Fire Department Response Time Study

Town of Rockland, Massachusetts

October 2021

FINAL REPORT

Town of Rockland
242 Union Street
Rockland,
Massachusetts
02370

Submitted by:

MANITOU INCORPORATED

www.manitouinc.com

FINAL REPORT

Fire Department
Response Time Study

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for

Town of Rockland
242 Union Street
Rockland, Massachusetts 02370

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Executive Summary

The Town of Rockland retained Manitou, Inc., to perform an analysis of response times and administrative organization and efficiency. The four-month study was largely completed in August 2021.

The Rockland Fire Department (RFD) provides comprehensive fire and emergency medical, fire prevention, and related services to the town and its residents. RFD staffs an engine, ambulance, and ladder company apparatus on a dynamic basis, using a limited staffing of six or seven assigned personnel per shift. The RFD workload appears to be increasing, subject to the impacts of Covid-19. Response times are increasing across the town, which corresponds to a larger percentage of incidents occurring in a simultaneous fashion. This means that the RFD is increasingly having to move personnel between apparatus, and responses are often from the field back to headquarters to get necessary apparatus.

Personnel recalls are quite common, with over 400 documented recalls taking place in 2019, which was thought to be a typical year. The department does not maintain definitive records of recalls in which no personnel responded; this is a recordkeeping concern that should be corrected. The implication is that the RFD is dependent on off-duty staffing to augment its assigned complement on a greater than daily basis. This suggests that current shift staffing could be reasonably increased. We recommend that all shifts be brought up to seven assigned personnel (two shifts are currently staffed with only six personnel).

Additional personnel may be necessary to enable staffing of two ambulances with on-duty personnel while maintaining the ability to staff the engine and ladder company, at least on a minimally staffed basis. Additional analysis and monitoring of response time trends should continue to support such a decision.

Administrative duties are split between the fire chief, deputy chief, and day officer. These positions, supported by an executive assistant, perform the bulk of administrative work, including fire prevention, training, and EMS billing. We recommend creation of another day officer position to provide additional support and continuity for these functions, as well as emergency management, which is really done as the chief has availability. Additional administration personnel can assist with recordkeeping, enhanced training, and fire prevention efforts, including development and implementation of a pre-incident planning program.

In terms of facilities, the north end of town is undergoing additional development and response times in this area, particularly the northeast, are comparatively long. We were asked to evaluate the potential for a second fire station within the town. We evaluated several scenarios, including the alternatives of Blasdell Park, the Lincoln School site, the area of 160 Market Street, and the existing headquarters on Union Street.

A second station would provide the potential for reduced response times in the northeast. However, any two-station scenario raises the difficulty of providing service and would require additional staff, given the way the RFD operates, and the need to maintain a credible initial fire response in the face of a prevailing demand for emergency medical services.

In addition, construction of a second station at Blasdell Park creates significant overlap with the coverage provided by the existing headquarters or the Lincoln School site. More efficient coverage, with better equity in response times and less overlap, could be made by moving headquarters to the Market Street area. Of course, this would create the need for construction of two new fire stations and the added costs of personnel.

We believe that, in the near future, consideration should be given to improving the on-duty staffing profile ahead of plans for a two-station configuration. Development and workloads in the northeast should continue to be monitored and, when development drives sufficient demand, a second sub-station could be constructed to serve this demand.

A complete list of recommendations is shown in Table E.1 below. These recommendations include the full utilization of the capabilities of recently-acquired computer records software. Finding personnel or resources to enter existing records into the system needs to be done.

Table E.1. List of Recommendations

Recommendation Number	Summary
3.1	Accelerate entry of fire prevention data in the new Records Management System.
3.2	Begin pre-fire planning program utilizing the department's Records Management System.
3.3	Hire personnel back on overtime for semi-annual multi-company training evolutions.
4.1	Track and report response times as averages and at the 90th percentile level.
4.2	Develop individual unit designations for CAD system to enable better tracking of activity.
4.3	Begin to track details of every Box 33 (recall) signal issued.
4.4	Track and analyze personnel attendance for each recall to monitor effectiveness. Purchase software to enable real-time tracking and location reporting.
7.1	Add a day officer for administrative support.
7.2	Hire personnel to bring each shift up to seven assigned staff.

Training demands are increasingly difficult to fulfill due to the workload of on-duty crews. Also, junior personnel are most likely to be on call for service on the ambulance, leaving them unavailable for training during their shifts.

There are a number of recommendations related to tracking, ongoing analysis and reporting of response times, and workload information. Through working with the Holbrook Regional Emergency Communications Center (HRECC), these recommendations should be feasible and will be very useful for evaluating the need for additional shift staffing in next three to five years. This includes tracking Box 33 activity and acquiring software to better manage and account for recalled personnel.

The RFD is doing a good job and is managing the resources they have in an effective manner. The workload for the chief and deputy, which includes 24-hour response to incidents in addition to their day-to-day administrative tasks, could benefit from additional support.

The RFD appears to have a very positive labor-management climate with a highly motivated and professional workforce. The use of shift personnel to perform daily administrative tasks is positive and instills a sense of responsibility for the department's success across the membership.

The department's existing staffing is very well utilized. Workloads appear to be impacting response times, which indicates a need for planning, to enable an orderly addition of staff in order to maintain response times and basic service capacity at a continued level acceptable to the town.

1. Acknowledgments, Scope, and Limitations

1.1. Acknowledgments

Any report of this type requires the support and participation of many partners to be successful. The cooperation of all parties in meeting the desired project schedule is appreciated.

We would particularly like to recognize the assistance we received from the following individuals:

Doug Lapp, Town Administrator
Scott Duffey, Fire Chief
Thomas Heaney, Deputy Fire Chief
Thomas Henderson, President Local 1602 IAFF
Stephan Hooke, Holbrook Regional Emergency Communications Center
Daniel Muse, M.D., Physician Medical Director
Tom Ruble, Building Commissioner, Town of Rockland

Project Staff

Manitou, Inc. would like to acknowledge the staff who performed this analysis and contributed to the report:

Charles Jennings, PhD, FIFireE, CFO -- Project Manager
Tom Vaughan, MS -- Geographic Information System and Data Analyst

1.2. Scope

Manitou, Inc., a public safety management consulting firm, was retained by the Town of Rockland to perform all work and furnish all services necessary to provide the town with a Fire Department Response Time Study. Retained in March 2021, the study was completed in approximately 120 days.

The town sought to understand staffing utilization and response times within the fire department. The goal of the study was to provide town officials with recommendations for innovative and sustainable methods to determine current and future fire department resource needs. Specific objectives in the study included:

- Assess fire and non-fire risk in the community.
- Define baseline emergency response performance standards.
- Identify if additional stations are needed and, if so, the appropriate location.
- Determine apparatus and staffing patterns.
- Evaluate workload and ideal unit utilization.
- Measure service delivery performance.

- Support strategic planning and policy development relative to resource procurement and allocation.

An important component of the study included an evaluation of administrative organization and function within the department. Based on the size of the staff, many positions are responsible for multiple duties. The adequacy of this arrangement and allocation of duties among staff is another focus of the study.

In addition to major recommendations, additional smaller recommendations and findings are presented throughout the text.

1.3. Limitations

This study was reliant on representations and data provided by the town and fire department. While we assessed service levels and delivery, we had limited opportunity to observe actual incidents. We relied on interviews and analysis of dispatch and incident data to assess fire department operations. The study did not include assessments of individual vehicle equipment, condition, or apparatus, or assessment of individual training records or competence. We did not assess field operations beyond information provided by the department and limited observation during our site visit.

Further, Manitou, Inc. can only indicate generally the impact of proposed changes on the Insurance Services Office (ISO), Fire Suppression Rating Schedule's Public Protection Classification (PPC). ISO uses proprietary assessment methodologies and reserves the sole right to apply its rating schedule. Further, because Rockland is in the midst of an updated rating, any impact cannot be definitively assessed until this input is received. Lastly, our role with regard to a potential new fire station was limited to location considerations. We did not engage in programming or any architectural, engineering, or site plan work.

Any reference to national consensus or industry standards does not necessarily imply endorsement.

2. Current System: Town of Rockland

This section discusses the general geography, setting, and demographic risks of the study area. In addition, specific risks as they relate to the provision of fire and emergency services are also examined.

2.1. Description of Service Area

The Town of Rockland is in Plymouth County in the State of Massachusetts. Located 20 miles from Boston, the town has experienced a resurgence in recent years as disused or underutilized industrial land is redeveloped. More recently, its proximity to Boston has benefited it as a component to an economically vital and dynamic region.

The town covers 10.1 square miles. Rockland is bordered by Weymouth to the northwest, Hingham to the northeast, Norwell to the northeast, Hanover to the east, Hanson to the south, Whitman to the southwest, and Abington to the west. The town is primarily a residential community, with a retail and industrial area in the northeast corner where Route 3 crosses over into the town.

2.2. Population, Housing and Other Statistics

Population, housing, and other statistics are drawn from the Census Bureau's American Community Survey (ACS) unless noted otherwise. The population of the Town of Rockland has grown 11.4 percent in the last 30 years (Table 2.1), with the most significant growth in the decade of 1990 to 2000. There was a slight decline during the period from 2000 to 2010. The last nine years of ACS data show a steady, small increase in population.

Table 2.1. Town of Rockland Population and Growth Rates, 1950-2019[1]

Year	Pop.	±%
1950	8,960	10.8%
1960	13,119	46.4%
1970	15,674	19.5%
1980	15,695	0.1%
1990	16,123	2.7%
2000	17,670	9.6%
2010	17,489	-1.0%
2019	17,953	2.7%

As outlined in Table 2.2, the town's population breakdown by age generally aligns with the Plymouth County population. The Town of Rockland has a slightly higher working age population and almost a similar percentage of the under 20 population (Figure 2.1). The town has a slightly smaller percentage of

[1] Data from U.S. Census Bureau – accessed 4/3/21 from https://en.wikipedia.org/wiki/Rockland,_Massachusetts
2019 data from Census ACS https://data.census.gov/cedsci/table?q=S0101&g=0600000US2502357775&tid=ACSST5Y2019.S0101

the over 65 population than the county. It is important to note that the most impacted portion of a fire department's population are those below 18 and over 65. Not only is this a factor of protection, but also of the number of increased incidents, including EMS, especially among the older population.

Table 2.2. Population by Age Group (2019 ACS)

Demographics	Plymouth County	Percent of Total	Town of Rockland	Percent of Total
Total Population	515,303	100.0%	17,953	100.0%
Persons under 5 years	27,334	5.3%	998	5.6%
Persons between 5 and under 20	97,459	18.9%	3,222	17.9%
Persons between 20 and 64	299,780	58.2%	10,890	60.7%
Persons 65 years and over	90,730	17.6%	2,843	15.8%
Female persons	264,977	51.4%	9,367	52.2%

Figure 2.1. Population by Age

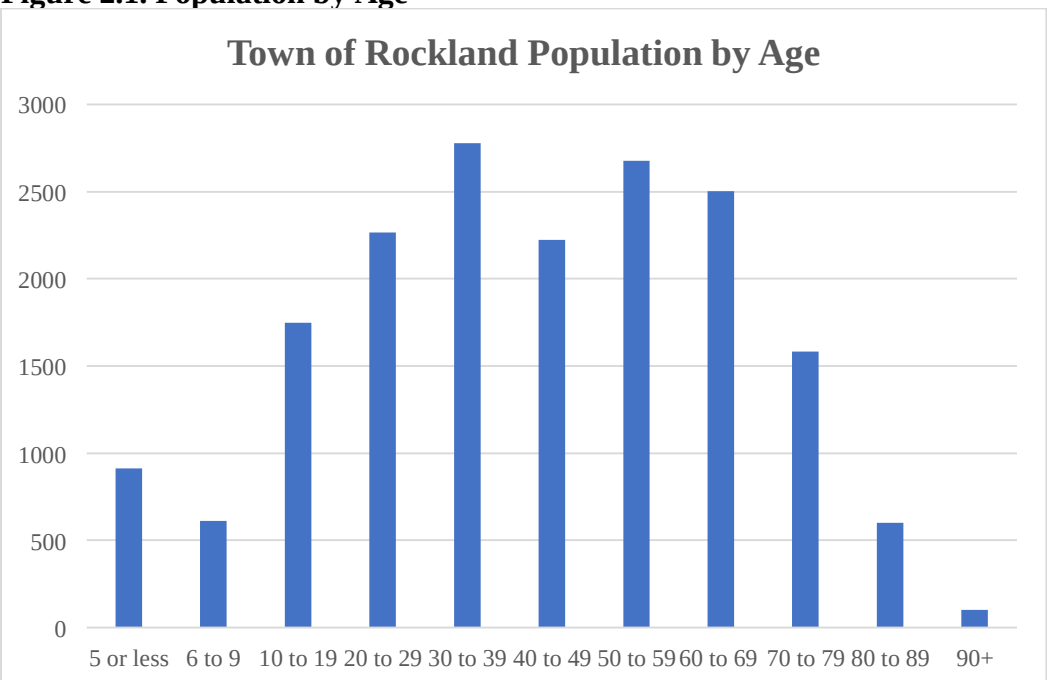


Table 2.3 outlines housing occupancy by type.

Table 2.3. Housing Occupancy by Type (2019, ACS)

SELECT HOUSING CHARACTERISTICS	Plymouth County	Percent of Total	Town of Rockland	Percent of Total
HOUSING TENURE - Total Households	187,460	100.0%	6,959	100.0%
Total HOUSEHOLDS - Average household size	2.69	NA	2.53	NA
HOUSING TENURE – Owner Occupied Households	143,407	76.5%	5,219	75.0%
HOUSING TENURE - Renter Occupied Households	44,053	23.5%	1,740	25.0%
HOUSING OCCUPANCY - Occupied housing units	187,460	90.6%	6,959	93.1%
HOUSING OCCUPANCY - Vacant housing units	19,543	9.4%	515	6.9%

The town's housing stock is slightly older (pre-1980) than that of the county as a whole (Table 2.4). The population growth in the early 2000's saw a building growth to accommodate the rise in population, but the town is relatively built-out. Rockland does have a lower percentage of its housing stock predating 1939 and has higher percentages of its housing stock built from 1950-1990.

Table 2.4. Age of Housing

YEAR STRUCTURE BUILT	Plymouth County	Percent of Total	Town of Rockland	Percent of Total
Built 2014 or later	3,964	1.9%	91	1.2%
Built 2010 to 2013	4,517	2.2%	45	0.6%
Built 2000 to 2009	18,756	9.1%	525	7.0%
Built 1990 to 1999	18,377	8.9%	1050	14.0%
Built 1980 to 1989	24,248	11.7%	1106	14.8%
Built 1970 to 1979	32,337	15.6%	686	9.2%
Built 1960 to 1969	22,845	11.0%	503	6.7%
Built 1950 to 1959	22,628	10.9%	1154	15.4%
Built 1940 to 1949	10,097	4.9%	271	3.6%
Built 1939 or earlier	49,234	23.8%	2,043	27.3%
Total housing units	207,003	100.0%	7,474	100.0%

Table 2.5 shows the number of units in structures. We can see that Rockland's distribution of housing is somewhat different from the countywide distribution. The Town of Rockland has fewer one-unit structures than the overall county distribution, but more attached one-unit, two-unit, and the larger 20-or-more units than the countywide average.

Table 2.5. Dwelling Units in Structures

UNITS IN STRUCTURE	Plymouth County	Percent of Total	Town of Rockland	Percent of Total
1-unit, detached	145,941	70.5%	3,817	51.1%
1-unit, attached	9,473	4.6%	901	12.1%
2-units	10,670	5.2%	500	6.7%
3-or-4-units	11,806	5.7%	365	4.9%
5-to-9-units	6,951	3.4%	503	6.7%
10-to-19 units	7,029	3.4%	214	2.9%
20-or-more units	9,852	4.8%	622	8.3%
Mobile home	5,249	2.5%	552	7.4%
Boat, RV, van, etc.	32	0.0%	0	0.0%
Total housing units	207,003	100.0%	7,474	100.0%

2.3. Economy

The Town of Rockland has a median household income of $78,011, lower than the overall county-wide medium income of $89,489. The town's poverty level of 8.3 percent is above the poverty level of 7.4 percent for the county. The town's median housing value for those households with a mortgage is $322,600, compared to $373,800 in the county. For those households without a mortgage, the town's median value is $269,800 compared to the county at $358,900. There are some 1,178 firms located within the town.

Rockland has a solid economy and does not present as a community with significant concentrations of poverty or other housing conditions that would contribute to heightened fire risk.

2.4. Street Network and Transportation Network

The town is served by several major state roadways, including State Route 3, which crosses diagonally through the northeast corner of the town off of Hingham Street. Although it does not have a lot of mileage within the town, as the closest responding agency, the RFD is responsible for protecting stretches of roadway in both directions.

Other major state roadways include MA 123 and 139; both roadways travel east to west across the middle of the town and run concurrently for a section in the center of town. Several other major roads are local in nature and consist of Spring Street, which travels from the center of town and turns into Beech Street, which then travels to the southern border and provides access to all the development in the southern part of town; Summer Street, which travels east to west across the town and supports several

north/south access roads; Union Street and Hingham Street, which are the major roads running north and south in the northern part of the town (Hingham leads to Highway 3 and Union currently dead ends north of the central business district in the town); and the Veterans of Foreign Wars (VFW) highway travels east out of the central business district and connects to Weymouth Street, which goes through the Union Point area and into the Town of Weymouth.

The only significant change to the street network is the possible extension of Union Street from its current termination north of Oregon Avenue, along its former right-of-way, to connect with the rotary on Bill Delahunt Parkway, adjacent to the Union Point development. Other incidental changes to the street network are more localized and provide access to new developments.

2.5. Community Risk Analysis

During the onsite visit, an assessment was made of the town's fire and related risks. The assessment was meant to provide the team with the most complete view of the Rockland community, its physical makeup, and the unique challenges faced when managing and operating fire and rescue programs and services.

The town has a diverse set of risks. The historic town center contains old, tightly-packed commercial structures. While much of the residential development consists of single-family dwellings, nearly 30 percent of the dwelling units in the town are located in three-unit or larger buildings. Many of these multi-family buildings predate modern building and fire codes, and are not equipped with sprinkler systems.

The town is seeing new commercial development, particularly in the north end. These developments include large office buildings, hotels, and commercial properties. While these properties are larger, they tend to be of newer construction and better protected.

The town has a handful of significant manufacturing facilities that utilize substantial quantities of hazardous materials in their manufacturing. While some are located in remote areas, others are adjacent to other properties, creating possible exposures in the event of a fire or hazardous materials release. These facilities have supplemental protection systems in place, and the RFD reports a good relationship with their operators in terms of upkeep of protective systems, cooperation with inspections, and compliance with regulatory reporting requirements.

In addition to these facilities, another risk of hazardous materials comes from transport through the town or along State Route 3, which has interchanges within the town.

Rockland also maintains a municipal fire alarm system consisting of street boxes and master boxes, which also monitor alarm systems in large or higher-risk properties. These alarms are reported directly to fire dispatch; this is very positive and should continue.

As an emergency medical service transport provider, the department operates ambulances and performs first-response medical aid. With regard to emergency medical services, higher risk is most closely associated with population age, with older members of the community more likely to utilize these services. As the population ages and there are more developments catering to seniors,

medical-related developments such as assisted living centers will likely see a continued increase in demand for service. The department will also continue to see demand for service related to auto accidents, especially with increasing traffic volumes. We would expect that EMS demand for service will continue to grow, owing to more activity within the town, greater utilization of services, and growth of the senior population.

Figure 2.2 on the next page shows the town's local hazard areas. The town is subject to flooding and wildland fires. The map also shows elements of critical infrastructure and the location of repetitive flood losses. The town is also subject to severe weather, most commonly winter storms, thunderstorms/microbursts, and hurricanes. Flooding is a hazard, primarily adjacent to Ben Mann Brook in northeast Rockland, portions of Cushing Brook, French Stream, and minor tributaries. The FEMA flood mapping study states, "historically, the Town of Rockland has sustained some damage during flood situations. However, the relatively flat terrain and small drainage areas have tended to reduce flood flows and damage from flood events."[2]

The RFD has a diverse set of risks and appears to be effectively mitigating these risks through code enforcement and fire prevention activity. As in all communities, residential properties, particularly older properties without fire protection systems, will pose a continued risk of loss. This area of risk can be mitigated through public education efforts.

The town has limited recreational water bodies, but does maintain water/ice rescue equipment and an inflatable boat.

The Town of Rockland has a well-developed hydrant network, as shown in Figure 2.3 below. This means that they can establish a reliable water supply for firefighting across the town and do not need to rely on tanker (tender) apparatus.

[2] Federal Emergency Management Agency, *Plymouth County, Massachusetts vol. 1 of 4*, Flood Insurance Study Number 28023CV001C, revised 11/4/2016, p. 30. 25023CV001C.pdf (fema.gov)

Figure 2.2. Local Hazards (source Hazard Mitigation Plan, 2019)

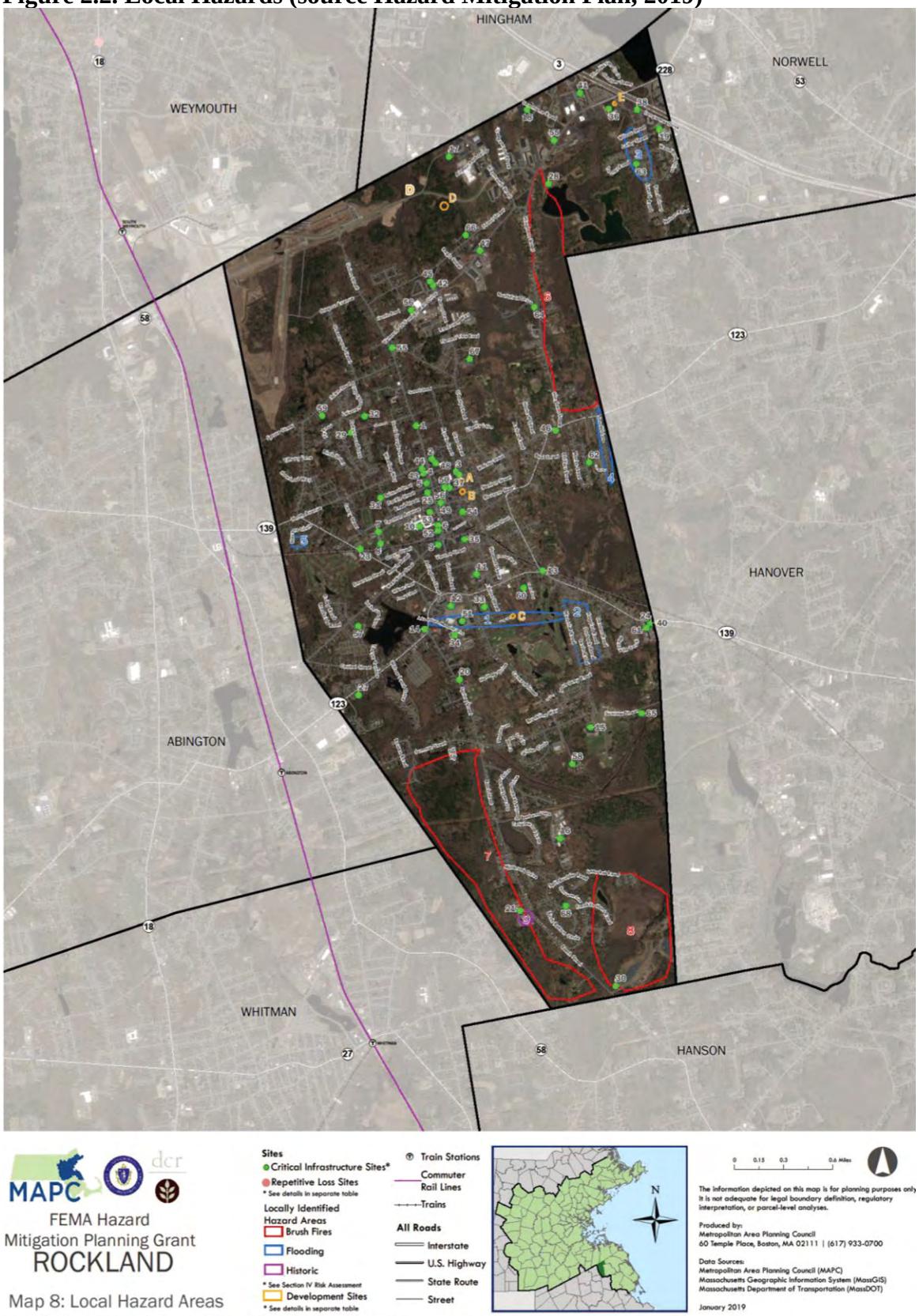
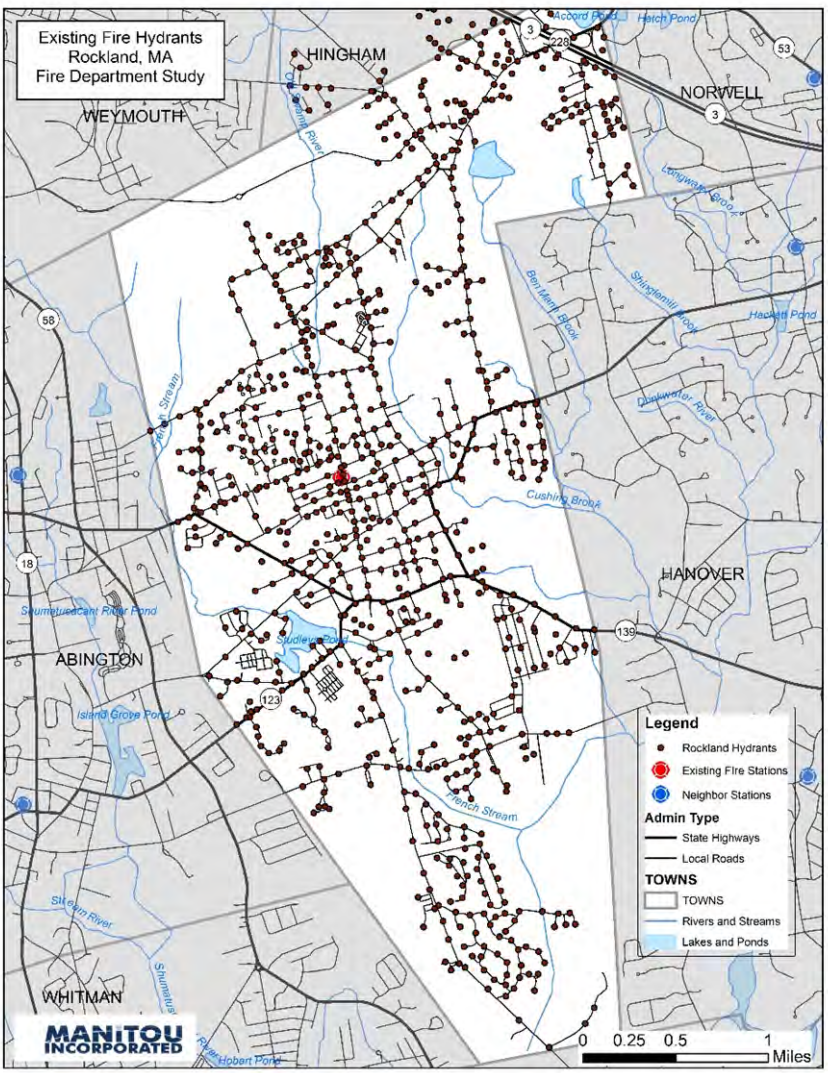


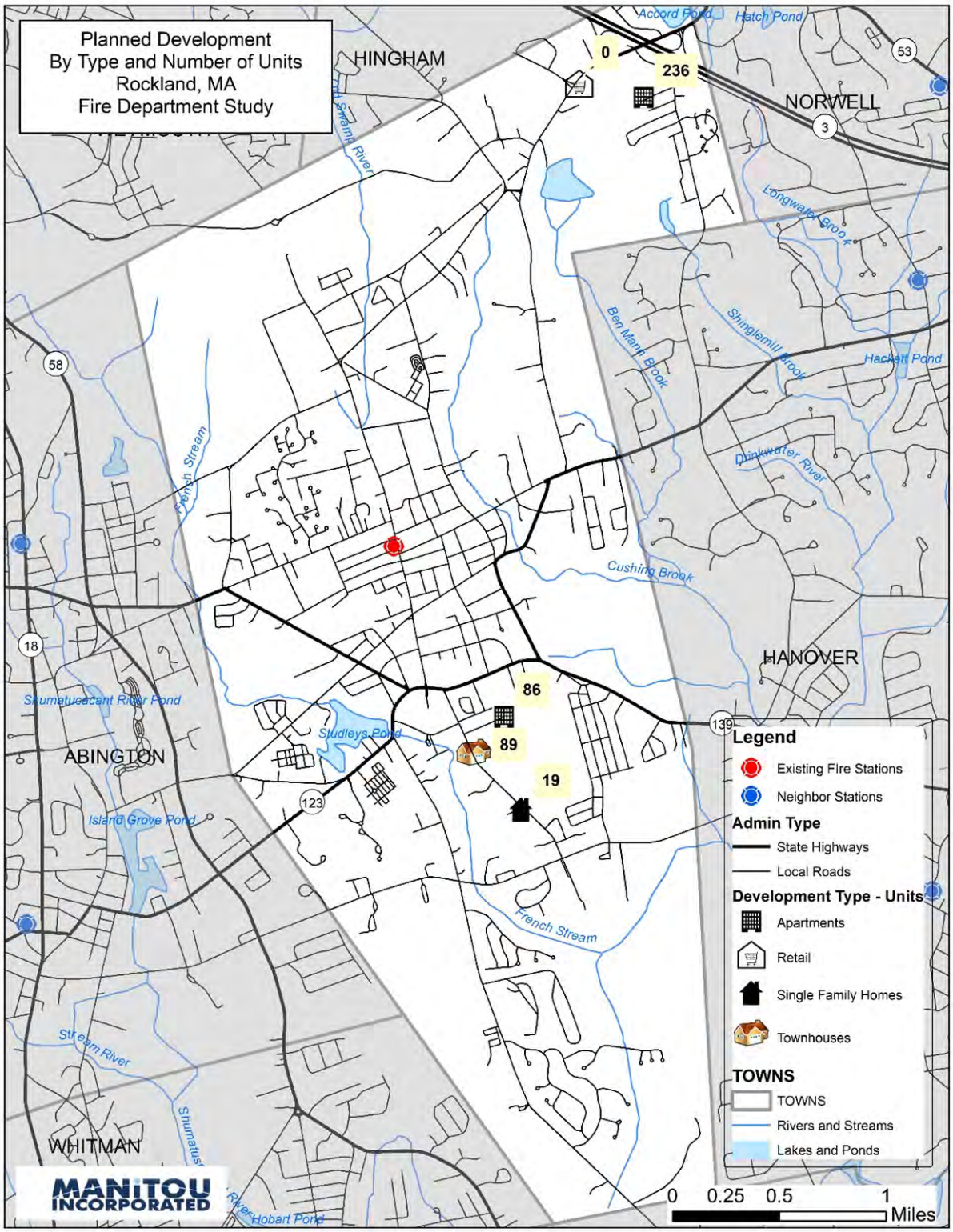
Figure 2.3. Existing Hydrants in the Town of Rockland



2.6. Planned Development

The Town of Rockland has several significant development projects underway (Figure 2.4). These projects are positive signs of the attractiveness of the community for investment, and these projects may further stimulate additional growth.

Figure 2.4. Existing and Planned Development Sites – Town of Rockland



One of the major development projects proposed within in the town is the Rockland Gateway at Hingham Street and Commerce Road. This is large mixed-use project that will enhance the commercial nature of the northeast area of the town near Highway 3. Although a zoning change to enable this project was recently voted down at a town meeting, the area will still be subject to some growth consistent with current zoning.[3] While most of this proposed development is commercial and retail, the increase in traffic coming to this location could lead to automobile accidents. There is also a marijuana facility/retail store at 1015 Hingham Street that will bring more traffic to the northeast corner of the town.

In addition to the Gateway project, there is the Shingle Mill multi-family development project on Pond Street by Wilson Road in the northeast corner of the town. The Project has two five-story apartment buildings (127 units and 109 units) with a community building. There is limited access to this area from the current headquarters station; the major road is through the Town of Hanover.

There are two other developments along the northern border of the town off Delahunt Parkway. One is called the South Shore Ice on Delahunt Parkway. This is a three-sheet ice sports arena with locker rooms, restaurant, and other amenities. Phase two will include dormitories with an unknown occupancy number at this time. The other project is Southfield Development, part of the Union Point project being developed on former Naval Air Station property. This project is still in the planning stages and completion is expected to be greater than five years out. While plans for the Rockland portion of this site are still not final, the level of development on other municipalities' portions of the site could bring significant growth.

All these developments in the northern portion of the town would be impacted by connecting Union St. to the Delahunt Parkway. Currently, Union St. dead ends prior to the highway, and opening access for the fire department and commercial and retail trips would impact the traffic along the street.

The other area of proposed developments is along Concord Street, south of State Route 139, adjacent to the Harmon Golf Course area. One development will be the Harmon Golf Course Townhouses at 168 Concord Street, which is planned to have 89 townhouse units. The other proposed development is Concord Meadows, around 365 Concord Street, with 19 single family houses. In addition to these two projects, the Lydia Square Apartments are planned for the end of Norman Street, with two four-story senior housing apartment buildings (44 units and 42 units).

[3] Cowperwaithe, Wheeler. "Rockland residents reject federal flood insurance program." *The Patriot Ledger* 5/11/21. Rockland town meeting rejects federal flood insurance, new zoning (patriotledger.com)

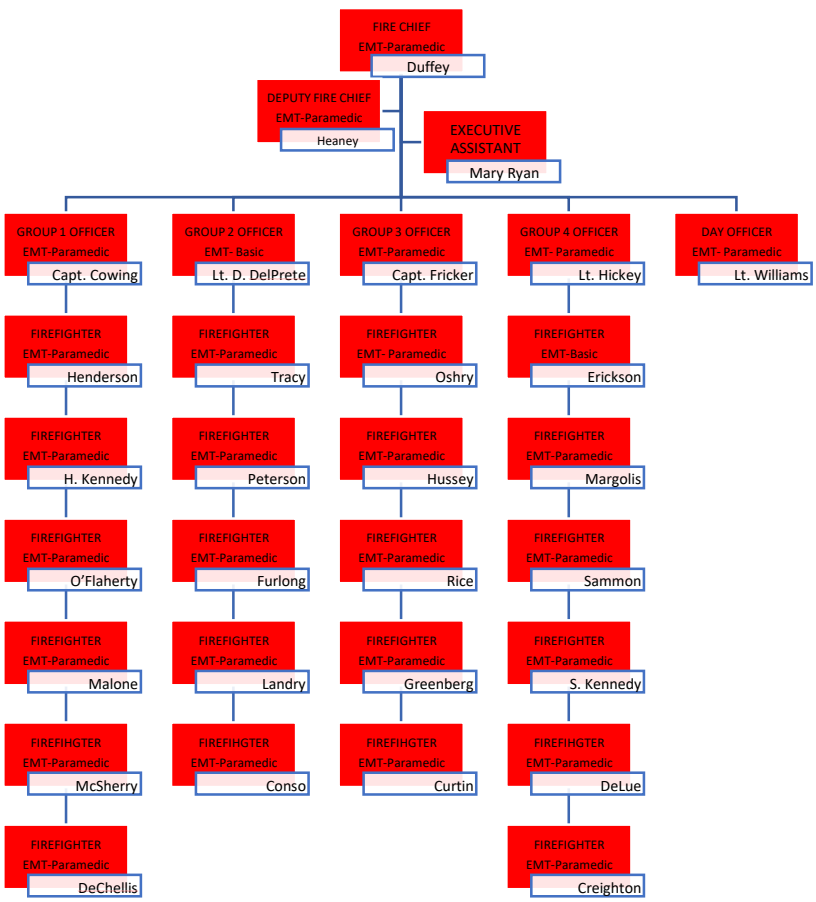
3. Organization of Rockland Fire Department

This chapter will describe the fire department, its organization, administrative operation, and emergency service delivery structures.

3.1. Administration and Management

The Rockland Fire Department (RFD) consists of 30 full-time uniformed positions. One position is a civilian administrative position who provides administrative support. Staff are organized on four shifts, overseen by a lieutenant or captain, and two additional daytime weekday positions – the chief, deputy chief, and a day officer (currently a lieutenant).

Figure 3.1. Rockland Fire Department Organization Chart (2021)



Two of the shifts have six personnel assigned, while two shifts have seven.

The department formerly employed paid-call personnel, part-time community members who responded to alarms when needed and were paid on an hourly basis. This program has not been active for several

years.

The department hires through the Massachusetts State Civil Service system. Candidates take a statewide written exam, followed by a physical agility test. Upon successful completion of these steps, the candidate is placed on an eligible list. This means that they are able to be selected for further screening by a fire department. Rockland requires all candidates to have paramedic certification at the time of hire. Cities and towns are permitted to give a preference to local residents in hiring.[4] The department hires only state-certified paramedics. The requirement for paramedic certification limits the number of personnel available for hire, meaning that it is not uncommon for the department to hire personnel who are not from the town. However, the presence of many fire-service operated advanced life support ambulance services in the area, and the corresponding potential hires who obtain the certification while working for private ambulance services, provide a supply of qualified candidates. The department also uses lateral transfers and accepts personnel from other fire departments.

3.1.1. General Administration

As stated previously, the department administrative staff consists of four personnel. In addition to the chief, deputy chief, and day officer, there is the administrative position of executive assistant.

The department also uses stipends and divides many other administrative and support positions among its firefighting staff assigned to shifts. Examples of these assignments include EMS recordkeeping, other maintenance tasks, and the electrician responsible for maintaining the town's municipal fire alarm system.

The primary administrative role is fulfilled by the executive assistant. This position performs many tasks essential to the department's daily operations, and is a much-needed support for the chief. The current executive assistant has been in her position for 27 years, and is nearing retirement. An orderly transition to a new person is critical, and ideally some overlap or other means to provide a smooth transition would be helpful.

The responsibilities of this position include:

- Answers some incoming phone calls and inquiries.
- Payroll tracking and processing (regular, overtime, and recall); this is done in conjunction with the town. This function is currently being transitioned from a manual process to one using software.
- Training – enters payroll for utilization of training benefits for each member after referral by the officers.
- Purchasing – processes all bills to be paid and purchase orders for the chief's signature
- Correspondence and records – processes requests for medical examiner and incident reports.
- Ambulance billing – prepares and reconciles ambulance billings and coordinates actual billing with the private contractor. Receives revenues and passes them along to the town for deposit.

[4] MA Civil Service Law Chapter 31, section 58.

It is difficult to overstate the importance of this position and its role in supporting the chief and deputy chief.

3.1.2. Fire Prevention

The State of Massachusetts requires municipalities to enforce a statewide suite of codes. The state uses National Fire Protection Association 1 (2015) *Fire Code*, as amended under Massachusetts 527 Code of Massachusetts Regulations 1.0, *Massachusetts Comprehensive Fire Safety Code.*[5]

Functionally, the day officer handles residential inspections, while the deputy chief is responsible for commercial and large or complex multi-residential occupancies within the town. Table 3.1 shows the workload for 2020, which was down slightly given the reduced activity during the pandemic.

There are an estimated 243 non-residential buildings within the town.

Table 3.1. RFD Inspection Activity, FY2020

Type	Number
Smoke alarm/CO detector (residential properties)	297
Propane storage	19
Fuel oil (tanks, burners, new installations)	68
Tank truck	4
Flammable or combustible storage	25
Fire alarm permits and inspections	10
Sprinkler installation/alteration	8

New development requires close coordination with the building department. Responsibilities for sign-off on new construction plans require the fire official to sign for fire protection systems and hazardous processes or storage. The fire prevention officer (deputy chief) is also responsible for reviewing site access for new developments to ensure that fire apparatus can access the building. The officer also evaluates interior circulation in anticipation of fire apparatus and ambulances being able to enter and exit the sites. Both the building official and RFD report an excellent working relationship.

The deputy chief attempts to visit the site frequently during the construction phase of new developments or major renovations, to enable observation of construction features that will later be hidden behind walls or otherwise obscured. It should be noted that the RFD does not collect any fees for new construction plan reviews or site inspections. These fees are collected by the building department and go to the town's general fund.

The Fire Prevention Division implemented an online self-service scheduling system for smoke detector/CO inspections, which greatly simplifies the process and reduces the administrative burden on the day officer. This is a positive example of using technology to gain efficiencies and improve customer service.

[5] Massachusetts Fire Code. https://www.mass.gov/service-details/massachusetts-fire-code

Recommendation 3.1: Accelerate entry of fire prevention inspection records into the department's new Records Management System.

Recommendation 3.2: Strengthen the pre-fire planning program and incorporate it into the department's Records Management System.

3.1.3. Training

The Rockland Fire Department's training program is a combination of in-house and outside training. The department manages its training in part through funding for external training, which members pursue on their own. The department pays costs associated with the training and compensates them for time spent outside their normal work schedule.

All new staff are required to hold Massachusetts Paramedic certification. Once hired, employees must complete Massachusetts State Firefighter I and II certification from the Massachusetts Firefighting Academy if they do not already have them. This means that the department effectively does not need to perform basic training for new hires.

Training falls under the duties of the day officer, who reports to the deputy chief. The training duties of the day officer include development of a training schedule for the department. This consists of topics and lesson materials which are distributed to each shift officer. Sometimes, the day officer will assist in delivery of the training, although usually the shift officer runs the trainings. The shift officer is responsible for seeing that trainings are accomplished, but because these are done while on-duty, it is common for training sessions to be interrupted by calls for service. The start-stop of on-shift training extends the time it takes to complete the scheduled topics on each shift.

The RFD has acquired software to monitor training, and much training was converted to online delivery during the pandemic.[6] They are currently working to enter every employee's individual training record into this database, which will facilitate tracking training hours and necessary recertifications. Since all firefighter employees are required to have Massachusetts paramedic certification, continuing education requirements are considerable and must be monitored carefully.

Training for probationary members of the department is overseen by the deputy chief in conjunction with their shift officer.

Personnel who receive promotions to officer positions are required to obtain Massachusetts State Fire Officer certification. These courses are completed based on available offerings given at the State Firefighting Academy or local courses under their sponsorship. The fire prevention day officer must also obtain fire prevention officer certification through the state.

A review of the most recent Insurance Services Office (ISO) Public Protection Classification (PPC) for the town showed that the RFD received 3.2 out of 9 points. The areas where the greatest improvements could be made are in pre-fire planning inspections, company training (16 hours per month

[6] The software, formerly known as Target Solutions, is now called Vector Solutions© Public Safety Online Training Management System & Courses (vectorsolutions.com).

recommended), and officer training (12 hours of continuing education annually). Of course, these ratings should be reviewed upon completion of the updated rating that is currently under way. In regard to training, the area of largest improvement was facilities and use, which calls for access to a drill tower, live fire training, and a training area large enough to accommodate multiple pieces of heavy apparatus.[7]

The department makes a good effort to maintain training, but limited staffing and the demand of responding to incidents make training difficult on-shift, especially for practical skills.

Recommendation 3.3: Consider hiring personnel on overtime to conduct simulated multi-company drills on a semi-annual basis.

3.1.4. Emergency Management

Emergency management is one of the fire chief's responsibilities. He estimates that approximately five percent of his time is spent on this function. The fire department was given this responsibility when the previous emergency manager, a part-time civilian employee, died in 2013. The chief is assisted by the deputy fire chief on an as-needed basis. Much of their work is performed as a collateral duty according to need. The chief takes on multiple roles, including assembling documentation and reimbursement expense processing following federally-declared disasters.

The town has a conference room in Town Hall designated as the Emergency Operations Center. It is currently outfitted with basic equipment and has not been formally utilized for this purpose. The EOC would require support of a portable generator in the event of a power outage. The town does have emergency power on-site for other key facilities and potential shelters. The high school can be used locally as a shelter, and its operation is supported by CERT and school staff. The town is also part of a shelter consortium consisting of Rockland, Hull, Norwell, Scituate, and Weymouth. This consortium cooperates on sheltering, and makes decisions jointly on opening the regional shelter, which is located in Weymouth and supported by the Red Cross.

An objective of the emergency management program is compliance with state mandates and it primarily targets the extreme weather events commonly experienced in the region. The town's Comprehensive Emergency Plan is currently being updated with the assistance of an intern from a nearby college and should be completed this summer. This is a wise use of resources. The town's Hazard Mitigation Plan, which was prepared by the Metropolitan Area Planning Council (a regional planning organization), was completed in 2019.

Operationally, many emergency management functions are performed by the on-duty chiefs, who are often actively engaged in mitigating an incident at the same time. A similar lack of resources is reported for key agencies such as Public Works and Parks, whose directors often get directly engaged in service delivery. The chief reports that the town's EOC has never been occupied due to staffing constraints. The town can establish radio interoperability between departments.

While the town reports that it has managed events successfully, its staffing levels are such that it is

[7] Training | Technical | PPC | ISO Mitigation

unable to staff its Emergency Operations Center. Further, having the town's emergency manager simultaneously handle fire service incidents while managing town-wide needs is not ideal.

The town maintains an alerting system to distribute information via telephone (including cell phones), text, and email. This system, known as Smart 9-1-1,™[8] is an opt-in system where residents can elect to receive emergency notifications. This system also has added capabilities, including a mobile phone app, and the capacity to include household data on residents' special needs, medical information, and hazards on the premises.

In addition to the town system, the Plymouth County Sheriff's Office maintains a county-wide reverse-9-1-1 capability, which lets them select specific geographic areas and send a pre-recorded land-line call to each address within the area. The emergency management function also maintains a Facebook page separate and distinct from the town and fire department's pages.

Additional assets available to the town in the event of a disaster or sustained emergency would come from the Fire Chiefs Association of Plymouth County (a command post vehicle), and additional support from the State Department of Fire Services. In a major emergency the State Emergency Management Agency would likely send a representative to the scene.

The RFD reports that they did a round of incident command and National Incident Management System trainings for town employees. The trainings were, at one time, a condition for federal homeland security grant eligibility. This is an area where periodic retraining is necessary to account for turnover, as well as the fact that most employees do not have the opportunity to apply the training and remain proficient. Ensuring that the Public Works, Police, Parks, Buildings, Town Manager, and Budget Department personnel are familiar with these concepts is important.

The town has a Community Emergency Response Team (CERT), a group of citizens trained to perform various support function in a time of emergency. CERT serves the dual purpose of enhancing public preparedness for disasters and providing a labor force to assist during these events. With the Covid-19 pandemic, the team has not been active in the past year. The RFD plans to reactivate the training this year.

3.1.5. Emergency Medical Services

The RFD, by operating an advanced life support (ALS) transport service, falls under additional regulatory requirements as prescribed by the state. The provision for EMS is regulated by the State Department of Public Health's Office of Emergency Medical Services. The ALS service is under the medical supervision of a physician who serves as medical director for the department's services. The system was described by the medical director as mainly one of mediation and communication to address concerns that may arise.

The medical director develops and administers continuing education, known as rounds, which are centrally administered and used by paramedics from multiple agencies overseen by the medical director.

[8] Smart 9-1-1- is a trademark of Smart9-1-1.com.

There are 20 rounds and two continuing education conferences per year. The department's current medical director, Dr. Muse, has provided this service for Rockland since 2007. He also oversees 12 other town's EMS programs.

Day-to-day management of the program is delegated to RFD's ALS coordinators (personnel who perform this as an additional function with stipend), who manage oversight, monitoring of training requirements, and audit call documentation for quality assurance purposes.

The State of Massachusetts has statewide EMS treatment protocols, with each medical director authorizing individual agencies to provide optional services or techniques within this scope of practice.[9] The system relies on hospitals to restock used medications, which are replaced when patients are transferred to the hospital. This obviates the need for fire departments to maintain stocks of these supplies.

The current system is reported to work well, and is a constructive partnership to deliver high-quality advanced life support care to the town's residents. The provision of this care is also offset by billing for services, which reduces the department's burden on taxpayers.

3.2. Emergency Operations

This next section of the chapter describes the functional organization of the Rockland Fire Department, its facilities, apparatus, and staffing as they pertain to emergency service delivery.

3.2.1. Current Fire Station

The Town of Rockland Fire Department operates from one station, located at 360 Union Street, in the heart of the town's traditional commercial district. The facility is shown in the following photographs (Figure 3.2a, Figure 3.2b).

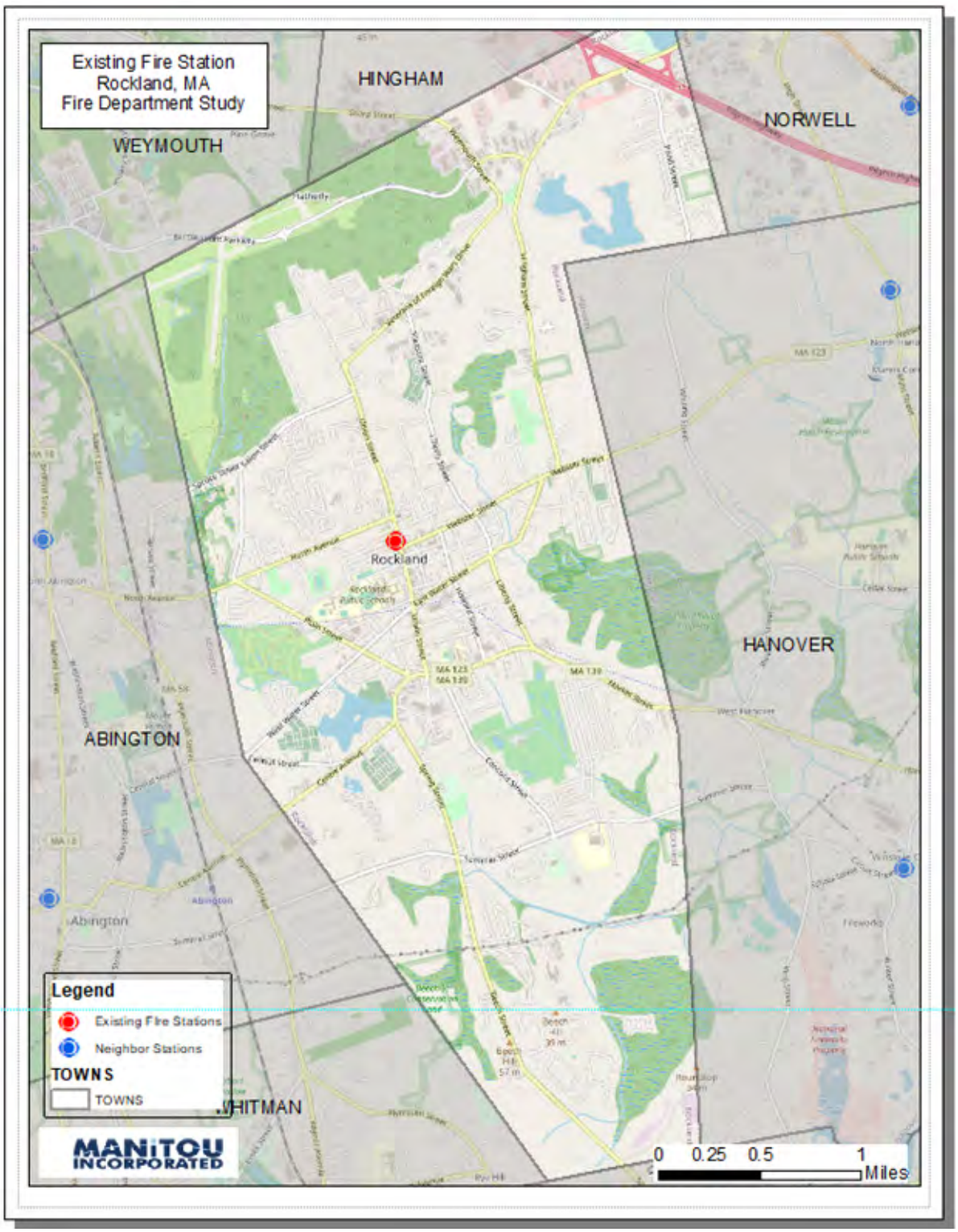
[9] Emergency Medical Services Statewide Treatment Protocols | Mass.gov

Figure 3.2a. Headquarters Station- 360 Union Street

Figure 3.2b. RFD Station from Pacific Street side

The geographic location of the current fire station is shown in Figure 3.3.

Figure 3.3. Current Fire Station Location, Rockland



3.2.2. Apparatus

The Rockland Fire Department (RFD) operates four assigned cars, two active engines, one tower ladder, two active advanced life support ambulances (rescues) from their station. They maintain one engine and one ambulance in reserve status (see Table 3.2).

Table 3.2. Current Rockland Apparatus

Station - Headquarters – 360 Union St		
Fire Chief	Car 270	2020 Chevrolet Tahoe – Admin Vehicle
Deputy Fire Chief	Car 271	2016 Chevrolet Tahoe – Admin Vehicle
Fire Prevention Officer	Car 3	2013 Chevrolet Tahoe – Admin Vehicle
General	Car 4	2004 Chevrolet Tahoe – Admin Vehicle
Engine	Engine 1	2011 E-One Typhoon – 1500 GPM
Engine	Pumper Engine 2	1992 E-One Protector – 1250 GPM
Engine	Pumper Engine 3[R]	2004 Smeal/HME - 1250 GPM
Ladder	Pumper Ladder 1	1999 Smeal/Spartan 105' Straight aerial
Rescue	Ambulance 1	2019 AEV/Ford E450 – Class 1/Type III Ambulance
Rescue	Ambulance 2	2013 AEV/Ford E450 – Class 1/Type III Ambulance
Rescue	Ambulance 3[R]	2008 AEV/Ford E450 – Class 1/Type III Ambulance
Brush/Forestry	Forest Fire 1	1986 Chevrolet Pick-up – Light Duty Brush Truck
Fire Alarm Electrician	Fire Alarm ST-1	2001 Ford F550 Bucket Truck
Rescue	Rescue Boat w Trailer[10]	14 Ft. Inflatable with Mercury outboard motor
[R] – Reserve;		

[10] A specific review of training requirements was not part of the report's scope, but we do note that water rescue has become increasingly regulated within the fire and emergency services, and there are now two primary NFPA standards that pertain to provision of this service. NFPA 1670 *Standard on Operations and Training for Technical Search and Rescue Incidents* (2017), contains guidance on organizational capabilities for various types of specializes rescue situations and environments.
In addition to NFPA 1670, NFPA 1006, *Standard for Technical Rescue Personnel Professional Qualifications* (2021) sets out requirements corresponding to awareness, operations, and technician levels for areas of specialty rescue. Both standards place the onus on the Authority Having Jurisdiction (AHJ) to assure a match between training levels and service expectations.

Figure 3.4. RFD Boat and Associated Equipment

Figure 3.5. Some RFD Apparatus

3.2.3. Shift Staffing

The RFD is staffed with a minimum of six on-duty personnel (two shifts have seven personnel

assigned) on a 24/7 basis (Table 3.3). This does not include non-shift personnel who work a weekday schedule, which includes the chief, deputy chief, and day officer, who works a four-day week. The daytime personnel are also available in the event of a major incident during weekday hours, and form an additional response capability for the department.

Staffing and deployment is governed by RFD policy #16-02 *Responses to Calls*. Each shift is overseen by a line officer, who also serves as the officer on the engine company. The daily staffing arrangement for the department is dynamic and varies depending on the nature of the reported incident. Keep in mind that this staffing plan is based on units being in quarters and available. The plan changes when units are already committed on a call, or may be out of quarters, which could require responding back to get a piece of apparatus. Table 3.3 shows typical staffing, while Table 3.4 shows highlights of Policy 16-02, which governs dispatch protocols.

Table 3.3. Rockland Fire Department Shift Staffing

Primary Apparatus	Staffing
Engine 1	1 Officer 2 Firefighter
Ladder 1 Ambulance 1 (Cross-staffed)	1-2 Firefighter 1-2 Firefighter
Total	6-7

Table 3.4. Staffing by Incident Type Summary (Assuming six personnel on duty)

Incident Type	Units	Personnel
Automatic Fire Alarm (Street Box)	Engine Ladder	3 1
Maser Box (Commercial/Large Residential Fire Alarm)	Engine Ladder Ambulance (if available)	3 2 1
Reported Building Fire	Same as Master Box, with striking of Box 33 for recall personnel and automatic aid at discretion of officer	
Medical	Ambulance Engine	2 3
Motor Vehicle Accident	Ambulance Engine	2 3

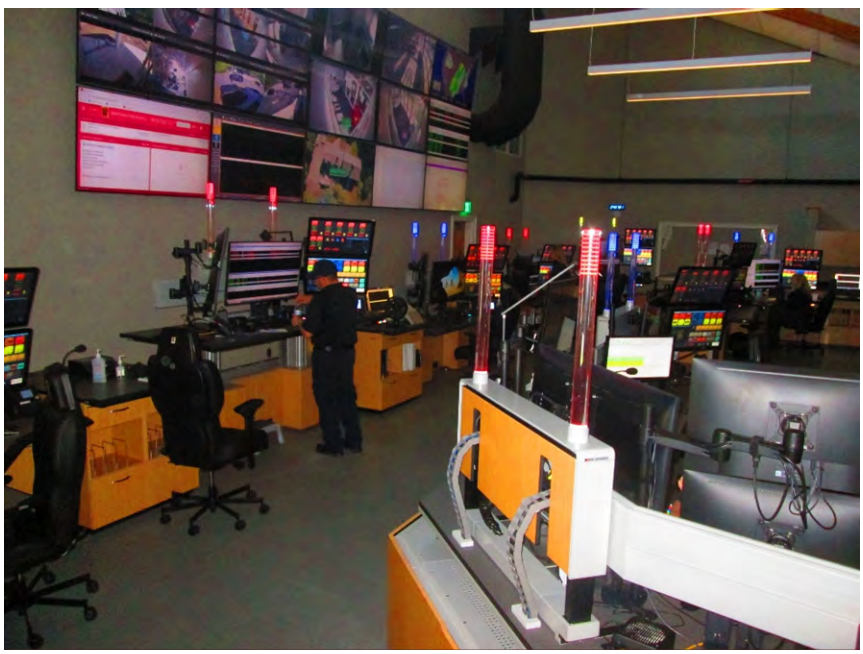
3.2.4. Dispatch

The RFD is dispatched by the Holbrook Regional Emergency Communications Center (HRECC). The HRECC currently serves as a public safety communications center consisting of six communities (six fire departments and two police agencies) comprising 105,000 residents. They are planning to take on dispatch for Abington Police in the coming months.

The Center moved into a new state-of-the-art, 6,000 square foot facility in January 2021 (see Figure 3.6). Approximately 50 percent of facility is currently being utilized, leaving room for expansion. Enabled in part by grant funding from the Massachusetts State 9-1-1 Commission, they provide full-service communications capability to the agencies they serve. Additional costs are supported by 9-1-1 surcharges on telephones and fees charged to participating communities.

The Center provides computer aided dispatch (CAD), records management, and can support vehicle-mounted mobile data terminals/computers. They have interfaces enabling automatic transfer of data between the Center's CAD and individual agency records management systems. As an example, time and incident details for Rockland are automatically transferred to the RFD records management system, improving accuracy and reducing labor.

Figure 3.6. HRECC Interior



HRECC is currently staffed with a director, deputy director, IT specialist, secretary and, after July 2021, they plan to hire four additional telecommunicators, one operations manager, and one full-time trainer/quality assurance person.

The Center is proud of their service level, and report that they strive to meet the requirements of NFPA 1221, *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems.* From January 1, 2019 through May 18, 2021, they answered 52,881 incoming calls in an

average of less than four seconds. The HRECC's goal is to answer 9-1-1 voice calls within ten seconds, and they meet this for 99.7% of all calls.

The Center also sends field personnel to large incidents to provide on-scene support for emergency communications. This is a high level of service. They also partner with RapidSOS®, a third-party service the enables delivery of rich data from mobile devices to 9-1-1 centers, who can share this information with first responders to enable faster, more effective response.[11]

The Center's director was recognized by the Associated Public-Safety Communication Officers (APCO), the national membership association of dispatch agencies, as Director of the Year for 2021.[12] This is a significant accomplishment, reflecting the strong leadership and progressive vision of the Center, which has enabled high-quality services to multiple agencies that could not be replicated by a small stand-alone center.

[11] RapidSOS. Learn about RapidSOS and Our Life-Saving Mission | About | RapidSOS
[12] APCO Opening General Session, Recognition. Opening General Session | APCO 2021

4. Current Deployment and Demand Analysis

This section will review the historical information regarding calls for service in the Town of Rockland, and the timing, type, and frequency of calls for service.

4.1. Calls for Service

We relied on information regarding calls for service maintained in the format of the National Fire Incident Reporting System (NFIRS). This voluntary national record keeping system requires fire services to maintain information regarding calls of service, incident type, response information (including dispatch operations and individual apparatus responses), and number of staff attending with each apparatus. The system also records situation found, actions taken, and damages to the structures, as well as false alarms, service calls, and other miscellaneous fire service activities. These data are completed after each incident.[13]

The town provided NFIRS records in Rockland Incident Analysis Annual reports from 2016 through 2020 for this report. The following sets of tables and figures highlight the volume, type of call, and the time of day the fire department is called. The major categories in the NFIRS reporting system are divided into nine groups, described below. A complete breakdown of incidents by detailed type is in the Appendix (Table A.1).

In Table 4.1, we see that the Rockland Fire Department has responded to an average of 3,188 incidents per year, of which over 2,482 (77.9%) were EMS incidents. Tables 4.2 and 4.3 describe the incident types in greater detail. It should be noted that the RFD maintains a separate database for ambulance calls. The incident totals are reflected in the NFIRS database, but detailed information on EMS transports by Rockland's ambulances is contained in the separate database.

The most common incident for Rockland was EMS incidents, which is as expected since they operate an advanced life support ambulance service. Following this category was 'other' incidents, which include alarm systems activations with no fire, hazardous condition calls such as natural gas leaks, wires down, and other calls for assistance.

Table 4.1. Town of Rockland - Incidents by Type, 2016-2020

Incident Type	2016	2017	2018	2019	2020	TOTAL	Percent of Total	Average Per Year
EMS	2,399	2,450	2,644	2,610	2,307	12,410	77.9%	2,482
FIRE	90	70	75	49	60	344	2.2%	69
OTHER	511	504	703	683	784	3,185	20.0%	637
	3,000	3,024	3,422	3,342	3,151	15,939	100.0%	3,188

[13] The RFD completes NFIRS reports for non-emergency incidents to capture their activity. We used only those reports submitted to the State of Massachusetts, which comprised emergency incidents.

A series of maps in the Appendix plot the location of incidents by type for 2016-2020.

Table 4.2. NFIRS Major Incident Types

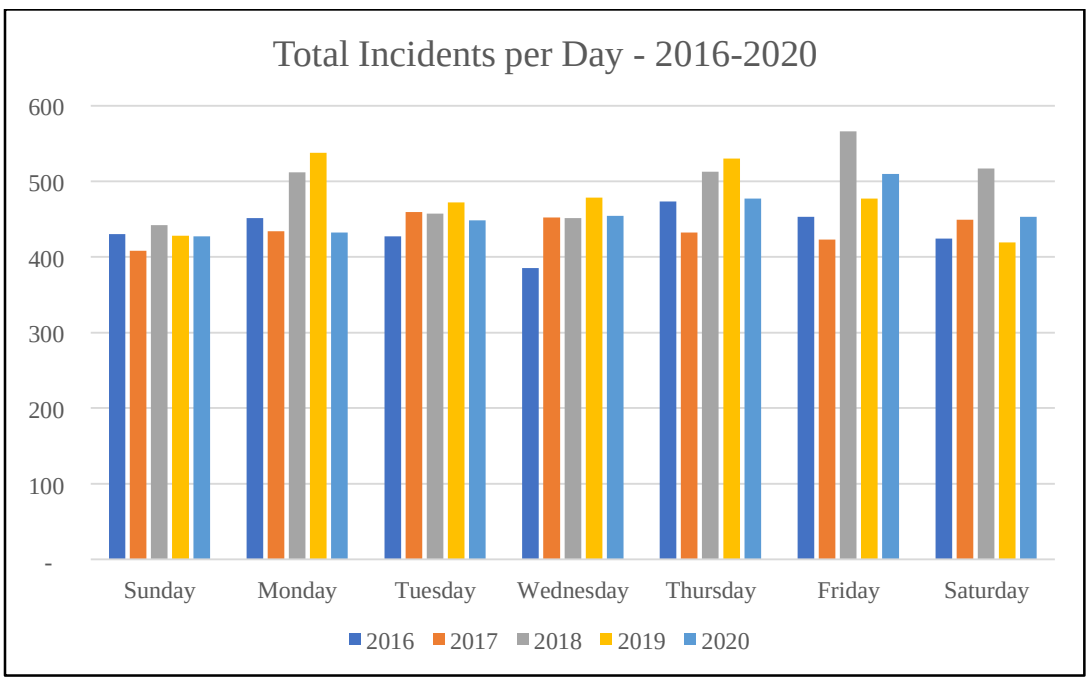
Incident Broad Category	Title	Description
Fire	Fire	Fires, including structures, brush, grass, mobile property (vehicles).
Other	Overpressure Rupture, Explosion, Overheat (No Fire)	Explosions or overpressure of containers such as boilers.
EMS	Rescue and Emergency Medical Service (EMS) Incidents	Medical calls, including auto accidents with injuries, elevator entrapment, and rescues.
Other	Hazardous Condition (No Fire)	Flammable gas or liquid releases, chemical spills, wires down, etc.
Other	Service Call	Public assistance calls, including lockouts, assisting other agencies with ladders, etc.
Other	Good Intent Call	Calls made with good intent, such as fire response to a burglar alarm, steam from a dryer vent mistaken for smoke, etc.
Other	False Alarm and False Call	Alarm systems activations with no fire, including malfunctions, unintentional activation, and malicious alarms.
Other	Severe Weather and Natural Disaster	Non-fire incidents associated with natural disasters.
Other	Special Incident Type	Reserved for special studies.

Table 4.3. Town of Rockland - Incidents by NFIRS Major Category, 2016-20

NFIRS Major Category	2016	2017	2018	2019	2020	Total	Percent of Total
1. Fire	90	70	75	49	60	344	2.2%
2. Overpressure Rupture, Explosion, Overheat (no fire)	4	4	5	1	1	15	0.1%
3. Rescue & Emergency Medical Service Incident	2,252	2,318	2,474	2,466	2,171	11,681	73.3%
4. Hazardous Condition (no fire)	143	128	165	143	135	714	4.5%
5. Service Call	146	129	215	188	241	919	5.8%
6. Good Intent Call	48	65	99	119	198	529	3.3%
7. False Alarm & False Call	313	307	373	346	321	1,660	10.4%
8. Severe Weather & Natural Disaster			4	5	5	14	0.1%
9. Special Incident Type	4	3	12	25	19	63	0.4%
TOTAL	3,000	3,024	3,422	3,342	3,151	15,939	100.0%

We next examine incidents day of the week. Figure 4.1 shows incidents by day of week. We see that Monday, Thursday, and Friday are the consistently busiest days of the week. Weekends are less active, corresponding to reduced business activity.

Figure 4.1. Town of Rockland - Incidents by Day of Week



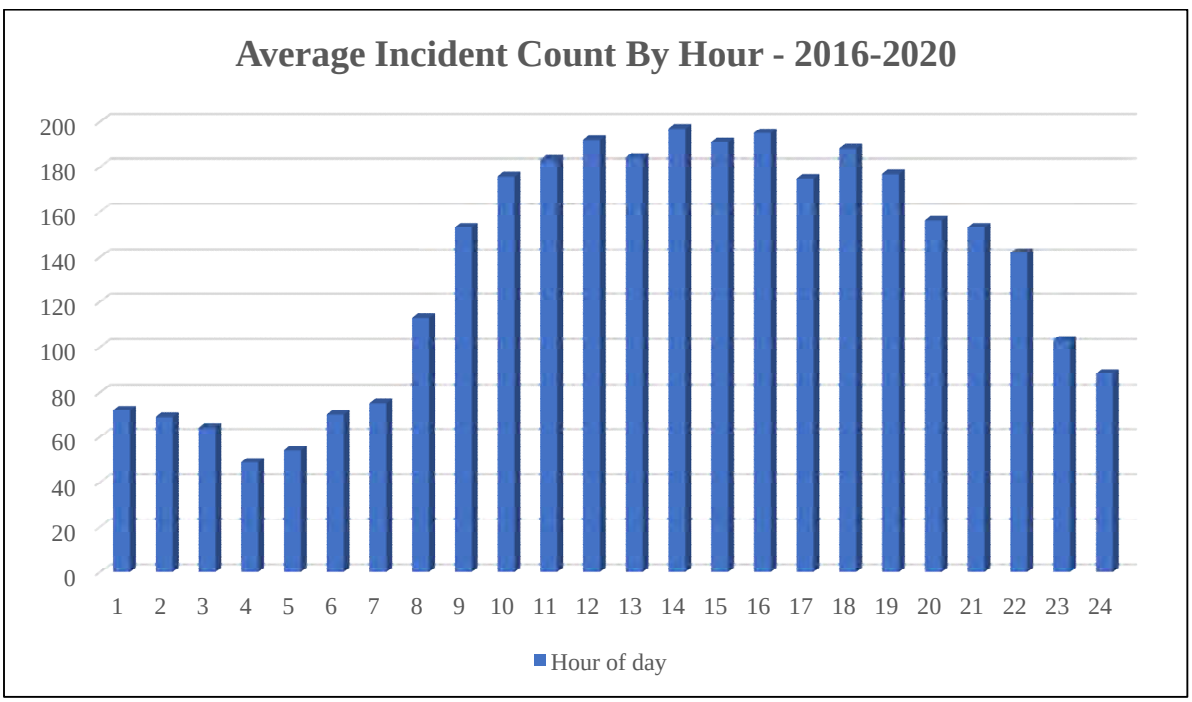
We next study incidents by time of day. Table 4.4 shows that the evening times are the busiest time period for calls, followed by daytime and nights.

Table 4.4. Town of Rockland - Incidents by Time of Day 2015-2019

Shift	2016	2017	2018	2019	2020	TOTAL	Percent of Total
Day (8:00 a.m. – 4:00 p.m.)	1,429	1,379	1,599	1,495	1,453	7,355	45.7%
Evening (4:00 – 11:59 p.m.)	1,110	1,108	1,257	1,241	1,193	5,909	36.7%
Night (12:00 a.m. – 8:00 a.m.)	504	570	602	606	555	2,837	17.6%
TOTAL	3,043	3,057	3,456	3,342	3,201	16,101	100.0%

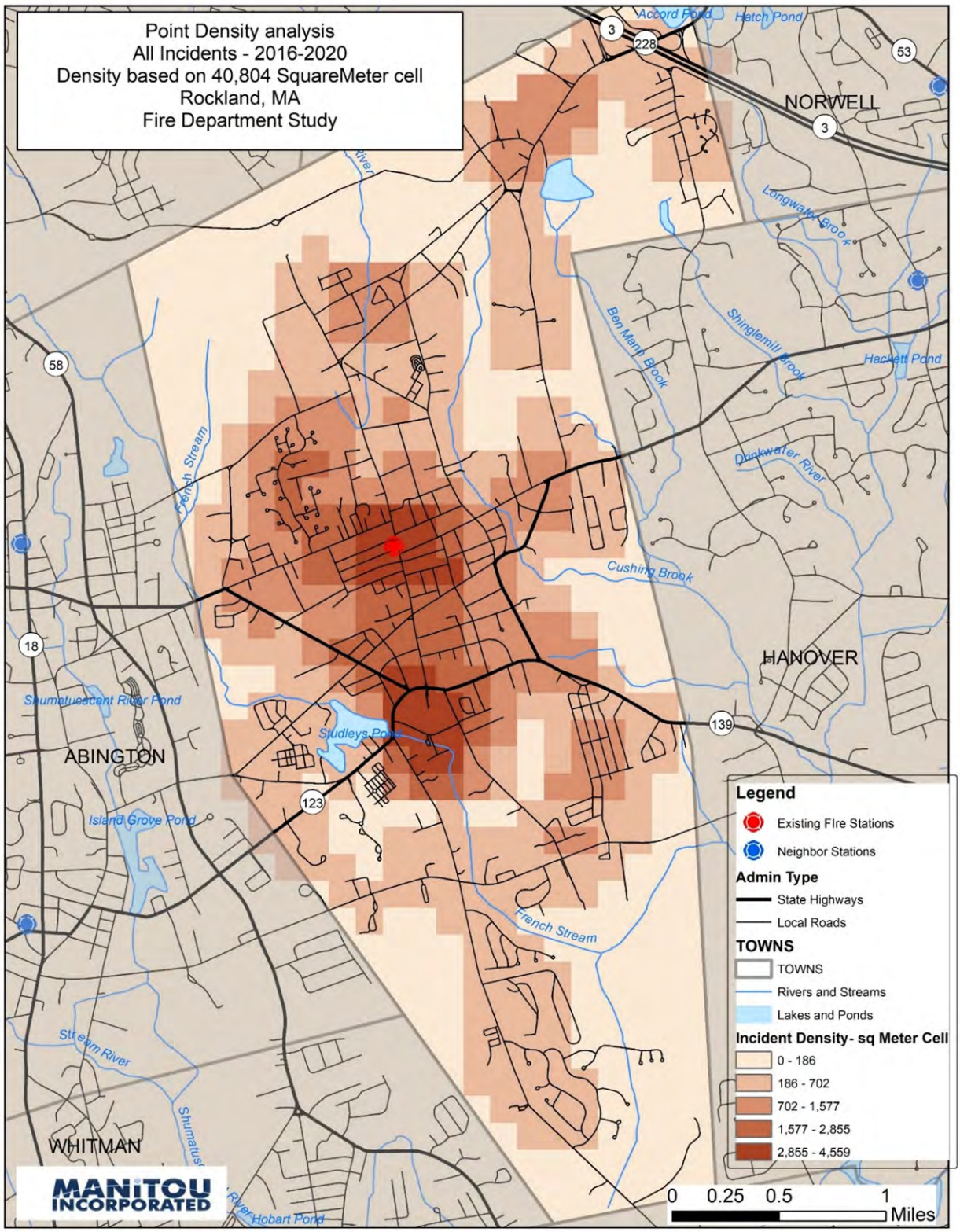
Figure 4.2 shows the average number of incidents by hour over the reported period, 2016 to 2020. The hourly count shows that incidents are highest from 9 a.m. through 8 p.m., then drop off from 8 p.m. through midnight.

Figure 4.2. Town of Rockland – Average Incident Count by Hour



Next, in Figure 4.3 we examine the density of incidents across the town. The highest density of incidents appears in the vicinity of fire headquarters, and also near the intersection of Route 123 and Union Street.

Figure 4.3. Point Density of Incidents 2016-2020



Next, we consider the type of real property affected by these incidents. Due to the nature of the town, over 65% of the incidents occurred at residential locations involving one- or two-family dwellings and multi-family dwellings, accounting for over 65 percent of all incidents (fire and EMS). Table 4.5 shows the number and percentage of the first 15 location types of reported incidents across the study period.

Table 4.5. Town of Rockland - Incidents by Real Property Location – 2016-2020

PROPERTY USE DESCRIPTION	2016	2017	2018	2019	2020	TOTAL	Pct
1- or 2-family dwellings	1405	1401	1507	1427	1500	7240	45.22%
Multi-family dwellings	617	585	727	693	658	3280	20.49%
Residential street/road or residential driveway	215	203	266	245	280	1209	7.55%
24-hour care nursing homes - 4 or more persons	95	136	166	182	167	746	4.66%
Street - other	95	73	64	103	58	393	2.45%
Hotel/motel - commercial	47	48	44	60	81	280	1.75%
Restaurant or cafeteria	29	45	58	61	29	222	1.39%
Vehicle parking area	52	37	46	35	30	200	1.25%
Business office	34	25	43	54	40	196	1.22%
Police station	30	42	20	39	29	160	1.00%
High school/junior high school/middle school	24	18	43	38	11	134	0.84%
Highway or divided highway	19	19	20	36	33	127	0.79%
Food and beverage sales - grocery store	30	29	28	8	21	116	0.72%
Street or road in commercial area	24	47	26	4		101	0.63%
Boarding/rooming house - residential hotels	12	24	18	15	13	82	0.51%

Table 4.6 shows the most active addresses for incidents within the town.

Table 4.6. Town of Rockland – Top 15 Addresses for Incidents (All Types)

Rank	Incident Address	Count	Description
1	56 Webster St	401	Webster Park Rehabilitation & Healthcare Center
2	115 North Ave	341	South Shore Rehabilitation & Skilled Care Center
3	51 Maple St	217	Emerson Shoe Lofts
4	490 Market St	188	Rockland Police Department
5	850 Hingham St	151	Comfort Inn Rockland - Boston
6	11 Pacific St	139	Building behind fire department
7	1149 Hingham St	96	The Home Depot
8	119 Grove St	85	Sheridon Square Condominiums
9	135 Grove St	85	BM Hardwood Floor Inc
10	909 Hingham St	82	Best Western Rockland
11	292 Market St	73	The Executive House Apartments
12	360 Union St	73	Rockland Fire Department
13	80 Market St	71	Minute Clinic - Urgent Care
14	30 Martha Dr	71	Spring Gate Apartments
15	103 Grove St	63	Sheridon Square

4.2. Response Time

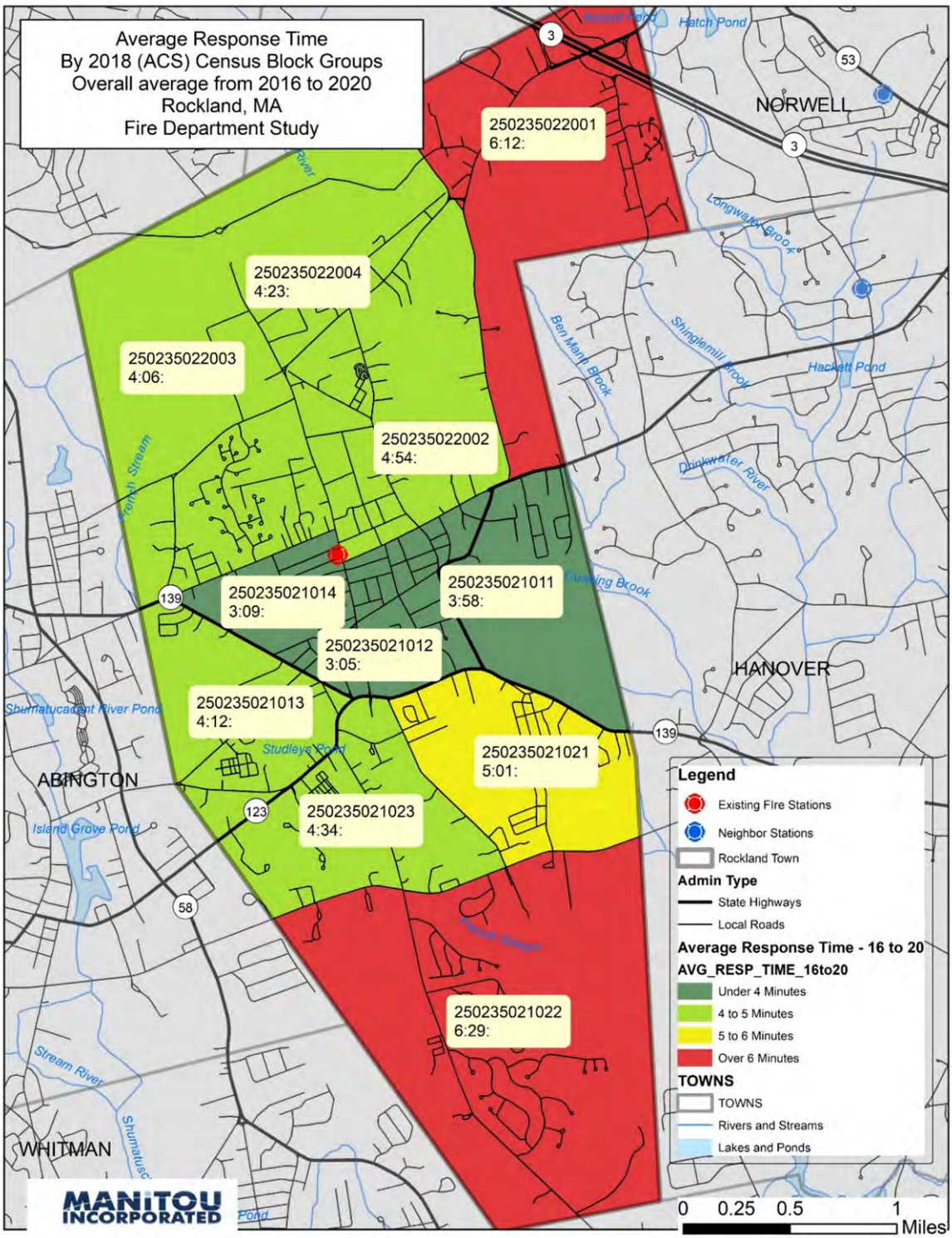
Table 4.7 shows average response times by type of incident for 2018-2020. We see that response times are in the 5-6-minute range. Caution should be used when drawing conclusions on incident types with small numbers, which can be easily influenced by very small or very large times.

Table 4.7. Average First Due Response Times (Turnout and Drive Time) by General Incident Type, 2018-2020

General Incident	Count	2018	2019	2020
1. Fire (Excluding Building Fires)	113	0:04:02	0:05:05	0:05:16
111 - Building Fire	24	0:04:07	0:05:00	0:06:20
2. Overpressure Rupture, Explosion, Overheat (no fire)	3	0:08:00	0:01:00	0:02:00
3. Rescue & Emergency Medical Service Incident - Excluding 311	710	0:05:33	0:05:11	0:05:37
311 - Medical assist, assist EMS crew	5014	0:04:56	0:04:52	0:05:45
4. Hazardous Condition (No Fire)	329	0:04:37	0:05:12	0:05:28
5. Service Call	473	0:04:56	0:05:09	0:06:12
6. Good Intent Call	258	0:05:00	0:05:00	0:05:15
7. False Alarm & False Call	836	0:04:45	0:04:36	0:05:01
8. Severe Weather & Natural Disaster	8		0:03:48	0:02:40
9. Special Incident Type	49	0:04:10	0:05:23	0:05:19
	7817			

Figure 4.4 shows response times by census block group. We can see that the southern end of town and the northeast have the longest response times, as expected based on their distance from the fire station.

Figure 4.4. RFD Average Response Time by Census Block Group



4.3. Response Time Standards and Modeling Criteria

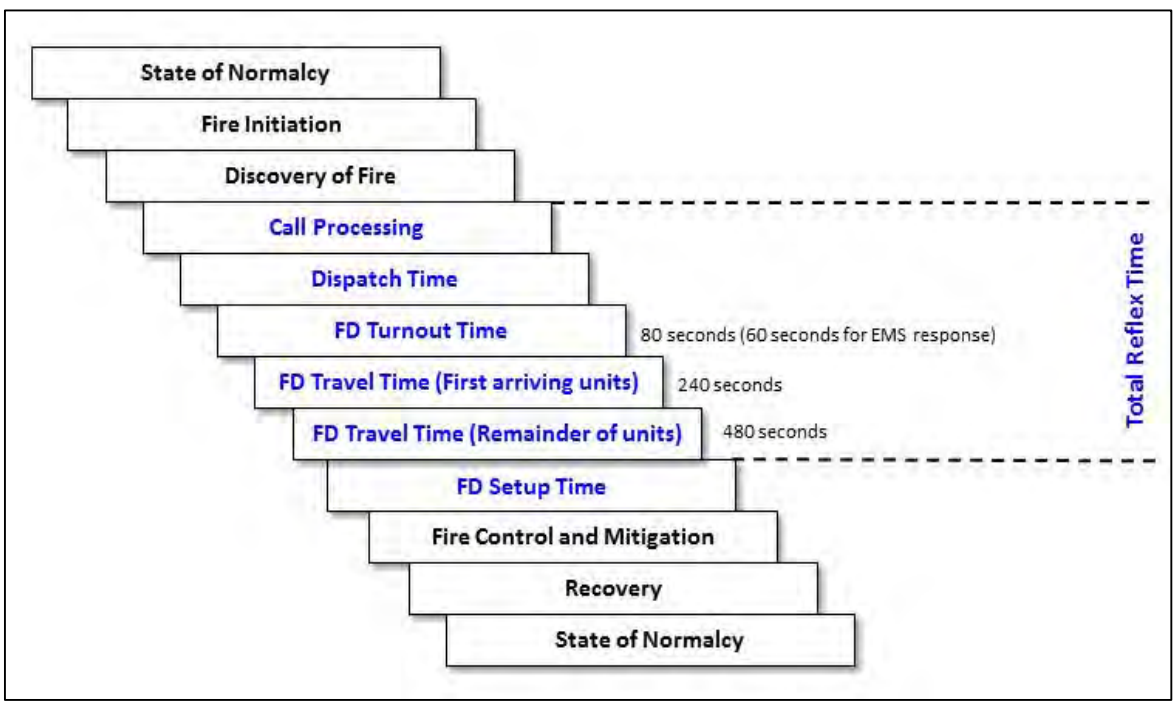
The fire apparatus response time to the scene of an emergency incident is an essential determining factor to the magnitude of the fire or medical emergency that the fire department must handle upon arrival. The theory is the shorter the response time, the smaller the fire that must be extinguished. The principal response time standards are developed by the National Fire Protection Association (NFPA).

It is important to bear in mind that response time standards are not binding on units of government, unless they are adopted as policy. They are, however, a standard by which service levels can be compared across communities.

Before delving into the details of response time standards, it is worthwhile to illustrate the components of fire service response time. While we typically think of the response time as the drive from the fire station to an incident, the reality is more complex (Figure 4.5). The goal of the fire service is to minimize the time taken by this entire sequence of steps. The steps shown in blue are generally under the control of fire services.

If we assume, as we do in this analysis, that minimizing fire department travel time is the goal of fire station location, we then seek to minimize travel time to incidents. Irrespective of the other steps, this is one area that is within the fire service's control.

Figure 4.5. Fire Department Response Reflex Time



The National Fire Protection Association (NFPA) is an industry association that develops and publishes fire protection related standards and codes for usage and adoption by local and other government entities. Their standards and codes are developed through a process approved by the American National

Standards Institute. The association was formed in 1896 by a group of New England insurance firms whose intent was to standardize the then-new fire sprinkler systems. The association develops its standards and codes through a consensus-based process, utilizing national-level technical committees, whose memberships consist of end users, subject matter experts, manufacturers, and representatives of adopting bodies, such as local government. Standards are published and subject for adoption by government and private industry, and subject to revision on an evolving three-to-five-year cycle. The codes and standards are not mandatory unless they are adopted by an *authority having jurisdiction*, usually a unit of government.

4.3.1. NFPA 1710

NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* (2020), is an industry benchmark for paid/career fire departments that describes the requirements for delivery of services, response capabilities, incident management, and strategy. The standard was just revised in 2020. As stated previously, while it is adopted by relatively few jurisdictions, it nonetheless is frequently cited and has become a *de facto* benchmark for service levels. While it is most often cited based on staffing and response time requirements, this standard includes numerous performance standards related to call receipt and processing time, turnout time, staffing, and response (travel) time. We will emphasize those that pertain to travel time:

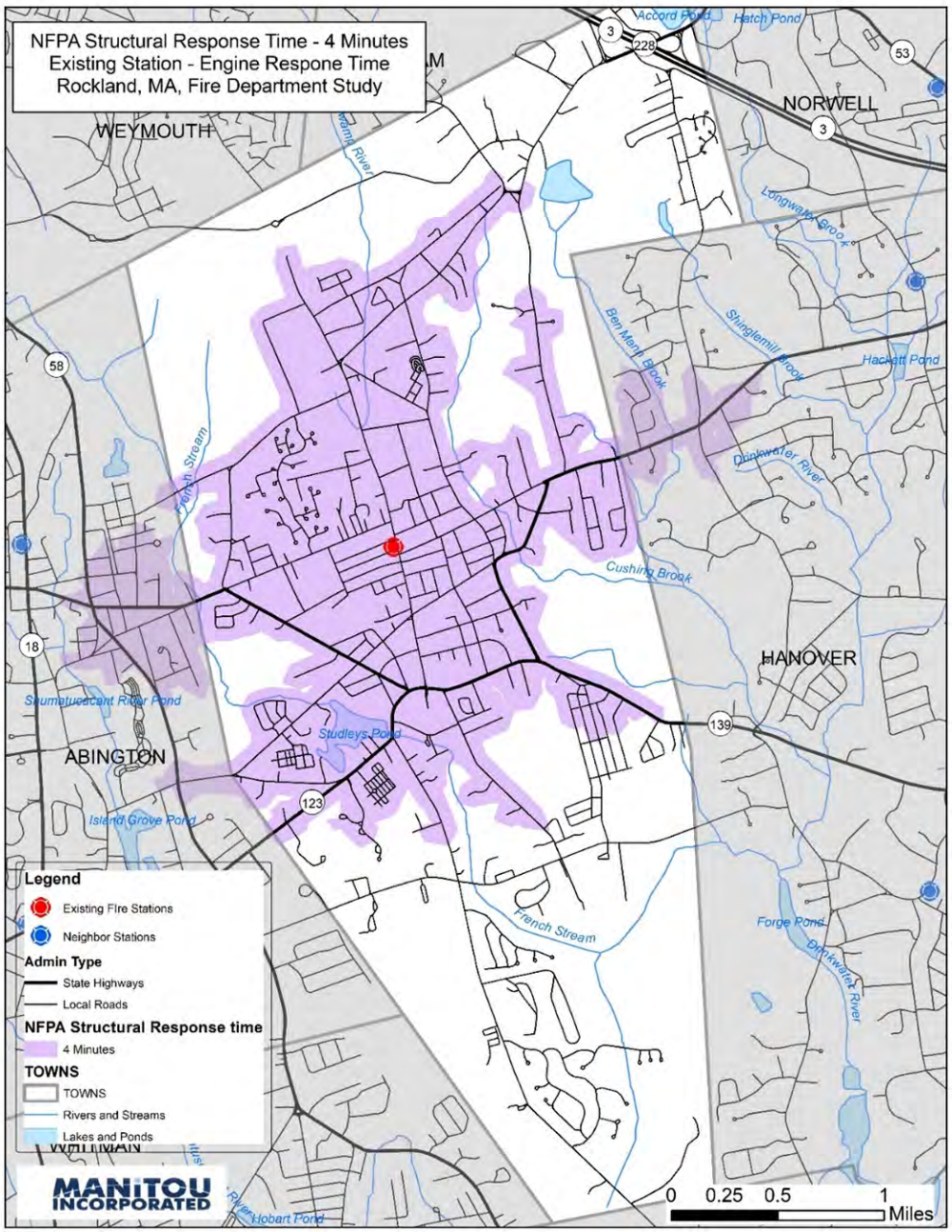
- The fire department's fire suppression resources are deployed to provide for the arrival of an engine company within a four-minute travel time, and/or the initial full alarm assignment within an eight-minute travel time, to 90 percent of the incidents for house fires.[14]

- The first responder medical or basic life support EMS resources are deployed to provide for the arrival of resources and care providers within a four-minute travel time, and/or advanced level paramedic services within an eight-minute travel time, to 90 percent of the incidents.

As stated, NFPA 1710 is a commonly-referenced standard, intended for career or mostly career fire departments. We will use four-minute first due drive time (Figure 4.6) as one benchmark for comparing station location alternatives. This, of course, assumes that all other factors (turnout time, dispatch, etc.) remain constant.

[14] Tracking response times using percentiles or fractiles is a superior method to the average, because averages are highly influenced by very large or very small observations. The 90th (or other) percentile is a more stable measure that captures the quality of service more accurately. The Appendix shows percentile or fractile response times for the RFD.

Figure 4.6. NFPA Four Minute Structural Response Coverage (Drive Time)



Some additional definitions that are worthy of discussion:

- Turnout time: The time required for firefighters to muster and prepare to respond with their equipment is considered turnout time. Where firefighters are assigned to a station, the standard allows for up to 90 seconds from the initial dispatch to exiting the station for fires and special operations and 60 seconds for emergency medical related responses.

- Response time: The time firefighters spend driving their apparatus to an emergency scene is considered response time. Normally, response time is considered the travel time from the fire station to the initial arrival on the scene of the emergency.

- Setup time: Set up is the time necessary upon the fire department's arrival at a structure fire to assemble the necessary resources for firefighting operations. The standard establishes a time for initial attack of no more than 2 minutes for 90 percent of structure fires.

A display of fractile response times is given in Appendix D.

Despite its widely being referenced, the standard incorporates, by reference, other NFPA standards. These standards are numerous and each impose significant requirements in their own right.[15]

The RFD does not meet NFPA 1710 with regard to staffing or response times, and compliance would not be feasible relying on their resources alone. In addition, most fire departments do not have the common practice or capacity to track all of the associated timed performance criteria referenced in the standard. That is, they commonly do not have data on unit staffing and arrival times of the entire complement of apparatus sent on an initial alarm for reported structure fires, particularly if other fire departments are part of that complement.

From a policy perspective, NFPA 1710 requires four-person staffing on engine and ladder companies[16] and, in addition to the response time requirements already referenced, sets minimums for the number of personnel dispatched to reported structure fires,[17] depending on the type of building involved. The staffing requirements tend to increase with successive revisions of the standard, and have increased again in the 2020 edition (Table 4.8).

Table 4.8. NFPA 1710 (2020) Initial Structural Alarm Response

Property Type	Number of Personnel
Single Family Dwelling	15/16
Open Air (Strip) Mall	27/28
Apartment Building	27/28
High-Rise Building	42

As can be seen in Table 4.8, the numbers of personnel within the standard are beyond the capabilities of the vast majority of career fire departments, and would require a mobilization of mutual aid on an unprecedented basis in many settings, such as those in Rockland. Remember, even if the staffing requirements were met, it is unlikely that the response time requirements could be met.

[15] There are 11 NFPA standards incorporated within NFPA 1710, and another ten referenced within mandatory sections of the document.
[16] With more personnel assigned based on a "high number of incidents, geographical restrictions, geographical isolation, or urban areas" (five personnel per company); "tactical hazards, high-hazard occupancies, or dense urban areas" should be staffed with six personnel. See NFPA 1710 (2020), 5.2.3.2.2 and 5.2.3.2.2.1.
[17] A minimum of four personnel is required on any activated automatic alarm system.

4.3.2. ISO Fire Suppression Rating Schedule

Insurance Services Office Public Protection Classification (PPC) Program. The ISO is the oldest and perhaps the most familiar assessor of public fire defense known to municipal managers and administrators. Using the PPC measures, ISO evaluates a community's public fire protection capability and assigns a protection class rating from one to ten. Class 1 represents exemplary fire protection; a Class 10 rating indicates that a community's fire suppression program does not meet ISO's minimum criteria. ISO evaluates all public elements of structural fire prevention and suppression in order to establish a rating. This consists of a review of a community's water supply, call taking and dispatching resources and protocols, response unit staffing, firefighter training, response capacity and coverage, and other factors. A key element of coverage evaluation is the location of engine and ladder apparatus in relation to the development within the jurisdiction. The PPC was developed by the insurance industry and is used to set fire insurance premiums. It does not evaluate EMS capabilities or the other emergency services a modern American fire department routinely provides.

It should be emphasized that for the typical homeowner's policy, fire is only one of many perils, and practices vary from insurer to insurer in terms of utilizing the PPC for insurance rate setting. Most insurers assign the same factor to multiple or bands of ratings, so a change of one grade may not have an immediate impact on insurance premiums. At least one major insurer does not rely on the ISO schedule. The schedule is more influential for commercial fire insurance, but these properties are individually rated.

Although an ISO evaluation was not included in our scope, we include this data for reference purposes. It should be noted that the RFD is currently being re-assessed and is awaiting an updated rating. When the new rating is provided, the potential impacts of a second station can be assessed more accurately.

Again, for informational purposes, we measured the current station locations using ISO criteria of 1.5 miles for engine (one pumping apparatus) and 2.5 miles for a ladder company. Figure 4.7 shows 1.5-mile engine coverage from the existing station. The 2.5-mile ladder coverage encompasses the existing headquarters on Union Street. Given the town's shape, the 1.5-mile coverage leaves areas to the north and south beyond the 1.5-mile limit. The 2.5-mile ladder company coverage does better, and extends well into neighboring towns of Abington and Hanover.

The RFD was last rated in 2014, and is currently rated a Class 3. With a rating of 70.09, the RFD was just able to qualify for a rating of 3. The divergence factor is designed to account for the relative difference between the fire department and the water supply scores.

Table 4.9 shows an overview of the 2014 ratings.

Table 4.9. Rockland FD 2014 ISO Fire Suppression Rating Schedule Overview

FSRS Feature	Earned Credit	Possible Credit
Emergency Communications		
Credit for emergency reporting	2.55	3
Credit for telecommunicators	4.0	4
Credit for dispatch circuits	3.0	3
Total credit for receiving and handling alarms	9.55	10
Fire Department		
Credit for engine companies	4.45	6
Credit for reserve pumpers	0.0	0.5
Credit or pump capacity	3.0	3.0
Credit for ladder service	4.0	4.0
Credit for reserve ladder and service trucks	0.0	0.5
Credit for deployment analysis		
Credit for company personnel	6.96	10.0
Credit for training	4.53	15.0
Credit for operational considerations	3.2	9.0
Credit for fire department	2.0	2.0
	28.14	50.0
Water Supply		
Credit for supply system	22.39	30.0
Credit for hydrants	3.0	3.0
Credit for inspection and flow testing	6.4	7.0
Credit for water supply	31.79	40.0
Divergence	-4.64	
Community Risk Reduction	5.25	5.5
Total Credit	70.09	105.50

An important component of the rating is the location of fire stations, relative to incidents and the area to be serviced (Figure 4.7, Figure 4.8).

Figure 4.7. ISO 1.5 Mile Engine Response Distance

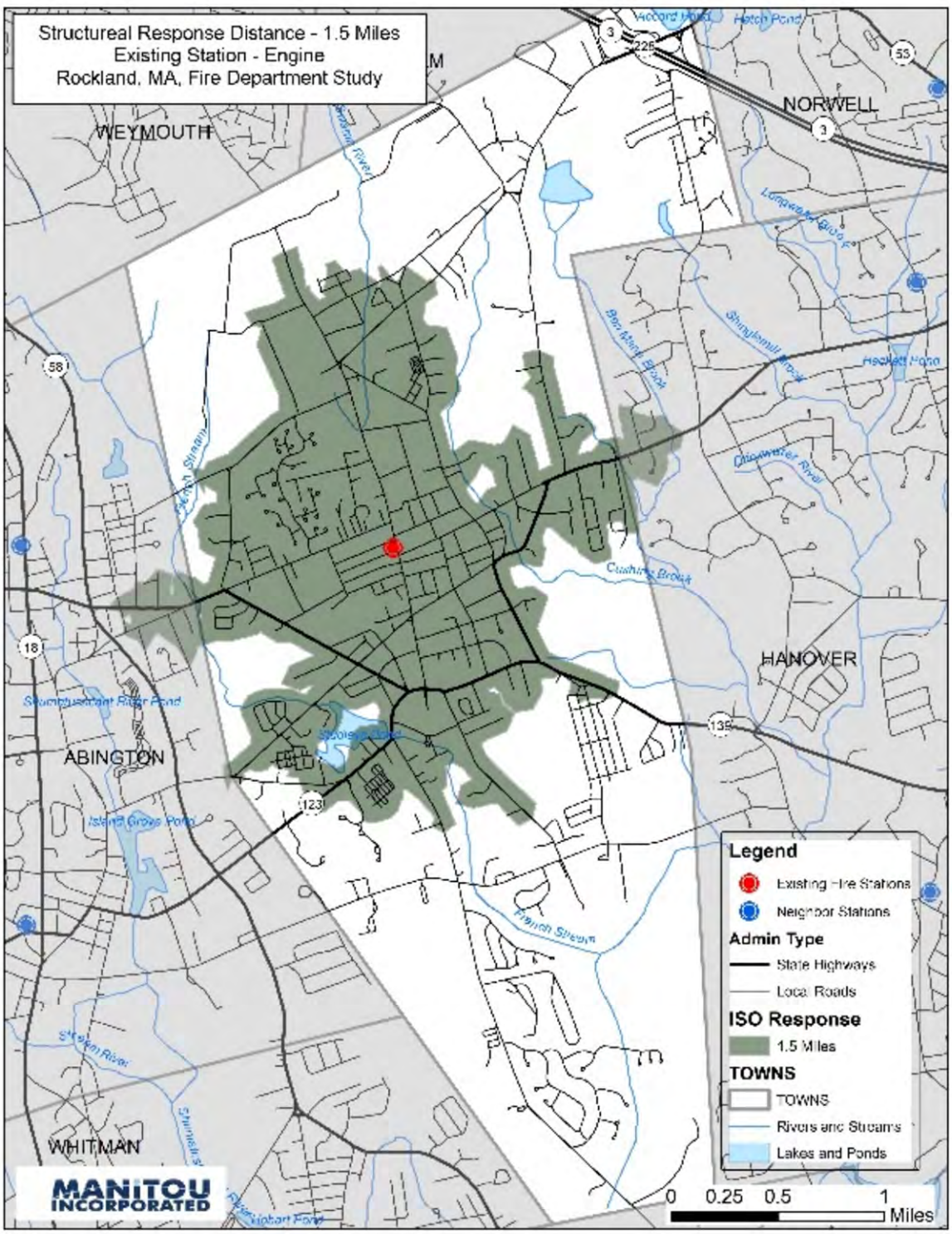
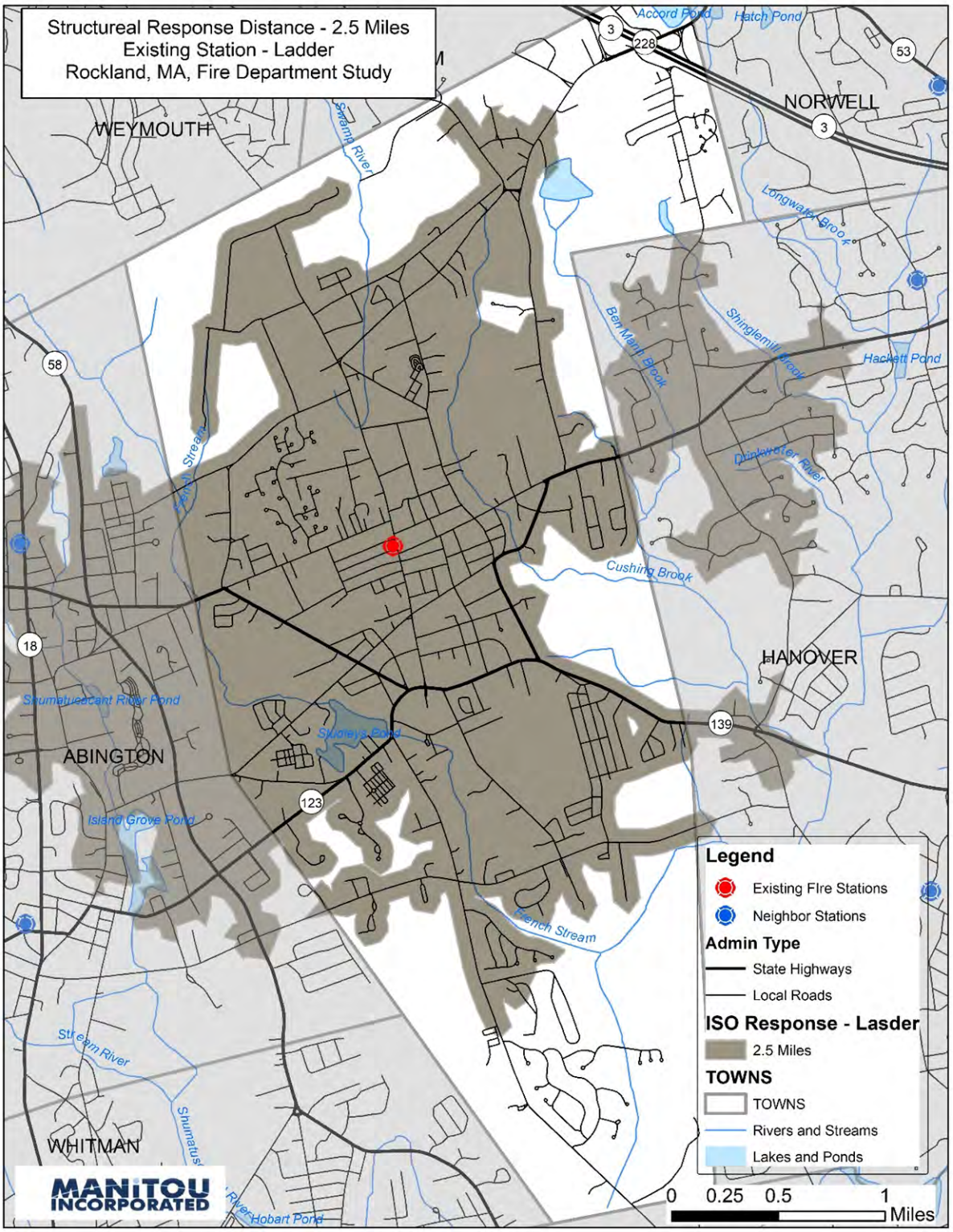


Table 4.8. ISO 2.5-Mile Ladder Response Coverage



Given the continued development of the town and the importance of monitoring response times, the RFD should begin tracking both average and fractile or percentile response times. Both measures have their strengths, but the careful ongoing review of response times is important in light of the relatively recent transition to HRECC, and its ability to very accurately record times by unit.

Recommendation 4.1: Begin to track and report response times, both as averages and at the 90th percentile level, in order to have a more complete understanding of how response times may be changing.

4.4. Unit Workload, Recall Staffing, and Simultaneous Incidents

This section of the chapter will describe various measures of unit workload. Unit workload is important in that the number of units and their staffing help drive response times and determine how many personnel are assigned to various incidents.

Unit Workload

We begin with the number of responses by unit (Table 4.10). We see that the engine company is the busiest unit. This makes sense, as it responds to all incidents. While responses increased from 2018—2019, there was a slight decline in 2020, owing to the pandemic. We would expect the numbers to increase again in 2021.

Table 4.10. Unit Responses, 2018-2020

Year	Ambulance	Boat	Engine	Forestry Unit	Ladder 1
2018	1,226		1,638	1	69
2019	2,538	1	3,267	5	168
2020	2,473		3,058	5	170

Unit Hour Utilization (UHU) is the number of hours spent on calls for service divided by the number of hours the unit was avilabe for service. It can provide a measure of busyness that can be used to monitor workload over time, and also identify units that may be becoming so busy that they are unavailable for incidents, which degrades response times. To obtain the UHU, we multiply the number of responses by the average time out of service per response, and divide that by the available hours (8,760 hours in a year). The average time of service for the engine was roughly 12 minutes in 2020, and 13:42 minutes for the ladder. Table 4.11 shows that utilizations are at 25 percent for the ambulance, and seven percent for the engine.

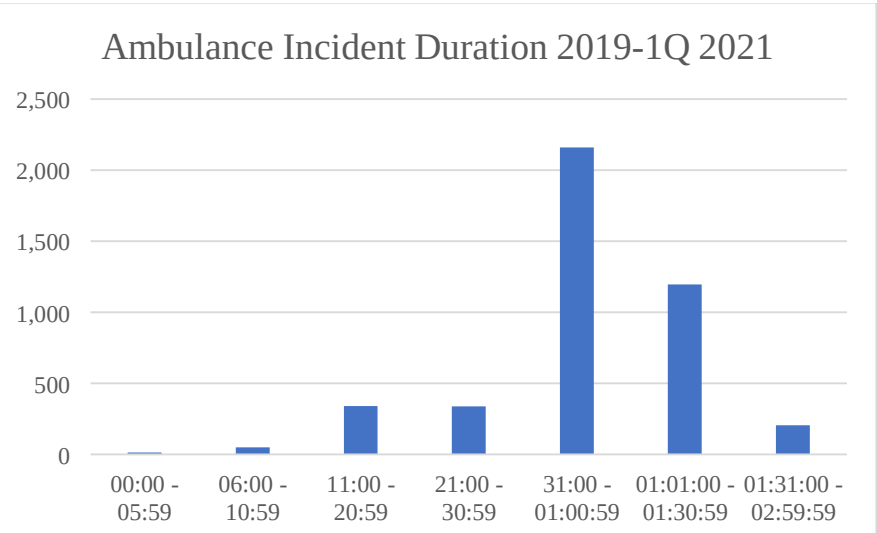
One caution in interpreting these numbers is that the numbers may understate the utilization of personnel because units are cross-staffed with the same personnel.

Table 4.11: Unit Hour Utilization (estimated)

Year	Ambulance 1	Rockland Cars	Rockland Engine	ROCKF	Rockland Ladder
2018	12.6%	0.76%	3.67%	0.04%	0.20%
2019	26.1%	0.64%	6.77%	0.09%	0.35%
2020	25.0%	1.03%	6.91%	0.08%	0.44%

The ambulance spent an average of 57 minutes out of service when it performed transport. We can see in Figure 4.9 that the vast majority of ambulance calls result in time of service in excess of 30 minutes. Lesser times likely reflect attendance at fire calls and other medical incidents where a transport was not made.

Figure 4.9: Ambulance Incident Duration



Turnround times tended to be longer in 2020, which is a likely impact of Covid-19 incidents and precautions.

For ambulance calls, there are two additional components that are critical to understanding both workload and unit availability. First, ambulances must transport the patient to the hospital, so there is the added time to transport from the scene to the hospital. Second, there is turnaround time, or that time that the ambulance spent at the hospital emergency room transferring the patient, restocking the unit with supplies, disinfecting, and preparing to go in service for the next call. RFD ambulances may go in service from the hospital emergency room, meaning that they are outside the town, and may have longer driving times to incidents than if they were responding from quarters.

Recommendation 4.2: Develop individual unit designations for each unit in the CAD system for purposes of assigning workload.

Recall Staffing

The department routinely utilizes recalled personnel. The RFD uses the code *Box 33* any time off-duty personnel are recalled. When this code is sounded, an SMS message is sent to RFD members, who will respond if they are available. Response is not mandatory, and members may gauge the severity of the situation in making their determination. Members do not check-in until they arrive at the station or at the scene. The incident commander does not know who is coming back, nor is there any on-call schedule.

Figure 4.10 lists the full rules for when this code is used. Generally it is used because of simultaneous calls, a working fire, or when there is only one person remaining on duty at the station.

Figure 4.10. Box 33 Policy

Box 33 (Recall Policy)

The following is the list which shall be used as a guidance for striking Box-33 and recalling department personnel:

- Reported fire in a structure.
- Reported smoke in a structure.
- Engine, ladder, or forest fire mutual aid to a scene or station coverage.
- Vehicle or dumpster fire located in close proximity to a structure (OIC to determine).
- Master box alarm received from a predesignated Red Box.
- Water/ice rescue.
- Any time the Hurst equipment (jaws of life) is in operation.
- MedFlight is responding to an LZ. Confirm MedFlight is flying prior to striking the box.
- Code red/CPR in progress (requested by units on scene only).
- Anytime the two ambulances have transported to a hospital and available staffing has dropped to two or less personnel.
- Anytime there is only one member responding to an incident.
- Upon the orders of an incident commander. The incident commander shall follow with instructions of where personnel are to respond.

We did an analysis of data in order to better understand the importance of personnel recalls. We used calendar year 2019 data, as that was viewed as being more typical. This analysis required making photocopies of paper overtime records and tabulating the results. These results do not include all incidents. The RFD advised that there may be no record retained if a recall is issued and no personnel respond. This means that *the following statistics undercount the number of cases where a recall was issued* and no personnel responded.[18]

In 2019, there were approximately 447 records of recalled personnel, for an average of 1.23 times per day. Of these recalls, most occurred during the day, followed by evenings, and then nights. Table 4.12 shows the number of calls by time of day.

Table 4.12: Recalls by Time of Day

Shift based on the start time of the OT recording	2019	Pct of Total
Missing	26	5.9%
Day (8:00 a.m. to 3:59 p.m.)	198	44.9%
Evening (4:00 p.m. to 11:59 p.m.)	157	35.6%
Night (Midnight to 7:59 a.m.)	60	13.6%
Total	441	100.0%

We next examine the number of personnel who respond to a recall (Table 4.13). We can see that the number of people who return ranged from zero, meaning no members returned, to a high of 14, which reflected a major incident.The most common number of personnel responding is one (130 cases), followed by two (107 cases). Again, remember that the number of cases with zero personnel responding is higher than what is reflected in the current records.

[18] We attempted by multiple means to obtain the number of times a Box 33 was struck. Neither HRECC and RFD could provide this information.

Table 4.13. Number of Members Returning for Recall

Number of personnel	Count	Pct of Total	# Personnel
0	8	1.79%	0
1	130	29.08%	130
2	107	23.94%	214
3	82	18.34%	246
4	65	14.54%	260
5	25	5.59%	125
6	16	3.58%	96
7	8	1.79%	56
10	1	0.22%	10
11	1	0.22%	11
12	3	0.67%	36
14	1	0.22%	14
TOTAL	447	100.00%	1198

Note: Recalls with no personnel responding are undercounted.

The average duration of recalls is a measure of how busy the department may be and the severity of the incident for which they were recalled. We see that the duration of recalls tends to be around an hour, with recalls at night (midnight to 8:00 a.m.) being longest, at one hour 11 minutes (Table 4.14). The recalls ranged from a low of six minutes, to a high of six hours, 27 minutes.[19]

Table 4.14. Duration of Recall by Time of Day

Average duration of activity by shift based on start time	Count	h:mm:ss
Day (8:00 a.m. to 3:59 p.m.)	136	0:53:29
Evening (4:00 p.m. to 11:59 p.m.)	104	0:55:51
Night (Midnight to 7:59 a.m.)	47	1:11:46

Recommendation 4.3: The RFD should begin tracking every time a recall is issued. This information is critical to understanding staffing needs.

Recommendation 4.4: The department currently does not track personnel returning to the station or to an incident, leaving the incident commander to wait and see who shows up at the scene of an incident. The RFD should consider purchase of software that would permit both automatic alerting of recalls for firefighters, and offer the ability to report in real time which personnel were responding and their estimated distance or time from the scene or station. Such software could largely automate tracking

[19] Contractually, members receive a minimum of two hours for recall if they come in on off-duty status. Members who are going off or coming on-shift may be held over, meaning they would receive actual hours.

recall data, and provide the incident commander with improved awareness about the need for mutual aid or additional recalls of personnel. This also assures accountability for personnel recalled to duty.

Simultaneous Incidents

The last measure of workload is the number of simultaneous incidents. With six or seven personnel on duty, multiple calls spread personnel extremely thin.

Table 4.15 shows the number of times in which there were two active calls at the same time. This was defined by identifying any call that occurred while another incident was still active. Looking at five years of data, we can see that the number of simultaneous or overlapping incidents is increasing. As a percentage, it went from nine percent in 2016 to 13.6 percent in 2020.

Table 4.15. Number of Occurrences of Overlapping Incidents by Year.

Count	2016	2017	2018	2019	2020	Total
No calls within duration	2,730	2,737	2,919	2,879	2,706	13,971
One additional call during duration	270	260	454	386	426	1,796
Total Incidents	3,000	2,997	3,373	3,265	3,132	15,767
Percentage overlapping calls	9.0%	8.7%	13.5%	11.8%	13.6%	11.4%

The next review is to determine when these incidents were occurring during the course of the day, in order to analyze the impact on staffing and call backs when multiple incidents occur and staffing may be at a lower total number.

Table 4.16 shows that, consistently over the years, the number of overlapping calls is highest during the evening hours and overall represents 49 percent of the total overlapping calls. The evening shift is when there is more activity as people are out of work and school, traveling, or at home cooking. This impacts the required staff and equipment that is necessary to have on hand to cover these calls when they occur while staff is engaged in working a prior incident.

Table 4.16. Number of Overlapping Calls by Time of Day/Shift – 2016-20

Overlapping Call Description	Shift	2016	2017	2018	2019	2020	Total	Pct
One call during duration	Day	66	67	107	115	102	457	25%
One call during duration	Evening	122	149	192	189	220	872	49%
One call during duration	Night	82	44	155	82	104	467	26%
Total Incidents		270	260	454	386	426	1,796	100%

Table 4.17 shows the type of incident already engaged in activity when a second call comes in. As expected by the overall incident distribution, the majority (52%) are EMS medical assist calls (311) and another 14% are the remaining incident type in the EMS category. There are a significant number of false alarms and false calls that occupy staff while other incidents are happening. This overlapping occurrence impacts the response time by requiring the removal of units and staff from an existing incident (only when it is safe to do so), or it impacts the current event by moving units to the second incident. The process takes time and increases response time.

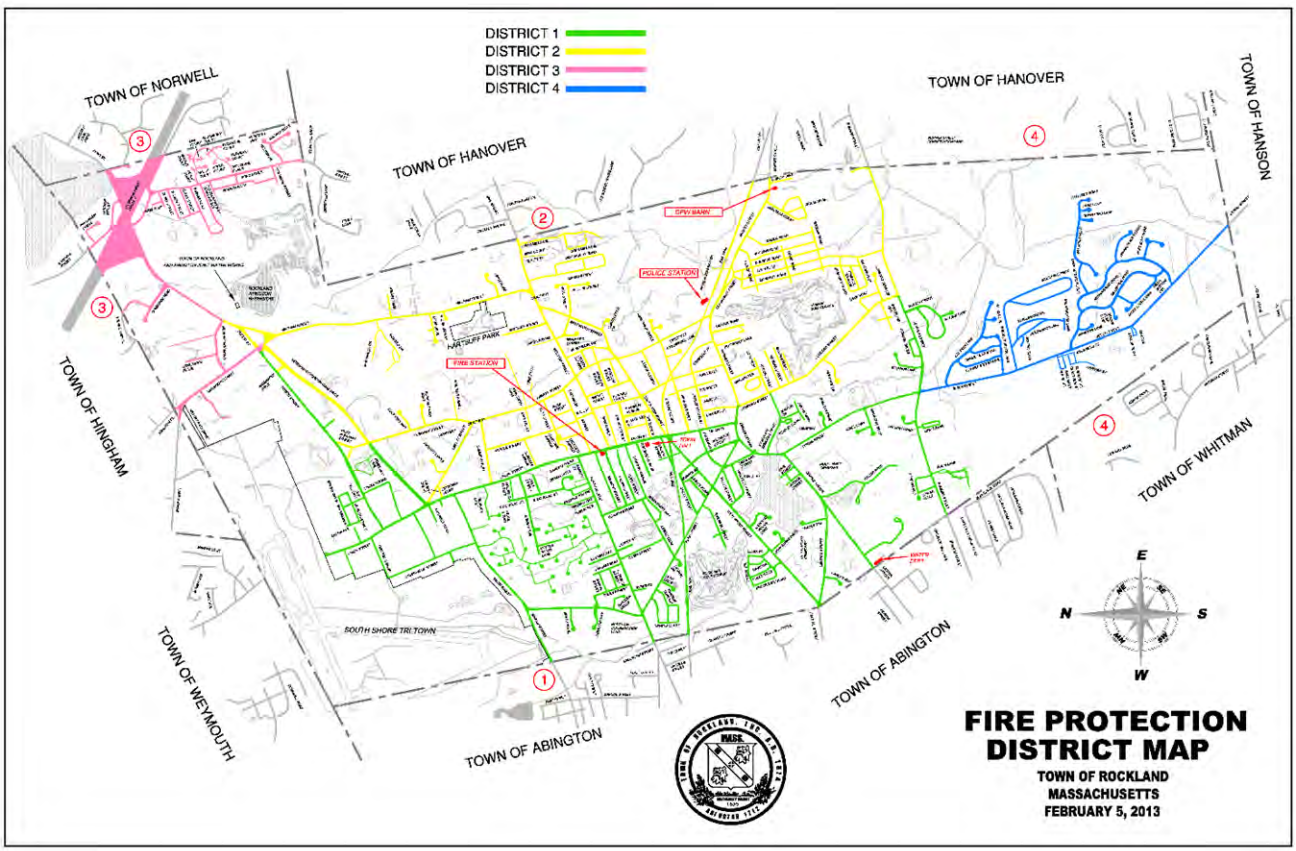
Table 4.17. Overlapping Calls by First Call Incident Type - Rockland 2016-2020

General Incident Description	2016	2017	2018	2019	2020	Total	Pct
1. Fire (Excluding Building Fires)	8	10	13	4	6	41	2%
111 Building Fire	1	9	12	2	3	27	2%
2. Overpressure Rupture, Explosion, Overheat (no fire)			1			1	0%
3. Rescue & Emergency Medical Service Incident - Excluding 311	58	50	67	40	43	258	14%
311 Medical assist, assist EMS crew	139	128	206	235	227	935	52%
4. Hazardous Condition (No Fire)	32	28	57	28	37	182	10%
5. Service Call	9	8	32	27	31	107	6%
6. Good Intent Call	1	2	4	10	26	43	2%
7. False Alarm & False Call	22	25	58	37	47	189	11%
8. Severe Weather & Natural Disaster			3		3	6	0%
9. Special Incident Type			1	3	3	7	0%
						1,796	100%

4.5. Mutual Aid

The RFD has defined mutual aid assignments through an eighth alarm for fires, detailed call lists for EMS, and special operations equipment such as boats, forestry, brush breakers, and tower ladders. These assignments vary by mutual aid district, which is based on the closest units given the town geography. The town is divded into four mutual aid districts (Figure 4.11).

Figure 4.11. RFD Mutual Aid Districts



The RFD relies on mutual aid and has a cooperative relationship with its neighboring fire departments (Figure 4.12).

Figure 4.12 RFD Mutual Aid Run Card, District 1

Rockland	1							STATION	STATION	STATION
ALARM	TO INCIDENT SCENE							All Cover Companies to 360 Union Street		
RESPONSE	ENGINE	ENGINE	LADDER	CHIEF #	AMBULANCE	SPECIAL		ENGINE	ENGINE	LADDER
1 ST Initial	Rockland		Rockland		Rockland	Rockland 270	Rockland 271			
WORKING FIRE	Abington	Hanover		Abington C-1		Rockland Engine		Hingham		
2 ND Alarm	Hingham	Norwell	Whitman	Whitman C-1	Pembroke	Whitman CERT		Hanson		
3 RD 3rd Alarm Chiefs	Hanson	Weymouth	Brockton T-1			DFS REHAB		Holbrook		
4 TH Alarm	Holbrook	Hanover				DFS ISU		Braintree	Pembroke to Hanover	
5 TH Alarm	Braintree	Whitman	Randolph					Brockton	E.Bridgewater to Whitman	
6 TH Alarm	Brockton	Pembroke from Hanover						Scituate	Marshfield to Hanover	
7 TH Alarm	Scituate	E.Brdgwatr from Whitman						Randolph	Bridgewater to Whitman	
8 TH Alarm	Randolph	Marshfield from Hanover						Hingham	Duxbury to Hanover	

Table 4.18 shows the mutual aid given and received by the RFD, based on incident type.We can see that EMS incidents were the largest share of mutual aid received and given. This table distinguishes between automatic and mutual aid.

Automatic aid is the aid given by neighboring departments without a confirmed working fire. Mutual aid is typically invoked only after an incident is confirmed (or when Rockland does not have any resources avialable due to other incidents).

Table 4.18. Mutual Aid Given and Received 2016-2020

Mutual Aid given and Received By General Incident Type - 2016-2020									
Category	AidGivenOrRecieved		2016	2017	2018	2019	2020	TOTAL	Percent
EMS	1	Mutual aid received	360	201	149	44	53	807	6.4%
EMS	2	Automatic aid received	3	5	8	3		19	0.2%
EMS	3	Mutual aid given	6	4	18	35	18	81	0.6%
EMS	N	None	2,073	2,273	2,505	2,528	2,286	11,665	92.8%
			2,442	2,483	2,680	2,610	2,357	12,572	100.0%
FIRE	1	Mutual aid received	7	7	16	4	4	38	11.4%
FIRE	2	Automatic aid received		1				1	0.3%
FIRE	3	Mutual aid given	11	7	2	1	2	23	6.9%
FIRE	4	Automatic aid given	1	1				2	0.6%
FIRE	N	None	71	50	53	44	52	270	80.8%
			90	66	71	49	58	334	100.0%
OTHER	1	Mutual aid received	5	6	10		5	26	0.8%
OTHER	3	Mutual aid given	13	18	15	6	15	67	2.1%
OTHER	N	None	492	480	675	677	764	3,088	97.1%
			510	504	700	683	784	3,181	100.0%
Total	1	Mutual aid received	372	214	175	48	62	871	5.4%
Total	2	Automatic aid received	3	6	8	3	-	20	0.1%
Total	3	Mutual aid given	30	29	35	42	35	171	1.1%
Total	4	Automatic aid given	1	1	-	-	-	2	0.0%
Total	5	Other aid given						-	0.0%
Total	N	None	2,637	2,803	3,233	3,249	3,103	15,025	93.4%
			3,042	3,053	3,451	3,342	3,199	16,087	100.0%

Plymouth County maintains a Technical Rescue Team and Dive Team that can be called on by RFD when needed. These teams are staffed by members of individual fire departments across the county. The RFD has some of their members on these teams.

Hazardous materials responses come from the Massachusetts State Department of Fire Services Regional Team.

Figure 4.18. A mutual aid deputy chief (from Abington) assists at a structure fire incident in Rockland.

Through observation, one concern that was addressed was the ability to muster sufficient command officers in the event of a structural fire or other complex incident. This is especially important for Rockland because the only officer on-duty on a 24-hour basis is a company officer, who typically engages in direct incident mitigation and customarily transfers command to the chief or deputy, who are responding from home. Personnel interviewed indicated that a chief officer arrives on the scene in a timely fashion, and mutual aid officers routinely respond as well, providing adequate oversight for operations.

The current mutual aid system appears to function well, given its limits. A desirable state of affairs would be to strive to meet the NFPA 1710 requirement of an initial complement of personnel dispatched to a reported structure fire (based on the single family dwelling requirement of 17 personnel).[20] This would typically require resources from the two to three closest stations on the initial alarm.

The department has automatic aid agreements in place, drawing one engine from the nearest department in the event of any reported structural fire response. This is a good policy and appears (in our limited observation) to work well. Such agreements are beneficial both in terms of providing firefighters and equipment to the scene, but also by providing additional chief officer support. Such agreements should be maintained and enhanced where possible.

[20] NFPA 1710 (2020) S*tandard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments,* 5.2.4.1.1 (9).

5. Future Growth and Demand

There are several sources for population forecast data. The first (which we used) was the UMass Donahue Institute's (UMDI) 2018 Forecast. The UMDI forecast (Table 5.1), which was based on 2015 data, called for the town's population to increase to a peak of 17,706 in 2020, and then decline to under 17,000 by 2040.

Table 5.1. UMDI Population Forecast, Town of Rockland 2015-2040

Minor Civil Division	County	Census 2010	Projection 2015	Projection 2020	Projection 2025	Projection 2030	Projection 2035	Projection 2040
Rockland	Plymouth	17,489	17,657	17,706	17,642	17,395	17,041	16,710

In comparison, the U.S. Census American Community Survey 2019 estimates showed 17,986 residents in 2019, which is larger than the EMDI projections.[21]

Predicting future growth is highly speculative. A number of factors can influence the course of population change. Local development and growth in housing units can cause increases in population that might not be captured in estimates produced at the state level. Locally, some large residential projects should be coming online. However, much future development is still speculative, given the defeat of the proposed zoning change at the most recent town meeting. In light of this development, the potential for growth has diminished in the near term, but the pre-existing land uses are still available for development.

Another factor that could work to reduce the town's population would be a reduction in average household size across housing units. This could actually reduce the town's population even if the number of housing units was maintained. It should be noted that demand for service is also driven by commercial activity and human presence from visitors, patrons, and workers who may not be captured in population forecasts.

To summarize, we believe that a major increase in population is unlikely, but growth may be greater than anticipated by the UMDI forecast. When 2020 Census data is released, it will be an important data point to better understand the dynamics of residential population in the town. On the commercial side, continued growth appears likely, and this will translate into increased demand for service associated with medical calls for workers and patrons of these establishments, and a need to provide fire and rescue services to a growing building stock, even if it is provided with modern fire protection systems such as sprinklers and fire alarms.

In terms of the number of incidents for the RFD, we expect that numbers will increase in 2021 based on a return to more normal economic and social activity. The overall number of incidents has fluctuated in recent years and, even with a sustained increase, we do not expect the number of incidents to increase by more than 100 or so annually above recent peaks over the next 10 years.

[21] U.S. Census Bureau QuickFacts: Rockland town, Plymouth County, Massachusetts

6. Fire Station Location Alternatives

The town provided us with three alternate sites for possible location of a new or additional fire station. We evaluated these sites for their ability to provide coverage in comparison to the current headquarters.

Recall that this analysis is based solely on drive time and does not represent total response time. Assuming other components of response time remain constant across scenarios, we can use drive-time as the discriminator among alternatives.

6.1. Scenarios

The three sites to be evaluated were the old Lincoln School, 160 Market Street, and a site in Blasdell Park. This produces five scenarios, as follows (Table 6.1):

Table 6.1. Station Location Scenarios

Scenario Number	Number of Stations	Station Locations
1	1	Current HQ (260 Union Street)
2	1	Lincoln School
3	1	160 Market Street
4	2	Current HQ, Blasdell Park[a]
5	2	160 Market Street, Blasdell Park

[a]Please note that for assessing coverage, the Lincoln School and current HQ are considered equivalent for the two station scenarios.

For each scenario, we compared coverage along multiple dimensions:

- Percent of town within mileage covered – percentage of land area covered.
- Percent of population served (2018 American Community Survey).
- Percent of road network covered – street segments.
- Percent of street addresses covered – percent of structures covered.
- Percent of historic incidents covered (2016-2020).
- Area covered both inside and outside the town boundaries.

These statistics were calculated at four- and five-minute drive-time distances from each station in each scenario. An ISO 1.5-mile distance analysis is presented in the Appendix.

The reader is referred to Chapter 4 for mapping of the current coverage using ISO and NFPA first-due criteria.

Scenario 2 shows the impact of a single station at the Lincoln School (Figure 6.1). The third scenario shows a single station located at 160 Market Street (Figure 6.2). Scenario 1 is not repeated here at the four-minute level (Figure 6.3).

Figure 6.1. Scenario 2 – Lincoln School, Four Minutes

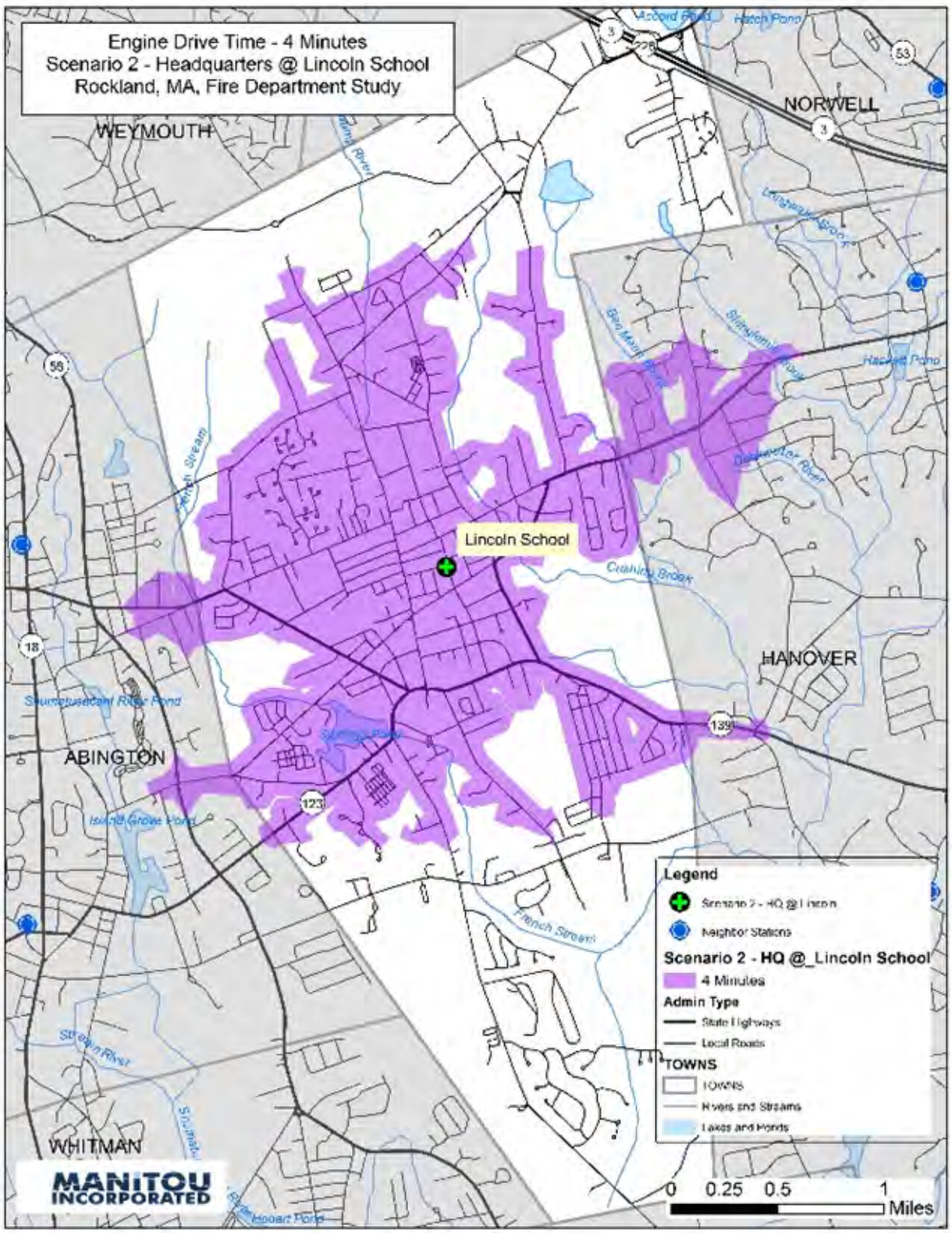


Figure 6.2. Scenario 3, 160 Market Street, Four Minutes

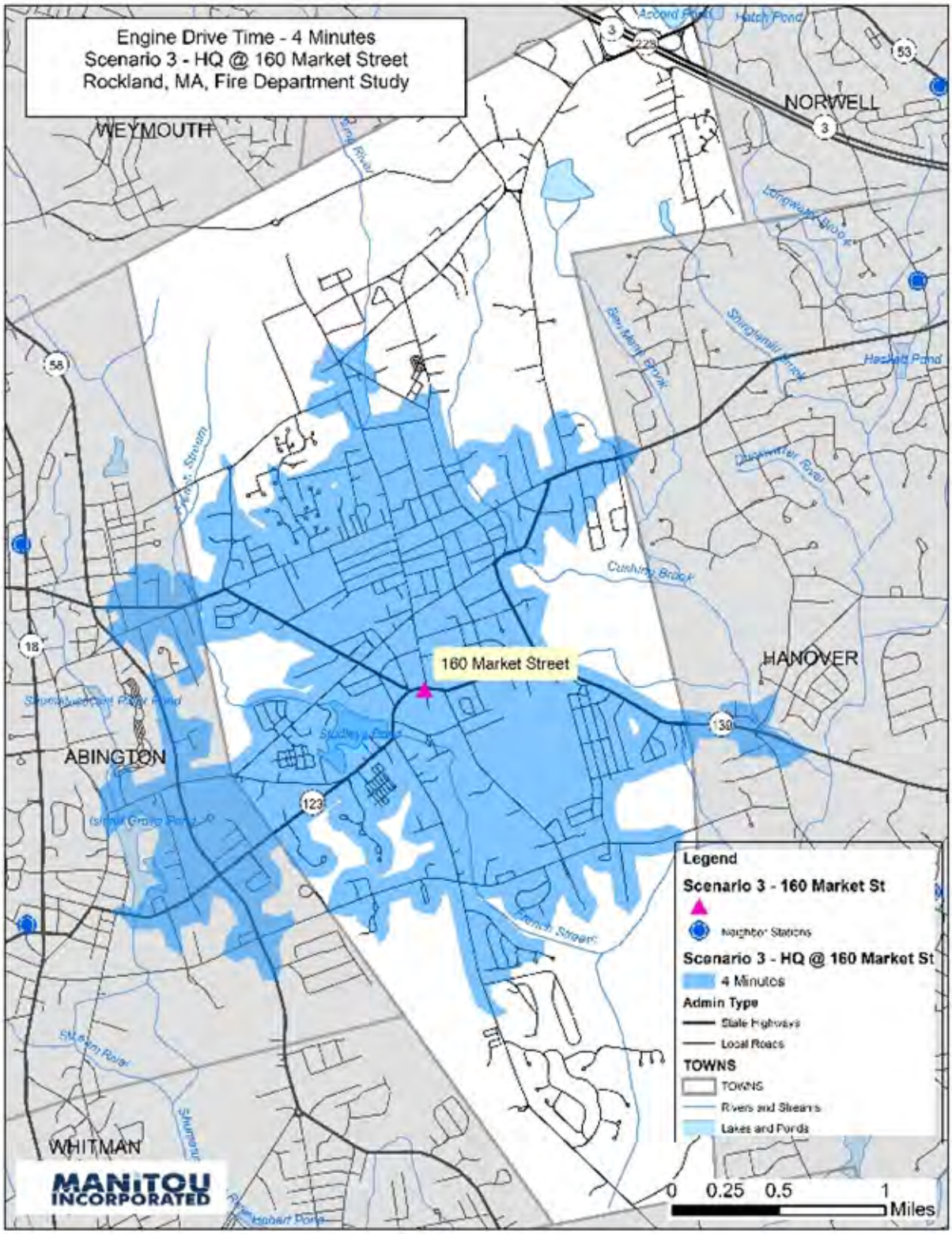


Figure 6.3. Scenario 1, Existing HQ, Five Minutes

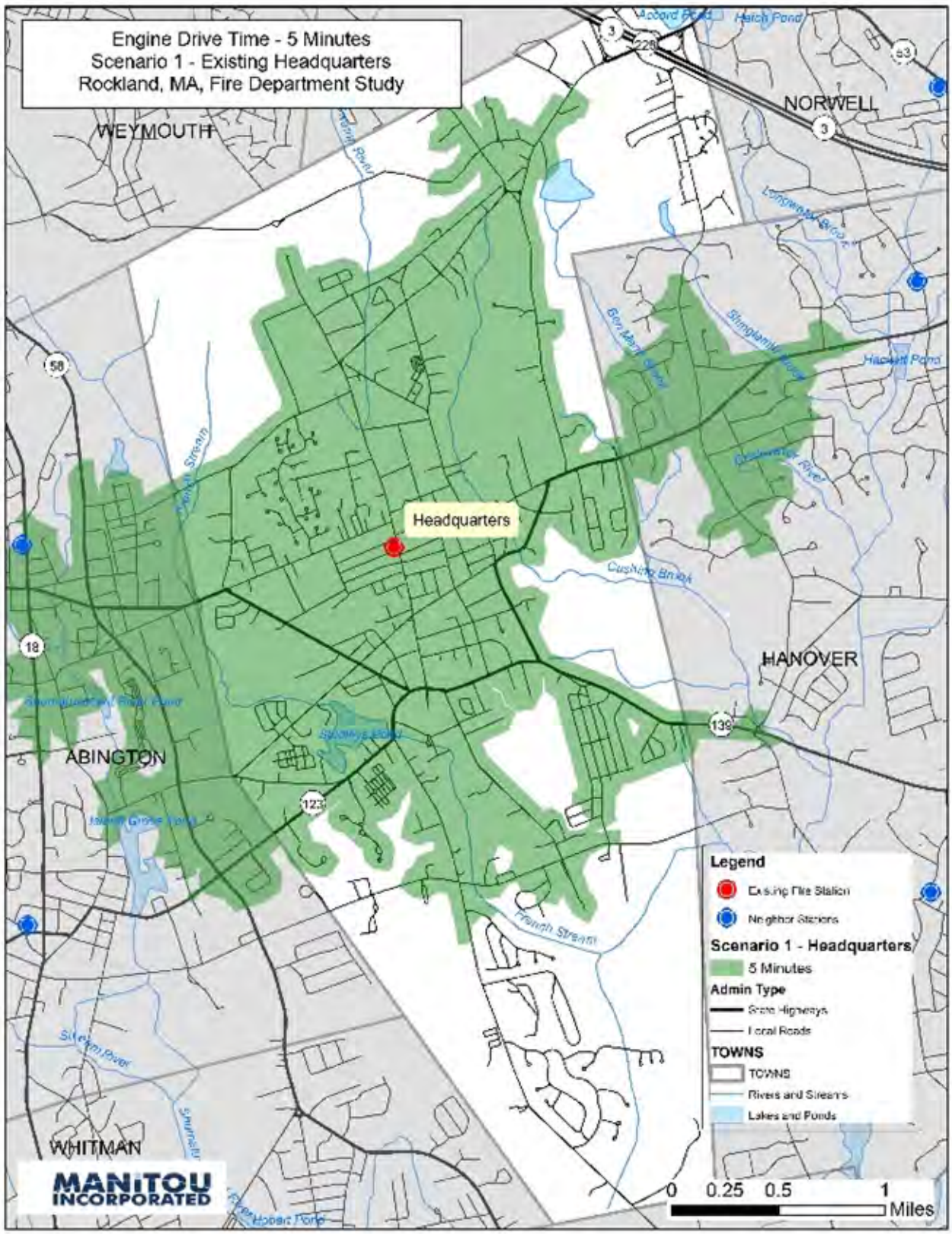


Table 6.2 shows the results of the four-minute drive-time analysis for one-station scenarios. We can see that each of the sites offers very similar coverage. Interestingly, Scenario 2 offers slightly better incident coverage (based on historic incidents).

Table 6.2. Four-Minute Coverage, One-Station Scenarios

Time (min.)	Scenario	Stations	Area Covered	Percent Area	Percent Outside	Population	Roads	Addresses	Incidents
4	1	1	3.84	38%	62%	54.3%	63.3%	75.3%	80.4%
4	2	1	3.81	38%	62%	54.5%	64.2%	77.2%	82.9%
4	3	1	3.87	38%	62%	56.1%	62.4%	73.4%	78.4%

We next examine these same scenarios, this time using a five-minute drive time. Coverage remains very similar for each of the scenarios at the five-minute mark. At five minutes, the drive time extends to the town boundary, so there is no need to do further distances (Table 6.3).

Table 6.3. Five-Minute Coverage, One-Station Scenarios

Time (min.)	Scenario	Stations	Area Covered	Percent Area	Percent Outside	Population	Roads	Addresses	Incidents
5	1	1	5.19	51%	49%	68.8%	74.7%	86.3%	91.7%
5	2	1	5.27	52%	48%	70.1%	74.1%	85.5%	88.4%
5	3	1	5.21	51%	49%	68.9%	76.7%	86.1%	89.1%

We next examine two-station scenarios (Table 6.4). Remember that we treat the existing headquarters and Lincoln School (Figure 6.4) as a single site, because they are so close. Figures 6.6 and 6.7 show these scenarios at four-minute drive times, while Figures 6.8 and 6.9 show them at five-minute drive times.

Table 6.4. Four-Minute Coverage, Two-Station Scenarios

Time (min.)	Scenario	Stations	Area Covered	Percent Area	Percent Outside	Population	Roads	Addresses	Incidents
4	4	2	5.04	50%	50%	62.4%	75.9%	83.4%	88.9%
4	5	2	5.98	59%	41%	72.8%	87.5%	92.7%	96.3%

Under the two-station scenario, we begin to see differences emerge. At four minutes, we see that the combination of Blasdell Park and 160 Market Street (Figure 6.5) is a better option. This is primarily due to the greater separation between the two sites, with the resultant improvement of coverage while avoiding overlap.

Lastly, we examine these two-station scenarios at a five-minute drive time. We see that the two scenarios become more even at the five-minute level. While Scenario 5 retains its lead, Scenario 4 gets much closer.

Table 6.5. Five-Minute Coverage, Two-Station Scenarios

Time (min.)	Scenario	Stations	Area Covered	Percent Area	Percent Outside	Population	Roads	Addresses	Incidents
5	4	2	5.97	59%	41%	72.7%	84.4%	91.2%	95.4%
5	5	2	6.84	68%	32%	80.3%	92.5%	96.9%	98.8%

Figure 6.4. Scenario 2, Lincoln School, Five Minutes

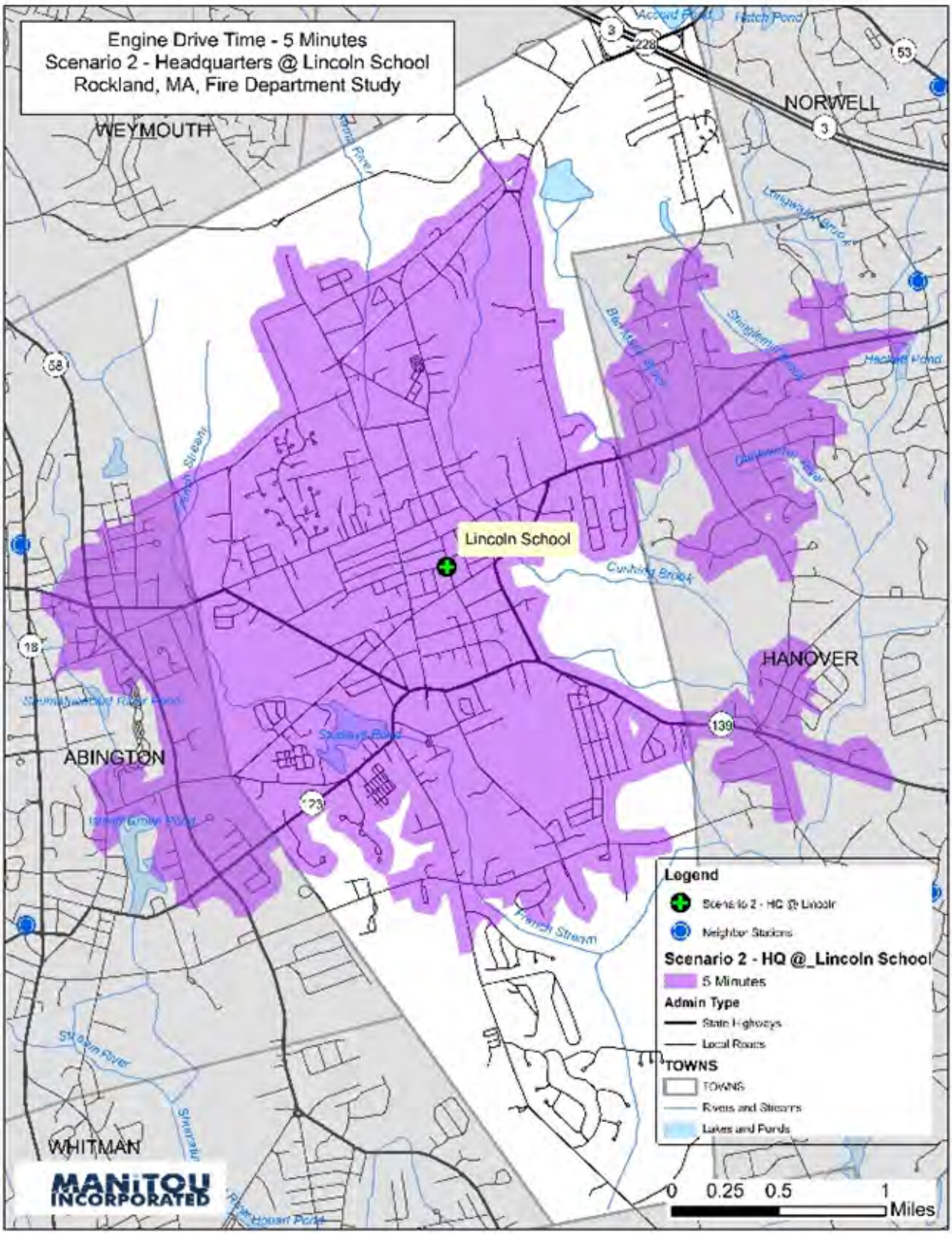


Figure 6.5. Scenario 1, 160 Market Street, Five Minutes

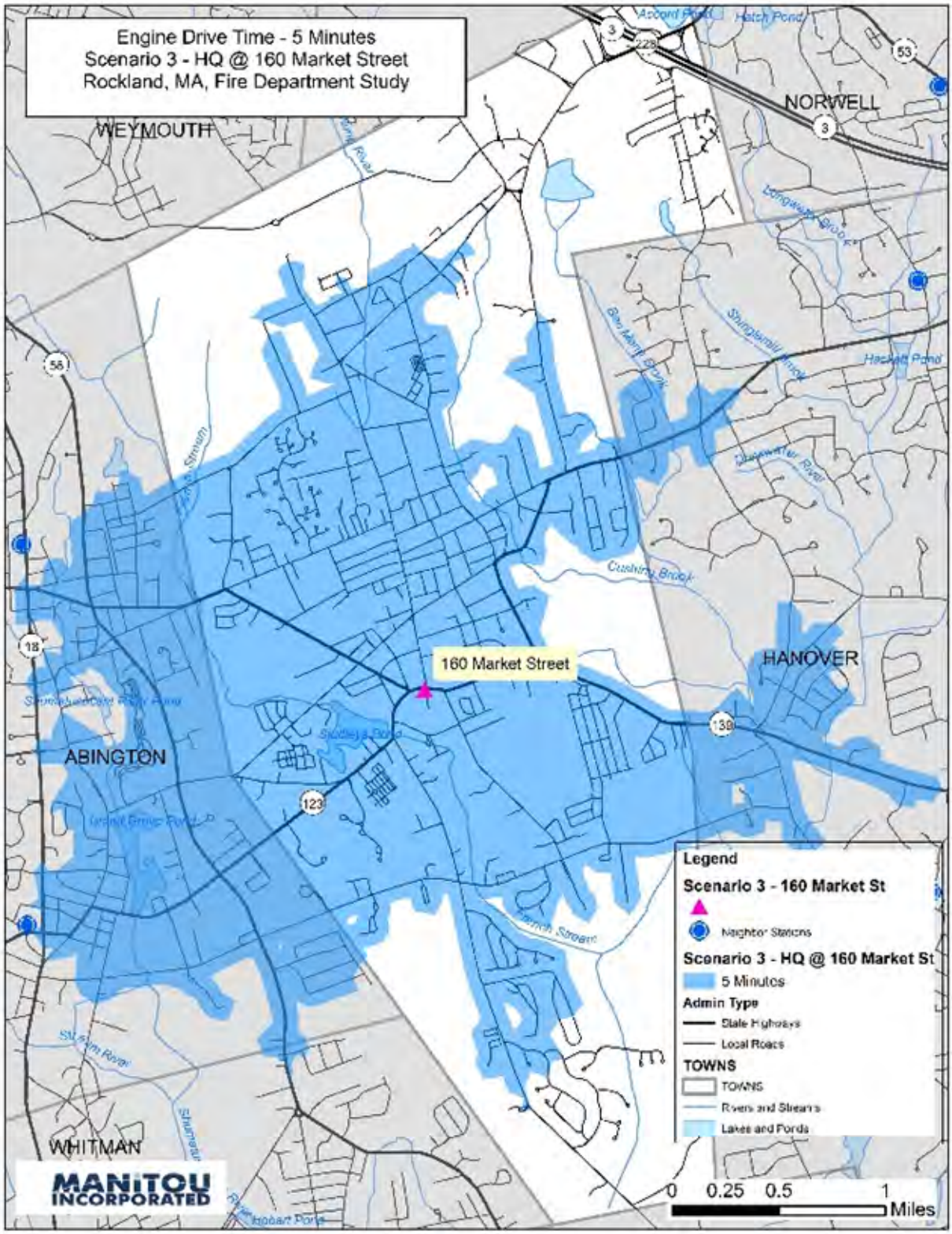


Figure 6.6. Scenario 4, 360 Union Street and Blasdell Park, Four Minutes

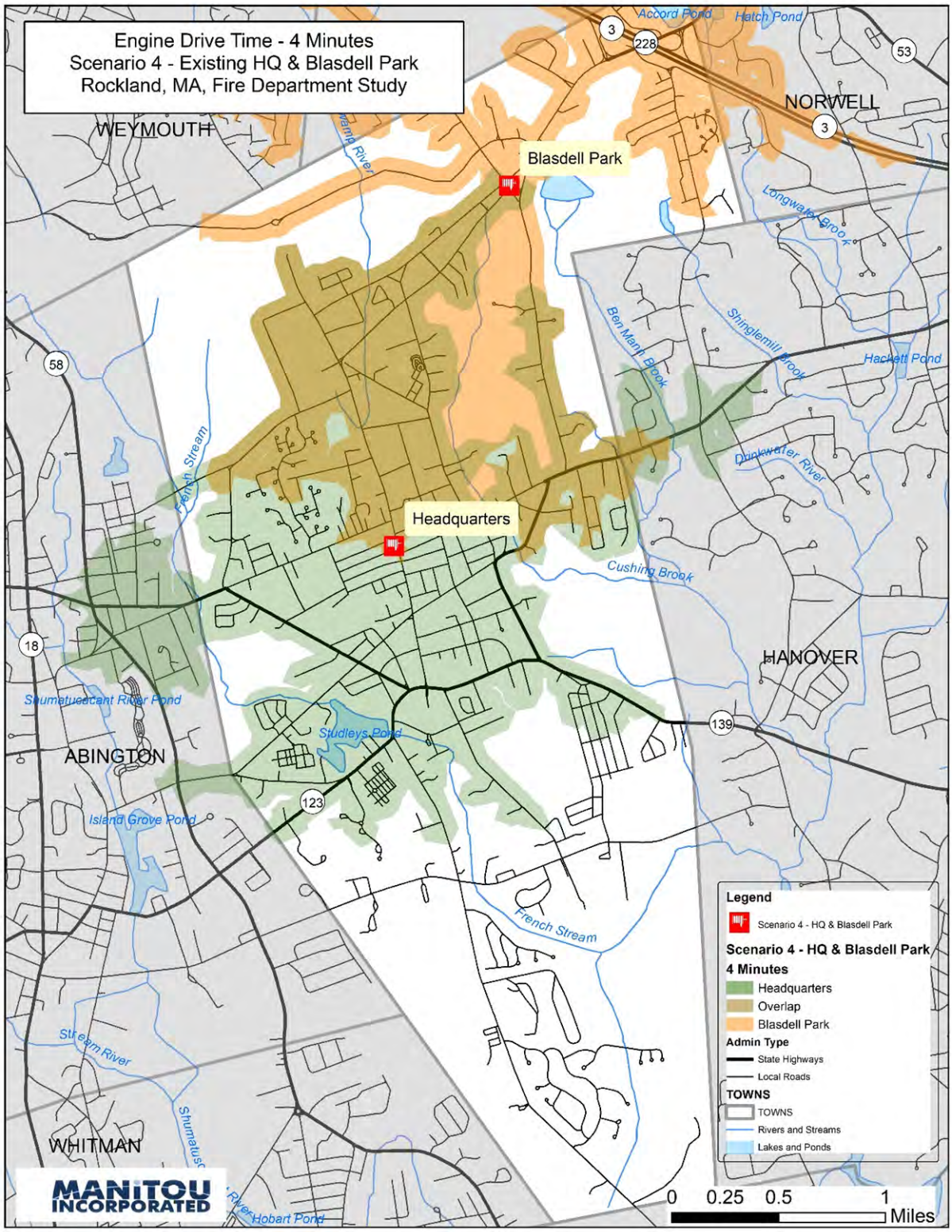


Figure 6.7. Scenario 5, 160 Market and Blasdell Park, Four Minutes

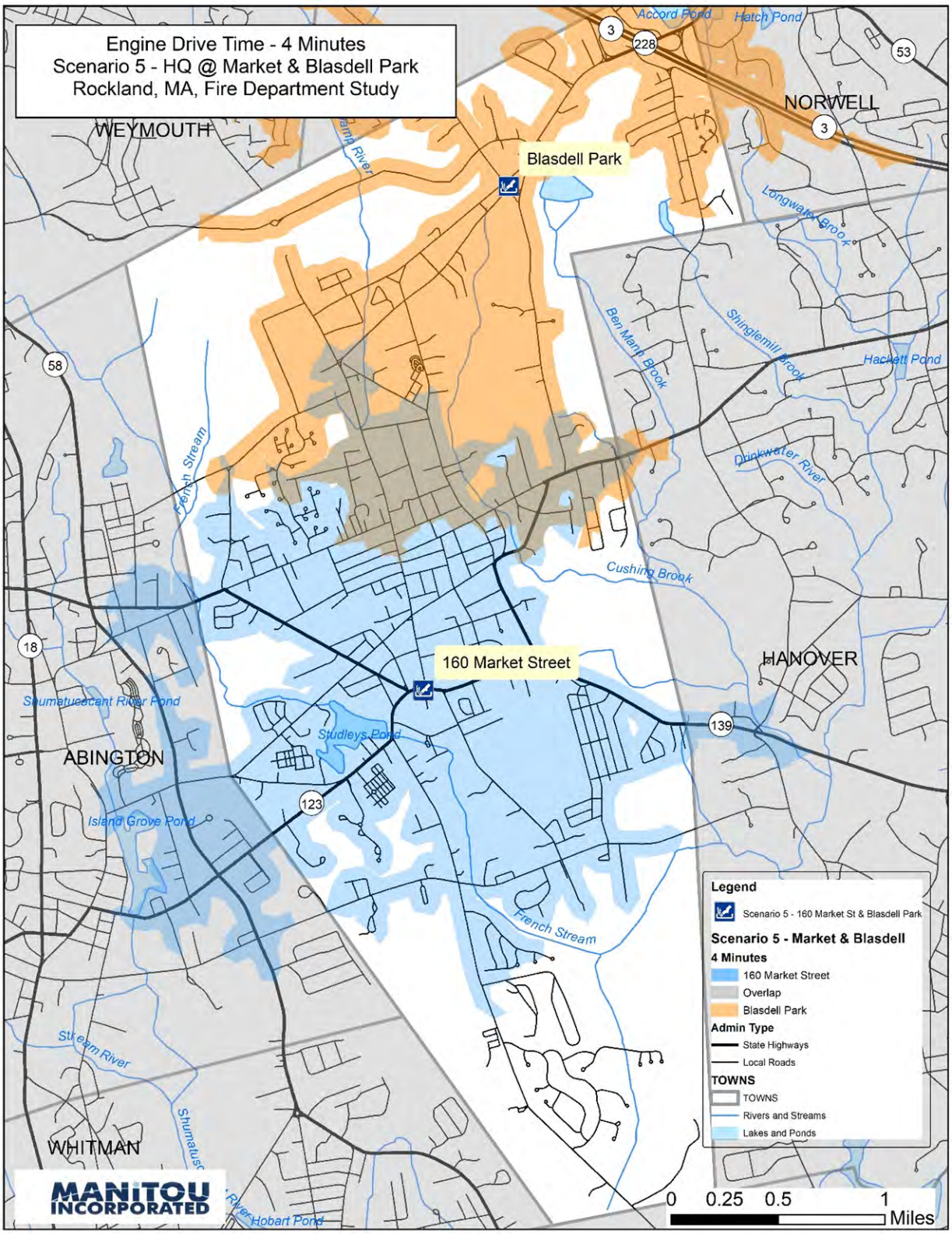


Figure 6.8. Scenario 4, 360 Union and Blasdell Park, Five Minutes

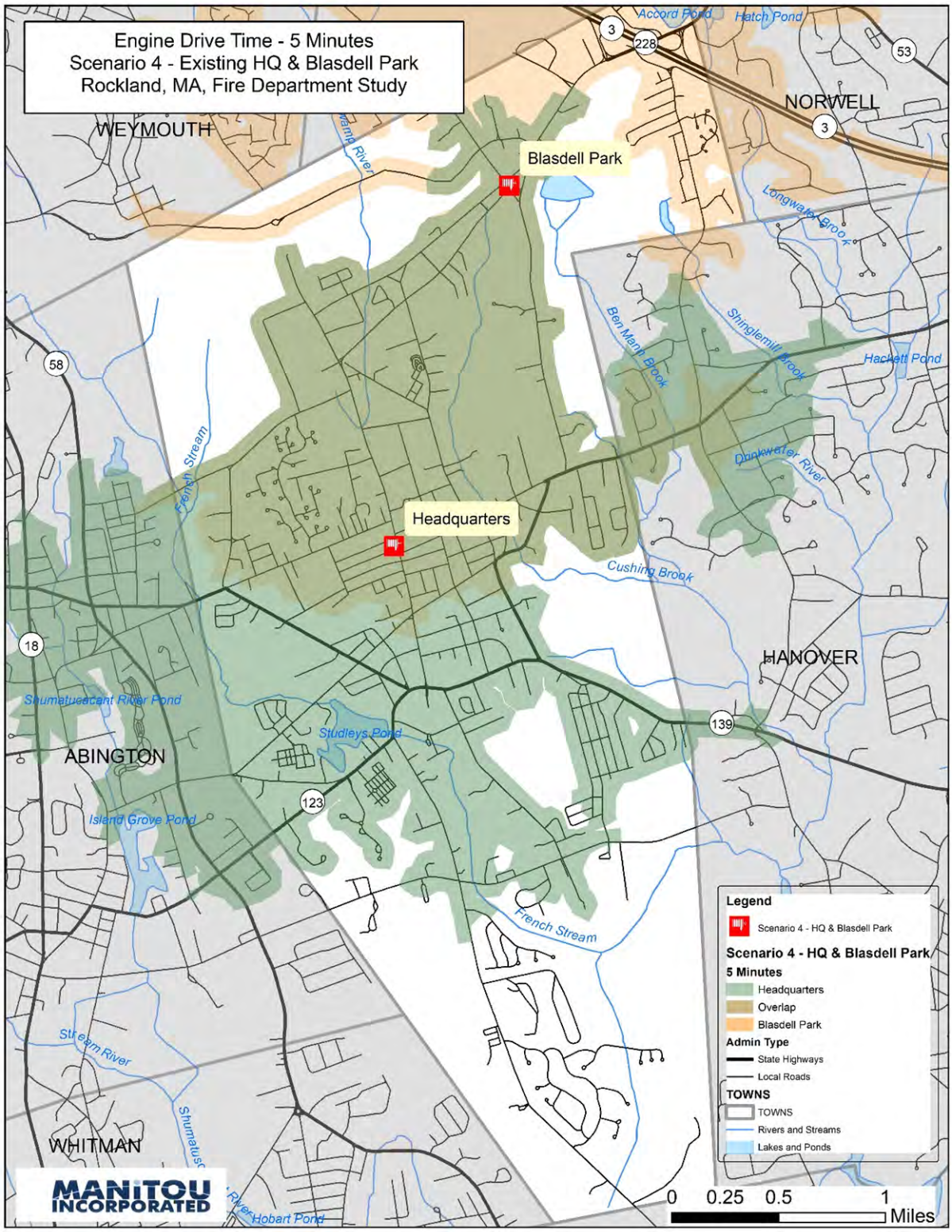


Figure 6.9. Scenario 5, 160 Market and Blasdell Park, Five Minutes

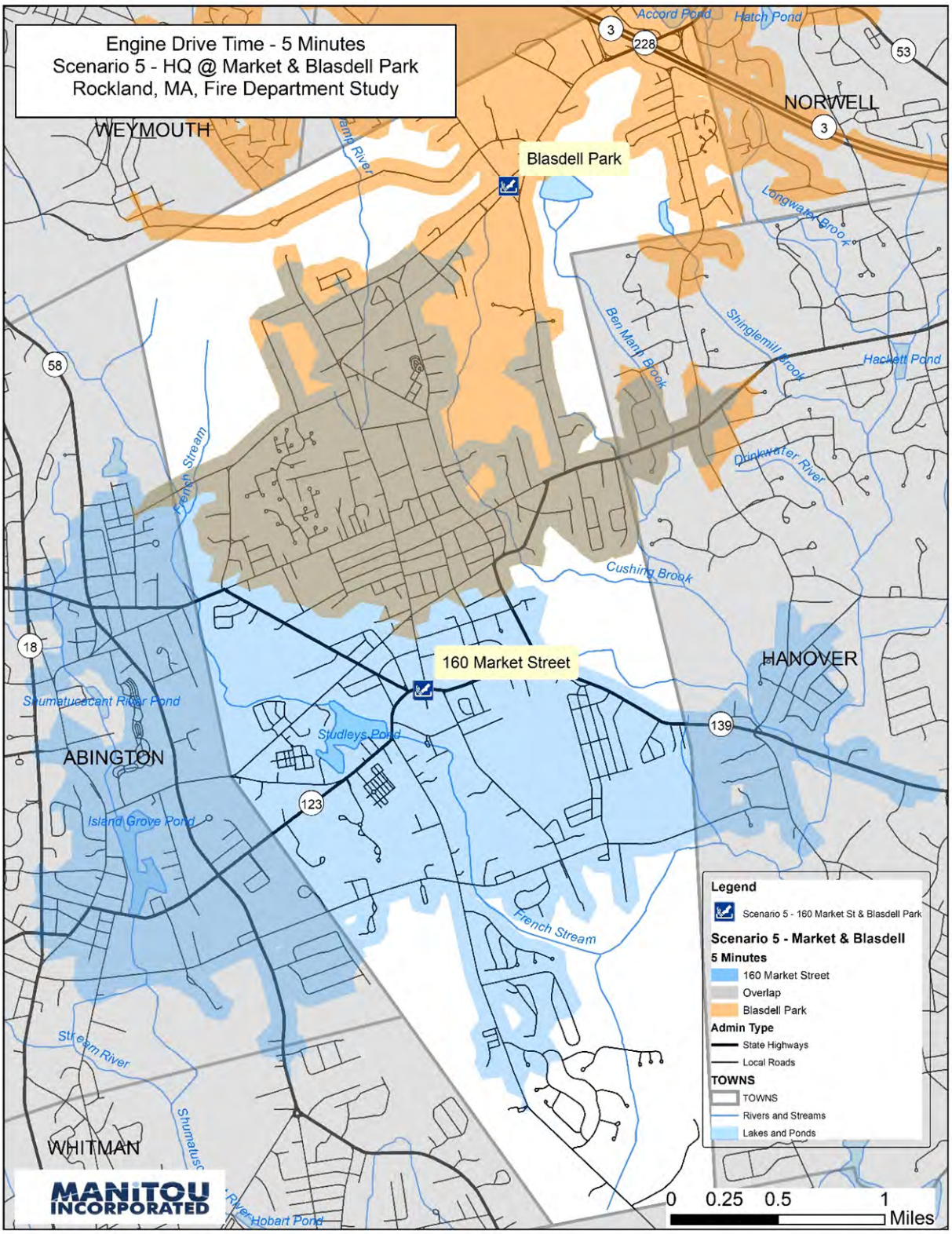


Table 6.6 on page 73 presents the summary of coverage along these measures for each of the configurations.

6.2. Station Location Commentary

Based on the foregoing analysis, the single station scenarios are similar in terms of overall coverage. The Market Street site, while it improves coverage in the south, creates even longer responses in the northeastern part of town which would further increase response times in the northeast. Maintaining or improving response times in this area, which is slated for additional development, was among the concerns that drove the study.

In the two-station scenarios, the scenario with 160 Market and Blasdell Park offers the best coverage from every dimension we studied. This option also minimizes overlap and thus provides more efficient overall coverage than either option using the current Headquarters or the Lincoln School site.

One of the concerns expressed about location of a possible second station is the ability to improve response times in the northeast corner of the town, where significant development is concentrated and existing response times are poor. To gain a better understanding of the demand in the northeast, we examined historic demand by time of day. Given the commercial nature of this area, we wanted the most efficient way of meeting demand and to see if there were temporal variations that might bear on a decision to open a second station.

Demand in this area is historically highest during daytime hours. We performed additional analysis to see the potential impact of this site. The details of this analysis are presented in Appendix F.

We will discuss the activity in the northeast and possibilities for a two-station scenario and staffing in the next chapter.

Table 6.6. Selected Coverage Statistics

Selected Coverage Statistics for Various Scenarios

Town of Rockland, MA - Existing Street Network

Analysis	Scenario	Stations	Area - square Miles- * #	% of Town within mileage	% of Town Beyond mileage	% of Pop Served ACS18	% of Road Network Covered	% of Addresses Covered	% of Incidents Covered 16-20
Process	Town Boundary Statistics		10.12	X	X	17,907	138,683	8,762	14,583
ISO 1.5 Miles	**Scenario 1 - Current Engines @ Headquarters**	**1**	3.29	32%	68%	47.7%	55.8%	69.3%	77.1%
ISO 1.5 Miles	**Scenario 2 - Headquarters @ Lincoln School**	**1**	3.09	31%	69%	46.4%	54.9%	67.9%	75.6%
ISO 1.5 Miles	**Scenario 3 - Headquarters @ 160 Market St**	**1**	3.42	34%	66%	52.3%	55.2%	67.5%	73.9%
ISO 1.5 Miles	**Scenario 4 - HQ + Blasdell Park**	**2**	4.29	42%	58%	54.7%	69.7%	76.9%	86.0%
ISO 1.5 Miles	**Scenario 5 - 160 Market St & Blasdell Park**	**2**	4.94	49%	51%	64.6%	76.5%	82.5%	89.2%
4 minute Engine	**Scenario 1 - Current Engines @ Headquarters**	**1**	3.84	38%	62%	54.3%	63.3%	75.3%	80.4%
4 minute Engine	**Scenario 2 - Headquarters @ Lincoln School**	**1**	3.81	38%	62%	54.5%	64.2%	77.2%	82.9%
4 minute Engine	**Scenario 3 - Headquarters @ 160 Market St**	**1**	3.87	38%	62%	56.1%	62.4%	73.4%	78.4%
4 minute Engine	**Scenario 4 - HQ + Blasdell Park**	**2**	5.04	50%	50%	62.4%	75.9%	83.4%	88.9%
4 minute Engine	**Scenario 5 - 160 Market St & Blasdell Park**	**2**	5.98	59%	41%	72.8%	87.5%	92.7%	96.3%
5 minute Engine	**Scenario 1 - Current Engines @ Headquarters**	**1**	5.19	51%	49%	68.8%	74.7%	86.3%	91.7%
5 minute Engine	**Scenario 2 - Headquarters @ Lincoln School**	**1**	5.27	52%	48%	70.1%	74.1%	85.5%	88.4%
5 minute Engine	**Scenario 3 - Headquarters @ 160 Market St**	**1**	5.21	51%	49%	68.9%	76.7%	86.1%	89.1%
5 minute Engine	**Scenario 4 - HQ + Blasdell Park**	**2**	5.97	59%	41%	72.7%	84.4%	91.2%	95.4%
5 minute Engine	**Scenario 5 - 160 Market St & Blasdell Park**	**2**	6.84	68%	32%	80.3%	92.5%	96.9%	98.8%
6 minute Engine	**Scenario 1 - Current Engines @ Headquarters**	**1**	6.38	63%	37%	79.8%	83.4%	91.1%	95.4%
6 minute Engine	**Scenario 2 - Headquarters @ Lincoln School**	**1**	6.39	63%	37%	80.5%	82.2%	91.9%	95.0%
6 minute Engine	**Scenario 3 - Headquarters @ 160 Market St**	**1**	6.44	64%	36%	80.1%	84.1%	92.4%	92.5%
6 minute Engine	**Scenario 4 - HQ + Blasdell Park**	**2**	7.42	73%	27%	84.7%	90.0%	95.2%	97.4%
6 minute Engine	**Scenario 5 - 160 Market St & Blasdell Park**	**2**	7.93	78%	22%	87.7%	96.2%	99.4%	99.9%

* = All Area calculations of the Network Solutions are created with a 100 Ft Buffer of the Street network traveled

- Square Feet are used in Calculation and converted to Square Miles

7. Conclusions

This chapter presents conclusions from our analysis and presents some high-level recommendations and summaries of our analysis.

7.1. Emergency Services

The Rockland Fire Department delivers effective services within their service area of the Town of Rockland. As a municipality with a population of less than 18,000 people, they serve the town with one station, located near the town's geographic center, but close to its traditional center and in an area of relatively higher incident activity. The locations of greatest growth are largely located in areas remote from the existing station.

As a consequence of this pattern of activity and the location of the fire station, there are areas of the town that are physically remote from the station, which results in drive times in excess of six or even seven minutes. This equates to a total response time of more than eight to ten minutes when call processing and turnout are included.

An increasing trend of simultaneous calls and a reliance on recalled personnel are indicators of a need to consider additional response resources.

Mix of Emergency Services

Overall, the mix of services provided by the RFD appear to be well-matched to its service area needs. The department's competence in handling the bulk of its calls for service, EMS, are well-met, and it has the capability to staff two ambulances, assuming it has no other incidents active at the same time.

7.2. Non-Emergency and Administrative Services

Administrative function is, for the most part, being maintained, while staffing limitations and use of part-time or shared duties among uniformed staff are maximized. The existing staffing model for the RFD is based on an assumption of sufficient time between alarms to accomplish the remaining tasks necessary for administration of modern fire and EMS agency. As the utilization of on-duty personnel increases, slack in the system eventually begins to disappear, or becomes so unpredictable that regular accomplishment of these tasks begins to be degraded.

The RFD is showing a pattern of increasing utilization of personnel, shown by a higher percentage of overlapping calls for service, reliance on recalls, and lengthening response times (reflecting units being out of quarters or not immediately available). Each of these singly is an indicator; together, they form a portrait of greater utilization for emergency service duties which limits availability for non-emergency functions.

On an administrative basis, the department is doing a good job given the resources. The number of responsibilities thrust upon the chief make it difficult to excel in all areas.

Training is already outsourced in large measure, and increasing workloads are making completing training while on-duty more challenging.

The day officer position is sensible but, depending on up-coming retirements, the incumbent may not be in the position long enough to become proficient. From an organizational development standpoint, it is a good opportunity for new officers, but there is a downside of lack of experience and the need for regular retraining.

Recommendation 7.1: We believe an additional day position is needed to support the training and general administrative needs of the RFD. This position should be a subordinate chief officer (battalion or assistant chief) or captain rank. In addition to taking the lead on day-to-day training activity, this position would assist the chief and deputy with special projects and take up any backlog from tasks currently detailed to personnel on shift. This position could also assist with the emergency management functions for the town, and relieve the chief from having to respond to initial alarms while on duty.

Recommendation 7.2: All shifts should be brought up to an assigned staffing of seven personnel. The cross-staffing of units and frequency of overlapping calls supports maintaining each shift at a uniform level.[22]

7.3. Facility Needs

From a coverage perspective, the three single-station scenarios offer comparable coverage overall. The single station located at Market Street does not address concerns about response times in the northeast, however, but it does improve times in the south.

The two-station alternative of Blasdell Park and Market Street offers the best overall coverage and would potentially enhance town-wide response times.

The decision to add a second station is a complicated one. The overall shift staffing is an important component of this decision, as is the combination of stations selected. There are three main dimensions to this decision, as explained below.

Response times are increasing, in a steady pattern, over the past few years. This may reflect the increasing number of simultaneous calls for service, which require staff to move to cover different apparatus, and the need for recalled personnel. As development increases in the north end of town, the number of responses to this area will further increase average response times.

The second issue is the **overall shift staffing** strength of the RFD. The RFD currently staffs an engine, ladder, and ambulance on an initial alarm basis. Only the engine has dedicated staffing, and personnel move between the ambulance and ladder depending on the order in which calls are received.

The department's current staffing model relies heavily on staff's ability to move between apparatus. Secondarily, with apparatus concentrated at a single site, recalled personnel can come to a single

[22] Ideally, with complete recall records we could see a measurable impact on need for recalls on shifts with six personnel assigned versus those with seven. Nonetheless, our analysis supports adding these two shift personnel.

location and staff whatever equipment that may be needed.

Splitting staff between two stations would threaten this capability and introduce additional delays in getting apparatus staffed. For example, if a second ambulance call were to occur when an engine at the second station was already committed, personnel would need to respond from headquarters or meet with the unit on scene.

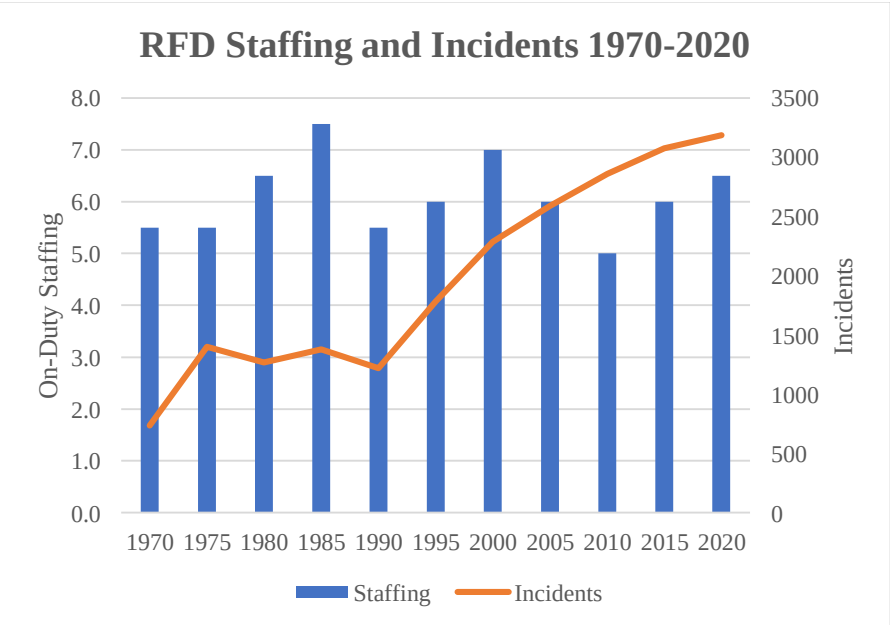
Remember that the second station, while located in area of relatively high demand and current growth, is at a far corner of the town, and thus has diminished impact on reducing first-due response times in much of the rest of the town.

In addition, to make staffing at a second station feasible would require a minimum of two personnel on duty. This would enable the station to staff an ambulance, but would lead to minimal staffing of two on an engine should a fire call occur. In addition, unless a critical mass of personnel remains assigned to headquarters, the RFD's existing operational model will be impacted. A second crew working remotely from others would quite possibly need an officer, which would require conversion of an existing firefighter position. Scenarios of eight on-duty staff would see a three-person crew assigned to station two, meaning that they could field a staffed engine company, or handle an EMS call with a one-person engine to assist. When more than eight shift personnel are on duty, this station could be staffed with four personnel, meaning that a full initial fire attack force could be provided, or a minimal fire service capability could be maintained, even assuming an ambulance crew was unavailable due to another call.

Some discussion of historical staffing with the RFD is appropriate at this point. The RFD has had staffing levels as high as eight per shift going back to the early 1980s. The history of staffing demonstrates an up-and-down pattern marked by layoffs in 1991 and 2008. Table 7.1 summarizes staffing levels (blue bars) and incidents (orange line). We can see the rapid increase in incidents against the fluctuating number of on-duty staff.

Please note that years with half positions (1980, 1985, 1990, and 2015, and current) reflect a change in staffing over that period, or different staffing levels per shift, as is currently the case with six on two shifts and seven on the other two shifts.

Figure 7.1. RFD Staffing and Incidents



These higher staffing levels generally occurred during periods of much lower incident activity.

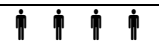
Most notably, the RFD took on operating an ambulance in 1975. While increasing workloads with steady staffing are not unusual, the differences in activity level are indeed striking, given that these differences are being absorbed by a small number of on-duty staff. The RFD administration also pointed out that regional staffing statistics collected by the NFPA show that for communities of comparable size and work schedule, Rockland was below regional averages. The RFD currently employs 29 firefighters (including chief officers and day staff). The analysis of per capita staffing averages would produce between 32 and 37 firefighters depending on the metric used.[23]

It should be noted that our recommendation to hire three additional positions would bring the RFD to the lowest levels using these high-level measures.

Table 7.1 shows the potential staffing configurations ranging from the current six to seven per shift, to a many as ten per shift. This is done to show the impact of adding personnel at a second station, and the impact on staffing and apparatus mix at headquarters. These are for discussion purposes, and show credible scenarios for assigning enhanced numbers of staff.

[23] While we do not find such statistics to be a superior tool in evaluating local data, we cite them here as an additional reference point. Two main organizations collect staffing data; these are statistics, of course. They do not reflect differences in department mission (e.g., do they provide EMS transport), differing community composition, or economic structure. The NFPA (osCareerFF1000Population.ashx (nfpa.org)) found an average of 2.06 members per 1,000 population in communities between 25,000 to 249,000. Given a rough estimate of Rockland's population at 18,000, this would equate to 37.1 firefighters. The International City/County Management Association uses a different classification scheme to present their analysis, but they found 1.75 firefighters per 1,000 residents in cities in the 10-24,999 population range. This would equate to 31.5 firefighters (2015 Municipal Year Book).

Table 7.1. Staffing Assignment Possibilities

Number of On-Duty Staff	One Station	Two Stations	
		HQ	Station 2
6 (current)		n/a	
7 (current)			
8			
9			
10			

If staffing were increased to seven per shift on a minimum basis, there would be potential to place two personnel at the second station to staff an ambulance and cross-staff a firefighting unit. This is not ideal, especially given the reduced flexibility for the current utilization of staff at headquarters.

An alternative would be to staff an additional two personnel on day shift, which would allow an additional ambulance to be staffed on the shift, when it is busiest. This has the benefit of offsetting some overtime costs the department is currently paying. It may be a worthwhile interim step toward a 24-hour crew based on yet-to-be-realized demand for service.

We understand from discussion with the chief that daytime positions are unpopular and may lead to turnover, which is undesirable. However, the use of daytime staff may be an efficient alternative to the much more expensive alternative of adding staffing on a 24-hour basis. At a minimum, it should be explored as a transition to augmented shift staffing.

The coverage problem assumes that current arrangements for mutual aid continue. However, a closest station response concept would potentially mitigate the need for a fully-staffed station in the north end, by relying on neighboring jurisdictions for an initial alarm response. Further consideration of this possibility is beyond our scope.

7.4. Next Steps

The RFD should continue to monitor response times, develop a systematic understanding of recall activity, and develop a plan for additional personnel and a new station, based on thresholds of demand for service, available staffing, and response times.

The steps outlined in the report will provide immediate support for response, enhance recordkeeping and data availability, and strengthen administrative operations to enable the chief to take a more data-informed strategic approach to the longer-term needs of the town.

Armed with more definitive data on recalls, workload, and ambulance revenues, trends in response times can be monitored and used to identify the impacts on service by potentially adding additional staff. Current staffing levels do not support a two-station configuration.

Appendices

Appendix A. Town of Rockland Incident Details

Table A1. Detailed NFIRS Incidents by Type 2016-2020
Source – Rockland Incident Analysis Annual Data reports

GENERAL CODE	INCIDENT CODE	INCIDENT_TYPE_DESCRIPTION	2016	2017	2018	2019	2020	Total	Percent of total
FIRE	100	Fire, other	4	4			4	12	0.1%
FIRE	111	Building fire	13	20	26	9	11	79	0.5%
FIRE	112	Fires in structure other than in a building		1				1	0.0%
FIRE	113	Cooking fire, confined to container	4	9	7	3	7	30	0.2%
FIRE	114	Chimney or flue fire, confined to chimney or flue	2	2	2	2		8	0.0%
FIRE	116	Fuel burner/boiler malfunction, fire confined		1	1	4	4	10	0.1%
FIRE	117	Commercial Compactor fire, confined to rubbish				1		1	0.0%
FIRE	118	Trash or rubbish fire, contained	1		2	5	4	12	0.1%
FIRE	121	Fire in mobile home used as fixed residence			1			1	0.0%
FIRE	122	Fire in motor home, camper, recreational vehicle					1	1	0.0%
FIRE	130	Mobile property (vehicle) fire, other				5	1	6	0.0%
FIRE	131	Passenger vehicle fire	7	2	7	4	4	24	0.1%
FIRE	132	Road freight or transport vehicle fire		1		1		2	0.0%
FIRE	134	Water vehicle fire					1	1	0.0%
FIRE	137	Camper or recreational vehicle (RV) fire		1				1	0.0%
FIRE	140	Natural vegetation fire, other	23	8	13	1	2	47	0.3%
FIRE	141	Forest, woods, or wildland fire	6		1	1	5	13	0.1%
FIRE	142	Brush or brush-and-grass mixture fire	19	8	11	5	9	52	0.3%
FIRE	143	Grass fire	4		2	1	2	9	0.1%
FIRE	150	Outside rubbish fire, other	2	5		1	1	9	0.1%
FIRE	151	Outside rubbish, trash, or waste fire	2	5	2	1	1	11	0.1%
FIRE	153	Construction or demolition landfill fire	1					1	0.0%

GENERAL CODE	INCIDENT CODE	INCIDENT_TYPE_DESCRIPTION	2016	2017	2018	2019	2020	Total	Percent of total
FIRE	154	Dumpster or other outside trash receptacle fire	1	2		5		8	0.0%
FIRE	160	Special outside fire, other		1			1	2	0.0%
FIRE	162	Outside equipment fire	1					1	0.0%
FIRE	163	Outside gas or vapor combustion explosion					1	1	0.0%
FIRE	164	Outside mailbox fire					1	1	0.0%
EMS	200	Overpressure rupture, explosion, overheat, other		1				1	0.0%
EMS	212	Overpressure rupture of steam boiler	1	2	1	1		5	0.0%
EMS	220	Overpressure rupture from air or gas, other			1			1	0.0%
EMS	240	Explosion (no fire), other			1			1	0.0%
EMS	251	Excessive heat, scorch burns with no ignition	3	1	2		1	7	0.0%
EMS	300	Rescue, EMS incident, other	4	4	7	3	6	24	0.1%
EMS	311	Medical assist, assist EMS crew	1,762	1,866	2,052	2,184	1,934	9,798	60.9%
EMS	3119						42	42	0.3%
EMS	320	Emergency medical service, other (conversion only)	19	52	28	6	7	112	0.7%
EMS	321	EMS call, excluding vehicle accident with injury	246	209	144	82	82	763	4.7%
EMS	3219						6	6	0.0%
EMS	321C						2	2	0.0%
EMS	322	Motor vehicle accident with injuries	78	84	86	74	66	388	2.4%
EMS	323	Motor vehicle/pedestrian accident (MV Ped)	9	3	4		5	21	0.1%
EMS	324	Motor vehicle accident with no injuries	129	98	146	111	69	553	3.4%
EMS	331	Lock-in (if lock-out, use 511)			2			2	0.0%
EMS	342	Search for person in water	2		1			3	0.0%
EMS	352	Extrication of victim(s) from vehicle			1			1	0.0%
EMS	353	Removal of victim(s) from stalled elevator	2	1	3	4	2	12	0.1%
EMS	356	High-angle rescue	1			1		2	0.0%
EMS	360	Water and ice-related rescue, other				1		1	0.0%
EMS	381	Rescue or EMS standby		1				1	0.0%
EMS	400	Hazardous condition, other	4	6	1	1	2	14	0.1%

GENERAL CODE	INCIDENT CODE	INCIDENT_TYPE_DESCRIPTION	2016	2017	2018	2019	2020	Total	Percent of total
EMS	410	Combustible/flammable gas/liquid condition, other	3	1	1			5	0.0%
EMS	411	Gasoline or other flammable liquid spill	5	4	1	3	3	16	0.1%
EMS	412	Gas leak (natural gas or LPG)	35	25	26	18	17	121	0.8%
EMS	413	Oil or other combustible liquid spill	2	6	9	3	1	21	0.1%
EMS	420	Toxic condition, other		1	1			2	0.0%
EMS	421	Chemical hazard (no spill or leak)	1		2			3	0.0%
EMS	422	Chemical spill or leak	1	3	2	1		7	0.0%
EMS	424	Carbon monoxide incident	16	12	21	14	8	71	0.4%
EMS	440	Electrical wiring/equipment problem, other	14	15	26	36	16	107	0.7%
EMS	441	Heat from short circuit (wiring), defective/worn	3	2	2		1	8	0.0%
EMS	442	Overheated motor		2	5		2	9	0.1%
EMS	443	Breakdown of light ballast			1			1	0.0%
EMS	444	Power line down	41	33	59	62	81	276	1.7%
EMS	444C		43	33	36			112	0.7%
EMS	445	Arcing, shorted electrical equipment	15	14	7	3	4	43	0.3%
EMS	460	Accident, potential accident, other	1		1	1		3	0.0%
EMS	461	Building or structure weakened or collapsed		2		1		3	0.0%
EMS	463	Vehicle accident, general cleanup	1					1	0.0%
EMS	471	Explosive, bomb removal (for bomb scare, use 721)		1				1	0.0%
EMS	480	Attempted burning, illegal action, other		1				1	0.0%
EMS	481	Attempt to burn	1					1	0.0%
OTHER	500	Service call, other	13	12	21	12	7	65	0.4%
OTHER	510	Person in distress, other	6	9	6	3	2	26	0.2%
OTHER	511	Lock-out	19	17	20	32	20	108	0.7%
OTHER	512	Ring or jewelry removal			1			1	0.0%
OTHER	520	Water problem, other	2	6	17	7	7	39	0.2%
OTHER	522	Water or steam leak	21	15	27	11	11	85	0.5%

GENERAL CODE	INCIDENT CODE	INCIDENT_TYPE_DESCRIPTION	2016	2017	2018	2019	2020	Total	Percent of total
OTHER	531	Smoke or odor removal	28	13	11	3	4	59	0.4%
OTHER	541	Animal problem	1		1	2		4	0.0%
OTHER	542	Animal rescue	1	1	2			4	0.0%
OTHER	550	Public service assistance, other	3	8	11	30	19	71	0.4%
OTHER	551	Assist police or other governmental agency	3	5	6	14	11	39	0.2%
OTHER	552	Police matter			4	2	9	15	0.1%
OTHER	553	Public service	5	3	40	36	18	102	0.6%
OTHER	5532	Public service			2	7	69	78	0.5%
OTHER	554	Assist invalid	3		5	5	28	41	0.3%
OTHER	555	Defective elevator, no occupants	1			1	1	3	0.0%
OTHER	561	Unauthorized burning	28	23	23	8	12	94	0.6%
OTHER	571	Cover assignment, standby, moveup	12	17	18	15	23	85	0.5%
OTHER	600	Good intent call, other	17	19	17	20	40	113	0.7%
OTHER	611	Dispatched & canceled en route	12	26	57	48	56	199	1.2%
OTHER	622	No incident found on arrival at dispatch address	6	5	14	18	49	92	0.6%
OTHER	631	Authorized controlled burning	5	10	4	2	1	22	0.1%
OTHER	632	Prescribed fire			1			1	0.0%
OTHER	641	Vicinity alarm (incident in other location)				1		1	0.0%
OTHER	650	Steam, other gas mistaken for smoke, other	3	1	1	1		6	0.0%
OTHER	651	Smoke scare, odor of smoke	2	3	2	25	52	84	0.5%
OTHER	652	Steam, vapor, fog or dust thought to be smoke	2		1	2		5	0.0%
OTHER	653	Smoke from barbecue, tar kettle	1	1		1		3	0.0%
OTHER	671	HazMat release investigation with no HazMat			2	1		3	0.0%
OTHER	700	False alarm or false call, other	3	8	3	13	53	80	0.5%
OTHER	710	Malicious, mischievous false call, other	1	4		2	2	9	0.1%
OTHER	711	Municipal alarm system, malicious false alarm	2		9	2	2	15	0.1%
OTHER	712	Direct tie to FD, malicious false alarm			1		2	3	0.0%
OTHER	714	Central station, malicious false alarm	1					1	0.0%

GENERAL CODE	INCIDENT CODE	INCIDENT_TYPE_DESCRIPTION	2016	2017	2018	2019	2020	Total	Percent of total
OTHER	715	Local alarm system, malicious false alarm			1		3	4	0.0%
OTHER	721	Bomb scare - no bomb	1					1	0.0%
OTHER	730	System malfunction, other	24	19	26	10	7	86	0.5%
OTHER	731	Sprinkler activation due to malfunction	11	7	11	4	2	35	0.2%
OTHER	732	Extinguishing system activation due to malfunction	2	3	1		1	7	0.0%
OTHER	733	Smoke detector activation due to malfunction	55	79	79	62	32	307	1.9%
OTHER	734	Heat detector activation due to malfunction	3	6	7	4	7	27	0.2%
OTHER	735	Alarm system sounded due to malfunction	9	11	33	34	39	126	0.8%
OTHER	736	CO detector activation due to malfunction	17	16	21	35	20	109	0.7%
OTHER	740	Unintentional transmission of alarm, other	16	9	15	13	7	60	0.4%
OTHER	741	Sprinkler activation, no fire - unintentional	6	6	8	2	5	27	0.2%
OTHER	742	Extinguishing system activation	1					1	0.0%
OTHER	743	Smoke detector activation, no fire - unintentional	100	96	75	62	36	369	2.3%
OTHER	744	Detector activation, no fire - unintentional	14	15	37	24	9	99	0.6%
OTHER	745	Alarm system activation, no fire - unintentional	38	18	38	61	81	236	1.5%
OTHER	746	Carbon monoxide detector activation, no CO	9	10	8	18	13	58	0.4%
OTHER	800	Severe weather or natural disaster, other			3			3	0.0%
OTHER	813	Wind storm, tornado/hurricane assessment			1	5	5	11	0.1%
OTHER	900	Special type of incident, other		1	3		3	7	0.0%
OTHER	911	Citizen complaint	4	2	9	25	16	56	0.3%
		TOTAL	**3,043**	**3,057**	**3,458**	**3,342**	**3,201**	**16,101**	**100.0%**

Figure A1. Town of Rockland Fire Incidents, 2016-2020

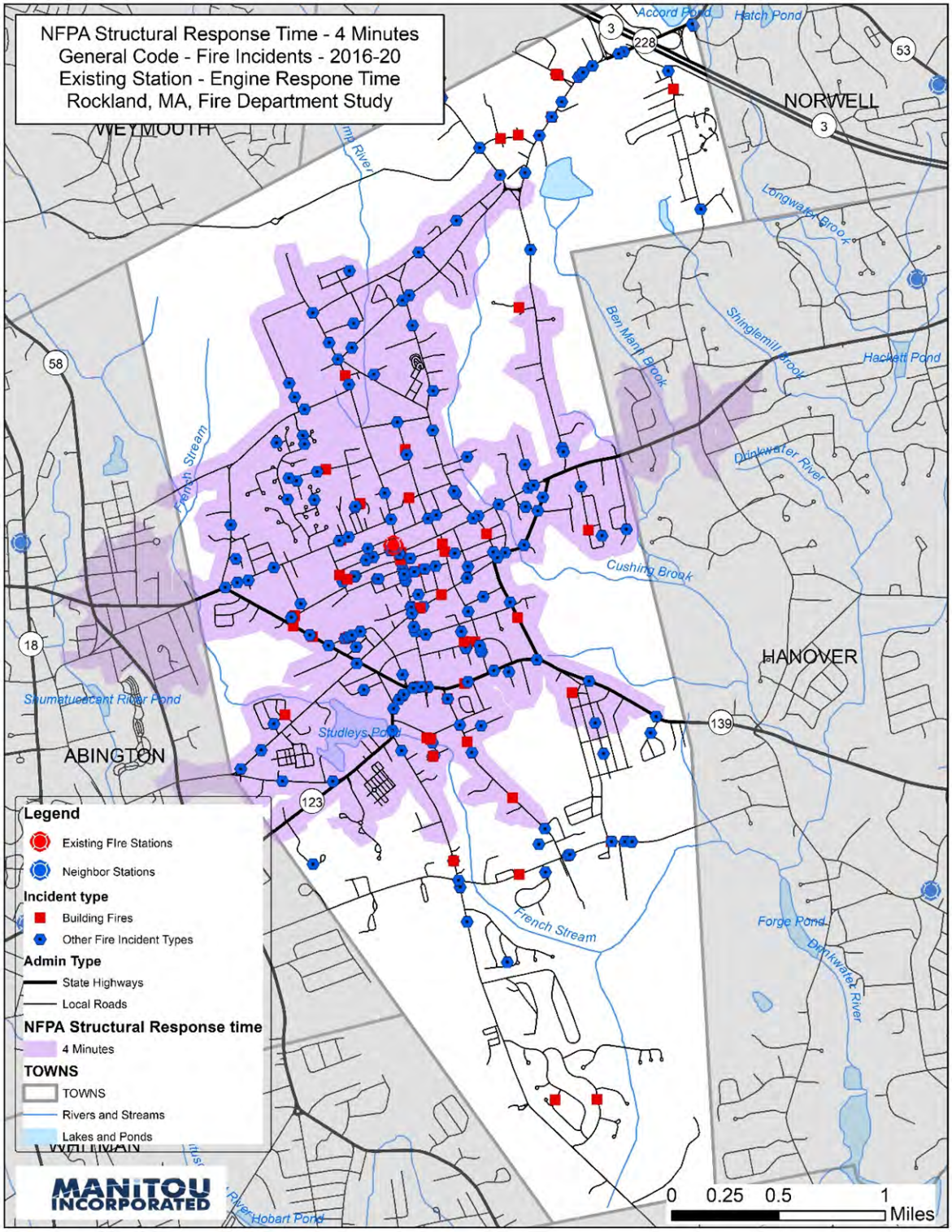


Figure A2. Town of Rockland EMS Incidents – Category 3 - no 311 Type - 2016-2020

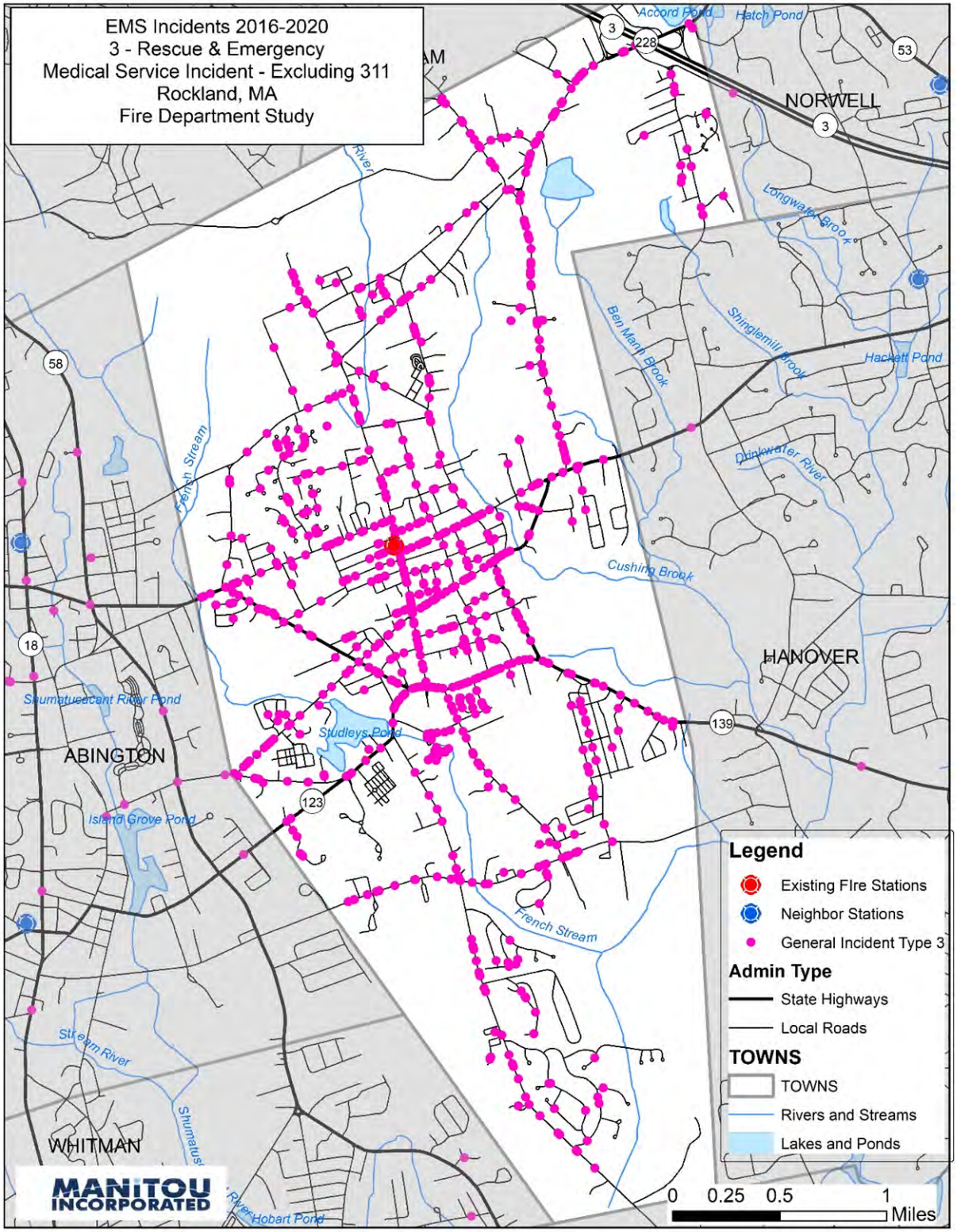


Figure A3. Town of Rockland EMS Incidents –Only 311 Type - 2016-2020

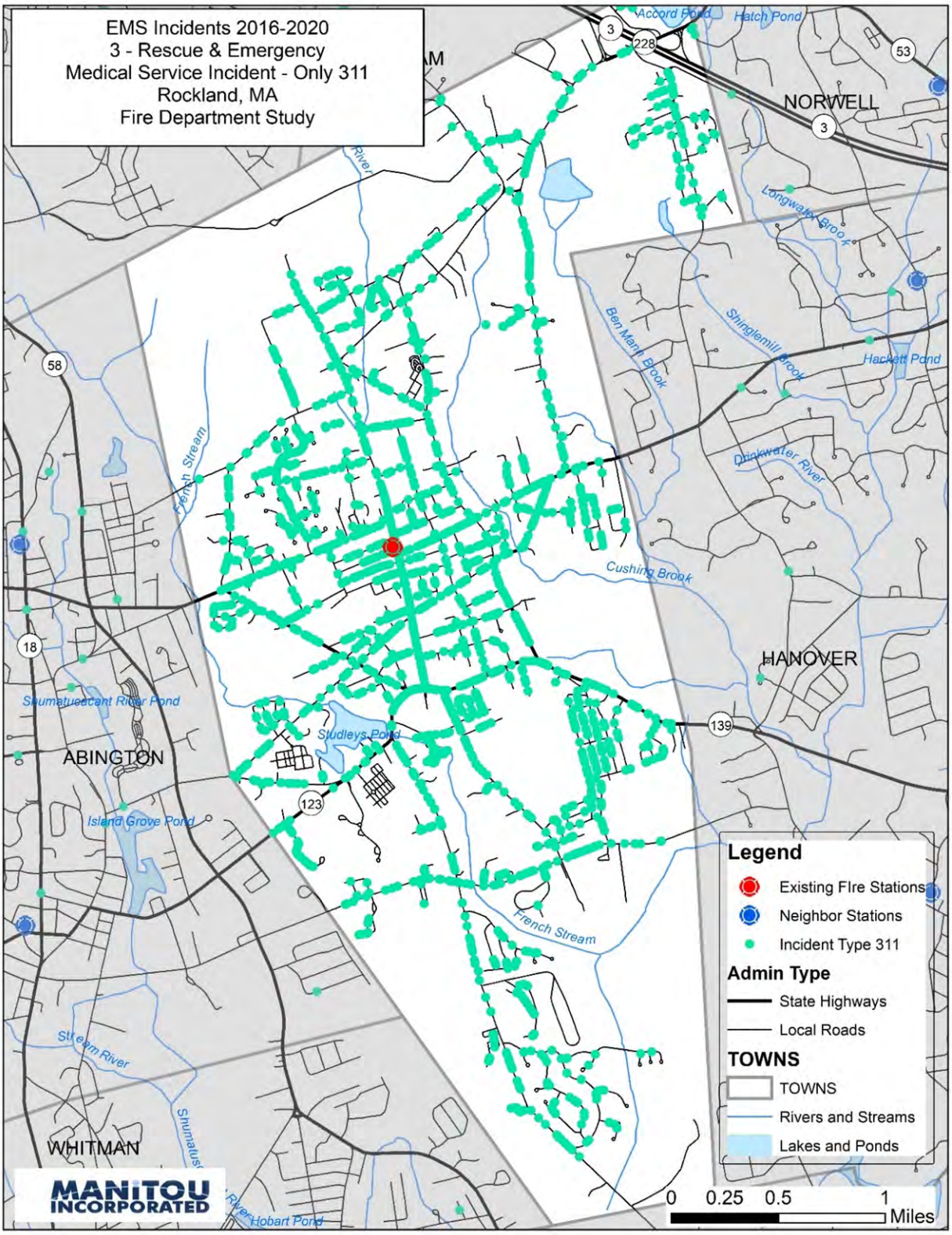
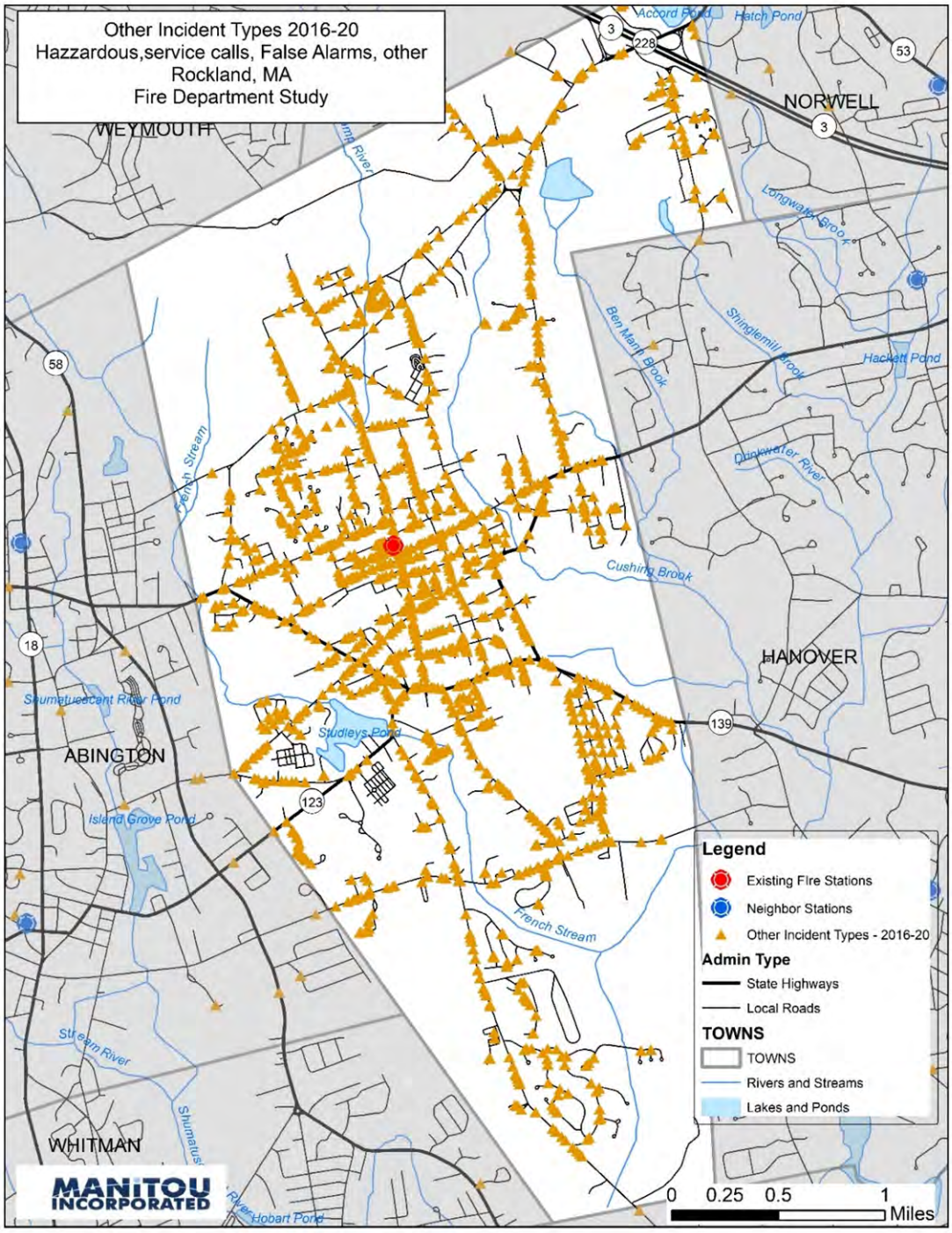


Figure A4. Town of Rockland Other Incidents, 2016-2020



Appendix B. Summary of Methodology

Network Methodology

The first step in the development of the recommendations is to finalize the street network for the drive time solutions in order to test the various alternatives to the existing locations. Preparing the network requires a working GIS layer of streets that depicts major intersections and interstate combinations, with the proper turning and one-way information. In addition, the speed information must be attributed on each link in the network, as well as any prohibitions for height clearance or oversize vehicles.

For Rockland, the state road network, MA – EOTROADS, was used as the base because it was accurate in terms of complete street network, street names, and locations. The layer included speed information, divided highway and ramp information, and a classification of roads. However, the speed information was only attributed for the state highways. The general vehicle speed information was developed using information from the town, the state highway system, and Google Maps drive through functionality. The remainder of the roads in the town were placed at 30 mph; this was based on there being no mention of the town adopting the MGL c. 90 § 17C which allows the lowering of the statutory speed limit of 30 to 25. [24]. (See Map B.1)

From that speed work, an *engine speed* was assigned to each link, which reflected the reduced speed of an engine moving through traffic, traffic lights, and other mobility issues. In general, the reduction is about 15% of the general vehicle speed limit. In addition, since there is a higher percentage of ambulance responses in Rockland, a *general speed* is also included. as the ambulances maintain a speed closer to the posted speed limit. These two speed assumptions, engine speed and general speed, were used in the drive time analysis (Table B.1). Once a speed is assigned to a link in the network, a calculation is determined to define the number of seconds it takes to traverse that link in the network.

Table B.1. Drive Time Analysis

MGIS_TOWN	Total Miles	General Speed Limit	Engine Speed Limit
Rockland	0.23	20	16.9
Rockland	2.96	25	21.1
Rockland	70.70	30	25.3
Rockland	8.58	35	29.6
Rockland	1.70	40	33.8
Rockland	1.61	45	38
Rockland	1.23	60	50.7
Total	87.00		

Over the course of the initial testing of the network, the configuration of the speeds and routings were continually tested to ensure that there were no disconnections within the network that would make the drive time analysis unrealistic.

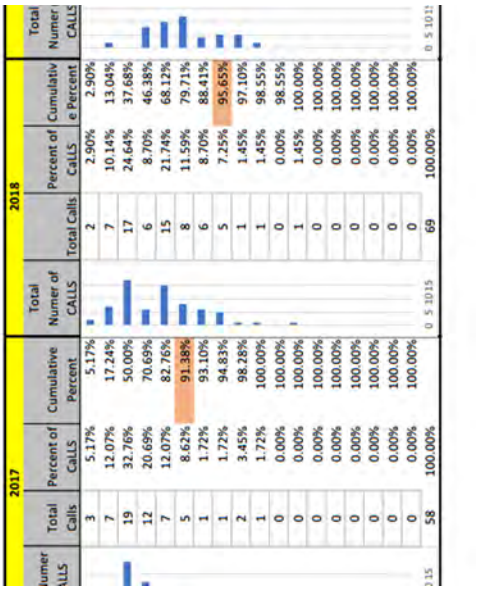
[24] https://www.mass.gov/info-details/speed-limits-in-thickly-settled-or-business-districts, which states that: Cities and towns have the option to opt-in to MGL c. 90 § 17C, reducing the statutory speed limit from 30 mph to 25 mph in thickly settled or business districts. The Town of Rockland has a listing of laws at https://ecode360.com/13239016 (*Web Site Accessed 4/10/21*).

Appendix C. Fire Experience by Community (2018 data)

	41	18	10	13	0	0	0	0				
	79	45	9	25	0	0	0	0				
	487	310	50	127	0	15	0	0				
	3	2	1	0	0	0	0	0				
	27	5	9	13	0	0	0	0				
	25	10	4	11	0	1	0	0				
	29	13	1	15	0	2	0	0				
	53	29	7	17	0	2	0	0				
	26	10	2	14	0	0	0	0				
	65	26	7	32	0	0	0	0				
	19	10	3	6	0	0	0	0				
	36	15	6	15	0	0	0	0				
	35	9	5	21	0	0	0	0				
	19	6	3	10	0	1	0	0				
	78	34	7	37	0	0	0	0				
	18	10	2	6	0	0	0	0				
	67	21	16	30	0	0	0	0				
	8	7	1	0	0	0	0	0				
	5	4	0	1	0	0	0	0				
	191	79	32	80	1	8	0	0				
	10	5	2	3	0	0	0	0				
	4	4	0	0	1	1	0	0				
	69	35	5	29	0	4	0	0				
	53	31	4	18	0	0	0	0				
Districts	123	63	19	41	1	1	0	0				
	31	6	9	16	0	3	0	0				
	26	13	5	8	0	0	0	0				

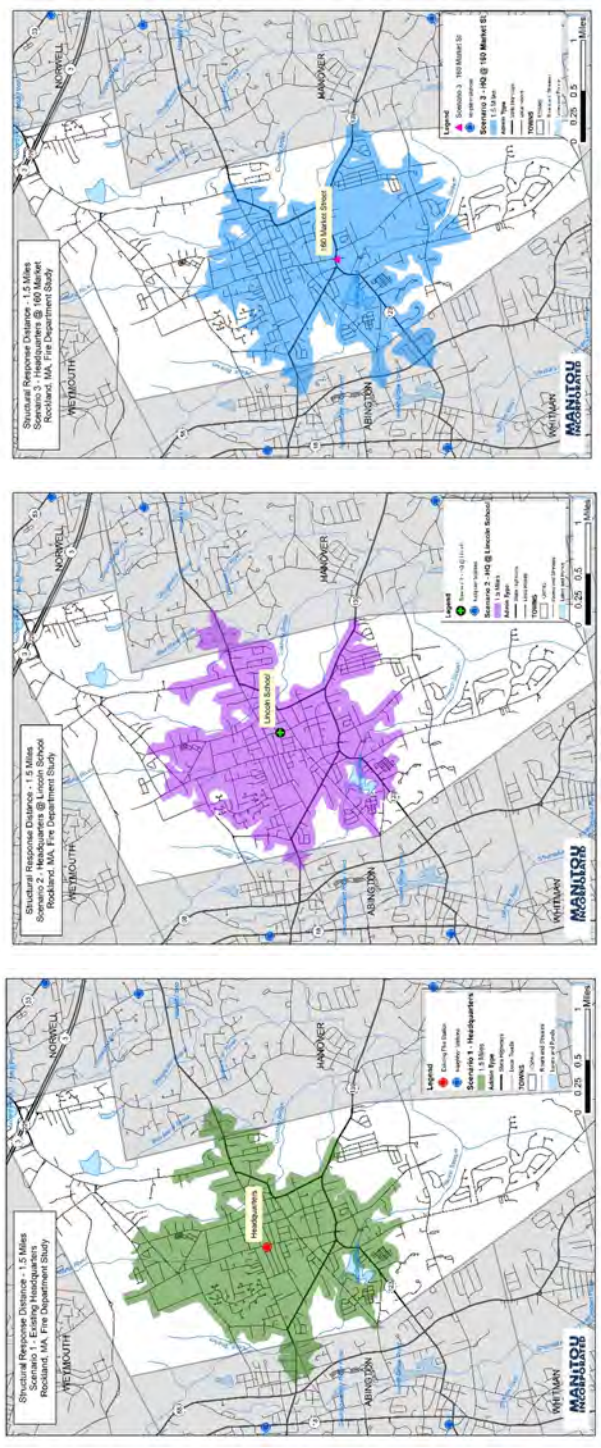
Source: State NFIRS Annual Report 2018, American Community Survey, 2018

Appendix D. Fractile Response Times, NFPA 1710



Appendix E.1. ISO 1.5-Mile Station Alternatives

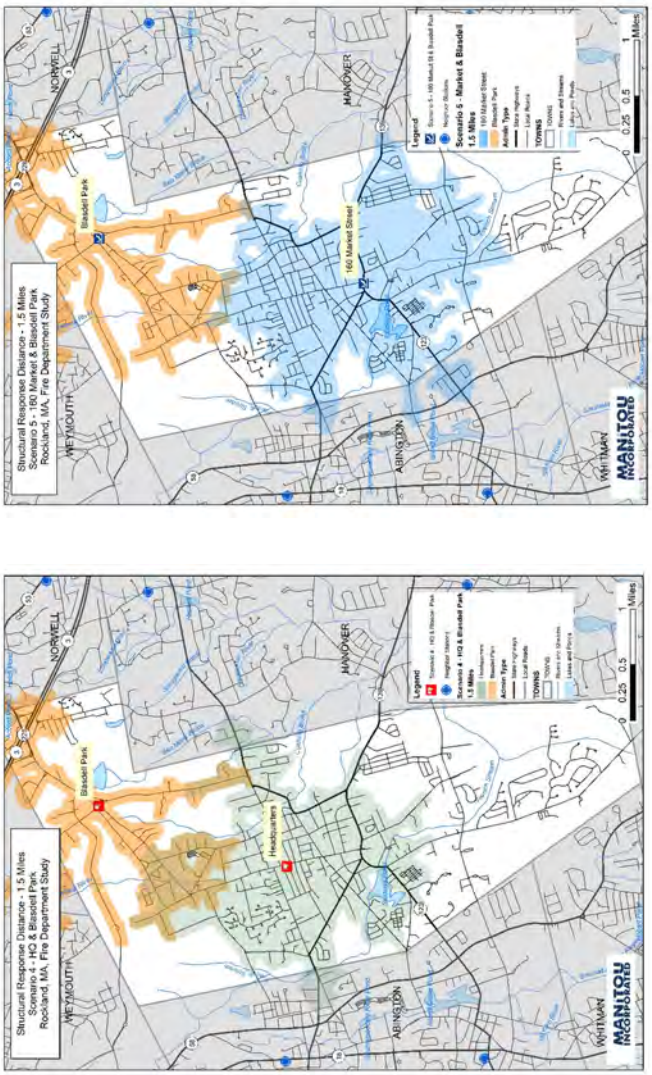
Single Station Scenarios for ISO 1.5 Mile Engine Coverage



Analysis	Scenario	Stations	Area Covered	Pct Area	Pct Outside	Population	Roads	Addresses	Incidents
ISO 1.5 Miles	**Scenario 1 - Current Engines @ Headquarters**	**1**	3.29	32%	68%	47.7%	55.8%	69.3%	77.1%
ISO 1.5 Miles	**Scenario 2 - Headquarters @ Lincoln School**	**1**	3.09	31%	69%	46.4%	54.9%	67.9%	75.6%
ISO 1.5 Miles	**Scenario 3 - Headquarters @ 160 Market St**	**1**	3.42	34%	66%	52.3%	55.2%	67.5%	73.9%

Appendix E.2. 1.5 Mile ISO Station Alternatives, 2 Station Scenarios 4 and 5

Two Station Scenarios for ISO 1.5 Mile Engine Coverage



Analysis	Scenario	Stations	Area Covered	Pct Area	Pct Outside	Population	Roads	Addresses	Incidents
ISO 1.5 Miles	**Scenario 4 - HQ + Blasdell Park**	**2**	4.29	42%	58%	54.7%	69.7%	76.9%	86.0%
ISO 1.5 Miles	**Scenario 5 - 160 Market St & Blasdell Park**	**2**	4.94	49%	51%	64.6%	76.5%	82.5%	89.2%

Appendix F. Demand and Response Times in the Northeast

There were 166 incidents within the proposed GMOD area from 2016 through 2020. There were another 500 incidents within 200 meters of the major roads surrounding the overlay district, for a total of 688 incidents[25]. Of the 608 incidents with valid response times, the mean response time is 5:58, with a standard deviation of 2:14 in both directions. The following table shows the frequency in seconds.

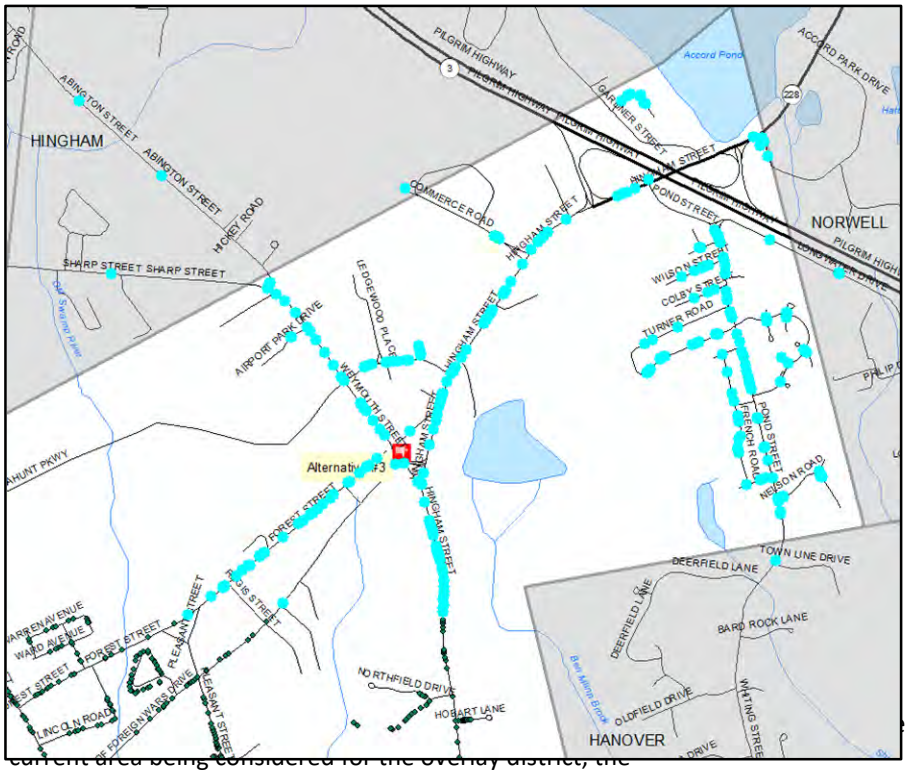
There is limited access to this area from the current headquarters station and the major road is through the Town of Hanover. Selecting the 2016-20 incidents with valid times within 400 meters of the proposed site of these proposed buildings, of the 216 incidents, 209 have valid response times, the mean response time is 7:01 with a standard deviation of 3:10 in both directions.

Figure F.1 shows a plot of historic incidents in the northeast.

A breakdown of these incidents is shown in Table F.1. We can see that in 2020, there were 176 EMS calls, nine fire-related incidents, and 63 'other' calls, to include automatic alarms.

We then broke these incidents out by time of day, and found that the peak hour of activity was between 11:00 a.m. and 1:00 p.m. The day shift was the busiest period in this area, followed by the evenings, and then midnight to 8:00 a.m. (Table F.2).

Figure F.1. Incidents in Northeast



there are no public roads within the current area being considered for the overlay district, the

Table F.1. Incidents by Type, Northeast 2016-2020

GENERAL TYPE	2016	2017	2018	2019	2020
EMS	152	193	186	190	176
FIRE	8	3	8	5	9
OTHER	73	60	89	70	63
TOTAL	233	256	283	265	248

Table F.2. Incidents by Hour of Day, Northeast

	2016	2017	2019	2019	2020
Day	121	124	123	111	117
Evening	70	88	111	96	88
Night	42	44	49	58	43

In Figure F.2, we see incidents by time of day (eight-hour blocks) as a percentage of all incidents. We can see that incidents in the evening are a growing share of responses, while the 12:00 a.m. – 8:00 a.m. period remains fairly steady.

Figure F.2. Percent of Incidents by 8-Hour Block, 2016-2020