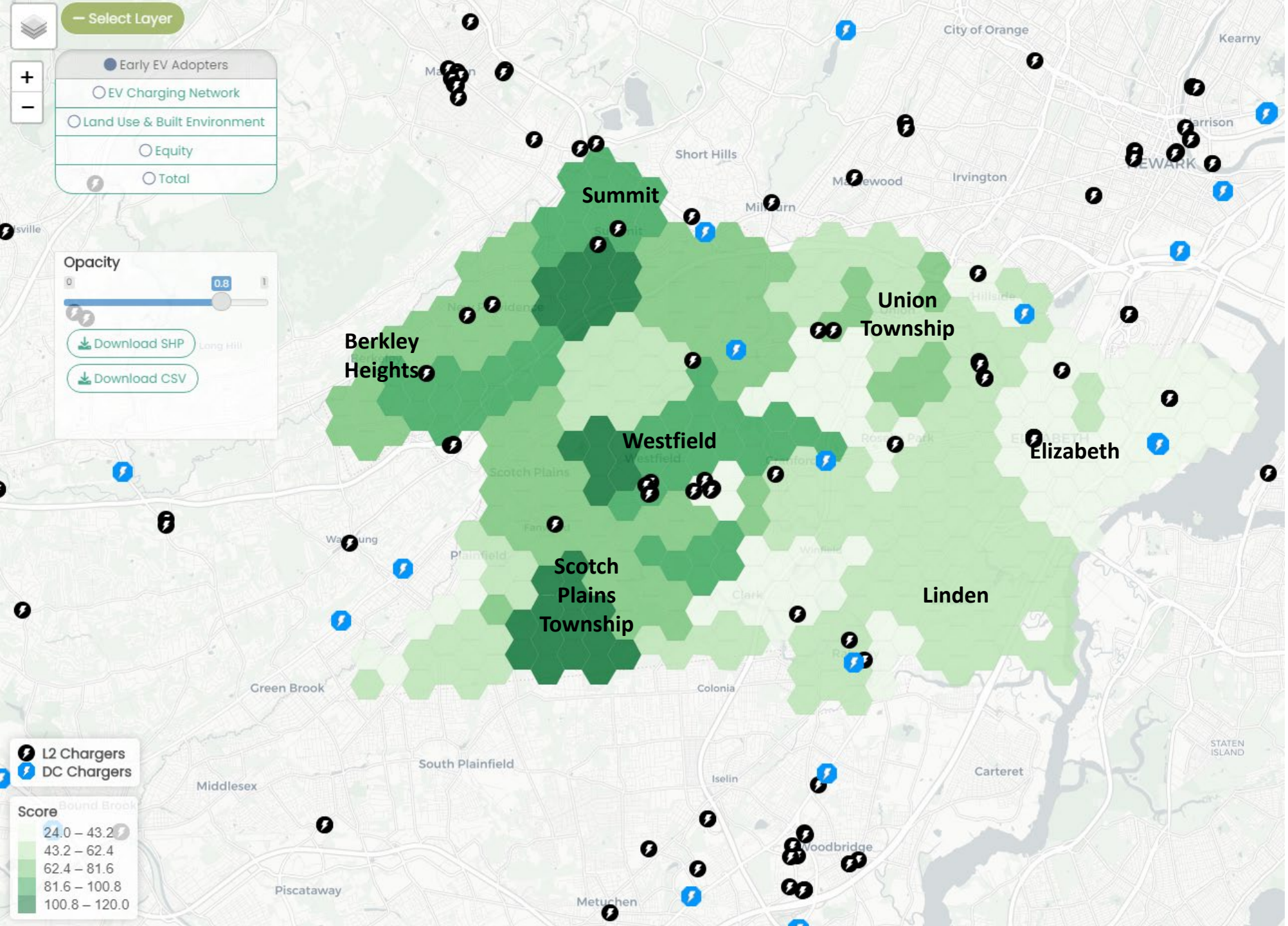
Weighting Categories

- *Equity*
- *EV Early Adopter*
- *Existing Land Use & Built Environment*
- *EV Network*



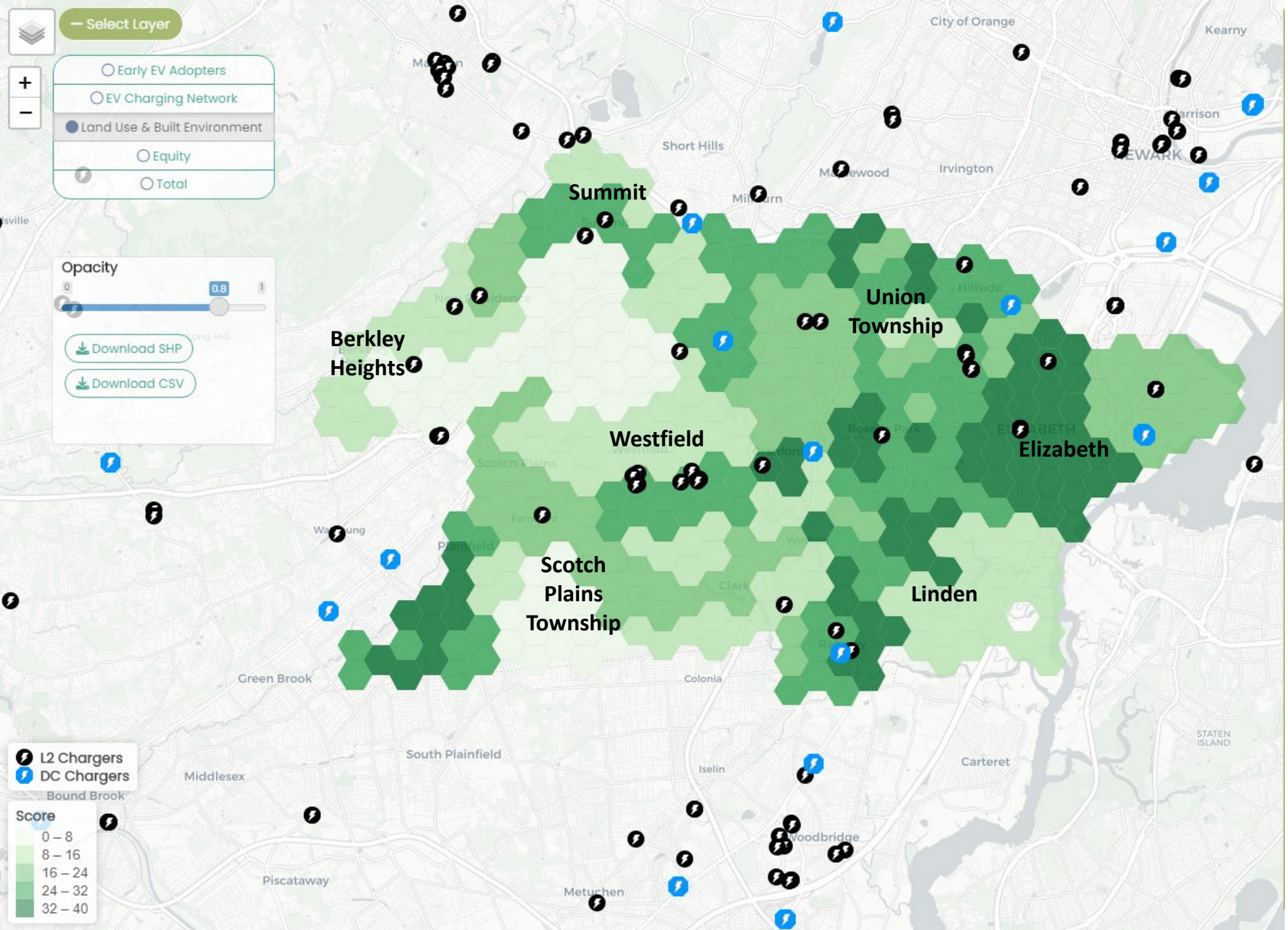
Equity

- NJTPA Equity Factors Composite Score



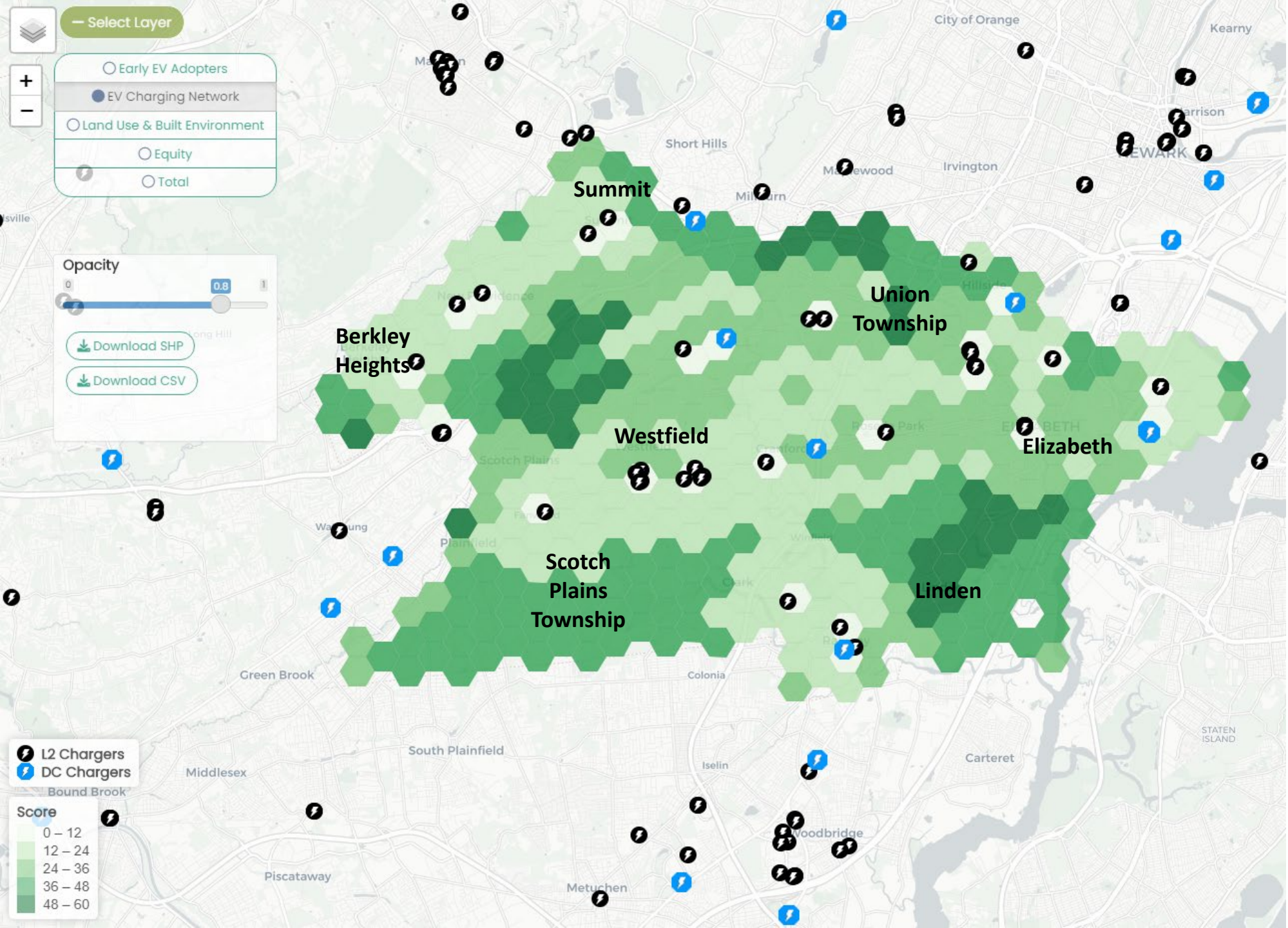
Early EV Adopters

- Median Household Income
- Environmental Concerns
- Car Ownership
- Higher Education Attainment
- Existing EV Ownership
- Urban Area



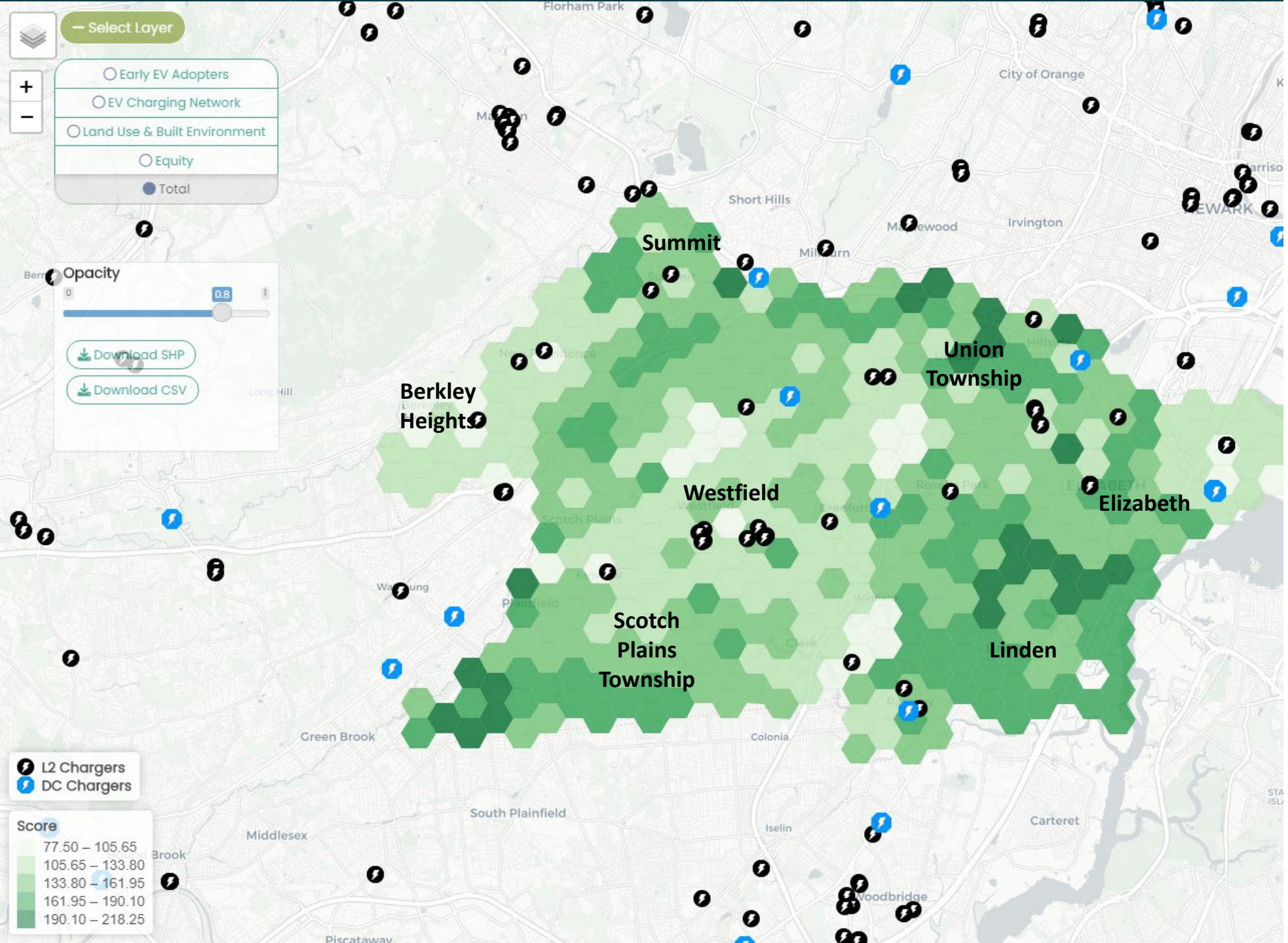
Land Use & Built Environment

- Multi-family Housing
- Zoning
- High Visit Locations
- Population Density



EV Charging Network

- Existing L2 Charging Infrastructure
- Existing DCFC Infrastructure
- Average Annual Daily Traffic



Total Score

- Equity
- Early EV Adopters
- Land Use & Built Environment
- EV Charging Network

Poll Questions

Poll questions will pop-up for users of the Teams App.

If you do not see the pop-up, open the chat icon in Teams, poll questions will appear there too.

We will do 1 question for practice first.

Work Plan & Schedule

Spring 2022

- *Kick-Off Study*
- *Equity assessment*

Summer 2022

- *Data collection and develop quantification of need*
- *Launch survey and interactive mapping tool*

Fall 2022

- *TAC #1*
- *Analysis Of Potential Charging Locations*

Winter 2023

- *TAC #2*
- *Public outreach meeting*
- *Study findings reported*

Spring 2023

- *Final report*

Discussion

Any additional comments, thoughts, guidance for the study team?

Next Steps

- *Public Outreach Meeting*

- *Analysis of potential charging locations*

- *Contact*

Liza Betz, AICP, PP
Union County
Department of Economic Development/Division of Strategic Planning
ebetz@ucnj.org
(908) 558-2273

Thank you!

Technical Advisory Committee Meeting #2

December 13, 2022

APPENDIX D

Public Meeting Presentation

Union County Electric Vehicles Infrastructure Study

Public Outreach Meeting

April 25, 2023

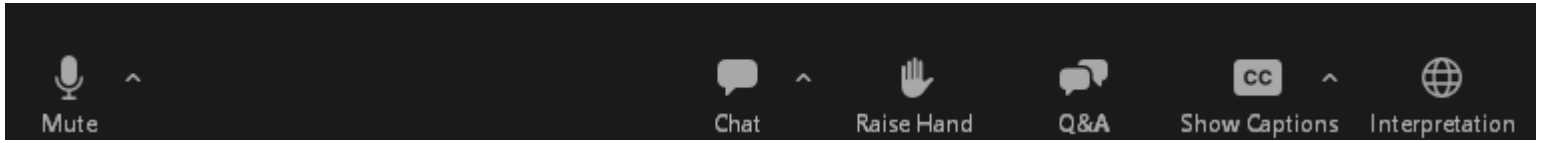
How to Participate

All attendees are muted during the presentation

Polling and Discussion will follow

Three ways to participate:

- Raise your hand to speak
- Type your comment or question in the Zoom Q&A button
- Respond to the polling questions



Set your audio channel to English or Spanish

En esta reunión habrá intérpretes de español. Si desea escuchar la reunión en español, cambie su canal de audio a español.

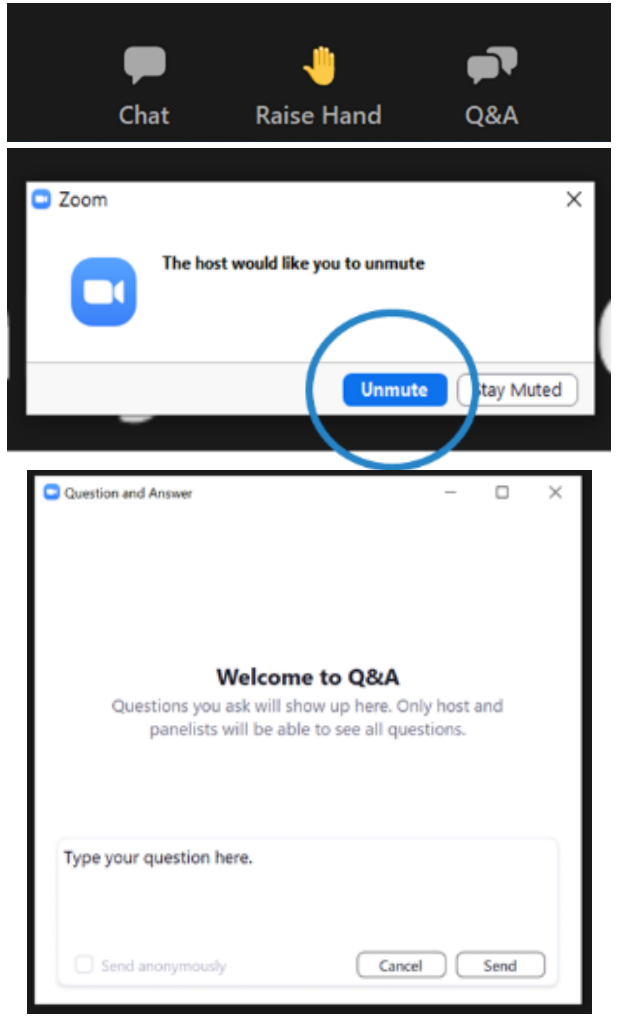
Tech Issues?

Email:
rcharkowsky@ucnj.org

How to Comment

Verbal Comments

- To comment, use the 'raise hand' button in Zoom (or *9 for phone-only participants)
- We will call on speakers in the order that hands are raised
- When you are called upon, the facilitator will invite you to unmute your line
- Please state and spell your full name when you begin
- Please limit comments to 3 minutes



Written Comments

- If you have a question throughout the presentation, type it in Q&A box at bottom of your screen

Union County Electric Vehicles Infrastructure Study

Public Outreach Meeting

April 25, 2023

Agenda

- EV Charging Background
- Study Methodology
- Poll Questions
- How to use the study
- Site Suitability Mapping
- Discussion

Westfield Train Station

ucnj.org/ev-study

Electric Vehicle Popularity Continues to Rise

4,001 EV's registered in Union County as of June 2022

Addressing EV Charging in Union County

NJ NEVI plan sets goals for EV adoption

330,000 (New Jersey, 2025)*

by population

>20,000 (Union County, 2025)

Chargers to be installed in Union County to support this goal

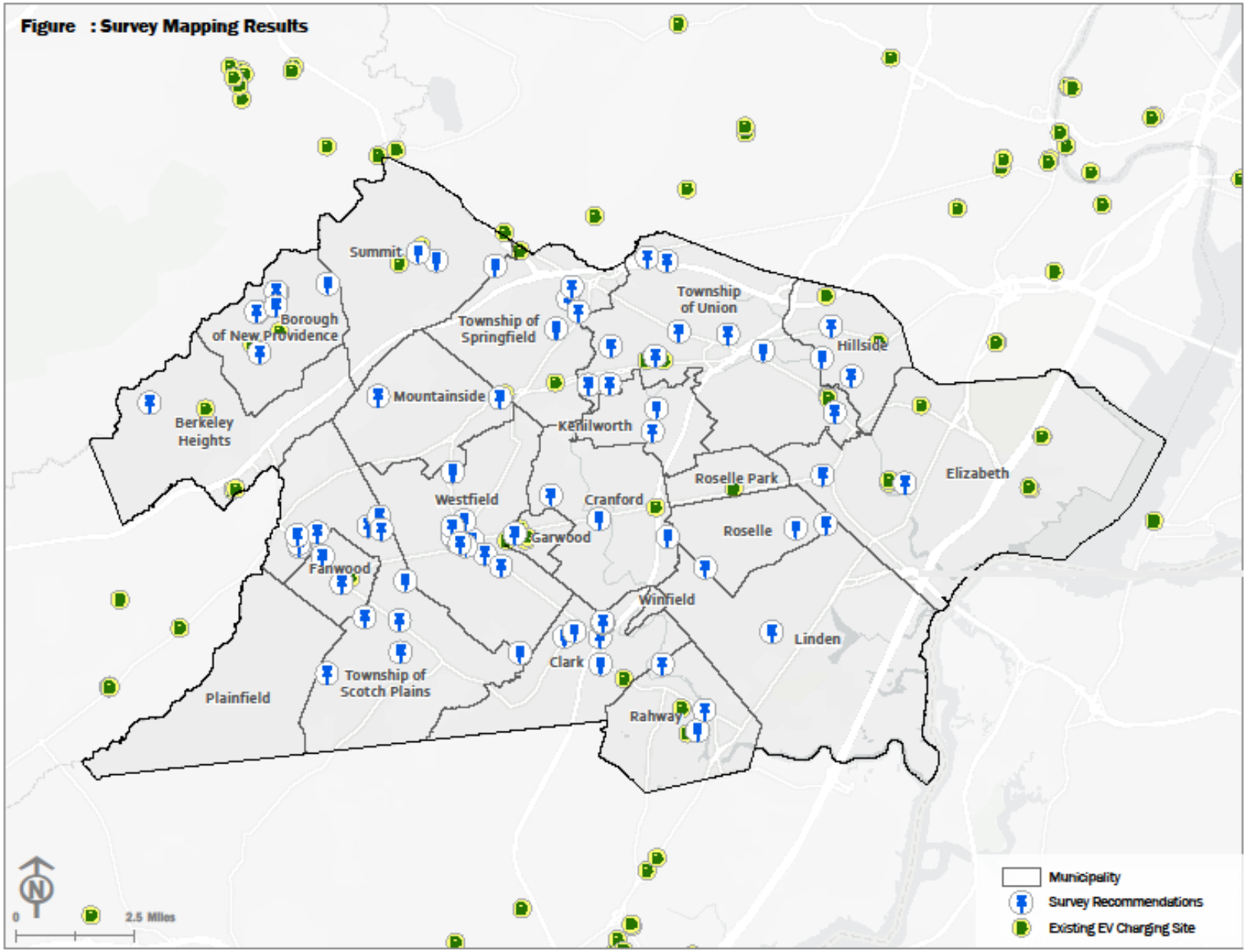
NJ NEVI Goal also sets a goal of 2M EVs by 2035

BPU NJ EDA ECONOMIC DEVELOPMENT AUTHORITY GANNETT FLEMING

Outreach & Partnerships

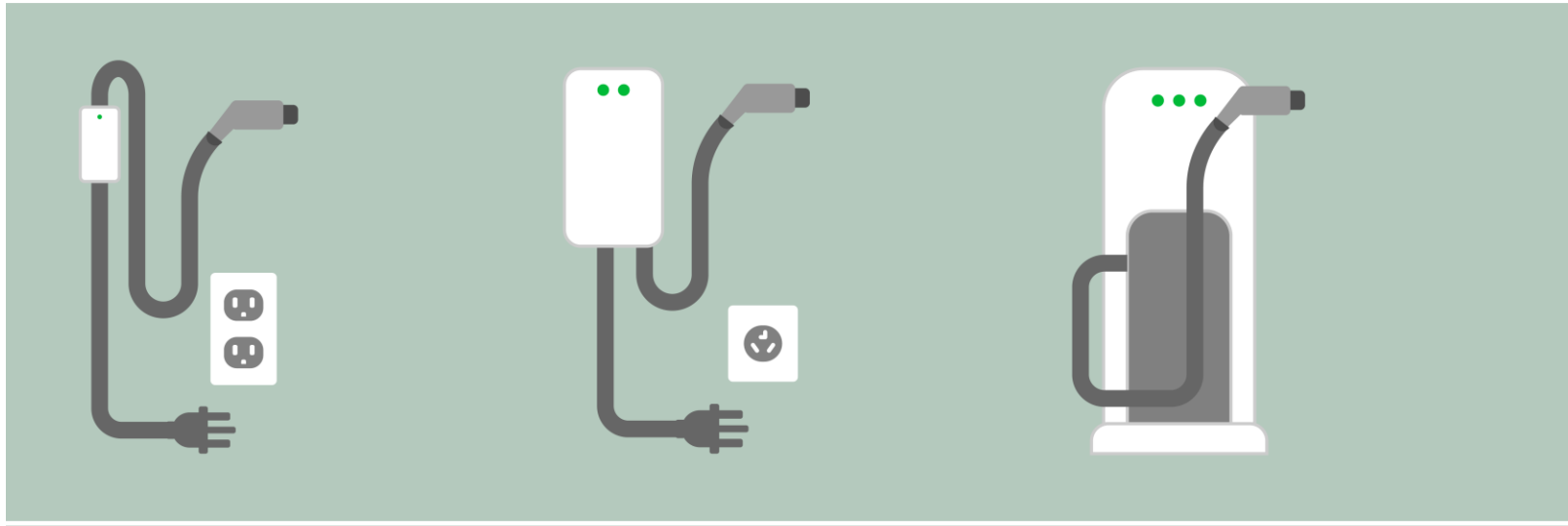
- Technical Advisory Committee
- Interactive map and survey
- Website: ucnj.org/ev-study
- Public Meeting

Existing/Planned Chargers and Suggestions



EVs and Charging

Public charging: Addressing range anxiety, equity, and multi-family housing



Level One
120V
Electrical source from a regular home outlet.

Charge Time
2-5 miles of range per 1 hour of charging.

Level Two
220V
Electrical source from a regular home dryer outlet, home hardwire, or public station.

Charge Time
10-20 miles of range per 1 hour of charging.

DC Fast Charge
208 or 480V 3-Phase AC
Electrical source from a public station.

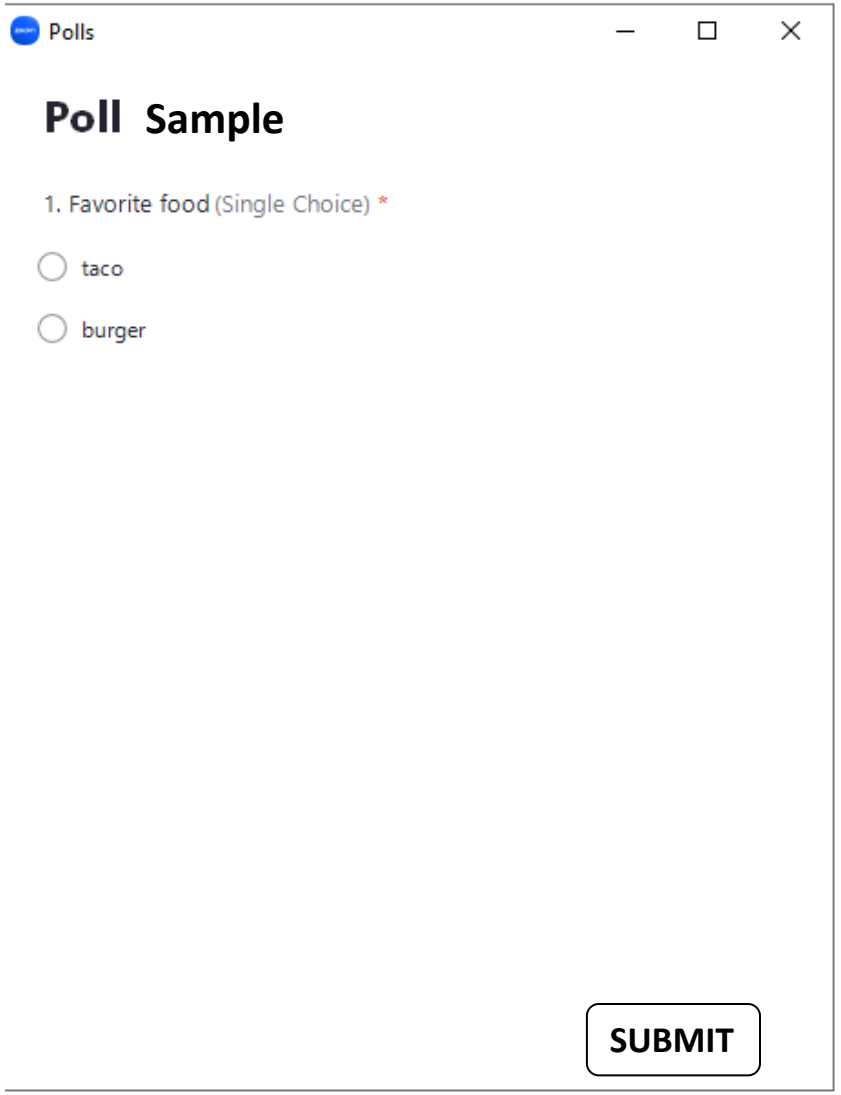
Charge Time
60-80 miles of range per 20 minutes of charging.

Developing a Network of Chargers

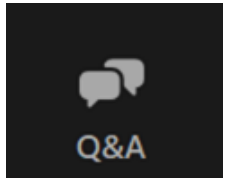
Workplace (Level 2)	Public (Level 2)	Public (DCFC)
Schools	Commercial Corridors	NEVI Corridors
Hospitals	Shopping Centers/Strip Malls	Popular Locations with Public L2
Office Buildings	Commuter Parking Lots	
Office Parks	Town Halls	
Heavy Industrial/Port	Public Parks	
	Recreation Centers	
	Public Libraries	
	Other Popular Destinations/Origins	
	Nearby to Multifamily Residential	

Poll Questions

Poll questions will pop-up.



Throughout the presentation, please add questions and comments via the Q&A feature. These will be responded to periodically throughout the presentation



Poll 1

- Do you own an electric vehicle, or know someone who owns an electric vehicle in New Jersey?
  - Yes
  - No, but considering it for my next purchase
  - No
  - Unsure

Poll 2

- If you own an EV, what are the top reasons you chose an EV?
  - Environmental benefits
  - Reduced reliance on fossil fuels
  - Reduced maintenance costs
  - Incentives available
  - Reliability
  - Available of a home charger

Poll 3

- If you do not own an EV, what are your concerns about purchasing one?
  - Cost to own/lease
  - Reliability, dependability, longevity of the vehicle
  - Charge capacity
  - Number of chargers available publicly
  - Length of time to charge

Poll 4

- If you had an EV, where would be your preferred location to charge?
  - Private driveway
  - Private/Shared Garage
  - Work/Office Building
  - Shopping center
  - Public parking lot/garage
  - Grocery store
  - Other/Don’t know

Poll 5

- Choose 1-2 which are most important to you for the placement of EV infrastructure
  - Charging speed
  - Affordability (low cost to charge)
  - Ability to charge multiple vehicles simultaneously
  - Access to amenities and /or recreational sites when charging
  - Proximity (Close to an off/on ramp) to a highway/interstate
  - Safety
  - Other

How To Use This Study

Selection and Placement of Chargers

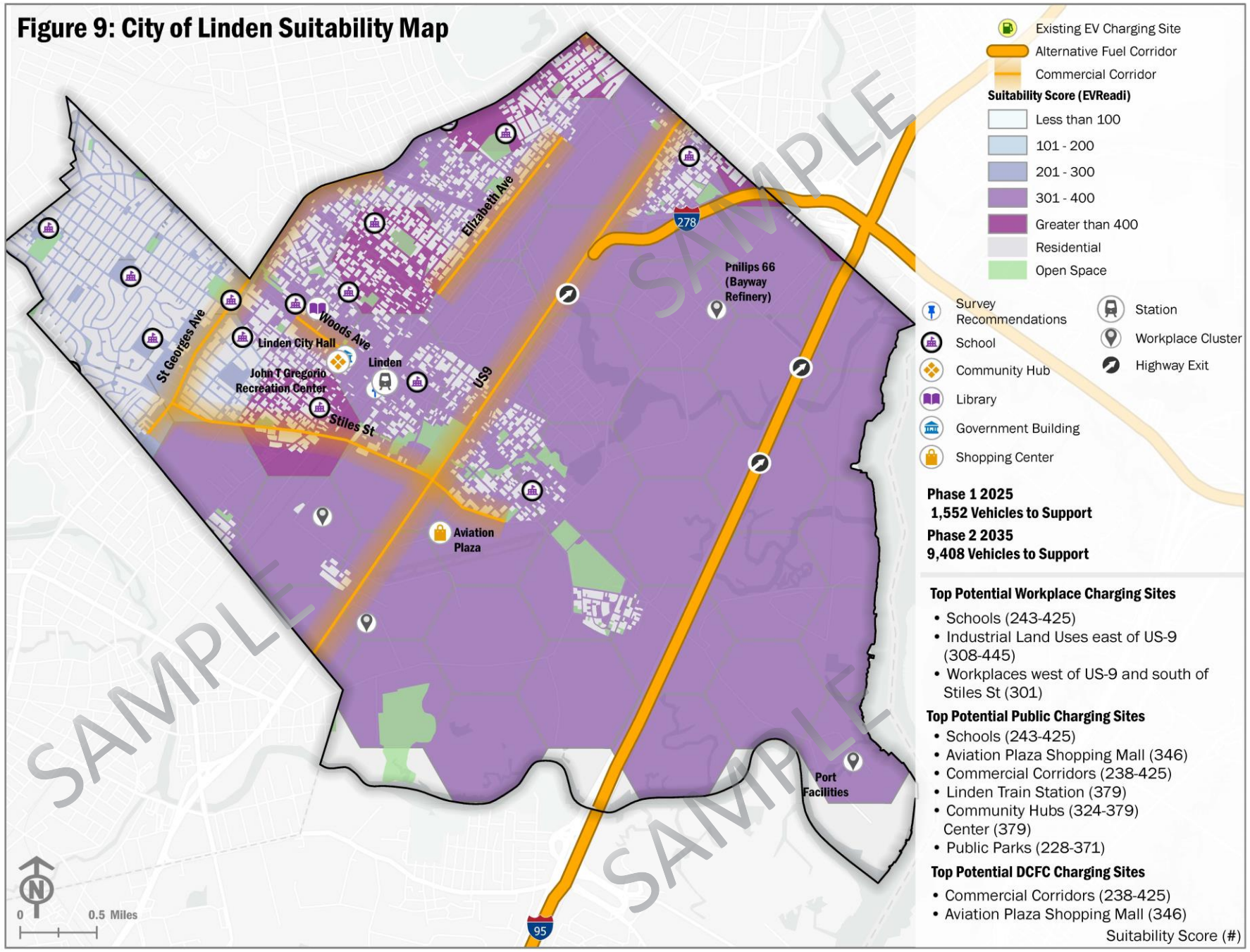
- Charger Requirements
- Electrical Service
- Networked or Not Networked
- How to Find a Charger
- Selecting a Charger Type
- Accessibility

Securing Funding

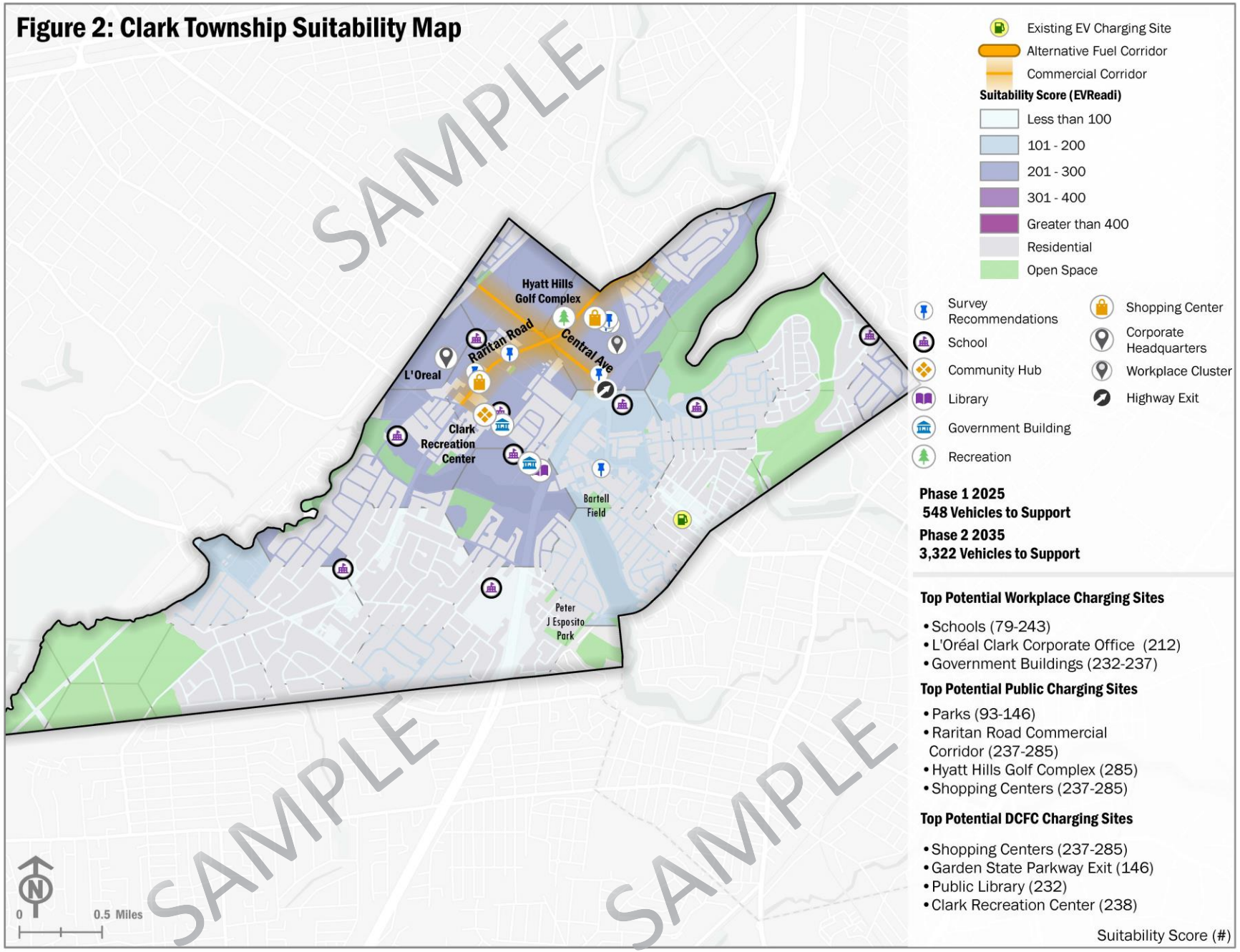
- Federal Grants
- State Grants
- Utility Grants
- Sample Language for Applications
- How this study gives your application an advantage

Site Suitability and Mapping

www.fpaengineers.com/unioncountyevstudy



Example Results



Work Plan & Schedule

Spring 2022

- Kick-Off Study
- Equity assessment

Summer 2022

- Data collection and develop quantification of need
- Launch survey and interactive mapping tool

Fall 2022

- TAC #1
- Analysis Of Potential Charging Locations

Winter 2023

- TAC #2
- Study findings reported

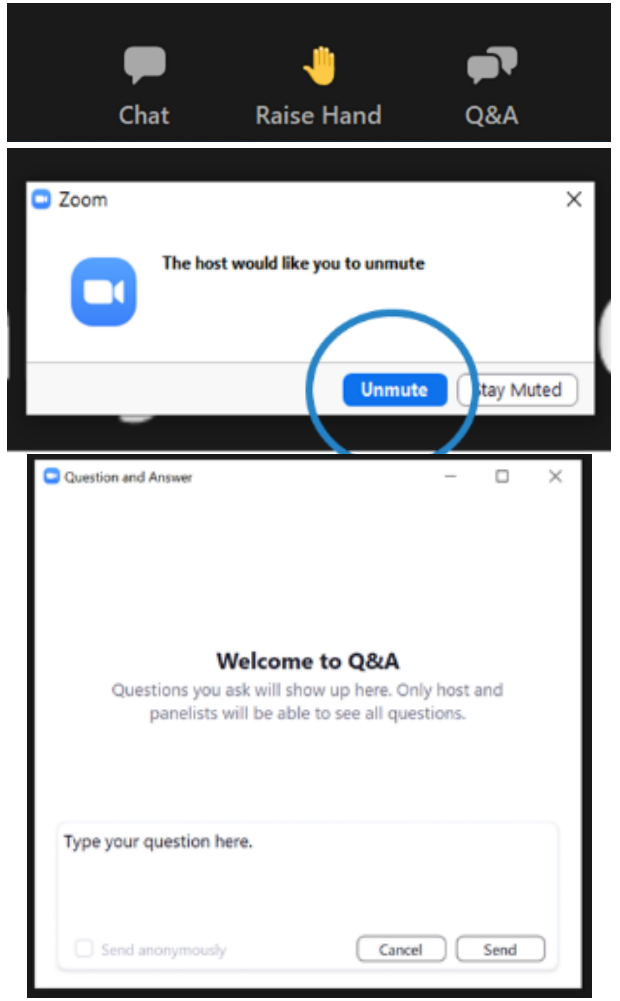
Spring 2023

- Public Outreach Meeting
- Final report

How to Comment

Verbal Comments

- To comment, use the 'raise hand' button in Zoom (or *9 for phone-only participants)
- We will call on speakers in the order that hands are raised
- When you are called upon, the facilitator will invite you to unmute your line
- Please state and spell your full name when you begin
- Please limit comments to 3 minutes



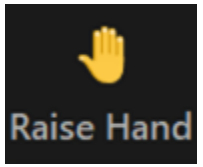
Written Comments

- If you have a question throughout the presentation, type it in Q&A box at bottom of your screen

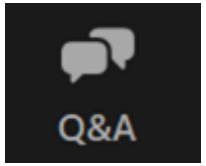
Discussion Prompt – Enter Responses into Chat

- Do you have specific location suggestions?
  Include location names, addresses and/or cross streets, and municipalities
  - E.g. Trader Joe's on Elm Street in Westfield

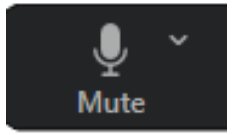
Discussion



Raise hand



Use Q&A



Unmute when called on

Thank you!

For more information, contact:

Liza Betz, AICP, PP
Union County
Department of Economic Development/
Division of Strategic Planning
ebetz@ucnj.org
(908) 558-2273

To review the draft final report:

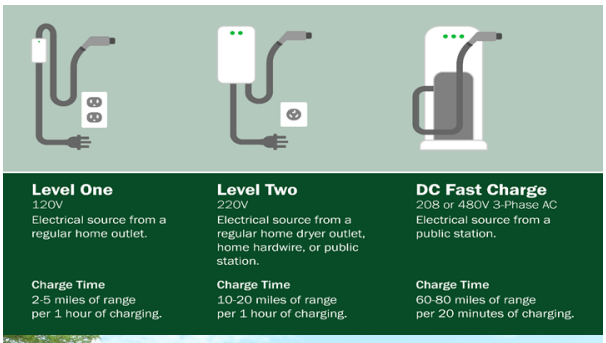
http://www.UCNJ.org/ev-study

APPENDIX E

Study Press Releases

Union County Starts Electric Vehicles Charging Infrastructure Study

September 15, 2022 < https://ucnj.org/press-releases/public-info/2022/09/15/union-county-starts-electric-vehicles-charging-infrastructure-study/>



Public Input Sought for Online Survey

The Union County Board of County Commissioners is pleased to announce that Union County and the North Jersey Transportation Planning Authority are funding a study aimed at preparing for an increase in electric vehicle (EV) ownership in Union County over the next 10 years. The growth in EV ownership is anticipated to lead to an increased demand for convenient EV charging sites throughout New Jersey.

“Our goal is to ensure that recharging an EV is just as easy and convenient as filling up with gasoline. By planning for more charging locations, we will be in a better position to support residents and make EVs a more viable choice as they become more affordable and popular,” said Union County Commissioner Chair Rebecca L. Williams.

In addition to meeting overall demand for convenient EV charging sites, the study aims to place the County in position to have the needed infrastructure with respect to traditionally underserved communities. The study will attempt to address the challenge of sufficient charging equipment locations for residents renting in multifamily residences and larger developments.

The Union County study will prioritize public outreach and input. On Friday, September 23rd, the project page will be launched on the County’s website, **ucnj.org/ev-study <http://www.ucnj.org/ev-study>** . The project page will include a survey and mapping tool to gather information from the public on where they believe new charging sites should be located.

All members of the public will be invited to participate in the survey, including individual residents as well as those representing businesses, schools, civic organizations, and local governments. When completed, the study will show where EV charging infrastructure should be located over the next ten years by considering areas of highest demand and need.

New Jersey has set a goal for December 2025 to have 330,000 registered passenger EVs and at least 400 public fast chargers throughout the state. The chargers are to be distributed to no fewer than 200 locations.

There are currently three different EV charging options, depending on the driver's needs. Drivers who charge their EVs at home can use a Level 1 Charger. These take several hours to fully recharge a battery, but they are relatively inexpensive and can be run on an ordinary household outlet.

The faster Level 2 Chargers are more appropriate for public use. Level 2 Chargers require a heavy-duty outlet, of the type used by refrigerators and other large appliances.

The fastest charger currently available is the Level 3, also called Direct Current Fast Charge. This is a purpose-built power source, which cannot be supported by the electrical system of a home.

This Union County study will focus on Level 2 and Level 3 DCFC chargers, which would be publicly accessible. The County is receiving assistance on the Study with a consultant team headed by French & Parrello Associates with FHI Studio and AECOM. For more information, please contact Project Manager Liza Betz, AICP PP, at **ebetz@ucnj.org**

Union County

Electric Vehicles Infrastructure Study

Summer 2022 Newsletter

Union County has launched a study to support electric vehicle use by planning the expansion of a network of charging stations for current and future vehicles.

The Union County Electric Vehicle (EV) Infrastructure Study will look at where EV charging infrastructure should be located by considering areas of highest demand and need.

Why Plan for EV chargers in Union County?

EV adoption is rising in the US with federal attention and state and federal funding being directed towards electrification. As EV ownership continues to grow, so will the infrastructure needed to support it.

Union County is making EVs a more viable choice for a growing population of residents and workers by planning the expansion of available chargers.

What is the Study Purpose?

The study is developing a plan for the installation of EV chargers over the next 10 years to meet New Jersey's goals during this time period. It will collect and analyze data, and with public input, recommend a network of locations for Level 2 and DC Fast Chargers.

EV Legislation in New Jersey

In January 2020, the NJ State Legislature passed legislation increasing support of plug-in EVs with incentives for purchase or lease of these vehicles and for the related charging equipment.

By December 2025, the goal is to have 330,000 registered passenger EVs in the state and at least 400 fast chargers for public use at no fewer than 200 charging locations.

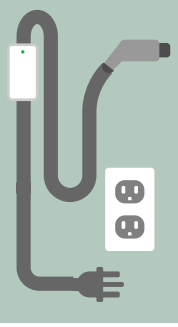
By December 2035, the state has a goal of at least two million registered EVs and at least 85 percent of all vehicles sold or leased by December 2040 to be EVs.

EV Charger Types

Level One
120v

Electrical Source
Regular home outlet

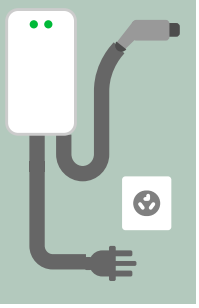
Charge Time
2-5 miles of range/1 hr of charging



Level Two
220v

Electrical Source
Home dryer outlet, home hardwire, or public station

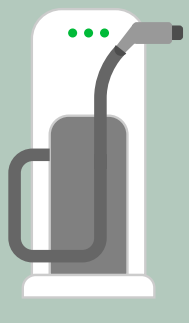
Charge Time
10-20 miles of range/1 hr of charging



DC Fast Charge
208/480V 3-Phase AC

Electrical Source
Public station

Charge Time
60-80 miles of range/20 mins of charging



Union County is Supporting the Expansion of EVs

EVs are now being widely produced by many car manufacturers. They are rapidly reaching price equivalence with gas-powered cars, and financial incentives are also sometimes available for EV purchasers.

According to the NJ Department of Environmental Protection, the transportation sector in NJ accounts for 46 percent of the state's net greenhouse gas emissions. This pollution negatively impacts community health. In addition, many studies have shown the disproportionate impact of pollution on low-income and minority communities in the United States.

This study helps to expand the charging network, so owning an EV will be as convenient as having a gas-powered vehicle.

Cranford, New Jersey

Westfield Train Station

Join the Conversation

The study is just beginning – we are collecting data and want to hear from you!

Feedback and input from the public will be imperative to identify key locations to place charging stations around the County.

Tell us about your travel patterns and where you think chargers should be located on our survey and crowdsourcing map, which is available at: www.fhistudio-apps.com/uc-ev-study.

Comments will also be collected on the project website (ucnj.org/ev-study), or please contact Project Manager Liza Betz, AICP PP, at ebetz@ucnj.org.

This Study is Made Possible Through

Sponsored by the Union County Board of County Commissioners

UNION COUNTY
We're Connected to You!

County Commissioners
Rebecca Williams, Chair
Christopher Hudak, Vice Chair
James E. Baker, Jr.
Dr. Angela R. Garretson
Sergio Granados
Bette Jane Kowalski
Lourdes M. Leon
Alexander Mirabella
Kimberly Palmieri-Mouded

County Manager's Office
Edward T. Oatman, County Manager
Amy C. Wagner, Deputy County Manager/Director, Department of Economic Development

NJTPA
NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

APPENDIX F

Equity Assessment

UNION COUNTY EV INFRASTRUCTURE STUDY

Equity Assessment

Introduction

Union County has initiated an Electric Vehicle (EV) Infrastructure Study to plan for the continued increase in popularity of electric vehicles and hybrids, as supported by goals of major car manufacturers and continued federal and state legislation and incentives. The study seeks to support electric vehicle use by planning the expansion of the network of EVSE, and thereby promote better air quality and improve community health by reducing emissions from the gasoline-powered engines of vehicles.

Many studies have showcased the disproportionate impact of pollution on low-income and minority communities.[1] Greater adoption of EVs have the potential to significantly reduce air pollution from transportation. By some metrics, they can be less expensive to own and operate over time[2] and are rapidly reaching sticker price parity with gas-powered cars. So-called "charging deserts" are a major barrier to greater EV adoption across the country. Additionally, many or most of the non-home chargers available today are located in higher-end shopping areas that may be undesirable if not inconvenient to reach for lower- and middle-income families. To that end, federal and state legislation has been adopted, including in New Jersey, where a model ordinance has been passed to assist local governments in their efforts to encourage EV ownership and establish standards and regulations for the safe and efficient installation of EVSE and Make-Ready, or pre-wired electric infrastructure, parking spaces at appropriate locations. The two utility providers within Union County, JCP&L and PSE&G, both offer incentive programs for Electric Vehicle Service Equipment (EVSE).

This equity assessment has been conducted to identify the presence and location of communities that have been traditionally underserved and underrepresented in the planning process. The United States Environmental Protection Agency defines environmental justice (EJ) as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." By understanding the concentration of these communities within the County, the project team will be able to understand and balance potential EV infrastructure locations within communities.

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[1] "Fumes Across the Fence-Line: The Health Impacts of Air Pollution from Oil & Gas Facilities on African American Communities." Clean Air Task Force and NAACP. http://www.catf.us/wp-content/uploads/2017/11/CATF_Pub_FumesAcrossTheFenceLine.pdf. Accessed June 3, 2022

[2] "Electric Vehicle Ownership Costs: Today's Electric Vehicles Offer Big Savings for Consumers." Consumer Reports. <https://advocacy.consumerreports.org/wp-content/uploads/2020/10/EV-Ownership-Cost-Final-Report-1.pdf.> Accessed June 3, 2022.

Data and Methodology

This evaluation used the NJTPA Equity Analysis Tool, launched in Spring 2022, to compile the environmental justice data for evaluation. The tool uses the United States Census Bureau's 2015-2019 American Community Survey 5-year Estimates. Data was evaluated at the census tract level and compared to region and statewide averages (for more detail see the Appendix).

The following factors were included:

- Race
- Low income
- Limited English Proficiency
- Population over 65 years
- Population under 5
- Population Aged 5-17
- People with Disabilities
- Zero Vehicle households
- Sex
- Place of Birth

Analysis

The analysis which follows showcases the diversity of Union County across all equity assessment variables. These factors vary across the 21 municipalities the county encompasses. They indicate notable gaps in wealth and opportunity within the county. Together, the data illustrate a clearer picture of the presence and location of historically disadvantaged communities.

The equity analysis factors were considered across four separate geographies:

- Census Tract
- Union County
- The NJTPA Region
- The State of New Jersey

Compared to North Jersey and the state, Union County has relatively consistent demographic proportions of key age groups and sex. There are slightly higher portions of young children and youth, and a slightly lower portion of seniors (those 65 or older), compared to North Jersey.

Table 1. Age and Sex

Municipality	Age			Sex
	Under 5 years old	5 to 17 years old	65 years and Over	Female
Union County	6.3%	17.2%	14.2%	51.2%
NJTPA	5.9%	16.3%	15.7%	51.2%
New Jersey	6.0%	18.0%	16.0%	52.0%

Union County has higher concentrations of low-income, language, racial or ethnic minority, and foreign-born indicators, compared to the statewide and North Jersey averages. Conversely, the percentage of disabled residents is lower compared to the state at large. There is a similar rate of zero-vehicle households.

Table 2. Equity Factors

Municipality	Minority	Low-Income	Limited English Proficiency	Disability	Zero Vehicle Households	Foreign-Born
Union County	60.5%	24.5%	18.8%	9.0%	11.6%	30.1%
NJTPA	46.7%	22.0%	12.7%	9.5%	12.7%	25.8%
New Jersey	28.0%	10.0%	7.0%	11.0%	11.5%	23.0%

These indicators were then scored on a scale of 0 to 4 based on the standard deviation and average score across the NJTPA region. A value of zero represents a metric category 'very below' average, while a score of four indicates the factor is 'very above' average, with the average range being indicated by a two. These scores are displayed in Table 3 for each Township/Borough in Union County. A map of the composite scores is also included in the Appendix.

Each of these factors was mapped to showcase the equity factor scores of each census tract within the County. For more detail on the methodology behind the equity scores, see the Appendix.

Racial and ethnic minorities, foreign-born residents, and those with limited English proficiency have historically been less included in the planning process. The network of electric vehicle charging equipment recommended through this study should include locations within these communities that improve access to reduce barriers to electric vehicle use.

Moreover, foreign-born and limited-English proficient residents face challenges participating in public outreach. Materials should be translated into Spanish, and community organizations and leaders should be identified so that "pre-outreach" to specific communities can be used to facilitate greater input in the public process.

There are similar higher than average concentrations of foreign-born residents and minorities in the eastern and western portions of the County, especially within Elizabeth and Plainfield. Communities with a high proportion of limited-English proficiency households tend to concentrate within more densely populated urban areas. Many census tracts within Linden, Elizabeth, and Plainfield have above-average concentrations, with up to one-third of households in these areas speak English less than "very well".

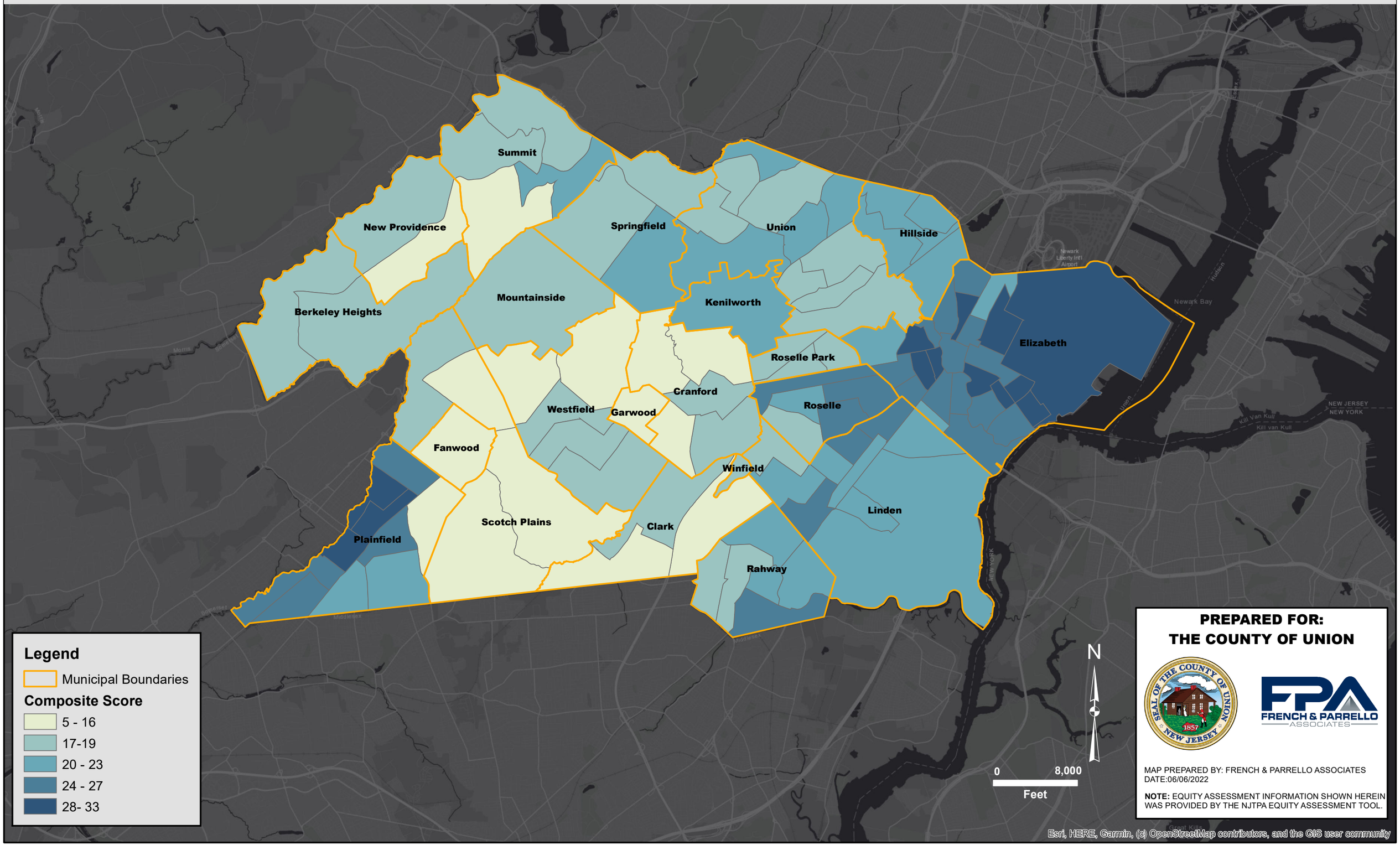
It is helpful to review the areas with higher-than-average concentrations where people live below double the poverty rate. These populations may be more sensitive to traveling long distances to access EV charging. Low-income households also face disproportionately high energy burdens. In portions of Elizabeth and Plainfield, more than half of residents live below twice the poverty line. Conversely, Union County also includes some of the wealthiest communities in New Jersey, including Summit, Westfield, and Berkeley Heights.

Concentrations of disabled populations are higher than average in some portions of municipalities on the east side of the county including Linden and one census tract within Elizabeth. Conversely, concentrations of areas with a low percentage of residents with disabilities are present in many areas of the County including Westfield, Union Township and Summit.

Table 3. Municipal Composite Scores

Municipality	Minority	Low Income	Limited English Proficiency	Disability	Age: Under 5	Age: 5-17	Age: 65+	Zero Vehicle Households	Foreign-Born	Female Population	Composite Score
Berkeley Heights Township	1.0	1.0	1.0	1.5	2.0	3.0	2.0	1.0	2.0	2.5	17.0
Clark Township	1.0	1.0	1.0	2.3	1.3	1.7	2.7	1.3	1.0	2.0	15.3
Cranford Township	1.0	1.2	0.8	2.2	1.8	2.2	2.2	0.8	1.0	2.0	15.2
Elizabeth City	3.3	3.3	4.0	2.0	2.7	2.5	1.4	2.8	3.3	1.5	26.7
Fanwood Borough	1.0	1.0	1.0	1.0	2.0	3.0	2.0	1.0	1.0	2.0	15.0
Garwood Borough	1.0	1.0	2.0	1.0	2.0	1.0	2.0	2.0	1.0	1.0	14.0
Hillside Township	3.3	2.0	2.0	1.8	2.3	1.8	1.5	2.0	2.3	2.5	21.3
Kenilworth Borough	2.0	2.0	2.0	2.0	2.0	3.0	2.0	1.0	2.0	3.0	21.0
Linden City	2.8	2.1	2.5	2.6	1.9	1.9	1.8	1.9	2.6	2.2	22.3
Mountainside Borough	1.0	1.0	1.0	2.0	3.0	2.0	3.0	2.0	1.0	2.0	18.0
New Providence Borough	1.0	1.0	1.0	1.5	2.0	3.0	2.0	1.0	1.5	2.0	16.0
Plainfield City	3.4	3.0	3.0	1.7	2.4	2.5	1.7	2.5	2.7	1.9	24.8
Rahway City	2.7	2.0	2.0	2.5	2.3	1.7	2.0	1.8	1.8	1.8	20.7
Roselle Borough	3.2	2.4	2.2	2.4	1.8	2.2	2.0	2.0	2.2	2.6	23.0
Roselle Park Borough	2.3	2.0	2.0	2.0	1.7	1.7	1.7	1.0	2.3	1.7	18.3
Scotch Plains Township	1.3	1.0	1.3	1.8	2.0	2.3	2.0	1.3	1.3	2.5	16.5
Springfield Township	1.7	1.3	1.7	2.0	2.3	1.7	2.3	1.0	2.0	2.0	18.0
Summit City	1.3	1.3	1.8	1.0	2.3	3.0	2.0	1.5	2.0	2.3	18.3
Union Township	2.4	1.5	2.0	1.7	1.5	1.5	2.0	1.5	2.4	2.5	18.9
Westfield Town	1.2	1.2	1.0	1.6	1.8	3.4	2.0	1.4	1.0	2.0	16.6
Winfield	1.0	2.0	0.0	3.0	2.0	1.0	2.0	2.0	1.0	3.0	17.0

UNION COUNTY ELECTRIC VEHICLES INFRASTRUCTURE STUDY EQUITY ASSESSMENT
COMPOSITE SCORE



It is also important to consider the concentrations of young children youth, and elderly populations within the County. Higher populations of young and older residents can suggest a higher than typical concentration of trips at local medical and social service facilities for the families and providers that attend to their transportation needs.

Youth populations have higher than average concentrations within the central County, including Westfield, Summit, and Elizabeth. Throughout much of the County, the percent of senior residents reflects the County average. In Mountainside and Springfield, approximately 20 percent of residents are 65 or older. The proportion of young children within the County is above average in portions of Elizabeth, Rahway, Plainfield, Mountainside, and Summit.

The concentration of zero-vehicle households is also a consideration with regard to the location of potential public charging locations and multi-modal trip planning (as zero-vehicle household concentration typically is an indication of the accessibility of alternatives modes including rail or bus, walking, and biking). Densely populated urban areas typically have high concentrations of zero-vehicle households, which is the case within Union County, where transit-oriented-development (which may limit the parking spaces per unit) has been a focus in many municipalities. Low-income households also typically rent. Nearly two-thirds of renters do not have access to a garage or location where installing home-based charging system would be possible.

In some census tracts within Plainfield and Elizabeth, 30 percent or more of residents do not have access to a vehicle. Conversely some areas of Cranford have below-average concentrations of residents without vehicle access.

Conclusions

Public engagement considerations and study recommendations should consider the following:

- Study recommendations should consider the needs of low-income and senior populations in places such as Clark Township and Mountainside Borough, as they consider the ideal locations for EV equipment. A quantitative criterion will be developed to evaluate potential charging locations. Equity ratings will be used as part of the criteria to promote installation of charging locations supporting low-income and senior population EV adoption.
- Meeting materials for this project should be available in both English and Spanish to address the needs of foreign-born and limited English proficiency residents, and materials should work to incorporate graphics and photos where possible.
- The project team should work to ensure an inclusive process.
- The project website should be designed for mobile-friendly viewing, so that people without computer access can easily view project materials.

Appendix

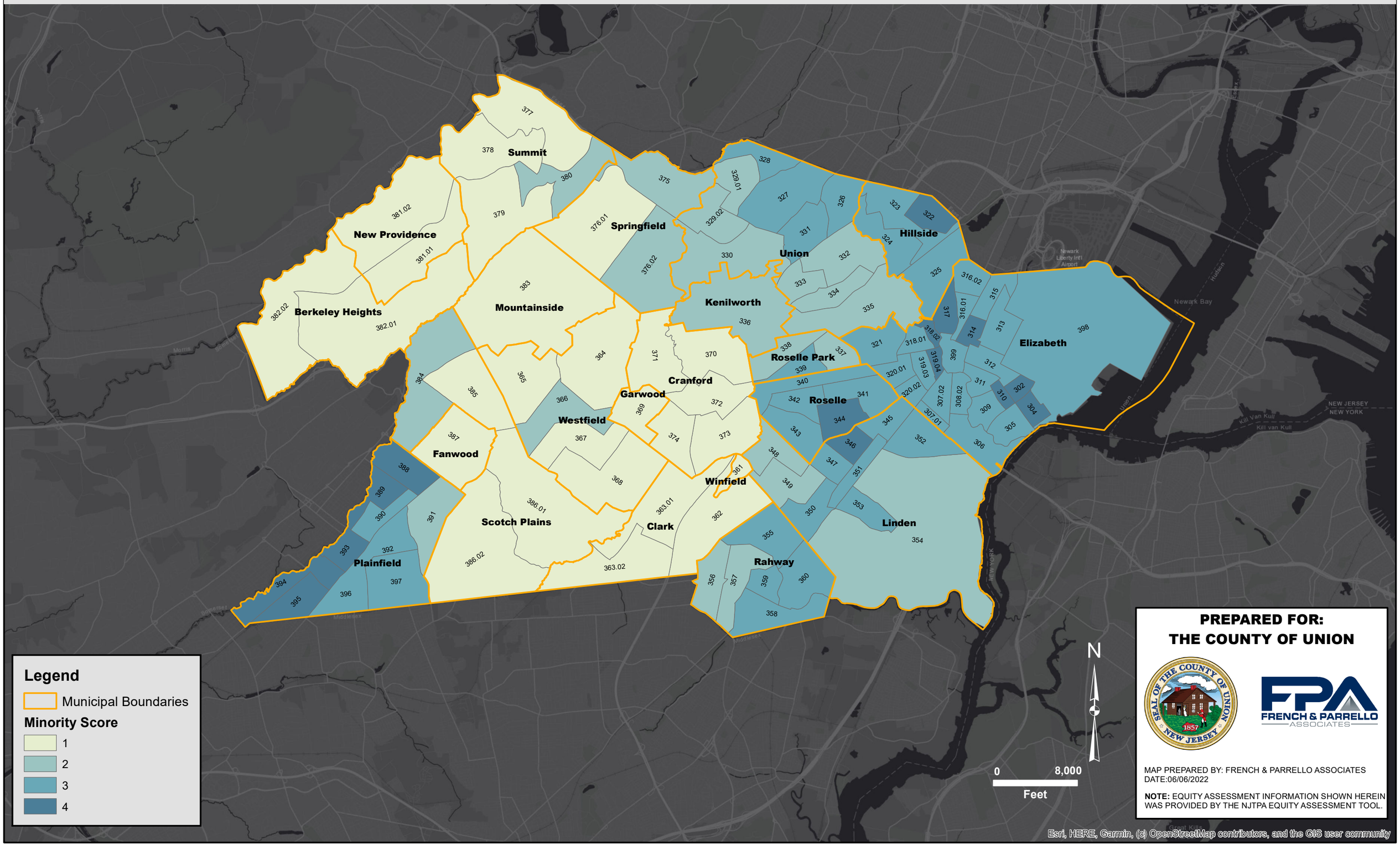
Defining Equity Assessment Variables

Variable	Definition
Disabilities	Percent of residents who have a disability
Elderly	Population Age 65 and Over
Foreign-Born	Percent of residents born outside of the United States
Limited English Proficiency	Percent of households in which no member 14 years old and over speaks only English or speaks a non-English language and speaks English "very well".
Low-Income	Percent of the population in households where the household income is less than or equal to twice the federal poverty level
Racial Minority	Percent of residents identifying as anything other than "Non-Hispanic, White Only"
Young Children	Population Under Age 5
Youth	Population Ages 5 to 17
Zero-Vehicle Households	Percent of households who indicated they do not have access to an automobile

Explanation of Equity Scores

The NJTPA Equity Analysis tool uses a methodology developed by the Delaware Valley Regional Planning Commission (DCRPC) to score census tracts within the region. Data was separated into five categories: very below average (score of 0); below average (score of 1); average (score of 2); above average (score of 3); and very above average (score of 4). The average category represents census tracts that are at or near the regional average for that factor. The other categories were then defined based on the regional average based on standard deviations above and below the mean. A composite score is determined for each census tract by summing the scores of all 10 factors, so the composite score for each census tract can range from 0 to 40.

UNION COUNTY ELECTRIC VEHICLES INFRASTRUCTURE STUDY EQUITY ASSESSMENT
MINORITIES



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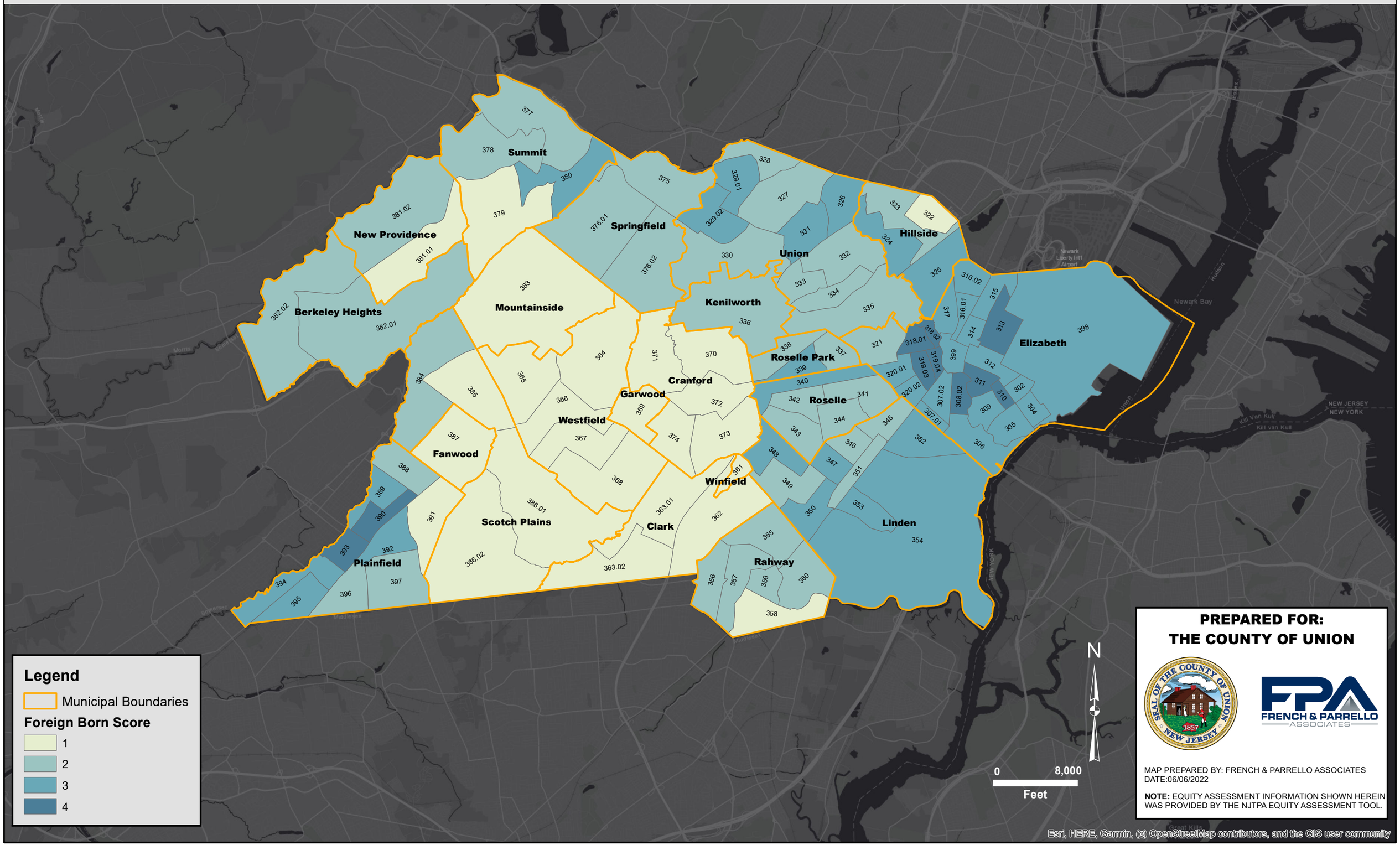
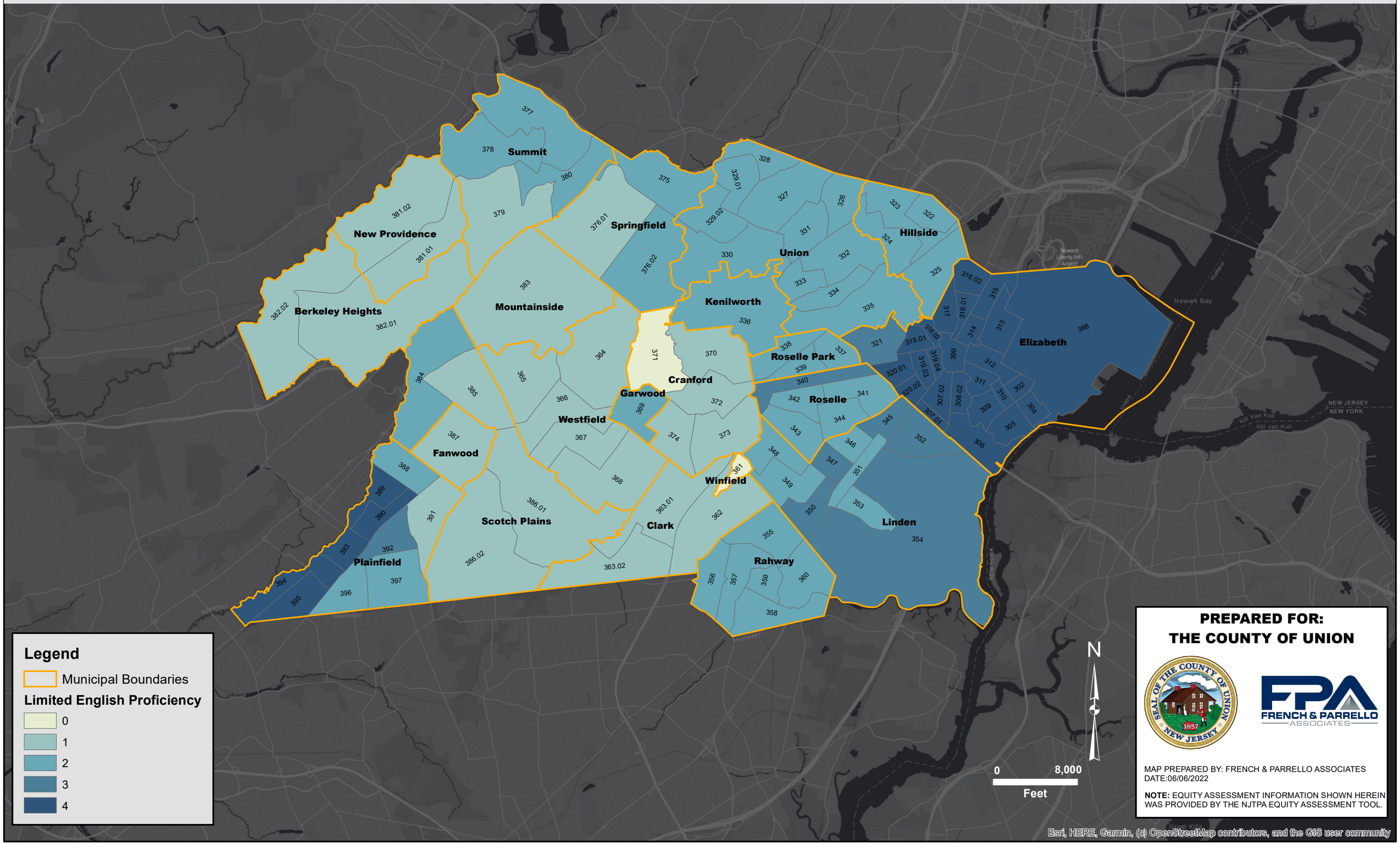
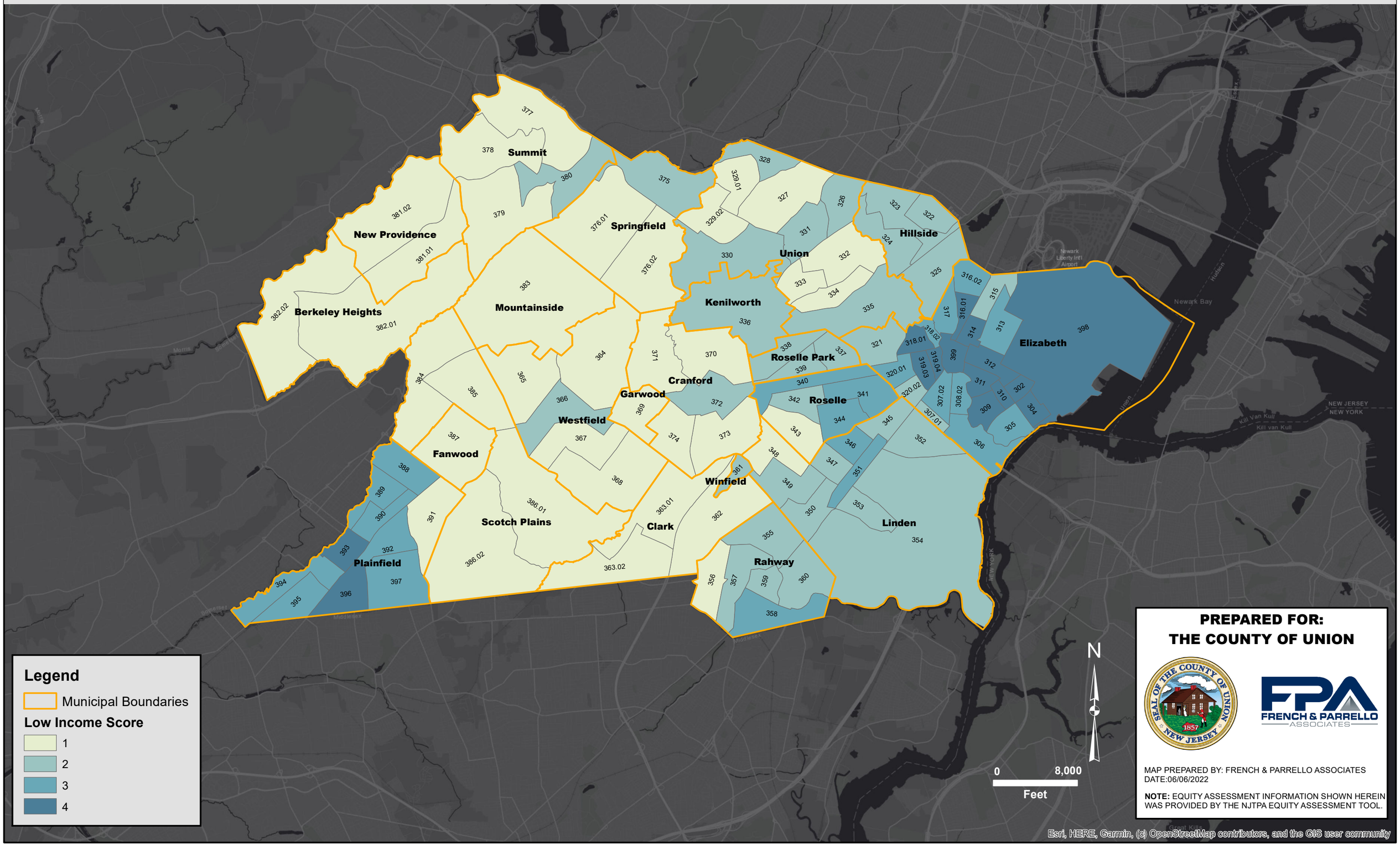
FOREIGN BORN



UNION COUNTY ELECTRIC VEHICLES INFRASTRUCTURE STUDY EQUITY ASSESSMENT
LIMITED ENGLISH PROFICIENCY



UNION COUNTY ELECTRIC VEHICLES INFRASTRUCTURE STUDY EQUITY ASSESSMENT
LOW INCOME



Legend

- Municipal Boundaries

Low Income Score

- 1
- 2
- 3
- 4

N

0 8,000

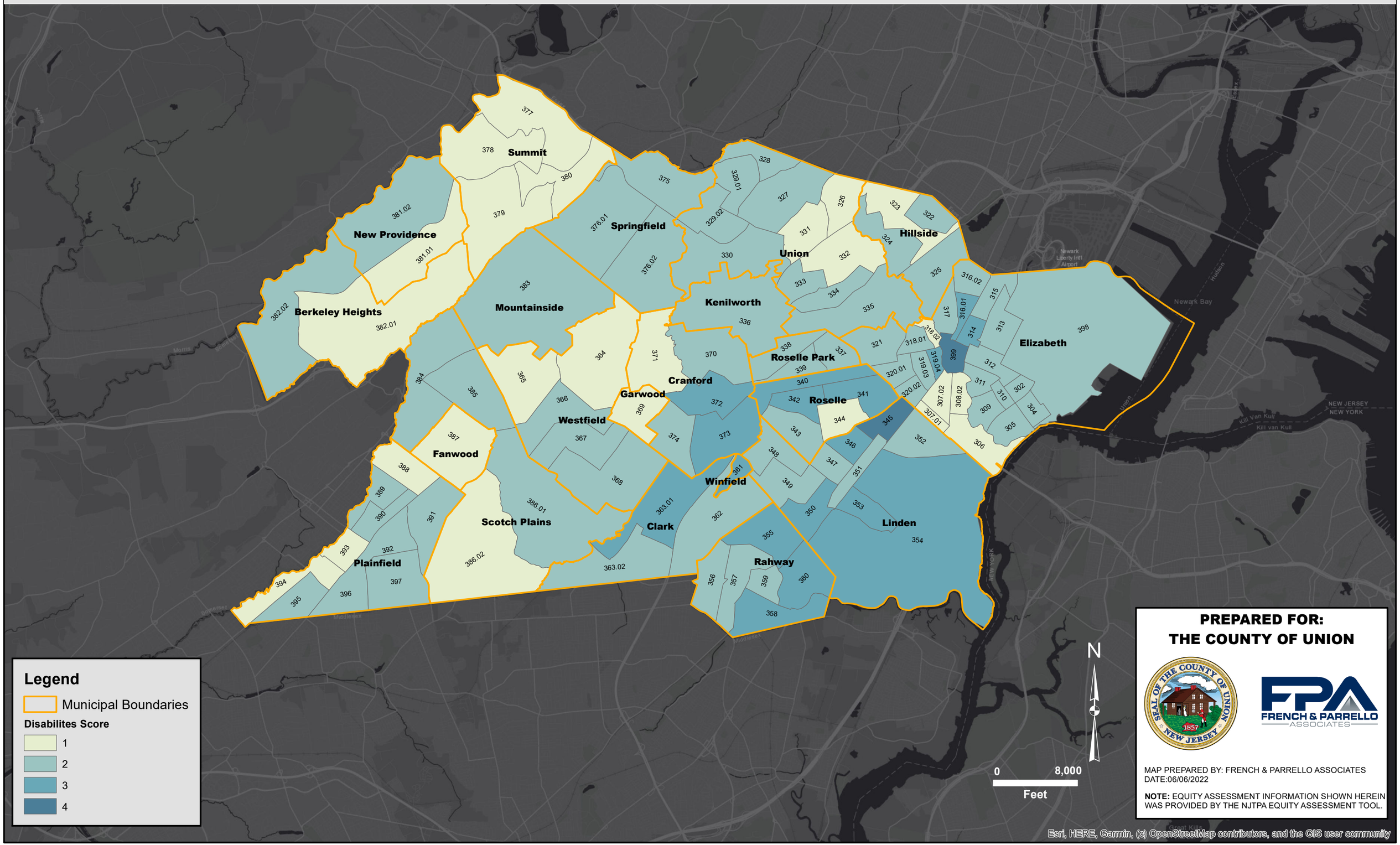
Feet

PREPARED FOR:
THE COUNTY OF UNION

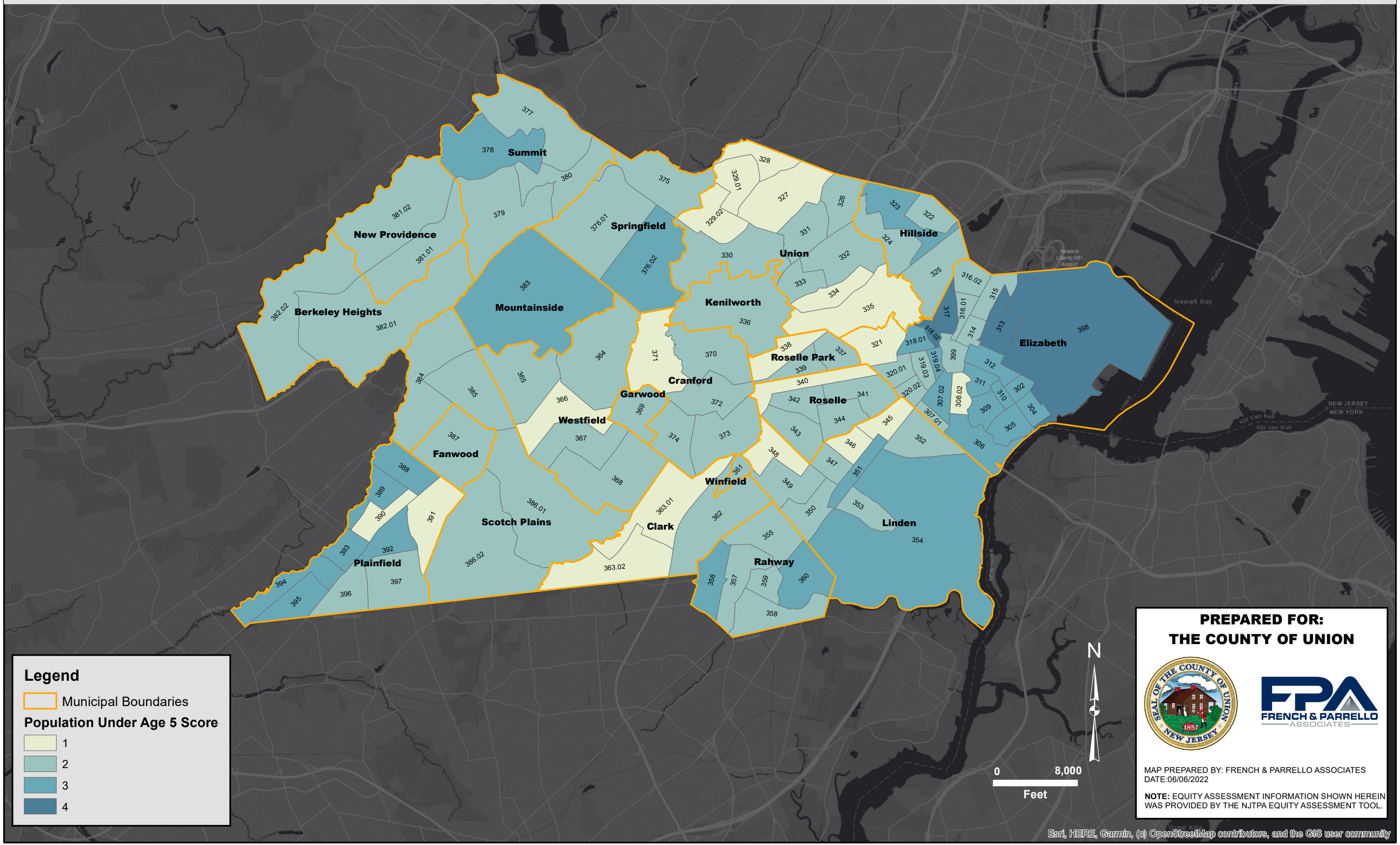
MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE:06/06/2022

NOTE: EQUITY ASSESSMENT INFORMATION SHOWN HEREIN WAS PROVIDED BY THE NJTPA EQUITY ASSESSMENT TOOL.

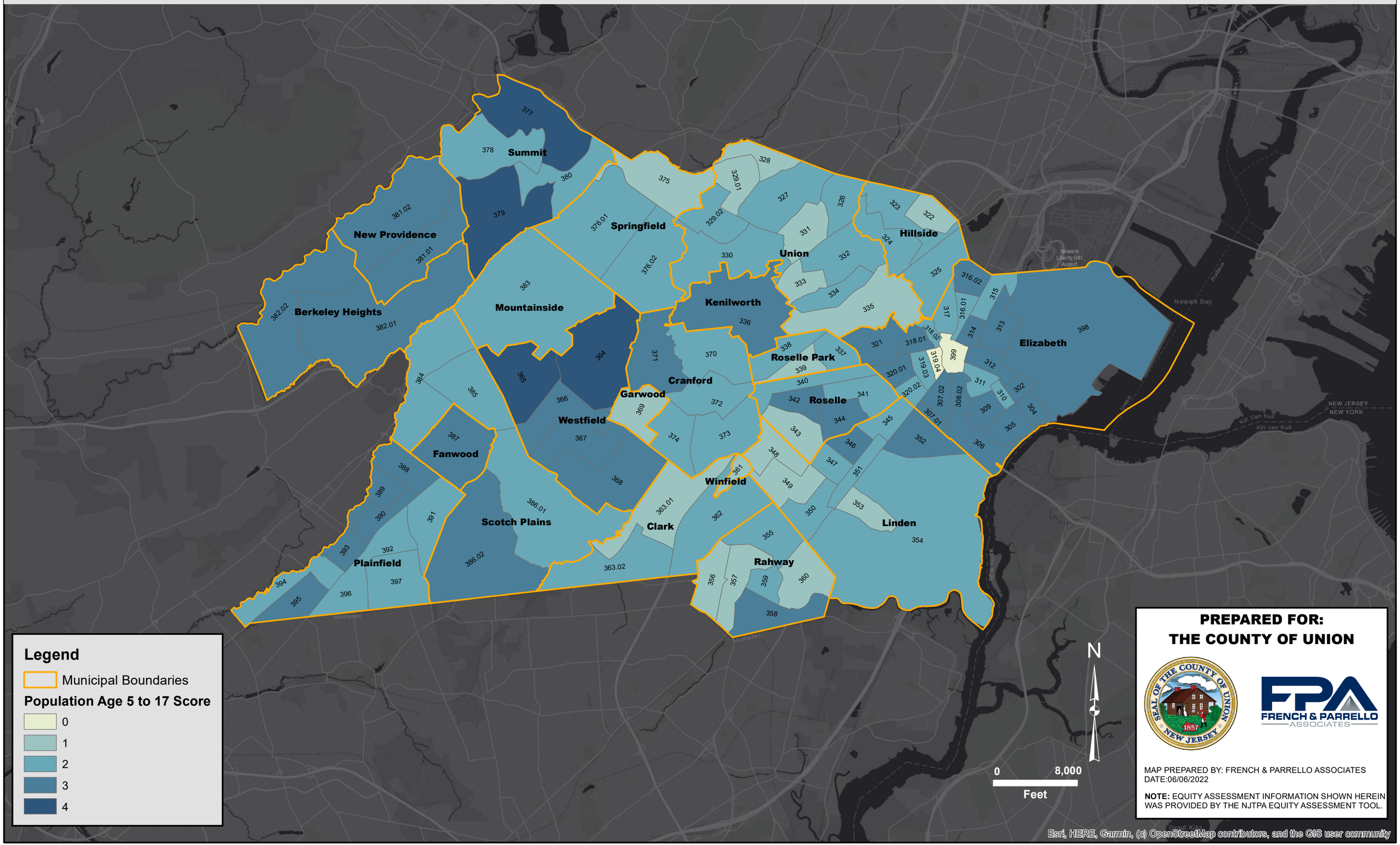
UNION COUNTY ELECTRIC VEHICLES INFRASTRUCTURE STUDY EQUITY ASSESSMENT
DISABILITIES



UNION COUNTY ELECTRIC VEHICLES INFRASTRUCTURE STUDY EQUITY ASSESSMENT
POPULATION UNDER AGE 5



UNION COUNTY ELECTRIC VEHICLES INFRASTRUCTURE STUDY EQUITY ASSESSMENT
POPULATION AGE 5 TO 17



Legend

- Municipal Boundaries

Population Age 5 to 17 Score

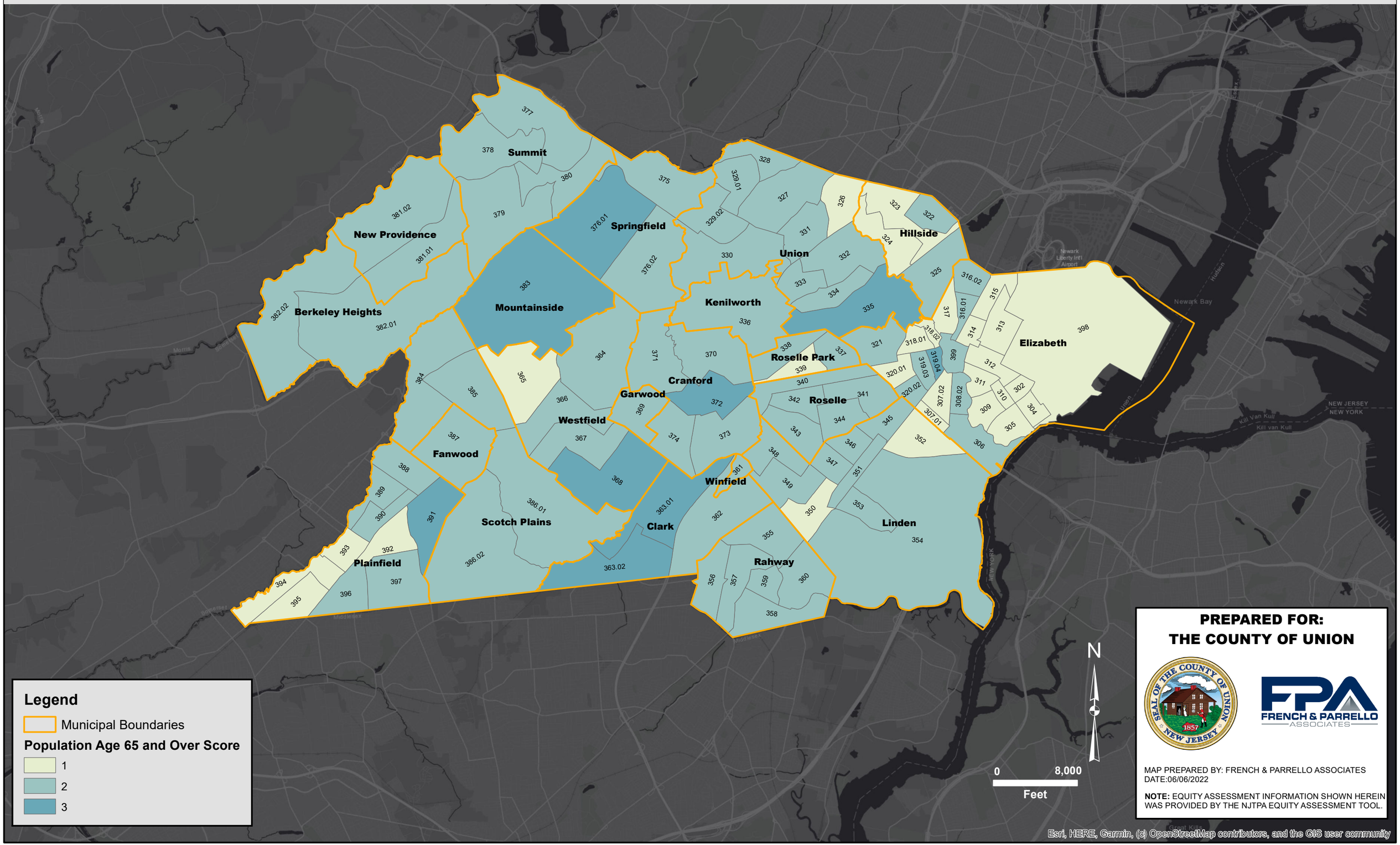
- 0
- 1
- 2
- 3
- 4

PREPARED FOR:
THE COUNTY OF UNION

MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE:06/06/2022

NOTE: EQUITY ASSESSMENT INFORMATION SHOWN HEREIN WAS PROVIDED BY THE NJTPA EQUITY ASSESSMENT TOOL.

UNION COUNTY ELECTRIC VEHICLES INFRASTRUCTURE STUDY EQUITY ASSESSMENT
POPULATION AGE 65 AND OVER



Legend

- Municipal Boundaries

Population Age 65 and Over Score

- 1
- 2
- 3

N

0 8,000

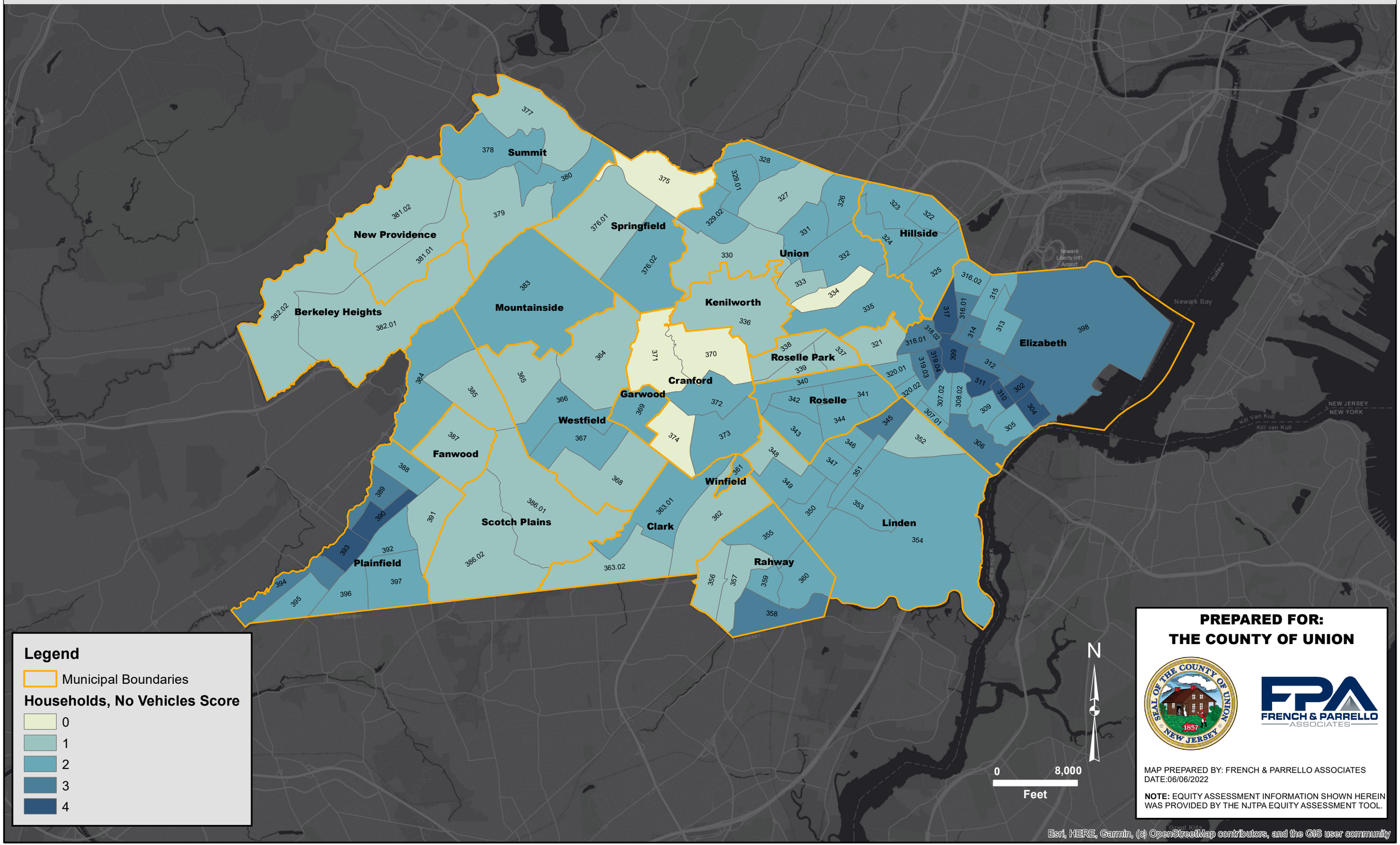
Feet

PREPARED FOR:
THE COUNTY OF UNION

MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE:06/06/2022

NOTE: EQUITY ASSESSMENT INFORMATION SHOWN HEREIN WAS PROVIDED BY THE NJTPA EQUITY ASSESSMENT TOOL.

UNION COUNTY ELECTRIC VEHICLES INFRASTRUCTURE STUDY EQUITY ASSESSMENT
ZERO VEHICLE HOUSEHOLDS



APPENDIX G

Municipality Contact List

APPENDIX A: MUNICIPALITY CONTACT LIST

Berkeley Heights			
Connie Valenti	Planning Board & Zoning Board Secretary	cvalenti@bhtwp.com	908-464-2700, 2124 908-963-6454 (cell)
Clark			
Donna Mazzucco	Planning Board Secretary	donna@ourclark.com	732-388-3600
Janet Gentry	Zoning Board Secretary	const@ourclark.com	732-428-8401
Cranford			
Kathleen Nemeth	Planning Board & Zoning Board Officer	k-nemeth@cranfordnj.org	908-709-7216
Elizabeth			
Monae Whitehead	Planning Board & Board of Adjustment Secretary	Monae.whitehead@elizabethnj.org	908-820-4023
Fanwood			
Patricia Hoynes	Planning Board & Zoning Board Secretary	PHoynes@FanwoodNJ.org	908-322-8236, 121
Ray Sullivan	Zoning Official	zoning@fanwoodnj.org	908-322-5244, 132
Garwood			
Adele Lewis	Planning Board & Zoning Board Secretary	a-lewis@Garwood.org	908-789-0710, 3028
Hillside			
Richard Thacker	Corresponding Secretary to the Planning Board	rthacker@hillsidenj.us	848-666-0935
Hope Smith	Zoning Officer	hsmith@hillsidenj.us	848-666-0744
Kenilworth			
Ms. Moschitta	Deputy Borough Clerk	deputyclerk@kenilworthnj.org	908-276-9090
Tony Galirano	Harbor Consultants	tonyg@hcicg.net	908-276-2715
Linden			
Dorothy Kotowski	Secretary of the Planning Board	dkotowski@linden-nj.gov	908-474-8473
Joseph Bodek	Municipal Clerk	jbodek@linden-nj.org	908-474-8452
Mountainside			
Theresa Snyder	Planning Board Secretary	tsnyder@mountainside-nj.com	908-232-2919
Patricia Gilstrap	Zoning Board Secretary	pgilstrap@mountainside-nj.com	908-232-2400, 250
Keith Disko	Engineer/Zoning Reviews	kddisko@yahoo.com	908-232-2409
New Providence			
Wendi Barry	Municipal Clerk	wbarry@newprov.us	908-665-1400
Plainfield			
Daniel White	Planning Board & Zoning Board Secretary	daniel.white@plainfieldnj.gov	908-753-3391
Rahway			
Steven Decker	Planning Board Secretary	SDecker@cityofrahway.com	732-827-2196
Jeffrey Jotz	Municipal Clerk	cityclerkdepartment@cityofrahway.com	732-827-2100
Roselle			
Dr. Stephanie Falana	Planning Board Secretary	planningboard@boroughofroselle.com	
Jackie Hollis	Zoning Board Secretary	hollisjc@gmail.com	
Robert Lawson	Zoning Officer	rlawson@boroughofroselle.com	908-259-3023
Roselle Park			
Martha Banks	Municipal Land Use Clerk	mbanks@rosellepark.net	908-245-2721, 1200
Richard Belluscio	Zoning Official	rbelluscio@rosellepark.net	908-245-2721
Scotch Plains			
Joana Roberts	Planning Board & Zoning Board Secretary	mbanks@rosellepark.net	908-245-2721, 1200
Bob LaCosta	Construction Official/Zoning Officer	blacosta@scotchplainsnj.com	908-939-8448
Springfield			
Jennifer Amend Law	Planning Board & Zoning Board Administrator	Jennifer.Law@springfield-nj.us	973-912-2221
Summit			
Christopher Nicola	Planning Board & Zoning Board Secretary	cnicola@cityofsummit.org	908-273-6407
Union Township			
Diana Rutledge	Administrative Assistant - Engineering	drutledge@uniontownship.com	908-851-8506
Eileen Birch	Municipal Clerk	Ebirch@uniontownship.com	908-851-5456
Westfield			
Kristine Burd	Planning Board & Zoning Board Secretary	kburd@westfieldnj.gov	908-789-4100, 4602
Winfield			
Melanie Slowik	Municipal Clerk	mmg019@yahoo.com	908-925-3850

APPENDIX H

Municipality Future/Planned Charging Locations
Data Collected

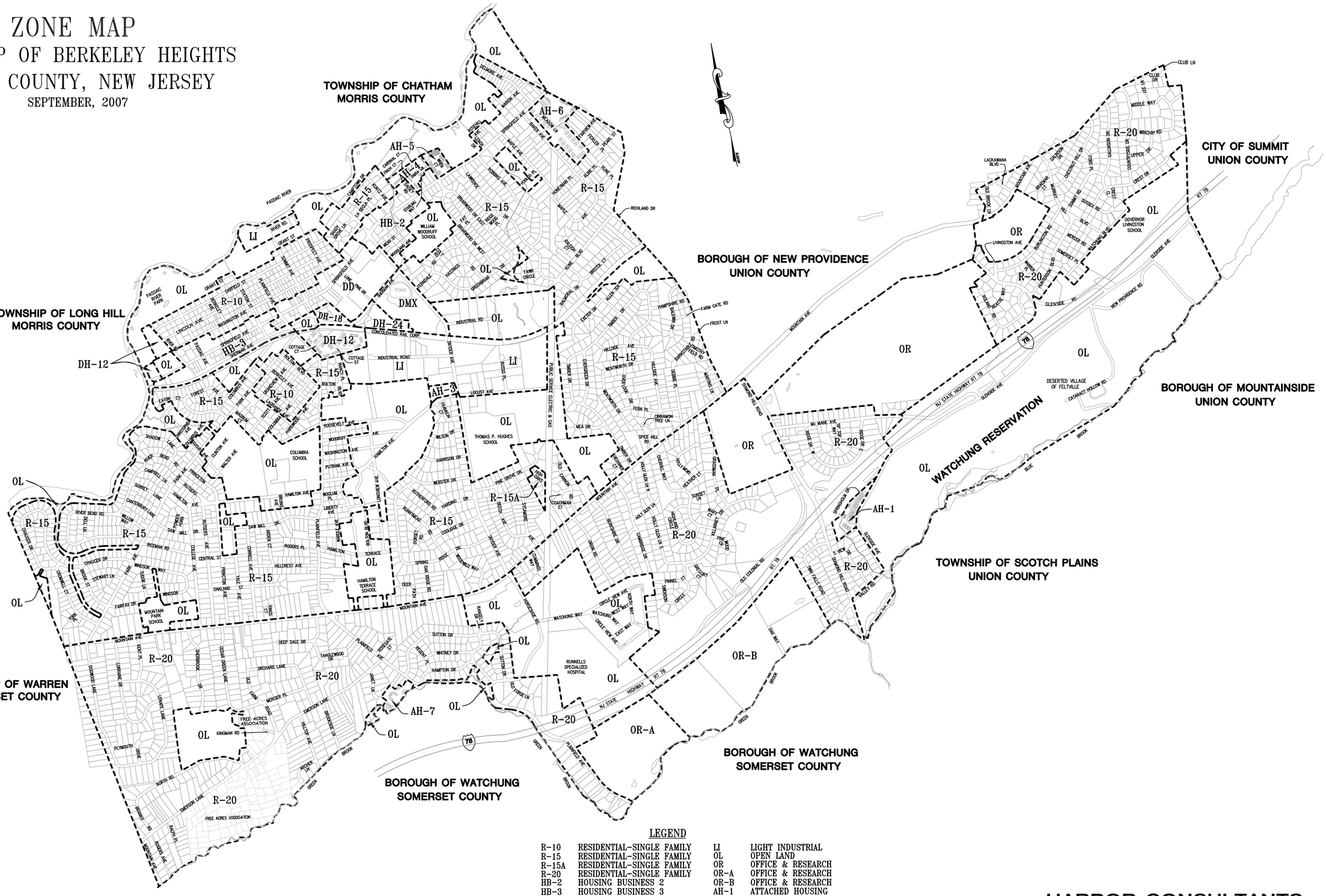
APPENDIX B: MUNICIPALITY FUTURE/PLANNED CHARGING LOCATIONS						
Location	**Business Name**	**# of Chargers**	**# of Parking Spaces**	**Description**	**Funding Source**	**Information Provided By**
Berkely Heights						
29 Park Avenue	Union County	1 or 2	2 or 4	Dual-port EV chargers at the new municipal complex	State Grant	Liza Viana
Connell Corporate Park	Union County			few EV chargers in town, and all existing		Liza Viana
Clark						
1060 Raritan Road	ACME	2	4			Donna Mazzucco
Cranford						
370 North Avenue, East	Tesla Dealership	12				Kathleen Nemeth
1080 Springfield Avenue	Union County	1	2	Level 2		Phil Kandl
201 Walnut Avenue			5			Kathleen Nemeth
24 South Avenue			8			Kathleen Nemeth
750 Walnut Street			24			Kathleen Nemeth
Elizabeth						
418-434 Palmer Street			2	Bus Fleet		Monae Whitehead
862-864 Anna Street			2	Township Fleet Vehicles		Monae Whitehead
Bollwage Garage on Elizabethtown Plaza				Existing EV charging stations in the Bollwage Garage on Elizabethtown Plaza and at the Mall.		Monae Whitehead
Elizabeth Mall				Existing EV charging stations in the Bollwage Garage on Elizabethtown Plaza and at the Mall.		Monae Whitehead
Fanwood						
1 2nd St		2		DC Fast; Shopping Center Parking Lot		Antonios Panagopoulos
475 Terrill Road	Union County			475 Terrill Road Redevelopment Plan consists of a 5,655 square foot QuickChek.		Thomas Strowe
Garwood						
75 North Avenue	Paperboard Renewal Assoc., LLC	14		Garwood Paperboard Redevelopment Area; Preliminary site plan approved.	NJ DOT	Adele Lewis
423-453 South Avenue & 424-440 South Avenue	South Ave Urban Renewal, LLC	2	4			Adele Lewis
400, 450-490 South Avenue & 50 and 70 Center Street	South Ave Urban Renewal, LLC	8		South Avenue Transit Oriented redevelopment area.		Adele Lewis
10 South Ave	Union County			Lidl Redevelopment Plan; and a 51 parking space park and ride.		Thomas Strowe
Kenilworth						
25 N. 26th Street	Union County	24	48			Christian Cueto
Linden						
31 East Henry Street	Linden Free Public Library	2		DC Fast	Applied for NJDEP It Pays to Plug In Grant	Steven Brodman
New Providence						
535 Central Avenue	The Murray Hill Inn	2				Keith Lynch
Roselle						
1 Park Drive	Union County	1	2	Level 2; Parking adjacent to Warinanco Sports Center.	Applied for It Pays to Plug In & Board of Public Utilities Electric Vehicle Tourism Program	Phil Kandl
Roselle Park						
Lot 1 Chestnut Street	Union County	3				Richard Belluscio
240-250 West Westfield Avenue	Union County	~12				Richard Belluscio
10 West Westfield Avenue	Union County					Richard Belluscio
Hunter Property	Union County	2 to 3		Proposed; 1 year away		Richard Belluscio
Ryan Property	Union County			Proposed; 1 year away		Richard Belluscio
Scotch Plains						
Downtown	Union County			Tier 1, Phase 1 Downtown Redevelopment Plan consists of a maximum of 350 residential units, 15,000 square feet of retail, and other public improvements.		Thomas Strowe
East Second Street	Union County			East Second Street Redevelopment Plan consists of 40 residential units and 2,100 square feet of retial		Thomas Strowe

APPENDIX B: MUNICIPALITY FUTURE/PLANNED CHARGING LOCATIONS						
Location	**Business Name**	**# of Chargers**	**# of Parking Spaces**	**Description**	**Funding Source**	**Information Provided By**
1805 Front Street	Union County			1805 Front Street Project consists of 41 residential units		Thomas Strowe
Springfield						
Morris Avenue	Wawa	7				Jennifer Amend Law
Morris Avenue	BP	3				Kevin Mizer
Union Township						
2255 Springfield Avenue, Union, NJ	Union Crescent Plaza	4		4 new EV charging stations in a location convenient to shopping, little to no additional traffic, and is located in a shopping center.		Diana Rutledge
Westfield						
155 Elm Street	Union County	1		Parking lot outside of Trader Joes.		Don Sammet
201-215 Prospect Street		15		Just had a Planning Board Application deemed complete which includes 15 EV Charging Stations.		Don Sammet
300 North Avenue East	Union County	1		Parking Lot in front of Colleen Fraser Building, Union County Passport Office.		Phil Kandl
300 North Avenue West	Union County	2		Parking Lot #2		Don Sammet
146 Mountain Ave	Union County	1		Parking lot #4		Don Sammet
No Municpal Information						
Route 22 East	Union County	1		Open installation order		Kevin Mizer

APPENDIX I

Zoning Maps for 21 Municipalities

ZONE MAP
TOWNSHIP OF BERKELEY HEIGHTS
UNION COUNTY, NEW JERSEY
SEPTEMBER, 2007



LEGEND

R-10	RESIDENTIAL-SINGLE FAMILY	LI	LIGHT INDUSTRIAL
R-15	RESIDENTIAL-SINGLE FAMILY	OL	OPEN LAND
R-15A	RESIDENTIAL-SINGLE FAMILY	OR	OFFICE & RESEARCH
R-20	RESIDENTIAL-SINGLE FAMILY	OR-A	OFFICE & RESEARCH
HB-2	HOUSING BUSINESS 2	OR-B	OFFICE & RESEARCH
HB-3	HOUSING BUSINESS 3	AH-1	ATTACHED HOUSING
DH-12	DOWNTOWN HOUSING 12	AH-3	ATTACHED HOUSING
DH-18	DOWNTOWN HOUSING 18	AH-6	ATTACHED HOUSING
DH-24	DOWNTOWN HOUSING 24	AH-7	ATTACHED HOUSING
DD	DOWNTOWN DEVELOPMENT		
DMX	DOWNTOWN MIXED USE		

HARBOR CONSULTANTS
ENGINEERS, PLANNERS & SURVEYORS
320 NORTH AVENUE EAST
CRANFORD, N.J. 07016
Tel. (908) 276-2715 Fax (908) 709-1738

2006010.03\berkeley heights-zoning revised 9/20/11 (SB)

ZONING DISTRICT MAP

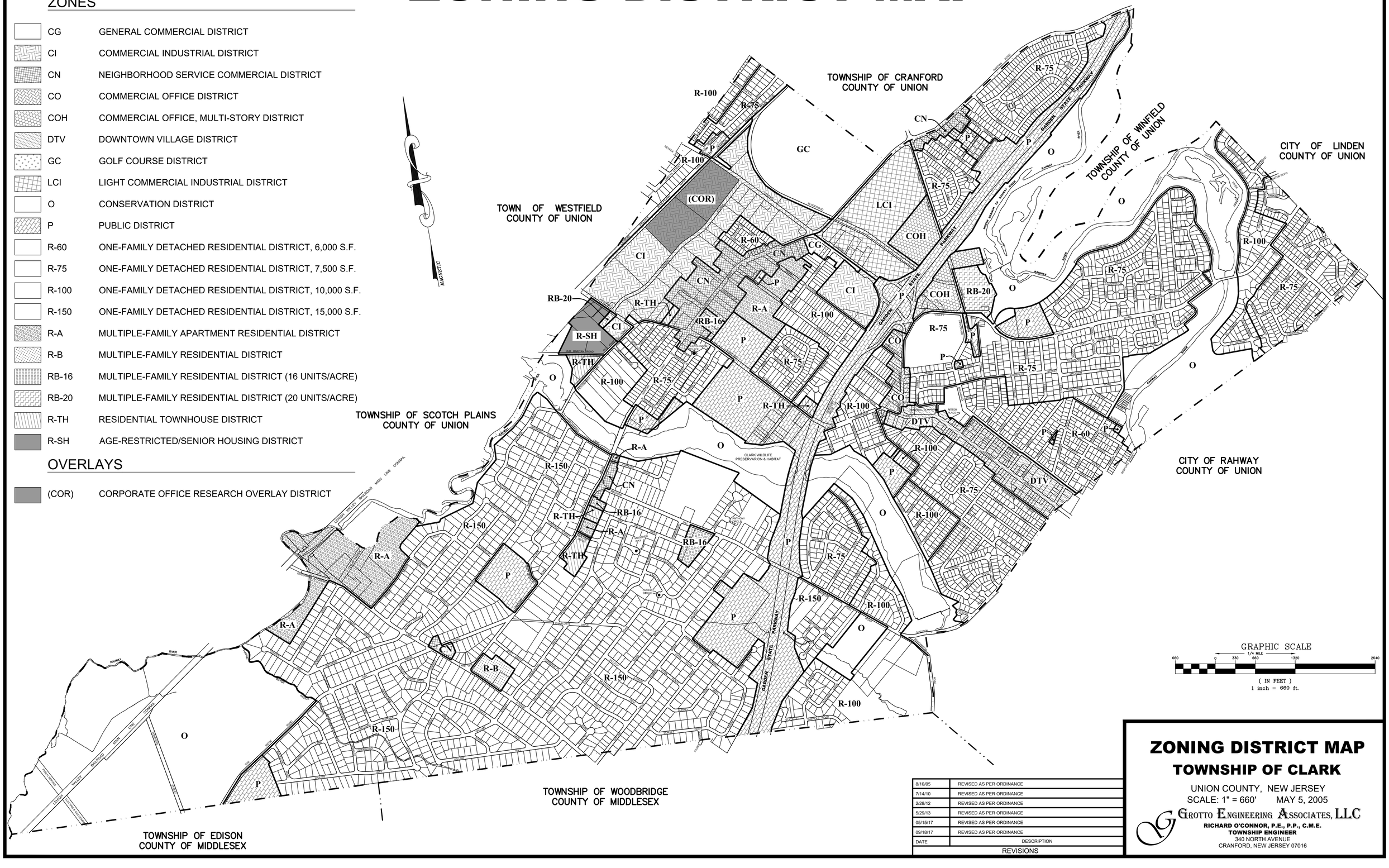
LEGEND

ZONES

	CG	GENERAL COMMERCIAL DISTRICT
	CI	COMMERCIAL INDUSTRIAL DISTRICT
	CN	NEIGHBORHOOD SERVICE COMMERCIAL DISTRICT
	CO	COMMERCIAL OFFICE DISTRICT
	COH	COMMERCIAL OFFICE, MULTI-STORY DISTRICT
	DTV	DOWNTOWN VILLAGE DISTRICT
	GC	GOLF COURSE DISTRICT
	LCI	LIGHT COMMERCIAL INDUSTRIAL DISTRICT
	O	CONSERVATION DISTRICT
	P	PUBLIC DISTRICT
	R-60	ONE-FAMILY DETACHED RESIDENTIAL DISTRICT, 6,000 S.F.
	R-75	ONE-FAMILY DETACHED RESIDENTIAL DISTRICT, 7,500 S.F.
	R-100	ONE-FAMILY DETACHED RESIDENTIAL DISTRICT, 10,000 S.F.
	R-150	ONE-FAMILY DETACHED RESIDENTIAL DISTRICT, 15,000 S.F.
	R-A	MULTIPLE-FAMILY APARTMENT RESIDENTIAL DISTRICT
	R-B	MULTIPLE-FAMILY RESIDENTIAL DISTRICT
	RB-16	MULTIPLE-FAMILY RESIDENTIAL DISTRICT (16 UNITS/ACRE)
	RB-20	MULTIPLE-FAMILY RESIDENTIAL DISTRICT (20 UNITS/ACRE)
	R-TH	RESIDENTIAL TOWNHOUSE DISTRICT
	R-SH	AGE-RESTRICTED/SENIOR HOUSING DISTRICT

OVERLAYS

	(COR)	CORPORATE OFFICE RESEARCH OVERLAY DISTRICT

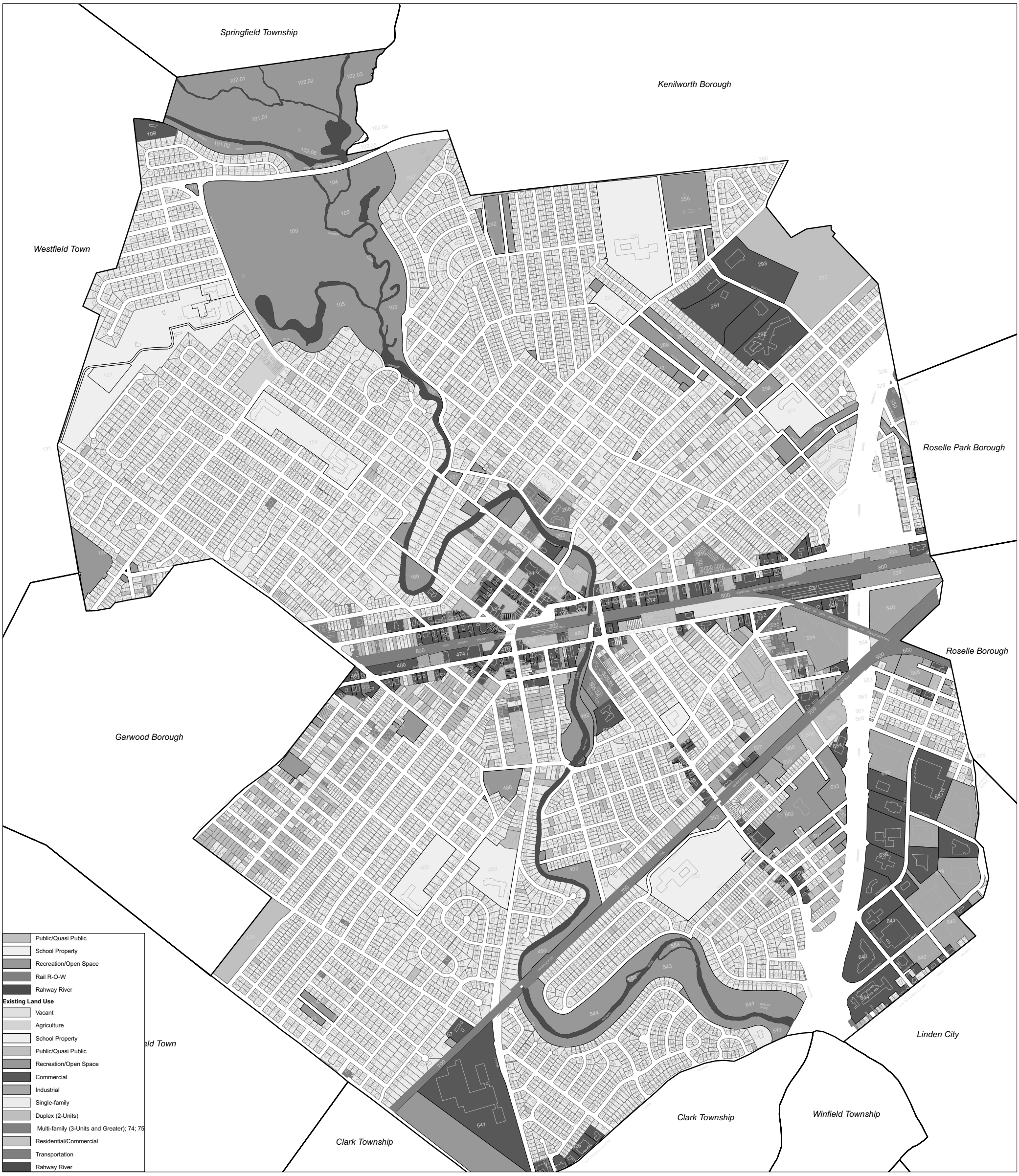


REVISIONS	
DATE	DESCRIPTION
8/10/05	REVISED AS PER ORDINANCE
7/14/10	REVISED AS PER ORDINANCE
2/28/12	REVISED AS PER ORDINANCE
5/29/13	REVISED AS PER ORDINANCE
05/15/17	REVISED AS PER ORDINANCE
09/18/17	REVISED AS PER ORDINANCE

ZONING DISTRICT MAP
TOWNSHIP OF CLARK

UNION COUNTY, NEW JERSEY
SCALE: 1" = 660' MAY 5, 2005

GROTTO ENGINEERING ASSOCIATES, LLC
RICHARD O'CONNOR, P.E., P.P., C.M.E.
TOWNSHIP ENGINEER
340 NORTH AVENUE
CRANFORD, NEW JERSEY 07016



TM ASSOCIATES
11 Tindall Road
Middletown, NJ 07748-2792
Phone: 732-671-6400
Fax: 732-671-7365

Prepared by: PNR, June 18, 2007
Source: Union County GIS, NJDEP
File Path: H:\CNPB\00020\Gis\Projects\Land Use.mxd

Figure LU-1
Existing Land Use
Township of Cranford
Union County, New Jersey

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

Zone District Abbreviation	Zone District Name
R-1	One-Family Detached Residence District
R-2	One-Family Detached Residence District
R-3	One-Family Detached Residence District
R-4	One-Family Detached Residence District
R-5	One- and Two-Family Residence District
R-6	Townhouse Residence District
R-7	Garden Apartment Residence District
R-8	Apartment Residence District
R-SC-1	Senior Citizen Apartment Residence District
B-1	Central Business Retail District
B-1-O	Central Business Retail Office District
B-2	General Business Service District
B-3	Neighborhood Business District
O-1	Low-Density Office Building District
O-2	Medium-Density Office Building District
O-3	High-Density Office Business District
ORD-1	Office Research Distribution District
ROI-1	Campus Research, Office and Industrial District
ROI-2	Selected Research, Office and Industrial District
ROI-3	Research-Office-Industrial-Limited District
E-1	Education District
P-1	Public Use District
CCRD	Cranford Crossing Redevelopment District
RRD	Riverfront Redevelopment District
WGRD	Western Gateway Rehabilitation District
ARR	Age Restricted Redevelopment District (555 South Avenue East Redevelopment Area)
NRD	North Avenue Rehabilitation District

11 Tindall Road
Middletown, NJ 07748-2792
Phone: 732-671-6400
Fax: 732-671-7365

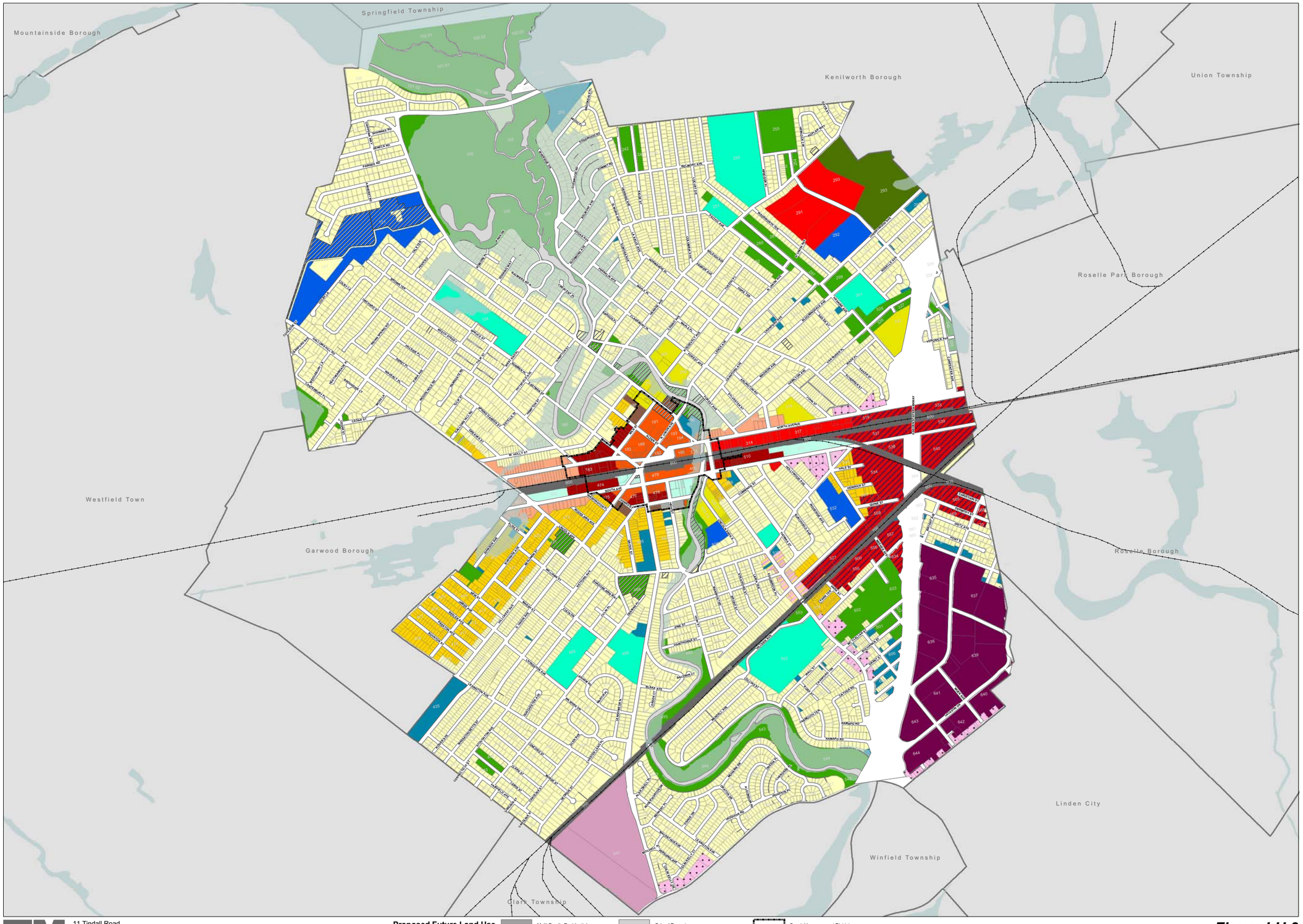
0 450 900 1,800 Feet

Prepared by: PNR, June 21, 2007, Last Revised February 21, 2008
Source: Union County GIS, NJDEP
File Path: H:\CNPB\00020\Gis\Projects\Zoning 2-08.mxd

Figure LU-2
Existing Zoning
Township of Cranford
Union County, New Jersey

N

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.



T&M ASSOCIATES
11 Tindall Road
Middletown, NJ 07748-2792
Phone: 732-671-6400
Fax: 732-671-7365

0 1,000 2,000 4,000 Feet

Prepared by: ARR, September 9, 2009
Source: FEMA - 2008 Flood Hazard Overlay; Cranford Township GIS - Tax Parcel, Building Footprint, Land Use, Histpric Sites, Overlay Zones; NJDOT - 2008 Roads
File Path: H:\CNPB\00020\GIS\Projects\Concept Plan 9-9-09.mxd

Proposed Future Land Use

- Commercial-1
- Commercial-2
- Commercial-3
- Conservation Center
- Downtown Business
- Downtown Core
- Multi-Family Residential
- Neighborhood/Gateway Commercial
- Office
- Office Residential Character
- Open Space
- Public/Quasi Public
- Redevelopment Project Area
- School Property
- Single and Two-Family Residential
- Single-Family Residential
- Age Restricted/ Senior Services/ Institutional
- Village Commercial
- Transition
- Railroad R-O-W
- Special Improvement District
- Historic Sites
- 100 Year Flood Hazard
- Municipal Boundary

Figure LU-3
Future Land Use
Township of Cranford
Union County, New Jersey

N

NOTE: This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not State-authorized.

City of Elizabeth

Union County, New Jersey

Zone Map

FEBRUARY 21, 2000
Revised 11-20-00, Revised 9-18-02,
Revised 1-25-12, Revised 4-26-16, Revised 7-16-19

UNION TWP
UNION County

HILLSIDE TWP
UNION County

ROSELLE PARK BORO
UNION County

ROSELLE BORO
UNION County

NEWARK CITY
ESSEX County

LINDEN CITY
UNION County

NEWARK BAY

ELIZABETH CHANNEL

WARD #1

WARD #2

WARD #3

WARD #4

WARD #5

WARD #6

Newark Airport

Elizabeth - Port Authority Marine Terminal

Redevelopment Areas

Elizabeth Zones

Zoning Designations

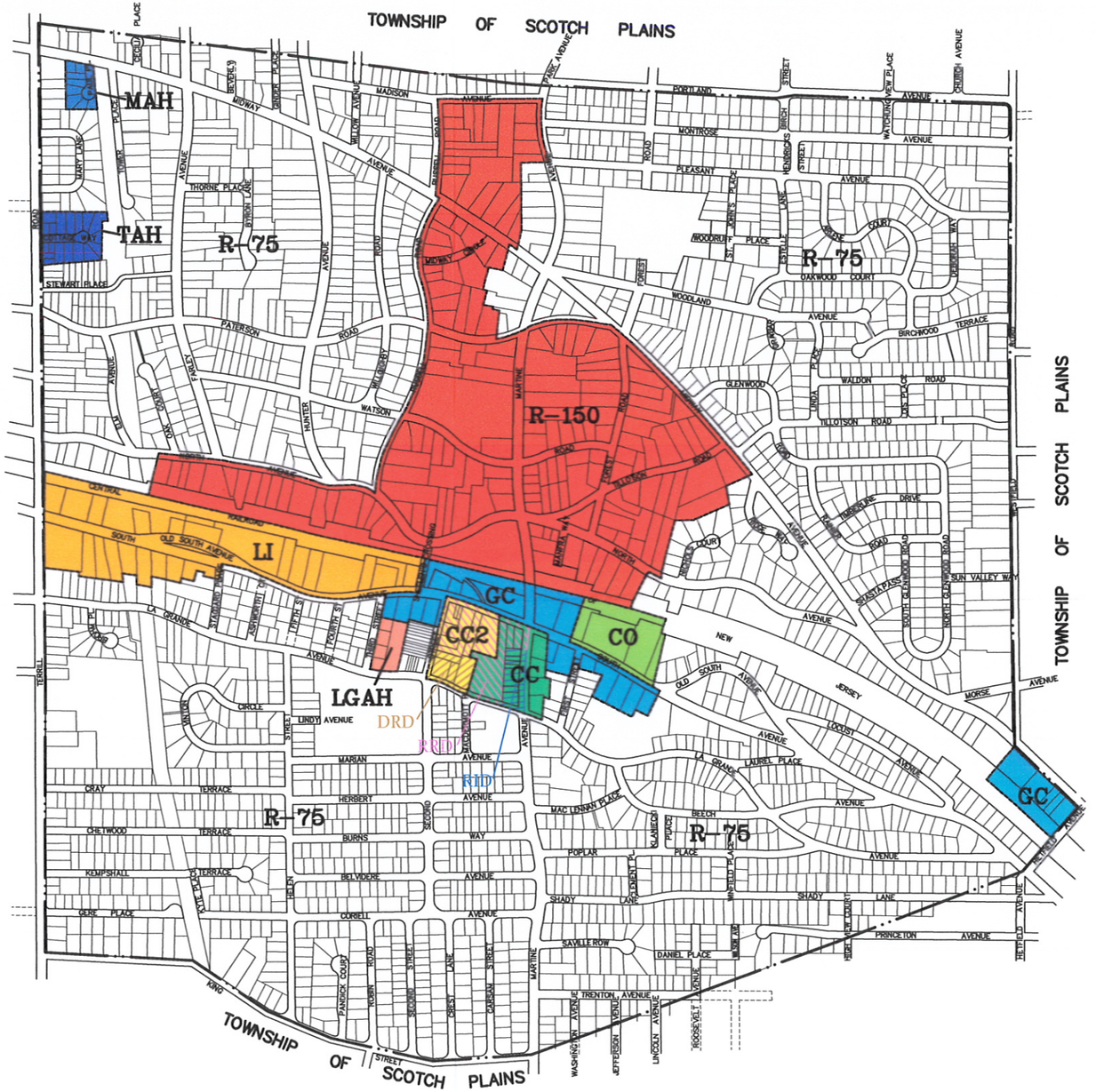
- R-1 Single-Family Residential
- R-2 Two-Family Residential
- R-3 Multifamily Residential
- R-3A Four-family Residential
- R-4 Elevator Apartment
- C-1 Neighborhood Commercial
- C-2 Community Commercial
- C-3 Central Commercial
- C-4 Special Commercial
- C-5 Commercial
- HC Highway Commercial
- RC Regional Commercial
- OC-1 Office/Commercial - 1
- OC-2 Office/Commercial - 2
- MRC Manufacturing, Research, & Commercial
- M-1 Light Industrial
- M-2 Heavy Industrial
- O Open Space
- P Public
- T Transportation
- Waterbodies

1. Kapkowski Road Redevelopment Area
2. Elizabethport Waterfront Redevelopment Area (39-55 Pine St)
3. Midtown Redevelopment Area
4. Seaport Industrial Center Redevelopment Area
5. Elizabethport Phase II Redevelopment Area
6. Elizabethport Redevelopment Area
7. Trumbull Street Redevelopment Area
8. South Front Street (Borne Chemical) Redevelopment Area
9. Baker Center Redevelopment Area
10. York Street Redevelopment Area
11. Oakwood Plaza Redevelopment Area
12. Morris Ave (University Corridor) Redevelopment Area
13. Henry Street Redevelopment Area
14. South Second Street Redevelopment Area
16. 56-78 Murray Street Redevelopment Area
17. Amended Baker Center (1029-1061 Newark Ave) Redevelopment Area
18. Former Elizabeth General Hospital Redevelopment Area
19. Magnolia Avenue Redevelopment Area
20. 125 North Broad Street (Hersh Tower) Redevelopment Area
21. North Ave East/Spring Street/Woodruff Lane - Ward 5 Redevelopment Area

N

0 0.15 0.3 0.6 0.9 1.2
Miles

HARBOR CONSULTANTS
ENGINEERS, PLANNERS & SURVEYORS
320 NORTH AVENUE EAST
CRANFORD, NJ 07016
Tel (908) 276-2715 FAX (908) 709-1738



NEW JERSEY STATE PLANE COORDINATE SYSTEM NAD 83 (SCALED)

LEGEND

DESIGNATION	USE	MIN. LOT AREA (S.F.)
R–150	RESIDENTIAL	15,000
R–75	RESIDENTIAL	7,500
CO	COMMERCIAL & OFFICES	10,000
CC	CENTRAL COMMERCIAL	
CC2	CENTRAL COMMERCIAL – 2	
GC	GENERAL COMMERCIAL	10,000
LI	LIGHT INDUSTRIAL	10,000
MAH	MIDWAY AFFORDABLE HOUSING	
TAH	TERRILL AFFORDABLE HOUSING	
LGAH	LAGRANDE AFFORDABLE HOUSING	

DOWNTOWN REDEVELOPMENT DISTRICTS

RRD	RETAIL – RESIDENTIAL REDEVELOPMENT DISTRICT
RID	REHABILITATION INFILL REDEVELOPMENT DISTRICT
DRD	DOWNTOWN RESIDENTIAL REDEVELOPMENT DISTRICT

REDEVELOPMENT DISTRICTS ARE SUBJECT TO THE REDEVELOPMENT PLAN FOR DOWNTOWN FANWOOD, BLOCK 64 ADOPTED ON FEBRUARY 24, 2005 AND AMENDED THROUGH NOVEMBER 1, 2005, PURSUANT TO THE LOCAL REDEVELOPMENT AND HOUSING LAW (NJSA 40A:12A–1 ET SEQ).

NO.	DATE	DESCRIPTION	CHKD.	APPRD.
5	12/08	ORD. CC2 & CC DISTRICTS SHOWN		
4	8/07	REDEVELOPMENT DISTRICT NOTES		
3	4/07	D.T. REDEVELOPMENT ZONES RRD, RID & DRD,		
2	4/07	ORD. 07–07–R – R150 & STAGGARD PLACE		
1	10/25/06	ORD. 06–15–R – STAGGARD PLACE		

REVISIONS

DESIGNED:
DRAWN: P.J.M.
OFFICE CHECKED:

MAP AND DATA REFERENCES:

ZONING MAP, BOROUGH OF FANWOOD, UNION COUNTY, NEW JERSEY, DATED JULY 2003, PREPARED BY JEM ENGINEERING INC.

KUPPER ASSOCIATES
N.J. CERTIFICATE OF AUTHORIZATION #24GA2795660
15 STELTON ROAD, PISCATAWAY, N.J. 08855–0036
732–752–5600

0 400 800
SCALE IN FEET
1" = 400'

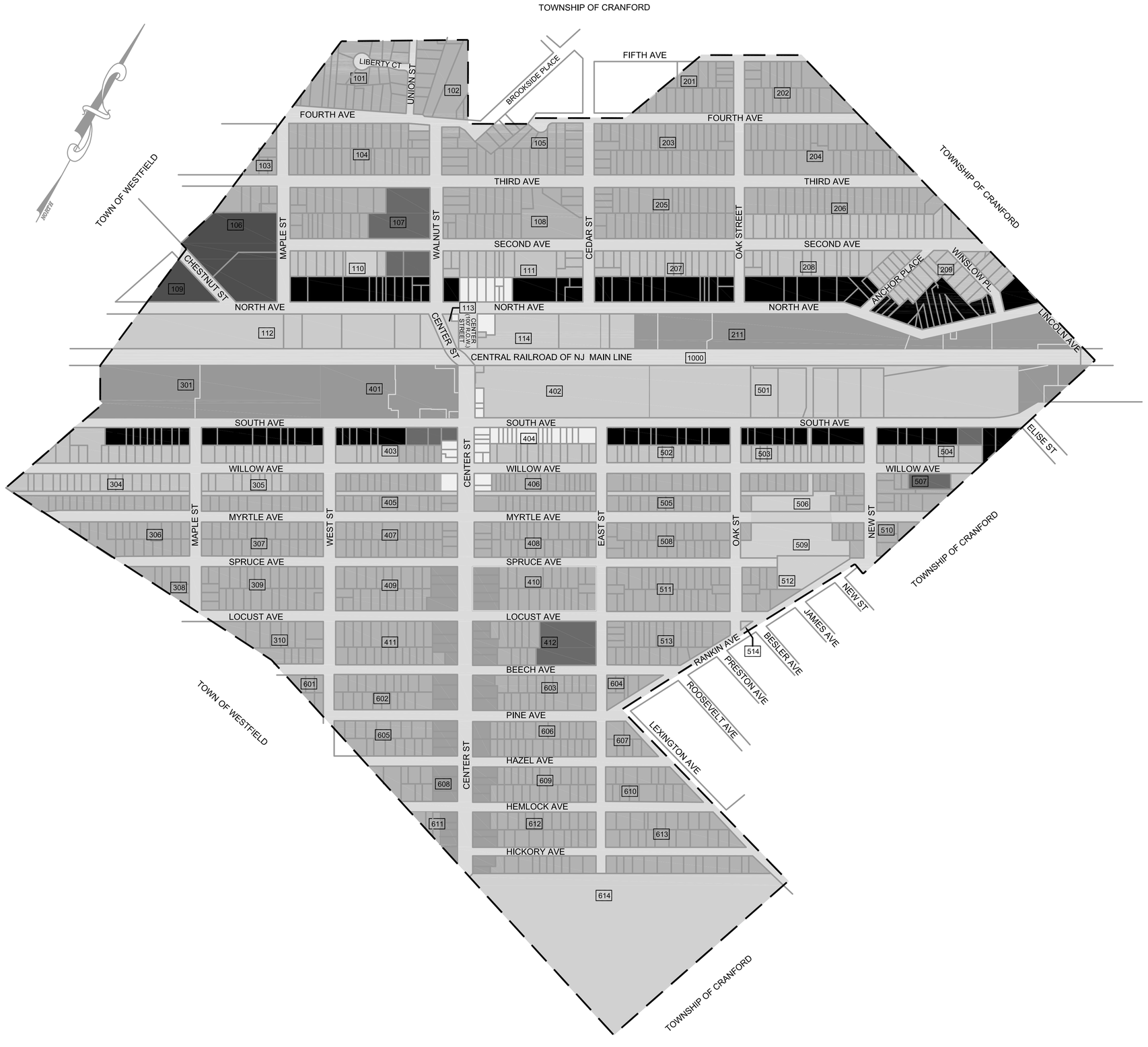
ZONING MAP
BOROUGH OF FANWOOD

UNION COUNTY NEW JERSEY
SCALE: 1" = 400' DATE: 6/2003

1 OF 1

275010.03
CONTRACT NO.

DRAW / SURVEY FILE NO.:
CREATED: 10/25/06 LAST OPENED: 12/10/08 16:25
TAB: –
FILE: AFN99999_ZONING MAP



ZONING DISTRICT LEGEND

R-A	RESIDENCE "A" (SINGLE FAMILY)
R-A1	RESIDENCE "A1" (SINGLE FAMILY)
R-B	RESIDENCE "B" (TWO FAMILY)
G-B	GENERAL BUSINESS
C-B	CENTRAL BUSINESS
CC	COMMUNITY COMMERCIAL
LI	LIGHT INDUSTRIAL
PL	PUBLIC LANDS
POS	PUBLIC OPEN SPACE
MUD	MIXED USE DISTRICT
T	TRANSPORTATION DISTRICT

MAY 1991
REVISED JUNE 20, 1994
REVISED DECEMBER 9, 1997 (ORD. #97–171)
REVISED OCTOBER 4, 2011

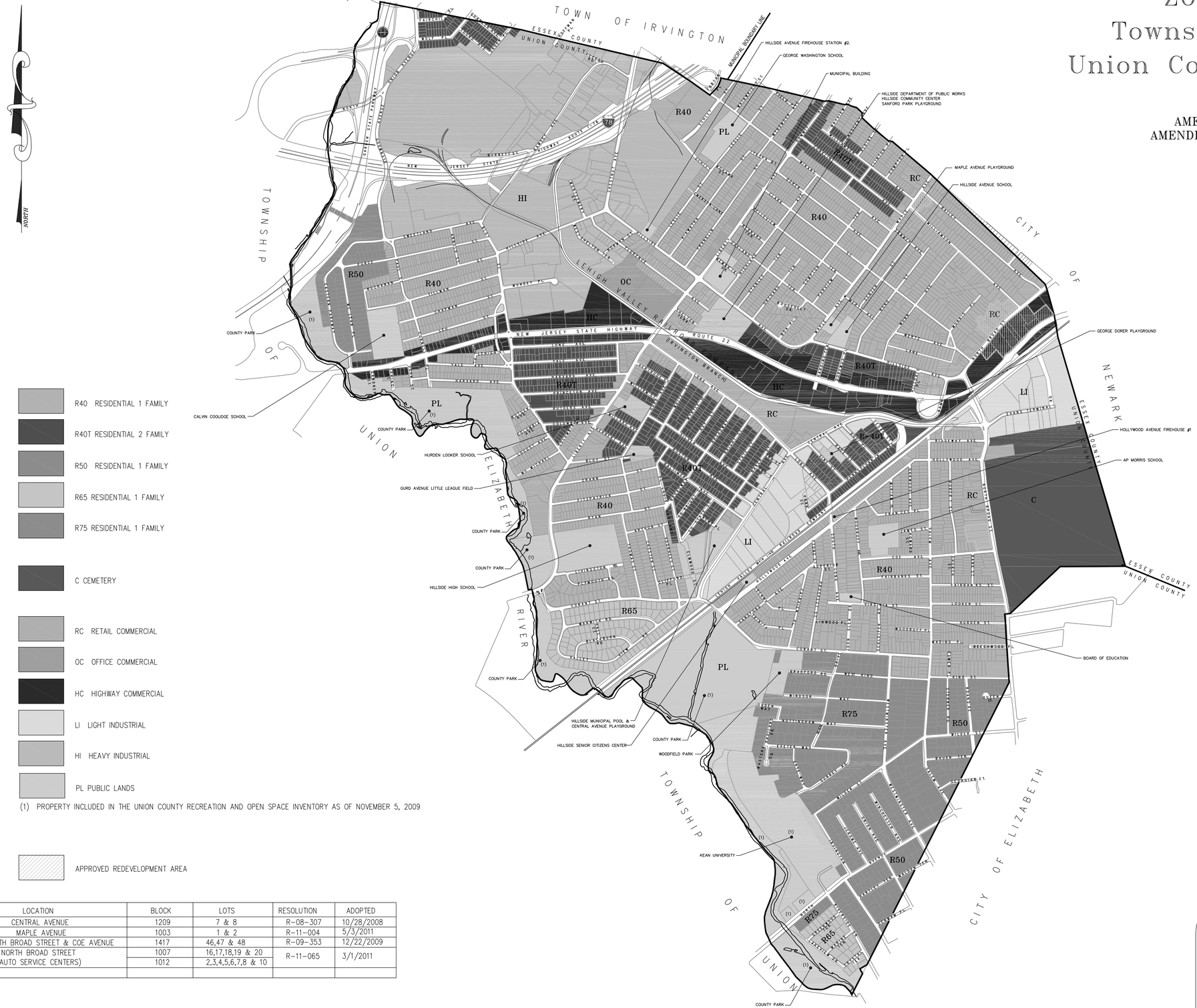
ZONING MAP
BOROUGH OF GARWOOD, UNION COUNTY, NEW JERSEY.

Engineers, Planners & Surveyors
320 NORTH AVENUE EAST
CRANFORD, N.J. 07016
Phone (908) 276–2715 Fax (908) 709–1738
E-mail: info@hcicg.net

F/Garwood Zone Amendments/2011 ZONE MAP

ZONING MAP
Township of Hillside
Union County, New Jersey

MAY 1, 1979
AMENDED: MAY 15, 1979
AMENDED: DECEMBER 8, 2009



- R40 RESIDENTIAL 1 FAMILY
- R40T RESIDENTIAL 2 FAMILY
- R50 RESIDENTIAL 1 FAMILY
- R65 RESIDENTIAL 1 FAMILY
- R75 RESIDENTIAL 1 FAMILY
- C CEMETERY
- RC RETAIL COMMERCIAL
- OC OFFICE COMMERCIAL
- HC HIGHWAY COMMERCIAL
- LI LIGHT INDUSTRIAL
- HI HEAVY INDUSTRIAL
- PL PUBLIC LANDS

(1) PROPERTY INCLUDED IN THE UNION COUNTY RECREATION AND OPEN SPACE INVENTORY AS OF NOVEMBER 5, 2009

- APPROVED REDEVELOPMENT AREA

LOCATION	BLOCK	LOTS	RESOLUTION	ADOPTED
CENTRAL AVENUE	1209	7 & 8	R-08-307	10/28/2008
MAPLE AVENUE	1003	1 & 2	R-11-004	5/3/2011
NORTH BROAD STREET & COE AVENUE	1417	46,47 & 48	R-09-353	12/22/2009
NORTH BROAD STREET (AUTO SERVICE CENTERS)	1007	16,17,18,19 & 20	R-11-065	3/1/2011
	1012	2,3,4,5,6,7,8 & 10		

F/2009005.19 zoning

S:\2009\05\2009005.19\Zoning Map.dwg, 6/25/2013 9:53:25 AM, Adobe PDF

Harbor Consultants Inc.
Engineers & Surveyors
320 NORTH AVENUE EAST
CRANFORD, N.J. 07016
Phone (908) 276-2715 Fax (908) 709-1738
E-mail: info@hcicg.net

BOROUGH OF KENILWORTH

UNION COUNTY, NEW JERSEY

ZONING MAP

SEPTEMBER, 2015

LEGEND

	R-6	LOW DENSITY SINGLE FAMILY RESIDENTIAL ZONE
	R-5	MEDIUM DENSITY SINGLE FAMILY RESIDENTIAL ZONE
	R-5A	HIGH DENSITY ONE AND TWO FAMILY RESIDENTIAL ZONE
	B-D	BOULEVARD DOWNTOWN ZONE
	AC	AREA COMMERCIAL ZONE
	C	COMMERCIAL ZONE
	OR	OFFICE RESEARCH ZONE
	I	INDUSTRIAL ZONE
	G	GOVERNMENT ZONE
	P	PARK ZONE
	CE	CEMETERY ZONE
	CS	COMMUNITY SERVING ZONE
	SLO	SENIOR LIVING OVERLAY ZONE
	GO	GATEWAY OVERLAY ZONE
	RO	RESIDENTIAL OVERLAY

GRAPHIC SCALE

500′ 0 250′ 500′ 1000′ 2000′

(IN FEET)

1" = 500'

NOTE:

THIS MAP HAS BEEN DIGITALLY RECREATED USING GIS INFORMATION AND WAS BASED UPON A MAP ENTITLED "ZONING MAP, BOROUGH OF KENILWORTH, UNION COUNTY, NEW JERSEY" WHICH WAS PREPARED BY SCHOOR DEPALMA ENGINEERS AND CONSULTANTS ON MAY 10, 2004.

MAP IS BASED ON:

1. DEC. 1981 DRAWING BY FRANK KOCZUR, FORMER BOROUGH ENGINEER, AND TAYLOR, WISEMAN & TAYLOR, CONSULTANTS.
2. NOV. 1992 REVISED DRAWING BY MICHAEL DISKO, P.E., P.P., FORMER BOROUGH ENGINEER.

SHAMROCK ENTERPRISES, LTD.

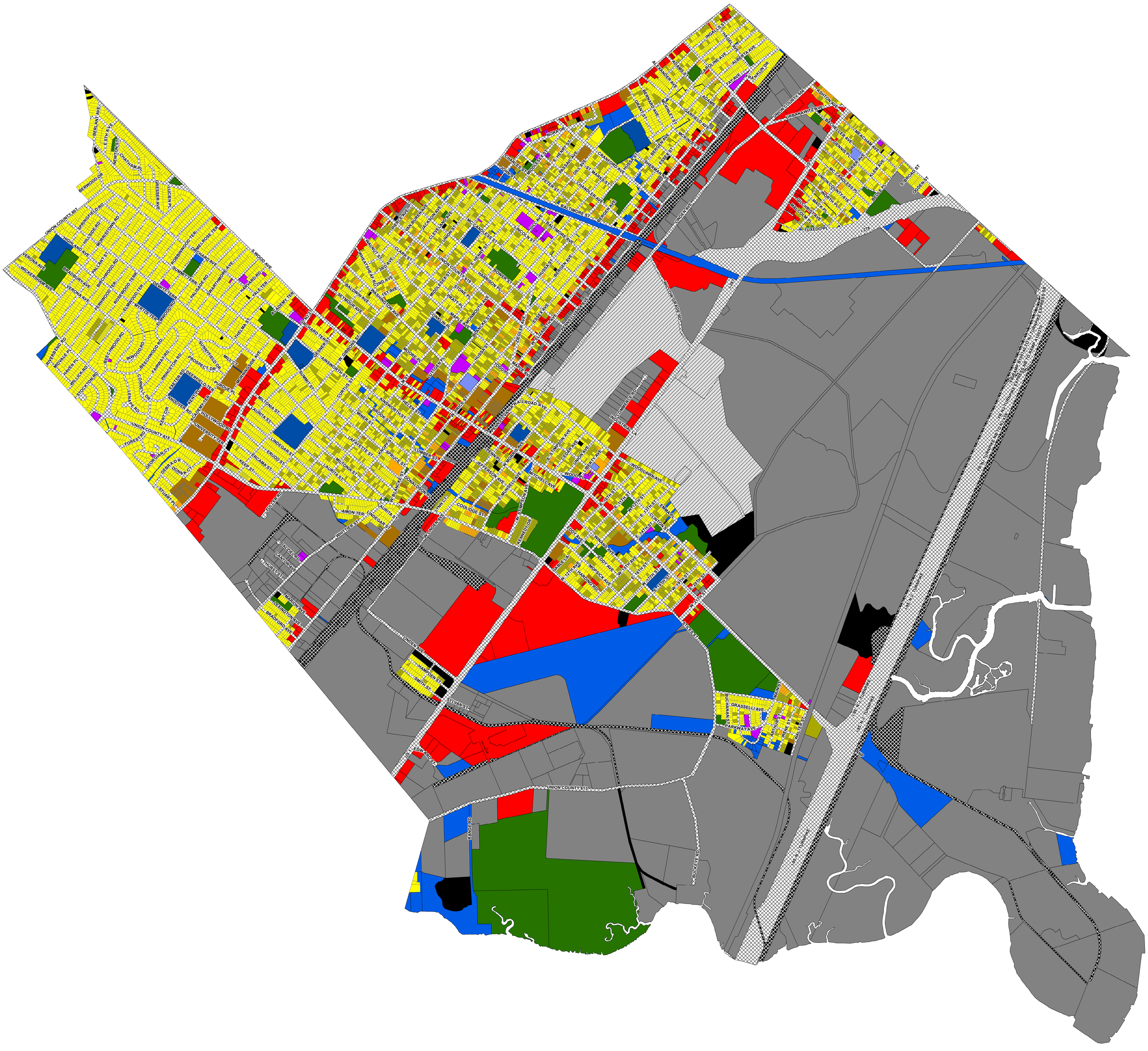
Land Use Planning and Transportation Consulting

MADISON HOUSE, SUITE B
866 MADISON AVENUE
RAHWAY, NJ 07065
(732)-388-4765 FAX (732)-388-7938
Shamrock_KOB@Comcast.net

KEVIN O'BRIEN, P.P., A.I.C.P.
BOROUGH PLANNER

Existing Land Use

City of Linden, Union County, New Jersey



ricciplanning
Paul Ricci, AICP, PP
10 Georgian Drive
Clark, NJ 07066

908.642.0070
Fax 350.4501
paul@ricciplanning.com

Existing Zoning

City of Linden, Union County, New Jersey

▭ Existing Zone District Boundary
▨ Existing Overlay Zone District Boundary

C-1 — Central Business
C-1A — Commercial
C-1B — General Commercial
C-2 — Retail Commercial
EDD — Economic Development
HI — Heavy Industrial

LI — Light Industrial
LI-A — Light Industrial — A
OPT — Office Professional Transition
PCD — Planned Commercial
R-1A — Single-Family 50-Foot
R-1B — Single-Family 40-Foot

R-2A — Two-Family 50-Foot
R-2B — Two-Family 40-Foot
R-3 — Apartment
RD — Redevelopment
ROC — Residential Office Commercial
RPZ — Runway Protection Overlay

SA-1 — Station Area - Core Transit Village - Mixed-Use
SA-2 — Station Area - Transit Village Residential
SA-R — Station Area - South Wood Avenue
T-R — Theater

Please note that this is not an official zoning map. This map should only be used as an illustration to the Land Use Element. The offical zoning map of the City of Linden should be consulted for all other purposes (e.g., zoning determinations).

0 400 800 Feet

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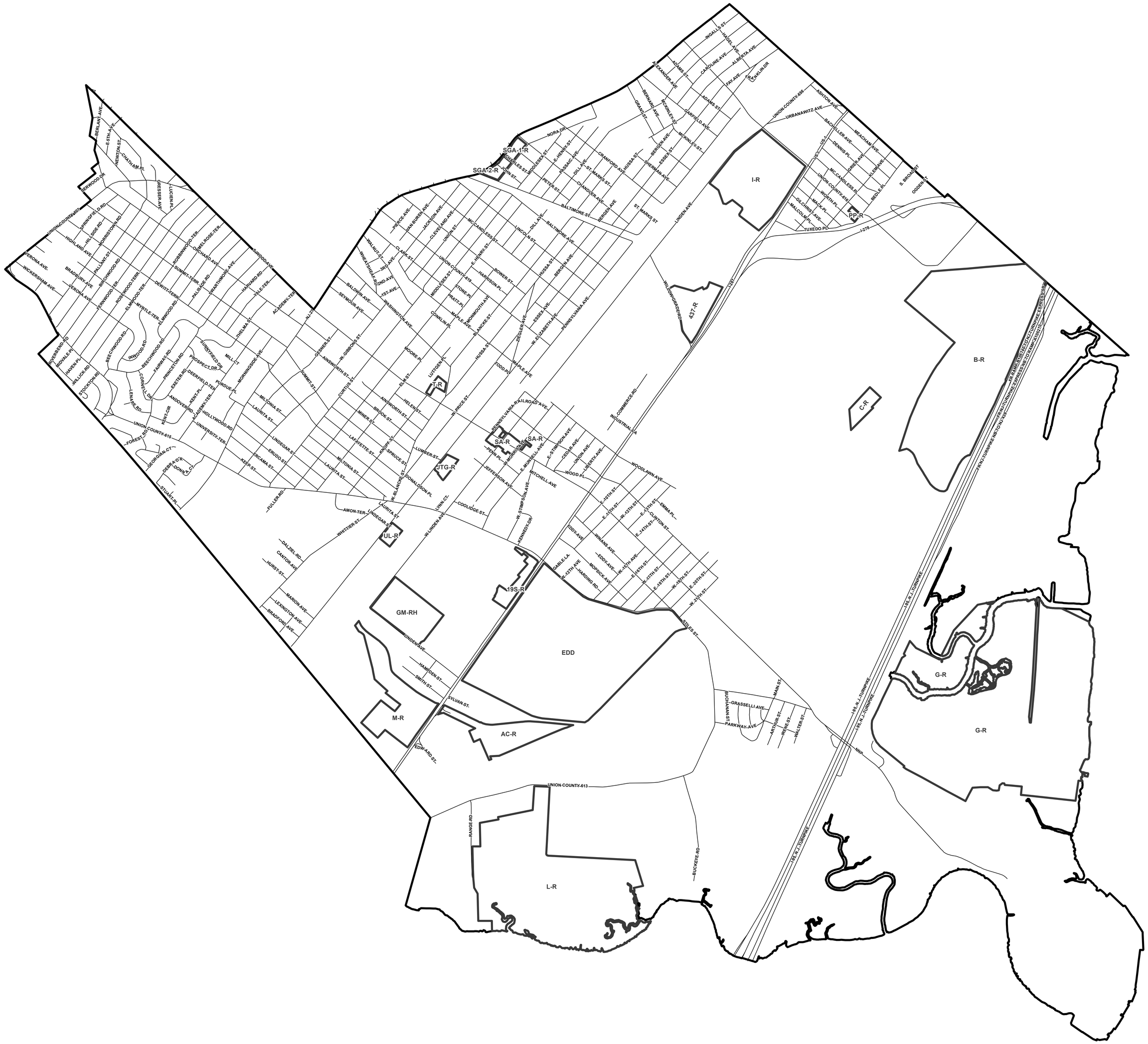
Redevelopment/Rehabilitation Districts

City of Linden, Union County, New Jersey



Existing Redevelopment/Rehabilitation District Boundary

19S-R	—	Route 1/9 and Stiles Street Redevelopment
437-R	—	Block 437, Lots 5.03 and 5.04 Redevelopment
AC-R	—	Avenue C Redevelopment
B-R	—	Bayway Redevelopment
C-R	—	Conoco-Phillips Redevelopment
EDD	—	Economic Development Redevelopment
G-R	—	Grasselli Road Redevelopment
GM-RH	—	General Motors Rehabilitation
I-R	—	Infineum Redevelopment
JTG-R	—	JTG Scaffolding Redevelopment
L-R	—	Landfill Redevelopment
M-R	—	Merck & Co. Redevelopment
PP-R	—	Park Plastics Redevelopment
SA-R	—	Station Area — South Wood Ave. Redevelopment
SGA-1-R	—	Saint Georges Ave. — Phase 1 Redevelopment
SGA-2-R	—	Saint Georges Ave. — Phase 2 Redevelopment
T-R	—	Theater Redevelopment
UL-R	—	United Lacquer Redevelopment

This map should only be used as an illustration to the Land Use Element. The offical delineation of each redevelopment/ rehabilitation district should be determined by consulting the appropriate redevelopment/rehabilitation plan for each district.

0 400 800 Feet

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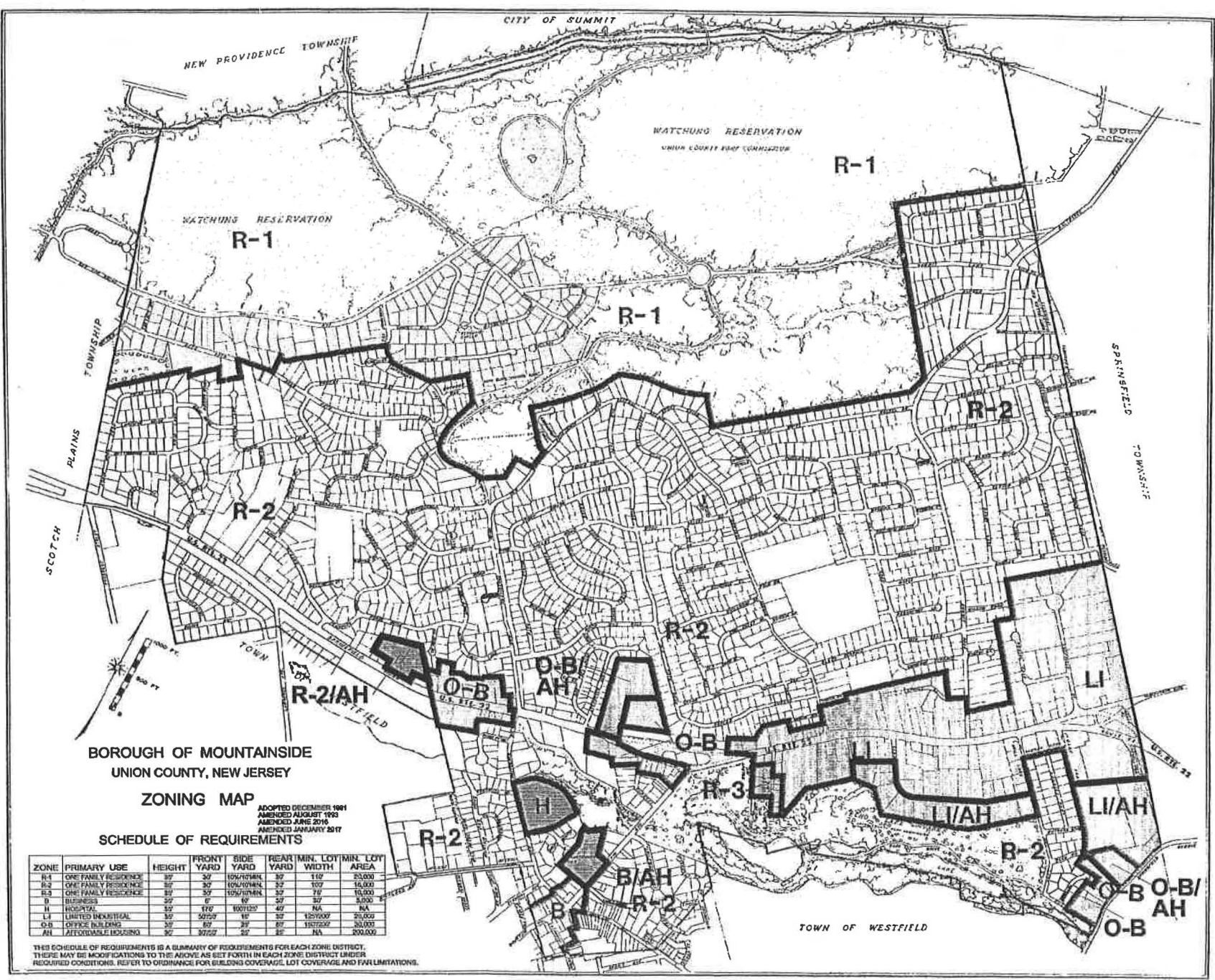


BOROUGH OF MOUNTAINSIDE
UNION COUNTY, NEW JERSEY

ZONING MAP

ADOPTED DECEMBER 1991
AMENDED AUGUST 1993
AMENDED JUNE 2016
AMENDED JANUARY 2017

SCHEDULE OF REQUIREMENTS

ZONE	PRIMARY USE	HEIGHT	FRONT YARD	SIDE YARD	REAR YARD	MIN. LOT WIDTH	MIN. LOT AREA
R-1	ONE FAMILY RESIDENCE	35'	30'	10%/10%MIN.	30'	110'	20,000
R-2	ONE FAMILY RESIDENCE	35'	30'	10%/10%MIN.	30'	100'	16,000
R-3	ONE FAMILY RESIDENCE	35'	30'	10%/10%MIN.	30'	75'	10,000
B	BUSINESS	35'	6'	10'	30'	30'	5,000
H	HOSPITAL	35'	175'	100'/125'	40'	NA	NA
LI	LIMITED INDUSTRIAL	35'	50'/30'	15'	30'	125'/200'	20,000
O-B	OFFICE BUILDING	35'	50'	25'	50'	150'/200'	30,000
AH	AFFORDABLE HOUSING	90'	30'/50'	50'	25'	NA	200,000

THIS SCHEDULE OF REQUIREMENTS IS A SUMMARY OF REQUIREMENTS FOR EACH ZONE DISTRICT. THERE MAY BE MODIFICATIONS TO THE ABOVE AS SET FORTH IN EACH ZONE DISTRICT UNDER REQUIRED CONDITIONS. REFER TO ORDINANCE FOR BUILDING COVERAGE, LOT COVERAGE AND FAR LIMITATIONS.

Zoning

New Providence, NJ

Proposed Zoning

- A-1: Affordable Housing District 6 units/acre
- A-2: Affordable Housing District 10 units/acre
- A-3: Affordable Housing District 14 units/acre
- A4: Affordable Housing Zone
- C-1: Specialty Commercial District
- C-2: Neighborhood Commercial District
- C: Central Commercial District
- OR: Office & Residential District
- R-1: Single Family Residential
- R-2: Single Family Residential
- R2A: Single Family District
- R-3: Two Family Residential
- R3A: Single and Two Family District
- R-4: Multi Family
- R-S: Residential Senior Citizen
- TBI 1: Technology and Business Innovation Zone I
- TBI 2: Technology and Business Innovation Zone II

Proposed Zoning Overlays

- AH-ARO: Affordable Housing Age-Restricted Overlay
- AHO: Affordable Housing Overlay
- PACO: Planned Adult Community Overlay
- CCRCO: Continuing Care Retirement Community Overlay

0 500 1,000 Feet

HGA

June 2019

Source: NJGIN, NJOGIS, NJDEP, Borough of New Providence

CHATHAM TWP
SUMMIT CITY
BERKELEY HEIGHTS TWP
Charnwood Rd
Slope Dr
Ridge Dr
Gordon Pl
Runnymede Pkwy
Delaware Ave
Springfield Ave
Earl Pl
Terrace Rd
Ridgeview Ave
Salt Brook Rd
Whitman Dr
Radcliff Dr
Fairmount Rd
Porter Pl
Magnolia Dr
Fairview Ave
Pearl St
Hawthorne Dr
Jones Dr
Kline Blvd
Crane Cir
Central Ave
Balcom Rd
Pioneer Dr
Westview Ave
High St
Springst
Chanlon Rd
Springfield Dr
Greenway
Commerce Dr
Floral Ave
Passaic St
Walton Ave
Crescent Dr
Commonwealth Ave
Woodbine Cir
Pine Way
Elkwood Ave
Stanley Rd
Jane Rd
Clinton Ave
Madison Ave
Pitney Ave
Alden Rd
Sherwood Dr
Gales Dr
5th St
Thomas St
8th St
6th St
W 5th St
Bradford St
W 3rd St
E 4th St
2nd St
1st St
Pleasantview Ave
Delwick Ln
Lancaster Ct
Inwood Rd
Pittsford Way
Laurel Dr
Mill Pond Rd
Midvale Dr
Willow St
Hickson Dr
Glenbrook Rd
Brookside Dr
Douglas St
Marion Ave
Livingston Ave
Grant Ave
Crest Rd
Maple St
Grove Ter
Division Ave
Rose Ave
Sagamore Dr
Knollwood Dr
Baldwin Dr
Union Ave
Sullivan Rd
Yarmouth Dr
Ethan Dr
Deerfield Rd
Woodland Rd
Greenwood Rd
Colchester Rd
Hathaway Dr
Hansell Rd
Johnson Dr
Frost Ln
Princeton Dr
Ryder Way
Southgate Rd
Candlewood Dr
South St
Hickory Pl
The Fellsway
Forest Rd
Colony Ct
Chestnut St
Walnut St
Elm St
Tall Oaks Dr
Stone Ridge Rd
Acorn Dr
Old Oak Dr
Overhill Rd
Kendrick Rd
Hillside Ter
Martins Ln
Possum Way
Mountain Ave
Old Brook Ln
Dorr Rd
Oakwood Dr
Gallinson Dr
Club Dr
Club Ln
R-1
R-2
R-3
R-4
R-S
R2A
R3A
A-1
A-2
A-3
A4
C
C-1
C-2
OR
TBI1
TBI2

FORMER CLINTON AVENUE TRAIN STOP AREA

FORMER GRANT AVENUE TRAIN STOP AREA

NORTH AVENUE REDEVELOPMENT PLAN

TEPPER'S TRACT REDEVELOPMENT PLAN

PARK MADISON REDEVELOPMENT PLAN

WEST SECOND AND MADISON AVE REDEVELOPMENT PLAN

ELMWOOD GARDENS REDEVELOPMENT AREA

MARINO'S TRACT REDEVELOPMENT PLAN

DOWNTOWN PLAINFIELD STATION AREA

NETHERWOOD STATION AREA

EAST THIRD & RICHMOND REDEVELOPMENT PLAN

EAST 6TH STREET AND SCOTT PLACE REDEVELOPMENT PLAN

GREEN BROOK TOWNSHIP

MIDDLESEX COUNTY

BOROUGH OF DUNELLEN

PISCATAWAY TOWNSHIP

WATCHUNG BOROUGH

PLAINFIELD

SCOTCH PLAINS TOWNSHIP

NORTH PLAINFIELD

BOROUGH OF FANWOOD

BOROUGH OF SOUTH PLAINFIELD

SCOTCH PLAINS TOWNSHIP

GREEN BROOK COUNTY PARK

CEDAR BROOK COUNTY PARK

CENTRAL RAILROAD OF NEW JERSEY

ZONING DISTRICTS

R-1		VERY LOW DENSITY RESIDENTIAL
R-2		LOW DENSITY RESIDENTIAL
R-3		LOW/MODERATE DENSITY RESIDENTIAL
R-4		MODERATE DENSITY RESIDENTIAL
R-5		MEDIUM DENSITY RESIDENTIAL
R-6		MEDIUM/HIGH DENSITY RESIDENTIAL
R-7		HIGH DENSITY RESIDENTIAL

HISTORIC DISTRICTS

R-VWB1		VAN WYCK BROOKS "1"
R-VWB2		VAN WYCK BROOKS "2"
R-CA		CRESCENT AVENUE
R-PW1		PUTNAM WATCHUNG "1"
R-PW2		PUTNAM WATCHUNG "2"
R-HA		HILLSIDE AVENUE
R-B		BROADWAY
R-NH		NETHERWOOD HEIGHTS
CHD		CIVIC HISTORIC DISTRICT
NAHD		NORTH AVENUE COMMERCIAL HISTORIC DISTRICT
CBPHD		CEDAR BROOK PARK HISTORIC DISTRICT
GBPHD		GREEN BROOK PARK HISTORIC DISTRICT
NC		NEIGHBORHOOD COMMERCIAL
PO-1		PROFESSIONAL OFFICE 1
MU		MIXED USE
GC		GENERAL COMMERCIAL
LI		LIGHT INDUSTRIAL
		197 SCATTERED REDEVELOPMENT SITES

TODN ZONES

TODN		
TSA		TRAIN STATION AREA ZONE
TSR		TRAINSIDE RESIDENTIAL ZONE
TSC		TRAINSIDE COMMERCIAL ZONE
PSR1		PARKSIDE RESIDENTIAL ZONE "1"
PSR2		PARKSIDE RESIDENTIAL ZONE "2"
PO-2		PROFESSIONAL OFFICE 2

TODD ZONES

TODD		
TSA		DOWNTOWN TRAIN STATION AREA ZONE DISTRICT
CBD		CENTRAL BUSINESS DISTRICT
CLAD		CLEVELAND AVENUE ARTS DISTRICT
CD		COLLEGE DISTRICT
TD		TRANSITION DISTRICT
PD		PARKING DISTRICT

ARLINGTON HEIGHTS REDEVELOPMENT PLAN

SOUTH AVENUE GATEWAY REDEVELOPMENT PLAN

ZONING MAP
CITY OF PLAINFIELD

UNION COUNTY NEW JERSEY

SCALE: 1" = 700' DATE: JUNE 2015

REMINGTON VERNICK AND ARANGO ENGINEERS

300 PENHORN AVENUE, 3RD FLOOR, SECAUCUS, NJ 07094

(201) 624-2137, FAX (201) 624-2136

WEB SITE ADDRESS: WWW.RVE.COM

S:\PLAINFIELD\VARIOUS MAPPING FILES\ZONINGMAPS\2015-ZONING MAP-REVISED-PARCELMAP-06-2015.DWG

OFFICIAL ZONING MAP OF THE CITY OF RAHWAY UNION COUNTY, NJ

CLARK TOWNSHIP

WOODBRIDGE TOWNSHIP

CITY OF LINDEN

- AREAS OF ADOPTED REDEVELOPMENT PLANS WITH ZONING OVERLAYS (Rev. 7/02)
- Revised 1/05
- Revised 7/24/07

ZONING DESIGNATIONS

R-1	LOW DENSITY SINGLE FAMILY
R-2	MEDIUM DENSITY SINGLE FAMILY
R-3	LOW-RISE MULTI-FAMILY
R-4	HIGH-RISE MULTI-FAMILY
B-1	NEIGHBORHOOD BUSINESS
B-2	REGIONAL BUSINESS
B-3	HIGHWAY BUSINESS
B-4	SERVICE BUSINESS
B-5	CENTRAL BUSINESS
MX	MIXED USE
OR	OFFICE-RESEARCH
I-L	LIGHT INDUSTRIAL
I-H	HEAVY INDUSTRIAL
O	OPEN SPACE
H	HOSPITAL
	HISTORIC PRESERVATION OVERLAY

Feet
0 400 800

Prepared in 1997 by **Abeles Phillips Preiss & Shapiro, Inc.** Planning & Real Estate Consultants 434 Sixth Avenue New York, New York 10011

ROSELLE PARK BORO

ELIZABETH CITY

CRANFORD TWP

Zoning Map Revisions

Adopted by Ordinance ____ on _____ date.

Legend

- Roselle Parcels
- Municipal Boundary

Zoning

- Residence A
- Residence B
- Residence C
- Residence D
- Residence E
- Residence F
- Business\Commercial
- Commercial Industrial
- Industrial
- Professional Office
- Public Use
- North Chestnut Street Redevelopment*
- 3rd Avenue Residential Stabilization*
- Commercial Redevelopment*
- Commercial/Residential Transition*
- Roselle Golf Club Redevelopment*
- South Central Neighborhood Revitilization Plan*

*Denotes a Redevelopment and/or Rehabilitation Zone and Plan.

NOTE: THIS MAP CONTAINS DATA FROM THE NJDEP AND UNION COUNTY GIS DATABASES.
THIS SECONDARY PRODUCT HAS NOT BEEN VERIFIED BY NJDEP AND IS NOT STATE OR COUNTY AUTHORIZED.

\\Hqgis1\gisprojects\Municipal\Q-T\RSB\RSB050\100913dag_Adopted_Zoning.mxd

0 460 920 1,840 2,760 Feet

1 inch = 460 feet

N

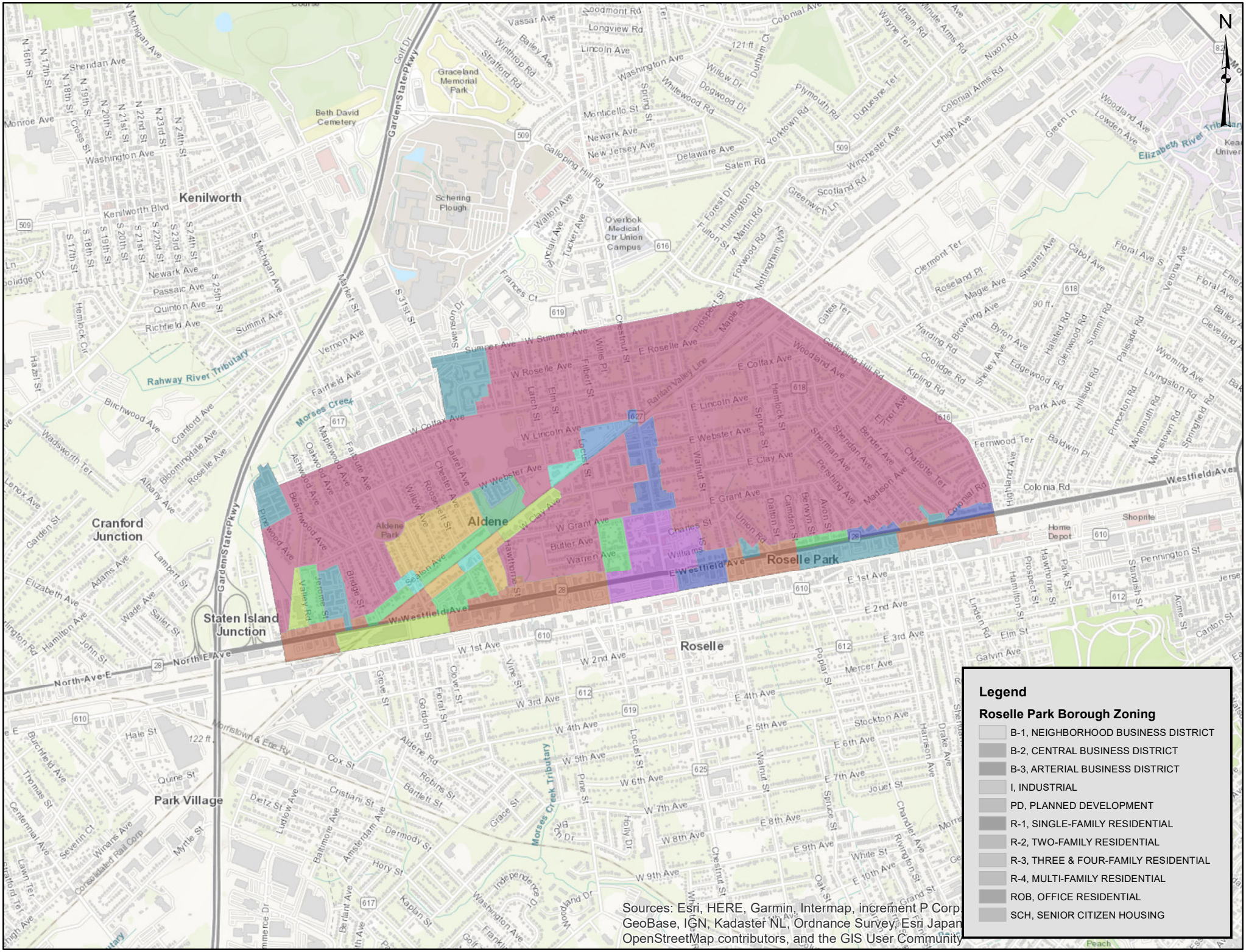
MASER CONSULTING P.A.

Zoning Map

Borough of Roselle
Union County, New Jersey

Adopted October 9, 2013

M.C. Project No. RSB-050X


N
Legend
Roselle Park Borough Zoning
B-1, NEIGHBORHOOD BUSINESS DISTRICT
B-2, CENTRAL BUSINESS DISTRICT
B-3, ARTERIAL BUSINESS DISTRICT
I, INDUSTRIAL
PD, PLANNED DEVELOPMENT
R-1, SINGLE-FAMILY RESIDENTIAL
R-2, TWO-FAMILY RESIDENTIAL
R-3, THREE & FOUR-FAMILY RESIDENTIAL
R-4, MULTI-FAMILY RESIDENTIAL
ROB, OFFICE RESIDENTIAL
SCH, SENIOR CITIZEN HOUSING
Sources: Esri, HERE, Garmin, Intermap, increment P Corp.
GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan
OpenStreetMap contributors, and the GIS User Community
Kenilworth
Cranford Junction
Staten Island Junction
Park Village
Aldene
Roselle
Roselle Park
Graceland Memorial Park
Beth David Cemetery
Schering Plough
Overlook Medical Ctr Union Campus
Aldene Park
Rahway River Tributary
Morses Creek
Morses Creek Tributary
Elizabeth River Tributary
Garden State Pkwy
Rantan Valley Line
Morristown & Erie Ry
Consolidated Rail Corp
Westfield Ave
North Ave E
Shoprite
Home Depot

OFFICIAL MAP
TOWNSHIP OF SCOTCH PLAINS
UNION COUNTY • NEW JERSEY

THE TOWNSHIP PLANNING BOARD

Revised To: January 1, 2015

0 500 1000 1500
Scale in Feet

SC-1, SC-2 SENIOR CITIZEN ZONE

R-2A, R-2B, R-2C BONUS DENSITY RESIDENTIAL SINGLE FAMILY HOMES

ML-1 MULTI-FAMILY ZONE

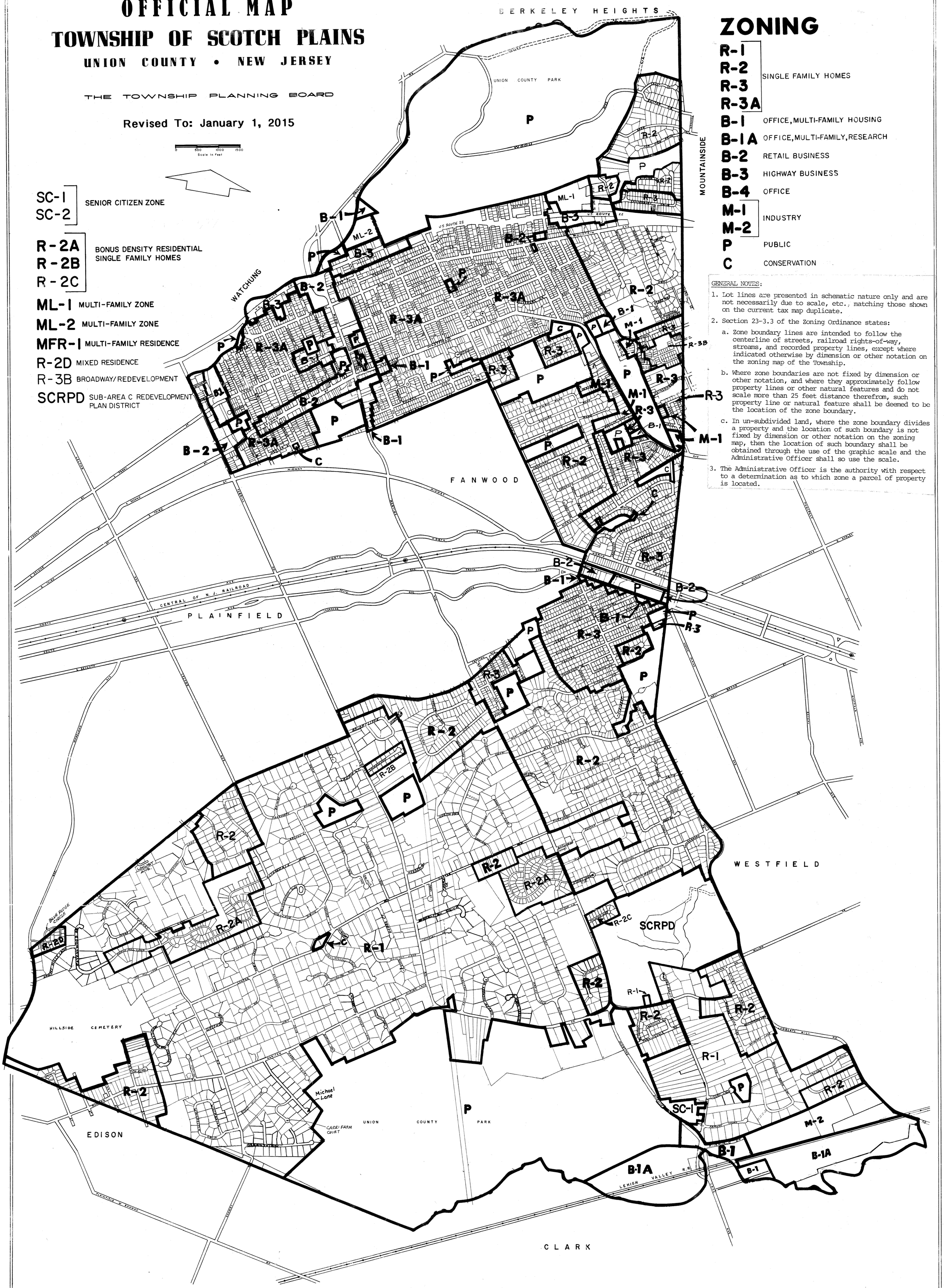
ML-2 MULTI-FAMILY ZONE

MFR-1 MULTI-FAMILY RESIDENCE

R-2D MIXED RESIDENCE

R-3B BROADWAY/REDEVELOPMENT

SCRPD SUB-AREA C REDEVELOPMENT PLAN DISTRICT



ZONING

R-1, R-2, R-3, R-3A	SINGLE FAMILY HOMES
B-1	OFFICE, MULTI-FAMILY HOUSING
B-1A	OFFICE, MULTI-FAMILY, RESEARCH
B-2	RETAIL BUSINESS
B-3	HIGHWAY BUSINESS
B-4	OFFICE
M-1, M-2	INDUSTRY
P	PUBLIC
C	CONSERVATION

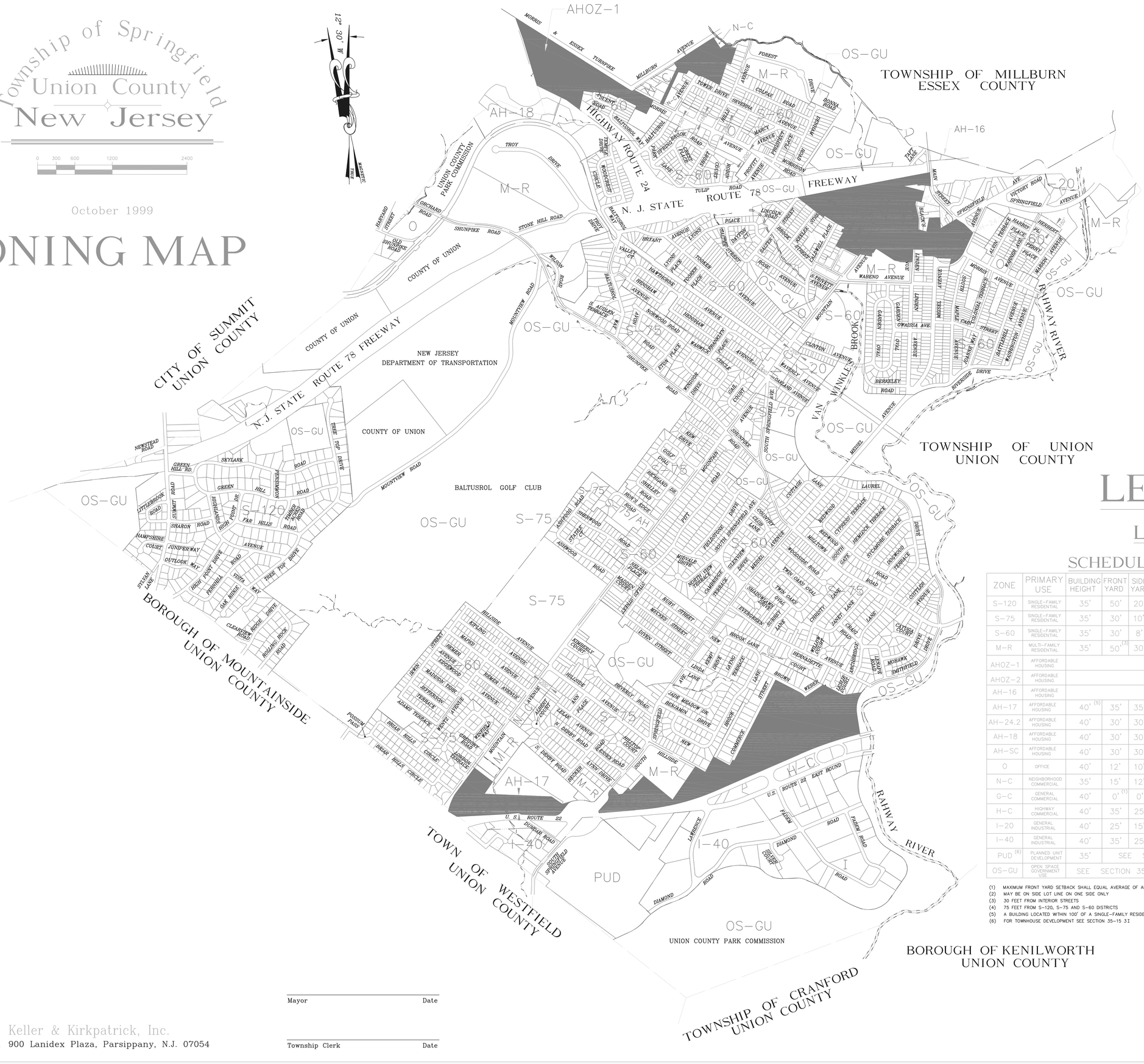
GENERAL NOTES:

1. Lot lines are presented in schematic nature only and are not necessarily due to scale, etc., matching those shown on the current tax map duplicate.
2. Section 23-3.3 of the Zoning Ordinance states:
   a. Zone boundary lines are intended to follow the centerline of streets, railroad rights-of-way, streams, and recorded property lines, except where indicated otherwise by dimension or other notation on the zoning map of the Township.
   b. Where zone boundaries are not fixed by dimension or other notation, and where they approximately follow property lines or other natural features and do not scale more than 25 feet distance therefrom, such property line or natural feature shall be deemed to be the location of the zone boundary.
   c. In un-subdivided land, where the zone boundary divides a property and the location of such boundary is not fixed by dimension or other notation on the zoning map, then the location of such boundary shall be obtained through the use of the graphic scale and the Administrative Officer shall so use the scale.
3. The Administrative Officer is the authority with respect to a determination as to which zone a parcel of property is located.

Township of Springfield
Union County
New Jersey

October 1999

ZONING MAP



LEGEND

LAND USE

SCHEDULE OF REQUIREMENTS

ZONE	PRIMARY USE	BUILDING HEIGHT	FRONT YARD	SIDE YARD	REAR YARD	LOT WIDTH	LOT DEPTH	No. STORIES	LOT COVERAGE	BUILDING COVERAGE	FAR	LOT AREA (Sq.Ft.)
S-120	SINGLE-FAMILY RESIDENTIAL	35'	50'	20'	50'	120'	160'	2-1/2	22.5%	15%	N/A	22,000
S-75	SINGLE-FAMILY RESIDENTIAL	35'	30'	10'	30'	75'	110'	2-1/2	27%	25%	N/A	10,000
S-60	SINGLE-FAMILY RESIDENTIAL	35'	30'	8'	30'	60'	100'	2-1/2	36%	25%	N/A	7,500
M-R	MULTI-FAMILY RESIDENTIAL	35'	50'(3)	30'	25'(4)	200'	200'	2-1/2	45%	25%	N/A	100,000
AHOZ-1	AFFORDABLE HOUSING	SEE ORDINANCE 2016-26										
AHOZ-2	AFFORDABLE HOUSING	SEE ORDINANCE 2016-26										
AH-16	AFFORDABLE HOUSING	SEE ORDINANCE 2016-26										
AH-17	AFFORDABLE HOUSING	40' (5)	35'	35'	35'			3 (5)	60%	30%		
AH-24.2	AFFORDABLE HOUSING	40'	30'	30'	50'			3	65%	30%		
AH-18	AFFORDABLE HOUSING	40'	30'	30'	30'			3	50%	25%		
AH-SC	AFFORDABLE HOUSING	40'	30'	30'	30'			3	50%	25%		
O	OFFICE	40'	12'	10'	50'	100'	150'	4	67.5%	40%	0.75	20,000
N-C	NEIGHBORHOOD COMMERCIAL	35'	15'	12'(2)	20'	65'	120'	2-1/2	72%	40%	0.50	10,000
G-C	GENERAL COMMERCIAL	40'	0' (1)	0'	30'	60'	100'	4	81%	60%	1.0	7,500
H-C	HIGHWAY COMMERCIAL	40'	35'	25'	50'	100'	200'	4	63%	40%	0.60	40,000
I-20	GENERAL INDUSTRIAL	40'	25'	15'	50'	100'	150'	2	72%	50%	0.80	20,000
I-40	GENERAL INDUSTRIAL	40'	35'	25'	50'	100'	200'	2	72%	50%	0.80	40,000
PUD (6)	PLANNED UNIT DEVELOPMENT	35'	SEE SECTION 35-15.3					2-1/2	75%		0.30	
OS-GU	OPEN SPACE GOVERNMENT USE	SEE SECTION 35-15.6										

(1) MAXIMUM FRONT YARD SETBACK SHALL EQUAL AVERAGE OF ALL EXISTING BUILDINGS IN GC ZONE WITHIN 200 FEET OF SITE.
(2) MAY BE ON SIDE LOT LINE ON ONE SIDE ONLY
(3) 30 FEET FROM INTERIOR STREETS
(4) 75 FEET FROM S-120, S-75 AND S-60 DISTRICTS
(5) A BUILDING LOCATED WITHIN 100' OF A SINGLE-FAMILY RESIDENTIAL DISTRICT SHALL NOT EXCEED 2-1/2 STORIES OR 35'
(6) FOR TOWNHOUSE DEVELOPMENT SEE SECTION 35-15 3I

Mayor Date

Township Clerk Date

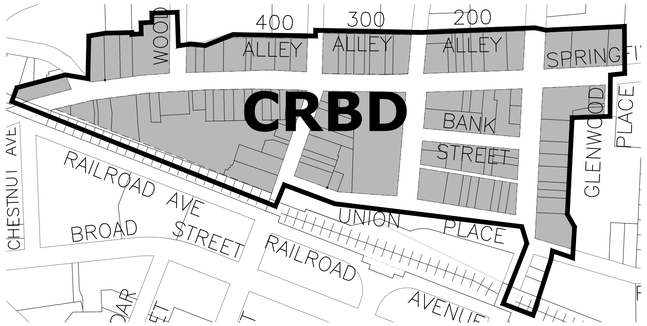
Keller & Kirkpatrick, Inc.
900 Lanidex Plaza, Parsippany, N.J. 07054

REVISED NOVEMBER 2003
REVISED JULY 2001
REVISED JANUARY 2001
REVISED DECEMBER 1999
REVISED DECEMBER 2017

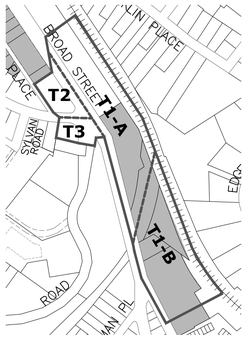
P:\509201A\SURVDWG\S-BASE

ZONING MAP

CITY OF SUMMIT
UNION COUNTY, NEW JERSEY
October 20, 1998

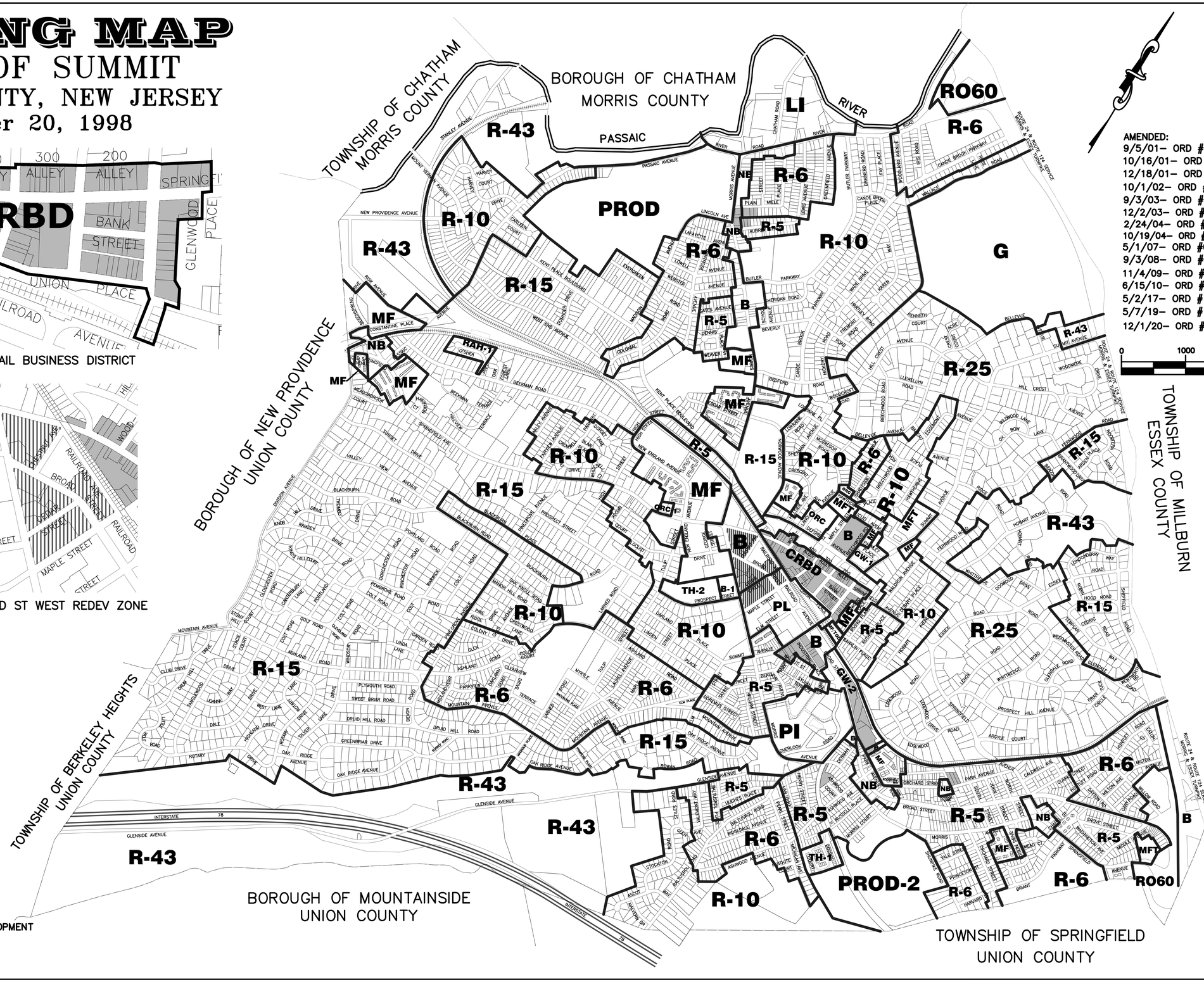


CENTRAL RETAIL BUSINESS DISTRICT



GATEWAY – 2

BROAD ST WEST REDEV ZONE



AMENDED:
9/5/01– ORD #01–2496
10/16/01– ORD #01–2501
12/18/01– ORD #01–2511
10/1/02– ORD #02–2544
9/3/03– ORD #03–2570
12/2/03– ORD #03–2580
2/24/04– ORD #04–2587
10/19/04– ORD #04–2620
5/1/07– ORD #07–2755
9/3/08– ORD #08–2818
11/4/09– ORD #09–2872
6/15/10– ORD #10–2900
5/2/17– ORD #17–3132
5/7/19– ORD #19–3188
12/1/20– ORD #20–3223

0 1000 2000

R–43	SINGLE FAMILY RESIDENTIAL
R–25	SINGLE FAMILY RESIDENTIAL
R–15	SINGLE FAMILY RESIDENTIAL
R–10	SINGLE FAMILY RESIDENTIAL
R–6	SINGLE FAMILY RESIDENTIAL
R–5	SINGLE & TWO FAMILY RESIDENTIAL
RAH–1	AFFORDABLE HOUSING
MF	MULTI–FAMILY RESIDENTIAL
MFT	MULTI–FAMILY TOWER RESIDENTIAL
GW–1	GATEWAY–1
GW–2	GATEWAY–2
TH–1	TOWN HOUSE – 1
TH–2	TOWN HOUSE – 2
NB	NEIGHBORHOOD BUSINESS
B	BUSINESS
B–1	BUSINESS – 1
CRBD	CENTRAL RETAIL BUSINESS DISTRICT
ORC	OFFICE RESIDENTIAL CHARACTER
ORC–1	OFFICE RESIDENTIAL CHARACTER–1
RO60	RESEARCH–OFFICE
PROD	PLANNED RESEARCH OFFICE DEVELOPMENT
PROD–2	PLANNED RESEARCH OFFICE DEVELOPMENT
LI	LIGHT INDUSTRY
PI	PROFESSIONAL–INSTITUTIONAL
PL	PUBLIC LAND
G	GOLF
MF/TOD	MULTI–FAMILY/TRANSIT ORIENTED DEVELOPMENT
	OVERLAY ZONE DISTRICT
	BROAD ST WEST RE–DEVELOPMENT ZONE

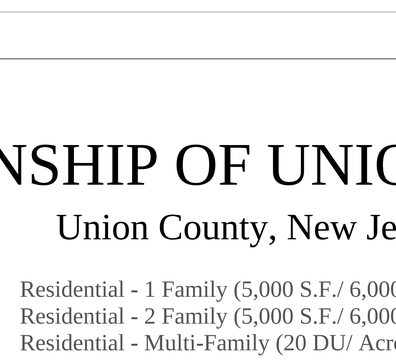
CITY OF SUMMIT DIVISION OF ENGINEERING

TOWNSHIP OF UNION

Union County, New Jersey

Districts

RA	Residential - 1 Family	(5,000 S.F./ 6,000 S.F.)
RB	Residential - 2 Family	(5,000 S.F./ 6,000 S.F.)
RC	Residential - Multi-Family	(20 DU/ Acre)
RD	Residential - Senior Housing	(40 DU/ Acre)
RM	Residential - Multi-Family Dwellings	(10 DU/ Acre)
BA	Business - Office	(15,000 S.F.)
BB	Business - Retail	(15,000 S.F.)
BC	Business - Retail	(40,000 S.F.)
I	Industrial	
I/O-80	Industrial/Office	(80,000 S.F.)
I/O-40	Industrial/Office	(40,000 S.F.)
OB	Office Buildings	(120,000 S.F.)
UCBD	Union Center Business District	(10,000 S.F.)
UCBD-2	Union Center Business District-2	
US	Union Station	(40,000 S.F.)
US-1	Union Station-1	
C	Cemetery	
MH	Medical/Health	(120,000 S.F.)
RA-PUD	Residential - 1 Family Planned Golf District	
SS	Schaefer Salt District	
SSO	Schaefer Salt Redevelopment Overlay	
HOD	Historic Overlay District	(Article XXI, Section 170-189 to 195)
MUOD	Mixed Use Overlay District	
	Flood Hazard Areas	(see Article XIII - Flood Damage Prevention)



INSERT

ORDINANCE NUMBER	ADOPTION DATE
5165	OCTOBER 12, 2010
5141	AUGUST 10, 2010
4575	JAN 26, 1999
4470	AUG 13, 1996
4433	APR 9, 1996
4380	MAR 28, 1995
4339	JUL 26, 1994
4314	APR 26, 1994
4287	DEC 14, 1993
4181	MAR 10, 1992
4155	JUL 9, 1991
4014	MAR 14, 1989
4013	MAR. 14, 1989
3986	AUG 9, 1988
H.O.D.	APR 19, 1988
3936	SEPT 8, 1987
3712	MAY 22, 1984
3702	MAR 27, 1984
3608	NOV. 23, 1982

T&M ASSOCIATES
APRIL 2011
H:\UTWP\00790\Plans\ZoneMap_OFFICIAL_TC_04-15-11.dwg

SCALE IN FEET
0 600 1200 1800 2400

SCALE IN METERS
0 150 300 450 600

April 2011

ZONING MAP

ZONING MAP

HP - HISTORIC PRESERVATION DESIGNATED SITES/DISTRICT

AHO - AFFORDABLE HOUSING OVERLAY DISTRICTS *

C: C-AHO	GB1: GB1-AHO
SW: SW-AHO	GB2: GB2-AHO
RP: RP-AHO	GB3: GB3-AHO
PA: PA-AHO	

* SEE LAND USE ORDINANCE FOR PERMITTED USES AND REGULATIONS

SCALE: (NOT TO SCALE)

ZONE	PERMITTED USES	MIN. LOT AREA
RS-40	RESIDENTIAL-SFD	40,000 sf
RS-24	RESIDENTIAL-SFD	24,000 sf
RS-16	RESIDENTIAL-SFD	16,000 sf
RS-12	RESIDENTIAL-SFD	12,000 sf
RS-10	RESIDENTIAL-SFD	10,000 sf
RS-8	RESIDENTIAL-SFD	8,000 sf
RS-6	RESIDENTIAL-SFD	6,000 sf
RM-12	RESIDENTIAL-SFD,2F	12,000 sf
RM-8	RESIDENTIAL-SFD,2F	8,000 sf
RM-6	RESIDENTIAL-SFD	6,000 sf
" "	RESIDENTIAL-2F	8,000 sf
RM-6D	RESIDENTIAL-SFD	6,000 sf
" "	RESIDENTIAL-2F	8,000 sf
" "	RESIDENTIAL-DUPLEX	4,000 sf
RA-1	ELDERLY HOUSING	1 acre
RA-2	GARDEN APARTMENTS	2 acres
RA-3	GARDEN APARTMENTS	15,000 sf
" "	RESIDENTIAL-MF	15,000 sf
" "	RESIDENTIAL-SFD	6,000 sf
" "	RESIDENTIAL-2F	6,000 sf
RA-4	SENIOR CITIZEN HOUSING	5 acres
RA-5A	RESIDENTIAL-SFA,MF	5 acres
RA-5B	RESIDENTIAL-SFA,MF	2 acres
RA-5C	RESIDENTIAL-SFA,MF	60,000 sf
NA-AH	RESIDENTIAL-TOD	1 acre
NS-AMFH	RESIDENTIAL-TOD	62,000 sf ≥ 68,000 sf
WBS-AMFH	RESIDENTIAL-TOD	22,500 sf
P-1	PROFESSIONAL OFFICE	12,000 sf
P-2	PROFESSIONAL OFFICE	12,000 sf
O-1	OFFICE	12,000 sf
O-2	OFFICE	80,000 sf
O-3	OFFICE, RESEARCH	80,000 sf
CBD	GENERAL BUSINESS	---
GB-1	GENERAL BUSINESS	---
GB-2	GENERAL BUSINESS	---
GB-3	GENERAL BUSINESS	---
" "	RESIDENTIAL-SFD	6,000 sf
" "	RESIDENTIAL-2F	8,000 sf
" "	MIXED RESIDENTIAL and NON-RESIDENTIAL	10,000 sf
C	COMMERCIAL	---

ZONING MAP REVISIONS

DATE	ORDINANCE NUMBER	ZONE
8/4/2009	G.O.# 1939	Various Amend. as recommended in the 2009 Master Plan Reexam Report
3/7/2014	G.O.# 2002	NA-AH
3/7/2014	G.O.# 2003	GB-3 to NS-AMFH
3/7/2014	G.O.# 2004	RA-5C
12/16/2014	G.O.# 2032	NS-AMFH to GB-3
11/10/2015	G.O.# 2054	WBS-AMFH
3/13/2018	G.O.# 2093	GB1 - AHO
3/13/2018	G.O.# 2094	GB2 - AHO
3/13/2018	G.O.# 2095	GB3 - AHO
3/13/2018	G.O.# 2096	C - AHO
3/13/2018	G.O.# 2097	SW - AHO
3/13/2018	G.O.# 2098	PA - AHO
3/13/2018	G.O.# 2099	RP - AHO
2/12/2019	G.O.# 2122	RS - 16 (New England Dr.)
2/12/2019	G.O.# 2123	603 Clark St. (HISTORIC)
6/19/2019	G.O.# 2135	Reeve House (HISTORIC)
6/19/2019	G.O.# 2136	Triangle Park. (HISTORIC)
12/12/2019	G.O.# 2152	1737 Nevada St. (HISTORIC)

TOWN OF WESTFIELD

Union County, New Jersey

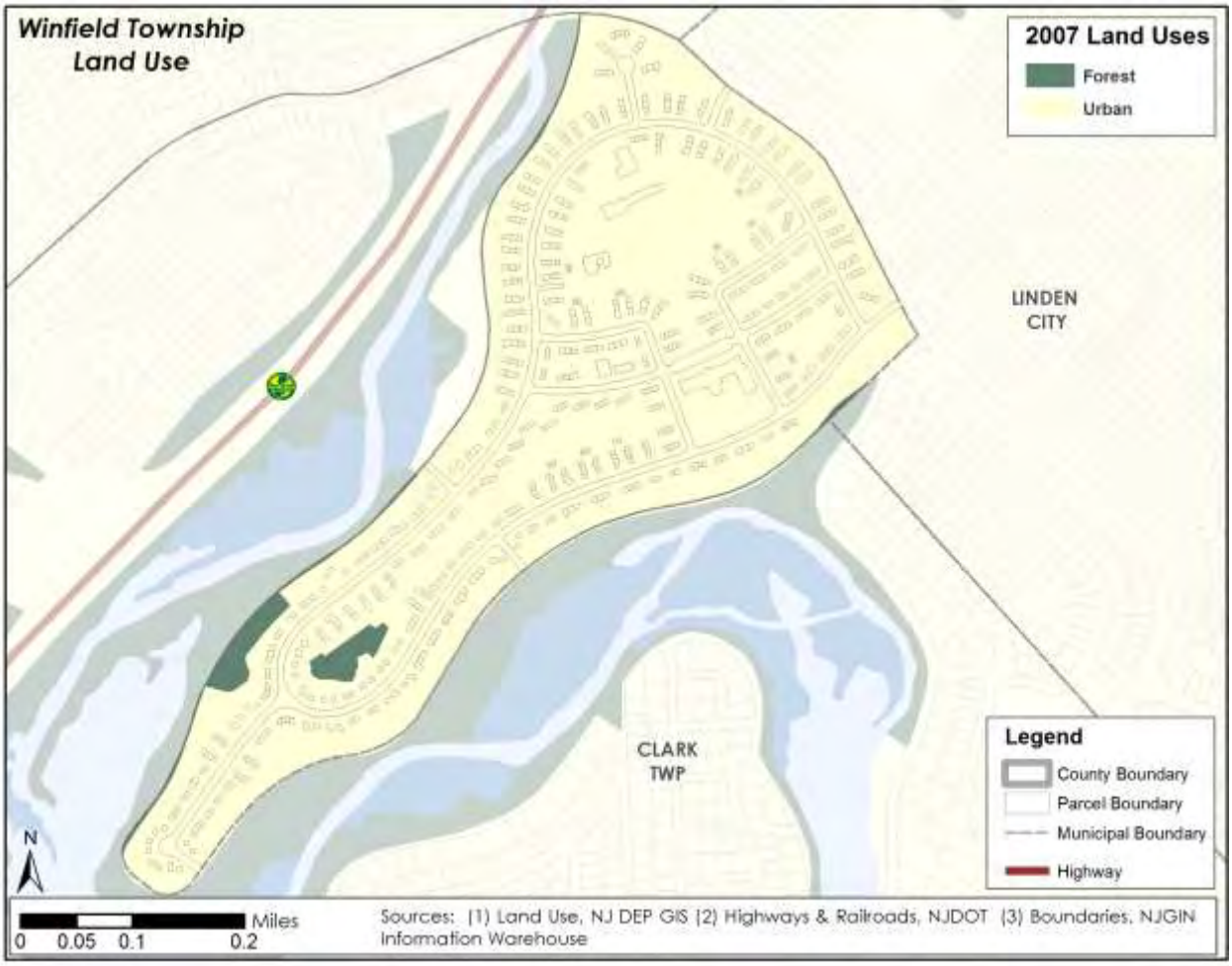
Original Map Date: October, 2001

Latest Parcel Map Revision: December, 2019

F:\acad\townmaps\zoningmap

Figure 20-1:

Land Use/Land Cover Map Township of Winfield



APPENDIX J

Photo Log of Existing Charging Locations

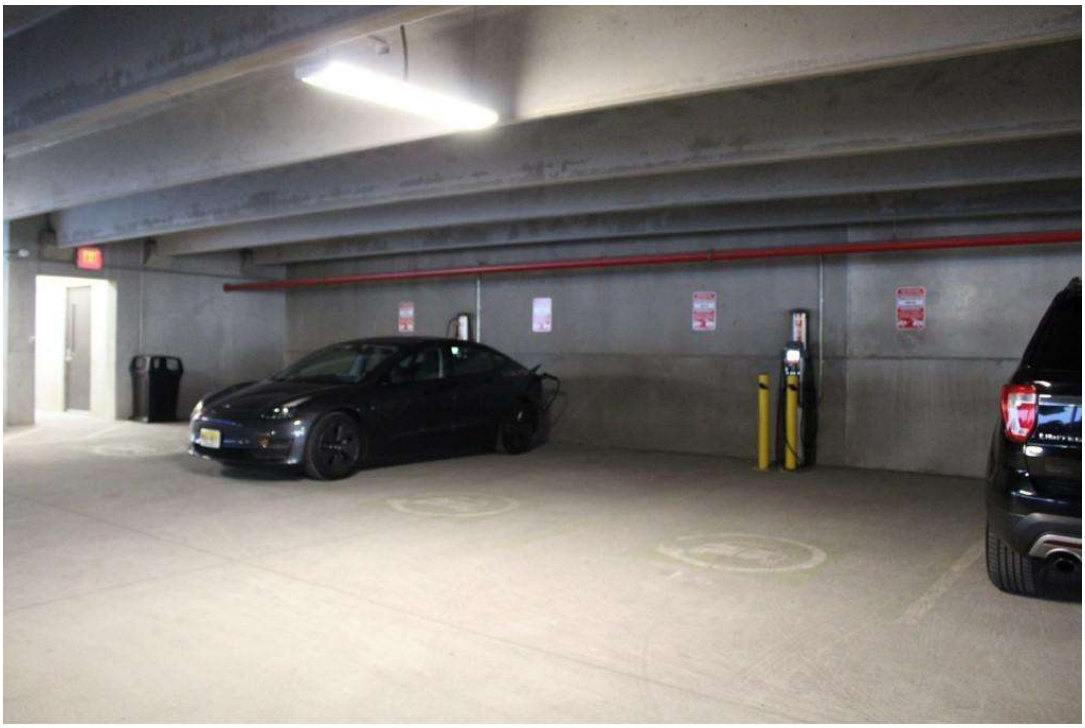


Photo 1: 2 Vermella Way, Union, NJ, 2 Charge Ports, Public Use, Free

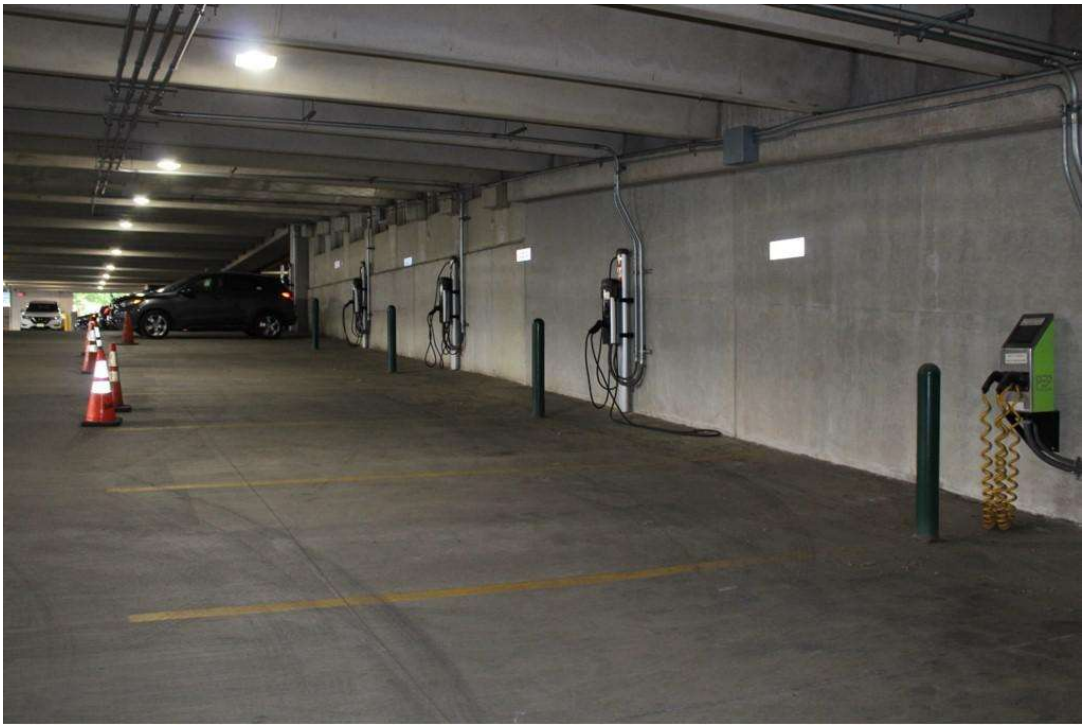


Photo 2: Lot 1 Jersey AV Bollwage Garage, 37 Caldwell Pl, Elizabeth, NJ, 2 Charge Ports, Public Use, Free

Photo 3: Trader Joe's, 155 Elm St, Westfield, NJ, 2 Charge Ports, Public Use, Free

Photo 4: Best Western, 435 North Ave W, Westfield, NJ, 2 Charge Ports, Public Use (see front desk for access), Free

Photo 5: Russo First Floor, 501 South Ave, Garwood, NJ, 2 Charge Ports, Public Use, Free

Photo 6: Planet Honda, 2285 US-22, Union, NJ, 2 Charge Ports, Public Use, Free

APPENDIX K

Data Collected Represented in Maps

UNION COUNTY - EXISTING ELECTRIC VEHICLE CHARGERS

Legend

Existing EV Charger Locations

- Existing, DC Fast
- Existing, Level 2

SUMMIT CITY
NEW PROVIDENCE BORO
SPRINGFIELD TWP
UNION TWP
HILLSIDE TWP
MOUNTAINSIDE BORO
BERKELEY HEIGHTS TWP
KENILWORTH BORO
ROSELLE PARK BORO
ELIZABETH CITY
CRANFORD TWP
GARWOOD BORO
ROSELLE BORO
FANWOOD BORO
WESTFIELD TOWN
WINFIELD TWP
LINDEN CITY
SCOTCH PLAINS TWP
CLARK TWP
PLAINFIELD CITY
RAHWAY CITY

0 6,000 Feet

N

PREPARED FOR:
THE COUNTY OF UNION

FRENCH & PARRELLO ASSOCIATES

MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE: 04/06/2023

NOTE: EXISTING AND PLANNED CHARGER LOCATION DATA PROVIDED BY THE U.S. DEPARTMENT OF ENERGY ALTERNATIVE FUELS WEBSITE AND THROUGH OUTREACH TO MUNICIPALITIES AND THE COUNTY OF UNION.

UNION COUNTY - PLANNED ELECTRIC VEHICLE CHARGERS

Legend

Planned EV Charger Locations

- Planned By Others, DC Fast
- Planned By Others, Level 2
- Planned By Others, Unknown

SUMMIT CITY
NEW PROVIDENCE BORO
SPRINGFIELD TWP
UNION TWP
HILLSIDE TWP
BERKELEY HEIGHTS TWP
MOUNTAINSIDE BORO
KENILWORTH BORO
ROSELLE PARK BORO
ELIZABETH CITY
CRANFORD TWP
GARWOOD BORO
ROSELLE BORO
FANWOOD BORO
WESTFIELD TOWN
WINFIELD TWP
LINDEN CITY
SCOTCH PLAINS TWP
CLARK TWP
RAHWAY CITY
PLAINFIELD CITY

0 6,000
Feet

N

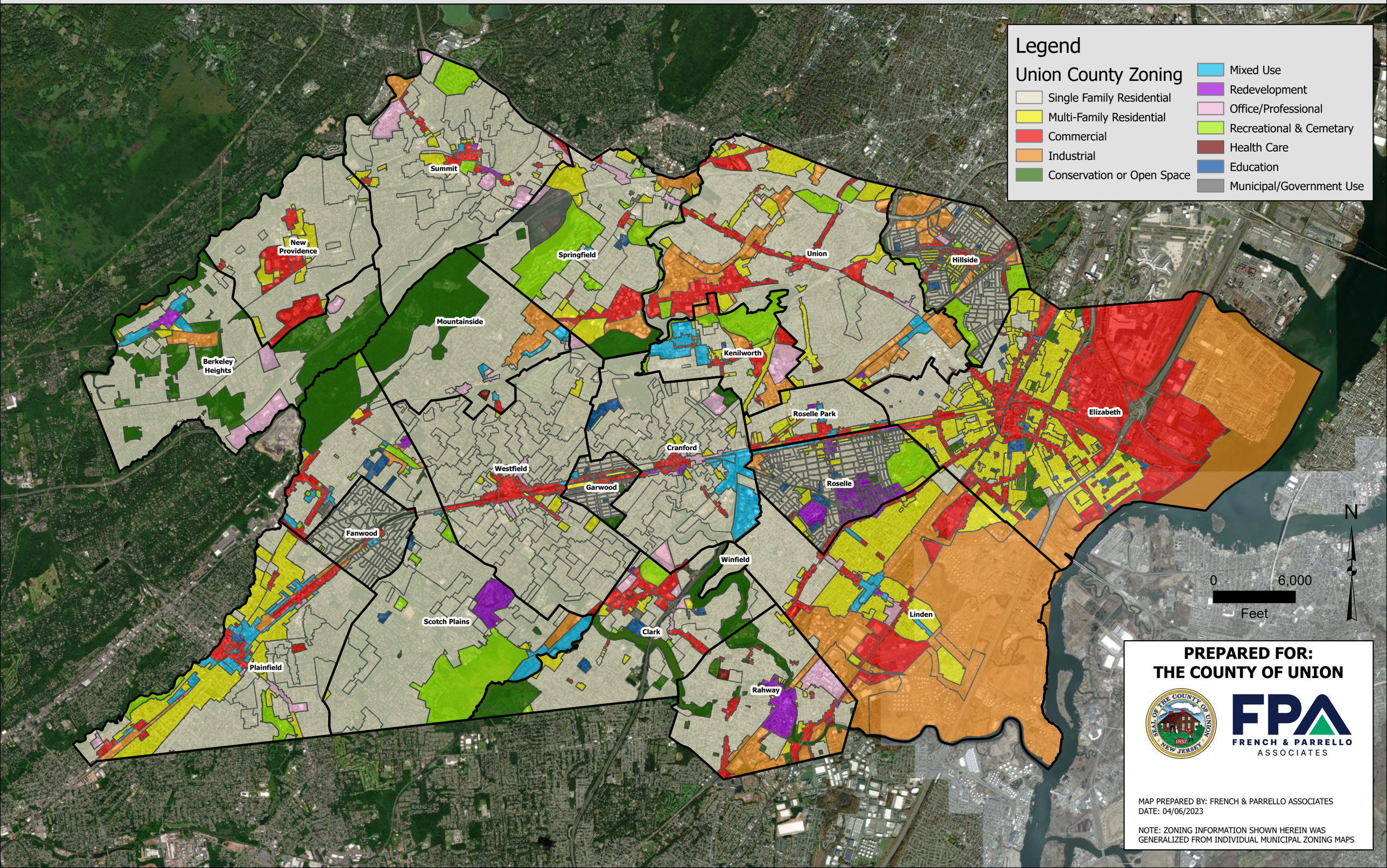
PREPARED FOR:
THE COUNTY OF UNION

FRENCH & PARRELLO ASSOCIATES

MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE: 04/06/2023

NOTE: EXISTING AND PLANNED CHARGER LOCATION DATA PROVIDED BY THE U.S. DEPARTMENT OF ENERGY ALTERNATIVE FUELS WEBSITE AND THROUGH OUTREACH TO MUNICIPALITIES AND THE COUNTY OF UNION.

UNION COUNTY - GENERALIZED ZONING



PREPARED FOR:
THE COUNTY OF UNION

FRENCH & PARRELLO ASSOCIATES

MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE: 04/06/2023

NOTE: ZONING INFORMATION SHOWN HEREIN WAS GENERALIZED FROM INDIVIDUAL MUNICIPAL ZONING MAPS

UNION COUNTY

STATE OF

NEW JERSEY

COMPUTER GENERATED BY THE

NEW JERSEY DEPARTMENT OF TRANSPORTATION
DIVISION OF INFORMATION TECHNOLOGY

GEOGRAPHIC INFORMATION SYSTEMS

IN COOPERATION WITH

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE IN MILES

SCALE IN KILOMETERS

LEGEND

GENERAL CULTURAL FEATURES

- COLLEGE OR UNIVERSITY
- CORRECTIONAL INSTITUTION
- HOSPITAL
- STATE POLICE STATION
- MOTOR VEHICLE INSPECTION STATION
- LIGHTHOUSE
- HORSE RACING OR SPEEDWAY
- POWER PLANT
- REST AREA
- SERVICE AREA
- GOLF COURSE
- NATIONAL, STATE, COUNTY OR MUNICIPAL PARK AND OTHER RESERVATIONS NATIONAL OR STATE FOREST OR NATIONAL MONUMENT
- NATIONAL,STATE WILDLIFE MANAGEMENT AREA OR REFUGE

ROAD DESIGNATION

- TOLL ROAD
- INTERSTATE ROUTE
- U.S. NUMBERED ROUTE
- STATE HIGHWAY
- 500 SERIES ROADS
- 600 SERIES ROADS
- ROUTE UNDER CONSTRUCTION
- PAVED LOCAL ROADS

AIRPORTS

- PUBLIC USE AIRPORT
- HELIPORT

RAILROADS

- RAILROAD (ANY NUMBER OF TRACKS)
- RAILROAD STATION
- RAILROAD ABANDONED

NAVIGATION AND DRAINAGE

- FERRY
- NARROW STREAM
- RIVER
- CANAL
- LAKE, POND OR RESERVOIR
- WETLANDS

BOUNDARIES

- STATE
- COUNTY
- MUNICIPAL LINE
- MILITARY BOUNDARY LINES

KEY MAP

NOTE:
THESE MAPS WERE PREPARED USING USGS QUADRANGLE MAPS AT SCALE OF 1:24,000 FOR THE BASE MAP IN NORTH AMERICAN DATUM 83 (NAD83). THE HIGHWAY NETWORK HAS BEEN REALIGNED USING DIGITAL ORTHOPHOTOGRAPHY.

LATITUDE AND LONGITUDE GRID SYSTEM IS DISPLAYED BY 2 MINUTE AND 30 SECOND INTERVALS. 74 20'00" 40 32'30"

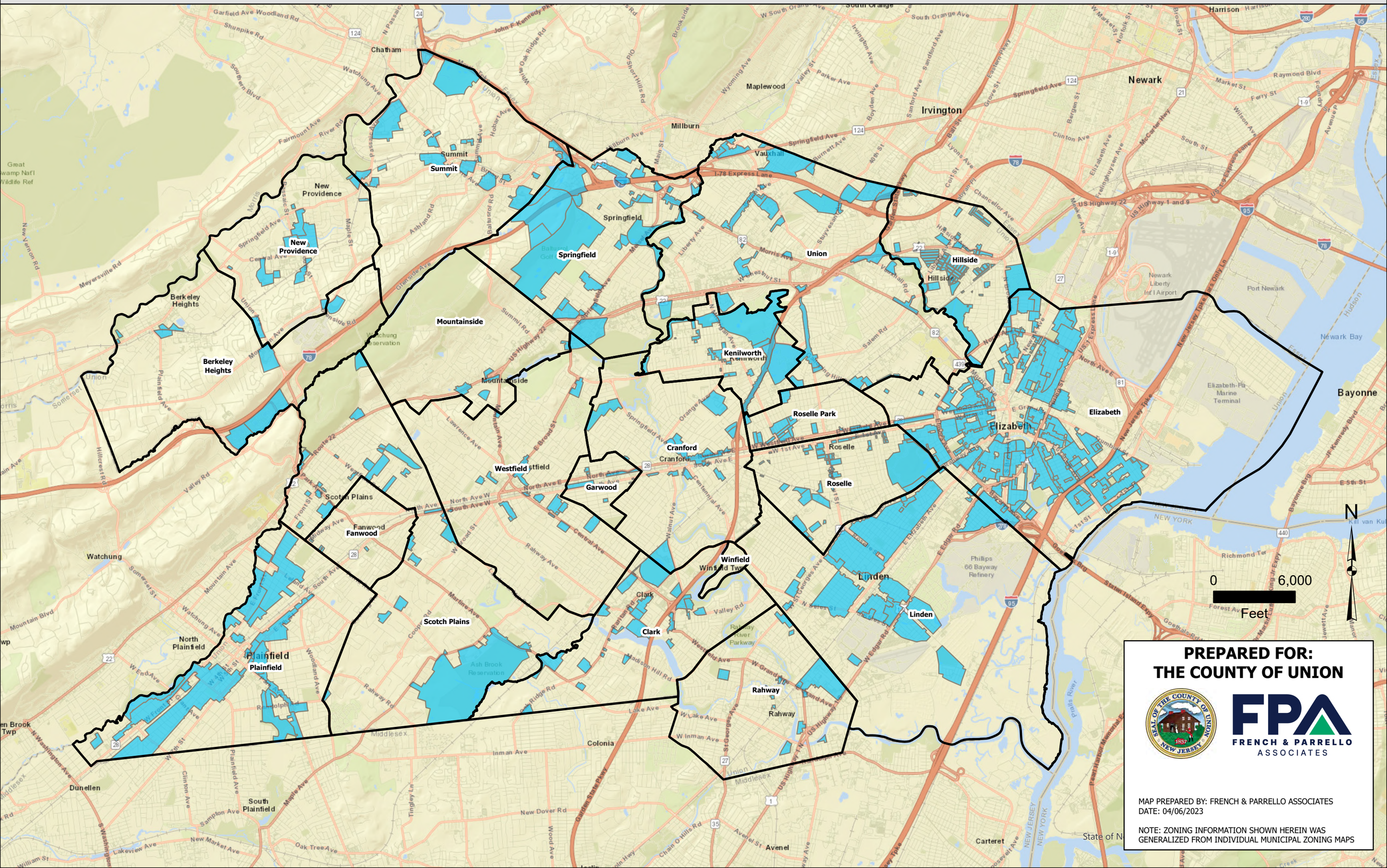
THE UNIVERSAL TRANSVERSE GRID NUMBERS ARE SHOWN ON A 5,000 FOOT GRID. 5,000 5,250

THE NEW JERSEY STATE PLANE COORDINATE GRID SYSTEM IS DISPLAYED IN 10,000 FOOT INTERVALS. 2,100 = 2,100,000

STATE HIGHWAYS ARE REVISED AS OF JULY,2000

NEW JERSEY GIS TRANSPORTATION

UNION COUNTY - LEVEL 1 AND LEVEL 2 ELECTRIC VEHICLE CHARGING ZONES



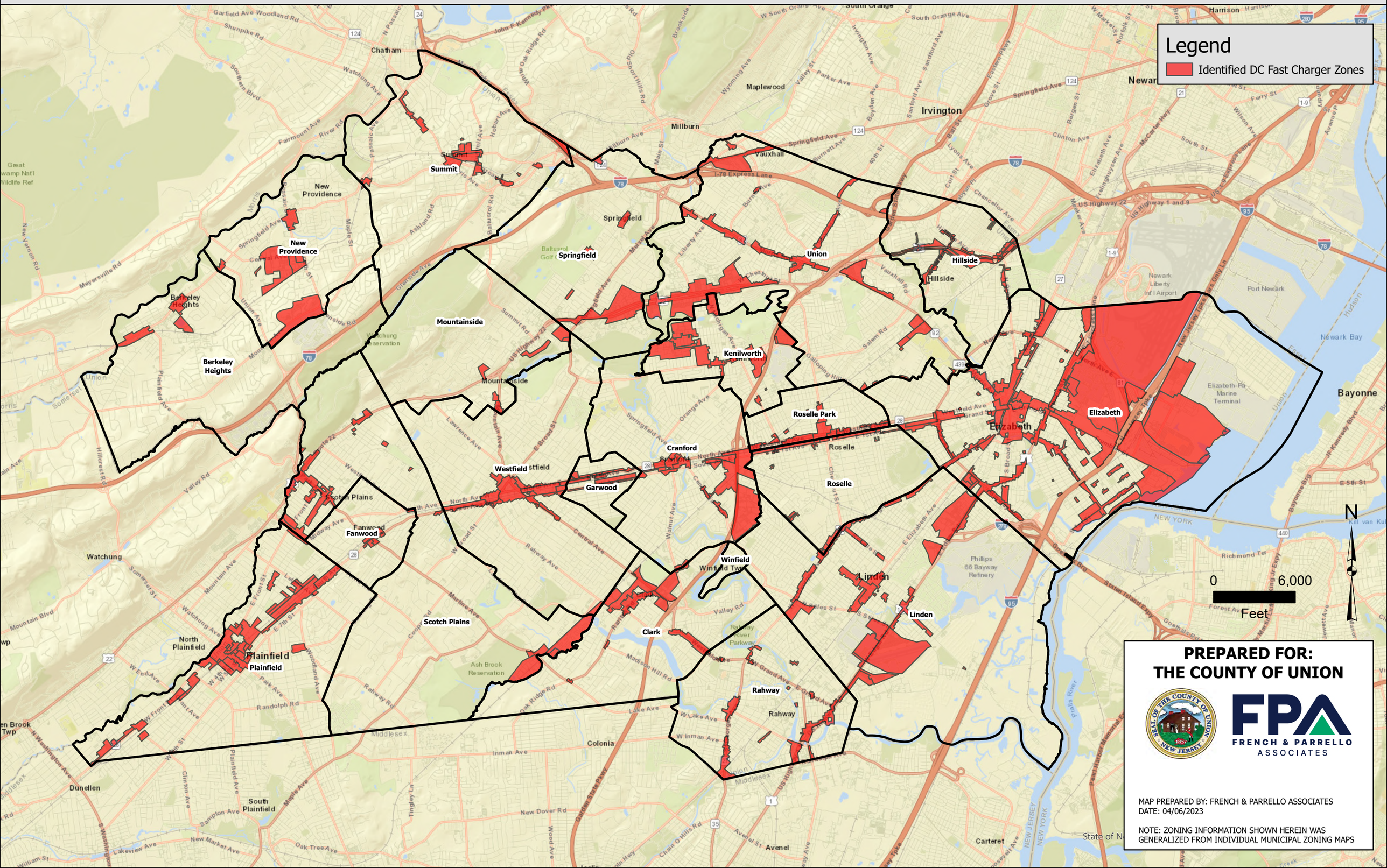
PREPARED FOR:
THE COUNTY OF UNION

FPA
FRENCH & PARRELLO ASSOCIATES

MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE: 04/06/2023

NOTE: ZONING INFORMATION SHOWN HEREIN WAS GENERALIZED FROM INDIVIDUAL MUNICIPAL ZONING MAPS

UNION COUNTY - DC FAST ELECTRIC VEHICLE CHARGING ZONES



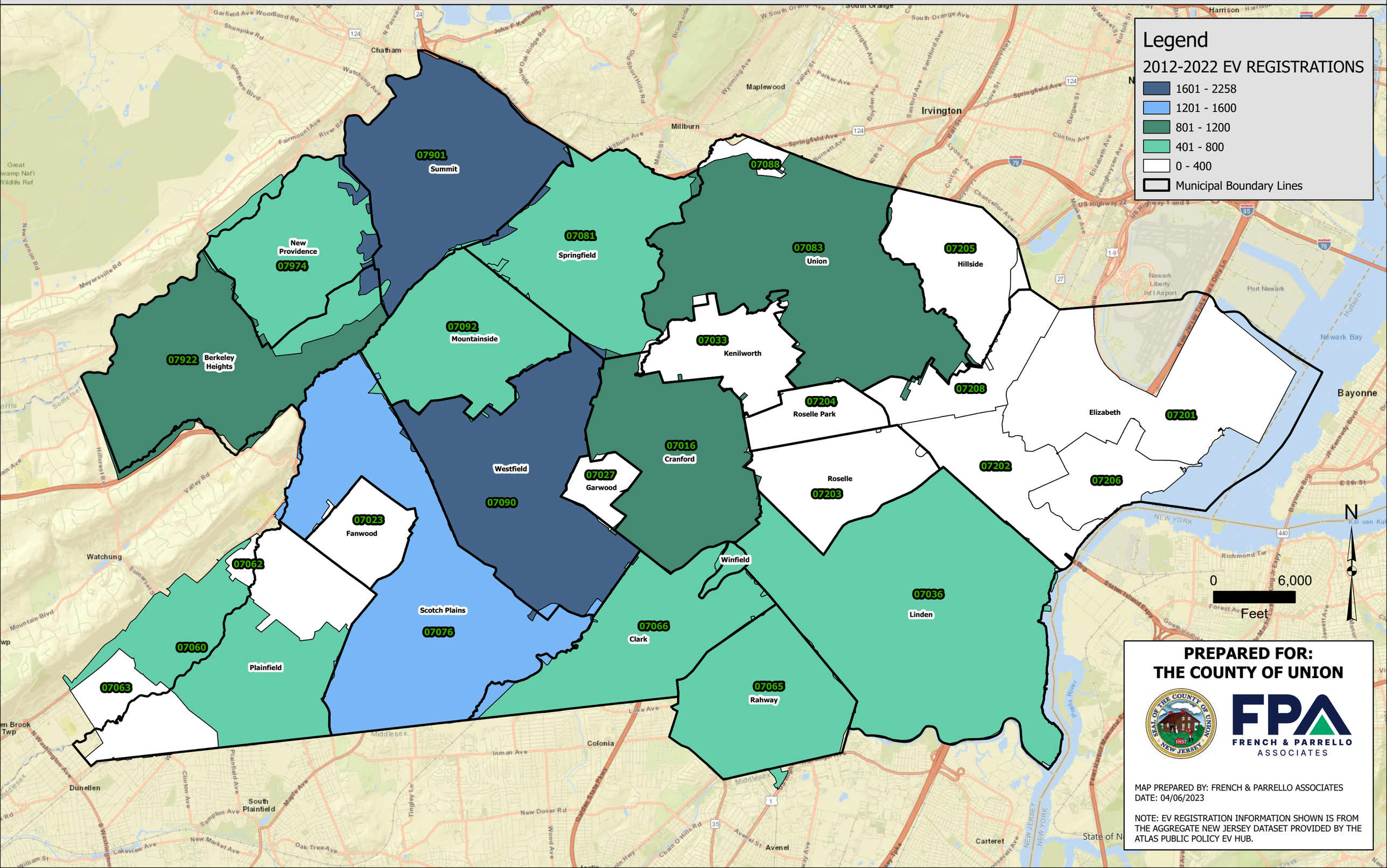
PREPARED FOR:
THE COUNTY OF UNION

FPA
FRENCH & PARRELLO ASSOCIATES

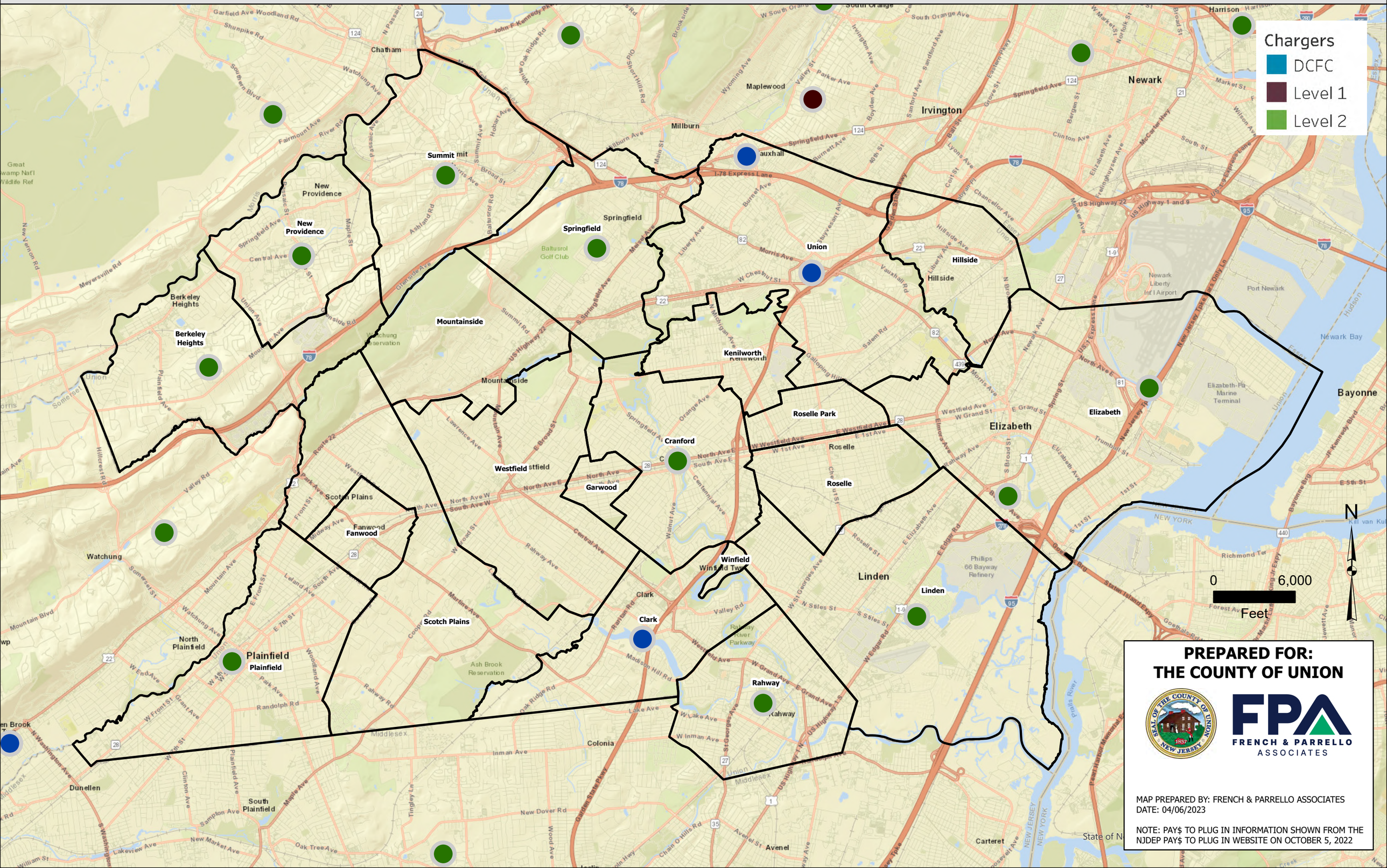
MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE: 04/06/2023

NOTE: ZONING INFORMATION SHOWN HEREIN WAS GENERALIZED FROM INDIVIDUAL MUNICIPAL ZONING MAPS

UNION COUNTY - PLUG-IN ELECTRIC VEHICLE REGISTRATIONS BY ZIP CODE 2012-2022



UNION COUNTY - NJDEP PAY$ TO PLUG-IN GRANT AWARD MAP



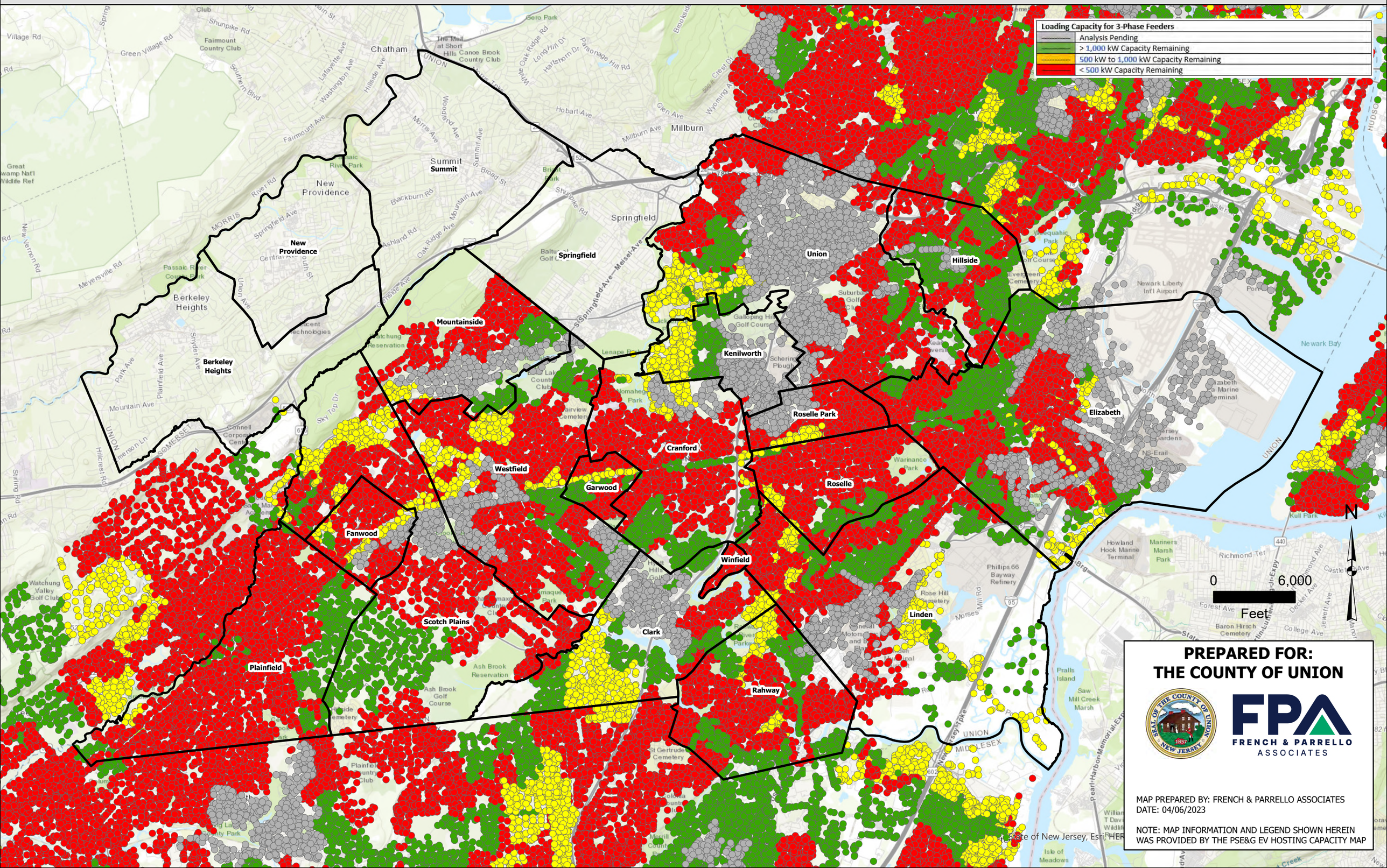
PREPARED FOR:
THE COUNTY OF UNION

FPA
FRENCH & PARRELLO ASSOCIATES

MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE: 04/06/2023

NOTE: PAY$ TO PLUG IN INFORMATION SHOWN FROM THE NJDEP PAY$ TO PLUG IN WEBSITE ON OCTOBER 5, 2022

UNION COUNTY - PSE&G EV HOSTING CAPACITY MAP



PREPARED FOR:
THE COUNTY OF UNION

FPA
FRENCH & PARRELLO
ASSOCIATES

MAP PREPARED BY: FRENCH & PARRELLO ASSOCIATES
DATE: 04/06/2023

NOTE: MAP INFORMATION AND LEGEND SHOWN HEREIN WAS PROVIDED BY THE PSE&G EV HOSTING CAPACITY MAP