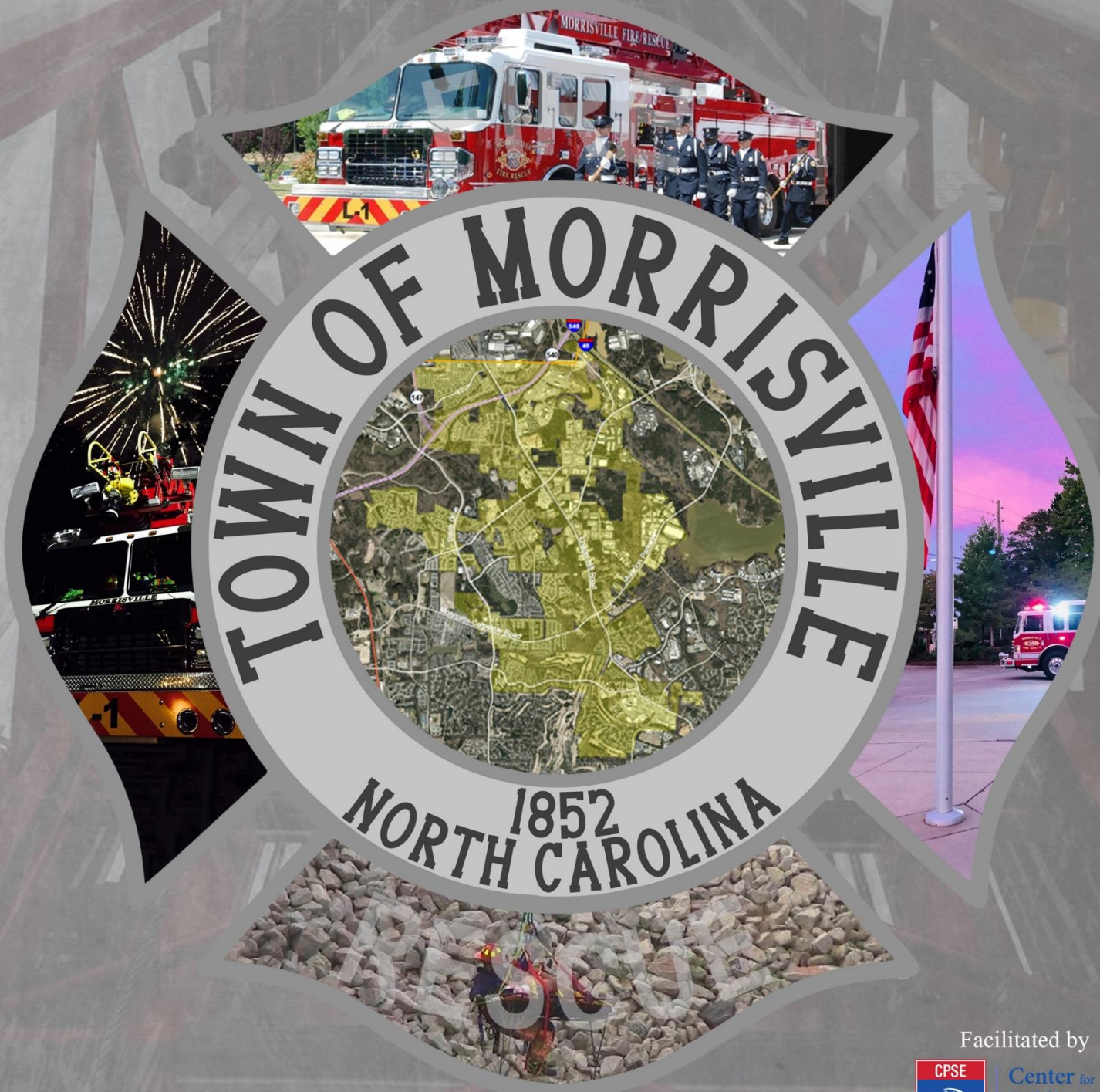
MORRISVILLE FIRE/RESCUE DEPARTMENT

COMMUNITY RISK ASSESSMENT-STANDARDS OF COVER



Facilitated by

CPSE Center for Public Safety Excellence

January 2021

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Morrisville Fire/Rescue Department

Fire Chief Scott Criddle

Community Risk Assessment-Standards of Cover

Contributors

Scott Criddle, Fire Chief
Nathan Lozinsky, Assistant Fire Chief
Chris Hoffman, Captain

January 2021

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Executive Summary

The Morrisville Fire/Rescue Department (MFRD) is committed to continuous quality improvement. Following the model set forth by the Commission on Fire Accreditation International, the Department updated the 2016 Community Risk Assessment/Standard of Cover in 2020. The community risk assessment is a constant cycle of deployment monitoring, evaluation, and modification. The real value realized in this document is the process undertaken in creating it. The MFRD identified the boundaries and unique characteristics of its jurisdictional area, identified the types and levels of risk present within, and evaluated the service demand for each risk. MFRD then assessed its ability to deliver the resources needed to handle these identified risks against industry best practices and standards.

MFRD finds itself in a unique position, being a relatively small town inside a large metro area. These dynamic conditions present challenges and necessitate adapting to not only a growing but maturing community as well. The town has very little geographical area that can be annexed, but MFRD is experiencing tremendous growth and redevelopment inside the already identified geographical boundaries. A general overview of the Department is included at the beginning of this document.

The organization has seen a tremendous amount of change and growth, and this document reflects this. The agency has shown the progressive nature most fire departments speak to by dropping our dispatch borders and entering into a seamless response concept with our two closest automatic aid partners. This was an enormous undertaking, and it showed not just the Morrisville Fire/Rescue Department's commitment to serving our citizens but the organization as a whole. In moving to this concept, we also moved to a new dispatch center to facilitate the new response concept. The agency also moved to a new record management system in between the writing of the 5th edition and this current 6th edition of the CFAI Standards of Cover. The Department's leadership also changed multiple times, but the agency continues to move forward. This also speaks volumes to the women and men of this organization and their commitment to not only the mission statement of the core values of the Department, but shows how the accreditation model has been woven into the fabric of the organization.

Scott E. Criddle
Fire Chief, Morrisville Fire/Rescue Department

Resolution 2021-218-0

TOWN OF MORRISVILLE * 100 TOWN HALL DRIVE * MORRISVILLE, NC 27560

RESOLUTION 2021-218-0 RESOLUTION ADOPTING THE MORRISVILLE FIRE/RESCUE DEPARTMENT COMMUNITY RISK ASSESSMENT/STANDARDS OF COVER

WHEREAS, The Town places high value on the principles of continuous improvement and transparency; and

WHEREAS, The Town benefits from establishing attainable fire service performance objective goals so that all stakeholders can clearly see the standards that the fire department is striving to achieve; and

WHEREAS, The Morrisville Fire/Rescue Department has developed and published a Community Risk Assessment/Standards of Cover which is a data driven analysis of risk present in Town and a comprehensive explanation of how the department will deploy to identified risks, in accordance with guidance from its accrediting body, the Commission on Fire Accreditation International (CFAI); and

WHEREAS, The Standards of Cover contain specific performance level objective goals which will be used to guide The Morrisville Fire/Rescue Department's continuous improvement efforts; and

WHEREAS, these performance goals may henceforth be used as a measure of the Morrisville Fire/Rescue Department's performance.

NOW, THEREFORE, BE IT RESOLVED THAT THE MORRISVILLE TOWN COUNCIL recognizes the Morrisville Fire/Rescue Department Community Risk Assessment/Standards of Cover as a data driven assessment of the town's risks, and as an explanation of how the department will deploy resources to those risks; and adopts the benchmark performance level goals contained therein.

Adopted this 25th day of May 2021.

TJ Cawley, Mayor

ATTEST:

Eric W. Smith II, Town Clerk

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A. Description of Community Served

Introduction

The Morrisville Fire/Rescue Department (MFRD) Community Risk Assessment and Standards of Cover (CRA-SOC) 2020 has been revised from previous editions of this work. While it is still the result of a comprehensive deployment analysis conducted by the MFRD, it has been rewritten to follow the guidelines in *Community Risk Assessment: Standards of Cover, 6th Edition* and is in compliance with the Center for Public Safety Excellence's (CPSE) *Fire and Emergency Services Self Assessment Manual, 9th Edition* accreditation model.

The community risk assessment and standards of cover process is a constant cycle of deployment monitoring, evaluation, and modification. The true value of this document lies in the process undertaken in creating it. The MFRD identified the boundaries and unique characteristics of its jurisdictional area, identified the types and levels of risk present within, and evaluated the service demand for each risk type. It then evaluated its ability to deliver the resources needed to handle these identified risks against best practice standards. Areas in need of improvement were identified, and a plan was made to improve the deployment ability of each.

The following study will begin with an overview of both the community and the department. Following this overview, the department will discuss areas such as risk assessment, critical task analysis, service level objectives, distribution and concentration measured documentation of reliability studies, and historical performance through charts, maps, and graphs. The study will conclude with policy recommendations.

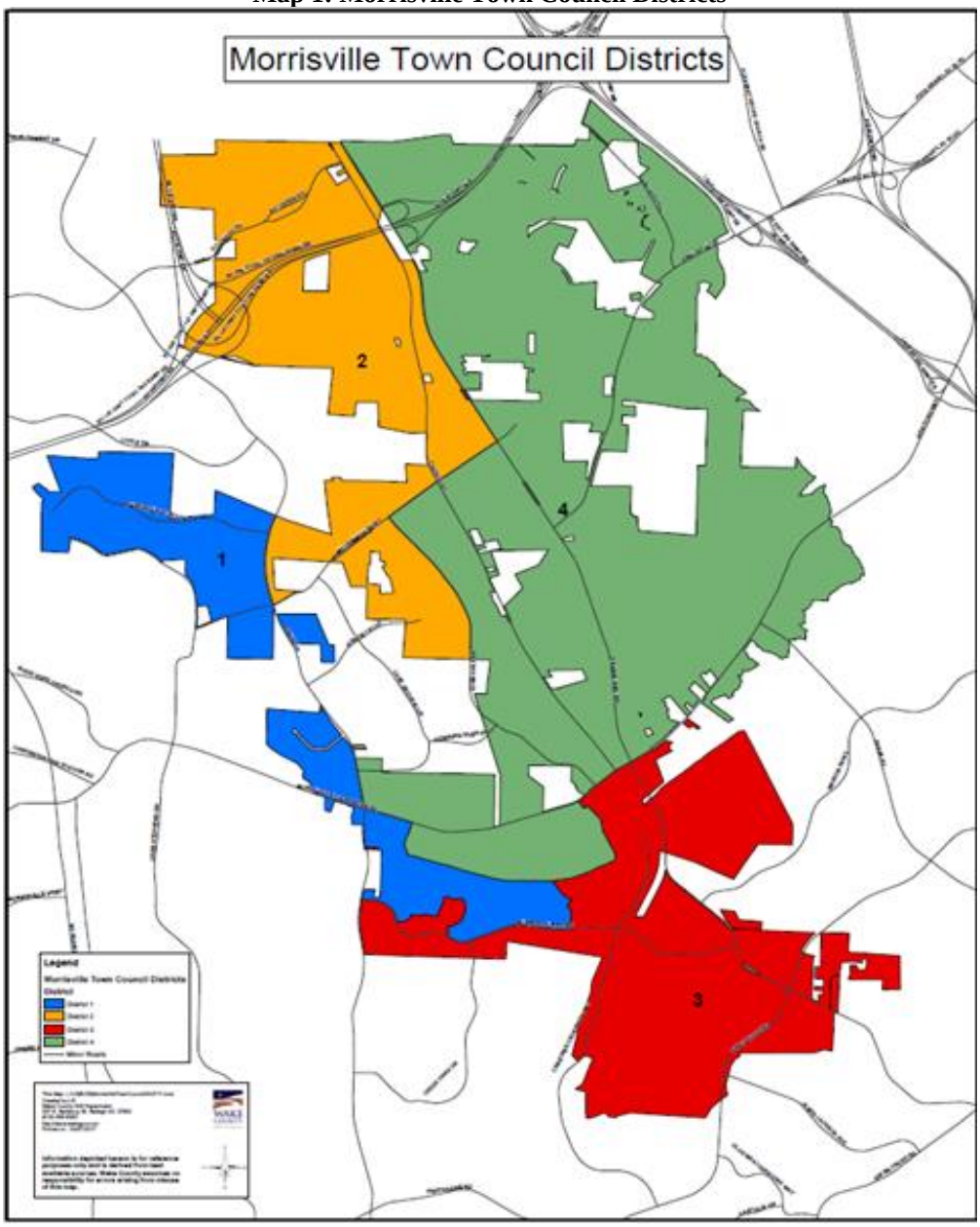
Community and Department Legal Basis

The Town of Morrisville operates under the council/manager form of government. In 2012 the town changed from a non-voting mayor to a voting mayor. The town is split into four voting districts, with one councilmember representing each district. The town also has two at-large seats in addition to one mayoral seat, all of which are voted on by all registered voters. The districts are broken up by neighborhood and community areas. Seats operate on four-year terms encompassing two-year election cycles. The district election cycles and neighborhood breakdown are shown in the following table and map. North Carolina General Statutes *Chapter 160A, Article 14* and *160A Article 1* authorize a municipality to appoint a fire chief and establish, organize, equip, and maintain a fire department. In addition, North Carolina General Statute *160A-293* is the law on fire protection outside city limits provided by a municipality. The roles, responsibilities, and authority of the department are defined in the Town of Morrisville Code of Ordinances, *Chapter 22*.

Table 1: District Designation

District Designation			
District 1	District 2	District 3	District 4
2019 Election Cycle	2017 Election Cycle	2019 Election Cycle	2017 Election Cycle
Breckenridge	Kitts Creek Area	Preston Area	Savannah
Portion North Morrisville Pkwy	Providence Place Area	Weston Area	Ridgemont
West of Davis Drive	Some of Town Hall Commons		Addison Park
	North of McCrimmon		Grace Park
	West of Church Street		Carpenter Park
			Downing Glen
			East of Church Street

Map 1: Morrisville Town Council Districts



The town manager is responsible for the operation of the town on a day-to-day basis. The assistant town manager reports to the town manager and supervises specific department heads. In addition, there is a Director of Management Services, who supervises the information technology department, the

communications and outreach department, and the finance department. The fire chief and police chief report directly to the town manager, who is responsible for community and emergency services.

History of the Community

The Town of Morrisville is located in Wake County, North Carolina, and is often referred to as the "Heart of the Triangle" for its central location in a dynamic region. Morrisville has grown from a small rural town into a thriving town with a population of approximately 29,968 based on a January 2021 estimate by the Town of Morrisville Planning Department. The Morrisville Fire/Rescue Department services the corporate limits and the surrounding unincorporated area in Wake County. The Town of Morrisville conducted a special census in 2015, which confirmed the town's population had grown to 23,699, a 27.5% increase over the 18,576 population in 2010. This equates to 5,123 additional people who moved to the community since 2010.

The town was originally chartered on March 3, 1875. The town grew as a railroad town, having one of the only train depots in Wake County in the late 1800s. After the citizens voted to repeal the original charter in 1933, the town became chartered again in 1947. The current charter is in the Town of Morrisville Code of Ordinances, *part I Charter Sections 1-12*. The department is legally established within the town's Code of Ordinances and complies with the North Carolina General Statutes *160A, Article 14*.

Morrisville Fire/Rescue was originally incorporated on June 8, 1955, as Morrisville Rural Fire Company, Inc, a time in which the town had a population of just 221. In 1994, the rural fire department merged with the town to create a municipal fire department, serving a town population of just over 1,000. The municipal fire department's first fire chief was Tony Chiotakis, who was hired by the town in 1991 as the first full-time chief to run the rural fire department. In 1999, the first full-time career firefighters were hired, with six personnel being assigned to each of the three shifts.

The department currently has 17 suppression personnel assigned on each of the three shifts and six administration positions, with three of those serving in fire prevention. The department operates out of three fire stations. Fire Station 1 is located at 200 Town Hall Drive and was constructed in 2012 to replace the previous station located just down the street at 100 Morrisville Carpenter Road. Fire Station 2 is located at 10632 Chapel Hill Road and was constructed in 1999 to serve the northern end of the community. Fire Station 3 is located at 6900 Carpenter Fire Station Road and is a co-located station with Cary Fire Department. The station replaced a previous station located just next door at 6804

Carpenter Fire Station Road. The previous station was designated as Station 2 prior to 1999 and then Station 3 after 1999 when the station at 10632 Chapel Hill Road was opened.

Community Financial Basis

North Carolina General Statutes *Chapter 159, Section 7* governs local government finance. This statute requires the town to operate under a balanced budget. The Town of Morrisville has established budget policies that are followed. Transferring funds between accounts covers minor cost overruns in an individual program or department. Large overruns that occur from revenue shortfall, natural disasters, the health and safety of residents, and actions to protect the long-term fiscal security of the Town of Morrisville can come from the general fund. The general fund is a fund that has unreserved and undesignated funds available. Town policy is to maintain a fund balance of 25% to 45%. The department's budget is in concert with state statutes and town policies.

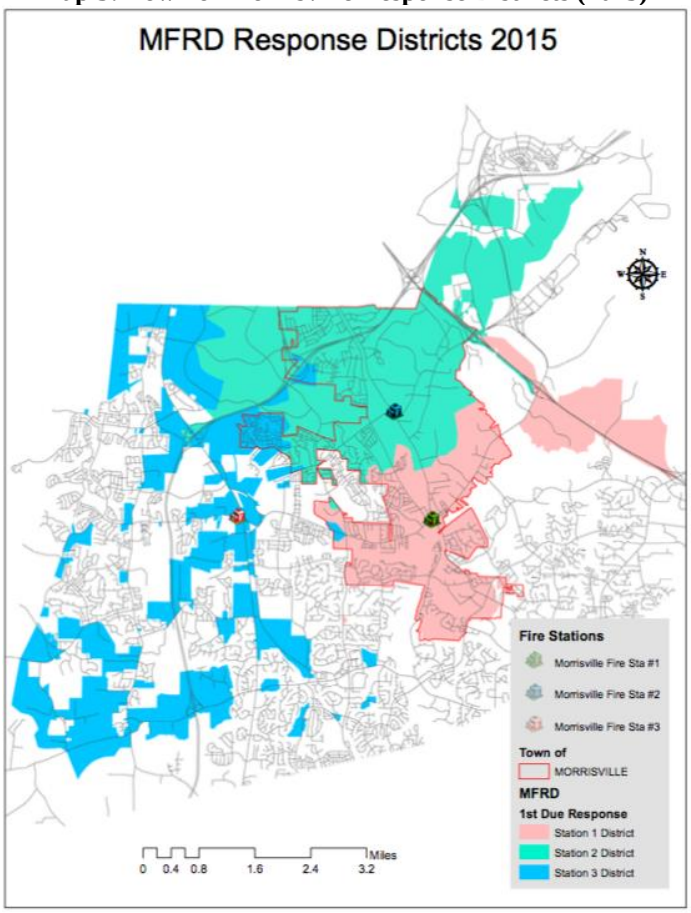
Each year, a budget calendar is adopted that provides guidance on when critical tasks in the development of the annual budget are due. The department's budget process begins with the previous year's budget spreadsheet, which includes a five-year projection for each line item. Department programs are assigned a program coordinator. Program coordinators are responsible for maintaining budgetary line items within their programs. The fire chief will communicate with program coordinators concerning changes in the program, funding or specific items and deadlines for the execution of the budget and formulation of the next budget. Once program coordinators have proposed the budgets for their programs, the fire chief must take the direction received from the manager and council to finalize the department's budget.

Community Boundaries

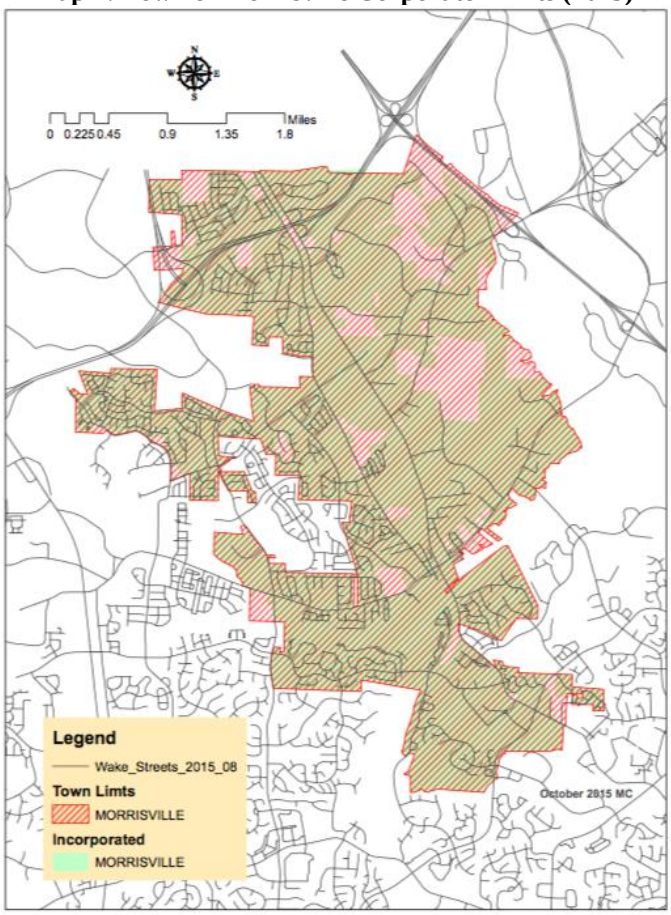
Map 2: Town of Morrisville in Relation to North Carolina

The Town of Morrisville is located in western Wake County, North Carolina. The town's corporate limits cover an area of 9.8 square miles. Many residents are attracted to this area due to its proximity to the capital, the Raleigh-Durham International Airport (RDU), the Research Triangle Park (RTP), and to the college cities of Raleigh, Durham, and Chapel Hill. In fact, the US Census Bureau reports that between the years 2000 and 2010, the town's population grew 257%, and 27.5% between 2010 and July 2014.

Map 3: Town of Morrisville Response Districts (2015)



Map 4: Town of Morrisville Corporate Limits (2015)

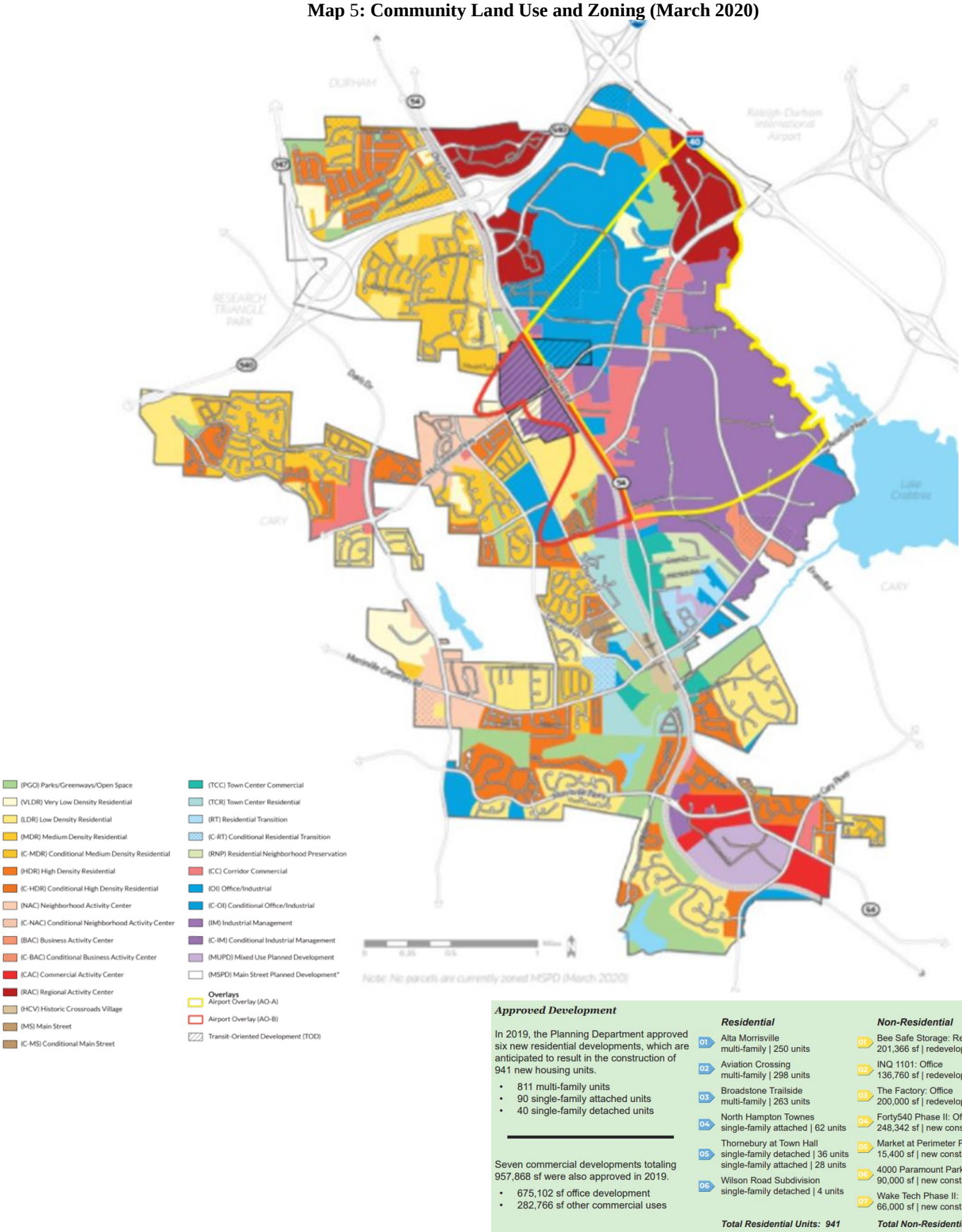


The department protects approximately 20 square miles and an estimated 29,968 residents. The northern section of the fire district covers the Interstate 40 corridor and the southern tip of the airport grounds. To the west, the response district stops just into the Wake-Durham County line. In the southern fire district, unincorporated areas of Wake County are covered up to the Wake-Chatham County lines. The town is bordered to the east completely by the Town of Cary, which has annexed much of the rural fire districts in the southern fire district once known as the Carpenter, Upchurch, and Green Level communities.

Community Planning Areas

The Town of Morrisville currently has 28 planning zones that vary from low/medium/high-density residential, mixed-use retail/residential, to office/industrial commercial uses. The zones are based on current manmade infrastructure within the service area along with community land use plans. Factors that played a role in the definition of the risk assessment zones included roadway, railroad crossings, population density, current/future land usage, and current/future occupancy types. A recent fire protection study performed by an outside consultant also recommended the building of new fire stations within the district. The factors that played a role in the placement of these community planning zones will be analyzed in detail throughout this CRA-SOC.

Map 5: Community Land Use and Zoning (March 2020)



Approved Development

In 2019, the Planning Department approved six new residential developments, which are anticipated to result in the construction of 941 new housing units.

- 811 multi-family units
- 90 single-family attached units
- 40 single-family detached units

Seven commercial developments totaling 957,868 sf were also approved in 2019.

- 675,102 sf office development
- 282,766 sf other commercial uses

Residential

01 Alta Morrisville
multi-family | 250 units

02 Aviation Crossing
multi-family | 298 units

03 Broadstone Trailside
multi-family | 263 units

04 North Hampton Townes
single-family attached | 62 units

05 Thornebury at Town Hall
single-family detached | 36 units
single-family attached | 28 units

06 Wilson Road Subdivision
single-family detached | 4 units

Total Residential Units: 941

Non-Residential

01 Bee Safe Storage: Retail/Storage
201,366 sf | redevelopment

02 INQ 1101: Office
136,760 sf | redevelopment

03 The Factory: Office
200,000 sf | redevelopment

04 Forty540 Phase II: Office
248,342 sf | new construction

05 Market at Perimeter Park: Retail
15,400 sf | new construction

06 4000 Paramount Parkway: Office
90,000 sf | new construction

07 Wake Tech Phase II: College
66,000 sf | new construction

Total Non-Residential: 957,868 sf

Community Transportation Systems

Air Travel: A portion of the Town of Morrisville lies under both approach corridors to RDU's runway 05L and 05R, which is approximately four miles from town center. The airport itself is the major point of entry into the RTP area and sees over 81,000 departures and landings annually, and over 14 million passengers a year. Over ten million people visit RDU each year to enplane, deplane, or make a connection. The types of aircraft operated out of RDU range in size from large commercial airliners like the Boeing 757 or Airbus A320, small regional jets like the Canadair CRJ-200, general aviation aircraft of all types and sizes, along with fixed and rotary military aircraft.

Raleigh-Durham International Airport

RDU Airport Authority employs a Crash Fire Rescue (CFR) department that houses several airport rescue firefighting vehicles. Morrisville is on the Wake County dispatch run order to all fire incidents at the airport, as well as aircraft crash standbys. The department responds to the airport an average of 20 times a year, many of which are false calls.

In the event an aircraft crashes outside the airport within the Town of Morrisville, RDU CFR would be dispatched to the crash site along with mutual aid from Raleigh, Cary, Western Wake, and Apex Fire Departments. While the impact area will be relatively small, an incident of this type would likely draw national media attention. Federal support from agencies like the National Transportation Safety Board and Federal Aviation Administration would be expected. Initial response priorities would be to assess rescue feasibility and find signs of life. As the response would most likely last days, the National Incident Management System would be enacted to ensure continuity of operations for an extended amount of time.

North Carolina Amtrak

Commuter Rail Service: The Town of Morrisville has approximately 13.3 miles of railroad track that runs north and south parallel to Chapel Hill Road and splits the town into two sections. This rail line is owned and operated by the Norfolk Southern Rail Company and is used under contract by the North Carolina Department of Transportation. This rail line, known as Rail Line H, is very active with as many as fourteen trains using the corridor per day. Old Morrisville Fire Station 1, at the intersection of Morrisville-Carpenter Road and Chapel Hill Road, is milepost 68.7 on the H line running from Greensboro (milepost 0) to Raleigh (milepost 81). There are currently two at-grade railroad crossings in Morrisville, and all have crossing arms and audio/visual warning systems.

Commuter rail service through the town consists of six trains daily. There are two types of commuter trains on this line, the Piedmont and the Carolinian. The Piedmont is a state-owned train that runs daily between Raleigh and Charlotte. There are two southbound trains to Charlotte and two northbound trains to Raleigh that may have 75-100 passengers on weekdays and 150-200 passengers on weekends. The Piedmont trains consist of one locomotive, one baggage car, and three passenger cars. The Carolinian is a commuter train owned and operated by Amtrak, which runs from Charlotte to New York. There is one northbound train to New York in the morning and one southbound train to Charlotte in the afternoon that carries 175-225 passengers daily. The Carolinian train consists of one locomotive, one baggage car, one lounge car, and five passenger cars.

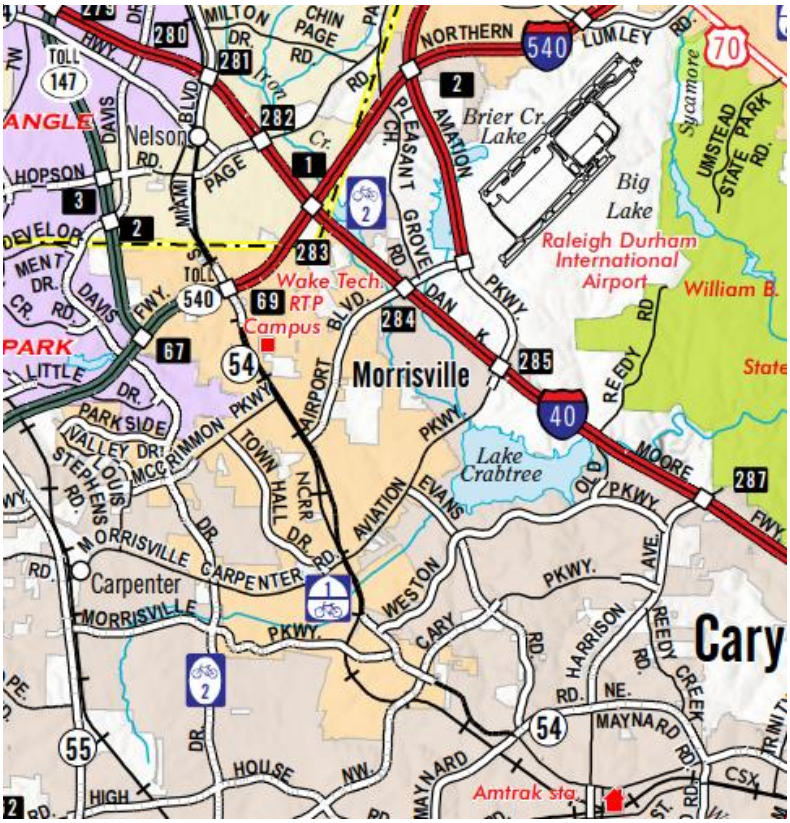
Map 6: Rail Lines

Commuter trains in this area carry only passengers and their baggage, and do not have additional freight cars. The amount of fuel in the locomotive at the time it passes through the town depends on whether it is heading northbound or southbound. The Piedmont and Carolinian locomotives have a 2,200-gallon diesel fuel capacity. When the Piedmont is heading southbound, it has approximately 2,000 gallons at milepost 68.7 and anywhere from 1,000-1,200 gallons of diesel when it is heading northbound as it passes milepost 68.7 going to Raleigh. The Carolinian typically has 1,000 gallons of diesel when it passes through Morrisville going northbound and 1,800-2,000 gallons going southbound. Diesel fuel represents the largest amount of hazardous material at a commuter train incident in Morrisville, while electrical and passenger safety hazards remain the primary physical hazards for responders.

Highways: The Town of Morrisville is bordered on three sides by major highways used to transport commodities. Interstate 40 sees a large amount of local and interstate traffic within the three-mile stretch. This traffic includes liquid fuel tankers, hazardous materials trucks, and many other tractor-trailer combinations. North Carolina Highway 55 and NC/Interstate 540 are both large roads that connect I-40 to Apex and points south and west of Morrisville. Mainly local traffic travels these roads, but commercial traffic and tractor-trailers also use these highways.

Potential incidents on these highways include motor vehicle collisions and vehicle fires. There are an infinite number of possibilities as to how many vehicles may be involved and the types of hazards present. One danger that does not change is the actual highway response and the requirement to block and redirect traffic. The volume of traffic that flows through this section of Interstate 40 is such that between 4 p.m. and 6 p.m. there is gridlock traffic. Operating in this environment is less than ideal and has led to the department adopting a highway response policy.

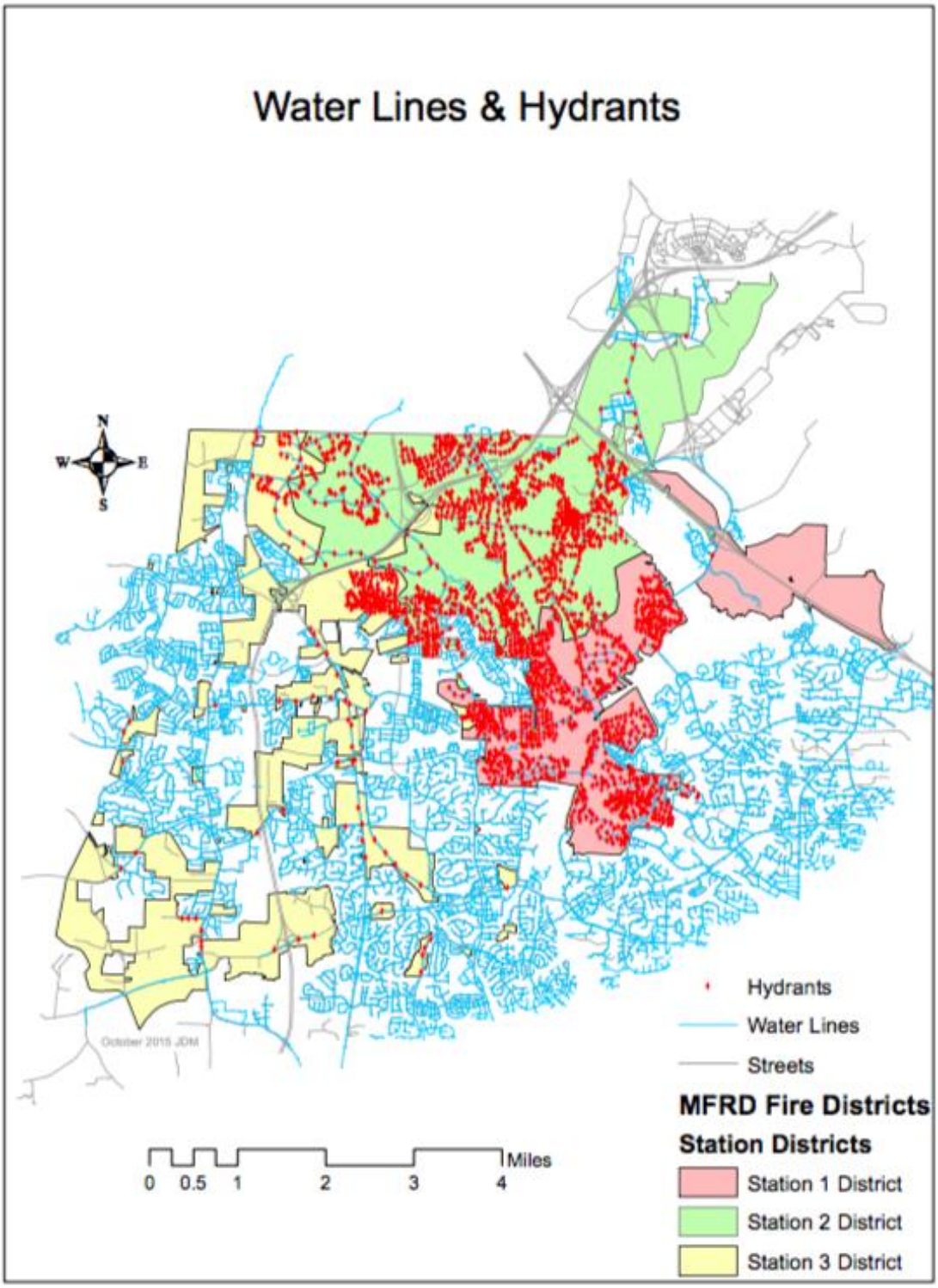
Map 7: Highways



Community Critical Infrastructure

The Town of Morrisville is serviced by an extensive water distribution system that covers most of the service area. Approximately 91% of the service area is covered by hydrants. In addition, only 275 properties are located further than 1,000 feet from a fire hydrant. The water distribution system is owned, operated, and maintained by a neighboring jurisdiction, the Town of Cary.

Map 8: Water Lines and Hydrants

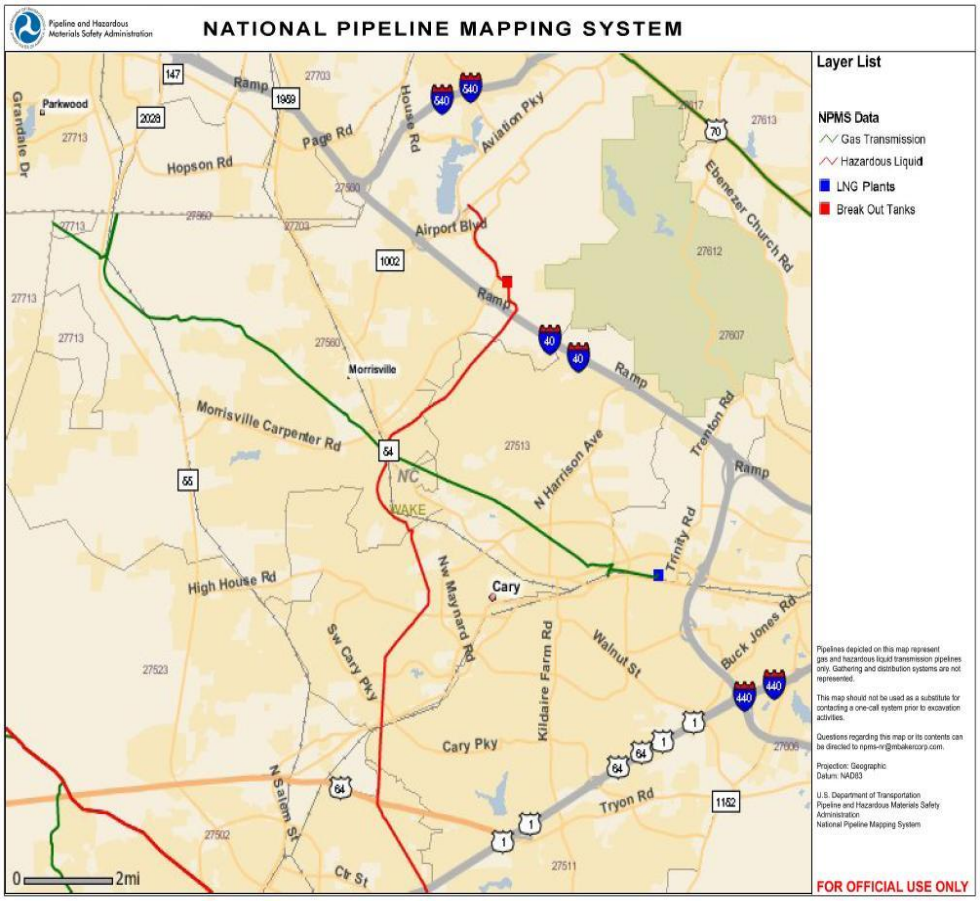


The Town of Morrisville employs its own stormwater engineers in the engineering department. The geographical topography of the land does not greatly affect stormwater runoff. However, the geology of the land does. The Town of Morrisville sits in the Deep River Basin: the largest of the three Triassic Basins located in North Carolina. In Triassic sites, the geology of the soil provides very poor water drainage and absorption. This causes the Town of Morrisville stormwater engineers to work with the planning department to determine permeable space land usage on new construction projects within the town.

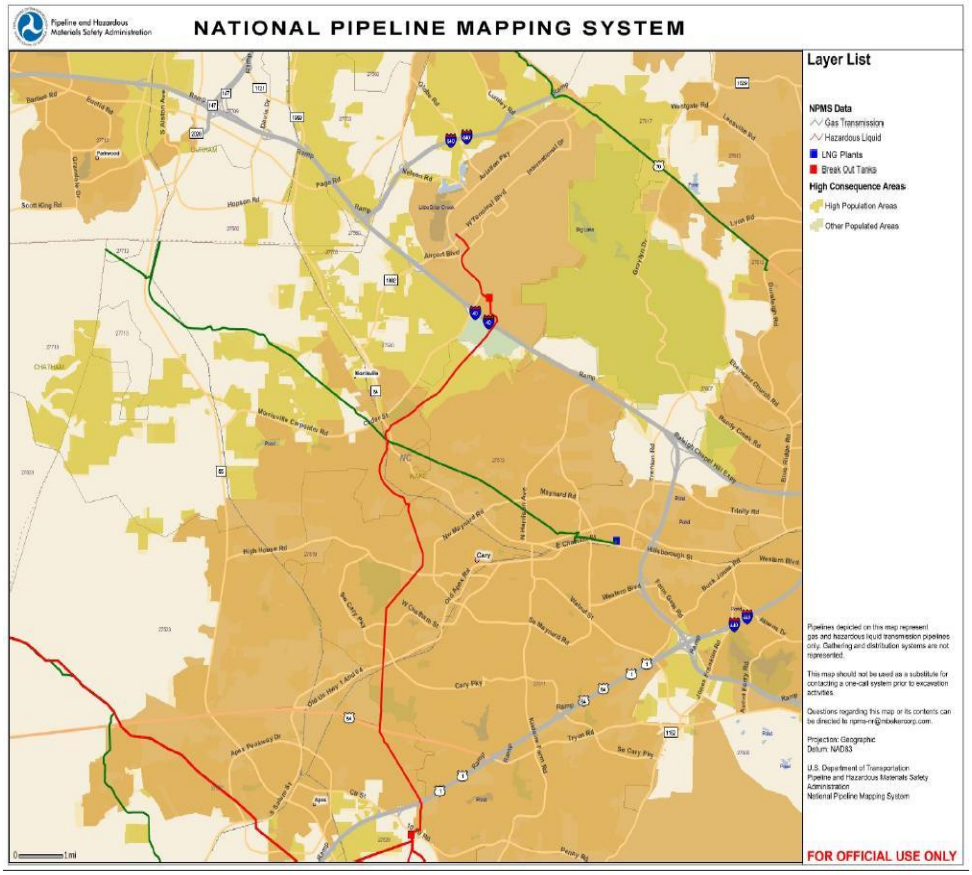
The town has two large-diameter pipelines running through the center of town. One pipeline is a 16-inch natural gas line owned and operated by PSNC Energy Company. This line is used as a main transmission line for the Wake-Durham County area and runs along Town Hall Drive out to NC/Interstate 540 and under Crabtree Creek, then crosses Chapel Hill Road under the Arium Weston apartment complex and into Cary.

The second pipe running under Morrisville carries aircraft fuel from Apex to the south and travels north to RDU. This pipe enters Morrisville jurisdiction under the Preston subdivision at NW Cary Parkway and Rainbrook Drive and generally travels along the Norfolk Southern Railroad corridor until it crosses Chapel Hill Road and Keybridge Drive. From that point, the pipeline goes north behind the Keybridge subdivision along Crabtree Creek, where it crosses through Lake Crabtree and under Interstate 40. The following maps show the pipes in relation to the town.

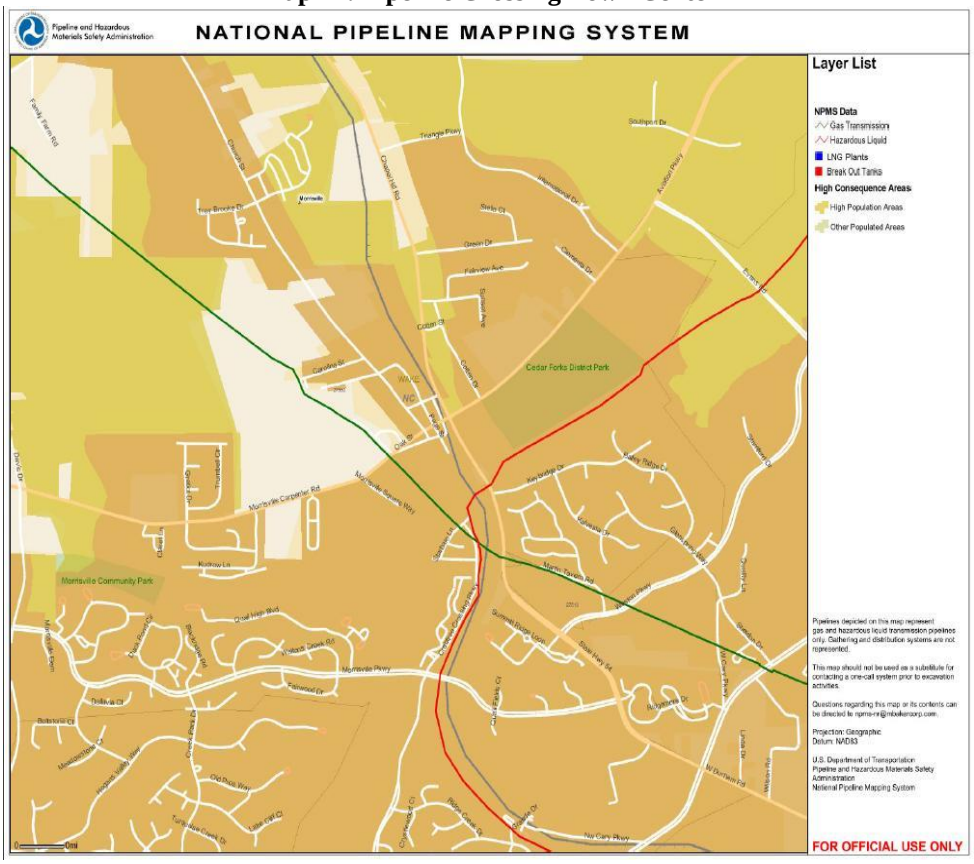
Map 9: Pipelines



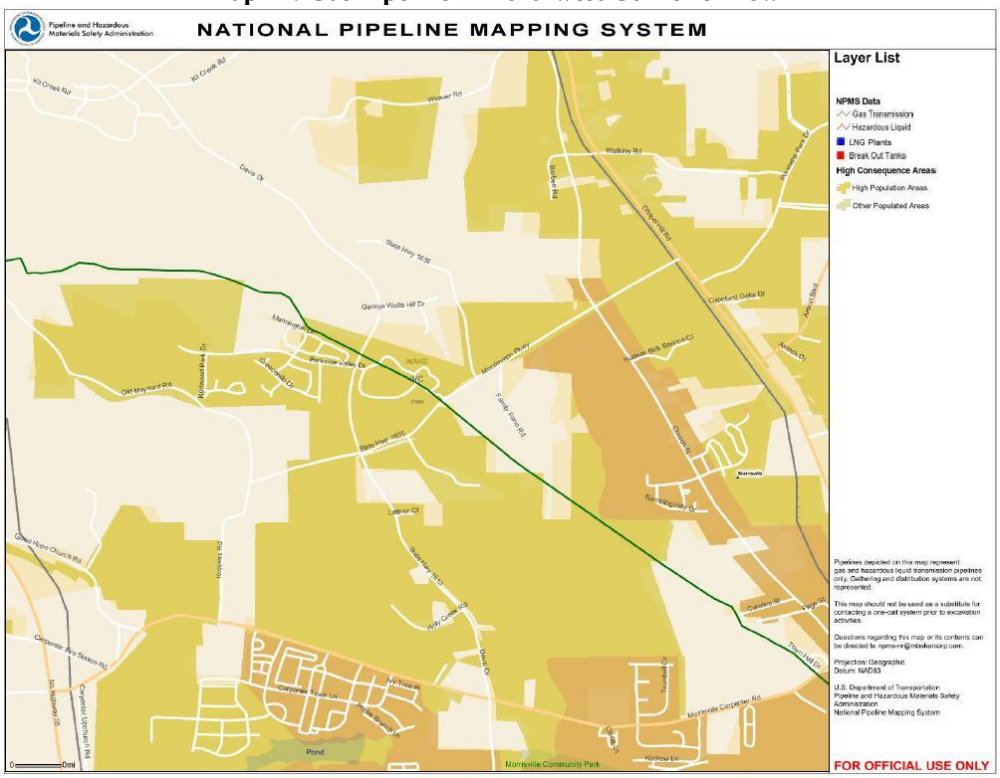
Map 10: Pipeline Start and End Points



Map 11: Pipeline Crossing Town Center



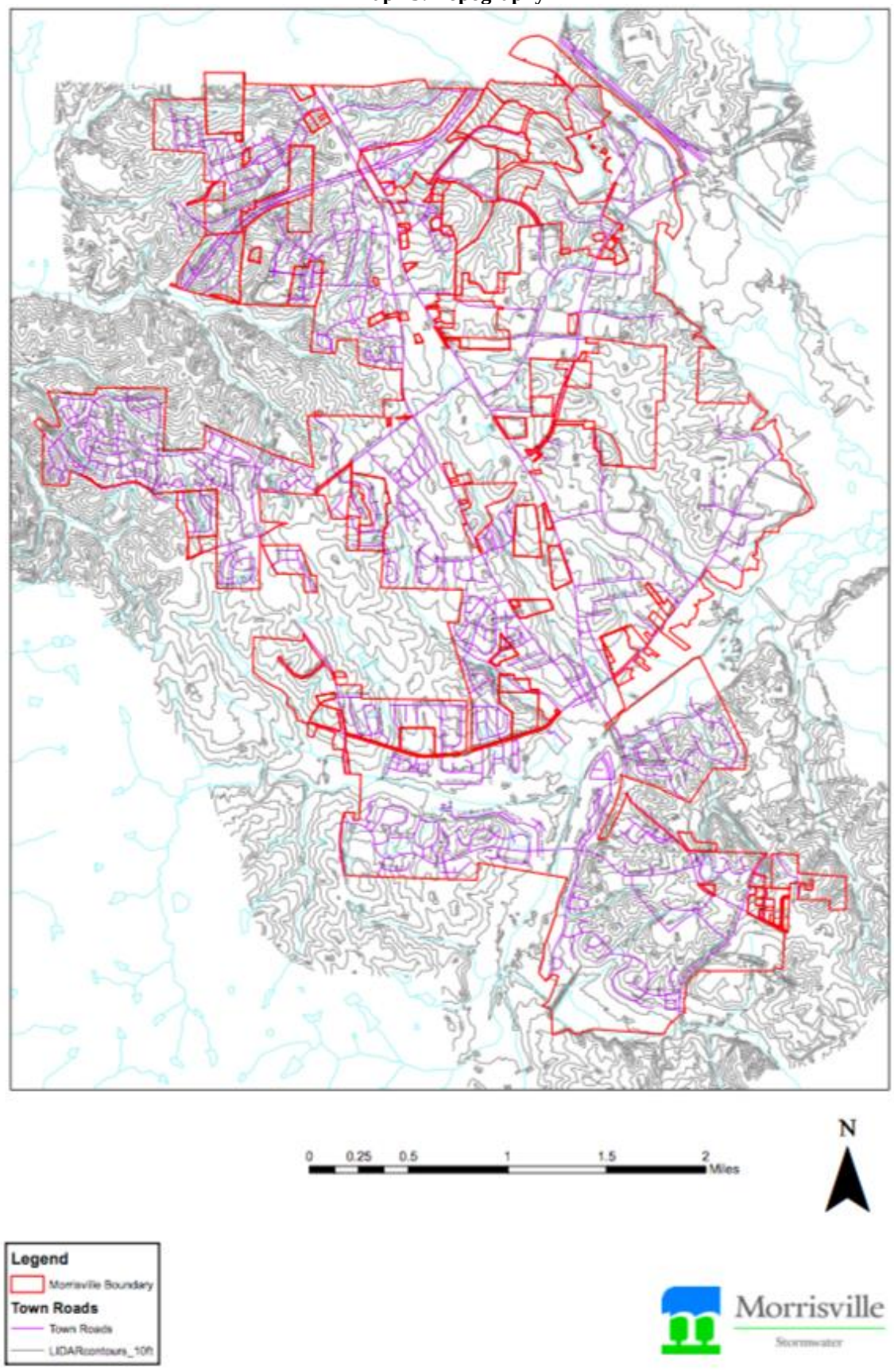
Map 12: Gas Pipeline in Northwest Corner of Town



Community Topography

The Town of Morrisville sits at an average elevation of 302 feet above sea level. Due to the town being located on the eastern side of the Piedmont region of the state and close to the Coastal Plain region, there are minimal elevation changes within the district. The topography of the district has little to no influence on the community planning areas. There are no major natural barriers within the service area that impact the deployment of the department.

Map 13: Topography



Community Geography

North Carolina can be broken down into three geographic regions that split the state into thirds. The regions are the Coastal Plain, Piedmont, and the Blue Ridge Mountains. The Town of Morrisville is in Wake County, within the Piedmont region of North Carolina, also known as the Central Piedmont Plateau.

The Piedmont region occupies about 45% of the state and is known for its rolling hills. The region has an elevation range of 300-1,100 feet above sea level. Morrisville is located on the eastern side of the region, closest to the Coastal Plain. As such, Morrisville does not experience any drastic elevation changes within the district.

Map 14: North Carolina Geographic Regions

Community Geology

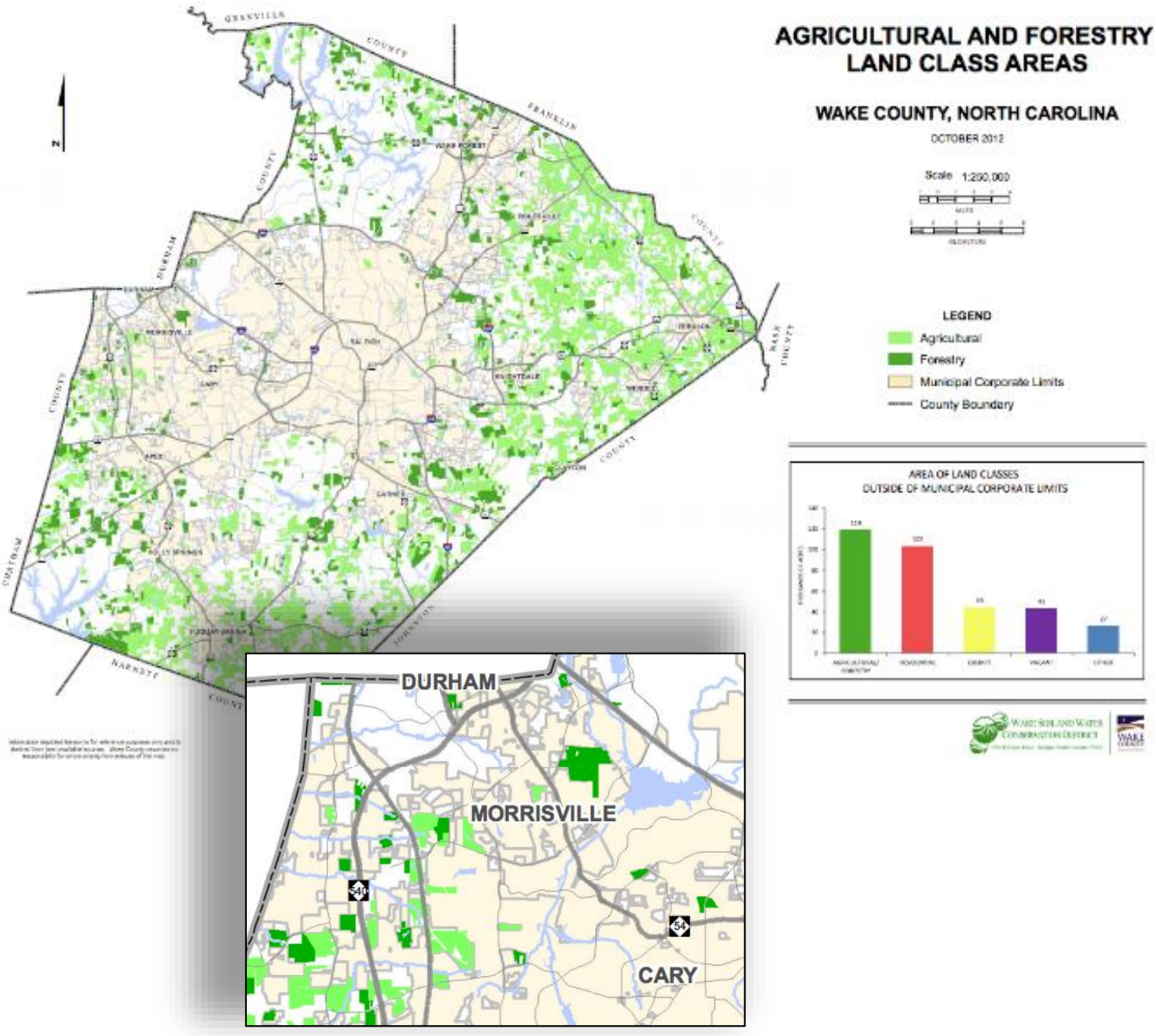
The Town of Morrisville sits in the Deep River Basin: the largest of the three Triassic Basins in North Carolina. In Triassic sites, the geology of the soil provides very poor water drainage and absorption. This is due to an underlayment of sedimentary rocks that provides little pore space to hold water. Due to its Triassic location, the Town of Morrisville issues more construction blasting permits than other area municipalities not affected by the Triassic site. These Triassic sites have also been the subject of recent political debates in North Carolina due to the large volumes of shale gas underneath the sedimentary rocks in the Triassic Basins. The debate revolves around hydraulic fracturing, also known as fracking.

Map 15: North Carolina Triassic Basins

Community Physiography

The Town of Morrisville is made up of a mix of urban and suburban land common with most areas in the easternmost part of the Piedmont region. This indigenous makeup of the region consists of a mix of pine forests and coastal-type plain lands. Based on historical events and data, the wildland/urban interface fire risk for the service area is considered extremely low.

Map 16: Agricultural and Forestry Land Class Areas



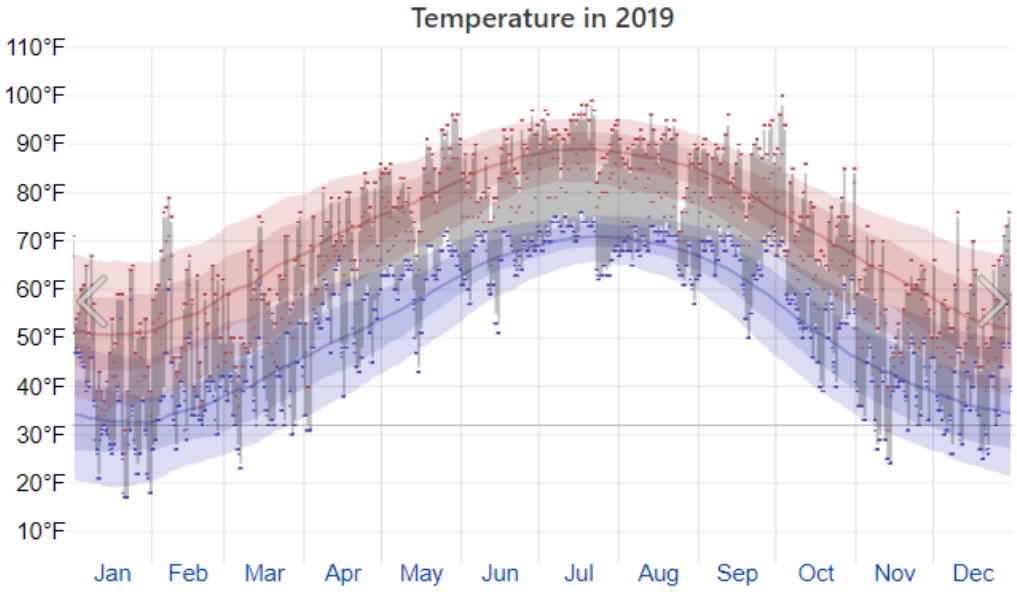
Community Climate

The Town of Morrisville and the state of North Carolina are in a region of the United States where the opportunity exists to experience all four seasons throughout the year. Due to this, the department must be equipped to handle weather of 100 degrees and above in the summer, winter storms, and any other natural weather phenomenon.

Table 2: Temperature and Rainfall by Month (2019)

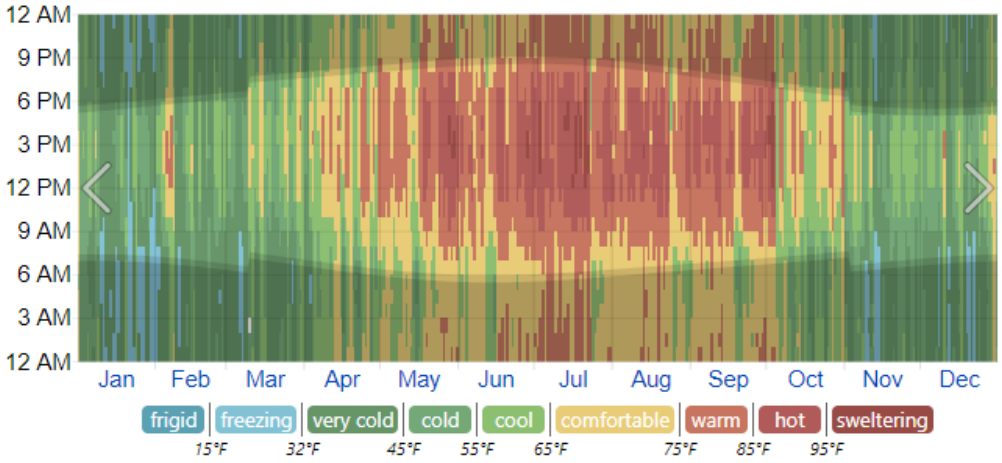
Nearest weather station at RALEIGH DURHAM AP , NC. Elevation 416 Feet

Month	High Temp	Average Temp	Low Temp	CDD	HDD	Rain(Inches)
January	49.8	39.7	29.6	0	783	4.0
February	54.0	43.0	31.9	1	627	3.5
March	62.5	50.7	38.9	9	456	4.0
April	71.8	59.1	46.4	38	214	2.8
May	78.7	67.0	55.3	119	61	3.8
June	85.5	74.7	63.8	293	5	3.4
July	89.1	78.8	68.5	429	0	4.3
August	87.2	77.2	67.2	379	1	3.8
September	81.3	71.2	61.0	206	20	4.3
October	71.8	60.0	48.2	39	194	3.2
November	62.4	51.0	39.5	6	425	3.0
December	53.3	43.0	32.6	2	679	3.0
Yearly Total				**1,521**	**3,465**	**43.1**



The daily range of reported temperatures (gray bars) and 24-hour highs (red ticks) and lows (blue ticks), placed over the daily average high (faint red line) and low (faint blue line) temperature, with 25th to 75th and 10th to 90th percentile bands.

Figure 1: Temperature (2019)



The hourly reported temperature, color coded into bands. The shaded overlays indicate night and civil twilight.

Figure 2: Hourly Temperature (2019)

Table 3: Precipitation and Temperature by Month (2019)

Month	Total Precipitation Normal (inches)	Mean Max Temperature Normal (°F)	Mean Min Temperature Normal (°F)	Mean Avg Temperature Normal (°F)
January	3.50	50.9	31.0	41.0
February	3.23	55.2	33.8	44.5
March	4.11	63.4	39.9	51.6
April	2.92	72.4	48.0	60.2
May	3.27	79.6	56.5	68.0
June	3.52	87.1	65.8	76.4
July	4.73	90.2	69.9	80.0
August	4.26	88.4	68.6	78.5
September	4.36	82.1	61.7	71.9
October	3.25	72.7	49.8	61.2
November	3.12	63.6	40.8	52.2
December	3.07	53.6	33.3	43.5
Annual	43.34	71.6	49.9	60.8

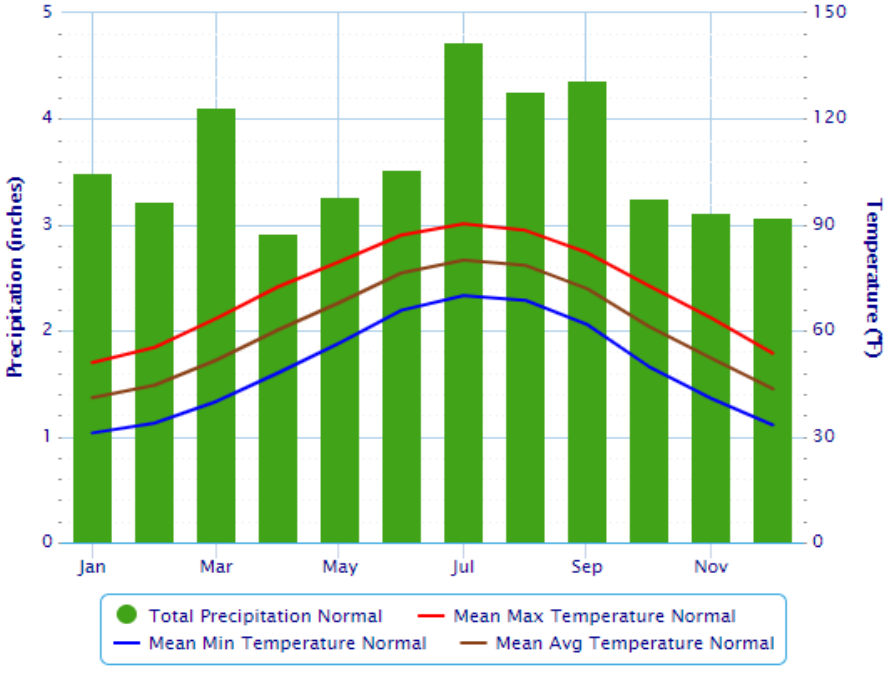


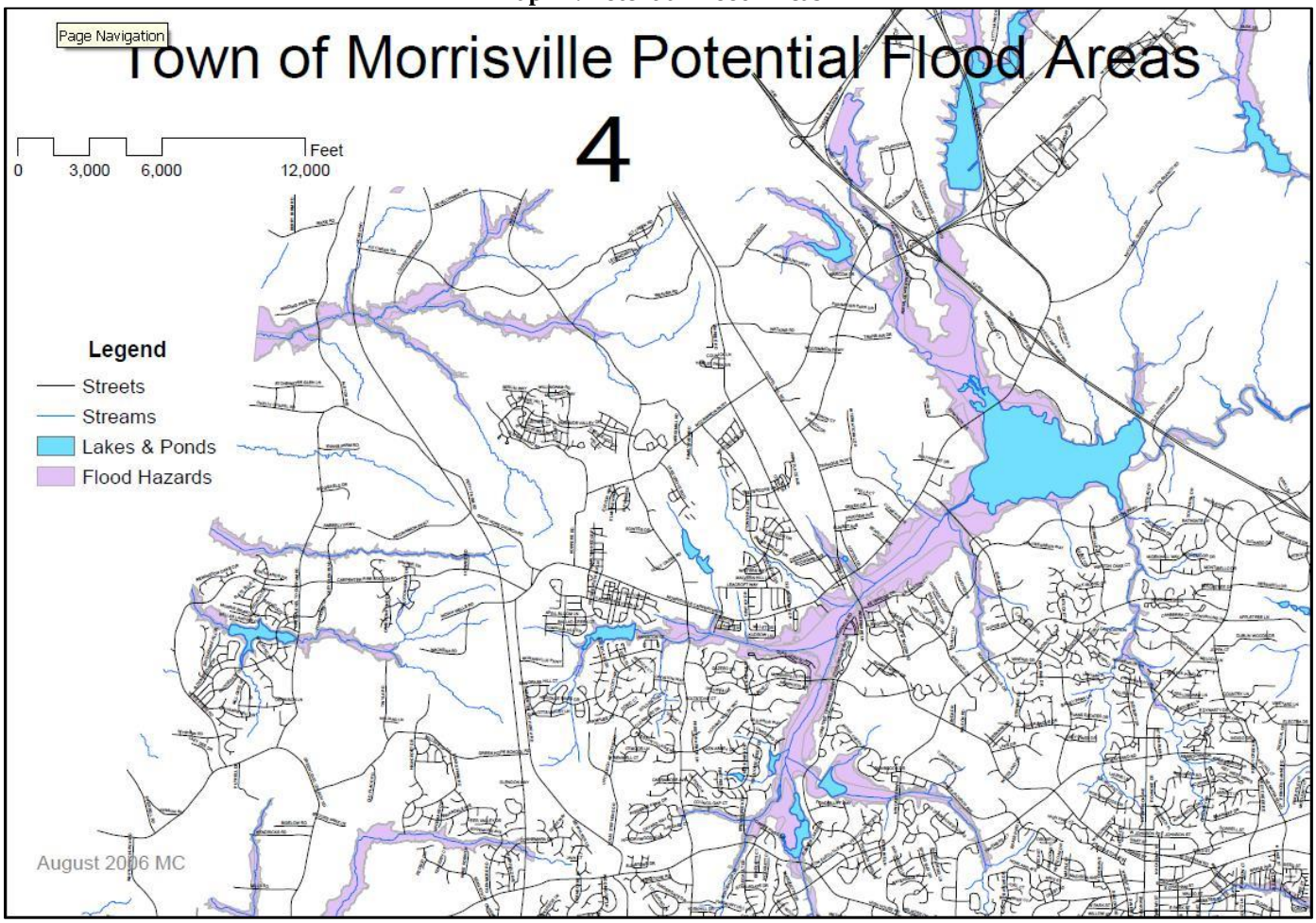
Figure 3: Precipitation and Temperature by Month (2019)

Severe Thunderstorms: Severe thunderstorms are the most frequent severe weather events seen in central North Carolina. According to the North Carolina Climate Office, the state experiences 40-50 thunderstorms in a year, with the busiest month being July. Each year an average of $5 million in damages are caused by thunderstorms and their byproducts of rain, hail, lightning, and high wind.

Cloud to ground lightning is one of the most common causes of structure fires in Morrisville during the summer months. Additional calls received during thunderstorm events are false detector activations due to loss of power to buildings. The agency can modify its dispatch protocol to a set reduced dispatch to reserve units for higher call volume. Any supervisor in the system can request dispatch change to Storm Mode dispatching.

Flooding: The primary cause of flooding in the Town of Morrisville is heavy precipitation, usually associated with major storm systems. Areas of focus for the town are Crabtree Creek, Indian Creek, and Stirrup Iron Creek. During the winter season, significant runoff from abnormal snowmelt conditions may pose a relative threat to the county. During hurricanes, flooding risk is fairly minimal. Surface flooding may occur in some areas, but it is not likely any sections would be inundated or require evacuation.

Map 17: Potential Flood Areas



Winter Storms: Because severe winter storms include frigid temperatures, heavy snow, ice, and gusting winds in all combinations, the severity is usually determined by duration, temperature extremes, and accumulation of precipitation. The primary threat is the ability of such storms to completely immobilize large areas, disrupt services, and cause injury or death. In the Town of Morrisville, on average, snow and/or sleet occurs once or twice annually. In North Carolina, snowfall ranges from one inch to approximately 24 inches across the state. During ice storms, many pine trees fall, causing roadway blockages and driving hazards.

Overall response plans during these types of weather events include fueling all apparatus prior to a storm, avoiding unnecessary trips, calling in additional personnel to staff small support vehicles, and running smaller vehicles as first out to EMS calls. This concept of operation has been enacted several times between 2015 and 2020 and has worked favorably in maintaining a high level of safety. All first out engines and quints (with the exception of Ladder 22) have automatic chains that are deployed when the apparatus must go on the road in icy conditions. Ladder 22 has chains that must be applied manually in preparation for winter weather. The heavy rescue company is also equipped with automatic chains. All smaller response vehicles are equipped with four-wheel-drive systems. This includes Rescue 21, Utility 21, Battalion 4, and all fire administration vehicles. Lastly, the Town of Morrisville and Town of Cary employ their respective public works departments to apply a salt brine solution to the main roads prior to any potential winter weather.

Tornadoes: Tornadoes can occur at any time of the year and at any hour of the day. Tornadoes are most common in North Carolina from late March through June. Avoidance of tornadoes is virtually impossible, and the Town of Morrisville is vulnerable to their occurrence. While tornadoes are not a common occurrence in the area, Morrisville has experienced tornadoes in the past. Due to the rapid increases in population and development within the area, any tornado of significant proportion would pose a maximum threat to both lives and property.

Table 4: Fujita Tornado Scale

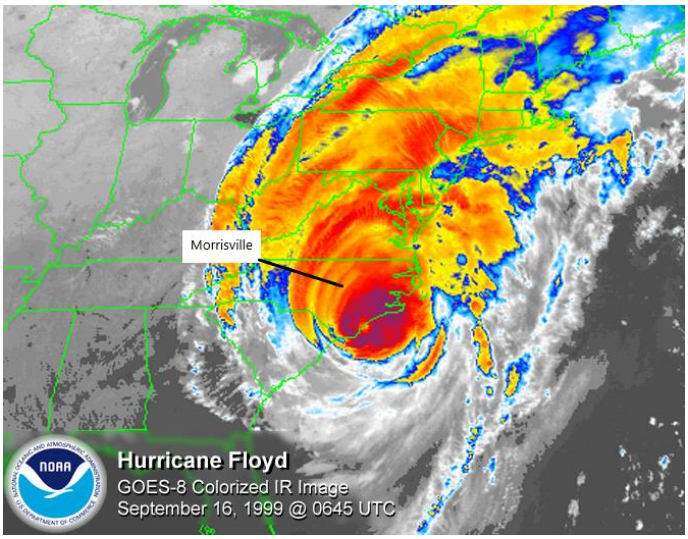
Scale	Three Second Gust (mph)	Damage
F0	65-85	Light
F1	86-110	Moderate
F2	111-135	Considerable
F3	136-165	Severe
F4	166-200	Devastating
F5	Over 200	Incredible

Deployment in response to a tornado touchdown would include a rapid assessment of the affected area, and then a call for specialized rescue services. Personnel most likely to be needed would be structural collapse rescue technicians and building inspectors. A high number of ambulances would also be required to be on standby for the transport of victims. The department would primarily be tasked with the search, rescue, and triage of victims.

Hurricanes: Hurricanes are among the most frequent and most damaging types of weather events faced by the Town of Morrisville. Since 2010, North Carolina has been directly and indirectly affected by 15 named tropical storms and hurricanes. Hurricanes are rated according to their wind speeds, which is then used to assign a category to the storm. This scale is known as the Saffir-Simpson Hurricane Scale.

Table 5: Saffir-Simpson Hurricane Scale

Category	Barometric Pressure	Wind Speed	Storm Surge	Damage Potential
1 (weak)	28.94 in Hg or more (980.2 Mb or more)	65 - 82 knots (75 - 95 mph)	4 - 5 feet (1.2 - 1.5 meters)	Minimal damage to vegetation
2 (moderate)	28.5 - 28.93 in Hg (965.12 - 979.68 mb)	83 - 95 knots (96 - 110 mph)	6 - 8 feet (1.8 - 2.4 meters)	Moderate damage to houses
3 (strong)	27.91 - 28.49 in Hg (945.14 - 964.78 mb)	96 - 113 knots (111 - 130 mph)	9 - 12 feet 2.7 - 3.7 meters	Extensive damage to small buildings
4 (very strong)	27.17 - 27.9 in Hg (920.08 - 944.8 mb)	114 - 135 knots (131 - 155 mph)	13 - 18 feet (3.9 - 5.5 meters)	Extreme structural damage
5 (devastating)	< 27.17 in Hg (< 920.08 mb)	> 135 knots (> 155 mph)	> 18 feet (> 5.5 meters)	Catastrophic building failures possible



Hurricane Florence North Carolina Landfall (2018)

Of the named storms that hit North Carolina since 2010 at their max classification, eight were tropical storms (winds below 65 knots), one was a tropical low, one was a Category 2, one was a Category 3, three were a Category 4, and one was a Category 5. As shown in the following table, 2018 had a dramatic increase in the number of powerful hurricanes impacting North Carolina. Weather events associated with hurricanes have included heavy rain, high winds, and tornadoes. Damage sustained during these storms included road closures due to flash flooding, building damage, and downed trees and power lines.

Prior to hurricane landfall, notices are sent to all employees, and equipment is prepared in accordance with the emergency operations plan. Deployment of apparatus and equipment during hurricanes is based on incident response needs.

Table 6: Named Storms with North Carolina Impact (2010-2020)

Storm Name	Max Classification	Year	Max Winds	Min Pressure
Michael	Category 4	2018	135	919
Florence	Category 4	2018	120	941
Chris	Category 2	2018	90	0
Ten	Tropical Low	2017	40	1004
Matthew	Category 5	2016	145	934
Julia	Tropical Storm	2016	45	1007
Colin	Tropical Storm	2016	50	987
Bonnie	Tropical Storm	2016	40	1006
Ana	Tropical Storm	2015	50	998
Andrea	Tropical Storm	2013	55	992
Beryl	Tropical Storm	2012	60	992
Alberto	Tropical Storm	2012	50	995
Lee	Tropical Storm	2011	50	986
Irene	Category 3	2011	105	942
Earl	Category 4	2010	125	927

Community Population/Population Densities

The Town of Morrisville conducted a special census in 2015, which showed the town's population had grown to 23,699, a 27.5% increase over the 18,576 population in 2010. This equates to 5,123 additional people who moved to the community from 2010 to 2015. Furthermore, based on population estimates conducted by the town's planning department, the population estimate as of January 2021 was 29,968. This data shows an increase of an additional 26.5% from 2015 to 2021.

The Town of Morrisville can be easily divided into three different residential occupancy types: multifamily apartments, multifamily townhouses, and single-family detached homes. The town has 19 occupied apartment complexes with four more under construction. Of the 29,968 estimated population, 10,328 of those residents, or 34.5%, live in apartments. In addition, 27.3% live in multifamily townhouses, and 38.2% live in single-family detached homes. The town currently has four apartment complexes, three townhome neighborhoods, and three single-family neighborhoods under construction. The estimated total build-out of the population after these completed residential construction projects is 32,216. The almost even one-third split of residential occupancy types shows the diverse nature of residential fire suppression deployment models encountered by the department.

Community Demographic Features

The Town of Morrisville serves a diverse community of 29,968 residents. Based on a 2015 special census (when the population was approximately 23,699), the town is made up of 27.9% Asian Indian.

Table 7: Town of Morrisville Racial Demographics (2015 Special Census)

Subject	Morrisville town, North Carolina			
	Estimate	Margin of Error	Percent	Percent Margin of Error
Two or more races	1,147	+/-415	4.8%	+/-1.7
One race	22,726	+/-417	95.2%	+/-1.7
White	10,583	+/-785	44.3%	+/-3.3
Black or African American	2,899	+/-422	12.1%	+/-1.8
American Indian and Alaska Native	118	+/-96	0.5%	+/-0.4
Cherokee tribal grouping	0	+/-22	0.0%	+/-0.1
Chippewa tribal grouping	0	+/-22	0.0%	+/-0.1
Navajo tribal grouping	0	+/-22	0.0%	+/-0.1
Sioux tribal grouping	0	+/-22	0.0%	+/-0.1
Asian	8,843	+/-806	37.0%	+/-3.4
Asian Indian	6,663	+/-757	27.9%	+/-3.2
Chinese	692	+/-370	2.9%	+/-1.5
Filipino	241	+/-172	1.0%	+/-0.7
Japanese	73	+/-68	0.3%	+/-0.3
Korean	214	+/-221	0.9%	+/-0.9
Vietnamese	78	+/-72	0.3%	+/-0.3
Other Asian	882	+/-392	3.7%	+/-1.6
Native Hawaiian and Other Pacific Islander	9	+/-16	0.0%	+/-0.1
Some other race	274	+/-258	1.1%	+/-1.1
Two or more races	1,147	+/-415	4.8%	+/-1.7
Race alone or in combination with one or more other races				
Total population	23,873	+/-54	23,873	(X)

In comparison, based on 2010 US Census data for the United States as a whole, only 0.9% of the US population is Asian Indian. The rapid growth of the Asian-Indian subculture, along with others, gives the town a different character than the rest of the country. It's likely this rapid growth is due to the availability of desirable employment, easy access to higher education, and the town being home to one of the first large Hindu Temples in North Carolina. The Temple is located at 309 Aviation Parkway and is operated by The Hindu Society of North Carolina, founded in 1977. In its first few years, the Hindu Society of North Carolina had under 100 members and met in a dilapidated structure in downtown Raleigh. In 1984, a six-acre plot in Morrisville was purchased, and construction on a new Temple was started. On December 20, 1986, the first worship service was held in the new Temple in Morrisville. Since then, the Asian Indian population in Morrisville has grown exponentially. Multiple other Hindu Temples have been created within Morrisville, along with Indian restaurants and other

cultural-based businesses. With this, the Asian Indian culture and population in Morrisville continues to grow.

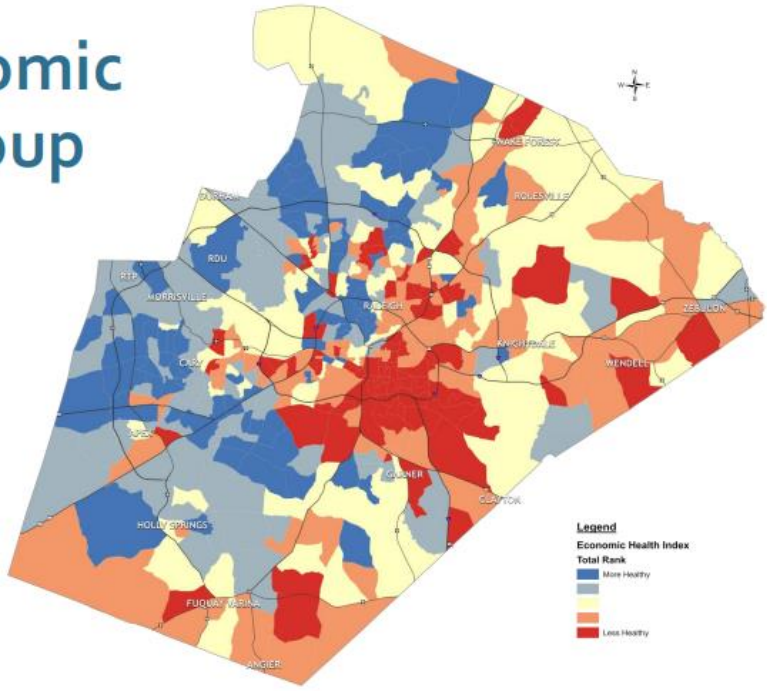
The Town of Morrisville has a median age of 33.5 years old, compared to the US population which has a median age of 37.2 years old. The almost four-year difference may seem small, but this data shows Morrisville as a younger community. This can be attributed to the high number of technology-based jobs and proximity to several major universities. Technology-based jobs stem from RTP which is partly located in the unincorporated service delivery area of MFRD. In addition, the town is within thirty minutes driving time of major colleges/universities such as the University of North Carolina at Chapel Hill, Duke University, North Carolina State University, Shaw University, North Carolina Central University, Meredith College, Peace College, Durham Technical Community College, and Wake Technical Community College. The town is also the home to the new Wake Technical Community College RTP Campus.

Table 8: Town of Morrisville Age Demographics (2015 Special Census)

Subject	Morrisville town, North Carolina			
	Estimate	Margin of Error	Percent	Percent Margin of Error
SEX AND AGE				
Total population	23,873	+/-54	23,873	(X)
Under 5 years	2,326	+/-291	9.7%	+/-1.2
5 to 9 years	2,346	+/-280	9.8%	+/-1.2
10 to 14 years	1,512	+/-291	6.3%	+/-1.2
15 to 19 years	1,088	+/-238	4.6%	+/-1.0
20 to 24 years	760	+/-189	3.2%	+/-0.8
25 to 34 years	4,928	+/-510	20.6%	+/-2.1
35 to 44 years	5,147	+/-457	21.6%	+/-1.9
45 to 54 years	2,623	+/-337	11.0%	+/-1.4
55 to 59 years	972	+/-227	4.1%	+/-0.9
60 to 64 years	815	+/-200	3.4%	+/-0.8
65 to 74 years	800	+/-177	3.4%	+/-0.7
75 to 84 years	317	+/-122	1.3%	+/-0.5
85 years and over	239	+/-109	1.0%	+/-0.5
Median age (years)	33.5	+/-0.8	(X)	(X)

Map 18: Wake County Economic Health by Block Group (2010-2014)

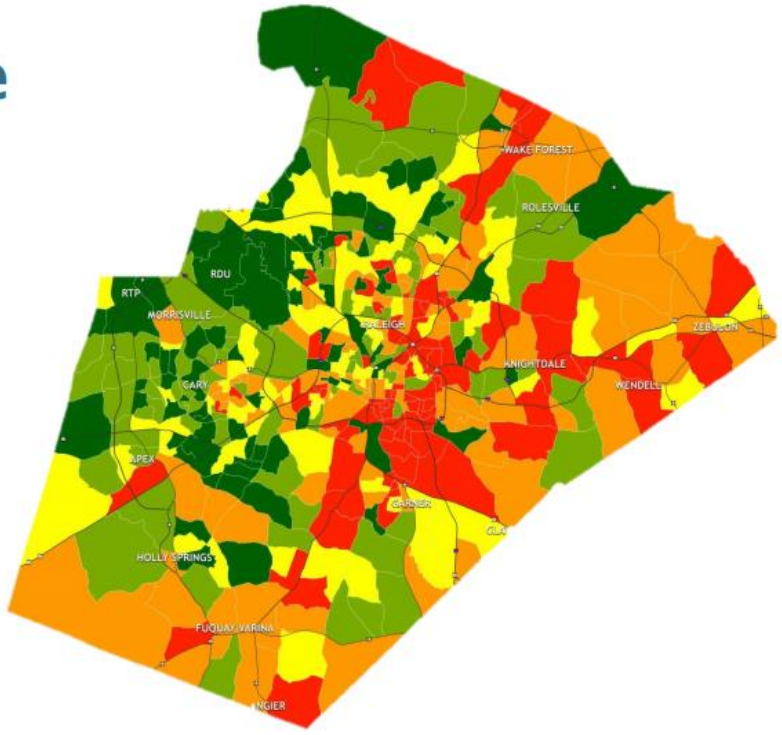
Wake County Economic Health by Block Group
ACS 2010-2014



The ACS Characteristics used were:
1) % of persons living between 100%-200% the Federal Poverty rate
2) % of persons on Food Stamps
3) % of persons spending greater than 30% of income on rent
4) % of persons spending greater than 30% of income on a mortgage
5) Median Household Income by Block Group

Map 19: Vulnerability Profile (2010-2014)

Vulnerability Profile
2010-2014



Legend

ACS 2010-2014 Census Block Groups

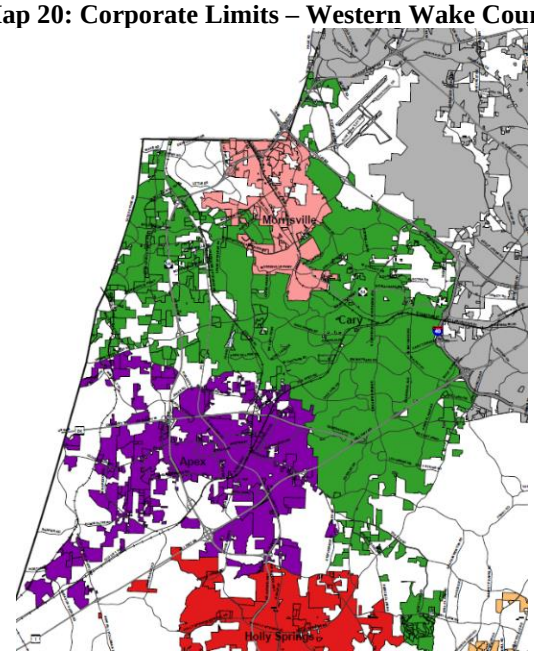
Vulnerability Ranking

Least Vulnerable

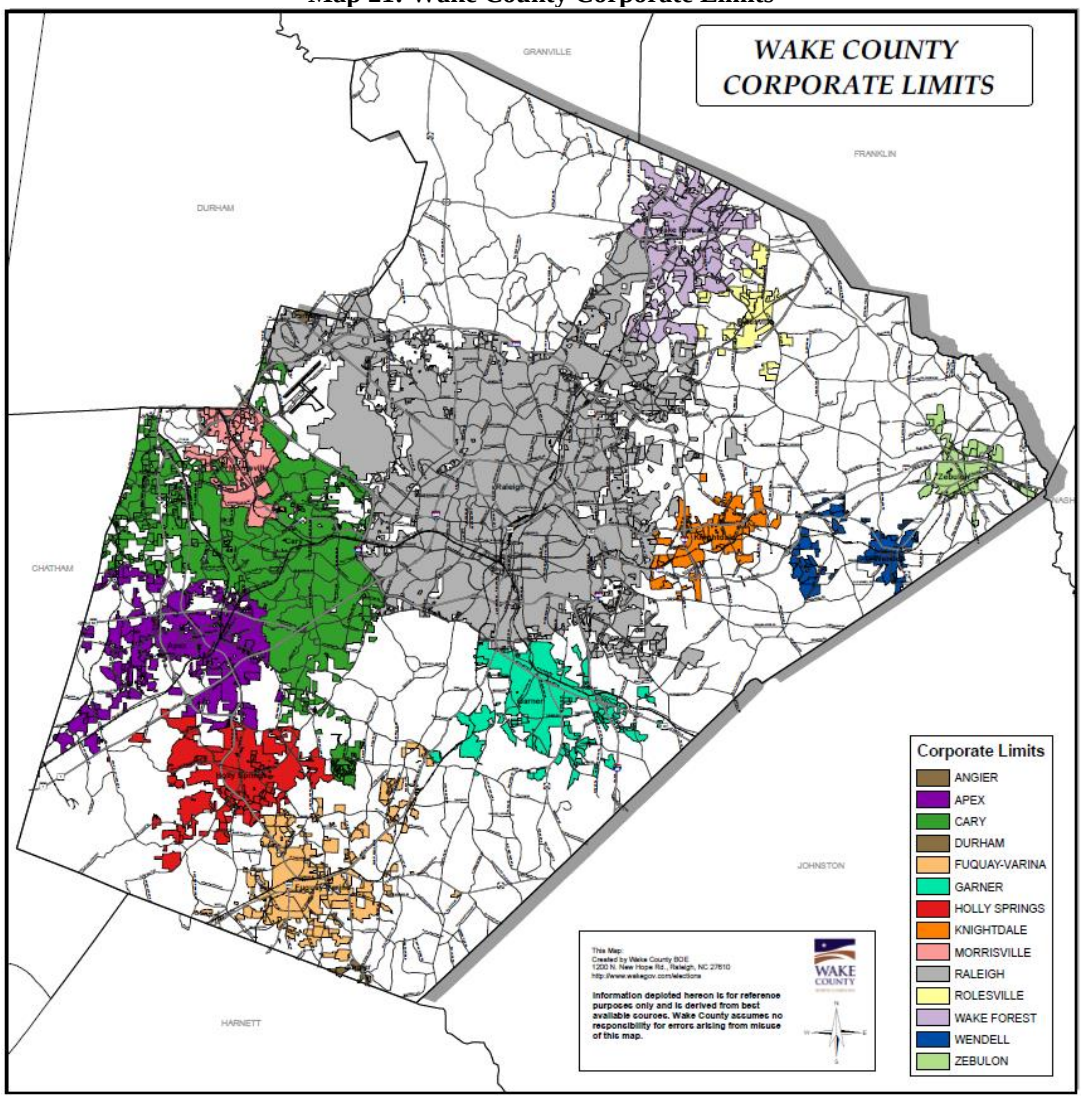
Most Vulnerable

The ACS Characteristics used were:
1) % of persons living between 100%-200% the Federal Poverty rate
2) % of persons on Food Stamps
3) % of persons spending greater than 30% of income on rent
4) % of persons spending greater than 30% of income on a mortgage
5) Median Household Income by Block Group

Map 20: Corporate Limits – Western Wake County

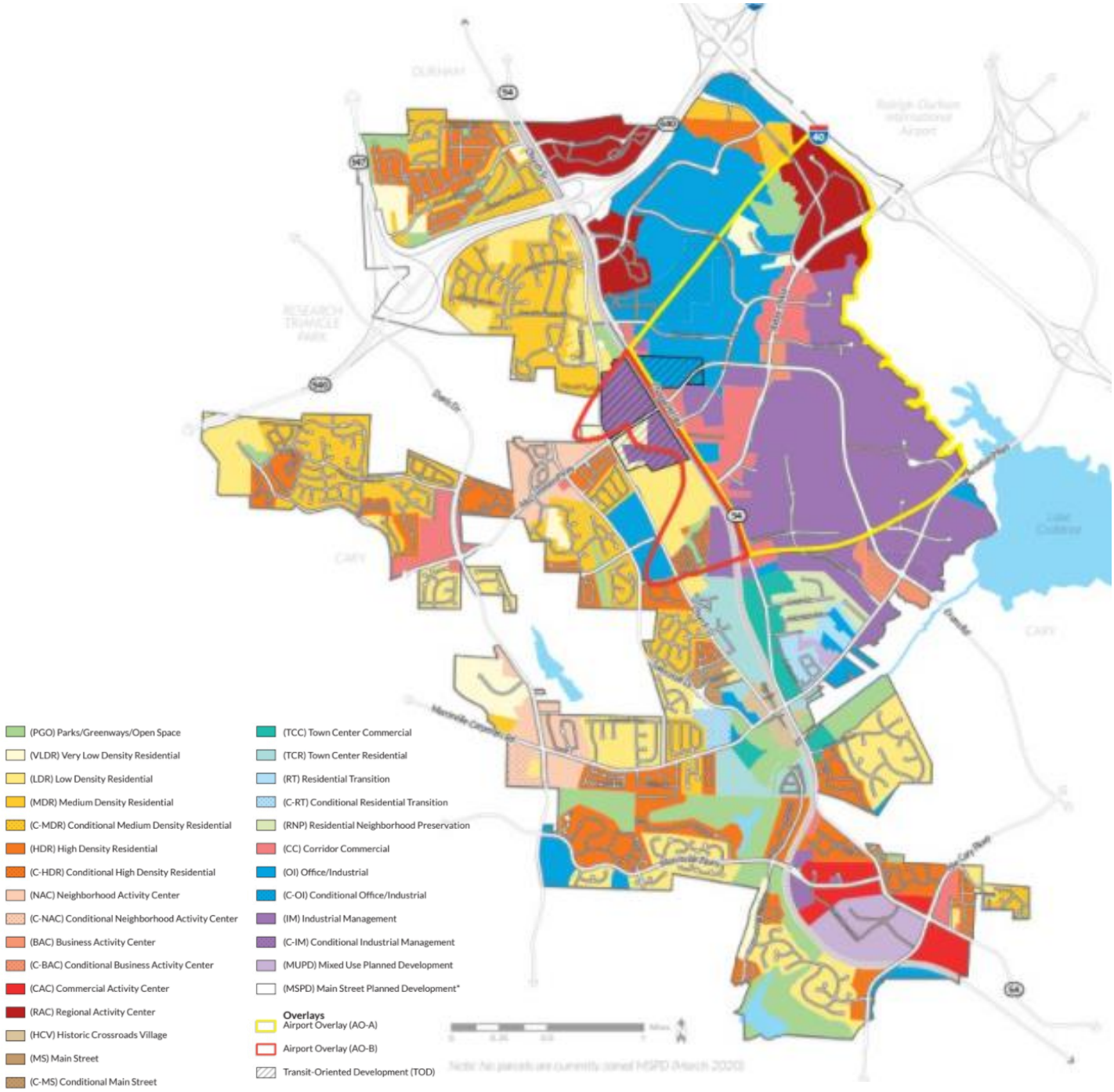


Map 21: Wake County Corporate Limits



Community Land Use and Zoning

Map 22: Community Land Use and Zoning (March 2020)



B. History of the Department

Major Historical Milestones

The Morrisville Fire/Rescue Department (MFRD) was originally established in 1955 as an all-volunteer fire department. Cecil Sears led the effort to start the fire department. He was able to establish a fire station out of a garage in downtown Morrisville. Funding sources included contracts from Wake County for fire protection in the unincorporated areas in Wake County, Town of Morrisville, and fundraisers in the form of barbeque and chicken dinners.

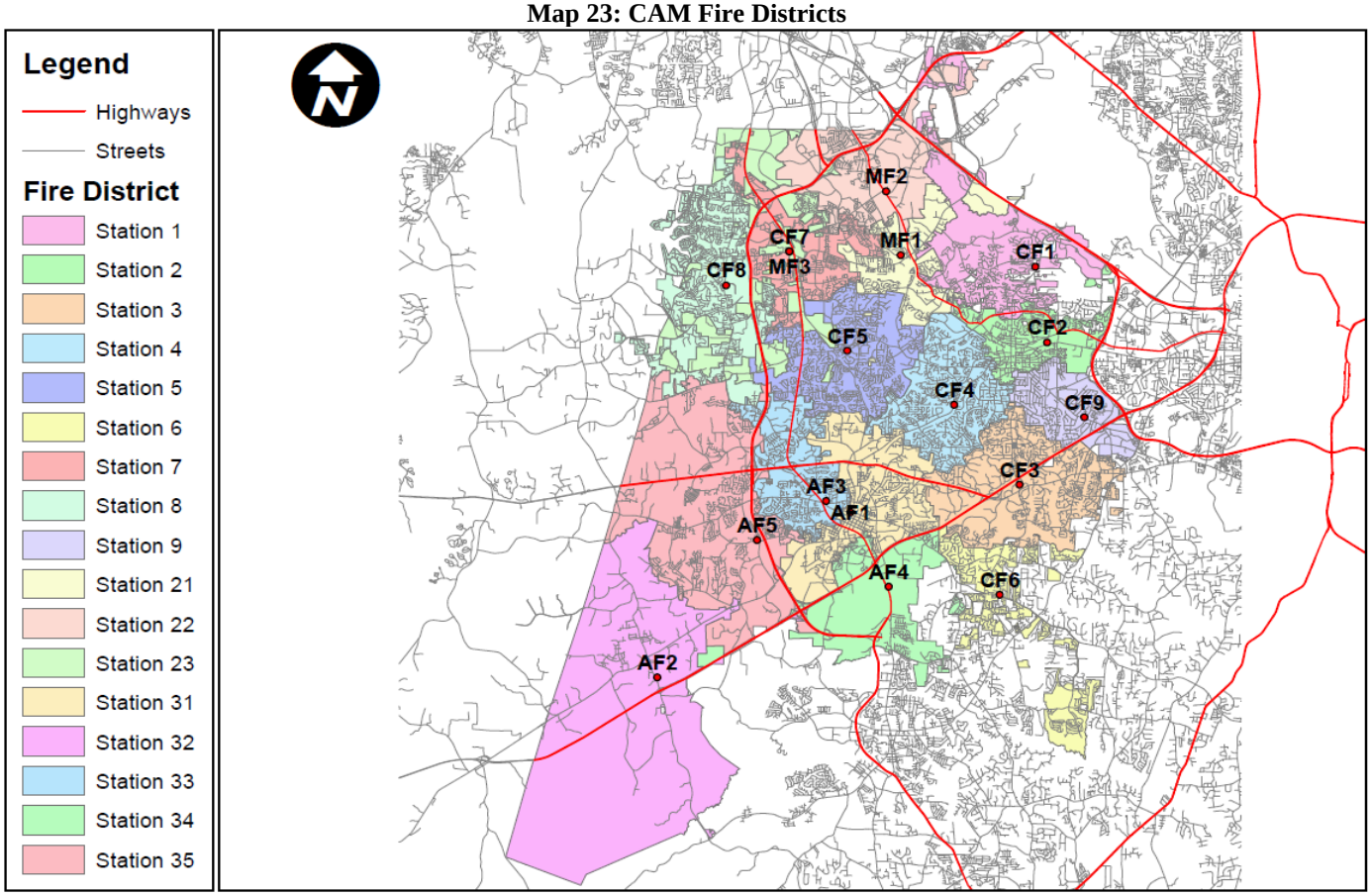
In 1974, the fire department opened up a second fire station, which was located on Carpenter Fire Station Road. The Carpenter fire station served the unincorporated fire district in Wake County. In 1976, the department proudly became the first fire department in Wake County to accept female firefighters into the department, a progressive mindset that has continued to this day. In 1983, the MFRD became the second department in Wake County to offer first responder services. In 1988, the department began to supplement volunteers with paid part-time staff. This trend continued for the next ten years. In 1995, by resolution, the MFRD became a municipal fire department. The department, consisting of a mixture of volunteers and paid part-time firefighters, hired the first career fire chief. In 1999, the department opened the third fire station located on Chapel Hill Road at McCrimmon Parkway. Fire Station 2 services the north part of town. Also, in 1999, all part-time positions were upgraded to full-time career positions. This allowed both fire stations to be staffed with career positions 24 hours per day. In 2003, full-time career firefighters were hired to staff the Carpenter fire station (now called Fire Station 3) 24 hours per day. In 2006, the department expanded its rescue service capabilities by joining NC USAR Task Force Four. In 2007, the department upgraded medical services from first responder to emergency medical technicians (EMT) level. Also in 2007, Station 3 operations relocated into Cary Fire Station 7, which is adjacent to the old MFRD Station 3. On March 14, 2012, a replacement was opened for Station 1 at 200 Town Hall Drive, approximately 1,600 feet from its predecessor.

NC USAR Task Force Four was disbanded by North Carolina Emergency Management in 2013, though the department still collaborates with the Town of Apex Fire Department to provide technician level rescue in water and trench. Since the implementation of the quint staffing plan, the department has undergone many restructuring plans to align staffing with the town-adopted quint concept plan, including a large restructuring in 2015, adding several new positions within the department, and setting the stage for further hiring and advancement. The town has continued to add staff and physical assets to align the department with the growing community the department serves. This includes an assistant chief in charge of operations who acts as the accreditation manager, an assistant fire marshal, a training captain, multiple firefighter positions, and additional quint apparatus.

Since the 2015 restructuring and addition of administrative positions, the department is organized with a fire chief, assistant fire chief, a senior administrative support assistant, training captain, 3 battalion chiefs, 9 captains, 3 lieutenants, 12 engineers, 9 master firefighters, 12 firefighters, a fire marshal, a deputy fire marshal, and an assistant fire marshal. Services provided to the community include public fire education, fire prevention, plans review, code enforcement, fire suppression, technical rescue, non-transport emergency medical services (EMS), and hazardous materials. Fire suppression includes both structural, vehicle, and a small amount of wildland/urban interface fires. Technical rescue services include high and low angle rope rescue, vehicle extrication, water rescue, and confined space rescue and trench rescue. EMS is provided at the EMT (basic life support – non-transport) level, and the department fits into the broader Wake County EMS system. All department members perform public education activities in a variety of subjects such as injury prevention, safe use of portable fire extinguishers, and home safety with the mobile fire safety house, CPR, and fire station tours.

The department responded to 2,847 emergency calls in 2019, averaging an increase of 8% per year for the previous five years. Historically the department was dispatched by the Raleigh Wake 911 Emergency Communications Center, but the department identified an area of opportunity to align the department's stated goals and objectives with a neighboring department that operates in the same fashion. The department signed a service level agreement with the Cary Emergency Communication Center for dispatching and entered into a new cooperative response model with the Cary Fire Department and Apex Fire Department. With the unified response philosophy came the name idea of "CAM" – Cary, Apex, and Morrisville. This response model theoretically dropped districts, and the three agencies responded as one fire department. In an effort not to have redundant unit numbering throughout CAM, the Morrisville Fire/Rescue Department renumbered units to the 20s. As an example, companies running out of MFRD Station 1 are now renumbered 21, companies responding from MFRD Station 2 are numbered 22, and so on.

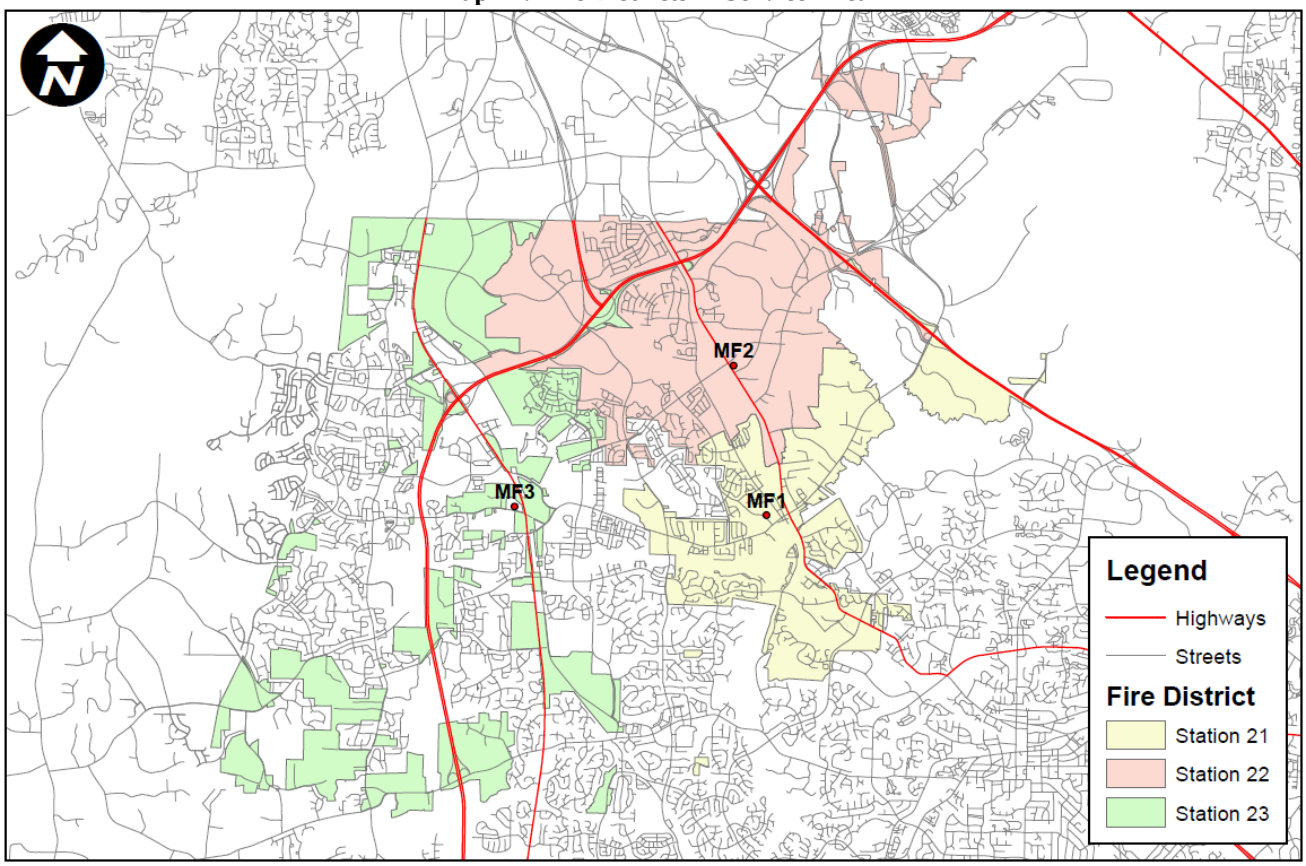
Map 23: CAM Fire Districts



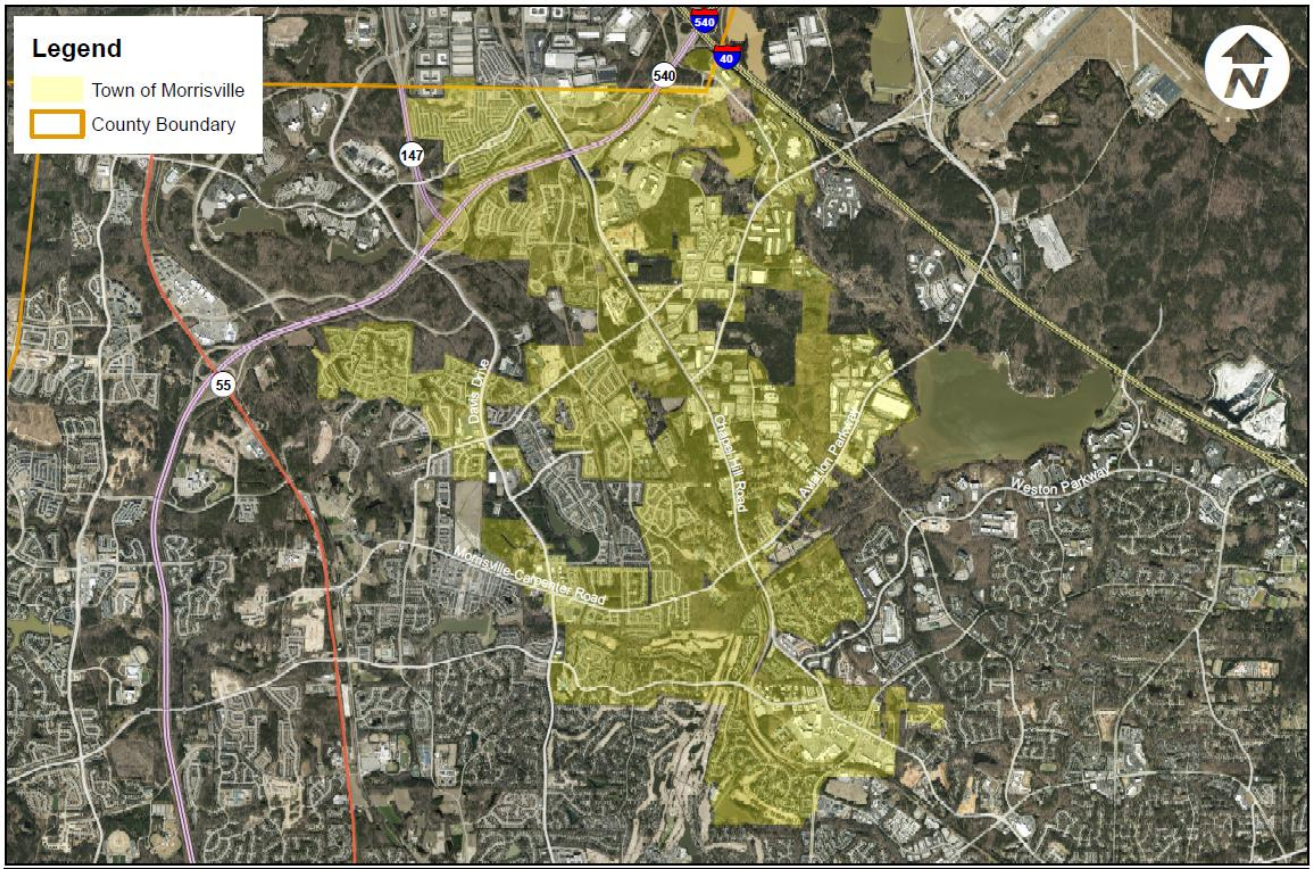
Current Legal Boundary of Service Area

The Town of Morrisville is in western Wake County, North Carolina. The town's corporate limits cover an area of 9.8 square miles. Many residents are attracted to this area due to its proximity to the capital, the Raleigh-Durham International Airport (RDU), the Research Triangle Park (RTP), and to the college cities of Raleigh, Durham, and Chapel Hill. In fact, the US Census Bureau reports that between the years 2000 and 2010, the town's population grew 257%, and 27.5% between 2010 and July 2014. The MFRD protects approximately 22 square miles with an estimated population of 29,968. (A special census conducted in 2015 showed an estimated population of 23,699).

Map 24: Fire Districts in Service Area



Map 25: Town and County Boundaries



Current Organization, Divisions, Programs, and Services

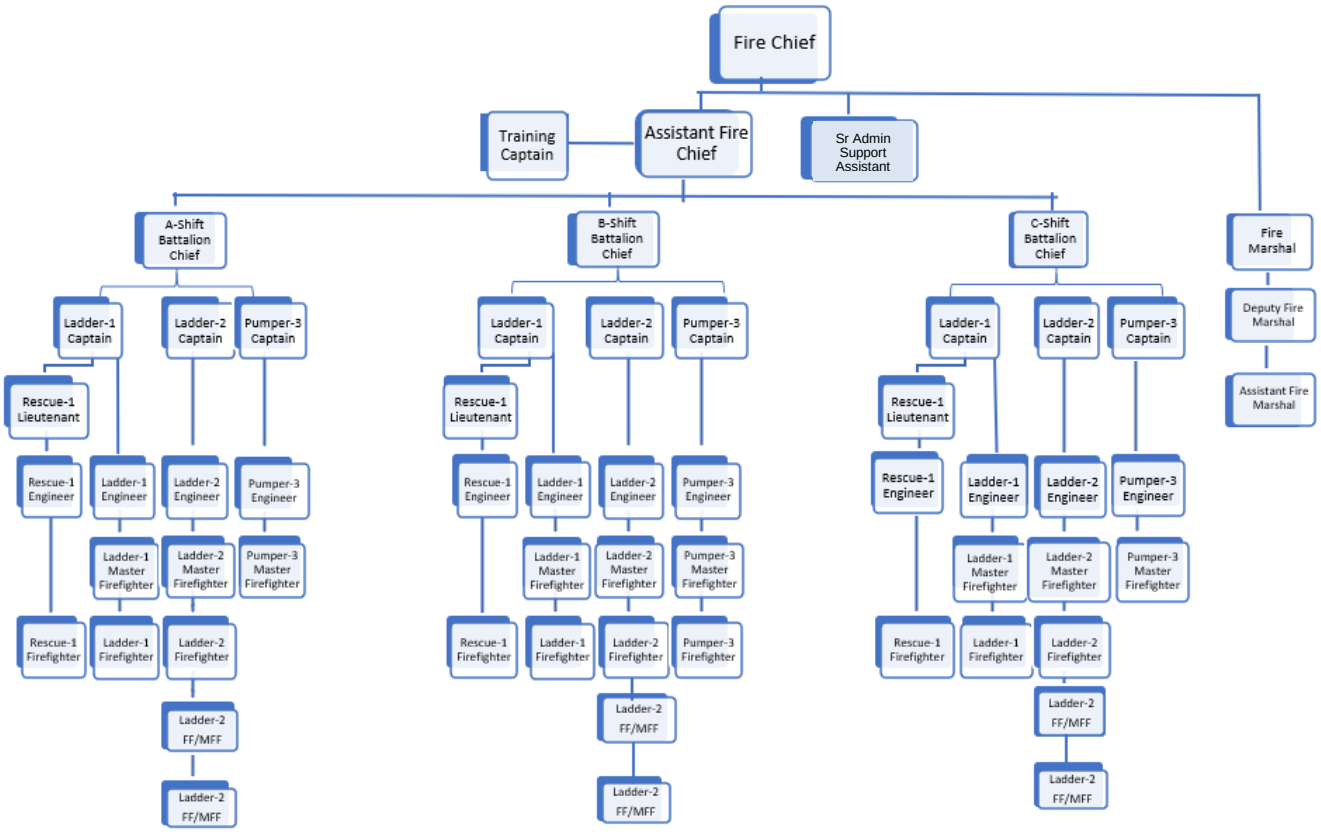


Figure 4: Organizational Chart

The department is broken down into four main sections or divisions: 1) Operations, 2) Training, 3) Fire Prevention, and 4) Fire Administration. While these divisions have very distinct roles and responsibilities, there is a heavy interdependency on each division, and one division could not operate without the assistance of the other.

Operations

The operations division is overseen by the assistant chief of operations (Morrisville Car 2). The assistant chief supervises all emergency response services and operations, supervises fire cause and accident investigations, manages employee evaluation, manages the execution of the department budget from an implementation perspective, manages company deployment and minimum staffing of all fire department equipment, and manages department efforts to comply with the insurance services office grading scale relating to the deployment of assets. This division plays a heavy role in many of the logistics functions for the department, including the procurement of capital assets, such as fire apparatus and all personal protective equipment, along with providing assistance to the fire administration, training, and prevention divisions.

Training Division

The training division is managed and overseen by the fire training officer, most often referred to as the training captain (Morrisville Car 6). This individual manages all the department's training needs, including obtaining certifications through the direct delivery model, providing continuing education for certifications, managing the record-keeping of all certifications, providing content and logistical support to company officers and fire department members for daily training topics, and hands-on training at the fire stations and training facilities. There are many operations staff who assist the training division with executing the department's overall training philosophy.

Fire Prevention

The fire prevention division is managed by the fire marshal (Morrisville FM21). The fire marshal is tasked with supervising fire code officials to ensure the quality and reliability of inspections are met, investigating complaints of building code violations, ensuring plans are submitted for construction projects meet fire code requirements, communicating with the operations division on upcoming construction projects to align inspections with operations, managing injury prevention and public education requests, and supporting the operations division with pre-incident planning.

Fire Administration

The fire chief (Morrisville Car 1) manages the fire administration division, which also consists of the assistant chief and the senior administrative support assistant. Overall functions managed by fire administration are the development of the annual operating budget, overall supervision of accreditation compliance with the Commission on Fire Accreditation International, department compliance with the state of North Carolina ISO framework, developing and maintaining the department's guiding documents, and all other management functions related to overseeing a municipal fire department.

Fire Stations, Training Facilities, Apparatus, Equipment, and Staffing

The MFRD serves the incorporated areas of the Town of Morrisville and unincorporated Wake County. The service district is approximately 20 square miles and contains a resident population of an estimated

29,968 people. The department is comprised of one administration building, three stations, four primary apparatus with three reserve units, a utility vehicle and USAR trailer equipped with technical rescue equipment, and six support vehicles. There are 59 full-time personnel and 2 volunteer personnel.

Current stations are located at the following addresses:

- Station 1: 200 Town Hall Drive (units responding from this station are numbered 21)
- Station 2: 10632 Chapel Hill Road (units responding from this station are numbered 22)
- Station 3: 6900 Carpenter Fire Station Road (units responding from this station are numbered 23)
- Administration: 260-C Town Hall Drive (Car 1, Car 2, Car 6, Fire Marshal (FM) 21, FM22, and FM23)

Table 9: Deployment

Company Type	Number of Units	Unit Designation	Minimum Staffing	Personnel	Apparatus Capabilities
Pumper	1	Pumper 23	3	Officer, Driver and firefighter	1500 GPM, 1000 Gallon booster tank, 40 gallon foam, dump capabilities w/drop tank, EMS capable
Quint (Ladder)	3	Ladder 21, Ladder 22, Ladder 23	3	Officer, Driver and firefighter	1500 GPM pump, 75-105 foot aerial, full compliment of NFPA 1901 ground ladders, EMS capable
Heavy Rescue	1	Rescue 21	3	Officer, Driver and firefighter	EMS Capable Full Compliment of NFPA 1901 Ground Ladders, Cutter/Spreaders, Low and High Pressure airbags, Rope Rescue equipment, etc.
Medium Rescue	1	Rescue 22	2	Officer, Firefighter	EMS Capable , small amounts extrication, and rescue equipment
Engines (used for reserve units)	2	Engine 21, Engine 22, and Engine 23	3	Officer, Driver and firefighter	1500 GPM pump, 500 gallon booster tank, 40 gallon foam
Battalion Chief	1	Battalion 4	1	Battalion Chief	Command vehicle
Car 1, Car 2, Car 6	1 each	Fire Chief, Asst Chief, Training Captain	1	Fire Chief, Asst Chief, Training Captain	Command vehicle, Training Captain (Acts as Safety Officer)

- The MFRD utilizes the Cary Emergency Communication Center (Cary ECC) for all dispatching needs. This 911 center utilizes both emergency fire dispatching and emergency medical dispatching to determine the nature of the call, its severity, and what units need to be dispatched to mitigate the hazard. The current Cary ECC, inside the "CAM" system, utilizes both an advanced vehicle location (AVL) and a station-based approach. The closest capable apparatus is dispatched to the location up to five minutes, but if no unit is within five minutes of the dispatched address, the computer-aided dispatch (CAD) will default to a station responsible unit.

Unit Type and Staffing:

- Pumper, engine, ladder, and rescue units are staffed with a minimum of three certified firefighters: a captain, a lieutenant or an engineer who is signed off to ride as a company officer, an engineer, master firefighter or a firefighter who is signed off to drive that specific apparatus, and a firefighter. All members are also certified as emergency medical technicians.
- Squad 22 is staffed with a minimum of two certified firefighters: a captain; a lieutenant or an engineer who is signed off to ride as a company officer; and an engineer, master firefighter, or a firefighter who is signed off to drive that specific apparatus; and a firefighter.
- Battalion units are staffed with a battalion chief who is a certified firefighter and an emergency medical technician.
- Morrisville Car 6 is staffed with the training captain who is a certified firefighter and an emergency medical technician.
- Morrisville Car 2 is staffed with the assistant chief who is a certified firefighter and an emergency medical technician. This unit has the capability of responding 24 hours a day but is not on any specific run card.
- Morrisville Car 1 is staffed with the fire chief who is a certified firefighter and an emergency medical technician. This unit has the capability of responding 24 hours a day but is not on any specific run card.

Geo Proximity Zones (GPZ):

The MFRD has broken down the overall response district into five zones for several reasons. Since the service area is landlocked and very few areas are able to be annexed, the department can easily determine what the build-out of all fire stations will be. Conceptually, from a data analysis perspective, it is ideal for the department to break down the zones where data will be analyzed and where future fire districts will be. The department has elected to further break down the zones into four additional quadrants. This allows for a deeper dive into where the areas of opportunity are for either re-distribution of resources or for increased concentration of units at existing stations. These GPZ's have recently been programmed into the CAD, which will allow for data analysis.

The department contracts with Wake County to provide fire protection and emergency response in areas outside of the Town of Morrisville's corporate limits. In addition, along with a memorandum of understanding with the Town of Cary, the department has an official, long-lasting automatic aid agreement with the Cary Fire Department to respond into areas north of Station 2's district; these areas are identified on the map as GPZ West and GPF East respectively.

Map 26: Geo Proximity Zones (GPZs)

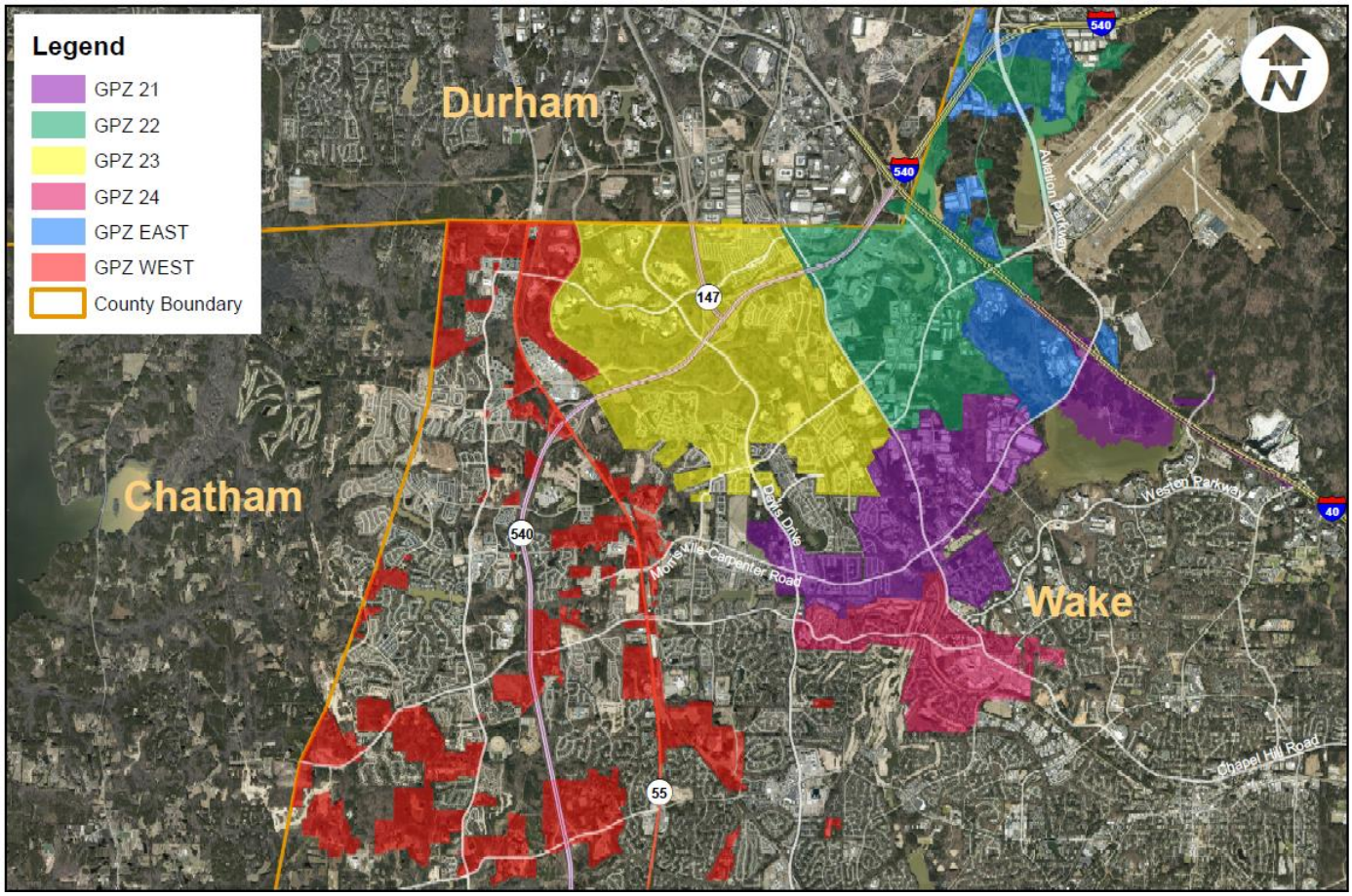
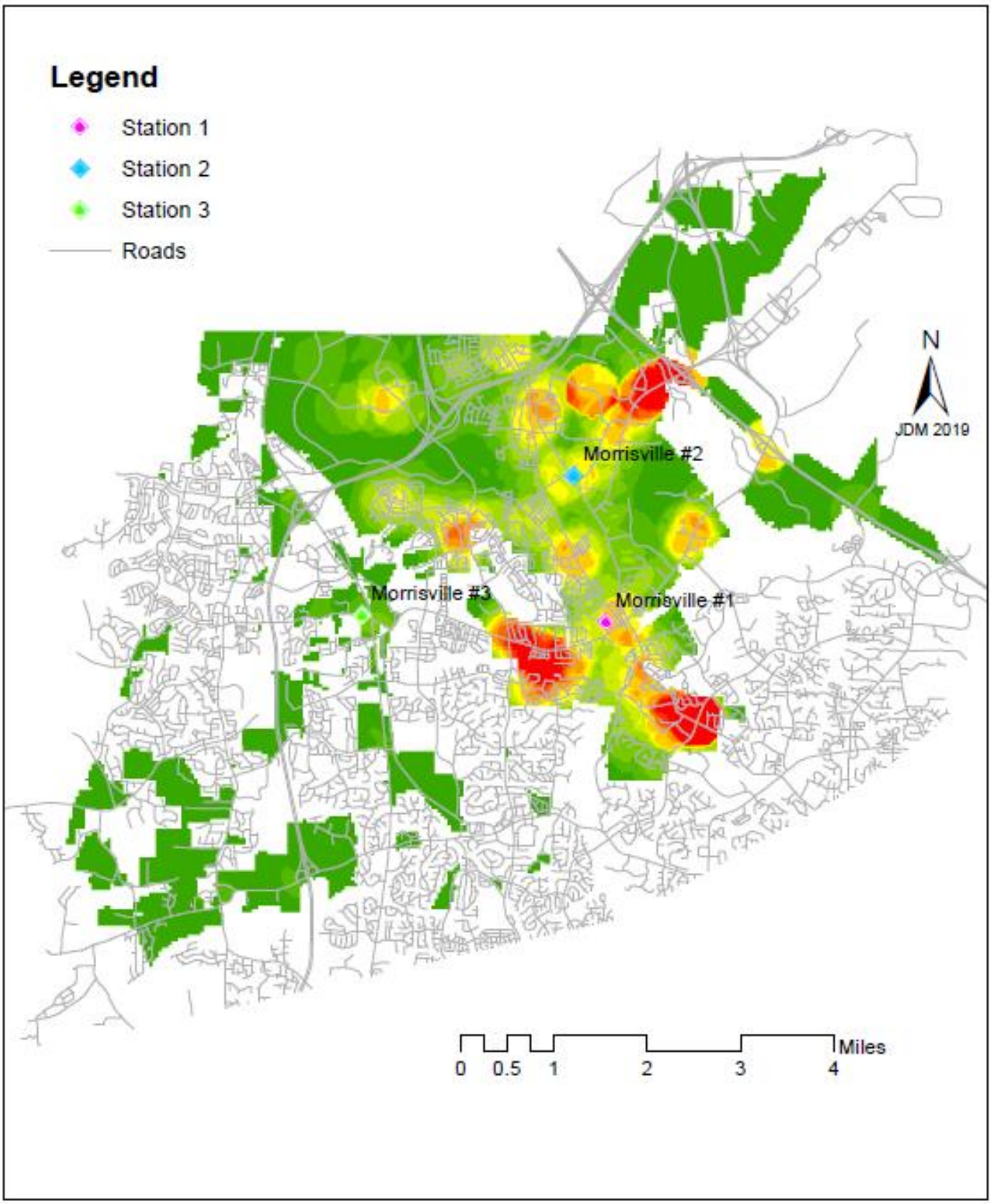


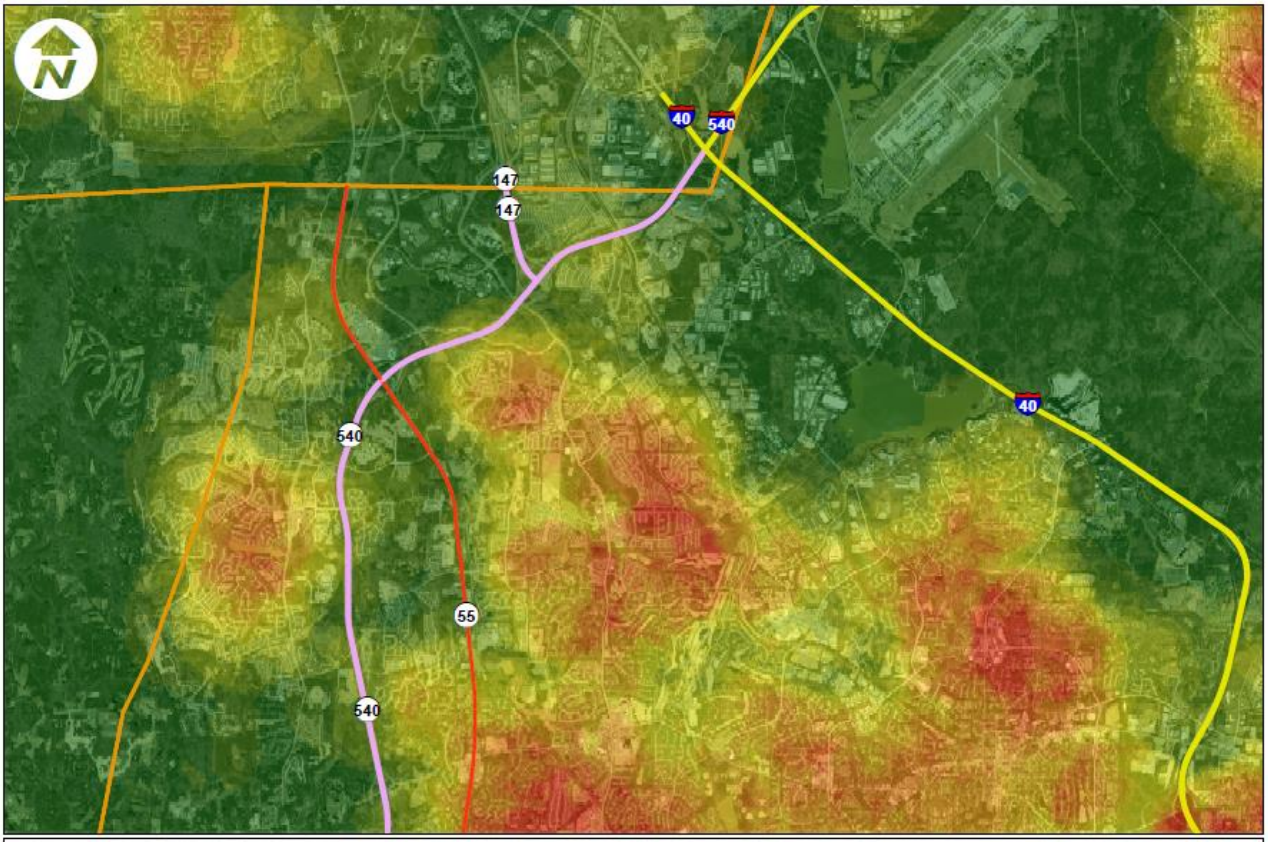
Table 10: Incidents per GPZ (2016-2020)

GPZ 21	GPZ 22	GPZ 23	GPZ 24	GPZ East/West
4463	2295	1742	4424	4180

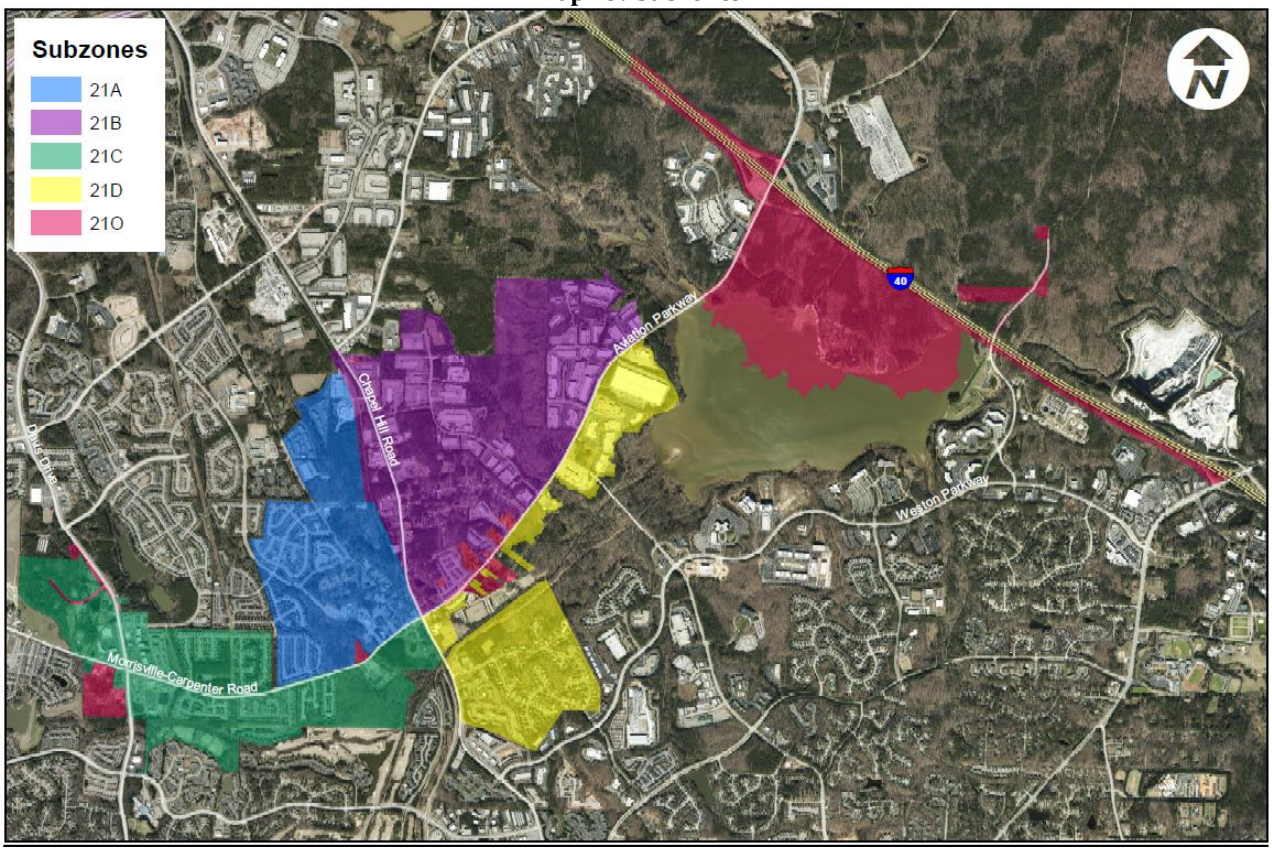
Map 27: Concentration of Calls (2016-2020)



Map 28: Population Density



Map 29: Subzones



Station 1

Station 1, completed in 2012, houses a quint (Ladder 21), a reserve engine (Engine 21), and a heavy-duty rescue (Rescue 21). The department's technical rescue trailer is also housed at this station, along with a utility truck to tow it. This trailer consists of confined space equipment, a small inflatable boat for light water rescue events and other miscellaneous rescue equipment. Seven personnel are assigned to this station: four personnel on Ladder 21, and three personnel on Rescue 21. Both Ladder 21 and Rescue 21 have minimum staffing of three per apparatus. Ladder 21 responds to suppression-related calls, motor vehicle accidents, and hazardous materials and technical rescue-related calls for service in its response area. Rescue 21 is the primary unit running EMS and service-related calls in Station 1's district. As a heavy rescue apparatus unit, Rescue 21 also responds to all motor vehicle accidents in and around the department's service area.

Table 11: Morrisville Station 1 Unit Movement (2016-2020)

Morrisville Brush 23	
Fire	29
EMS	12
Rescue	1
Service	15
Cancelled-Fire	13
Cancelled-EMS	1
Totals for Morrisville Brush 23	71
Morrisville Engine 21	
Fire	67
EMS	190
Rescue	5
Hazmat	23
Service	282
Cancelled-Fire	95
Cancelled-EMS	36
Totals for Morrisville Engine 21	698
Morrisville Ladder 21	
Fire	289
EMS	1,076
Rescue	17
Hazmat	96
Service	1,843
Cancelled-Fire	504
Cancelled-EMS	182
Totals for Morrisville Ladder 21	4,007
Morrisville Rescue 21	
Fire	85
EMS	1,314
Rescue	27
Hazmat	62
Service	439
Cancelled-Fire	132
Cancelled-EMS	162
Totals for Morrisville Rescue 21	2,221
Morrisville Squad 1	
Fire	13
EMS	207
Rescue	3
Hazmat	3
Service	54
Cancelled-EMS	23
Totals for Morrisville Squad 1	303
Morrisville USAR 21	
Cancelled-Fire	2
Totals for Morrisville USAR 21	2
Morrisville Utility 21	
Fire	2
EMS	4
Rescue	1
Service	4
Cancelled-EMS	1
Totals for Morrisville Utility 21	12
Totals for Morrisville Station 1	**7,495**

Station 2

Station 2, built in 1999, houses a platform ladder company (Ladder 22), a medium rescue (Rescue 22), a reserve engine company (Engine 22), and a battalion chief vehicle. This station is staffed by six personnel. When staffing permits, three personnel staff Ladder 22, two personnel staff Rescue 22, and one person staffs the battalion chief vehicle. When staffing does not permit, all Station 2 personnel staff Ladder 22 other than one staff member for the battalion vehicle. Ladder 22 is the primary apparatus stationed at this facility, responding to all calls in Station 2's response area. Station 2 has a medium rescue unit that, when staffing allows, runs EMS and service-related calls in Station 2's district. This allows Ladder 22 to focus on fire suppression-related calls. When in service, Rescue 22 is staffed with two personnel.

Table 12: Morrisville Station 2 Unit Movement (2016-2020)

Morrisville Battalion 4	
Fire	236
EMS	524
Rescue	15
Hazmat	88
Service	1,447
Cancelled-Fire	127
Cancelled-EMS	50
Totals for Morrisville Battalion 4	2,487
Morrisville Engine 22	
Fire	142
EMS	690
Rescue	30
Hazmat	45
Service	954
Cancelled-Fire	179
Cancelled-EMS	91
Totals for Morrisville Engine 22	2,131
Morrisville Ladder 22	
Fire	140
EMS	647
Rescue	32
Hazmat	58
Service	1,132
Cancelled-Fire	341
Cancelled-EMS	111
Totals for Morrisville Ladder 22	2,461
Morrisville Rescue 22	
Fire	69
EMS	1,000
Rescue	15
Hazmat	29
Service	316
Cancelled-Fire	43
Cancelled-EMS	140
Totals for Morrisville Rescue 22	1,612
Totals for Morrisville Station 2	8,691

Station 3

Station 3, also known as Cary Fire Station 7, was built in 2007 and is owned and operated by the Town of Cary Fire Department. The MFRD cohabitates the station with three personnel assigned to Ladder 23. Personnel also cross-staff one pumper/tanker (Pumper 23) that responds to the contracted area in unincorporated western Wake County and parts of Research Triangle Park. This station also houses a Cary Fire Department heavy rescue company and engine company.

Table 13: Morrisville Station 3 Unit Movement (2016-2020)

Morrisville Engine 23	
Fire	69
EMS	120
Hazmat	12
Service	192
Cancelled-Fire	55
Cancelled-EMS	28
Totals for Morrisville Engine 23	476
Morrisville Ladder 23	
Fire	22
EMS	35
Hazmat	2
Service	63
Cancelled-Fire	25
Cancelled-EMS	6
Totals for Morrisville Ladder 23	153
Morrisville Pumper 23	
Fire	219
EMS	342
Rescue	9
Hazmat	29
Service	616
Cancelled-Fire	226
Cancelled-EMS	99
Totals for Morrisville Pumper 23	1,540
Totals for Morrisville Station 3	2,169

Fire Administration

The department's administration offices consist of the fire chief (Car 1), assistant fire chief (Car 2), fire marshal (FM 21), deputy fire marshal (FM 22), assistant fire marshal (FM 23), field training officer (Car 6), and senior administrative support assistant. Fire Administration offices are headquartered at 260 Town Hall Drive and have been there since 2007. This public safety facility also houses the Morrisville Police Department and staff from the engineering and stormwater departments.

C. Current Descriptions of Levels of Service with Delivery Programs

Fire Suppression

The Morrisville Fire/Rescue Department (MFRD) has current standards identifying structural and vehicle fire suppression critical tasks. For each of these standards, a set of performance measures have been adopted with which to assess the performance of each. The current deployment reflects a shift from a traditional two company station to what is known as a "quint concept." The MFRD quint concept encompasses replacing the department's engine companies with smaller ladder trucks known as "quints." These ladder trucks typically have an aerial ladder, an assortment of ground ladders, a 300 to 500-gallon internal tank, a 1,500 gpm or greater pump, and enough large diameter hose and attack lines to be categorized as an engine. Thus, the apparatus is named quint for the five primary functions it fills as one apparatus compared to a separate ladder and engine company. The concept was adopted by the town's senior leadership in 2008, and the department has been realigning personnel and equipment to match the concept. The MFRD has four primary units that are in service full time. Four personnel (minimum of three) regularly staff Ladder 21, Ladder 22, Ladder 23, and Rescue 21.

The department is working on building out the quint concept as the expansion of the department's budget allows. Currently, Station 1 has all the apparatus needed for proper implementation of the quint concept; Station 2 utilizes the medium rescue to assist with EMS calls when staffing allows, and Station 3 does not have a support vehicle to assist Ladder 23 with EMS calls as the quint concept requires.

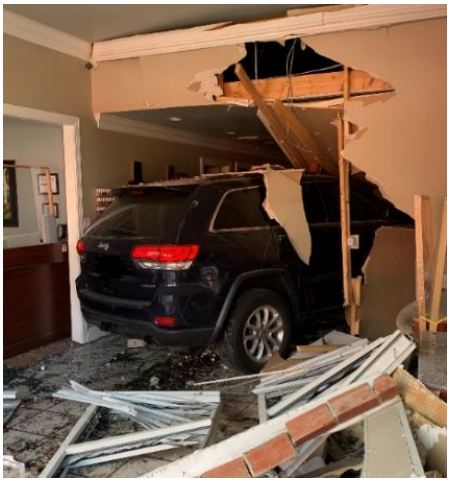
The goal is for the fire suppression operations division to add staffing assigning four personnel on each quint, three personnel on Rescue 21, and two personnel on small rescue vehicles at each station by 2026.

Emergency Medical Services

In 2006, the department made several key changes to the types of services provided by upgrading medical services to the basic life support level (BLS). Upgrading to a BLS department meant training all personnel from the medical first responder level to become North Carolina State Emergency Medical Technicians-Basic (EMT-B). This change also meant following the Wake County medical protocols at an EMT-Basic level, and upgrading the equipment carried on the apparatus to reflect what the protocols EMTs are allowed to do. Additional equipment included adding suction units, blood glucose meters, epinephrine auto-injectors, aspirin, oral and nasal airways, and albuterol breathing treatments to department EMS bags. Continued first responder level services included oxygen, defibrillator, trauma, cervical spine immobilization, oxygen saturation, and blood pressure. In calendar year 2019, EMS calls accounted for 46.8% of the call volume, or 1,146 total calls of 2,432 primary calls.

Technical Rescue

Rescue capabilities of the department are identified as motor vehicle, water rescue, confined space rescue, trench rescue, and rope rescue. All firefighters are certified to the appropriate rescue certifications based on the most current *Standard Operating Guideline 01.01 Promotional Eligibility Guide*. These certifications are technician level that follow the most recent edition of NFPA 1006, *Standard for Technical Rescue Professional Qualifications*. Typically, certifications required of staff are Technical Rescuer, Technical Rescuer-Vehicle, Technical Rescuer-Confined Space, Technical Rescuer-Water, and Technical Rescuer-Trench. The fire department works in conjunction with the other CAM partners to decide what the dispatch capabilities are on all apparatus in the system. Currently, the fire department has extrication capabilities on Ladder 22 and Rescue 21. They each carry a large cache of technical rescue equipment, including spreaders, cutters, airbags, stabilization equipment, etc. Rescue 22, which is a medium-duty rescue truck, carries extrication tools along with a smaller cache of equipment. Additionally, an enclosed trailer containing all the department's confined space rescue and water rescue equipment went into service in February 2015.



Hazardous Materials

The Town of Morrisville has several hazardous materials threats, which lead to the adoption of a service contract with the City of Raleigh to provide specialized hazardous materials response. In addition to that service, all department operations personnel obtain and maintain a hazardous materials operation plus level certification through the North Carolina Office of State Fire Marshal (NC OSFM). This certification is a 40-hour course that meets the current edition of NFPA Standard 472, *Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents.* All apparatus carries equipment to isolate, absorb, and stop small leaks typically associated with motor vehicle collisions. This equipment includes clay silicate absorbent, a 100-gallon spill pool, shovels for damming and diking, absorbent pads and tubes, and clay and wood plugs.

Community Risk Reduction

The department's prevention and enforcement fall under the purview of the town fire marshal. Operations personnel still play a crucial role in these three functions due to the staffing restraints and heavy workload of the fire marshal's office. All personnel who are master firefighter and above are fire and life safety educator certified through NC OSFM, ensuring senior operations personnel are trained in safety education to support the department's mission.

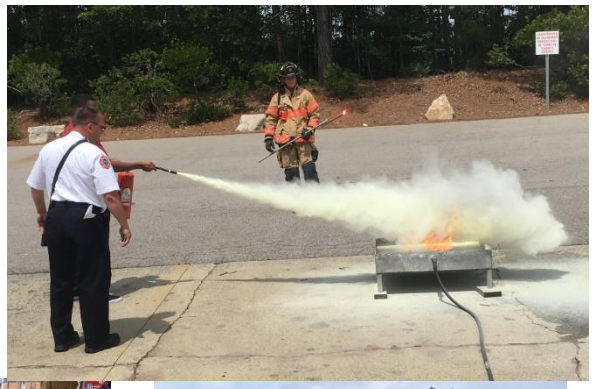


Table 14: Community Risk Reduction Stats (2019)

Total Annual Fire Inspections	1,018
Total Fire Re-Inspections	990
Total Plan Reviews	996
Total Construction Inspections	726
Total Citizens Reached	17,535

Other functions of the fire marshal's office are code enforcement and inspections. The fire chief, assistant fire chief, fire marshal, deputy fire marshal, assistant fire marshal, and battalion chiefs are trained and certified in code enforcement. Some company officers are certified to conduct inspections and will occasionally support the fire prevention office by conducting yearly inspections or following up to ensure violations have been fixed.

D. Current Deployment and Coverage Areas

Points of Service Delivery

The Town of Morrisville has a unique set of physical terrain features and risks which have guided the department to adopt its current operations matrix. The levels of service available to areas of the town and county vary due to the difference in each areas' threats. Fixed and mobile hazards, critical infrastructure, terrain, demographics, and call volume all affect the level of service the department can provide.

Automatic/mutual aid resources are available through automatic aid contracts with the following agencies:

1. Cary Fire Department (automatic aid)
2. Apex Fire Department (automatic aid)
3. Durham Fire Department (automatic aid)
    - Durham Station 13
    - Durham Station 12
    - Wake County Fire Department (mutual aid) Western Wake Station 1

Depending on the location of an incident, resources from these agencies will be dispatched according to their proximity and unit capability. This ensures calls requiring an effective response force of more than what the department can provide have the appropriate number of outside resources automatically dispatched.

Minimum Deployment Resources

The daily minimum staffing level is 13 personnel. Of these, six are dispatched from Station 1, four from Station 2, and three from Station 3. Daytime during the week, additional help can be solicited from the fire chief, assistant chief of operations, fire marshal, deputy fire marshals, assistant fire marshal, and training captain for a significant event such as a large structure fire. All staffing is scheduled in 24-hour shifts.

On-duty crews at Station 3 select the appropriate response apparatus based on the nature of the call for service, access considerations, availability of hydrants, and the recommendations of computer aided dispatch software. The agency has mutual- and auto-aid agreements in place with surrounding career fire and EMS agencies to provide equipment and additional personnel when needed.

Table 15: Deployment Resources

	Minimum Staffing	Available Apparatus (*indicates reserve units)
Station #1	6	Ladder 21, Rescue 21, Engine 21*
Station #2	4	Battalion 4, Ladder 22, Squad 22 (when staffing allows), Engine 22*, Rescue 22*
Station #3	3	Ladder 23*, Pumper 23 (cross-staffed with Ladder 23), Engine 23*

E. Summary of Community Response History

An examination of the volume and nature of responses across the Morrisville Fire/Rescue Department's (MFRD) jurisdiction paints a picture of the needs of the community. The following data represents only the incidents within the jurisdiction and omits mutual aid given calls. Across all response categories, one evident trend is the lower response volume to the Fire Station 3 district. This is due to the lower population and population density of that district.

Fire Responses

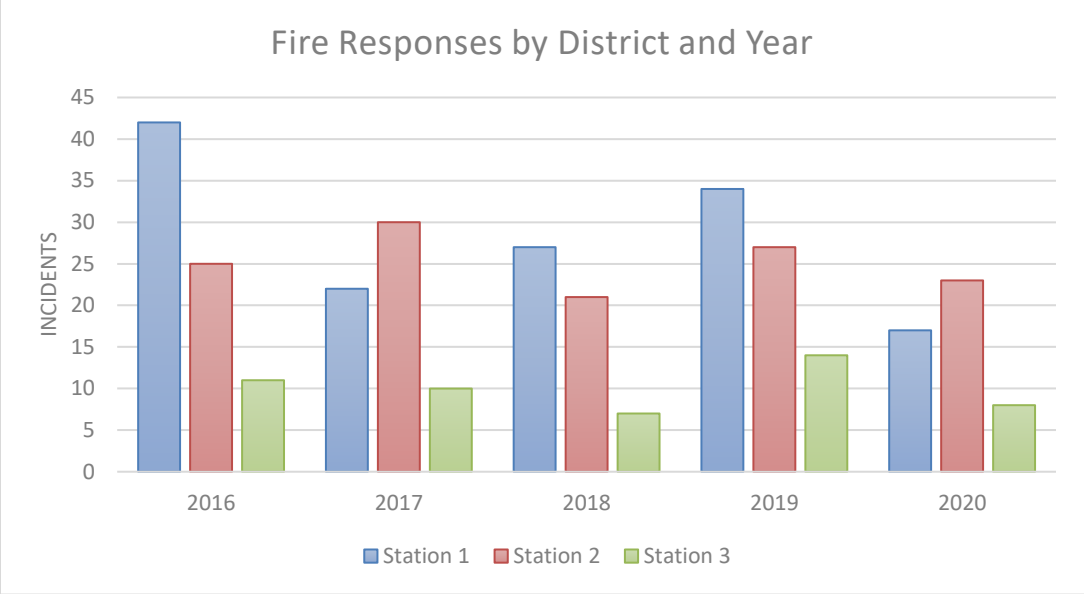


Figure 5: Fire Responses by District and Year (2016-2020)

Table 16: Fire Responses by Type, Jurisdiction-Wide (2016-2020)

Nature	Number (5 year cumulative)	Percent
Outside fire, other (160)	54	17.1%
Structure fire (111)	46	14.6%
Arcing/shorted electrical equipment (445)	40	12.7%
Passenger vehicle fire (131)	36	11.4%
Electrical wiring/equipment problem, other (440)	35	11.1%
Confined cooking fire (113)	26	8.3%
Dumpster/outside trash fire (154)	11	3.5%
Natural vegetation fire, other (140)	9	2.9%
Brush fire (142)	8	2.5%
Commercial vehicle fire (132)	7	2.2%
Other	43	13.7%

Fire responses account for 3.7% of total responses within the jurisdiction. There is an apparent variability in the distribution of fire incidents across the three station districts from year to year. This is due to the relatively low number of overall incidents.

EMS Responses

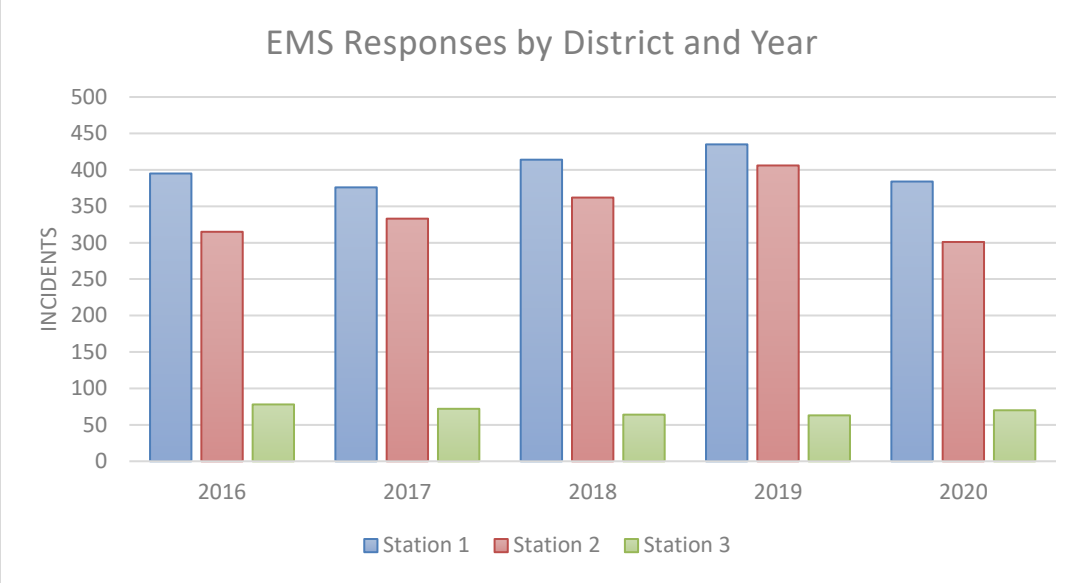


Figure 6: EMS Responses by District and Year (2016-2020)

Table 17: EMS Responses by Type, Jurisdiction-Wide (2016-2020)

Nature	Number (5 year cumulative)	Percent
EMS call (321, single low acuity)	2,030	50.0%
Medical assist (311, low acuity)	1,204	29.7%
Motor vehicle accident (322, moderate acuity)	547	13.5%
Medical assist (311, moderate acuity)	145	3.6%
Other	125	3.2%

EMS responses account for 47.2% of total responses within the jurisdiction. It is difficult to determine the reason why Station 1 has 50 to 100 more EMS calls per year than Station 2. At first glance, it appears likely the difference is due to unequal population distribution; however, several factors make this comparison difficult.

- Station 2's district contains 12 hotels, whereas Station 1's district has none. Hotels represent an EMS service demand that is not captured in traditional population statistics.
- Station 1's district contains a senior living facility with 166 residential units, many of which have two occupants. This facility represents a significant EMS service demand.
- Station 2 is closer to Interstate 40 and responds to an increased number of motor vehicle accidents.
- Station 2's district has a significant commercial district that represents a high workday population not captured in traditional population statistics.

Technical Rescue Responses

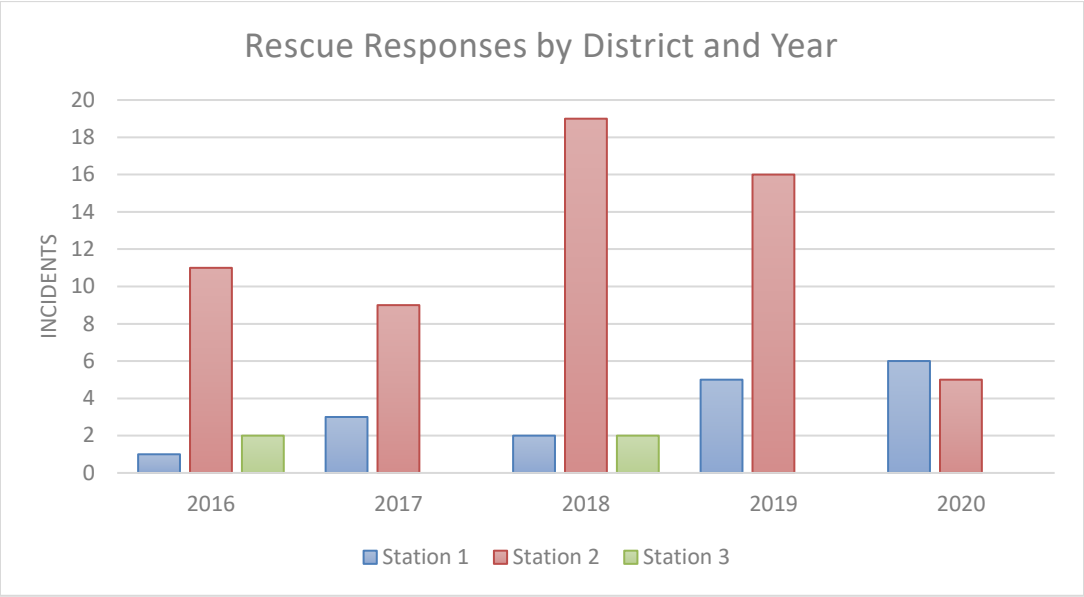


Figure 7: Rescue Responses by District and Year (2016-2020)

Table 18: Rescue Responses by Type, Jurisdiction-Wide (2016-2020)

Nature	Number (5 year cumulative)	Percent
Elevator rescue (353)	58	71.6%
Vehicle extrication (352)	16	19.8%
Search for person on land (341)	3	3.7%
Extrication, rescue, other (350)	3	3.7%
Other	1	1.2%

Technical rescue responses account for 0.9% of total responses within the jurisdiction. Station 2's district accounts for 84% of all elevator rescues due to the 12 hotels and a high percentage of the jurisdiction's multistory commercial buildings.

Hazmat Responses

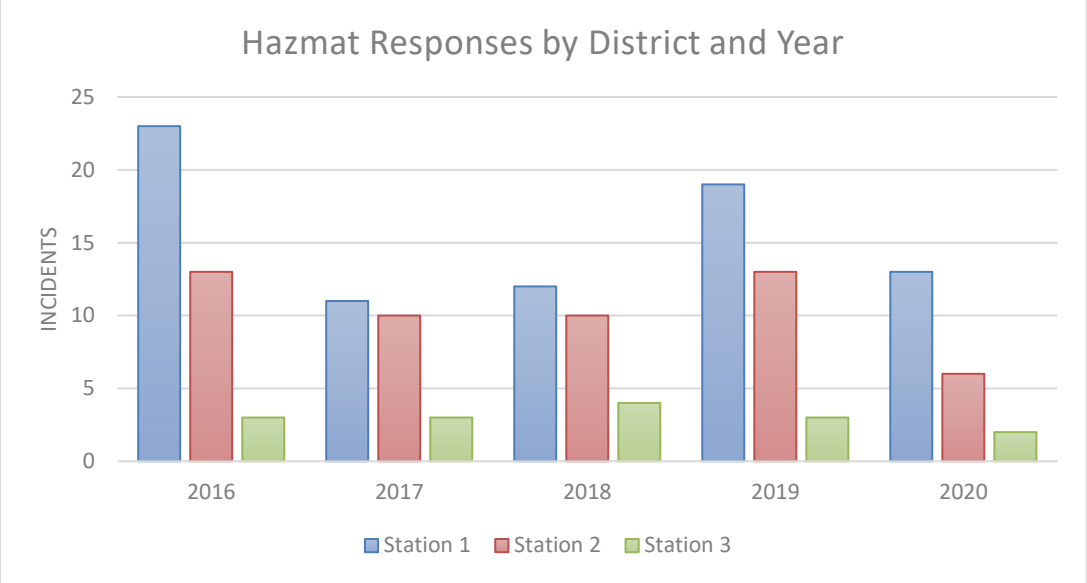


Figure 8: Hazmat Responses by District and Year (2016-2020)

Table 19: Hazmat Responses by Type, Jurisdiction-Wide (2016-2020)

Nature	Number (5 year cumulative)	Percent
Gas leak (412)	102	70.3%
Flammable liquid spill (411)	20	13.8%
Carbon monoxide incident (424)	9	6.2%
Combustible liquid spill (413)	4	2.8%
Other	10	6.9%

Hazardous materials responses account for 1.7% of total responses within the jurisdiction. While most of these responses are gas leaks, history has shown that the volume and distribution of these responses are highly dependent on the location and volume of construction occurring within the jurisdiction. For example, in previous years, a spike of over 50 gas leaks had occurred in a year when both AT&T and Google had been competing to install fiber optic lines throughout the jurisdiction. The underground boring techniques used to install the fiber optic lines resulted a large number of damaged gas lines.

Service Responses

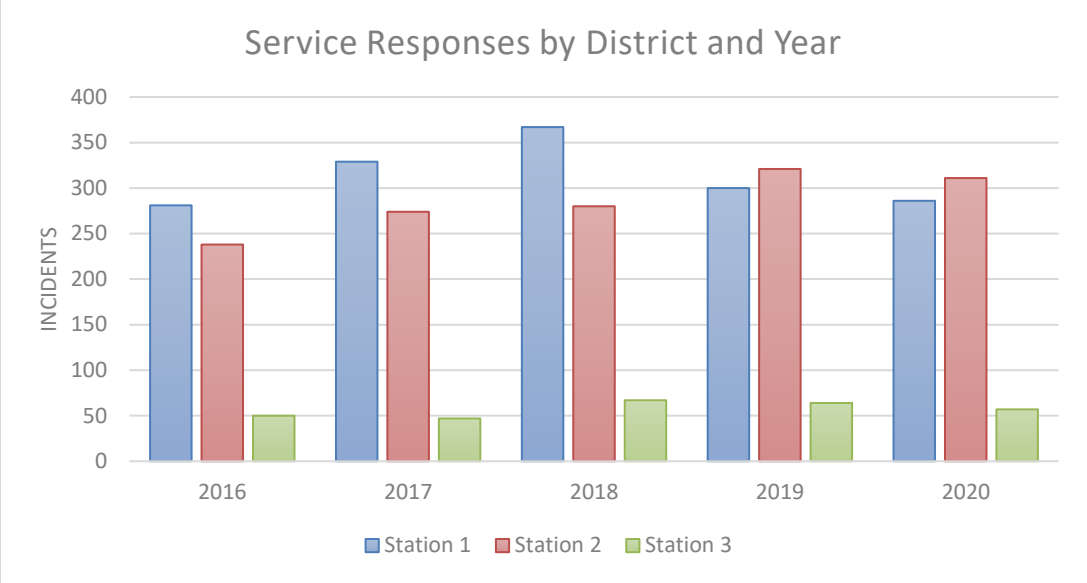


Figure 9: Service Responses by District and Year (2016-2020)

Table 20: Service Responses by Type, Jurisdiction-Wide (2016-2020)

Nature	Number (5 year cumulative)	Percent
Alarm system activation (745)	1,296	39.6%
Motor vehicle accident with no injuries (324)	267	8.2%
No incident found (622)	261	8.0%
Service call, other (500)	221	6.8%
Good intent call, other (600)	184	5.6%
Public service assistance, other (550)	84	2.6%
False alarm/false call, other (700)	80	2.4%
Assist invalid (554)	69	2.1%
Other	608	24.7%

Service responses account for 38.1% of total responses within the jurisdiction. This category of responses is a "catch-all" of incidents that do not logically fit in any of the other response categories. While very few of these responses have historically represented true emergencies, these responses represent a critical function of the organization. Whether it is responding to a false fire alarm activation, installing a smoke alarm, or regularly helping a wheelchair-bound individual back into a wheelchair, the members of the department take immense pride in providing these non-traditional, "value-added" services to the community.

Cancelled Enroute Responses

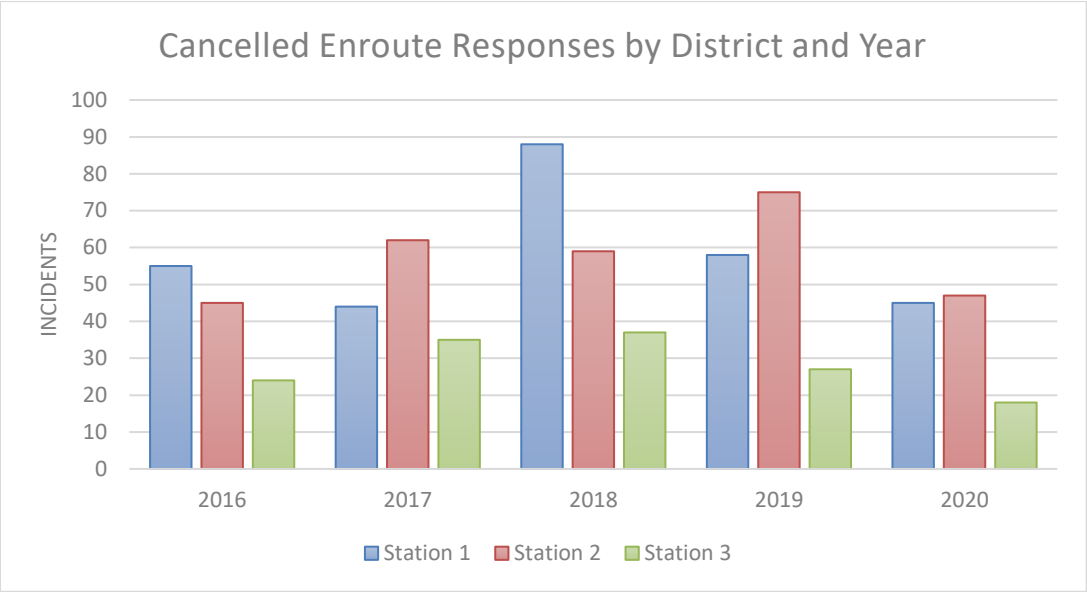


Figure 10: Cancelled Enroute Responses by District and Year (2016-2020)

While this category of response is not traditionally considered, canceled en route constitutes 8.4% of the responses within the jurisdiction. To a large degree, these responses are a function of emergency fire dispatching/emergency medical dispatching. Often units are dispatched based on a "worst-case scenario" while the 911 call taker is still questioning the 911 caller. Many of the canceled en route calls are a result of the incident being downgraded after the initial dispatch based on the additional information gleaned from the 911 caller.

F. Community Priorities, Expectations, and Performance Goals

Mission Statement

The purpose of the mission is to answer the questions:

- Who are we?
- Why do we exist?
- What do we do?
- Why do we do it?
- For whom?

In November 2018, the Morrisville Fire/Rescue Department (MFRD) partnered with the Technical Advising Program of the Center for Public Safety Excellence to develop a community-driven strategic plan. Both external and internal stakeholders participated in the development of the strategic plan, with an emphasis on aligning the department's strategic plan with the town's *Connect Morrisville Strategic Plan*. By focusing on alignment, the department committed to supporting the town's plan and to its future implementation. The department, along with all stakeholders, developed a new mission statement, core values, and obtained a greater understanding of what the community members' expectations are of the organization.

The Morrisville Fire/Rescue Department is committed to continuously improving the quality of life for our customers through prevention and emergency response.

Values

Values embraced by all members of an organization are extremely important, as they recognize the features that make up its personality and culture. A workgroup of internal stakeholders met during the strategic planning session to revisit the existing values and proposed a revision that was discussed, enhanced further, and agreed upon by the entire group.

- **Integrity**
- **Commitment**
- **Compassion**
- **Respect**
- **Professionalism**
- **Leadership**

The mission and values are the foundation of this organization. Additionally, the revised and accepted mission and values align with the town's *Connect Morrisville Strategic Plan*. Thus, every effort will be made to keep these current and meaningful so the individuals who make up the MFRD are guided by them in the accomplishment of their goals, objectives, and day-to-day tasks.

Community Service Priorities

To best dedicate time, energy, and resources to services most desired by its community, the MFRD needs to understand what the customers consider to be their priorities. With that, community/external stakeholders were asked to prioritize the programs offered by the department through a process of direct comparison. The results, including the scoring, were as follows:

Table 21: Community Service Priorities

Programs	Ranking	Score
Fire Suppression	1	63
Emergency Medical Services	2	58
Hazardous Materials Mitigation	3	46
Technical Rescue	4	38
Emergency Management	5	35
Community Risk Reduction	6	27
Fire Investigation	7	21
Public Fire and Life Safety Education	8	20

Community Service Expectations

A key element of the MFRD's organizational philosophy is having a high level of commitment to the community, as well as recognizing the importance of community satisfaction. Thus, the department invited community representatives to provide feedback on services provided by the department. Respondents were asked to provide a prioritized perspective of the programs and services provided by the department. Additionally, input was gathered during the meeting that revolved around community expectations and concerns (prioritized), as well as positive and other comments about the organization. Specific findings of the community stakeholders are provided in the appendix of this document. The department stakeholders utilized the full feedback from the community stakeholders in understanding the current challenges encountered within the organization. Additionally, the community stakeholders' feedback provided a process to ensure alignment with the work completed on the organizational mission, values, vision, and goals for improvement.

Here is some of the feedback given by community/external stakeholders:

1. Best possible response times. Be quick and have equipment necessary. Respond to all incidents within 10 - 15 minutes. To respond within 3 - 5 minutes of 911 call. Respond to requests for service (emergency and non-emergency) in a timely fashion. Respond to a fire in a timely manner and with adequate personnel to handle the situation. Respond to emergencies in a timely manner.
2. Be approachable to citizens. Accessibility for public - non-emergency situations, i.e. events, education, etc. Be involved with outreach and prevention activities, such as child car seat safety, fire prevention, etc. To have the fire department once a month meet with the community. To have a community meeting for citizens about fire safety. Talk with parents about children and playing with matches.
3. Well-trained staff. Well trained. Well-trained, professional, courteous staff. Be adequately trained to perform. Knowledgeable, trained, and certified responders in time of need to provide the best possible outcome.
4. Adequate staffing. Enough staff and firehouses to be located and serve all sides of town. Adequately staffed and equipped. Well-supported, paid, appropriately staffed department.
5. Adequate equipment. Equipment is maintained well. Have most up-to-date equipment. Be properly equipped to deliver services. Be fully knowledgeable in the use of their equipment.

Historical Performance Goals

The department developed the first set of performance goals in the initial 2011 standards of cover and kept the goals relatively the same through the 2016 re-accreditation process. These goals were initially developed for an urban and a rural district. Benchmark goals were set utilizing the accreditation guidance from the *Commission on Fire Accreditation International Fire and Emergency Services Self-Assessment Manual 7th Edition* and *8th Edition*, respectively. The department set performance goals for fire suppression, EMS, hazardous materials, and rescue. Inside each category were a few different data points, first due apparatus, and total response time of the identified effective response force. For all four categories (fire suppression, EMS, hazmat, and rescue), the benchmark for the first due apparatus was 7 minutes and 12 seconds, and the arrival of the balance of the alarm for each one of the four categories was: fire suppression 12 minutes; EMS 7 minutes and 12 seconds; hazmat 12 minutes; and rescue 7 minutes.

G. Community Risk Assessment and Risk Levels

Risk Assessment Methodology

Methodology (Probability/Consequence/Impact of Event Risk)

The Morrisville Fire/Rescue Department (MFRD) recognizes hazards exist within the community, which brings with it an inherent risk to the citizens and visitors of that community, including their property and environment. Hazards are the causes of danger and peril in the community, and risk quantifies the degree of potential danger the hazard presents. The process for assessing risk within the community requires a logical, systematic, and consistent methodology that can be utilized and replicated over the entire community from year-to-year. The MFRD assesses risk created by identified hazards to determine the potential adverse impact for fire, emergency medical services, hazardous materials, technical rescue, and other service demands.

It is important to understand that MFRD assesses the risk to the community using a methodology utilizing computer-aided dispatch (CAD). This assessment recognizes increased or decreased risk factors based on a quality assurance process utilizing the International Academy Version 7 Guide. Dispatch protocols are predetermined by run card based on the effective response force (ERF) to properly mitigated hazards in certain areas, topographical inputs, as well as structure types.

While the risk is assessed using stable and known data source features such as station locations, it is managed at the service demand zone (station first due) level for deployment and administration purposes. MFRD utilized the resources of the technical assistance and information resource division at the National Fire Protection Association (NFPA) to develop its risk assessment methodology based on what ERF is required to mitigate a hazard.

The department utilizes three factors when assessing risk: probability or likelihood of an incident occurring, the consequence (magnitude) of an incident on the community, and impact of an incident on the MFRD response system (which includes its automatic aid partners) and its ability to provide ongoing services to the remaining areas for service demand.

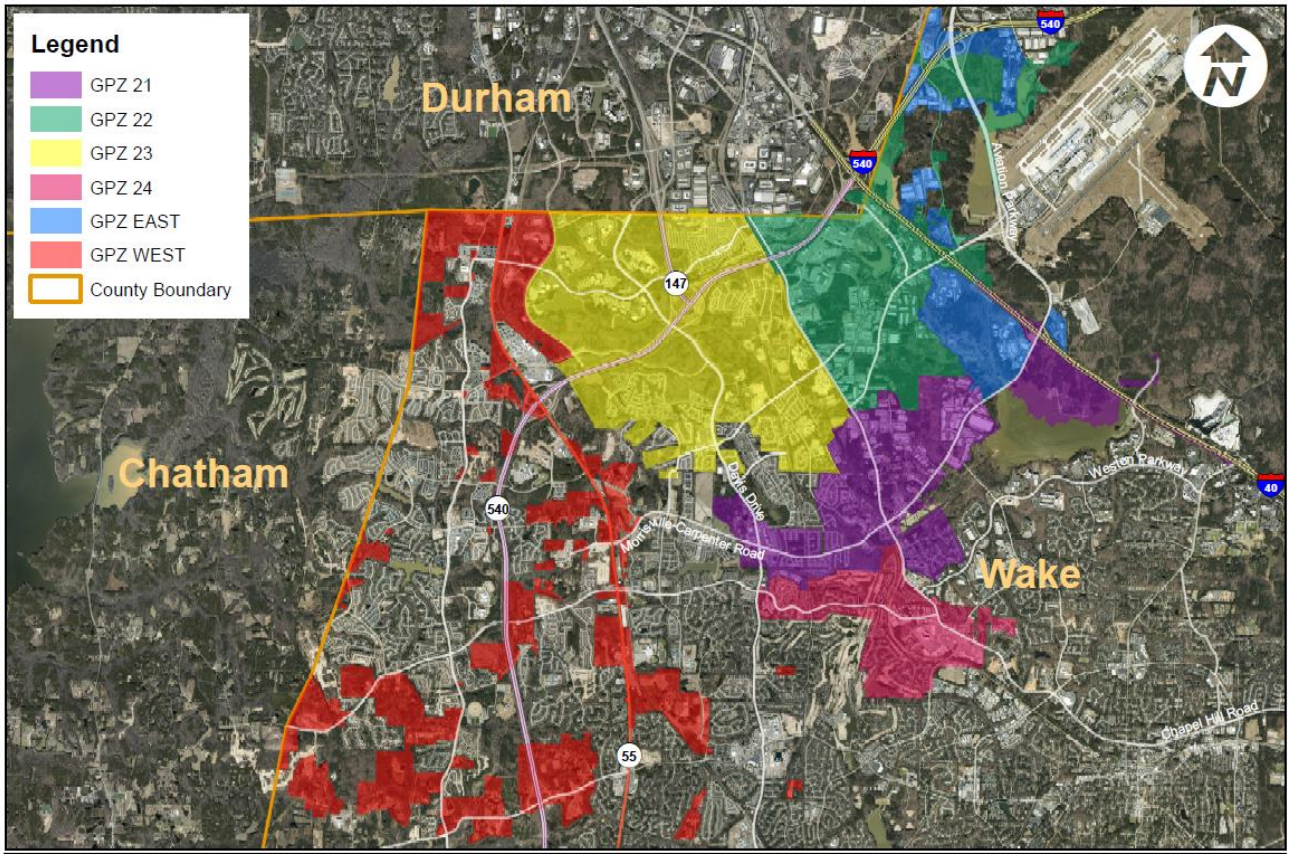
The department currently does not have the ability to dispatch based on specific location risks. As previously mentioned, the dispatch is driven by emergency fire dispatching and emergency medical dispatching. The department uses varying tools to analyze the potential risk that structures and occupancies have on the broader community. To date, units dispatched are directly correlated to the ERF for a certain emergency fire dispatch nature code, not on the risk. The department, like most fire and emergency services, use the occupancy vulnerability assessment profile (OVAP) to rate and rank specific property hazards within the primary response district. The profile is based on the Federal Emergency Management Agency's (FEMA) risk, hazard, and value evaluation (RHAVE) tool developed in the 1990s. While this information is used in the pre-planning process in the records management system, the department is not able to transition this into dispatch protocol for specific addresses.

Planning Areas/Zones

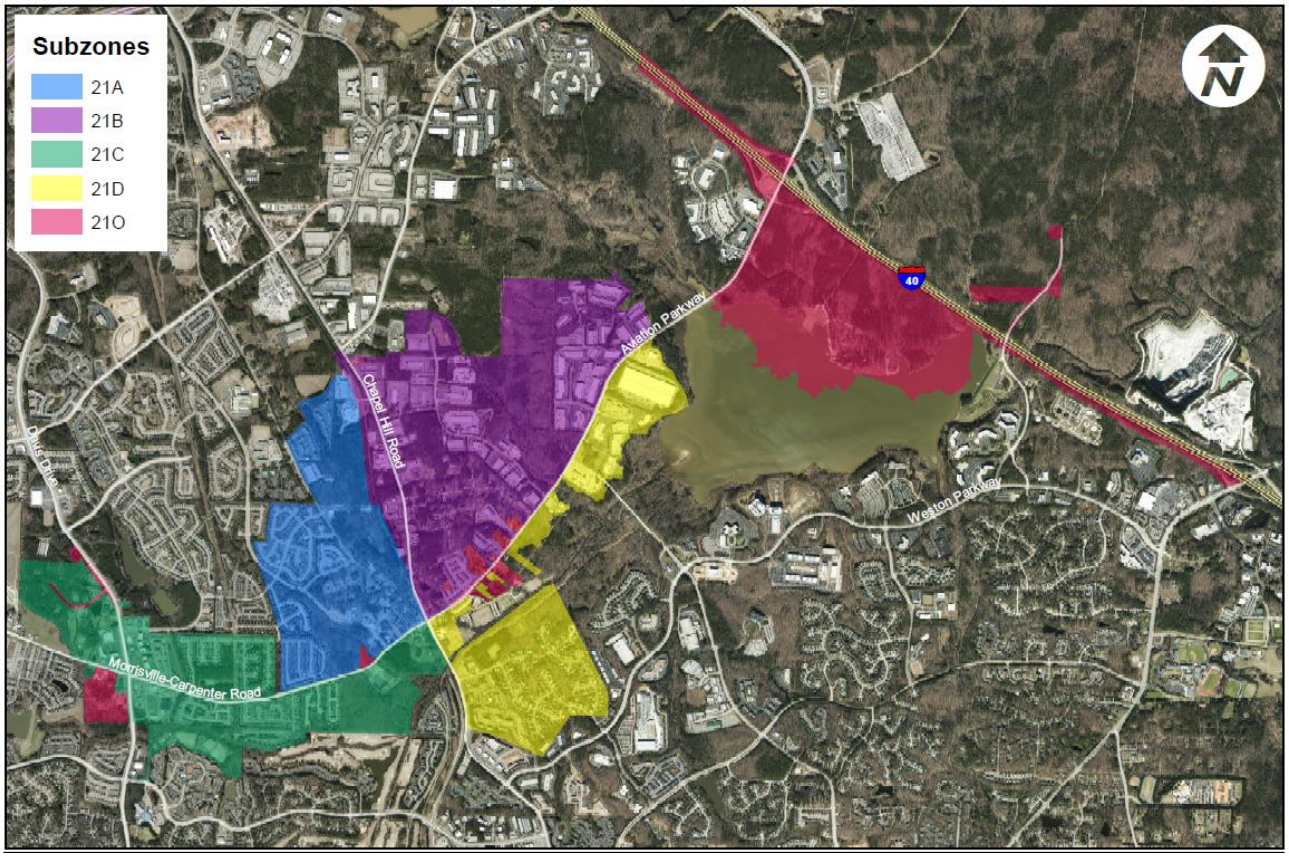
The department utilizes station location and automatic vehicle location to determine the correct dispatch of apparatus based on prearranged run cards for each dispatch determinant. The department also utilizes planning zones for forward-thinking and planning to project growth and future needs of

where station locations should be placed. The size of planning zones are determined by many different factors. Each fire geo proximity zone's (GPZ) size and area are based on the future build-out of the organization. There are four main GPZs where data is analyzed for responses inside the town limits. These areas are subdivided into smaller areas, typically four subzones, to allow the department the opportunity to examine data in a more granular way. While this is an option, typically the call volume and service needs are too small in these zones for a true data analysis. The two GPZs outside the corporate limits are made up of two areas. The GPZs of East and West are areas the department is either contracted to respond to by Wake County or through an automatic aid agreement with the Cary Fire Department.

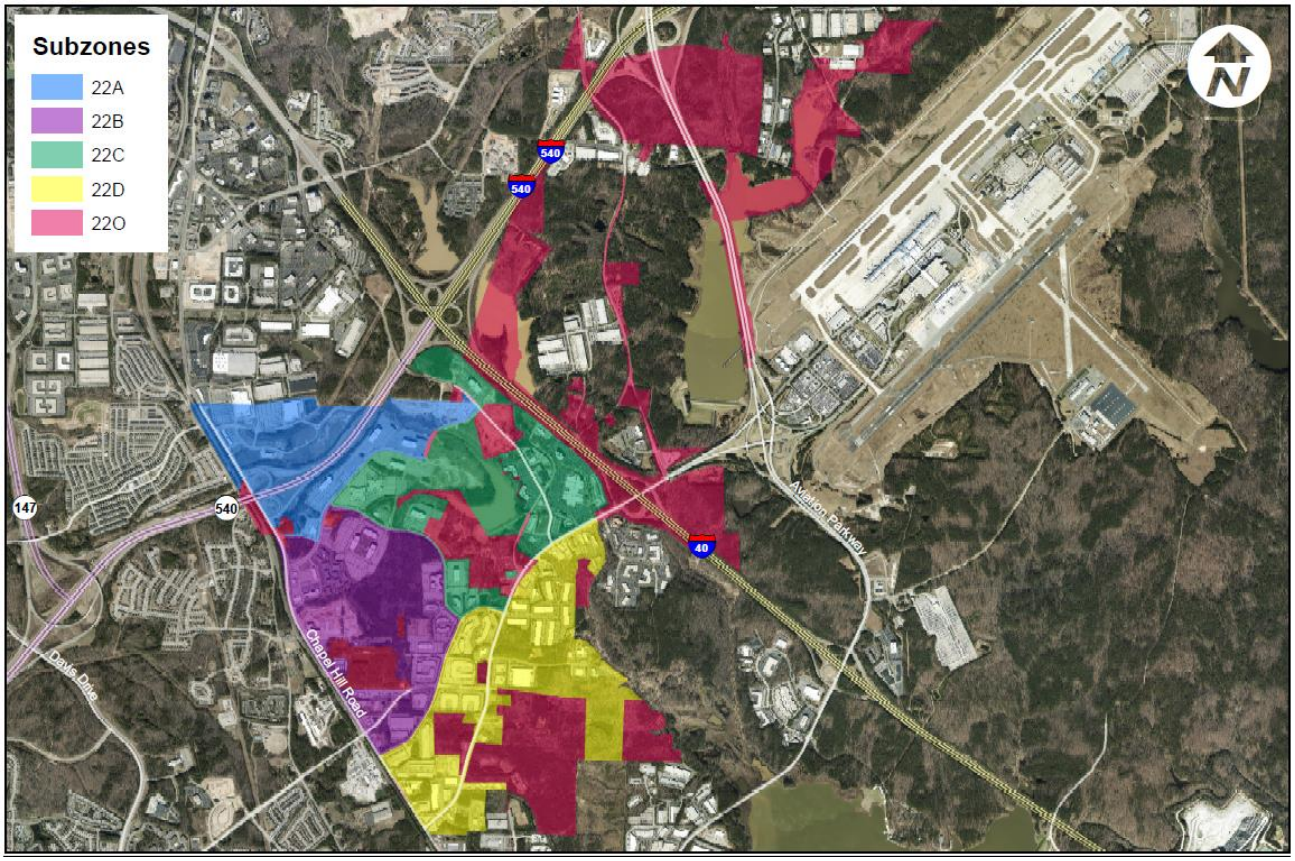
Map 30: Town-Wide Geo Proximity



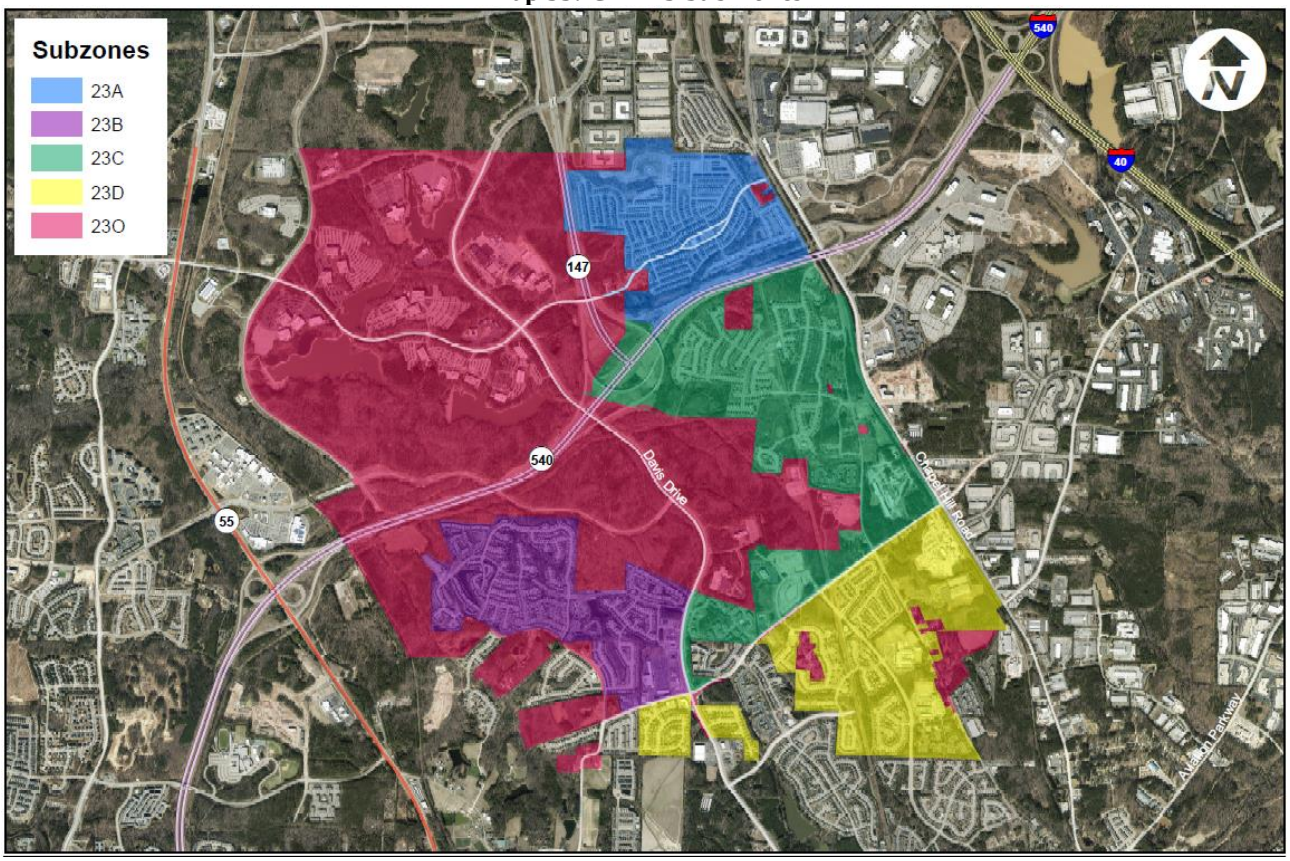
Map 31: GPZ 21 Sub Zones



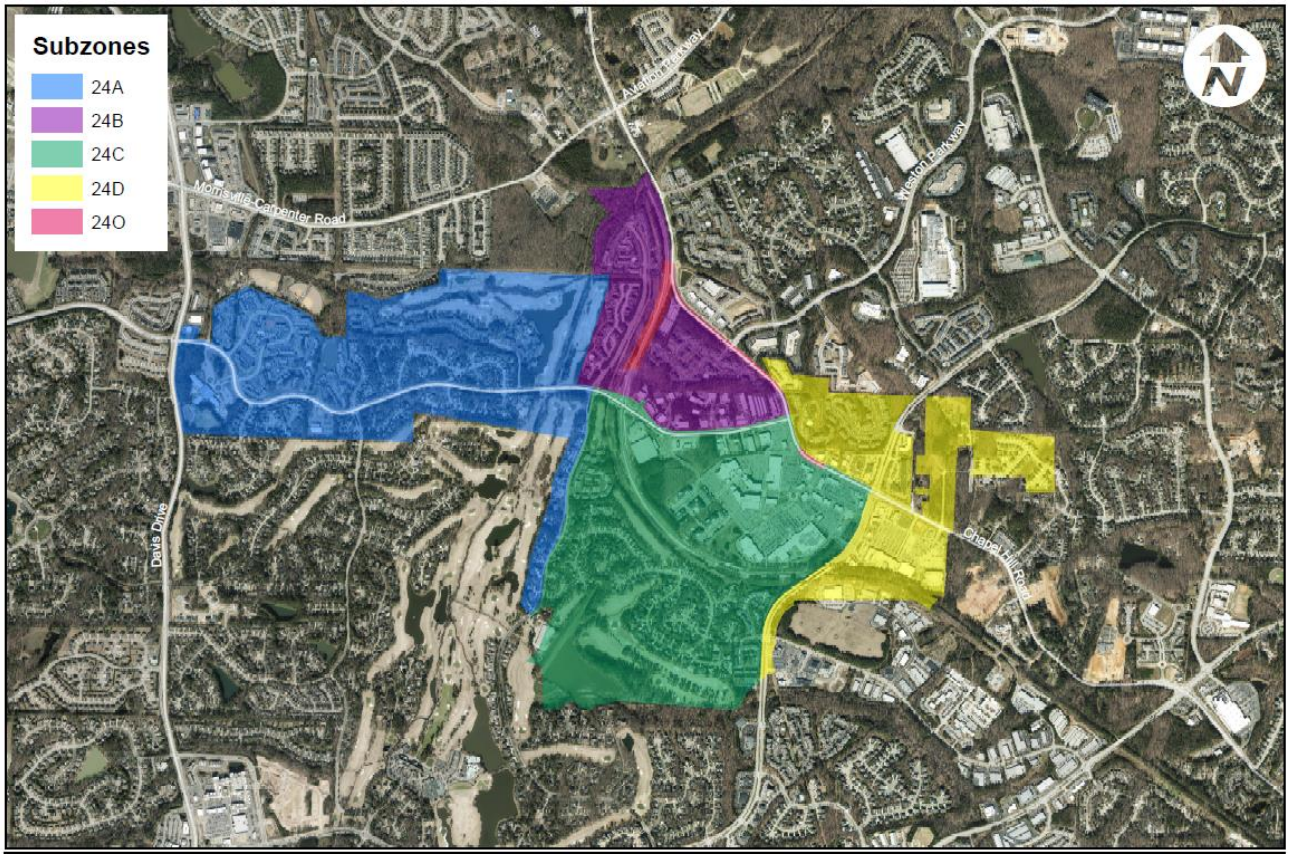
Map 32: GPZ 22 Sub Zones



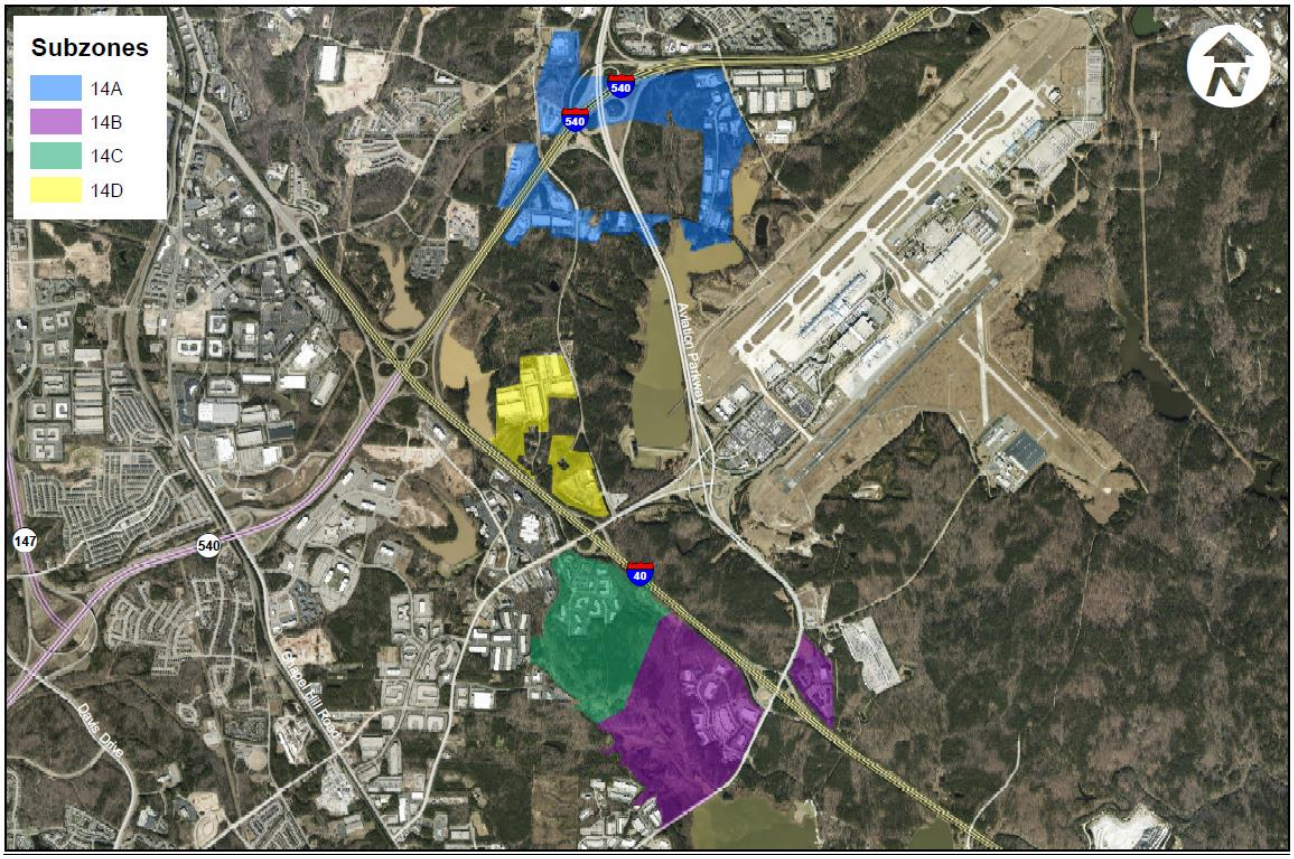
Map 33: GPZ 23 Sub Zones



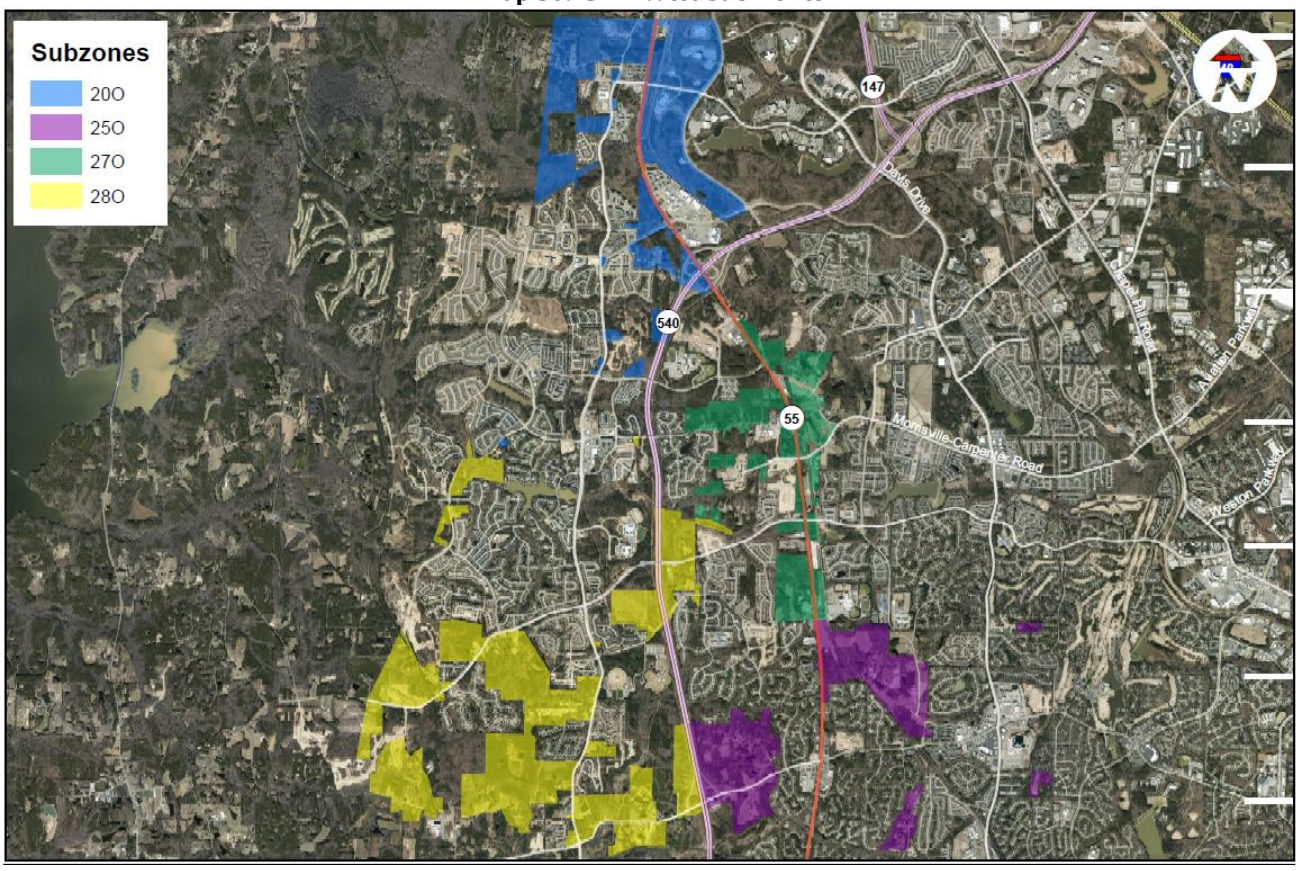
Map 34: GPZ 24 Sub Zones



Map 35: GPZ East Sub Zones



Map 36: GPZ West Sub Zones



Risk Assessment, Classification, and Categories

Risk Methodology

The MFRD suppression division operates three shifts of personnel out of three fire stations. Each station is located based on multiple different factors, and as the town grows rapidly the re-evaluation of station locations is ongoing. A part of the re-evaluation process is reacting in a progressive way where growth will be, how performance has changed due to the introduction of the new automatic aid agreement and unified response concept with the Cary Fire Department, and MFRD's contractual obligation with Wake County to provide both fire protection and first responder coverage to the unincorporated areas of Wake County to the north and west parts of the county.

These areas are broken down into geographical planning zones (GPZs) for better data collection and analysis. Many different factors and characteristics define how these geographic planning zones are developed. The small and oblong shape of the response district, population density, economic factors, demographics, the high percentage of the fire district that is commercial property, call response performance, and the future build-out of the fire district are all factors that were considered. Additionally, fire incidents between 2016 and 2020 were analyzed to determine fire loss and fire casualty rates for the town in these areas.

The department has six GPZs to use in data analysis within the response area. These GPZs are further subdivided into four to five subzones for more pinpoint data analysis and to accurately capture data for areas that are under contract with the Town of Cary and Wake County. Zone and subzone borders are based on contract area limits, natural boundaries, and manmade boundaries. In mid-2020, the department updated its GPZs to align with dispatch system station renumbering along with current and potential station build-out.

The department is continuously evaluating adding additional resources into existing fire stations if call volume and performance demand it. Additionally, the department has been working towards moving to the quint concept, which would add additional resources to each station alleviating the burden on the primary ladder trucks responding to higher acuity calls where a smaller apparatus can respond. Currently, all the stations are multi-company stations, but each is unique in how that is accomplished. Station 1 has a quint and a heavy rescue, Station 2 has a quint and a battalion chief, while Station 3 only has a quint. Station 3 is also Cary Station 7, where an additional engine and rescue are housed. With the automatic aid agreement with the Cary Fire Department, those units can respond in the absence of Ladder 23.

The decision to move Rescue 21 to Station 1 was made for two primary reasons: the first is the high acuity of medical calls at a location in that district, the second is the proximity Station 1 has to I-40, a limited access, high-use freeway.

With the use of automatic aid partners and advanced vehicle location dispatching, concentration factors have not been an issue for the department.

The department also evaluates needed resources based on the arrival and performance of the ERF. Historically these data points have been hard to meet since the units responding did so from fire stations

that were much farther away. With the new automatic aid agreement with CAM partners, the department is in a better position to analyze ERF arrival.

The MFRD assesses risk based on the potential frequency or the probability of an incident occurring, the needed resources it takes to mitigate the hazard or risk, and the consequences (life, emotional, and financial impact) using the three-access model. An example of this is a natural disaster. While it has a very high probability of impact and consequence, it has a low probability of occurrence and would rate accordingly using the three-axis risk calculator.

Conversely, the department responds to medical emergencies daily. The overall potential for damage from a medical call to the community at large is small, the amount of resources that are needed to mitigate the hazard using critical tasking is low, but the frequency rate that it happens is high. By using the three-axis risk calculator, the score will be 12.33. The lower the score, the less of a risk it is. The department breaks risk up into four categories: low, moderate, high, and maximum. The department's stated and adopted service level goals determine the needed concentration and distribution of resources.

The department is continuously assessing the resources needed to mitigate hazards. Historically, the department applied a risk assessment to each building, but has moved towards applying a risk assessment to the resources needed to mitigate the hazard.

Table 22: Fire Risk Assessment

Fire Risk Assessment

Fire	Probability	Consequence	Impact	Risk Score	Risk Assessment
Fire Alarm	6	2	2	12.33	Low
Vehicle Fire	4	2	2	8.48	Low
Dumpster/Trash Fire	4	2	2	8.48	Low
Single Family Home (<4000 SqFt)	4	6	6	34.98	Moderate
Single Family Home (>4000 SqFt)	4	8	6	44.18	High
Multi-Family	4	8	6	44.18	High
Commercial Building	2	8	6	37.67	High
Schools	2	8	8	48	Maximum
Structure Fire/Target Hazard	2	8	8	48	Maximum

Probability of Occurrence	
2	Quarterly/Yearly (0-4)
4	Monthly (5-31)
6	Weekly (32-364)
8	Daily (365 or more)

Impact to Resources	
2	1-3 MFD Dispatched Unit
4	4 MFD Dispatched Units
6	4 MFD and 1 Mutual Aid
8	4 MFD and 2 Mutual Aid

Low	0-19
Moderate	20-35
High	36-45
Maximum	45 and greater

Consequence of Significant Impact					
	Life (50%)	Emotional (25%)	Financial (25%)	Weight	Risk Score
2	No Hazard	No Emotional	$0-$49,999	50%	0.5
4	Potential loss of a life	Single real property/ business	$50,000-$499,000	25%	0.25
6	Potential loss of multiple civilian lives	Multiple real property/businesses	$500,000-$999,999	25%	0.25
8	Potential loss of multiple civilian lives or firefighters	Neighborhood/ Business Campus	$1,000,000 and greater	Total Score	1

Emergency Medical Services Risk Assessment

Medical risks are defined as emergency medical events or areas which have a high probability of overloading the department's ability to respond. Though the department does not transport patients nor staff ambulances, a first responder program of EMTs has been in place since 2007. Advanced life support (ALS) and transport services are provided to the Town of Morrisville by Wake County EMS.

As a medical first responder provider, most of the medical calls the department responds to are classified as "Charlie," "Delta," or "Echo" calls. Examples of Charlie and Delta calls are cardiac emergencies, unconscious persons, choking calls, burns, and obstetrics. The department also responds to some calls that are "Bravo 9" level calls. This gives the opportunity for apparatus to start the process of responding while the telecommunicator finishes the emergency medical dispatching process, entering the information into the *ProQA* computer processing and giving the responding units a final determinant. If it is determined the call is an "Alpha" level, response crews have the authority to return to service if they determine it does not need a first responder response. By asking a line of scripted questions to callers, calls receive a classification from the public safety answering point (PSAP) and are dispatching accordingly. This system is known as "emergency medical dispatching" and has been in place in Cary 911 since early 2010.

Medical risk levels have been reduced in the RTP area, as corporations such as Biogen, Cisco Systems, and Network Appliance have created emergency response teams that are staffed by employees who are medical first responders trained in first aid and cardiopulmonary resuscitation (CPR). Companies that do not have response teams in place use contracted security companies, which employ guards with first aid, CPR, and automatic external defibrillator (AED) training. The use of these teams has improved medical care intervention times in an area that experiences long response times due to the road networks.

Table 23: EMS Risk Assessment

EMS Risk Assessment

Event	Probability	Consequence	Impact	Risk Score	Risk Assessment
Breathing Difficulty	8	2	2	12.33	Low
Allergic Reaction	8	2	2	8.48	Low
Psychiatric	8	2	2	8.48	Low
Carbon Monoxide (2-4)	2	6	8	36.76	Moderate
9E1 (Code Blue)	6	6	6	44.1	Moderate
Mass Casualty Incident	2	8	8	48	High

Probability of Occurrence	
2	Yearly < 2
4	Quarterly/Yearly (3-4)
6	Monthly (5-31)
8	Weekly (32-364)

Impact to Resources	
2	1 MFD Dispatched Unit
4	2 MFD Dispatched Units
6	> 2 MFD Units
8	> 2 MFD Units and Auto Aid

Low	0-19
Moderate	20-45
High	46-50

Consequence of Significant Impact	
	Emotional (20%)
2	1 Potential Fatality
4	> 18 years old Fatality
6	< 18 years old Fatality
8	> 2 Fatalities

Technical Rescue Risk Assessment

Rescue risks within the Town of Morrisville are fairly limited but have been identified as probable. The risk categories for rescue include everything from single vehicle collisions to complex structural collapse scenarios. Typical risks found in structures include confined spaces and elevator rescue. Rural rescue risks include Lake Crabtree and the surrounding park, and the unincorporated county areas of Green Level and Carpenter, where there are large areas of canopied forest and trails. Construction sites in the town pose a considerable risk due to the heavy machinery, uneven terrain, and numerous trenches for utilities. The MFRD has the ability with the CAM response model to execute large, complex technical rescues since partners allow a force multiplier.

In assessing rescue risk probability, the department has determined the following rescue risk categories for the Town of Morrisville:

Table 24: Rescue Risk Assessment

Rescue Risk Assessment					
Event	**Probability**	**Consequence**	**Impact**	**Risk Score**	**Risk Assessment**
Entrapment	6	4	2	19.8	Low
Extrication	4	2	2	13.85	Low
High Angle Rescue	2	6	6	28.14	Moderate
Trench	2	8	6	36.76	Moderate
Train Derailment	2	8	8	44.18	High

Probability of Occurrence	
2	Quarterly/Yearly (0-4)
4	Monthly (5-31)
6	Weekly (32-364)
8	Daily (365 or more)

Impact to Resources	
2	1-3 MFD Dispatched Unit
4	4 MFD Dispatched Units
6	4 MFD and 1 Mutual Aid
8	4 MFD and 2 Mutual Aid

Low	0-19
Moderate	20-39
High	36-45
Maximum	40 and greater

Consequence of Significant Impact	
	Life
2	No Hazard
4	Potential loss of a life
6	Potential loss of multiple civilian lives
8	Potential loss of multiple civilian lives or firefighters

Hazardous Materials Risk Assessment

Hazardous materials risks within the department's jurisdiction fall into two categories: mobile and fixed. The mobile hazards consist of hazardous materials containers on rail cars, 18-wheel tankers, and smaller trucks used to transport liquid propane and other materials. Each of these hazard types follow a fixed infrastructure, whether the Norfolk Southern rail line, Interstate 40, or one of the major arteries through town (Airport Boulevard, Aviation Parkway, Chapel Hill Road, Highway 55, Davis Drive, etc.).

Fixed facility hazards are hazards located on a property in the jurisdiction. Fixed hazards include the natural gas and aviation fuel pipelines, and hazardous materials or processes stored at a specific address. The University of Texas at Dallas also hosts a Tier II reporting database known as E-PLAN, which the department has access to in an online setting. Using the E-PLAN system, the department is able to access the hazardous chemical database saved for each property in the district. This information is then referenced in the pre-fire plan if applicable. All personnel are trained to the Hazmat Operations Level, which is the Occupational Safety & Health Administration *Standard 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER)* along with the NFPA 1072: *Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Professional Qualifications*. In addition, the state of North Carolina also allows operation-level trained staff to perform some offensive-level actions. These actions can be found in North Carolina General Statue *13 NCAC 07F .0103 HAZARDOUS MATERIALS*.

Other hazardous materials services are contracted through Raleigh Fire Department, which is a North Carolina Hazardous Materials Regional Response Team. If the response needs technician-level services, the MFRD can request this response through the dispatch center.

Table 25: Hazmat Risk Assessment

HAZMAT Risk Assessment

Event	Probability	Consequence	Impact	Risk Score	Risk Assessment
Carbon Monoxide Alarm	6	2	2	12.33	Low
HAZMAT Release (Small 5>)	4	2	2	8.48	Low
Gas Leak Low Pressure	6	4	2	17.35	Moderate
HAZMAT Release (6-49 Gallons)	4	4	4	19.59	Moderate
HAZMAT Release (50-100)	4	8	4	33.94	High
Gas Leak High Preassure	6	8	6	44.2	High
HAZMAT Release(Large >101 Gallons)	2	8	8	48	Maximum

Probability of Occurrence	
2	Quarterly/Yearly (0-4)
4	Monthly (5-31)
6	Weekly (32-364)
8	Daily (365 or more)

Impact to Resources	
2	1 MFD Dispatched Unit
4	2-3 MFD Dispatched Units
6	MFD and 1 Mutual Aid
8	4 MFD units and/or NC RRT

Low	0-15
Moderate	16-29
High	30-45
Maximum	45 and greater

Consequence of Significant Impact					
	Life (50%)	**Emotional (25%)**	**Financial (25%)**	**Weight**	**Risk Score**
2	No Hazard	No Emotional	Residential Area	50%	0.5
4	Potential loss of a life	Single real property/ business	Commercial Area	25%	0.25
6	Potential loss of multiple civilian lives	Multiple real property/businesses	Residential and Commerial	25%	0.25
8	Potential loss of multiple civilian lives or firefighters	Neighborhood/ Business Campus	Evacuation >500 Civilians	Total Score	1

Specific Event Risks

The department has maintained a hazard analysis, which began in 2006 with the adoption and implementation of the *Town of Morrisville Emergency Operations Plan* (EOP). The EOP was created to establish a chain of command in the event of a large-scale incident. This document outlined specific procedures for operating an emergency operations center and listed threats to the community as identified in the *Wake County Hazard and Vulnerability Assessment*.

In addition to the federal model of incident types, the department has outlined a method of determining the impact an incident will have on the community and rated it accordingly. The hazards are rated by the likelihood of occurrence, impact on the community, and total area impacted.

Vulnerability Scale / Likelihood of Occurrence:

- Highly likely: near 100% probability within the next year
- Likely: between 10% and 100% and probability next year with at least 1 chance in 10 years
- Possible: between 1% and 10% probability in the next year with at least 1 chance in next 100 years
- Unlikely: less than 1% probability in next year with less than 1 chance in next 100 years

Impact on Community:

- Catastrophic: 50%+ damage with multiple deaths, complete shutdown of facilities for 30+ days
- Critical: 25% - 50% damage with multiple severe injuries and complete shutdown of critical facilities for at least 2 weeks
- Limited: 10% to 25% damage with some injuries and complete shutdown of critical facilities for more than 1 week
- Negligible: Less than 10% damage with minor injuries and shutdown of critical facilities and services for 24 hours or less

Area of Impact:

- Large: Area affected is greater than 50% of the town jurisdiction
- Small: Area affected is less than 50% of the town jurisdiction

Hurricanes

Hurricanes are among the most frequent and most damaging types of weather events faced by the Town of Morrisville. Over the years 2001-2020, North Carolina has been directly and indirectly affected by 45 tropical storms and named hurricanes. Hurricanes are rated according to their wind speeds. That measurement is used to assign a category to the storm. This scale is known as the Saffir-Simpson Hurricane Scale.

Table 26- Saffir-Simpson Hurricane Scale

Category	Barometric Pressure	Wind Speed	Storm Surge	Damage Potential
1 (weak)	28.94 in Hg or more (980.2 Mb or more)	65 - 82 knots (75 - 95 mph)	4 - 5 feet (1.2 - 1.5 meters)	Minimal damage to vegetation
2 (moderate)	28.5 - 28.93 in Hg (965.12 - 979.68 mb)	83 - 95 knots (96 - 110 mph)	6 - 8 feet (1.8 - 2.4 meters)	Moderate damage to houses
3 (strong)	27.91 - 28.49 in Hg (945.14 - 964.78 mb)	96 - 113 knots (111 - 130 mph)	9 - 12 feet 2.7 - 3.7 meters	Extensive damage to small buildings
4 (very strong)	27.17 - 27.9 in Hg (920.08 - 944.8 mb)	114 - 135 knots (131 - 155 mph)	13 - 18 feet (3.9 - 5.5 meters)	Extreme structural damage
5 (devastating)	< 27.17 in Hg (< 920.08 mb)	> 135 knots (> 155 mph)	> 18 feet (> 5.5 meters)	Catastrophic building failures possible

Of the named storms which hit North Carolina, three were tropical storms (winds below 65 knots), one was a Category 1 storm, one was a Category 2, one was a Category 3, and one was a Category 4. Morrisville experienced weather events with six of the seven hurricanes which hit North Carolina since 2004. Weather events associated with hurricanes have included heavy rain, high winds, and tornadoes. Damage sustained during these storms has included road closures due to flash flooding, building damage, and downed trees and power lines.

Prior to hurricane landfall, notices are sent to all employees, and equipment is prepared in accordance with the emergency operations plan. Deployment of apparatus and equipment during hurricanes is based on incident response needs.

Table 27: Hurricane Threat Assessment

Likelihood of Occurrence	Area of Impact	Impact of Hazard	Incident Type
Possible	Large	Limited	Type 2

Flooding

The primary cause of flooding in the Town of Morrisville is heavy precipitation, usually associated with major storm systems. Areas of focus for the town are Crabtree Creek, Indian Creek, and Stirrup Iron Creek. During the winter season, significant run-off from abnormal snowmelt conditions may pose a relative threat to the county. During hurricanes, flooding risk is fairly minimal. Surface flooding may occur in some areas, but it is not likely that any sections would be inundated or requires evacuation.

Map 37: Potential Flood Areas

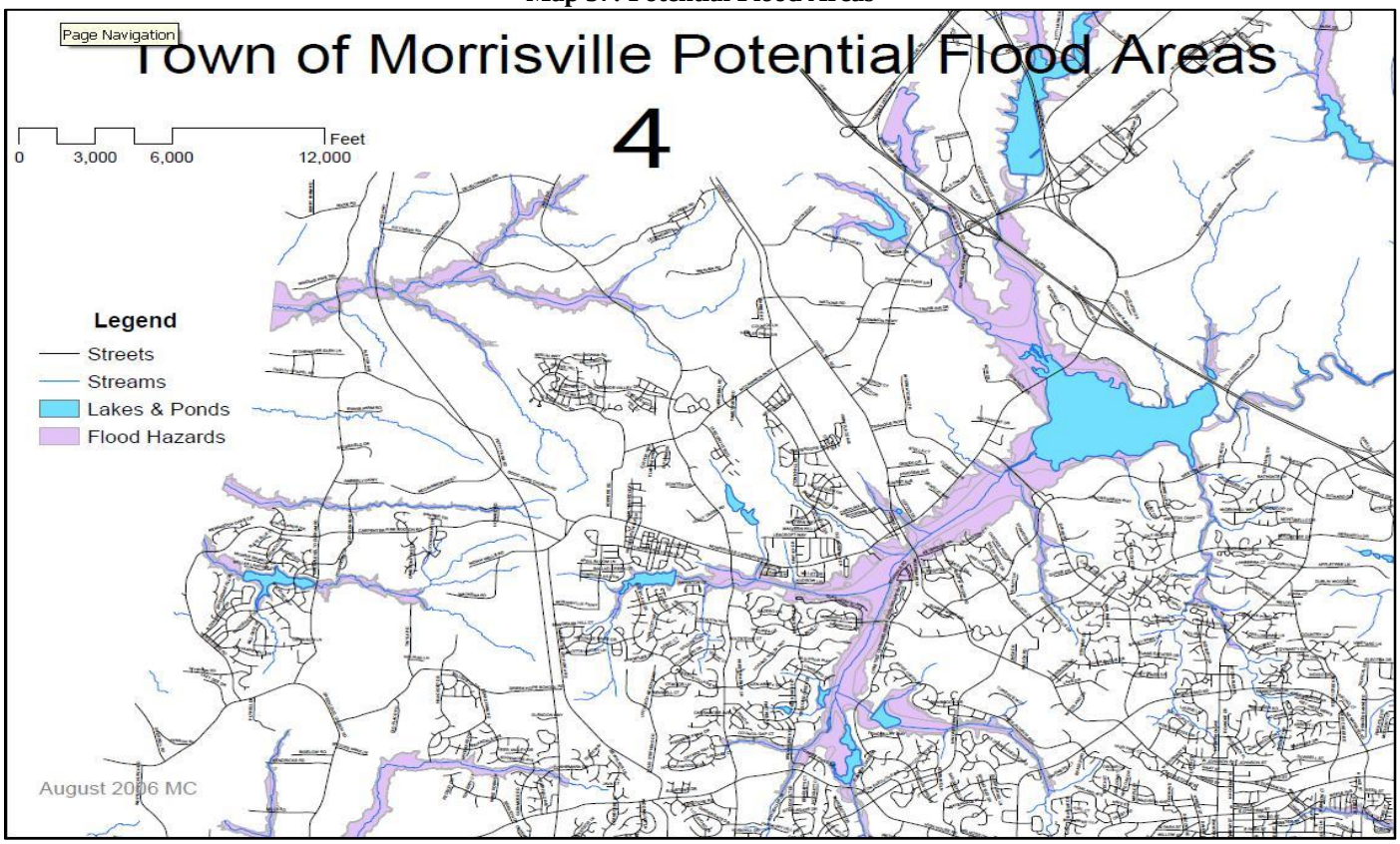


Table 28: Flooding Threat Assessment

Likelihood of Occurrence	Area of Impact	Impact of Hazard	Incident Type
Highly Likely	Small	Limited	3

Tornadoes

Tornadoes can occur at any time of the year and at any hour of the day. Tornadoes are most common in North Carolina from late March through June. Avoidance of tornadoes is virtually impossible, and the Town of Morrisville is vulnerable to their occurrence. While tornadoes are not a common occurrence in the area, Morrisville has experienced tornadoes in the past. Due to the rapid increases in population and development within the area, any tornado of significant proportion would pose a maximum threat to both lives and property.

Table 29: Enhanced Fujita Scale

Scale	Three Second Gust (mph)	Damage
F0	65-85	Light
F1	86-110	Moderate
F2	111-135	Considerable
F3	136-165	Severe
F4	166-200	Devastating
F5	Over 200	Incredible

Deployment in response to a tornado touchdown would include a rapid assessment of the area affected, followed by a call for specialized rescue services. Personnel most likely to be needed would be structural collapse rescue technicians and building inspectors. A high number of ambulances would also be required to be on standby for the transport of victims. The department would primarily be tasked with search, rescue, and triage of victims.

Table 30: Tornado Threat Assessment

Likelihood of Occurrence	Area of Impact	Impact of Hazard	Incident Type
Possible	Large	Limited	3

Severe Thunderstorms

Severe thunderstorms are the most frequent severe weather events seen in central North Carolina. According to the North Carolina Climate Office, the state experiences 40-50 thunderstorms in a year, with the busiest month being July. Each year an average of $5 million in damages is lost due to thunderstorms and the byproducts of rain, hail, lightning, and high wind.

Cloud to ground lightning is one of the most common causes of structure fires in Morrisville during the summer months. Additional calls received during thunderstorm events are false detector activations due to loss of power to buildings. As thunderstorms form quickly, no formal plan outside the EOP is required for thunderstorms. Operations are maintained as normal, and calls are answered as dispatched, barring any second or third duty calls for service.

Table 31: Severe Thunderstorm Threat Assessment

Likelihood of Occurrence	Area of Impact	Impact of Hazard	Incident Type
Highly Likely	Large	Limited	3

Winter Storms

Because severe winter storms include frigid temperatures, heavy snow, ice, and gusting winds in all combinations, the severity is usually determined by duration, temperature extremes, and accumulation of precipitation. The primary threat is the ability of such storms to completely immobilize large areas, disrupt services, and cause injury or death. In the Town of Morrisville, on average, snow and/or sleet occurs once or twice annually. In North Carolina, snowfall ranges from one inch to approximately 24 inches across the state. During ice storms many pine trees fall, causing roadway blockages and driving hazards.

The overall response plan during these types of weather events includes fueling all apparatus prior to a storm, avoiding unnecessary trips, calling in additional personnel to staff small support vehicles, and running smaller vehicles as first out to EMS calls. This concept of operation has been enacted several times in 2016-2020 and has worked favorably in maintaining a high level of safety. All first out engines and quints have automatic chains that are deployed when the apparatus must go on the road in icy conditions. Lastly, the Town of Morrisville and Town of Cary employ their respective public works departments to apply a salt brine solution to the main roads prior to any potential winter weather.

Table 32: Winter Storms Threat Assessment

Likelihood of Occurrence	Area of Impact	Impact of Hazard	Incident Type
Likely	Large	Limited	3

Critical Task Analysis

Fire Suppression

Fire risk categories are separated into low, moderate, high, and maximum risk. The fire risk level dictates the critical task analysis for the incident, which then dictates the initial response. Two basic assumptions are made in relation to establishing an ERF to fire incidents. The first assumption is there are only 17 people per shift, with a minimum of three personnel per engine/quint and three personnel per rescue. The second assumption is based on current operations, automatic aid will be a part of the ERF. One assumption that could be made but is not is the closest CAM partner responds with a minimum of four personnel on their engines. With the quint concept and the nuances that have to be taken into account for the capability of units dispatched, a standard of three personnel are set for all units, though in reality some will arrive with more staffing than the minimum. Since Wake County EMS dispatches a minimum of one ambulance to all structure fires, EMS will fill the role of rehab.

Low Risk Fire Incidents

Low risk fires would normally be minor in intensity, magnitude, or scope and may be effectively handled by one company. Low risk fires usually involve brush, dumpster, and vehicle fires with no exposure threats to structures. The following table depicts the critical tasking and staff necessary for mitigation and the resources assigned to low-risk fires.

Table 33: Critical Task Analysis - Low Risk Fire

Task	Number of Firefighters	Dispatched Units	Total Personal
Attack line	1	1 Pump Capable Unit	3
Pump operator	1	**Total Dispatched**	**3**
Command/safety	1		
Total	**3**		

Moderate Risk Fire Incidents

Moderate risk fires are usually confined to a single room or involve only contents. Moderate risk fires usually involve a single-family home or residence with little risk of extension to surrounding exposures. The following table depicts the critical tasking and staff necessary for mitigation and the resources assigned to moderate risk fires. MFRD does not count rehab or medical into the ERF. Wake County responds to every structure fire with at least an ALS ambulance with two trained medical staff (one paramedic and one emergency medical technician) and a district chief with one trained paramedic to perform rehab. If additional medical units are needed on scene, the EMS district chief will request the additional units.

Table 34: Critical Task Analysis - Moderate Risk Structure Fire

Task	Number of Firefighters	Dispatched Units	Total Personnel
Attack line	2	4 Pump Capable Units	12
Pump operator	1	1 Ladder	3
Water supply	1	1 Rescue	3
Back up line	2	2 Battalion Chiefs	2
RIT	2	**Total Dispatched**	**20**
Command/safety	1		
Search/rescue	2		
Ventilation	2		
Overhaul/salvage	2		
Total	**15**		

High Risk Fire Incidents

High risk fires have the potential to involve not only an entire structure but exposures as well. The following table depicts the critical tasking, necessary staff for mitigation, and the resources assigned to high risk fires. This includes unit movement-ups from CAM partners to ensure there is adequate coverage across Morrisville during this event. MFRD does not count rehab or medical into the ERF. Wake County responds to every structure fire with at least an ALS ambulance with two trained medical staff (one paramedic and one emergency medical technician) and a district chief with one trained paramedic to perform rehab. If additional medical units are needed on scene, the EMS district chief will request the additional units.

Table 35: Critical Task Analysis - High Risk Structure Fire

Task	Number of Firefighters	Dispatched Units	Total Personnel
Assessment team	2	5 Pump Capable Units	15
Attack line	2	2 Ladders	6
RIT	5	1 Rescue	3
Search and rescue	2	2 Battalion Chiefs	2
Ventilation/Ground Ladders/Utilities	3	**Total Dispatched**	**26**
Back up line	2		
Safety	1		
Command	1		
Pump operator	1		
Aerial operator	1		
Water supply	1		
Accountability officer	1		
Exposure protection	2		
Overhaul/salvage	2		
Total	**26**		

Maximum Risk Fire Incidents

Maximum risk fire incidents involve any high-rise or high life hazard. The following table depicts the critical tasking, necessary staff for mitigation, and the resources assigned to maximum risk fires. This includes unit movement-ups from CAM partners to ensure there is adequate coverage across Morrisville during this event. MFRD does not count rehab or medical into the ERF. Wake County responds to every structure fire with at least an ALS ambulance with two trained medical staff (one paramedic and one emergency medical technician) and a district chief with one trained paramedic to perform rehab. If additional medical units are needed on scene, the EMS district chief will request the additional units.

Table 36: Critical Task Analysis - Maximum Risk Structure Fire

Task	Number of Firefighters	Dispatched Units	Total Personnel
Assessment team	2	5 Pump Capable Units	15
Attack line	2	3 Ladders	9
R.I.T.	5	2 Rescue	6
Search and rescue	4	3 Battalion Chiefs	3
Ventilation/Ground Ladders/Utilities	4	Command Vehicle Response	2
Back up line	3	**Total Dispatched**	**35**
Safety	1		
Command	2		
Pump operator	2		
Aerial operator	2		
Water supply	2		
Accountability officer	1		
Exposure protection	2		
Overhaul/salvage	2		
Operations officer	1		
Total	**35**		

Emergency Medical Critical Task Analysis

The department commits to dispatching a single unit with a minimum of three EMTs to all EMS incidents. The department currently provides only basic life support services with no transport capabilities. Advanced life support and transport services are provided by Wake County EMS. While the department considers mass casualty incidents from a medical perspective to be a medical responsibility and not fire only, the department recognizes the need to assist with an elevated response level for triaging and possible rescue functions. Other mass casualty incidents not classified as rescue incidents, such as mass shootings, would be handled by the town emergency operations plan and would be managed using a unified command system incorporating fire, law enforcement, and EMS personnel. To date, no incidents of this nature have occurred, and there is no response data to present.

Low Risk Medical Incidents

Low risk medical emergencies typically involve minimal intervention on the part of the response resources. The department operates inside the Wake County EMS system and follows all applicable policies and protocols the medical director initiates.

Table 37: Critical Task Analysis - Low Risk Medical

Task	Number of Firefighters	Dispatched Units	Total Personnel
Basic life support	1	B.L.S. Capable Unit	2
Information gathering/basic life support/command	1		
Total	**2**		

Moderate Risk Medical Incidents

Moderate risk medical emergencies sometimes require multiple units to get the identified ERF. When the primary unit dispatched only has three staff members on it, a second unit will add themselves to the call. This is so the department can execute the "pit crew" style CPR Wake County utilizes.

Table 38: Critical Task Analysis - Moderate Risk Medical

Task	Number of Firefighters	Dispatched Units	Total Personnel
Airway Management	1	1 B.L.S. Capable unit (if the dispatched unit does not have daily staffing of 4 personnel, a second unit will add themselves to the incident to get the desired ERF.	4
Compressions	1	**Total Dispatched**	**4**
Defibrillator Manager	1		
Command	1		
Total	**4**		

Table 39: Critical Tasks Analysis - High Risk Medical

Task	Number of Firefighters	Dispatched Units	Total Personnel
Fire Branch Officer	1	1 Battalion Chief	1
Safety	1	3 B.L.S. Capable Units	9
Triage	3	**Total Dispatched Units**	**4**
BLS	5		
Total ERF Needed	**10**		

Technical Rescue Critical Task Analysis

Technical rescue covers a wide variety of circumstances that require specialized skills and equipment. All staff are certified to a minimum of technical rescuer certification, but as staff gain higher ranks they are able to obtain multiple additional technical rescuer certifications. Trench, confined space, water rescue, high and low angle rescues are events to which the department is dispatched. While structural collapse is something the department is dispatched to, MFRD will seek assistance from both CAM auto aid partners and mutual aid departments from the county and region.

Technical Rescue Low Risk Incident

These incidents cover a wide variety of circumstances and can be handled by a single or double-unit response.

Table 40: Critical Task Analysis – Low Risk Technical Rescue

Task	Number of Firefighters	Dispatched Units	Total Personnel
Command/Safety	1	1 Suppression Unit	3
Rescue	2	**Total Dispatched**	**3**
Total	**3**		

Technical Rescue Moderate Risk Incident

Rescue conditions can be controlled by a primary response. The incident may require specialized knowledge and equipment but not the assembly of a specialized team.

Table 41: Critical Task Analysis - Moderate Risk Technical Rescue

Task	Number of Firefighters	Dispatched Units	Total Personnel
Command/ Accountability	1	1 Pump Capable Unit	3
Safety	1	1 Ladder	3
Equipment Team	4	1 Rescue	3
Equipment Support	1	1 Battalion Chief	1
Triage	1	**Total Dispatched**	**10**
Life Safety, Hazard Analysis/Control	1		
Total	**9**		

Technical Rescue High Risk Incident

Complex rescue conditions will likely be extended in duration and require the use of specialized knowledge and resources with the assembly of a specialized team.

Table 42: Critical Task Analysis - High Risk Technical Rescue

Task	Number of Firefighters	Dispatched Units	Total Personnel
Command	1	4 Pump Capable Units	12
Safety	1	1 Ladder	3
Triage	1	1 Rescue	2
Equipment Support	2	2 Battalion Chiefs	1
Equipment Team	4	**Total Dispatched**	**18**
Comms Leader	1		
Rescuer	2		
Accountability	1		
Backup Team	2		
Attendant	1		
Air Supply	1		
Life Safety, Hazard Analysis/Control	1		
Total	**18**		

Hazmat Critical Task Analysis

Hazardous material responses are classified into low, moderate, high, and maximum risk assessment categories. While the department identifies there could be a maximum risk hazmat emergency and plans accordingly, the time needed to mobilize the units and the minimal number of calls that require a hazmat technician level response, the department has elected not to analyze these calls.

Low Risk Hazmat Incidents

These emergencies are usually frequent but require a small amount of intervention or resources to mitigate. They consist of fluid clean-up after motor vehicle accidents and carbon monoxide alarms.

Table 43: Critical Task Analysis - Low Risk Hazmat

Task	Number of Firefighters	Dispatched Units	Total Personnel
Command	1	1 Pump Capable Unit	3
Air Monitoring	1	1 Rescue	3
Equipment Support	1	**Total Dispatched**	**6**
Total	**3**		

Moderate Risk Hazmat Incident

Incidents classified as moderate risk are small gas leaks both inside and out, and fuel spills under 50 gallons.

Table 44: Critical Task Analysis - Moderate Risk Hazmat

Task	Number of Firefighters	Dispatched Units	Total Personnel
Command	1	1 Pump Capable Unit	3
Pumper Operator	1	1 Ladder	3
Prepare for fire attack	2	1 Rescue	3
Air Monitoring	1	1 Battalion Chief	1
Accountability/Safety	1	**Total Dispatched**	**10**
Evacuation	2		
Total	**8**		

High Risk Hazmat Incident

Large outside gas lines or other large hazardous material spills would constitute a high risk hazmat emergency. These emergencies would also potentially need automatic and mutual aid to fulfill the ERF requirements. While not specifically designated, structure fires with a hazmat component could potentially be identified as a high risk hazmat incident.

Table 45: Critical Task Analysis - High Risk Hazmat

Task	Number of Firefighters	Dispatched Units	Total Personnel
Command	1	4 Pump Capable Units	12
Pumper Operator	1	1 Ladder	3
Prepare for fire attack	2	1 Rescue	3
Air Monitoring	2	2 Battalion Chiefs	2
Accountability	1	**Total Dispatched**	**20**
Evacuation	4		
RIT	5		
Safety	1		
Water Supply	1		
Mitigation Support	2		
Total	**20**		

H. Historical Perspective and Summary of System Performance

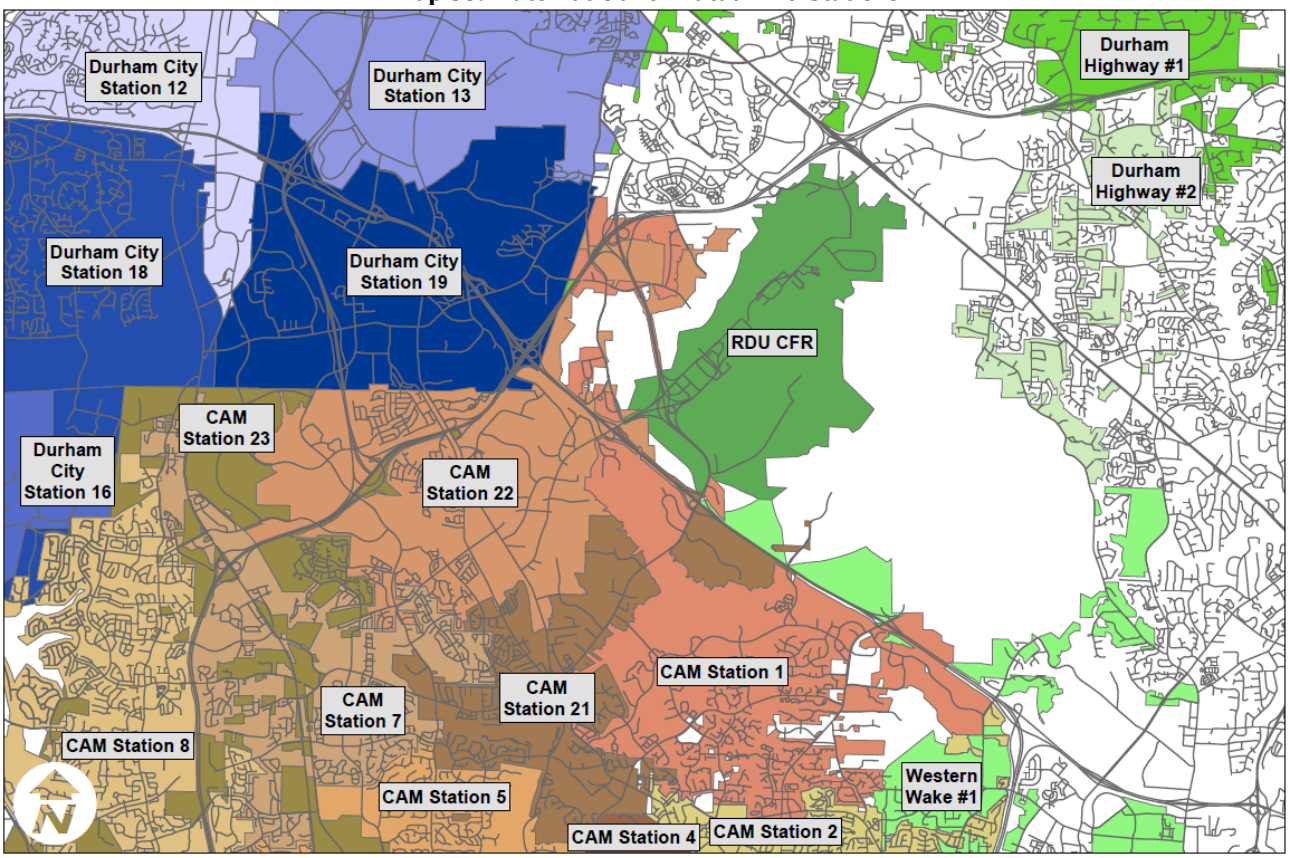
Distribution Factors

The Morrisville Fire/Rescue Department (MFRD) suppression division operates three shifts of personnel out of three fire stations. Each station is located based on multiple different factors, and as the town grows rapidly, the re-evaluation of station locations is ongoing. A part of the re-evaluation process is reacting in a progressive way where growth will be, how performance has changed due to the introduction of the new automatic aid agreement and unified response concept with the Cary Fire Department, and the department's contractual obligation with Wake County to provide both fire protection and first responder coverage to the unincorporated areas of Wake County to the north and west parts of the county.

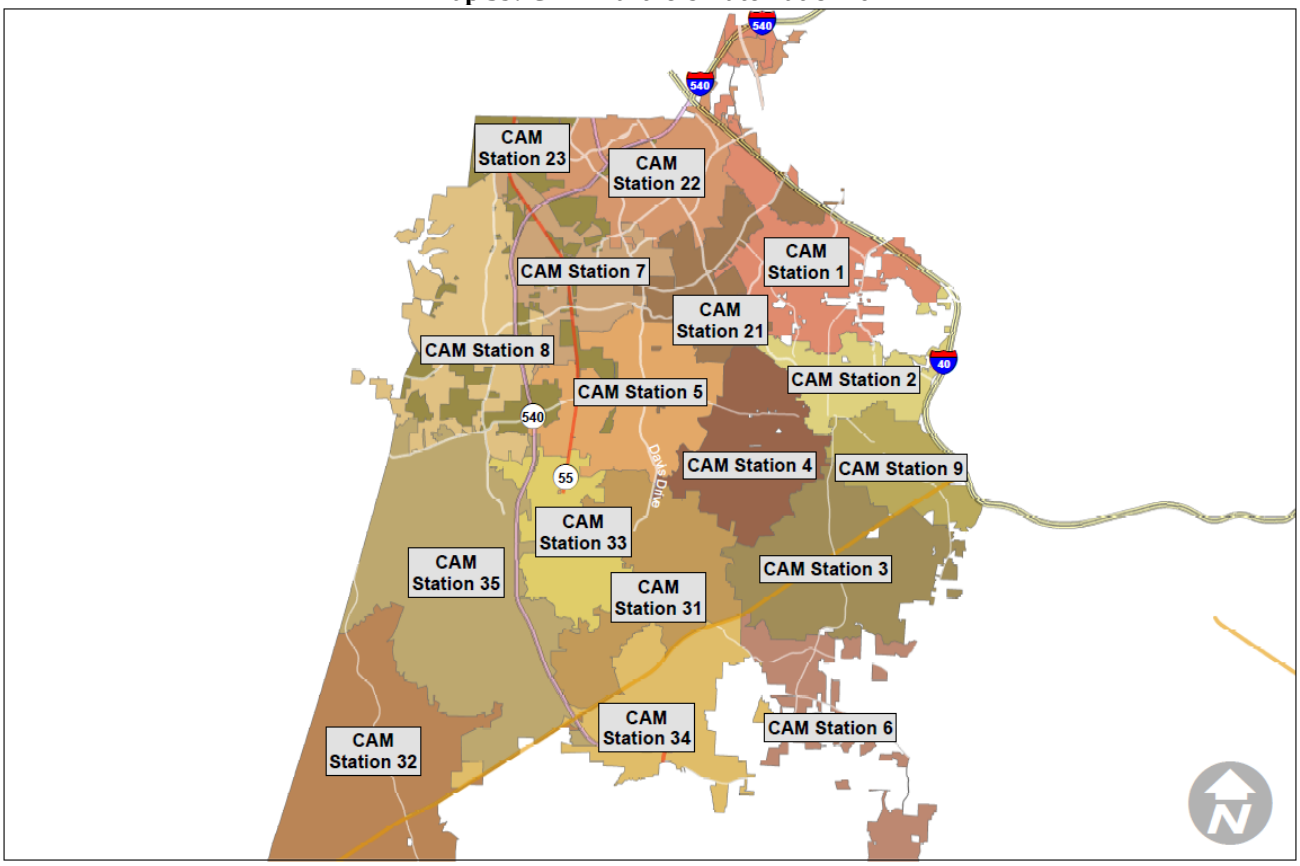
These areas are broken down into geographical planning zones for better data collection and analysis. Many different factors and characteristics define how these geographic planning zones are developed. The small and oblong shape of the response district, population density, economic factors, demographics, the high percentage of the fire district that is commercial property, call response performance, and the future build-out of the fire district are all factors that were taken into account in the development of the geographic planning zones (GPZ). Additionally, fire incidents between 2016-2020 have been analyzed to determine fire loss and fire casualty rates for the town in these areas.

The department has six GPZs to use in data analysis within the response area. These GPZs are further subdivided into four to five subzones for more pinpoint data analysis and to accurately capture data for areas that are under contract with the Town of Cary and Wake County. Zone and subzone borders are based on contract area limits, natural boundaries, and manmade boundaries. In mid-2020, the department updated its GPZs to align with dispatch system station renumbering along with current and potential station build-out.

Map 38: Automatic and Mutual Aid Stations



Map 39: CAM Partners Automatic Aid



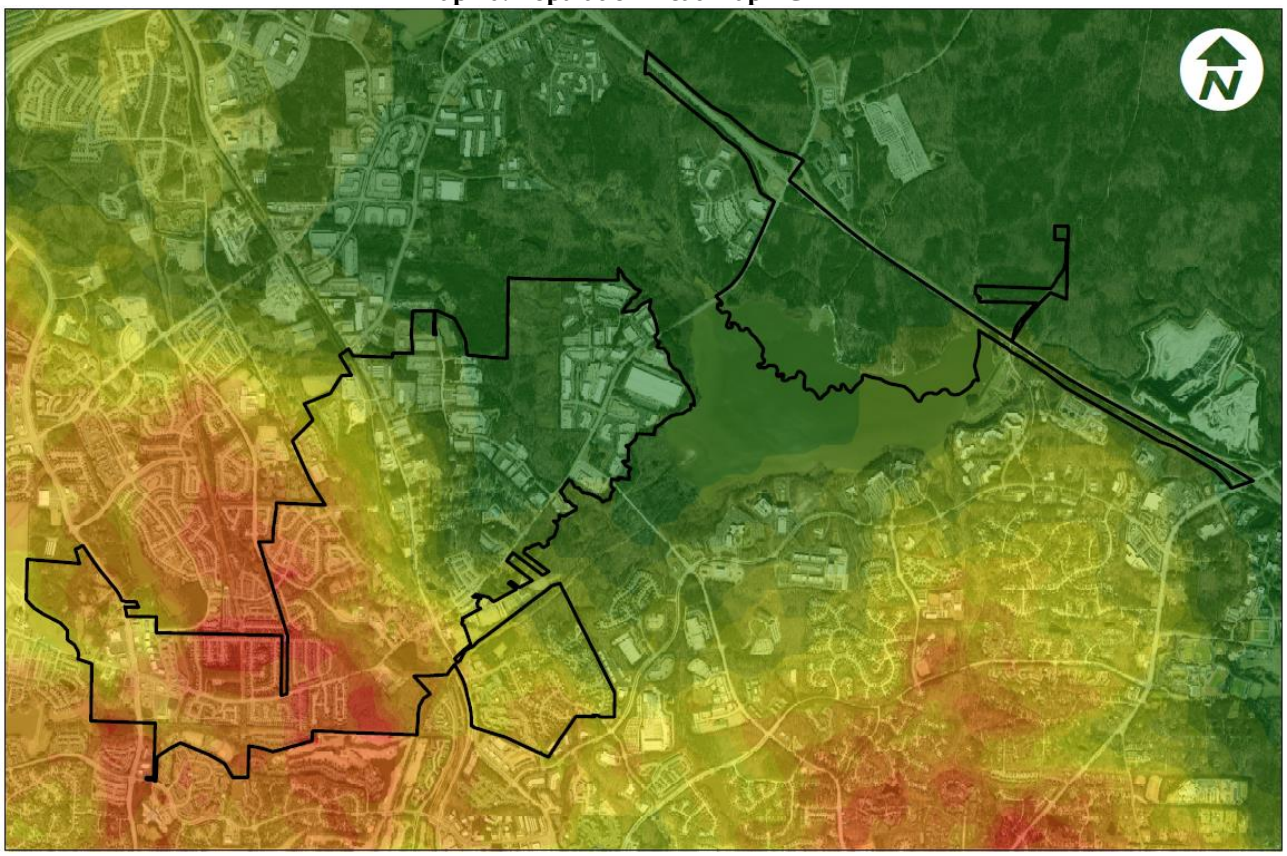
Durham

The following table reflects the first due travel time in each geographical planning zone.

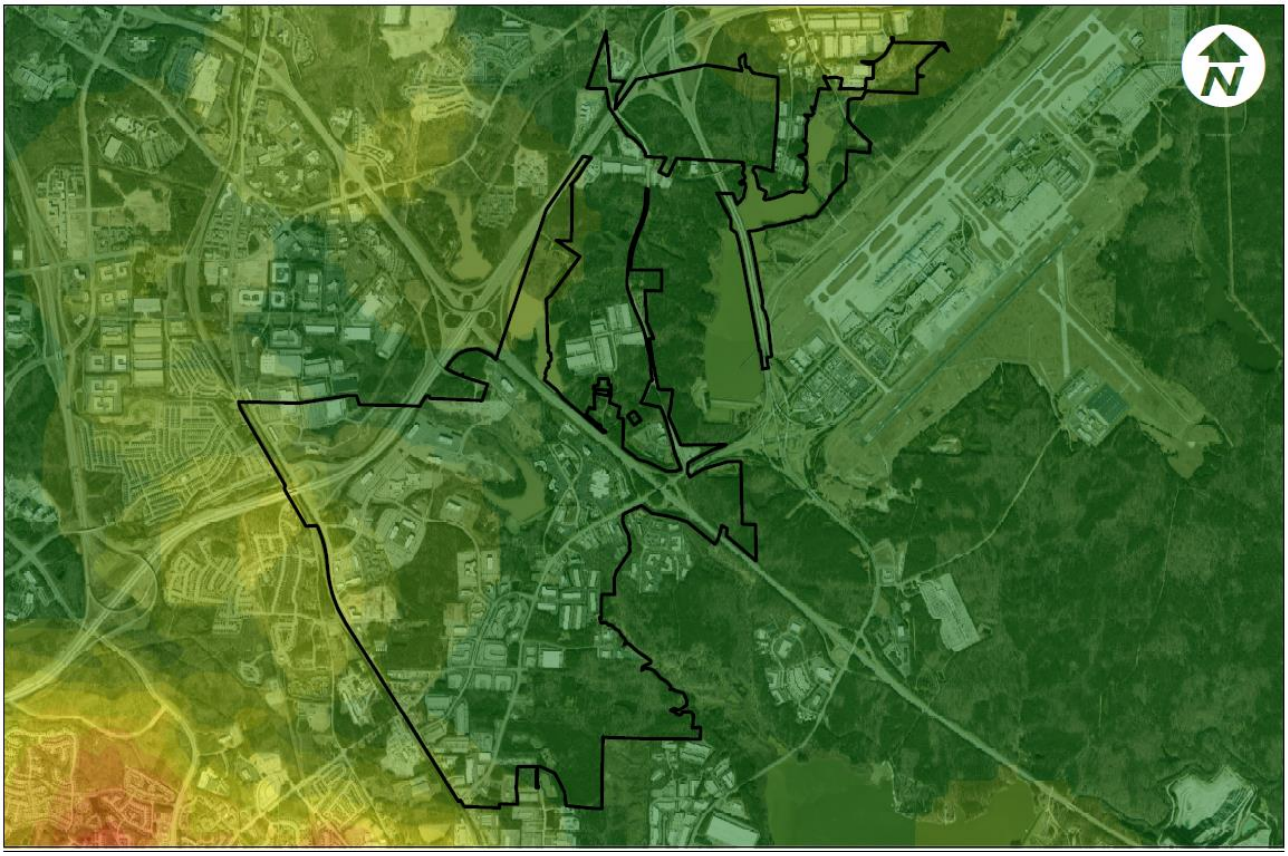
Table 46: First Due Travel Time by GPZ (2016-2020)

Travel Time by GPZ		2016-2020	2020	2019	2018	2017	2016
Travel Time	GPZ 20	08:22	07:51	08:17	08:11	08:26	08:22
		n=105	n=15	n=19	n=26	n=30	n=15
	GPZ 21	04:32	04:24	04:38	04:33	04:33	04:37
		n=1439	n=307	n=263	n=318	n=305	n=246
	GPZ 22	06:07	05:34	05:44	06:16	06:32	06:27
		n=1679	n=291	n=335	n=359	n=398	n=296
	GPZ 23	07:10	06:58	07:10	07:17	07:18	07:09
		n=1559	n=275	n=312	n=332	n=360	n=280
	GPZ 24	06:10	06:32	06:10	05:52	05:47	06:11
		n=1572	n=296	n=318	n=348	n=360	n=250
	GPZ 25	07:05	05:11	06:03	07:21	07:07	06:20
		n=31	n=4	n=7	n=12	n=3	n=5
	GPZ 27	03:18	02:40	03:39	04:44	02:41	02:23
		n=97	n=27	n=16	n=13	n=27	n=14
	GPZ 28	06:55	06:22	06:50	08:08	06:17	08:00
		n=61	n=17	n=14	n=11	n=9	n=10

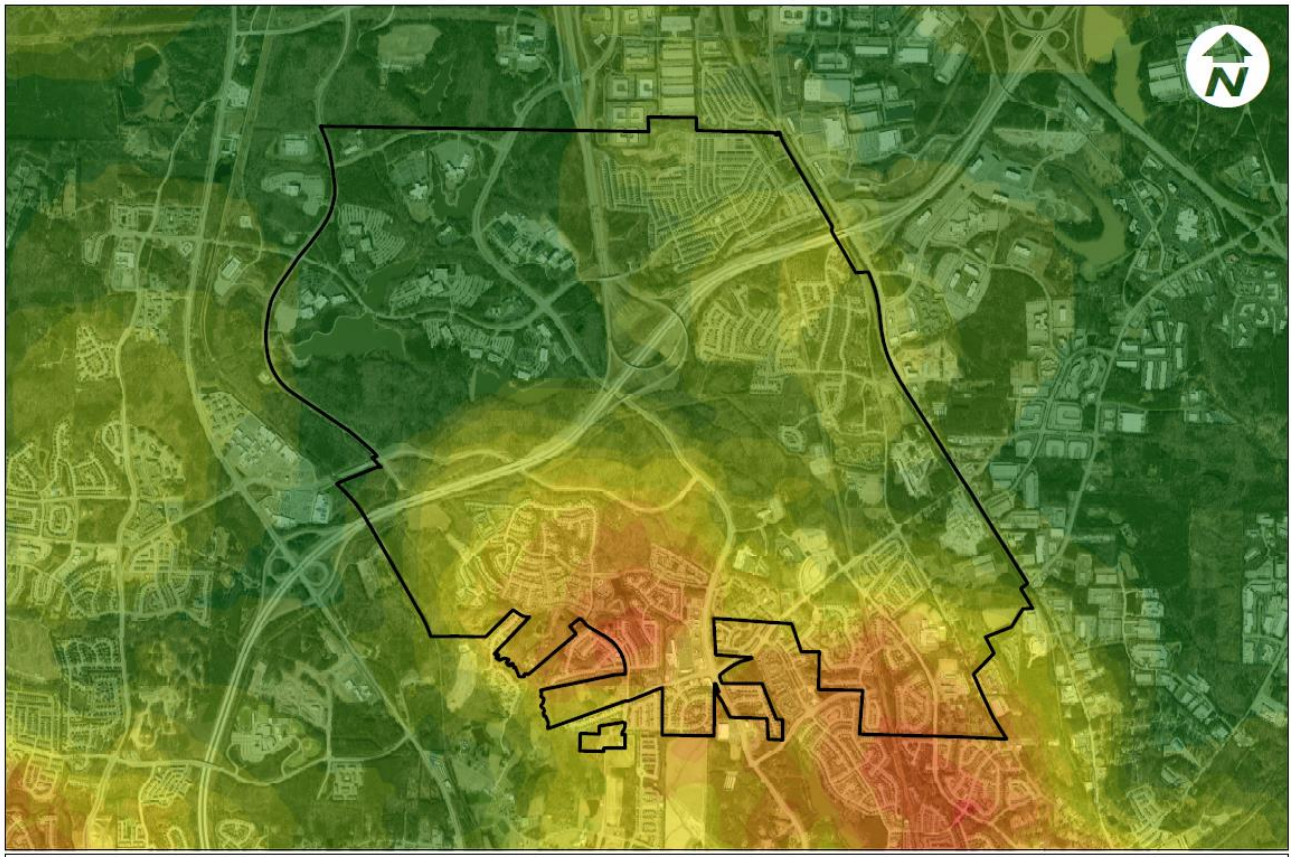
Map 40: Population Heat Map - GPZ 21



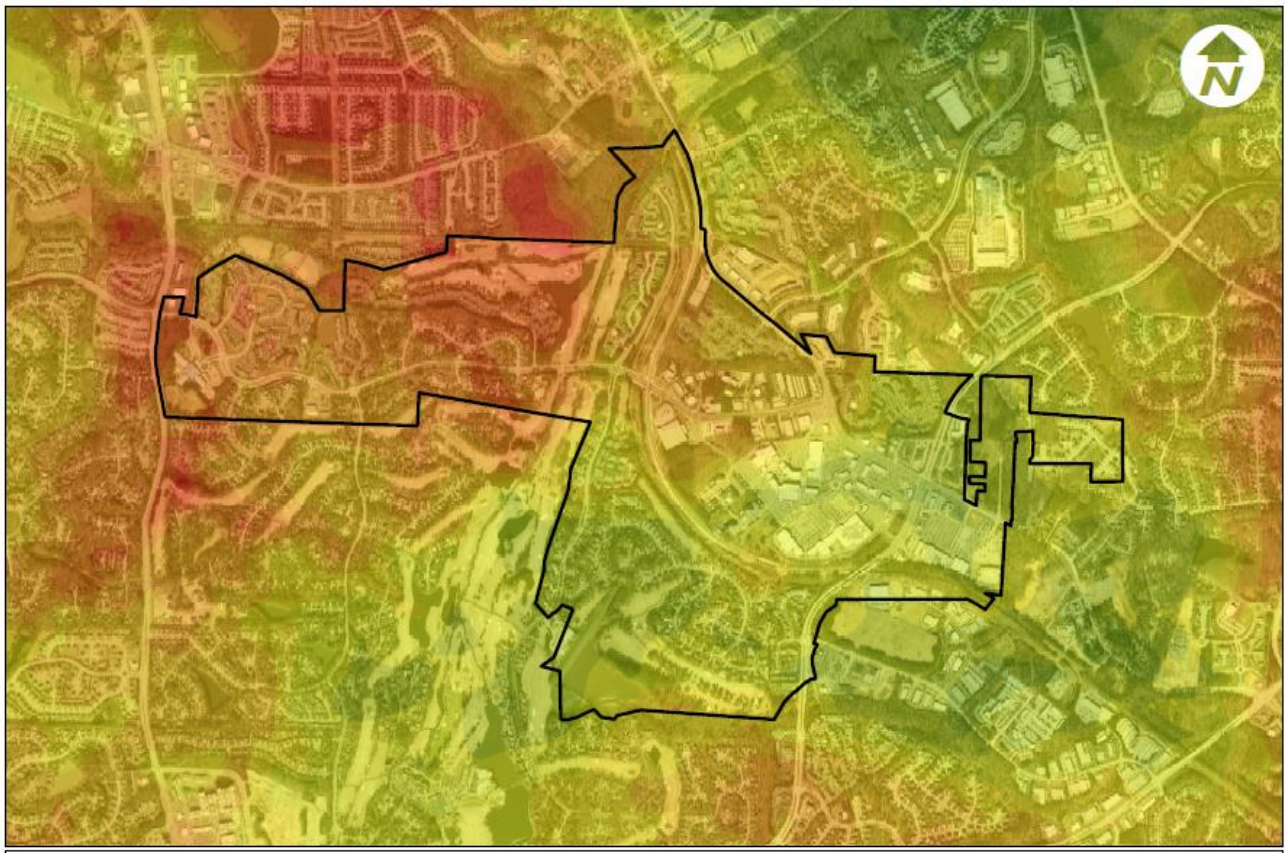
Map 41: Population Heat Map - GPZ 22



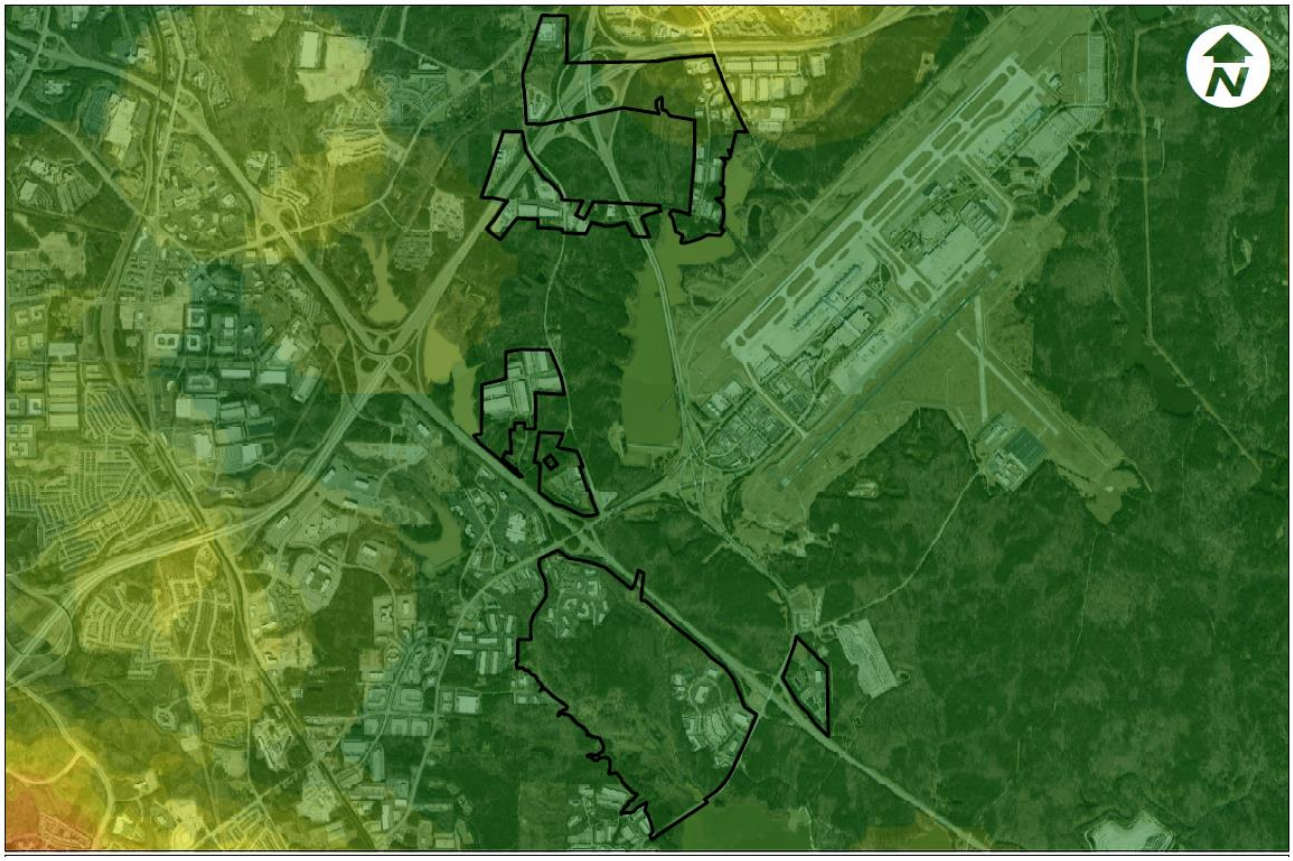
Map 42: Population Heat Map - GPZ 23



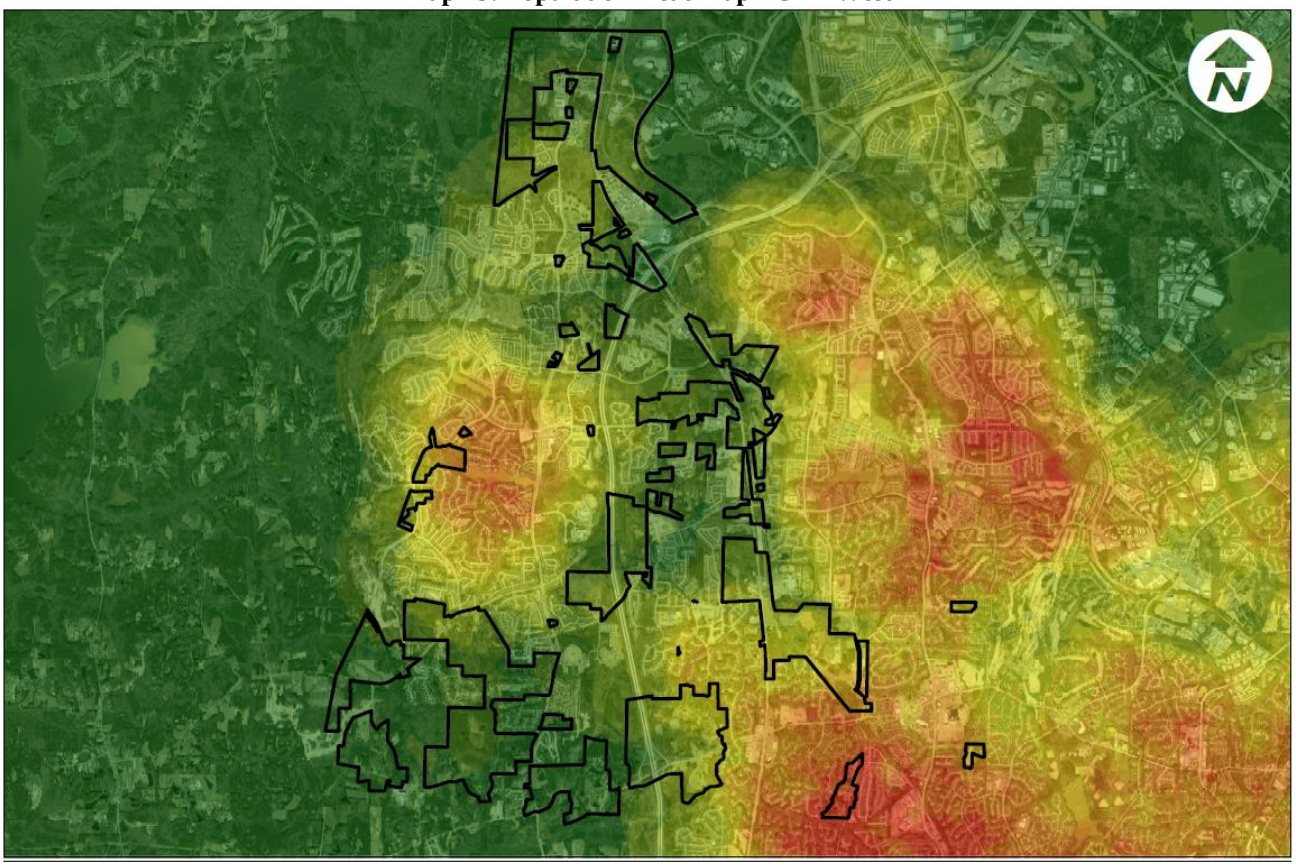
Map 43: Population Heat Map - GPZ 24



Map 44: Population Heat Map - GPZ East



Map 45: Population Heat Map - GPZ West



The following table reflects the road mileage that is in each geographical planning zone.

Table 47: Road Mileage by GPZ

GPZ	Area (SqMi Long)	Area (SqMi Rounded)	Road (US Ft Long)	Road (US Mi Long)	Road (US Mi Rounded)
21	3.480588	3.5	220460.968	41.753971	41.8
22	3.601801	3.6	211023.125	39.966501	40.0
23	5.670992	5.7	342497.595	64.866969	64.9
24	1.600528	1.6	103256.950	19.556241	19.6
East (14)	1.578524	1.6	94439.062	17.886186	17.9
West	5.081351	5.1	274197.957	51.931431	51.9

Concentration Factors

The department is continuously evaluating adding additional resources into existing fire stations if call volume and performance demand it. Additionally, the department has been working towards moving to the quint concept, which would add additional resources to each station to alleviate the burden on the primary ladder trucks responding to higher acuity calls where a smaller apparatus can respond. Currently, all the stations are multi-company stations, but each is unique in how that is accomplished. Station 1 has a quint and a heavy rescue; Station 2 has a quint and a battalion chief, while Station 3 only has a quint. Station 3 is also Cary Station 7, where an additional engine and rescue are housed. With the automatic aid agreement with the Cary Fire Department, those units can respond in the absence of Ladder 23.

The decision was made to move Rescue 21 to Station 1 for two primary reasons. The first is the high acuity of medical calls at a location in that district, and second the proximity that station has to I-40, a limited access high-use freeway. With the use of automatic aid partners and advanced vehicle location dispatching, concentration factors have not been an issue for the department.

Reliability Factors

Unit reliability has historically been a difficult item to track for the department. Reliability has been defined in a few different ways, one being the percentage of calls handled by the station in their first due response area, and secondly, the percentage of simultaneous calls. Both have merit, while both offer areas of improvement. Station unit reliability is an excellent factor in determining who is handling the calls in a specific station, but there is not a direct correlation between who is handing a call in a specific station and performance. With the implementation of advanced vehicle location dispatching and the new response model with auto-aid partners, units often times handle calls from a first due perspective inside a neighboring district.

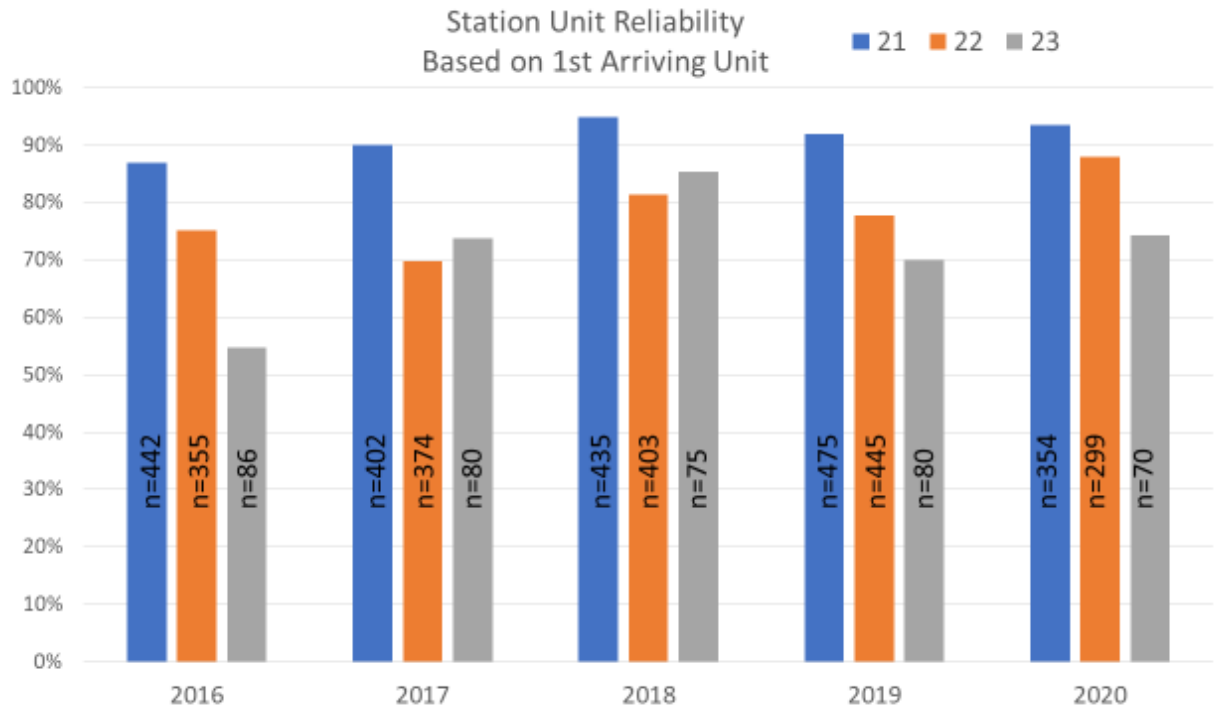


Figure 11: Station Unit Reliability (2016-2020)

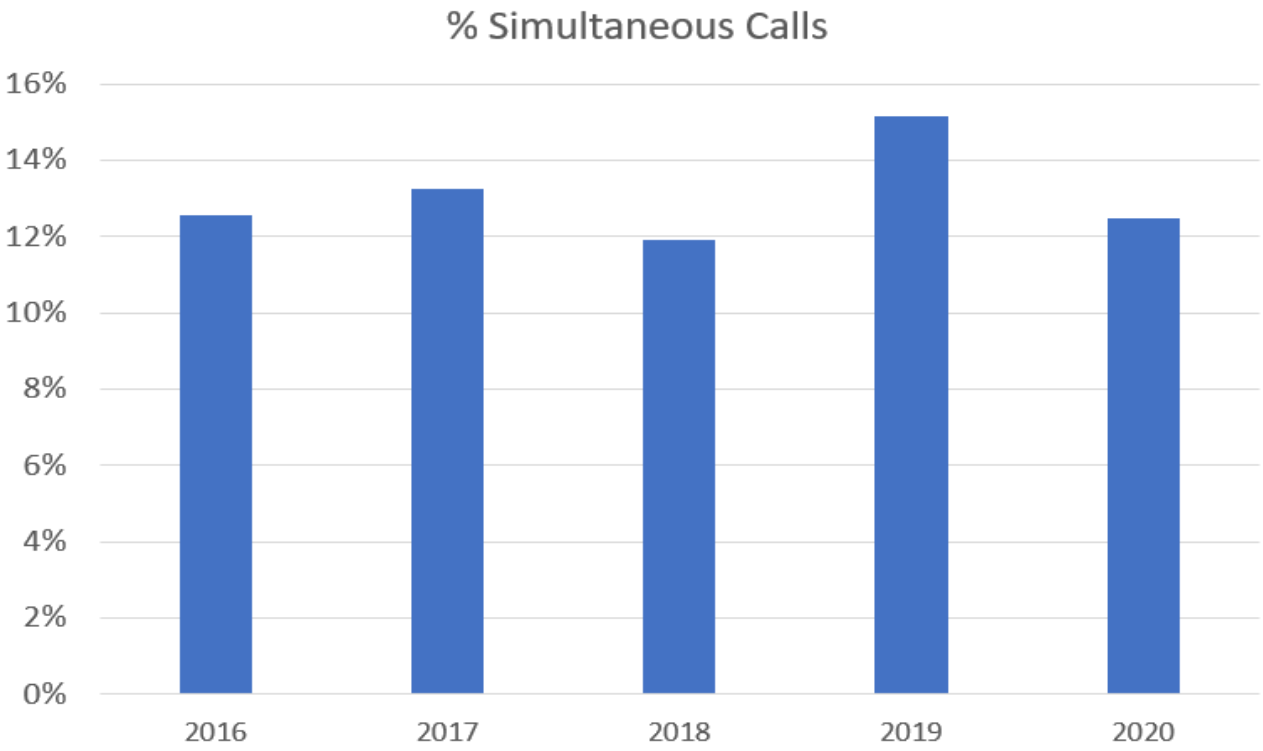


Figure 12: Percentage of Simultaneous Calls (2016-2020)

Dataset Qualification

During the course of data analysis, very few data points were excluded from the data set. The department operates under the philosophy that the 90th percentile analysis (generated in Microsoft Excel via the function "percentile.inc") provides the remaining 10% as an outlet to account for outlying data points. All data is therefore included in the analysis with the following exceptions:

1. If there is reason to believe the data does not reflect what actually happened. Under this practice, the circumstances surrounding data points are examined on a case-by-case basis. Data in the records management system is compared to that of the CAD database, and individuals who participated in the incident are interviewed to determine if the data collected represent what actually occurred. In the case of the data contained in this document, one arrival timestamp was excluded (2019, incident #1891) because it reflected a 35+ minute travel time. The officer making the report was interviewed, and a consensus was reached that the arrival timestamp was made a considerable amount of time after the actual apparatus arrival.
2. Data is not "manufactured" to generate a data point. For example, there is a small percentage of the calls where suppression personnel fail to timestamp their en route time on their mobile data terminal. In these cases, it is impossible to generate an accurate turnout or travel time for that given unit. This results in a different number of incidents analyzed in a given data set for travel time versus total response time.
3. For effective response force (ERF) calculations, units dispatched more than 5 minutes after the initial assignment dispatch are not included in the ERF assembly statistics.

Table 48: Travel Time by GPZ (2016-2020)

Travel Time by GPZ		2016-2020	2020	2019	2018	2017	2016
Travel Time	GPZ 20	08:22	07:51	08:17	08:11	08:26	08:22
		n=105	n=15	n=19	n=26	n=30	n=15
	GPZ 21	04:32	04:24	04:38	04:33	04:33	04:37
		n=1439	n=307	n=263	n=318	n=305	n=246
	GPZ 22	06:07	05:34	05:44	06:16	06:32	06:27
		n=1679	n=291	n=335	n=359	n=398	n=296
	GPZ 23	07:10	06:58	07:10	07:17	07:18	07:09
		n=1559	n=275	n=312	n=332	n=360	n=280
	GPZ 24	06:10	06:32	06:10	05:52	05:47	06:11
		n=1572	n=296	n=318	n=348	n=360	n=250
	GPZ 25	07:05	05:11	06:03	07:21	07:07	06:20
		n=31	n=4	n=7	n=12	n=3	n=5
	GPZ 27	03:18	02:40	03:39	04:44	02:41	02:23
		n=97	n=27	n=16	n=13	n=27	n=14
	GPZ 28	06:55	06:22	06:50	08:08	06:17	08:00
		n=61	n=17	n=14	n=11	n=9	n=10

Baseline Performance Tables

Low Risk Fire 90th Percentile Times Baseline Performance			2016-2020	2020	2019	2018	2017	2016	Target
Alarm Handling	Pick-up to Dispatch	All	2:57	1:42	2:53	3:29	2:38	2:57	1:00
			n=197	n=23	n=52	n=41	n=33	n=48	
Turnout Time	Turnout Time 1st Unit	All	1:48	2:39	1:46	1:25	1:34	1:46	1:20
			n=188	n=25	n=51	n=39	n=30	n=43	
Travel Time	Travel Time 1st Unit Distribution	Urban	5:35	6:41	5:27	5:07	4:55	5:49	5:00
			n=131	n=19	n=35	n=28	n=19	n=30	
		Rural	11:42	7:40	12:49	8:36	6:46	13:02	8:00
			n=55	n=6	n=16	n=10	n=11	n=12	
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:45	9:21	8:12	9:15	8:07	9:01	7:20
			n=134	n=19	n=35	n=29	n=19	n=32	
		Rural	14:47	9:55	15:12	14:50	9:54	16:33	10:20
			n=55	n=6	n=16	n=10	n=11	n=12	

Moderate Risk Fire 90th Percentile Times Baseline Performance			2016-2020	2020	2019	2018	2017	2016	Target
Alarm Handling	Pick-up to Dispatch	All	2:56	1:38	1:28	3:24	3:19	2:46	1:00
			n=45	n=10	n=6	n=7	n=9	n=13	
Turnout Time	Turnout Time 1st Unit	All	1:43	1:19	1:44	1:33	1:21	2:32	1:20
			n=43	n=11	n=6	n=6	n=8	n=12	
Travel Time	Travel Time 1st Unit Distribution	Urban	5:34	5:41	4:56	7:17	4:52	5:19	5:00
			n=36	n=9	n=3	n=6	n=8	n=11	
	Travel Time ERF Concentration	Urban	9:19	9:13	7:05	9:04	9:08	7:46	8:00
			n=16	n=5	n=2	n=2	n=4	n=3	
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	9:34	8:07	6:08	10:46	8:02	8:31	7:20
			n=7	n=9	n=3	n=6	n=8	n=11	
	Total Response Time ERF Concentration	Urban	12:01	11:43	8:23	12:20	11:20	11:58	11:20
			n=16	n=5	n=2	n=2	n=4	n=3	

High Risk Fire 90th Percentile Times Baseline Performance			2016-2020	2020	2019	2018	2017	2016	Target
Alarm Handling	Pick-up to Dispatch	All	2:32	1:01	1:46	2:15	3:13	2:42	1:00
			n=63	n=6	n=17	n=7	n=17	n=16	
Turnout Time	Turnout Time 1st Unit	All	1:57	2:20	1:53	2:10	1:36	1:37	1:20
			n=63	n=10	n=17	n=7	n=16	n=13	
Travel Time	Travel Time 1st Unit Distribution	Urban	5:13	5:22	4:56	4:31	5:15	4:57	5:00
			n=54	n=9	n=15	n=7	n=13	n=10	
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	7:52	7:25	7:13	7:25	8:07	9:39	7:20
			n=55	n=9	n=15	n=7	n=14	n=10	

Low Risk EMS 90th Percentile Times Baseline Performance			2016-2020	2020	2019	2018	2017	2016	Target
Alarm Handling	Pick-up to Dispatch	All	2:03	0:47	1:21	2:13	2:22	2:34	1:00
			n=3,274	n=550	n=717	n=705	n=642	n=660	
Turnout Time	Turnout Time 1st Unit	All	1:36	1:50	1:41	1:36	1:30	1:21	1:00
			n=3,127	n=486	n=700	n=683	n=625	n=633	
Travel Time	Travel Time 1st Unit Distribution	Urban	6:01	6:12	6:07	5:57	6:01	5:53	5:00
			n=2,886	n=464	n=638	n=640	n=573	n=571	
		Rural	8:07	8:11	8:19	8:11	8:12	7:42	8:00
			n=245	n=28	n=61	n=43	n=51	n=62	
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:25	7:52	8:02	8:34	8:37	8:35	7:00
			n=2,901	n=464	n=639	n=642	n=579	n=577	
		Rural	10:48	9:56	11:23	11:10	10:15	10:07	10:00
			n=246	n=28	n=61	n=43	n=52	n=62	

Moderate Risk EMS 90th Percentile Times Baseline Performance			2016-2020	2020	2019	2018	2017	2016	Target
Alarm Handling	Pick-up to Dispatch	All	1:56	0:50	1:29	2:23	2:25	2:35	1:00
			n=789	n=202	n=178	n=135	n=139	n=135	
Turnout Time	Turnout Time 1st Unit	All	1:37	1:58	1:40	1:22	1:20	1:32	1:00
			n=752	n=187	n=172	n=129	n=135	n=129	
Travel Time	Travel Time 1st Unit Distribution	Urban	5:23	6:11	5:22	5:03	4:49	4:34	5:00
			n=484	n=126	n=112	n=88	n=82	n=76	
		Rural	7:22	7:09	7:46	7:19	7:09	7:01	8:00
			n=267	n=63	n=60	n=41	n=51	n=52	
	Travel Time ERF Concentration	Urban	6:04	6:02	6:14	5:32	6:37	5:26	5:00
			n=319	n=49	n=91	n=73	n=50	n=56	
		Rural	8:47	8:36	9:28	7:34	9:58	8:18	8:00
			n=199	n=53	n=50	n=32	n=33	n=31	
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	7:36	7:54	7:13	7:45	7:08	7:23	5:00
			n=488	n=126	n=112	n=88	n=83	n=79	
		Rural	10:00	9:28	10:07	9:44	9:48	10:34	8:00
			n=269	n=63	n=60	n=41	n=53	n=52	
	Total Response Time ERF Concentration	Urban	8:24	7:57	8:21	7:49	8:39	8:44	9:20
			n=323	n=49	n=92	n=73	n=50	n=59	
		Rural	11:10	10:20	11:15	10:15	13:51	10:43	11:20
			n=202	n=53	n=50	n=32	n=36	n=31	

Low Risk Rescue 90th Percentile Times Baseline Performance			2016-2020	2020	2019	2018	2017	2016	Target
Alarm Handling	Pick-up to Dispatch	All	2:51	1:51	2:16	2:29	7:08	2:28	1:00
			n=58	n=4	n=18	n=19	n=7	n=10	
Turnout Time	Turnout Time 1st Unit	All	1:38	1:37	1:20	2:02	0:45	0:50	1:00
			n=56	n=4	n=18	n=19	n=7	n=8	
Travel Time	Travel Time 1st Unit Distribution	Urban	7:20	4:23	10:53	6:44	7:00	6:49	5:00
			n=46	n=3	n=14	n=15	n=6	n=8	
		Rural	8:26	11:37	7:38	7:41	6:29	N/A	8:00
			n=10	n=1	n=4	n=4	n=1	n=0	
	Travel Time ERF Concentration	Urban	7:35	4:43	10:53	6:44	7:08	5:58	5:00
			n=42	n=3	n=14	n=15	n=5	n=5	
		Rural	8:26	11:37	7:38	7:41	6:29	N/A	8:00
			n=10	n=1	n=4	n=4	n=1	n=0	
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	11:23	7:06	13:24	10:44	13:10	9:35	7:00
			n=47	n=3	n=14	n=15	n=6	n=9	
		Rural	10:56	14:05	10:09	10:02	9:17	N/A	10:00
			n=10	n=1	n=4	n=4	n=1	n=0	
	Total Response Time ERF Concentration	Urban	11:27	7:06	13:24	10:44	13:43	8:43	7:00
			n=42	n=3	n=14	n=15	n=5	n=5	
		Rural	10:56	14:05	10:09	10:02	9:17	N/A	10:00
			n=10	n=1	n=4	n=4	n=1	n=0	

Moderate Risk Rescue 90th Percentile Times Baseline Performance			2016-2020	2020	2019	2018	2017	2016	Target
Alarm Handling	Pick-up to Dispatch	All	2:32	2:40	1:00	1:31	2:52	1:52	1:00
			n=22	n=6	n=3	n=4	n=5	n=4	
Turnout Time	Turnout Time 1st Unit	All	1:24	1:23	0:58	1:27	1:25	0:57	1:00
			n=22	n=7	n=2	n=4	n=5	n=4	
Travel Time	Travel Time 1st Unit Distribution	Urban	5:58	5:45	6:34	3:19	3:58	5:08	5:00
			n=15	n=6	n=2	n=3	n=2	n=2	
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:13	8:42	7:34	5:22	6:59	8:09	7:00
			n=15	n=6	n=2	n=3	n=2	n=2	
		Rural	9:17	7:16	N/A	4:48	10:12	2:06	10:00
			n=7	n=1	n=0	n=1	n=3	n=2	

Low Risk Hazmat 90th Percentile Times Baseline Performance			2016-2020	2020	2019	2018	2017	2016	Target
Alarm Handling	Pick-up to Dispatch	All	3:22	1:07	1:51	2:04	3:41	3:26	1:00
			n=50	n=2	n=6	n=13	n=14	n=15	
Turnout Time	Turnout Time 1st Unit	All	1:22	1:20	1:06	1:26	1:12	0:55	1:00
			n=42	n=1	n=5	n=12	n=13	n=11	
Travel Time	Travel Time 1st Unit Distribution	Urban	6:35	3:00	6:30	6:15	5:34	6:38	5:00
			n=37	n=1	n=4	n=10	n=12	n=10	
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	9:36	5:32	8:18	9:06	9:34	10:30	7:00
			n=37	n=1	n=4	n=10	n=13	n=10	

Moderate Risk Hazmat 90th Percentile Times Baseline Performance			2016-2020	2020	2019	2018	2017	2016	Target
Alarm Handling	Pick-up to Dispatch	All	2:51	1:52	2:12	2:46	3:02	3:06	1:00
			n=81	n=5	n=29	n=13	n=10	n=24	
Turnout Time	Turnout Time 1st Unit	All	1:56	2:05	157	1:44	1:16	1:36	1:00
			n=91	n=18	n=29	n=12	n=9	n=23	
Travel Time	Travel Time 1st Unit Distribution	Urban	5:19	5:54	4:47	5:23	4:58	5:12	5:00
			n=80	n=17	n=25	n=8	n=7	n=23	
		Rural	6:36	3:45	8:01	5:59	4:25	N/A	8:00
			n=10	n=1	n=4	n=3	n=2	n=0	
	Travel Time ERF Concentration	Urban	9:38	9:35	6:04	12:13	6:46	7:11	5:00
			n=41	n=14	n=13	n=1	n=1	n=12	
Total Response Time	Total Response Time 1st Unit on Scene Distribution	Urban	8:20	8:00	7:45	9:19	8:25	8:22	7:00
			n=82	n=17	n=25	n=9	n=7	n=24	
		Rural	9:36	7:32	9:21	10:03	7:30	N/A	10:00
			n=10	n=1	n=4	n=3	n=2	n=0	
	Total Response Time ERF Concentration	Urban	13:17	12:02	8:38	17:09	6:46	12:35	9:20
			n=41	n=14	n=13	n=1	n=1	n=12	

I. Evaluation of Service Delivery

Performance Objectives – Benchmarks

All Programs

Call Processing Performance Objective
For all incident types in all population categories, the first alarm will be dispatched within one minute less call processing time 90 percent of the time.

Turnout Time Performance Objective
For all incident types, except emergency medical, in all population categories, the turnout time for all responding units will be 1 minute and 20 seconds or less 90 percent of the time.

Fire Suppression Services Program
For 90 percent of all fire suppression incidents, the total response time for the arrival of the first due unit staffed with 2 firefighters and 1 officer shall be 7 minutes and 20 seconds in urban areas and 10 minutes and 20 seconds in rural areas. The first due unit shall be capable of: providing 300 gallons of water and 1,500 gallons per minute (gpm) pumping capacity, initiating command, requesting additional resources, establishing and advancing an attack line flowing a minimum of 150 gpm, establishing an uninterrupted water supply, containing the fire, and/or rescuing at-risk victims. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

For 90 percent of all moderate risk fires, the total response time for the arrival of the effective response force (ERF) staffed with 15 firefighters and officers shall be 11 minutes and 20 seconds. For 90 percent of all high risk structure fires, the total response time for the arrival of the ERF staffed with 26 firefighters and officers shall be 11 minutes and 20 seconds. For 90 percent of all maximum risk structure fires, the total response time for the arrival of the ERF staffed with 26 firefighters and officers shall be 11 minutes and 20 seconds.

The ERF for moderate risk shall be capable of: establishing command, providing an uninterrupted water supply, advancing an attack line and a backup line for fire control, complying with the Occupational Safety and Health Administration (OSHA) requirements of two in-two out, completing forcible entry, searching and rescuing at-risk victims, ventilating the structure, controlling utilities, and performing salvage and overhaul. The ERF for high and maximum risk fires shall also be capable of placing elevated streams into service from aerial ladders. These operations shall be done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

Emergency Medical Services Program

For 90 percent of all emergency medical services (EMS) responses, the total response time for the arrival of the first-due unit staffed with 2 firefighters shall be 7 minutes in urban areas and 10 minutes in rural areas. The first-due unit shall be capable of: assessing scene safety and establishing command, sizing-up the situation, conducting an initial patient assessment, obtaining vitals and patient's medical history, initiating mitigation efforts within one minute of arrival, providing first responder medical aid including automatic external defibrillation (AED), and assisting transport personnel with packaging the patient.

For 90 percent of all moderate risk EMS response incidents, the total response time for the arrival of the ERF staffed with 4 firefighters and officers shall be 7 minutes in urban areas and 10 minutes in rural areas. The ERF shall be capable of: providing incident command and producing related documentation, appointing a site safety officer, completing patient assessment, providing appropriate treatment, performing AED, and initiating cardiopulmonary resuscitation (CPR).

For all high risk EMS response incidents, the department will dispatch a designated ERF, but the department considers the risk to belong with Wake County EMS since they are the transport agency and MFRD is a supporting role.

Technical Rescue Program

For 90 percent of all technical rescue incidents, the total response time for the arrival of the first-due unit staffed with 2 firefighters and 1 officer shall be 7 minutes and 20 seconds in urban areas and 10 minutes and 20 seconds in rural areas. The first-due unit shall be capable of: establishing command, sizing up to determine if a technical rescue response is required, requesting additional resources, and providing basic life support to any victim without endangering response personnel.

For 90 percent of all moderate risk technical rescue incidents, the total response time for the arrival of the ERF including the technical response team staffed with 9 firefighters and officers shall be 7 minutes and 20 seconds in urban areas and 10 minutes in rural areas. The ERF shall be capable of: appointing a site safety officer, establishing patient contact, staging and apparatus set up, providing technical expertise, knowledge, skills, and abilities during technical rescue incidents, and providing first responder medical support.

For 90 percent of all high risk technical rescue incidents, the total response time for the arrival of the ERF including the technical response team staffed with 18 firefighters and officers shall be 7 minutes and 20 seconds in urban areas and 10 minutes and 20 seconds in rural areas. The ERF shall be capable of: appointing a site safety officer, establishing patient contact, staging and apparatus set up, providing technical expertise, knowledge, skills, and abilities during technical rescue incidents, and providing first responder medical support.

Hazardous Materials Services Program

For 90 percent of all hazardous materials response incidents, the total response time for the arrival of the first-due unit staffed with 4 firefighters and 2 officers shall be 7 minutes and 20 seconds in urban areas and 9 minutes and 20 seconds in rural areas. The first-due unit shall be capable of: establishing command, sizing up and assessing the situation to determine the presence of a potentially hazardous material or explosive device, determining the need for additional resources, estimating the potential harm without intervention, and begin establishing a hot, warm, and cold zone.

For 90 percent of all moderate risk hazardous materials response incidents, the total response time for the arrival of the ERF including the hazardous materials response team staffed with 8 firefighters and officers shall be 9 minutes and 20 seconds in urban areas and 12 minutes and 20 seconds in rural areas. The ERF shall be capable of providing the equipment, technical expertise, knowledge, skills, and abilities to mitigate a hazardous materials incident in accordance with department standard operating guidelines.

For 90 percent of all high risk hazardous materials response incidents, the total response time for the arrival of the ERF including the hazardous materials response team staffed with 20 firefighters and officers shall be 9 minutes and 20 seconds in urban areas and 12 minutes and 20 seconds in rural areas. The ERF shall be capable of providing the equipment, technical expertise, knowledge, skills, and abilities to mitigate a hazardous materials incident in accordance with department standard operating guidelines.

Performance Objectives – Baselines

Fire Suppression Services Program

The department's baseline statements reflect actual performance from 2016 to 2020. The department relies on the use of automatic, and where applicable, mutual aid from neighboring fire departments to provide its ERF complement of personnel. These resources are immediately available as part of a seamless response system. The department's actual baseline service level performance is as follows:

For 90 percent of all fire suppression incidents, the total response time for the arrival of the first due unit staffed with minimum 3 fire personnel is 8 minutes and 45 seconds in urban areas and 11 minutes and 47 seconds in rural areas. The first due unit was capable of: providing 300 gallons of water and 1,500 gallons per minute (gpm) pumping capacity, initiating command, requesting additional resources, establishing and advancing an attack line flowing a minimum of 150 gpm, establishing an uninterrupted water supply, containing the fire, and/or rescuing at-risk victims. These operations were done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

For 90 percent of all moderate risk fire suppression incidents, the total response time for the arrival of the ERF staffed with minimum 15 fire personnel is 9 minutes and 34 seconds in urban areas and 12 minutes and 01 seconds in rural areas. For 90 percent of all high risk fire suppression incidents, the total response time for the arrival of the ERF staffed with minimum 26 fire personnel is 7 minutes and 52 seconds. There were not sufficient incidents in rural areas to report a baseline measure. There was also not enough data in urban and rural areas to record the 90 percent of maximum risk fire suppression response incidents the total response time the arrival of the ERF staffed with minimum 35 fire

personnel. The ERF was capable of: establishing command, providing an uninterrupted water supply, advancing an attack line and a backup line for fire control, complying with the OSHA requirements of two in-two out, completing forcible entry, searching and rescuing at-risk victims, ventilating the structure, controlling utilities, and performing salvage and overhaul. The ERF for high and maximum fires was also capable of placing elevated streams into service from aerial ladders. These operations were done in accordance with departmental standard operating procedures while providing for the safety of responders and the general public.

Emergency Medical Services Program

The department's baseline statements reflect actual performance from 2016 to 2020. The department, on occasion, relies on the use of automatic aid, and where applicable, mutual aid from neighboring fire departments to provide its ERF complement of personnel. These resources are immediately available as part of a seamless response system. The department's actual baseline service level performance is as follows:

For 90 percent of all emergency medical services (EMS) responses, the total response time for the arrival of the first-due unit staffed with 2 firefighters is 8 minutes and 25 seconds in urban areas and 10 minutes and 49 seconds in the rural areas. The first-due unit was capable of: assessing scene safety and establishing command, sizing-up the situation, conducting an initial patient assessment, obtaining vitals and patient's medical history, initiating mitigation efforts within one minute of arrival, providing first responder medical aid, including automatic external defibrillation (AED), and assisting transport personnel with packaging the patient.

For 90 percent of all moderate risk EMS incidents, the total response time for the arrival of the ERF staffed with minimum 4 fire personnel is 8 minutes and 23 seconds in urban areas and 11 minutes and 12 seconds in rural areas. The ERF was capable of: providing incident command and producing related documentation, appointing a site safety officer, completing patient assessment, providing appropriate treatment, performing AED, and initiating cardiopulmonary resuscitation (CPR).

Technical Rescue Program

The department's baseline statements reflect actual performance from 2016 to 2020. The department, on occasion, relies on the use of automatic aid, and where applicable, mutual aid from neighboring fire departments to provide its ERF complement of personnel. These resources are immediately available as part of a seamless response system. The department's actual baseline service level performance is as follows:

For 90 percent of all technical rescue incidents, the total response time for the arrival of the first-due unit staffed with 2 firefighters and 1 officer is 11 minutes and 23 seconds in urban areas and 10 minutes and 56 seconds in the rural areas. The first-due unit was capable of: establishing command, sizing up to determine if a technical rescue response is required, requesting additional resources, and providing basic life support to any victim without endangering response personnel.

For 90 percent of all moderate risk response incidents, the total response time for the arrival of the ERF staffed with a minimum of 9 firefighters and officers is 8 minutes and 17 seconds in urban areas and 9 minutes and 31 seconds in rural areas. The ERF was capable of: appointing a site safety officer,

establishing patient contact, staging and apparatus set up, providing technical expertise, knowledge, skills, and abilities during technical rescue incidents, and providing first responder medical support.

There was not enough data to record urban and rural areas for 90 percent of all high risk response incidents the total response time for the arrival of the ERF staffed with a minimum 18 fire personnel.

Hazardous Materials Services Program

The department's baseline statements reflect actual performance from 2016 to 2020. The department, on occasion, relies on the use of automatic aid, and where applicable, mutual aid from neighboring fire departments to provide its ERF complement of personnel. These resources are immediately available as part of a seamless response system. The department's actual baseline service level performance is as follows:

For 90 percent of all hazardous materials response incidents, the total response time for the arrival of the first-due unit staffed with 2 firefighters and 1 officer is 9 minutes and 36 seconds in urban areas. There were not sufficient incidents in rural areas to report a baseline measure. The first-due unit was capable of: establishing command, sizing up and assessing the situation to determine the presence of a potentially hazardous material or explosive device, determining the need for additional resources, estimating the potential harm without intervention, and begin establishing a hot, warm, and cold zone.

For 90 percent of all moderate risk hazardous materials response incidents, the total response time for the arrival of the ERF staffed with a minimum of 8 fire personnel is 13 minutes and 17 seconds in urban areas. There were not sufficient incidents in rural areas to report a baseline measure. The ERF was capable of providing the equipment, technical expertise, knowledge, skills, and abilities to mitigate a hazardous materials incident in accordance with department standard operating guidelines.

There was not enough data to record for urban and rural areas for 90 percent of high risk hazardous materials response incidents for the arrival of the ERF staffed with minimum 20 fire personnel.

Performance Gaps – Baseline to Benchmark Time Gap

Fire Suppression Response

- For 90% of fire responses to urban areas, the first due apparatus shall arrive within 7 minutes and 20 seconds total response time (TRT).
  - 8:45 (n=53134)
    - +1:25
- For 90% of fire responses to rural areas, the first due apparatus shall arrive within 7 minutes and 20 seconds TRT.
  - 14:47 (n=55)
    - +7:27
- For 90% of moderate risk fire responses to urban areas, the full initial assignment arrives within 11 minutes and 20 seconds TRT.
  - 9:34 (n=7)
    - -1:46
- For 90% of moderate risk fire responses to rural areas, the full initial assignment arrives within 11 minutes and 20 seconds TRT.
  - 12:01(n=16)
    - +0:41
- For 90% of high risk fire responses to urban areas, the full initial assignment arrives within 11 minutes and 20 seconds TRT.
  - 7:52 (n=55)
    - -3:28

EMS Response

- For 90% of EMS responses to urban areas, the first due apparatus shall arrive within 7 minutes TRT.
  - 8:25 (n=2,878)
    - +1:25
- For 90% of EMS responses to rural areas, the first due apparatus shall arrive within 10 minutes TRT.
  - 10:49 (n=244)
    - +0:49
- For 90% of moderate risk EMS responses to urban areas, the first due apparatus shall arrive within 7 minutes TRT.
  - 8:23 (n=321)
    - +1:23
- For 90% of moderate risk EMS responses to rural areas, the first due apparatus shall arrive within 10 minutes TRT.
  - 11:12 (n=199)
    - +1:12

Technical Rescue Response

- For 90% of rescue responses to urban areas, the first due apparatus shall arrive within 7 minutes and 20 seconds TRT.

    - 11:23 (n=47)
        - +4:03
- For 90% of rescue responses to rural areas, the first due apparatus shall arrive within 10 minutes TRT.
    - 10:56 (n=10)
        - +0:56
- For 90% of moderate risk rescue responses to urban areas, the full initial assignment arrives within 9 minutes and 20 seconds TRT.
    - 8:17 (n=14)
        - -1:03
- For 90% of moderate risk rescue responses to rural areas, the full initial assignment arrives within 12 minutes TRT.
    - 9:31 (n=6)
        - -2:29

Hazmat Response

- For 90% of hazmat responses to urban areas, the first due apparatus shall arrive within 7 minutes and 12 seconds TRT.
    - 9:36 (n=37)
        - +1:48
- For 90% of moderate risk hazmat responses to urban areas, the full initial assignment arrives within 9 minutes 20 seconds TRT.
    - 13:17 (n=41)
        - +3:57

Community Areas for Program Delivery and Coverage Improvement

The department went to a seamless response model with the two closest automatic aid departments, and that has changed the areas of improvement and coverage gaps the department has experienced over the previous years. Since the closest station is responding to any emergency inside the MFRD's district, regardless of the department responding to the call, that has closed the gaps that have been experienced. Historically, GPZ 24D has been an issue with the delivery of the ERF, but new data has shown the move to the seamless response module with the Town of Cary has greatly improved the response times to that area. Two other areas that have shown a need for improvement for the first due delivery are GPZ 23B and GPZ 23A. These two areas will not see an improvement in first due delivery from the new response model, but the department has made plans to move fire station 3. This will allow for an improvement in the distribution of resources.

Recommendations for Improved Effectiveness in Deployment and Coverage

The MFRD utilizes a process designed to deliver continuous, systematic, data-driven decision performance review. One of the main intents of the analysis conducted in the standard of cover process was to effect real change to the department and its ability to more effectively and efficiently accomplish its goals and mission.

Performance Improvement Methodology

Phase 1 Establish/Review Performance Measures

The Morrisville Fire/Rescue Department has completed a review of services and service levels as described in the Community Risk Assessment: Standards of Cover (CRA-SOC). Current services are based on the community's needs and expectations. The CRA-SOC is written to reflect the mechanism of self-assessment and allows for the adjustment of the service delivery model and the associated performance benchmarks. During the previous accreditation cycle, the department established and reviewed performance objectives from a broader view. The CRA-SOC has been adjusted to further delineate the department's response to fire and non-fire risks so different levels of response can be evaluated for effectiveness. Continual review of risk within the town and geo-proximity planning zones allow for response adjustments so resources reflect the potential hazards.

Phase 2 – Evaluate Performance

The department constantly evaluates performance against the goals set forth in the CRA-SOC to ensure response levels are meeting expectations. The department's response time performance is evaluated for the first-in apparatus and the ERF. Holistically, each response is evaluated to ensure the department is meeting compliance, effectiveness, and relevance related to the hazard found.

Review of individual apparatus response times is conducted quarterly during the review and analysis quality control process. Reviews are used to ensure response time, apparatus, and staffing data are as accurate as possible. The department develops quarterly operational reports, which are reviewed by the Executive Team. These reports are used to determine the overall performance for first-due apparatus and ERF. Incidents with non-compliant response times are evaluated to determine cause. Trends within geo-proximity zones are used to identify needs and adjust short- and long-term strategic planning.

Phase 3 – Develop Compliance Strategies

Call Processing and Turnout Performance

In 2019, the MFRD moved to a different PSAP, which aligned the department with the largest auto-aid department. This move streamlined not only dispatching services, but the department also entered into a system-wide closest station response and seamless response concept with the Cary Fire Department and the Apex Fire Department, known as "CAM." The department plans to continue to monitor and evaluate call processing processes and turnout performance as well as implement technological or guideline-based procedural changes to improve consistency with call processing and unit en route time measurement.

First-In and Effective Response Force Performance

The department plans to continue to analyze response data to determine areas that do not meet current response guidelines. Response data, post-move to the Cary Communication Center, and the department's new seamless response mindset will show where system performance has improved or where areas of concern need to be addressed. The department also moved to align data analysis with CAM partners and the capabilities of the Cary Communication Center by developing new management zones (GPZs). This will allow the department to develop more granular data and analyze response metrics both on a macro and micro level. The department is moving ahead with the relocation of Station 3. This fire station, which has been co-located with the Cary Fire Department since 2007, will better align with the increasing demand inside the Morrisville corporate limits, move the station closer to the large target hazards inside the contractual areas in Research Triangle Park, and contribute to the concentration of resources. The department has purchased property for the new station, and funds are allocated for the design of the fire station. The department will seek funds for the construction of the building in FY22.

Performance Monitoring Methodology

Phase 4 – Communicate Expectations to the Organization

The MFRD executive team routinely emphasizes how performance is measured and the importance of accurate data. Accuracy is ensured via multiple layers of quality control and assurance. This information is then disseminated to the department to create a framework for discussion and improvement. When deficiencies are identified, staff are encouraged to provide suggestions or possible solutions. This information is used to evaluate current performance as well as predict future performance expectations. As the population and target hazards of Morrisville continue to grow and change, the department will continue to analyze and adjust the deployment model to meet the needs of the community.

Phase 5 – Validate Compliance

The MFRD continuously evaluates data and performance trends to ensure service delivery compliance. Performance is reviewed at multiple levels and at regular intervals. Individual unit response times are validated quarterly for accuracy and compliance. System performance is reviewed with the executive team, who represents the town manager on matters related to emergency response capabilities. Finally, GPZ and system performance data will be used to drive budget requests.

Continuous Improvement Plan

Phase 6 – Make Adjustments and Repeat Process

The MFRD works to ensure and maintain compliance with the standards that have been set by the organization and Town Council. All response data is compiled, evaluated, and reviewed in intervals that ensure expectations are being met. This includes looking at trends in performance failure, projecting future obstacles to success, and realizing and addressing challenges in accurate data collection and processing. In addition to historical performance evaluation, the department will extrapolate current data to forecast future performance. This data is compiled and displayed in an interactive and easy-to-understand format that allows for comparison and trend analysis, thus giving decision-makers an efficient way to predict future performance.

J. Performance Maintenance and Improvement Plans

Compliance Team / Responsibility

Responsibility for assembly and analysis of performance data is performed by the accreditation data team currently consisting of:

- The fire chief
- The accreditation manager (currently the assistant chief)
- The data manager (currently a captain)
- The GIS analyst (currently a captain)

Performance Evaluation, Compliance Strategy, and Compliance Verification Reporting

Over the years 2008-2020, the MFRD has fully embraced the accreditation model of decision-making based on the evaluation of performance data. As a result, all but the very newest personnel have become accustomed to the terminology such as call handling, turnout times, and effective response force (ERF).

The following performance measures are analyzed quarterly at the 90th percentile for emergency responses:

- Overall alarm handling
- Turnout time by company
- Overall first arriving travel time (rural and urban districts)

Additionally, quarterly analysis is also performed of:

- Progression on accomplishing short, mid, and long-range goals
- Incident volume
- Incident aid given vs. received
- Simultaneous incident volume
- Property saved/loss to fire
- Fire fatalities
- Near miss reports
- Accidents involving department vehicles
- Department budget execution
- Fire inspection/reinspection completion
- Public education instances
- Customer service survey feedback
- Training hours completed
- Pre-fire plans completed

At the close of each calendar year, the above metrics are re-compiled for the preceding year along with:

- ERF statistics
- Progress towards meeting strategic and specific recommendations from the most recent peer assessment

As a small department with relatively few high acuity calls, the struggle is often in having enough performance data points to make data-based decisions. Often when data is filtered to incidents of just

one specific year, response discipline, and severity level, the statistical significance of the remaining data pool is of questionable use for making high-level strategic decisions. This issue is further exacerbated when data is even further broken down geographically. To combat this issue, the department often uses aggregate data of call handling, turnout, and first arriving unit travel time/total response time as key decision-making statistics. Since the same six primary units respond to incidents of all natures, this analysis strategy often provides the most insightful and statistically significant representation of performance.

There is a constant focus on not just compiling the data but understanding what it means. As a small department, operational changes are able to be implemented quickly, and the impacts of those changes can often be analyzed in short order. Conversely, changes to performance metrics can typically be identified quickly, and the root cause for the change can be determined and corrected.

- If you don't measure the results of your plan, you can't tell success from failure.
- If you can't see success, you can't reward it.
- If you can't reward success, you're probably rewarding failure.
- If you can't see success, you can't learn from it.
- If you can't recognize failure, you can't correct it.
- If you can demonstrate results, you can win public support.

David Osborn and Ted Gaebler
Reinventing Government

Compliance Verification Reporting

Response metrics are compiled and reviewed on a quarterly basis in preparation for the Quarterly Review and Analysis meeting held by the fire chief or assistant chief with each of the three shifts, ensuring all department personnel stay informed and aware. A gap report is prepared and shared with town administration and elected officials annually as a summary of the previous year's performance and an identification of any deficiencies.

The data tables for the CRA-SOC are updated annually when the statistics are compiled for the annual compliance report.

Continuous Improvement Strategy

The department takes great pride in its spirit of continuous improvement with the end goal of maximizing customer service and incident outcomes. This is the underlying logic on which every major strategic and operational decision is based. In this case, between 2016 and 2020 a number of major undertakings have been executed in the spirit of continuous improvement.

TAP Team Facilitation of Strategic Plan and CRA/SOC Rewriting

In preparation for the 2021 accreditation cycle, the department contracted with the Center for Public Safety Excellence Technical Advisor Program for assistance with rewriting both the Strategic Plan and Community Risk Assessment-Standards of Cover. Both documents had only seen only minor revisions and data updates since their original inception prior to the department's initial 2011 accreditation cycle. The department places great value on the importance of having an objective third party guide the process of forging the documents that will determine the path forward and ensure the standards of a progressive, modern fire agency are being met.

CAM

As of May 7, 2019, the department switched from Raleigh Wake 911 to the Town of Cary 911 as the primary public safety answering point (PSAP). The Cary Fire Department is both the primary resource for receiving mutual aid and the most common recipient of aid given from the MFRD. This transition was accompanied by an agreement between the three fire agencies (Cary, Apex, and Morrisville, hence the acronym "CAM") to essentially operate as a single, seamless district by utilizing closest unit dispatching through automatic vehicle location (AVL) regardless of political or district boundaries. Since many of the 911 calls originating within the department's jurisdiction went through Cary's PSAP prior to the switch, the change resulted in a decrease in alarm handling times and total response times by eliminating the need to transition the call from one PSAP to the other prior to dispatch. This change is anticipated to also result in a reduction of travel time and total response time both for the first arriving unit and the ERF. As the three agencies have sought to increase interoperability, joint training and consolidation of operational policies have increased at a steady pace. The administrations of all three agencies chose to undertake this laborious realignment with the end goals of increased efficiency and improved incident outcomes.

Fire Protection Study

In 2016, Brooks Innovative Consulting was selected to perform what was titled a "Fire Protection Study." The scope of the study included an analysis of future fire station placement and staffing needs along with recommendations for maximizing credit towards improving the department's insurance rating. Completed in 2017, the study helped justify major, long-term strategic changes needed to maintain and improve levels of service.

ESO Records Management System

As of April 1, 2020, the department changed records management systems to *ESO*, consolidating two other systems used previously. One of the main drivers of this decision was to increase the plausibility of obtaining patient outcome data. The Wake County EMS system uses *ESO* for patient care reporting. The MFRD is the first non-transport/first responder department in Wake County to align records management systems with the EMS system. The change also made the department *NEMSIS* compliant, which is not currently required by the state, but that requirement is anticipated to be implemented at some point in the future.

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