CENTER FOR PUBLIC SAFETY MANAGEMENT, LLC

Strategic Plan Gap Analysis for Fire Department

Roswell, GA

June 2022

CPSM®

CENTER FOR PUBLIC SAFETY MANAGEMENT, LLC
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Exclusive Provider of Public Safety Technical Services for
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THE ASSOCIATION & THE COMPANY

The International City/County Management Association is a 103-year old, nonprofit professional association of local government administrators and managers, with approximately 13,000 members located in 32 countries.

Since its inception in 1914, ICMA has been dedicated to assisting local governments and their managers in providing services to its citizens in an efficient and effective manner. ICMA advances the knowledge of local government best practices with its website (www.icma.org), publications, research, professional development, and membership. The ICMA Center for Public Safety Management (ICMA/CPSM) was launched by ICMA to provide support to local governments in the areas of police, fire, and emergency medical services.

ICMA also represents local governments at the federal level and has been involved in numerous projects with the Department of Justice and the Department of Homeland Security.

In 2014, as part of a restructuring at ICMA, the Center for Public Safety Management (CPSM) was spun out as a separate company. It is now the exclusive provider of public safety technical assistance for ICMA. CPSM provides training and research for the Association's members and represents ICMA in its dealings with the federal government and other public safety professional associations such as CALEA, PERF, IACP, IFCA, IPMA-HR, DOJ, BJA, COPS, NFPA, and others.

The Center for Public Safety Management, LLC, maintains the same team of individuals performing the same level of service as when it was a component of ICMA. CPSM's local government technical assistance experience includes workload and deployment analysis using our unique methodology and subject matter experts to examine department organizational structure and culture, identify workload and staffing needs, and align department operations with industry best practices. We have conducted 341 such studies in 42 states and provinces and 246 communities ranging in population from 8,000 (Boone, Iowa) to 800,000 (Indianapolis, Ind.).

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INTRODUCTION

The City of Roswell retained the Center for Public Safety Management LLC (CPSM) to complete a gap analysis to be used to shape the foundation for a strategic plan for the city's fire department.

The Roswell Fire Department (RFD) is responsible for providing services that include fire suppression; first response emergency medical services; emergency medical services transport when the primary private agency is unavailable; emergency management; training and education; logistics, fleet and facility oversight; hazardous materials and technical rescue incident mitigation; and community risk reduction that includes fire prevention and code enforcement, plans review, fire investigation, and life safety public education.

The CPSM gap analysis and strategic plan project team conducted an on-site visit on May 2 and 3, 2022, and observed fire department and agency-connected supportive operations; visited each of the seven fire stations; conducted stakeholder interviews of key fire department and operational staff; analyzed the city's building and transportation risks; and reviewed department operations. Virtual and phone meetings were held throughout the gap analysis with senior fire staff wherein CPSM project staff further affirmed project information and elicited discussion to determine the department's strengths, weaknesses, opportunities, and threats.

The service demands on the department from the community are numerous and include EMS first response; fire suppression; technical rescue; hazardous materials; and transportation emergencies to include extensive vehicle traffic, a mass transit system utilizing bus service, and other non-emergency responses typical of suburban fire departments. A significant component of this report is the completion of an All-Hazard Risk Assessment of the Community. The All-Hazard Risk Assessment of the Community contemplates many factors that cause, create, facilitate, extend, and further risk in and to a community.

The response time and staffing components discussion of this report are designed to examine the current level of service provided by the RFD compared to national best practices. As well, these components of the report provide incident data and relevant information that can be utilized for strategic planning and self-review of service levels for continued improvement designed to meet community expectations and mitigate emergencies effectively and efficiently. Other significant components of this report are an analysis of the current staffing patterns and deployment of resources; review of the ISO-PPC Classification report; and fire station facility locations as benchmarked against industry standards.

A comprehensive risk assessment and review of deployable assets are critical aspects of a fire department's operation. First, these reviews will assist the RFD in quantifying the risks that it faces. Second, the RFD will be better equipped to determine if its current response resources are sufficiently staffed, equipped, trained, and positioned. The factors that drive the service needs are examined and then link directly to discussions regarding the assembling of an effective response force; these factors also must be considered when contemplating the response capabilities needed to adequately address the existing and future risks, and which encompass the component of critical tasking.

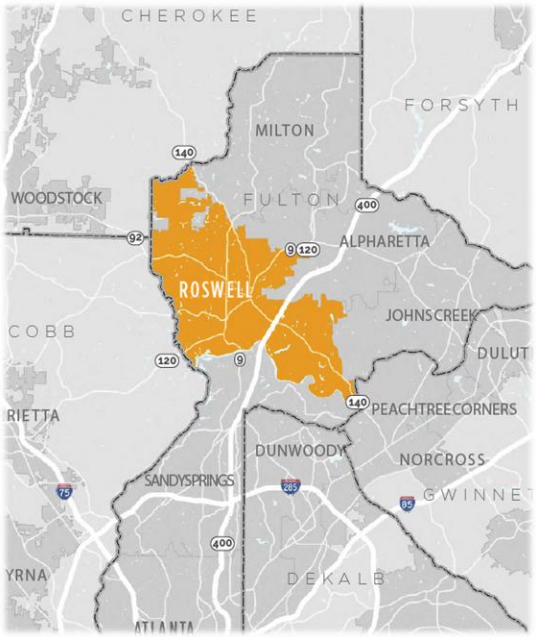
This report also contains a series of observations and planning objectives and recommendations—listed in Section 5—which are intended to form the foundation of the strategic plan CPSM will develop.

SECTION 1. ADMINISTRATIVE AND OPERATIONAL ANALYSIS

CITY OF ROSWELL

Roswell is located in north Fulton County. Contiguous cities include Alpharetta and Milton to the northeast, Johns Creek and Gwinnett County to the east, Sandy Springs to the south, unincorporated Cobb County to the west, and Cherokee County to the northwest. The southern boundary of the city is the Chattahoochee River.

FIGURE 1-1: City of Roswell and Surrounding Jurisdictions



The total area of the city is 42.00 square miles with 40.73 square miles being land and 1.27 square miles of water.

The city operates under a Mayor-Council form of government; the Mayor is the chief executive officer of the city. The Mayor and Council are vested with full legislative power.[1]

The Council-appointed City Administrator manages the day-to-day operations of the city and carries out the council's policy direction.[2]

Article 8.3 of the Roswell Code of Ordinances (Fire Protection and Prevention) establishes a fire department, Fire Chief, personnel, guidelines, ambulance service, fire prevention standards and enforcement, and other applicable laws associated with a fire department.[3]

1. Roswell, GA Code of Ordinances, Article Chapter 1.
2. www.roswellgov.com/government.
3. Roswell, GA Code of Ordinances, Article 8.3.

Section 8.3.2 of the Roswell Code of Ordinances designates the Fire Chief to be "*responsible for directing and supervising the operations and personnel of the Roswell Fire Department. Duties shall include implementing policies and procedures to enhance the operation of the department; reviewing training programs; conducting fire prevention and safety educational programs; and administering the departmental human resource program.*"

In April 2022, the City Council completed an update to the city's strategic plan for the period of 2021 to 2025. Development of the strategic plan included community input and public meetings, which were intended to assist the Mayor and Council in developing the plan's vision, mission, and goals.[4] The components of the city's strategic plan include:

City's Vision. To be the #1 family community in America.

City's Mission. To provide our citizens with an exceptional quality of life.

The Roswell Fire Department (RFD) has a mission statement, which is implemented through department policies and procedures #RFD002, and is disseminated as follows:

RFD Mission Statement. *Established in 1937, the Roswell Fire Department was committed to the saving of lives and the preservation of property. Today the tradition is carried on by dedicated employees.*

City's Core Values

- Accountability
- Communication
- Inclusion
- Innovation
- Trust
- Excellence
- Respect
- Responsiveness
- Transparency

City's Goals

- Economic Vitality
- Exceptional Quality of Life
- Safest Community in America
- Align Zoning and Development Decisions to Benefit Residents
- Outstanding City Services
- Great Governance
- Improve Transportation to Benefit Residents

The city's Strategic Plan includes key objectives specific to the Roswell Fire Department (RFD). These are:[5]

Goal: Safest Community in America

- Implement a phased approach to transition the fire department to a full-time staffing model.
- Determine site location strategy for public safety headquarters.

4. City of Roswell Strategic Plan, 2021–2025, April 2022.
5. Ibid.

- Complete the design for a new 911/emergency operations center and develop funding options.
- Review all emergency management policies, procedures, and programs and remedy any findings.
- Implement citywide training and certifications in Public Safety operations.

Goal: Exceptional Quality of Life

- Develop a program to annually assess resident and business partner satisfaction.
- Create and review formal special events program and staffing analysis to increase annual city events and sponsoring opportunities for community organizations.

Goal: Align Zoning and Development Decisions to Benefit Residents

- The Unified Development Code will align with the Comprehensive Plan.
- Update codes of ordinances.

Goal: Outstanding City Services

- Develop a succession plan for each department.
- Recruit and retain the best employees.
- Fantastic customer service.
- Maintain and upgrade city facilities.

Goal: Great Governance

- Develop and execute a Communications Plan.
- Develop and execute a program to annually assess resident and business partner satisfaction.
- Conduct seminars with all elected officials and executive team members to determine, clarify, memorialize, and promulgate roles and responsibilities and communicate them to the public.

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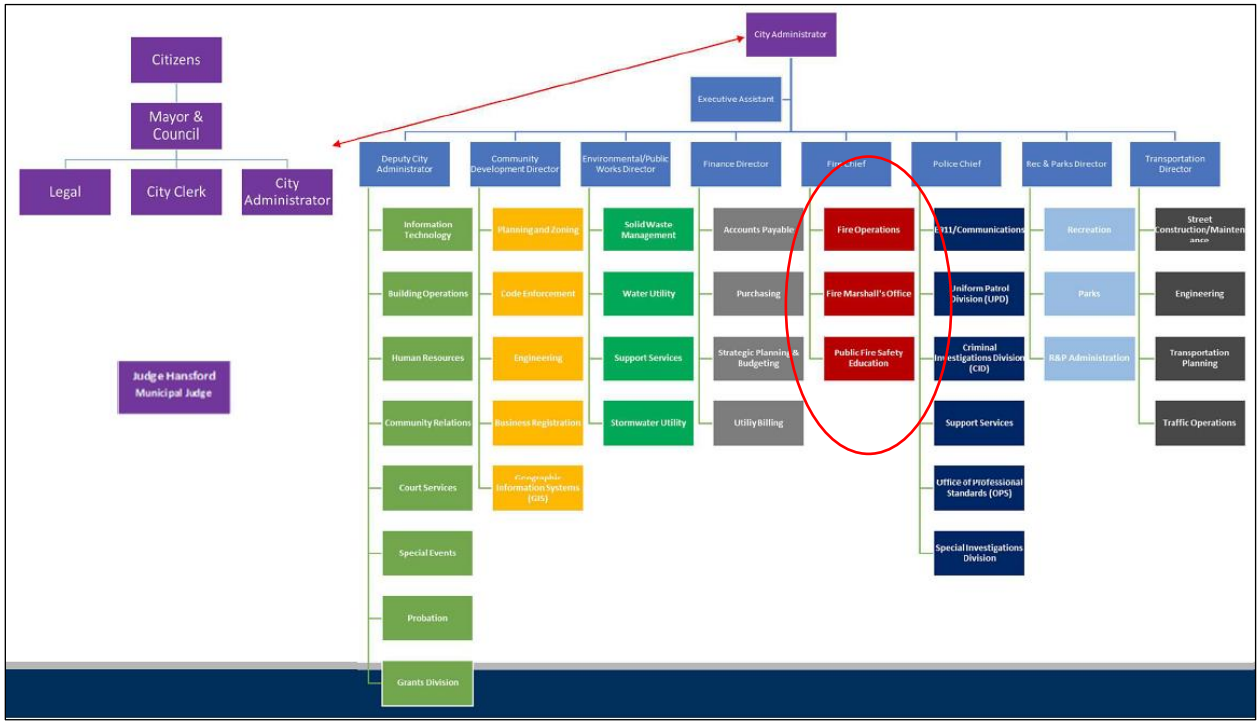
FIGURE 1-2: City Organizational Chart



ROSWELL FIRE DEPARTMENT

The RFD is a career fire department that employs full-time administrative, community risk reduction, and support staff, and part-time operational company level officers and firefighters. The part-time fire suppression force is drawn from multiple neighboring career fire departments; primarily those within and immediately surrounding Fulton County. There are some part-time staff assigned to fire administration as well.

When fully staffed, the RFD deploys seven engine companies, two truck companies, one heavy rescue, and two recues capable of providing Emergency Medical Services (EMS) ground transport if needed. This deployment model requires company level staffing of 34 personnel. The RFD has one Battalion Chief (shift commander) on-duty 24/7 as well. This position is a full-time RFD employee. Total on-duty shift personnel when fully staffed is 35. The RFD operates with a typical 24-hour shift. There are three operational shifts or platoons (A, B, C shifts).

The RFD is led by a Fire Chief who has overall responsibility for the management and leadership of the department. The Fire Chief is assisted by two Deputy Chiefs who are direct reports.

The Deputy Chief of Operations manages the three operational shifts as described above. This includes all operational components and staffing. Each of the three operational shift Battalion Chiefs as well as the Division Chief of Professional Standards report directly to the Deputy Chief of Operations. The Division Chief of Professional Standards has oversight over the department's training and EMS.

The Deputy Chief of Administration manages the community risk reduction and support services branches of the department. The community risk reduction component is responsible for fire prevention code enforcement, fire protection plans review, and fire and life safety education.

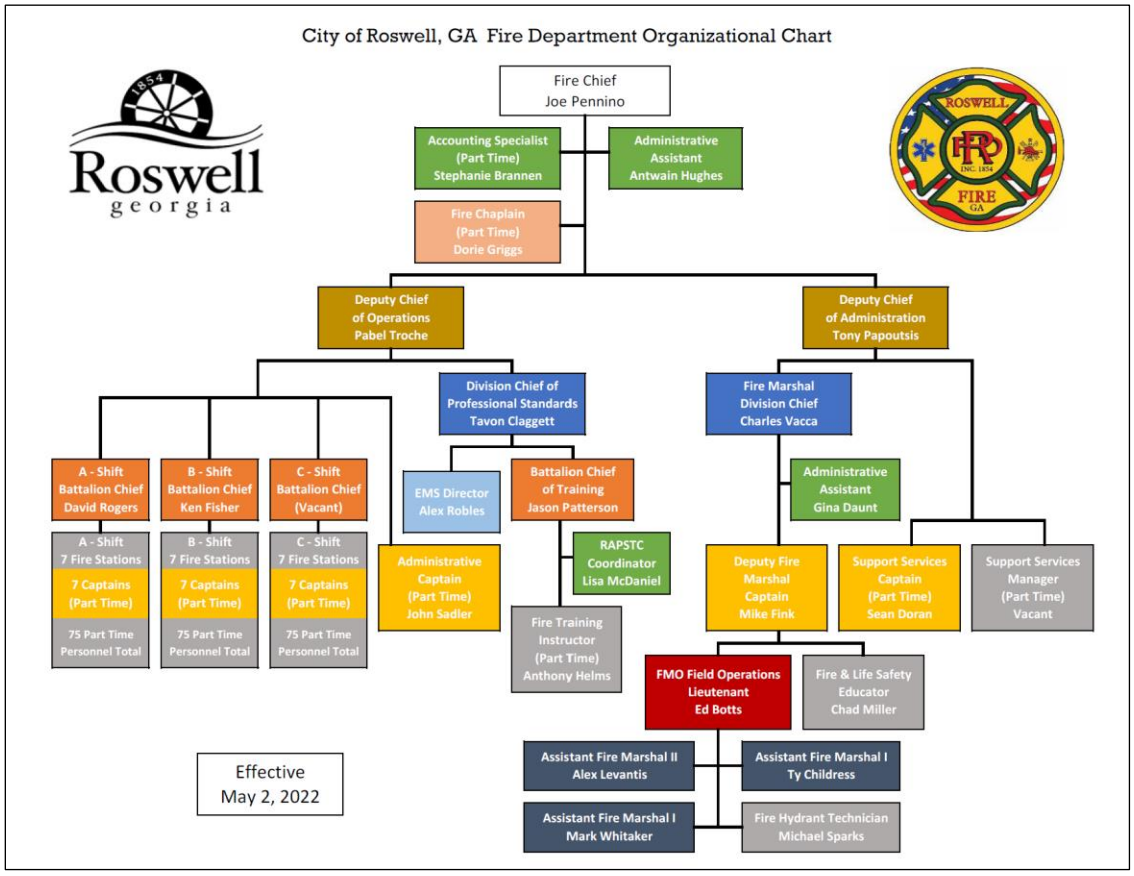
The support services component oversees the all-important supply-chain management function of the department, as well as fleet and facility services.

The key elements of the RFD include:

- Fire protective services.
- EMS first-tier response (ALS level) and ground transport when needed.
- Fire prevention, fire code enforcement, fire protection plans review.
- Fire cause and origin investigation.
- Emergency management operations and preparation.
- Technical rescue response and mitigation.
- Hazardous materials response and mitigation.
- Community outreach and life safety education.
- Employee training and education.
- Fleet, facility, and logistical support and management.
- Special event support.

Specialty response limited to available on-duty staffing.

FIGURE 1-3: RFD Organizational Chart



FIRE AND EMS OPERATIONS

Fire and EMS operations are deployed from seven fire stations located throughout the city and are commanded by a Deputy Fire Chief. The department delivers field operations and emergency response services through a clearly defined division of labor that includes a middle manager (Battalion Chief, who is a full-time RFD employee), first-line operational supervisors (part-time Captains), and part-time firefighters, some who fill the roles of apparatus drivers/operators. The entire city is considered a single operational battalion and is commanded each day by the Battalion Chief who acts as the overall day-to-day shift commander managing daily shift scheduling, on-duty crews, and employee relations, assigned administrative and logistical duties, and serves as an incident commander on those incidents the Battalion Chief is dispatched to. The RFD operates on a three-shift system (A, B, C shifts); each shift is 24 hours.

Operational services provided by the RFD include:

- Fire protective services.
- EMS first-tier response utilizing basic and advanced life support staffed and equipped apparatus dependent on available ALS staffing.
- EMS ground transport depending on patient severity and proximity/availability of the ambulance provider to support American Medical Response, the primary EMS ground transport provider.
- Swift Water Rescue – Technician Level.
- Vehicle and Machinery Rescue - Technician Level.
- Rope Rescue – Technician Level.
- Trench Rescue – Operations Level.
- Collapse Rescue – Technician Level.
- Confined Space Rescue – Operations Level.
- Hazardous Material – Operations Level.
- Wilderness Search and Rescue – Technician Level.

As noted above, operational company level supervisors (Captains) and firefighters are part-time employees. These employees work in other fire departments in the region to include Caroll County, Cartersville FD, Cherokee County, City of Atlanta, City of Austell, City of Alpharetta, City of Decatur, City of Gainesville, City of John's Creek, City of Marietta, City of Milton, City of Morrow, City of Sandy Springs, City of Smyrna, City of South Fulton, City of Woodstock, Clayton County, Cobb County, Dawson County, DeKalb County, Forsyth County, and Gwinnett County. The RFD also lists part-time employees from within their agency. In total, staffing of the RFD is drawn from 21 external fire departments. Shift personnel are typically reporting from their full-time fire department jobs. There is an expectation that vehicles and protective clothing and equipment are inspected, facility upkeep is performed, and daily assignments are completed. However, depending on the call volume they've handled the day before on their full-time job, personnel may require rest to ensure they can complete another 12- or 24-hour shift.

The RFD is budgeted for 21 part-time Captains and 204 part-time firefighters (225 total, a goal of 75 per shift). In January of 2022, the RFD provided CPSM a snapshot of part-time employees that totaled 216. Of the 216 listed in January 2022, 78 are paramedics, 38 are advanced emergency

medical technicians (EMT-A), 4 are basic emergency medical technicians (EMT-B), and 82 are (EMT-I).

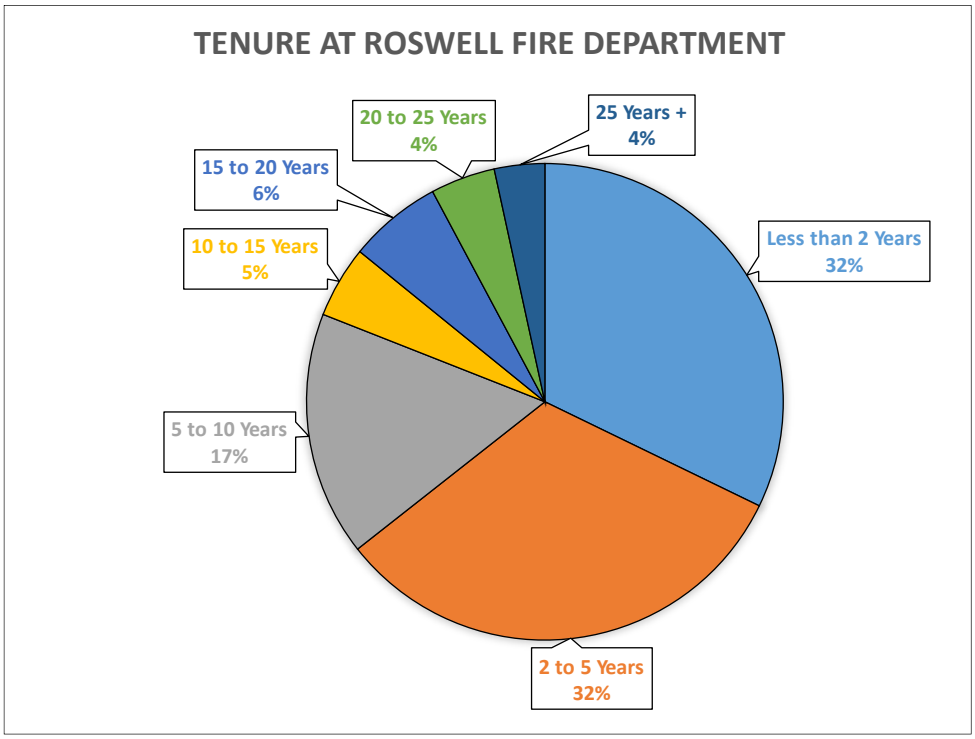
During CPSM's field visit in May of 2022, the total number of part time employees had fallen to 205. The loss of employees affects the ability of the department to consistently staff at maximum levels. Additionally, when part-time employee leave there is a loss of Roswell-specific experience and specialty trained staff members such as advanced EMTs and paramedics. As of May 2022, the largest percentage of part-time employees had either less than two years or two to five years' experience with the RFD (a total of 64 percent of the part time workforce). More specifically the workforce experience (205 employees) is:

- Less than 2 years: 66 total .
- 2 to 5 years: 66 total.
- 5 to 10 years: 34 total.
- 10 to 15 years: 10 total.
- 15 to 20 years; 13 total.
- 20 to 25 years: 9 total.
- 25-plus years: 7 total.

39/205 have ten or more years' experience with the RFD

The next figure illustrates the overall tenure of the part-time employees.

FIGURE 1-4: Part-time Workforce Tenure of Service with RFD



At the time of this study, the RFD was utilizing a deployment model where each of the seven engines are staffed with three personnel. Standard engine staffing is one part-time Captain, and two part-time firefighters (one serves as the driver/operator). Service companies (Aerials/Truck,

Heavy Rescue) are staffed with three part-time firefighters (one serves as the driver/operator). Two rescue units (ambulance) are staffed with two firefighters. Under this staffing model, total on-duty maximum staffing for this model is 35 personnel (includes the Battalion Chief).

At maximum staffing levels (35 on-duty shift members), the RFD staffs each station as follows:

- Station 21 houses three primary staffed units, which are an engine, truck (ladder), and rescue (ambulance). The current staffing model for this station is eight personnel, which consists of one part-time company officer (Captain) and seven part-time firefighters. Three firefighters staff the engine (no officer), the Captain and two firefighters staff the truck, and the rescue is staffed with two part-time firefighters when maximum daily staffing is available.
- Station 22 houses one primary staffed unit, which is an engine. The current minimum staffing model for this station is three personnel, which consists of one part-time company officer (Captain) and two part-time firefighters. A rescue is available at this station to upstaff with two part-time firefighters as needed and as staffing allows.
- Station 23 houses two primary units, one staffed engine and one cross-staffed brush truck. The current minimum for this station is three personnel, which consists of one part-time company officer (Captain) and two part-time firefighters. All three employees staff the engine while the brush unit is left unstaffed, but is cross-staffed with the engine personnel when the brush unit is needed or dispatched.
- Station 24 houses four primary staffed units, which are an engine, truck (ladder), battalion chief, and rescue (ambulance). The current minimum staffing model for the station is nine personnel, which consists of one full-time Battalion Chief staffing Battalion 2, one part-time company officer (Captain) and nine part-time firefighters. Three firefighters staff the engine (no officer), the Captain and two firefighters staff the truck, and the rescue is staffed with two part-time firefighters.
- Station 25 houses two primary staffed units, which are an engine (75-foot quint apparatus; engine, ladder combination apparatus) and one staffed heavy rescue. The current minimum staffing model for the station is six personnel, which consists of one part-time company officer (Captain) and five part-time firefighters. The captain and two firefighters staff the heavy rescue, and three firefighters staff the engine (no officer). When the heavy rescue is out of service the officer staffs the engine.
- Station 26 houses one primary staffed unit, which is one engine. The current staffing model for this station is three personnel, which consists of one part-time company officer (Captain) and two part-time firefighters.
- Station 27 houses one primary staffed unit, which is one engine. The current minimum staffing model for the station is three personnel, which consists of one part-time company officer (Captain) and two part-time firefighters.

Part-time firefighters must submit a schedule for a minimum total request of 72 hrs. per pay cycle. Shift availability requests for shifter program members must contain a minimum total request of seven 24-hour shifts (168 hrs.) in a pay cycle on their assigned shift. All members must submit their shift availability request to include a minimum of 24 hrs. on a weekend. Employees will not be scheduled for more than 48 hrs. consecutively without at least a 12-hour period of rest or relief.[6]

Because the RFD is dependent on part-time staff to sign up for shifts 365/24/7, and because there are shifts where the department does not meet the maximum staffing level of 35

6. Roswell Fire Department SOP 004

personnel, the RFD at times has to implement a draw-down deployment schedule. This draw-down may be for a part of the 24-hour shift or the entire 24-hour shift. The RFD senior staff conveyed to CPSM that shift levels have dropped to as low as 20 personnel on weekends and holidays, or on days where part-time staff's home department required their attendance there for a variety of reasons.

During draw-down time periods, the RFD will staff the primary fire protective service apparatus, which are engines first and then trucks. The heavy rescue and the rescue units will be placed in service as staffing becomes available. Responding to structural fire incidents (or potential fire incidents) with just the engines as opposed to a combination of engines and aerial ladders with elevated aerial devices and elevated water stream capabilities limits the department's tactical options. It will not have aerial ladder or even longer ground ladder capabilities immediately available on scene. On the fireground this can impact the ability to perform rescues, access roofs, and deliver elevated water streams.

In review of staffing with RFD senior staff for CY 2021, we learned that personnel tend to prefer to work the night shift more than the day shift, which is when more staffing is needed to handle the service demand. Draw down of units out of service are noted below, which impact deployable services.

- Heavy Rescue 25 is out of service when staffing drops to 33 according to the staffing matrix. In 2021, 51% of the day shifts had less than 34 personnel.
- Rescue 24 is out of service when staffing drops to 31. In 2021, 34.5% of the day shifts had less than 32 personnel.
- Rescue 21 is out of service when staffing drops to 29. In 2021, 21.6% of the day shifts had less than 30 personnel.
- Truck 21's staffing is reduced to 2 when staffing drops to 27 and is out of service when staffing drops to 26. In 2021, 10.1% of the day shifts had less than 28 personnel and 5.2% had less than 27 personnel.

Shift staffing for primary units is illustrated in the following figure.

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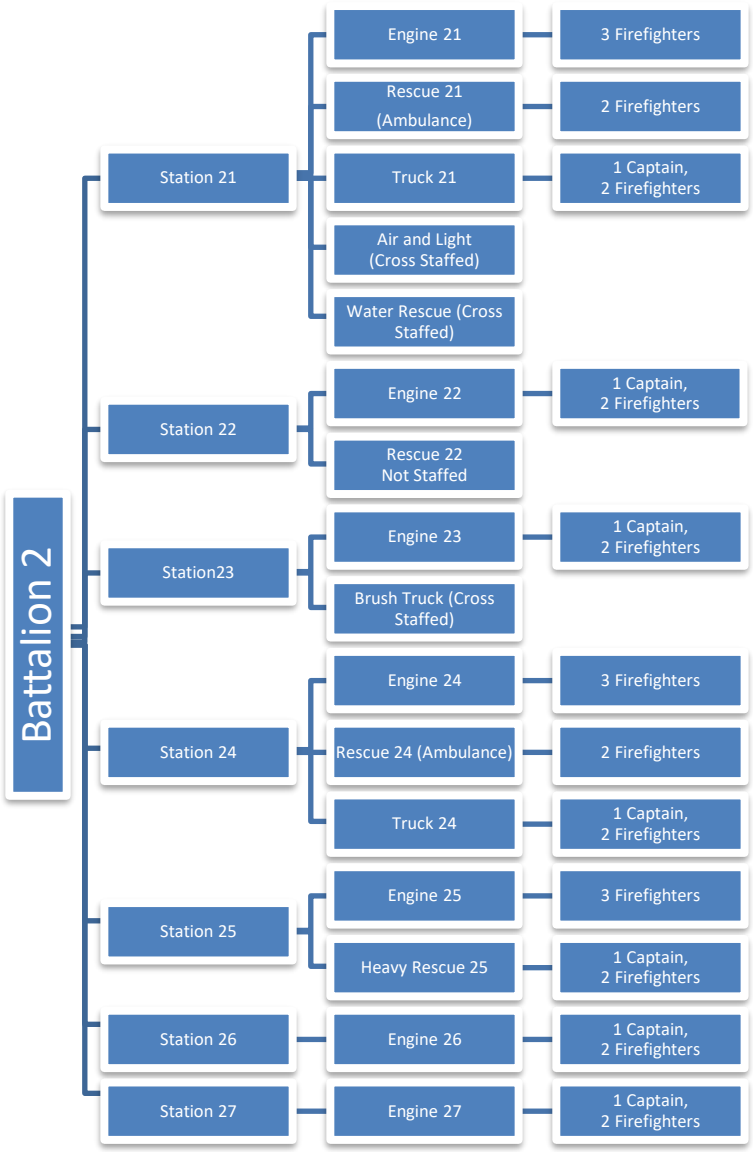
FIGURE 1-5: RFD Shift Staffing Matrix



The next figure illustrates current station locations in the city with primary apparatus assignments.

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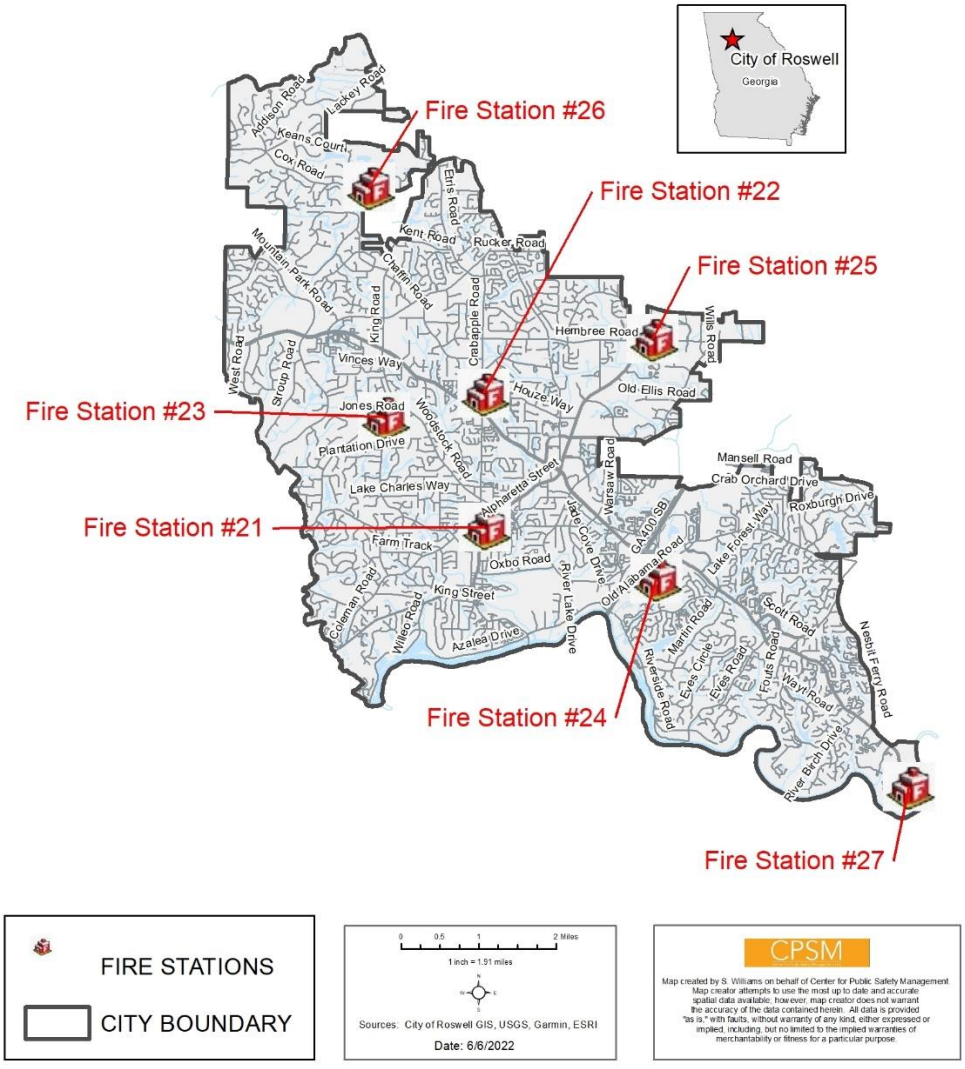
FIGURE 1-6: Roswell Fire Station Locations

Primary Staffed Apparatus Assigned to Station

Station 21: Engine, Truck, Rescue
Station 22: Engine
Station 23: Engine, Brush
Station 24: Engine, Truck, Rescue, Battalion Chief
Station 25: Engine (75-foot Quint), Heavy Rescue
Station 26: Engine
Station 27: Engine *(Station 27 also houses Sandy Springs Engine 55)*



NFPA 1710, EFFECTIVE RESPONSE FORCE, AND CRITICAL TASKING

National Fire Protection Association (NFPA) standards are consensus standards; they are not mandates nor are they the law. Many cites and countries strive to achieve these standards to the extent possible without causing an adverse fiscal impact to the community and use these standards as benchmarks and service delivery goals.

NFPA 1710 outlines the organization and deployment of operations by career, and primarily career, fire and rescue organizations.[7] It serves as a benchmark to measure staffing and deployment of resources to certain structures and emergencies.

According to NFPA 1710, fire departments should base their capabilities on a formal all-hazards community risk assessment, as discussed earlier in this report, and taking into consideration:[8]

- Life hazard to the population protected.
- Provisions for safe and effective firefighting performance conditions for the firefighters.
- Potential property loss.
- Nature, configuration, hazards, and internal protection of the properties involved.
- Types of fireground tactics and evolutions employed as standard procedure, type of apparatus used, and results expected to be obtained at the fire scene.

According to NFPA 1710, if a community follows this standard, engine and ladder companies shall be staffed with a minimum of four on-duty members.[9] Additional staffing parameters in this standard for engine and ladder companies is based on geographical isolation and tactical hazards, and increases each to five or six as a minimum.[10] This staffing configuration is designed to ensure a fire department can efficiently assemble an effective response force for each risk the department may encounter and complete the critical tasking necessary on building fires and other emergency incidents simultaneously to the extent possible. ***NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with the assembling of on-scene personnel to complete critical tasks as outlined in the standard.***

Critical tasks are those activities that must be conducted on time and preferably simultaneously by responders at emergency incidents to control the situation and minimize/stop loss (property and life-safety). Critical tasking for fire operations is the minimum number of personnel needed to perform the tasks needed to effectively control and mitigate a fire or other emergency. To be effective, critical tasking must assign enough personnel so that all identified functions can be performed simultaneously. However, it is important to note that initial response personnel may manage secondary support functions once they have completed their primary assignment. Thus, while an incident may end up requiring a greater commitment of resources or a specialized response, a properly executed critical tasking assignment will provide adequate resources to immediately begin bringing the incident under control.

7. NFPA 1710 is a nationally recognized standard, but it has not been adopted as a mandatory regulation by the federal government or the State of Georgia. It is a valuable resource for establishing and measuring performance objectives for the City of Roswell but should not be the only determining factor when making local decisions about the city's fire services.
8. NFPA 1710, 5.2.1.1, 5.2.2.2
9. NFPA 1710, 5.2.3.1.1; 5.2.3.2.1
10. NFPA 1710, 5.2.3.1.2, 5.2.3.1.2.1.,5.2.3.2.2.,5.3.2.3.2.2.1

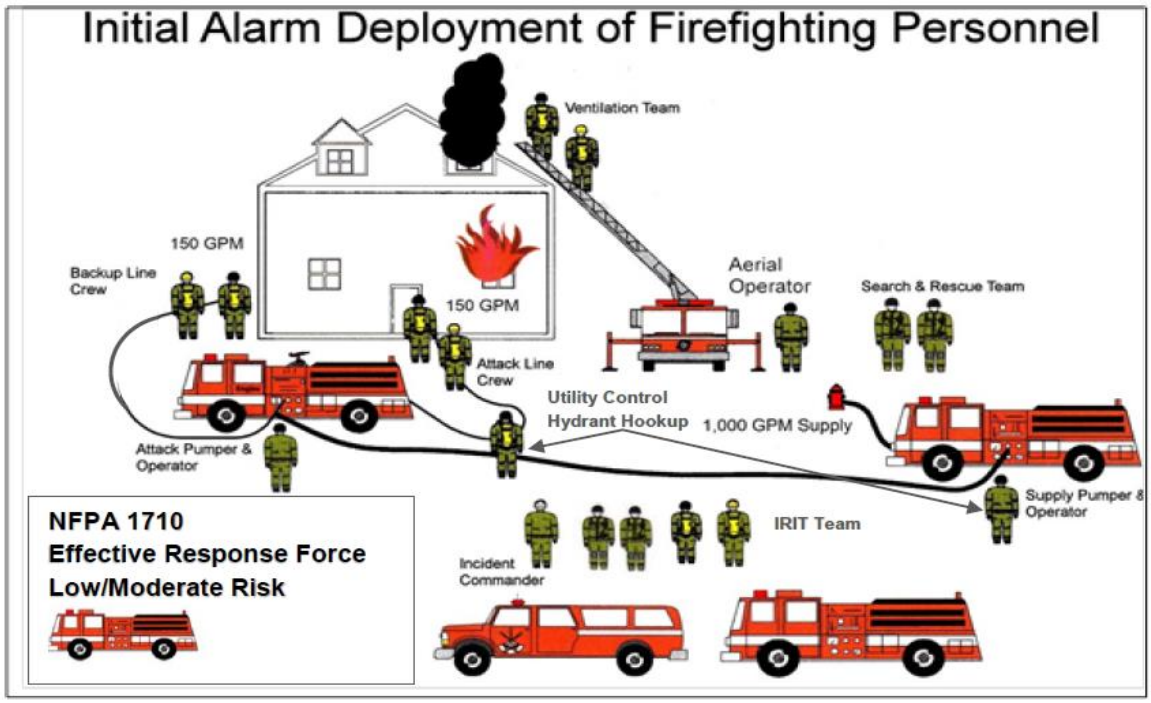
The specific number of people required to perform all the critical tasks associated with an identified risk or incident type is referred to as an *Effective Response Force* (ERF). The goal is to deliver an ERF within a prescribed period. NFPA 1710 provides the benchmarks for effective response forces.

Key provisions of NFPA 1710 related to an Effective Response Force are as follows:

- Incident command.
- Continuous water supply and hydrant hookup.
- Ventilation (horizontal and/or vertical).
- Forcible entry.
- Fire attack via two handlines (primary and backup).
- Primary search and rescue.
- Establishment of an IRIT (initial rapid intervention team).

The next figure illustrates an ERF for a single family dwelling as outlined in NFPA 1710 (which is 16 personnel, 17 if the aerial device is in operation).

FIGURE 1-7: Effective Response Force for Single-Family Dwelling Fire



The RFD utilizes ProQA Paramount priority dispatch solutions for fire dispatch. This software utilizes pre-determined asset deployment response protocols ensuring the most correct resources are dispatched from the lowest acuity (single unit response) to the highest acuity (multiple unit response to include command and specialty units).

The following tables outline how critical tasking and assembling an effective response force is first measured in NFPA 1710 and then how the RFD is benchmarked against this standard. This

discussion will cover fires in single-family dwelling buildings, open-air strip malls / commercial buildings, and apartment buildings as outlined in the NFPA standard. These are typical structural fire incidents that fire departments respond to, and which are, by far, the most common type of structure fire. Personnel requirements for fires involving large, more complex structures such as commercial or industrial facilities or multifamily residential occupancies will require a significantly greater commitment of personnel.

Single-Family Dwelling: NFPA 1710, 5.2.4.1

The initial full alarm assignment (ERF) to a structural fire in a typical 2,000 square-foot, two-story, single-family dwelling without a basement and with no exposures must provide for a minimum of 16 members (17 if an aerial device is used). The following table outlines the critical task matrix.

TABLE 1-1: Effective Response Force for Single-Family Dwelling Fire

Critical Tasks	Personnel
Incident Command	1
Continuous Water Supply	1
Fire Attack via Two Handlines	4
Hydrant Hook Up – Forcible Entry – Utilities	2
Primary Search and Rescue	2
Ground Ladders and Ventilation	2
(Aerial Operator if Aerial is Used)	(1)
Establishment of IRIC (Initial Rapid Intervention Crew)	4
Total Effective Response Force	**16 (17 If aerial is used)**

The following table outlines how the RFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for a single-family dwelling fire.

TABLE 1-2: RFD Effective Response Force for Single-Family Dwelling Fire

Apparatus	Personnel
Battalion Chief	1
RFD Engine or Auto Aid (Sandy Springs E55 or Milton E41)	3
RFD Engine or Auto Aid (Sandy Springs E55 or Milton E41)	3
RFD Engine	3
RFD Aerial	3
RFD Rescue	2
RFD Heavy Rescue	3
Total RFD ERF	18

As a single responding agency, and if fully staffed, the RFD meets the minimum benchmarks of NFPA 1710 for an Effective Response Force for single-family dwelling fires-if all units are staffed. Automatic aid bolsters the RFD's ability to meet this benchmark. ***NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2.1.3 of this standard***.

Open-Air Strip Mall/Commercial Building, NFPA 5.2.4.2

The initial full alarm assignment (ERF) to a structural fire in a typical open-air strip center or commercial building ranging from 13,000 square feet to 196,000 square feet in size must provide for a minimum of 27 members (28 if an aerial device is used). The following table outlines the critical tasking matrix for this type of fire.

TABLE 1-3: Effective Response Force for Open-Air Strip Mall/Commercial Fire

Critical Tasks	Personnel
Incident Command	2
Continuous Water Supply	2
Fire Attack via Two Handlines	6
Hydrant Hook Up – Forcible Entry - Utilities	3
Primary Search and Rescue	4
Ground Ladders and Ventilation	4
(Aerial Operator if Aerial is Used)	(1)
Establishment of IRIC (Initial Rapid Intervention Crew)	4
Medical Care Team	2
Total Effective Response Force	**27 (28 If aerial is used)**

The following table outlines how the RFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for an open-air strip mall and commercial building fire.

TABLE 1-4: RFD Effective Response Force for Open-Air Strip Mall/Commercial Fire

Apparatus	Personnel
Battalion Chief	1
RFD Engine or Auto Aid (Sandy Springs E55 or Milton E41)	3
RFD Engine or Auto Aid (Sandy Springs E55 or Milton E41)	3
RFD Engine or Auto Aid	3
RFD Aerial	3
RFD Aerial	3
RFD Rescue	2
RFD Heavy Rescue	3
Total RFD ERF	**21**

As a single responding agency under the current response matrix, the RFD does not meet the minimum benchmarks of NFPA 1710 for an Effective Response Force for an open-air strip mall fire. With an increase in RFD response assets and/or utilizing regional automatic and mutual aid, the RFD will meet the benchmark. RFD response dependent on all units being staffed. ***NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2.1.3 of this standard***.[11]

11. NFPA 1710. 5.2.1.3

Apartment Building, NFPA 5.2.4.3

The initial full alarm assignment (ERF) to a structural fire in a typical 1,200 square-foot apartment within a three-story, garden-style apartment building must provide for a minimum of 27 members (28 if an aerial device is used). The following table outlines the critical tasking matrix for this type of building fire. The RFD has no specific response matrix for apartment buildings, so we utilized the NFPA commercial fire ERF matrix as it has similar staffing.

TABLE 1-5: Effective Response Force for Apartment Building Fire

Critical Tasks	Personnel
Incident Command	2
Continuous Water Supply	2
Fire Attack via Two Handlines	6
Hydrant Hook Up – Forcible Entry – Utilities	3
Primary Search and Rescue	4
Ground Ladders and Ventilation	4
(Aerial Operator if Aerial is Used)	(1)
Establishment of IRIC (Initial Rapid Intervention Crew	4
Medical Care Team	2
Total Effective Response Force	**27 (28 If aerial is used)**

The following table outlines how the RFD assembles staffing and deployable resources as measured against NFPA 1710 benchmarking for an effective response force for an apartment building or other multi-unit housing type building fire.

TABLE 1-6: RFD Effective Response Force for Apartment Building Fire

Apparatus	Personnel
Battalion Chief	1
RFD Engine or Auto Aid (Sandy Springs E55 or Milton E41)	3
RFD Engine or Auto Aid (Sandy Springs E55 or Milton E41)	3
RFD Engine or Auto Aid	3
RFD Aerial	3
RFD Aerial	3
RFD Rescue	2
RFD Heavy Rescue	3
Total RFD ERF	**21**

As a single responding agency, the RFD does not meet the minimum benchmarks of NFPA 1710 for an Effective Response Force for an apartment building fire. With an increase in RFD response assets and/or utilizing regional automatic and mutual aid, the RFD will meet the benchmark. RFD response dependent on all units being staffed. ***NFPA 1710 permits fire departments to use established automatic aid and mutual aid agreements to comply with section 5.2.1.3 of this standard.***[12]

12. NFPA 1710. 5.2.1.3

Another consideration, and one that links to critical tasking and assembling an effective response force, is that of two-in/two-out regulations. Essentially, prior to starting any fire attack in an immediately dangerous to life and health (IDLH) environment [with no confirmed rescue in progress], the initial two-person entry team shall ensure that there are sufficient resources on-scene to establish a two-person initial rapid intervention team (IRIT) located outside of the building.

This critical tasking model has its genesis with the Occupational Safety and Health Administration, specifically 29 CFR 1910.134(g)(4) and was later included in NFPA 1500, *Standard on Fire Department Occupational Health, Safety, and Wellness*.

CFR 1910.134 states: Procedures for interior structural firefighting. The **Error! Hyperlink reference not valid.** shall ensure that:

(i) At least two **Error! Hyperlink reference not valid.** enter the **Error! Hyperlink reference not valid.** atmosphere and remain in visual or voice contact with one another at all times;

(ii) At least two **Error! Hyperlink reference not valid.** are located outside the **Error! Hyperlink reference not valid.** atmosphere; and

(iii) All **Error! Hyperlink reference not valid.** engaged in **Error! Hyperlink reference not valid. Error! Hyperlink reference not valid.** SCBAs.[13]

It should be noted here that Georgia is not a "state plan" state, meaning it does not have a federally approved occupational safety and health regulatory program; federal OSHA governs the private sector; the public sector is governed as applicable through the *Public Employee Hazardous Chemical Protection and Right-to-Know Act*. There are no additional state workplace and health rules for the public sector. Notwithstanding these parameters, two-in-two out is a national best practice and should be followed as outlined for firefighter safety.

NFPA 1500, 2018 Edition, has similar language as CFR 1910.134(g)(4) to address the issue of two-in/two-out, stating *the initial stages of the incident where only one crew is operating in the hazardous area of a working structural fire, a minimum of four individuals shall be required consisting of two members working as a crew in the hazardous area and two standby members present outside this hazard area available for assistance or rescue at emergency operations where entry into the danger area is required.*[14]

NFPA 1500 also speaks to the utilization of the two-out personnel in the context of the health and safety of the firefighters working at the incident. *The assignment of any personnel including the incident commander, the safety officer, or operations of fire apparatus, shall not be permitted as standby personnel if by abandoning their critical task(s) to assist, or if necessary, perform rescue, this clearly jeopardizes the safety and health of any firefighter working at the incident.*[15]

In order to meet CFR 1910.134(g)(4), and NFPA 1500, the RFD must utilize two personnel to commit to interior fire attack while two firefighters remain out of the hazardous area or immediately dangerous to life and health (IDLH) area to form the Initial Rapid Intervention Team (IRIT), while attack lines are charged and a continuous water supply is established.

However, NFPA 1500 allows for fewer than four personnel under specific circumstances. It states: *Initial attack operations shall be organized to ensure that if on arrival at the emergency scene,*

13. CFR 1910.134 (g) 4
14. NFPA 1500, 2018, 8.8.2.
15. NFPA 1500, 2018, 8.8.2.5.

initial attack personnel find an imminent life-threatening situation where immediate action could prevent the loss of life or serious injury, such action shall be permitted with fewer than four personnel.[16]

CFR 1910.134(g)(4) also states that nothing in section (g) is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.[17]

It is also important to note that the OSHA standard (and NFPA 1500, 1710) specifically references "interior firefighting." Firefighting activities that are performed from the exterior of the building are not regulated by this portion of the OSHA standard, however there must be presence on the fireground from company officers, incident commanders, and the firefighting force to recognize that when operating in and under any part of the exterior structure (extended roofs, marquees, three-wall exterior abutments) these areas should be considered interior operations and applicable fireground strategy and tactics applied. In the end, the ability to assemble adequate personnel, along with appropriate apparatus and incident command on the scene of a structure fire, is critical to operational success and firefighter safety.

In discussions with RFD administration, CPSM found many fundamental issues with staffing a career fire department with part-time personnel. These issues require strategic planning and funding to overcome and include:

- When a regional emergency is occurring such as an extreme weather event or a pandemic, part-time staff may be bound to their home departments, thus leaving the City of Roswell with the potential of a severely understaffed department to respond to the same regional emergency.
- Part-time staff is typically reporting to RFD stations when they are getting off from their primary department, which is at the end of a 24-hour shift. Fatigue during their 12- or 24-hour shift with the RFD is highly probable, which can lead to errors, injuries, and reduction in productivity.
- Staggered shift start-times based on where firefighters are coming from (home department) causes problems with accountability at the station and on the fireground during shift change as the RFD does not know who is still at work. On many mornings part-time staff report to work beyond the normal shift start time of 8:00 a.m. due to travel from their home department station or mandatory overtime/hold over.
- Equipment utilized in the RFD may not be the same as the employee's home department. This includes self-contained breathing apparatus, structural clothing ensemble, fire pumps, aerial hydraulics and stabilization equipment, heavy apparatus driving and motor components, firefighter escape devices, cardiac monitors, and the like.
- Inconsistent staffing with the same crew members disables the ability to form a cohesive team that routinely works and trains together. A more cohesive team translates to efficiencies and increased effectiveness on the emergency scene. Most part-time employees only check their email when they work so those who work infrequently are slow to respond to email requests for information.
- Different policies, protocols, procedures, and mission and vision statements in the home department than in the RFD create a situation where part-time staff must adapt when working in the RFD. This can lead to inefficiencies in and around the station and apparatus, and on an emergency incident, which reduces effectiveness.

16. NFPA 1500, 2018 8.8.2.10.
17. CFR 190.134, (g).

- There is no regular full-time supervision (company officer level) in each fire station, which leads to lack of upkeep and maintenance of the facility and the apparatus.
- The RFD tends to lose part-time staff when overtime opportunities at their full-time job increase.
- It is difficult to complete regular staff evaluations due to inconsistent part-time schedule.
- High attrition rate. The RFD lost 31 part-time staff in 2021 and has lost 25 in 2022 (as of June 1, 2022). This requires dedicating copious administrative staff time recruiting, outfitting, and onboarding new firefighters.
- Tenure at the RFD: 66 of RFD's part-time firefighters have worked at the RFD for less than 2 years, and 132 (64 percent overall) have worked at the RFD for less than 5 years. Even working full-time with frequent exposure, it takes considerable time for new firefighters to learn the City of Roswell community and geography, as well as the RFD's policies, apparatus, and equipment. This process is further impeded by the inconsistent part-time schedule and lack of consistent supervision.
- Operating and maintenance costs per employee are higher for 225 part time positions as each requires uniforms, custom-fitted structural gear ensemble, etc. A full-time department is estimated at 135, which would reduce these costs.
- Difficult to implement department-wide training, health and safety, employee relations, and other fundamental fire and EMS programs due to inconsistent staffing schedules of personnel.
- Difficult to implement succession planning, particularly at the first-line and middle-manager levels (Captain and Battalion Chief).
- Any transfer, promotion, FMLA, or worker's comp injury/illness that occurs in the part-time staff's full-time department affects staffing with the RFD.
- For any given emergency to which RFD responds, there are critical tasks that must be completed. These tasks can range from the immediate rescue of trapped occupants within a burning structure to vehicle accidents with entrapment, to hazardous materials leaks and spills when needed. The department's inconsistent staffing levels has an impact on its ability to handle a moderate risk structure fire effectively and safely. Although the use of automatic and mutual aid from surrounding departments can help bridge this gap, this assistance will have built-in and at times delayed response time considerations.

RESPONSE TIMES

Response times are typically utilized as a primary measurement for evaluating fire and EMS services. Response times are used as a benchmark to determine how well a fire department is currently performing, to help identify response trends, and to predict future operational needs and station placement. Achieving the quickest and safest response times possible should be a fundamental goal of every fire department.

Fire incident response time criterion is linked to the concept of "flashover." This is the state at which super-heated gasses from a fire are released rapidly, causing the fire to burn freely and become so volatile that the fire reaches an explosive state (simultaneous ignition of all the combustible materials in a room). In this situation, usually after an extended period (often eight to twelve minutes after ignition but at times as quickly as five to seven minutes), and a combination of the right conditions (fuel and oxygen), the fire expands rapidly and is much more difficult to contain. When the fire does reach this extremely hazardous state, initial firefighting forces are often overwhelmed, larger and more destructive fire occurs, the fire

escapes the room and possibly even the building of origin, and significantly more resources are required to affect fire control and extinguishment.

EMS response times are measured differently than fire service response times. Where the fire service uses NFPA 1710 as a response time benchmarking document, the focus for EMS is and should be directed to the evidence-based research relationship between clinical outcomes and response times. Much of the current research suggests response times have reduced impact on clinical outcomes outside of a small segment of call types. These include cerebrovascular accidents (stroke); injury or illness compromising the respiratory system; injury or illness compromising the cardiovascular system to include S-T segment elevation emergencies, high-acuity medical and pediatric emergencies; cardiac and respiratory arrest; and certain high-risk obstetrical emergencies to name a few. Each requires rapid response times, rapid on-scene treatment and packaging for transport, and rapid transport to the hospital.

A crucial factor in the whole response time question is what we term "**detection time**." This is the time it takes to detect a fire or a medical situation and notify 911 to initiate the response. In many instances, particularly at night or when automatic detection systems (fire sprinklers and smoke detectors) are not present or inoperable, the fire detection process can be extended. The same holds true for EMS incidents. Many medical emergencies are often thought to be something minor by the patient, treated with home remedies, and the true emergency goes undetected until signs and symptoms are more severe. When the fire-EMS department responds, they often find these patients in acute states. Fires that go undetected and are allowed to expand in size become more destructive, are difficult to extinguish, and require more resources for longer periods of time.

For the purpose of this analysis, ***response time*** is a product of three components: ***dispatch time***, ***turnout time***, and ***travel time***.

For this study, and unless otherwise indicated, response times and travel times measure the first arriving unit only. The primary focus of this section is the dispatch and response time of the first arriving units for calls responded to with lights and sirens.

Dispatch time is the difference between the time a call is received and the earliest time an agency is dispatched. Dispatch time includes call processing time, which is the time required to determine the nature of the emergency and the types of resources to dispatch. The NFPA 1710 standard for this component of response times is the event is processed and dispatched in:

- ≤ 64 seconds 90 percent of the time.
- ≤ 106 seconds 95 percent of the time.

Special call types:

- ≤ 90 seconds 90 percent of the time.
- ≤ 120 seconds 99 percent of the time.

The next component of response time is **turnout time**, an aspect of response which is controlled by the responding fire department. NFPA 1710 states that turnout time shall be:

- ≤ 80 seconds (1.33 minutes) for fire and special operations 90 percent of the time.
- ≤ 60 seconds (1.0 minute) for EMS responses.

The last component of response time is **travel time,** an aspect of response time that is affected by factors such as station location, road conditions, weather, and traffic control systems. NFPA 1710 states that travel time for the first arriving fire suppression unit to a fire incident shall be:

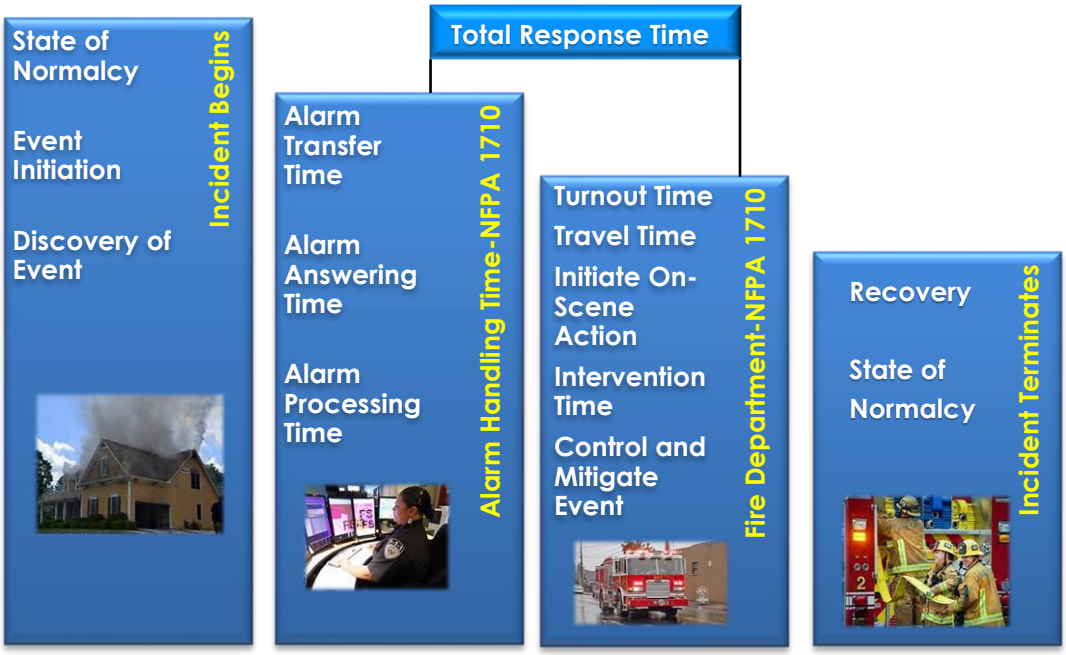
- ≤ 240 seconds for the first arriving engine company to a fire suppression incident 90 percent of the time.
- ≤ 360 seconds for the second company 90 percent of the time.
- ≤ 480 seconds to assemble the initial first alarm assignment on scene 90 percent of the time for low/medium hazards, and 610 seconds for high-rise fire incidents 90 percent of the time.

For EMS incidents the NFPA 1710 standard establishes a travel time of:

- ≤ 240 seconds for the first arriving engine company with automatic external defibrillator (AED) or higher level capability.
- ≤ 480 seconds or less travel time of an Advanced Life Support (ALS) unit at an EMS incident where the service is provided by the fire department provided a first responder with an AED or basic life support unit arrived in 240 seconds or less travel time.

The following figure provides an overview of the fire department incident cascade of events and further describes the total cascade of events and their relationship to the total response time of a fire incident.

FIGURE 1-8: Incident Cascade of Events



Travel time is key to understanding how fire and EMS station location influences a community's aggregate response time performance. Travel time can be mapped when existing and proposed station locations are known. The location of responding units is one key factor in response time; reducing response times, which is typically a key performance measure in determining the efficiency of department operations, often depends on this factor. The goal of placement of a single fire station or creating a network of responding fire stations in a single

community is to optimize coverage with short travel distances, when possible, while giving special attention to natural and manmade barriers, and response routes that can create response-time problems.[18] This goal is generally budget-driven and based on demand intensity of fire and EMS incidents, travel times, and identified risks.

The following figures use GIS mapping to illustrate travel time bleeds using the existing street network from the current RFD stations. CPSM also mapped the travel time projections from one primary auto aid station (Milton 41) that may respond automatically into Roswell if in station.

The GIS data for streets includes speed limits for each street segment and allows for "U-turns" for dead-end streets and intersections, as well as other travel obstacles.

It is important to understand that measuring and analyzing response times and response time coverage are measurements of performance. When we discuss community risk later in this analysis, we identify that the RFD like most other fire departments in the nation is an all-hazards response agency. While different regions of the country respond to different environmental risks, the remaining hazards that fire departments confront remain the same. Linking response data to community risks lays the foundation for future fire department planning in terms of fire station location, the need for additional fire stations, and staffing levels whether supplied by the fire department or a combination of a city's fire department and automatic aid. Managing fire department response capabilities to the identified community's risk focuses on three components, which are:

- Having a full understanding of the total risk in the community and how each risk impacts the fire department in terms of resiliency, what the consequences are to the community and fire department should a specific risk or combination of two or more occur and preparing for and understanding the probability that the risk may occur.
- Linking risk to the deployment of resources to effectively manage every incident. This includes assembling an Effective Response Force for the response risk in measurable times benchmarked against NFPA standards, deploying the appropriate apparatus (engines, ladders, heavy rescues, ambulances), and having a trained response force trained to combat a specific risk.
- Understanding that each element of response times plays a role in the management of community risk. Low response times of the initial arriving engine and low time to assemble an Effective Response Force on fire and other incidents is associated with positive outcomes.

The next set of figures illustrates travel time bleeds using the NFPA benchmarks for:

- First arriving engine company on fire incidents and EMS incidents with an automated external defibrillator (AED) or higher level capability.
  - ≤ 240 seconds 90 percent of the time.
- Arrival of second company
  - ≤ 360 seconds 90 percent of the time.

18. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments*, 2020 Edition.

- Arrival of first alarm assignment on a structural fire and arrival of an Advanced Life Support (ALS) unit at an EMS incident where the service is provided by the fire department provided a first responder with an AED or basic life support unit arrived in 240 seconds or less travel time.
  - ≤ 480 seconds 90 percent of the time.

At 240 seconds there are significant gaps in travel time from RFD stations in the northwest, southwest, and southeast areas of the city. Some of these are due to road network (northwest specifically). Milton Station 41 provides some relief in the extreme northeast area as noted in the mapping. At 360 seconds the gaps are reduced to small pockets, with the extreme northeast pocket covered by Milton Station 41. At 480 seconds, the entire city is covered from RFD stations.

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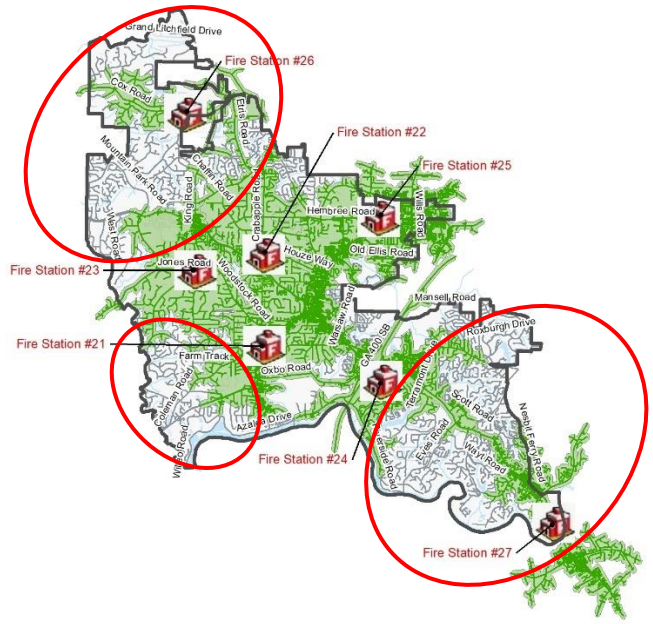
FIGURE 1-9: 240 Seconds Travel Time Bleeds

RFD Stations



RFD Stations and Milton Station 41(Milton 41 is Automatic Aid)

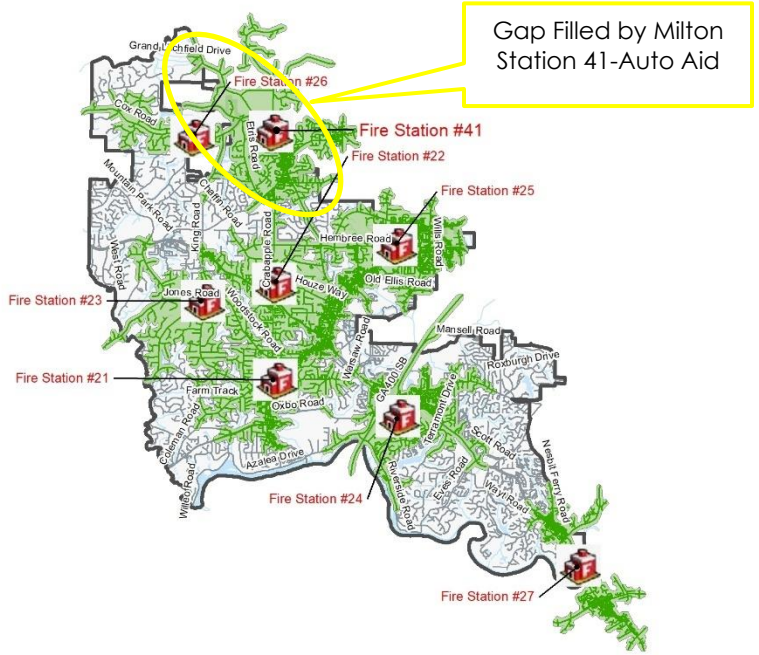
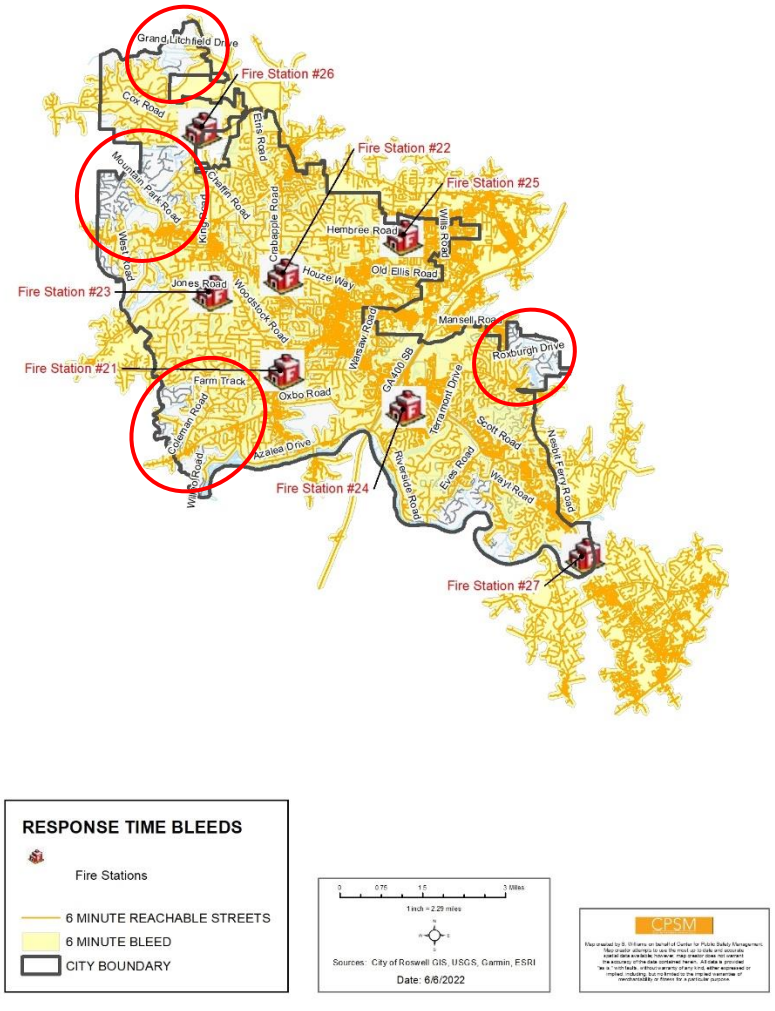
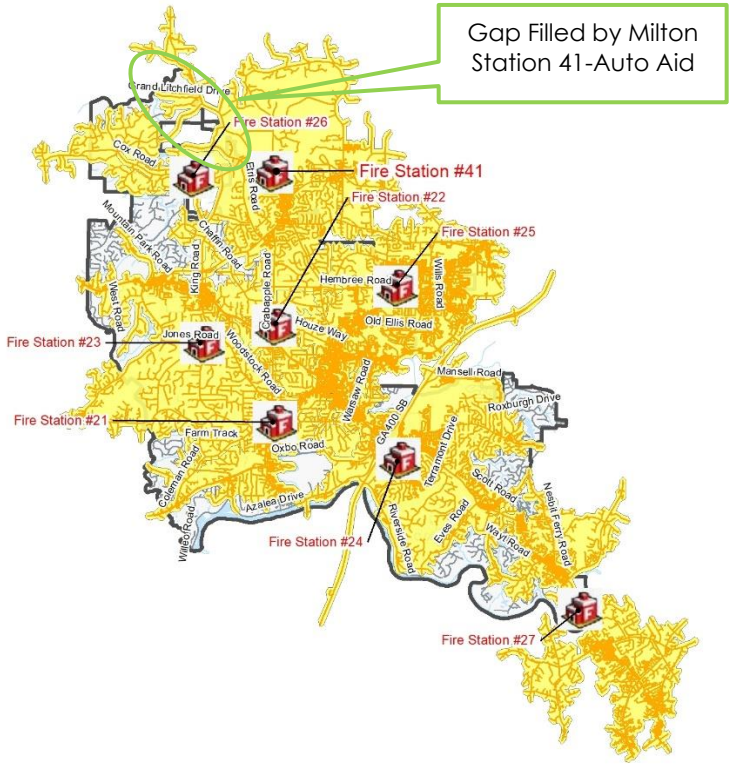


FIGURE 1-10: 360 Seconds Travel Time Bleeds

RFD Stations



RFD Stations and Milton Station 41(Milton 41 is Automatic Aid)



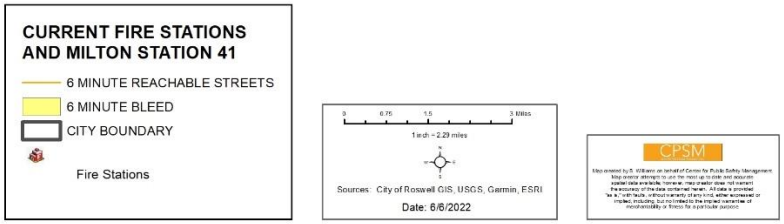
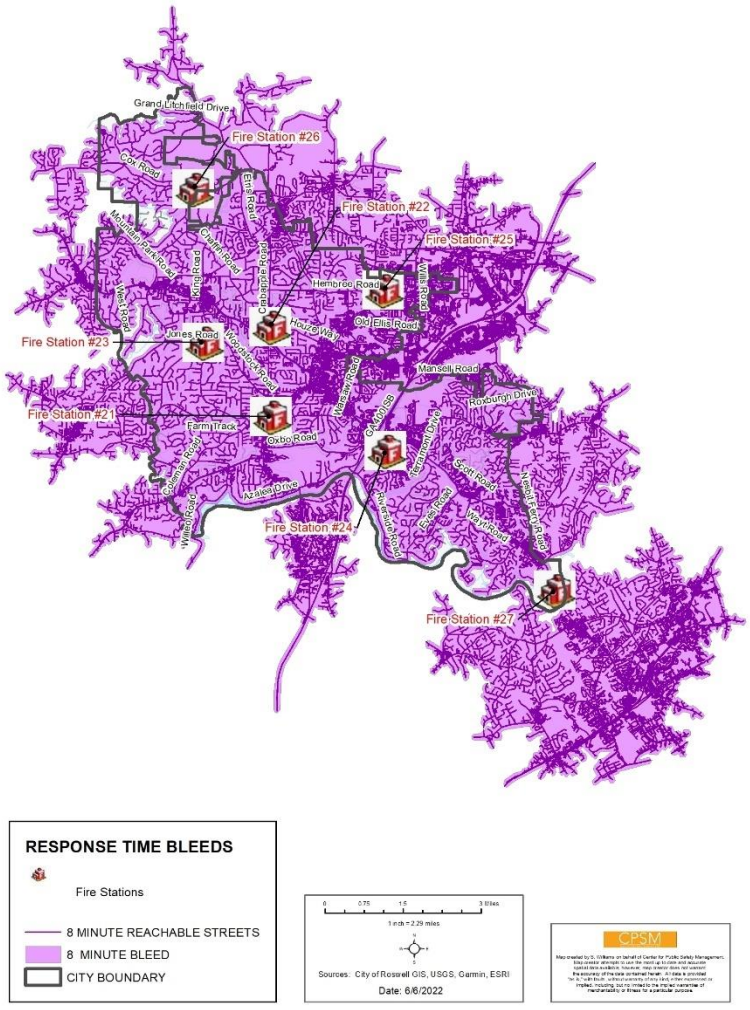
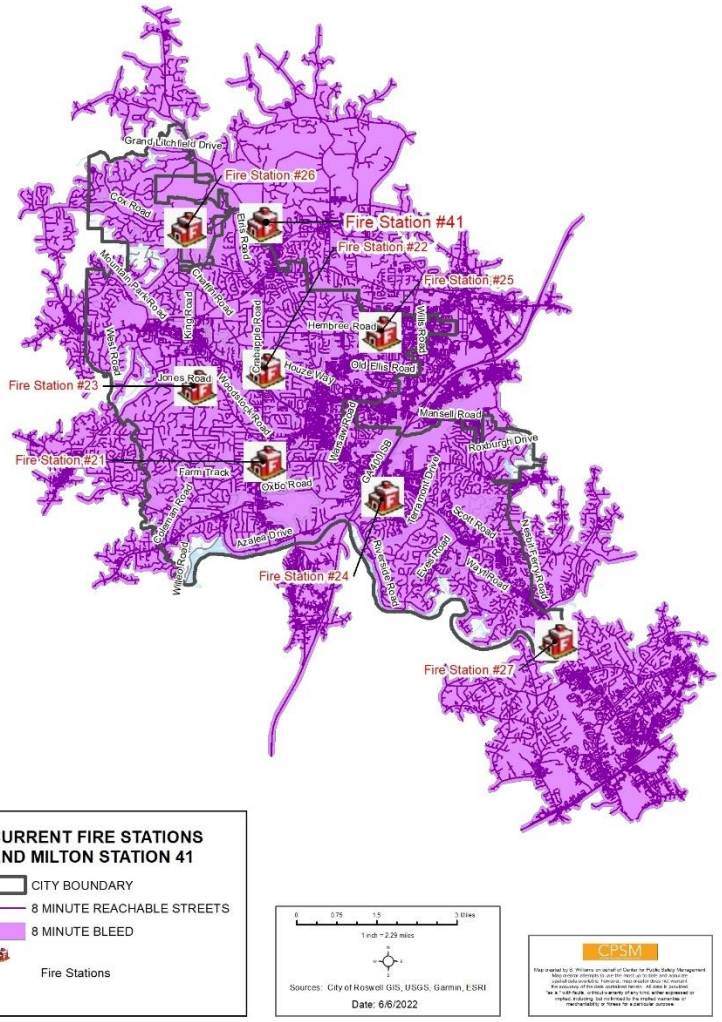


FIGURE 1-11: 480 Seconds Travel Time Bleeds

RFD Stations



RFD Stations and Milton Station 41(Milton 41 is Automatic Aid)



RFD response times are outlined in the following tables. Travel time columns directly link to the preceding maps. The 90th percentile response time is the NFPA 1710 benchmark.

TABLE 1-7: 90th Percentile Response Time of First Arriving Unit, by Call Type

Call Type	Time in Minutes					Number of Calls
	Dispatch	Turnout	Travel	Turnout & Travel	Total Response	
Breathing difficulty	1.3	3.5	8.1	10.3	10.9	538
Cardiac and stroke	1.2	3.4	8.0	10.3	10.9	588
Fall and injury	1.5	3.5	7.8	9.7	10.8	933
Illness and other	1.5	3.5	8.2	10.5	11.3	957
MVA	1.9	2.8	6.4	8.3	9.3	362
Overdose and psychiatric	1.4	3.8	8.4	10.9	11.7	207
Seizure and unconsciousness	1.4	3.1	7.9	10.0	10.8	542
EMS Total	**1.5**	**3.4**	**7.9**	**10.1**	**10.9**	**4,127**
Fire (non-specific)	4.2	3.8	5.3	7.2	10.3	8
Fire alarm	4.2	3.3	7.5	9.8	12.9	548
Hazard	4.7	3.7	7.6	9.8	13.0	173
Outside fire	4.9	3.6	8.2	10.8	14.3	90
Public service	5.3	3.3	7.2	9.7	14.4	66
Structure fire	4.2	4.1	5.6	7.9	11.0	80
Fire Total	**4.4**	**3.4**	**7.4**	**9.8**	**13.0**	**965**
Total	**2.9**	**3.4**	**7.8**	**10.1**	**11.5**	**5,092**

TABLE 1-8: 90th Percentile Response Time of First Arriving Unit, by Station

Station	Time in Minutes					Number of Calls
	Dispatch	Turnout	Travel	Turnout & Travel	Total Response	
21	2.9	3.4	7.1	9.4	10.8	1,663
22	2.7	3.3	6.3	8.6	9.7	630
23	2.8	3.4	7.5	9.9	11.2	594
24	2.7	3.6	8.6	10.8	12.1	1,303
25	3.3	3.1	6.7	8.8	10.4	469
26	2.9	3.2	8.8	10.9	12.4	232
27	2.9	3.5	9.6	11.9	13.8	201
Total	**2.9**	**3.4**	**7.8**	**10.1**	**11.5**	**5,092**

In both tables above, and when referencing the RFD, turnout time and travel time exceeds the NFPA 1710 standard. Turnout times significantly exceed the standard and are in the most control of the crews at the stations. Travel times are controlled largely by response district, road network, and weather.

COMMUNITY RISK REDUCTION

Community risk reduction activities are important undertakings of a contemporary fire department. A comprehensive fire protection system in every jurisdiction should include, at a minimum, the key functions of fire prevention, code enforcement, inspections, and public education. Preventing fires before they occur, and limiting the impact of those that do, should be priority objectives of every fire department. Fire investigation is a mission-important function of fire departments, as this function serves to determine how a fire started and why the fire behaved the way it did, providing information that plays a significant role in fire prevention efforts. Educating the public about fire safety and teaching residents appropriate behaviors on how to react should they be confronted with a fire is also an important life safety responsibility of the fire department.

The RFD has a community risk reduction division. This division is led by a Division Chief who also serves as the Fire Marshal. Assisting the Fire Marshal is a Deputy Fire Marshal who supervises three Assistant Fire Marshals and a Lieutenant who manages field operations fire prevention efforts. Included in the Deputy Fire Marshal chain of command is a fire and life safety educator, ***a national best practice.***

The Fire Marshal division also conducts building and site plan reviews. Plan reviews include fire protection and fire suppression systems, egress, interior and exterior finishes, and fire alarm systems to name the most prominent plan review components for new construction and applicable renovation construction. Additionally, plan reviews include land/site development, fireworks stands, tents (used for public assembly and where cooking occurs primarily), and code variance requests.

The RFD community risk reduction division utilizes the following code books to carry out fire prevention code enforcement and building plan reviews.

- International Fire Code 2018 Edition.
- International Building Code 2018 Edition.
- International Residential Code 2018 Edition.
- International Plumbing Code 2018 Edition.
- International Mechanical Code 2018 Edition.
- International Fuel Gas Code 2018 Edition.
- International Energy Conservation Code 2015 Edition.
- National Electrical Code 2020 Edition.
- International Swimming Pool and Spa Code 2018 Edition.
- International Property Maintenance Code 2018 Edition.
- International Existing Building Code 2018 Edition.
- National Green Building Standard 2008 Edition (Voluntary).

Public life safety education includes cardiopulmonary resuscitation (CPR), fire extinguisher training, home fire safety, fire and life safety, fire warden training, senior fall and fire training, and Community Emergency Response Training (CERT), **all best practices.**

The workload for the Fire Marshal Division for 2019, 2020, and 2021 is outlined in the next table.

TABLE 1-9: RFD Fire Marshal Division Workload, 2019–2021

	2019	2020*	2021
Fire Code Inspections**	6,366	4,136	5,369
Fire Investigations	5	27	14
Plan Reviews	1,066	826	1,077
Life Safety Education***	432	408	606

Notes: *COVID impacts.
**There are currently 5,882 inspectable properties and tenants in the city requiring annualized fire code inspections
*** Fire Marshal Division and fire companies together provide this function.

One issue identified is the workload and time commitment that plan reviews pose for the Fire Marshal division. Plan reviews coupled with fire code inspections make up the largest percent of daily workload for this division. The Fire Marshal and Deputy Fire Marshal spend considerable time on plan reviews, which reduces the time spent managing and supervising division staff and programs, as well as properly planning for future growth and new workload.

STAFF TRAINING AND EDUCATION

Training is, without question, one of the most essential functions that a fire department should be performing on a regular basis. One could even make a credible argument that training is, in some ways, more important than emergency responses because a department that is not well trained, prepared, and operationally ready will be unable to fulfill its emergency response obligations and mission. Education and training are vital at all levels of fire service operations to ensure that necessary functions are completed correctly, safely, and effectively. A comprehensive, diverse, and ongoing training program is critical to the fire department's level of success.

Training is managed by a Battalion Chief. The training staff includes a part-time instructor and a coordinator for the Roswell/Alpharetta Public Safety Training Facility (RAPSTC). The RFD hires certified staff to work in the daily operational engine, truck, heavy rescue, and rescue positions. The RFD requires the following certifications on hire of operational staff:

- Georgia Firefighter certification or National Professional Qualification FF I or FF II certification.
- State of Georgia EMT or Paramedic Certification.
- There are no additional certifications required for officer positions.

Staff training currently occurs, to the extent possible, in station or at the RAPSTC. Station-based training is managed by the on-duty operational Battalion Chief and daily station officer, the training division, or by the RAPSTC coordinator.

One issue identified is the inability for the RFD training staff to effectively plan and conduct department-wide training for operational staff and consistently, if at all, capture all operational personnel. This is due to the type of schedule inherent to rotating shifts utilizing part-time staff, where staff is not regularly scheduled on a permanent shift, and who may work only one to two days in a 28-day period.

SECTION 2. RFD INFRASTRUCTURE

FLEET

The procurement, maintenance, and eventual replacement of response vehicles is one of the largest expenses incurred in sustaining a community's fire-rescue department. While it is the personnel of the RFD who provide emergency services within the community, the department's fleet of response vehicles is essential to operational success. Modern, reliable vehicles are needed to deliver responders and the equipment/materials they employ to the scene of dispatched emergencies within the city.

The RFD has a robust fleet of frontline and reserve heavy fire apparatus and ambulances. Additional fleet includes administrative vehicles and light response vehicles for specialty fire and EMS incidents.

RFD apparatus maintenance is performed by the city's vehicle maintenance shop and a private vendor that specializes in apparatus-specific maintenance and annual testing. City vehicle maintenance shop work includes regular motor service and light service work that does not involve the fire pump or aerial hydraulic system maintenance and repair. Apparatus-specific work, aerial ladder testing, and annual preventive maintenance and required service is performed by a vendor who specializes in this type of fire apparatus work. This combination of maintenance and repair work is common practice across the country. The intricacies and scope of fire pumps and fire pump controls, aerial ladder hydraulic systems and controls, and apparatus electrical control systems (the main components outside of the motor, chassis, and drive train) are best left in the hands of specialists for diagnosis, maintenance, and repair.

The following table lists RFD frontline heavy apparatus.

TABLE 2-1: RFD Frontline Heavy Apparatus

Unit Number	Year of Purchase	Scheduled Replacement
Truck 25 (SA75)	2001	FY2021
Engine 26	2007	FY2022
Rescue 22	2013	FY2023
Rescue 24	2013	FY2023
Engine 22	2008	FY2023
Engine 25	2010	FY2025
Rescue 21	2016	FY2026
Engine 23	2012	FY2027
Truck 21	2012	FY2027
Engine 27	2013	FY2028
Engine 24	2015	FY2030
Engine 21	2016	FY2031
Truck 24	2017	FY2032
Heavy Rescue 25	2019	FY2034

NFPA 1901, *Standard for Automotive Fire Apparatus*, serves as a guide to the manufacturers that build fire apparatus and the fire departments that purchase them. This document is updated every five to eight years (or shorter time periods) using input from the public and industry stakeholders through a formal review process. The committee membership is made up of representatives from the fire service, manufacturers, consultants, and special interest groups. The committee monitors various issues and problems that occur with fire apparatus and attempts to develop standards that address those issues. A primary interest of the committee over the past years has been improving firefighter safety and reducing fire apparatus crashes.

The Annex Material in NFPA 1901 (2016) contains recommendations and work sheets to assist in decision making in vehicle purchasing. With respect to recommended vehicle service life, the following excerpt is noteworthy:

> *"It is recommended that apparatus greater than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status and upgraded in accordance with NFPA 1912, Standard for Fire Apparatus Refurbishing (2016), to incorporate as many features as possible of the current fire apparatus standard. This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many improvements and upgrades required by the recent versions of the standards are available to the firefighters who use the apparatus."*

The impetus for these recommended service life thresholds is the continual industry advances in vehicle and occupant safety. Despite good stewardship and maintenance of emergency vehicles in sound operating condition, there are many advances in occupant and vehicle component safety, such as fully enclosed cabs, enhanced rollover protection and air bags, three-point restraints, antilock brakes, increased visibility, cab noise abatement/hearing protection, a clean cab free from carbon products, and a host of other improvements as reflected in each revision of NFPA 1901. These improvements provide safer response vehicles for those providing emergency services within the community, as well those "sharing the road" with these responders.

Many departments use a 10-5 rule (10 years front-line service, then 5 years of reserve service) when programming replacement of fire apparatus such as engines, ladders, water tenders, heavy rescues, and heavy squad type haz-mat vehicles. Annex D of the current NFPA 1912 edition states:

> *To maximize firefighter capabilities and minimize risk of injuries, it is important that fire apparatus be equipped with the latest safety features and operating capabilities. In the last 10 to 15 years, much progress has been made in upgrading functional capabilities and improving the safety features of fire apparatus. Apparatus more than 15 years old might include only a few of the safety upgrades required by the recent editions of the NFPA fire department apparatus standards or the equivalent Underwriters Laboratories of Canada (ULC) standards. Because the changes, upgrades, and fine tuning to NFPA 1901, Standard for Automotive Fire Apparatus have been truly significant, especially in the area of safety, fire departments should seriously consider the value (or risk) to firefighters of keeping fire apparatus more than 15 years old in first-line service.*
>
> *It is recommended that apparatus more than 15 years old that have been properly maintained and that are still in serviceable condition be placed in reserve status, be upgraded in accordance with NFPA 1912, and incorporate as many features as possible of the current fire apparatus standard. This will ensure*

that, while the apparatus might not totally comply with the current editions of the automotive fire apparatus standards, many of the improvements and upgrades required by the current editions of the standards are available for firefighters who use the apparatus.

Given that NFPA 1901 targets specifications for only fire suppression vehicles, NFPA 1917, *Standard for Automotive Ambulances*, was published in 2013 (updated in 2019) to provide similar recommendations governing the design and construction of ambulances. The U.S. General Services Administration also promulgates ambulance standards under KKK-A-1822. Additionally, the Commission on Accreditation of Ambulance Services (CAAS) has established a Ground Vehicle Standard (2016). While NFPA 1917, KKK, and CAAS standards do not include recommended service-life replacement standards for EMS vehicles, common industry practice suggests typical replacement intervals of four to eight years. This schedule depends on a number of variables, most notably vehicle mileage, escalation of annualized repair expenses, and frequency with which the subject vehicle is out of service. After replacement, serviceable vehicles may be retained in ready-reserve status for an additional two to four years. In light of the inherently shorter service life of ambulances, owing to a higher frequency of emergency responses handled than corresponding suppression vehicles, there are fewer legitimate concerns regarding "missing" essential improvements in occupant/operator safety standards.

The current RFD replacement program is 15 years at frontline service for engines, trucks, the heavy rescue, and ambulances. Then the apparatus goes into reserve status and eventually is cycled out as frontline apparatus is replaced. Because of the current call workload on ambulances and heavy fire apparatus, the amount of traffic at certain times of the days (stop and go), and intersections (stop and go), the RFD should give strategic consideration when evaluating the replacement schedule of frontline apparatus individually by class (engine, truck, heavy rescue, ambulance) rather than aggregately.

FACILITIES

Sound community fire-rescue protection requires the strategic distribution of an adequate number of station facilities to ensure that effective service area coverage is achieved, that predicted response travel times satisfy prevailing community goals and national best practices, and that the facilities are capable of supporting mission-critical personnel and vehicle-oriented requirements and needs.

Fire facilities must be designed and constructed to accommodate both current and forecast trends in fire service vehicle type and manufactured dimensions. A facility must have sufficiently-sized bay doors, circulation space between garaged vehicles, and departure and return aprons of adequate length and turn geometry to ensure safe response.

Fire department facilities are exposed to some of the most intense and demanding uses of any public local government facility, as they are occupied 24 hours a day. Personnel-oriented needs in fire facilities must enable performance of daily duties in support of response operations. For personnel, fire facilities must have provisions for vehicle maintenance and repair; storage areas for essential equipment and supplies; and space and amenities for administrative work, training, physical fitness, laundering, meal preparation, and personal hygiene/comfort.

As discussed above, the RFD responds from seven fire facilities. Fire administration is located in shared city facility space with the Roswell Public Works Department and transportation facility. The following table describes each fire facility related to operational use.

TABLE 2-2: RFD Station Facilities

Station Number	Address	Year Built	Square Footage	# of Bays	# of Bunks	Gender Separation
21	1002 Alpharetta St.	1948	10,440	5	10	Yes
22	11115 Crabapple Rd.	1975	2,900	2	5	No
23	740 Jones Rd.	1977	2,888	2	4	No
24	1400 Old Alabama Rd	2017	14,800	3	8	Yes
25	1200 Hembree Rd.	1990	7,258	3	8	Yes
26	825 Cox Rd.	1996	8,217	3	8	Yes
27	8025 Holcomb Bridge Rd.	2002	9,947	3	7	Yes

When siting fire stations for the most efficient response, several factors must be considered. These include the road network the assigned apparatus will use to serve the response district the station is built to serve, which directly ties to response travel time. As discussed above, and reviewed here, travel time is key to understanding how fire and EMS station location influences a community's aggregate response time performance. 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*, establishes benchmark travel times for first arriving fire units as:

- ≤ 240 seconds for the first arriving engine company to a fire suppression incident 90 percent of the time.
- ≤ 240 seconds for the first arriving engine company with automated external defibrillator (AED) or higher level capability.

The NFPA 1710 standard also benchmarks the travel time of the second arriving unit on a fire incident, and the travel time to assemble the first alarm assignment of apparatus and staff on low/medium hazards as:

- ≤ 360 seconds for the second company 90 percent of the time.
- ≤ 480 seconds to assemble the initial first alarm assignment on scene 90 percent of the time for low/medium hazard.

The location of responding units is one key factor in response time; reducing response times, which is typically a key performance measure in determining the efficiency of department operations, often depends on this factor. The goal of placement of a single fire station or creating a network of responding fire stations in a single community is to optimize coverage with short travel distances, when possible, while giving special attention to natural and manmade barriers, and response routes that can create response-time problems.[19]

An additional benchmark is the ISO Public Protection Classification rating system. Under this system, one element a jurisdiction is graded on is the distribution within built-upon areas of engine companies and ladder companies (deployment analysis). For full credit in the Fire Suppression Rating Schedule (FSRS), a jurisdiction's fire protection area with residential and commercial properties should have a first-due engine company within 1.5 road miles and a ladder service company within 2.5 road miles.[20] As engine and ladder companies both respond

19. NFPA 1710, *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Departments*, 2020 Edition.
20. Insurance Services Office, ISO Mitigation, Deployment Analysis.

from fire facilities, and because engine companies are the more prevalent fire suppression company, fire facilities are predictably sited based on the response needs of engine companies.

Finally, the current and potential for future demand for service is a consideration for the siting of fire facilities. Demand is the number and types of calls for services provided by the entire fire department. When demand is evaluated it is important the number of incidents is not confused with the number of unit responses. An emergency call may require the response of more than one unit, but only one incident number is generated. This is a direct accelerator of demand. CPSM measures a call as a single event, which may be handled by a single unit, and a run as a response made by a unit to a call that involves more than one unit.

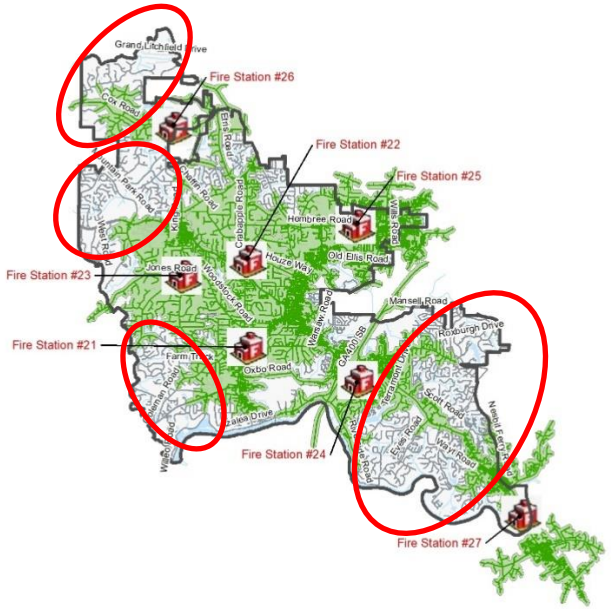
The next figures and tables outline the RFD's current stations as benchmarked against the NFPA 1710 standard, the ISO standard for engine company and ladder company placement, and how the response coverage changes with some stations relocated. These elements should be discussed and included in any strategic planning the RFD conducts in the near, mid, and long terms.

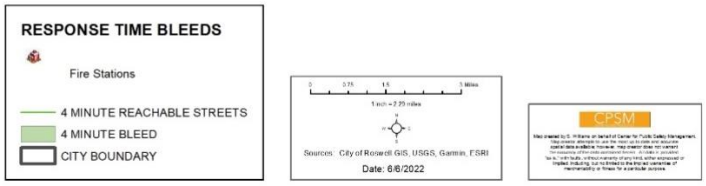
- The RFD's deficiencies in the NFPA 1710 240-second first due fire unit travel time and the ISO 1.5 mile engine company placement benchmark are outlined in red. The two benchmark deficiencies are closely related and should be included in any current and future station placement planning. Station 28 (new facility) should be included in any strategic planning and funding discussions.
  - The greater fire and EMS demand is concentrated in the Station 21, 22, 24, and 27 districts. There is a concentration of EMS demand around Leita Thompson Memorial Park. This is an area of the city where the NFPA 1710 240-second travel time benchmark and the 1.5-mile ISO engine company benchmark for fire response are not met. Additionally, there is increased demand for fire and EMS between Station 24 and Station 27 along the Holcombe Bridge Road corridor, which is an area of the city where the NFPA 1710 240-second travel time benchmark and the 1.5-mile ISO engine company benchmark for fire response are deficient.
- The RFD ladder companies (trucks 21 and 24) are located in the central portion of the city, where the greatest fire demand is. Engine 25 receives credit as a ladder as it is a 75-foot Quint (pump, water tank, hose, ground ladders, 75-foot aerial device). Ladder coverage when benchmarked against the ISO-PPC rating schedule (ladder company distribution every 2.5 miles of built upon land) is deficient in the north/northwest one-third of the city.

§ § §

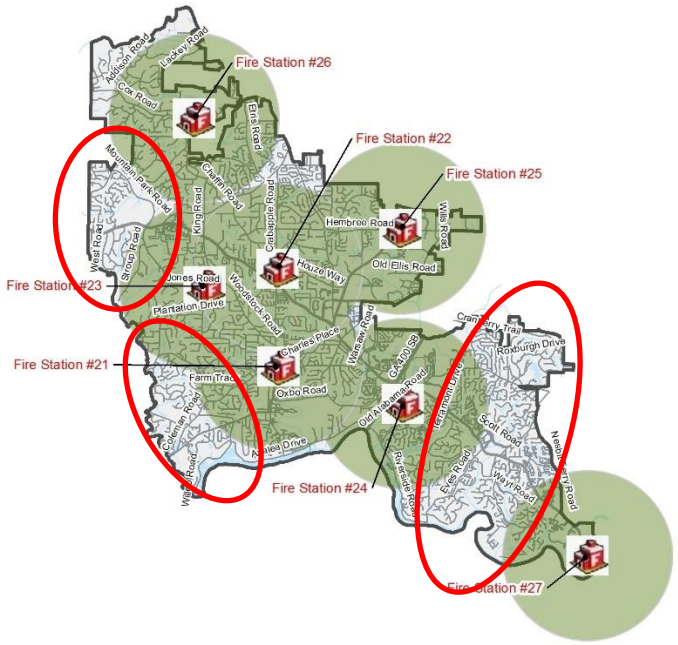
FIGURE 2-1: 240 Seconds Travel Time and ISO 1.5-Mile Benchmarks, All Stations

RFD 240 Seconds Travel Time





ISO 1.5-Mile Engine Co. Benchmark



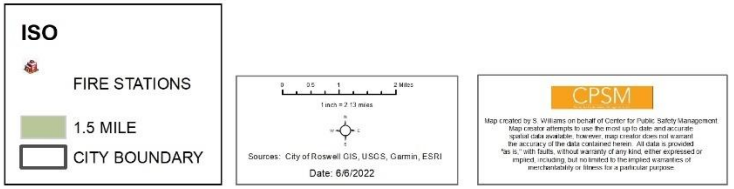
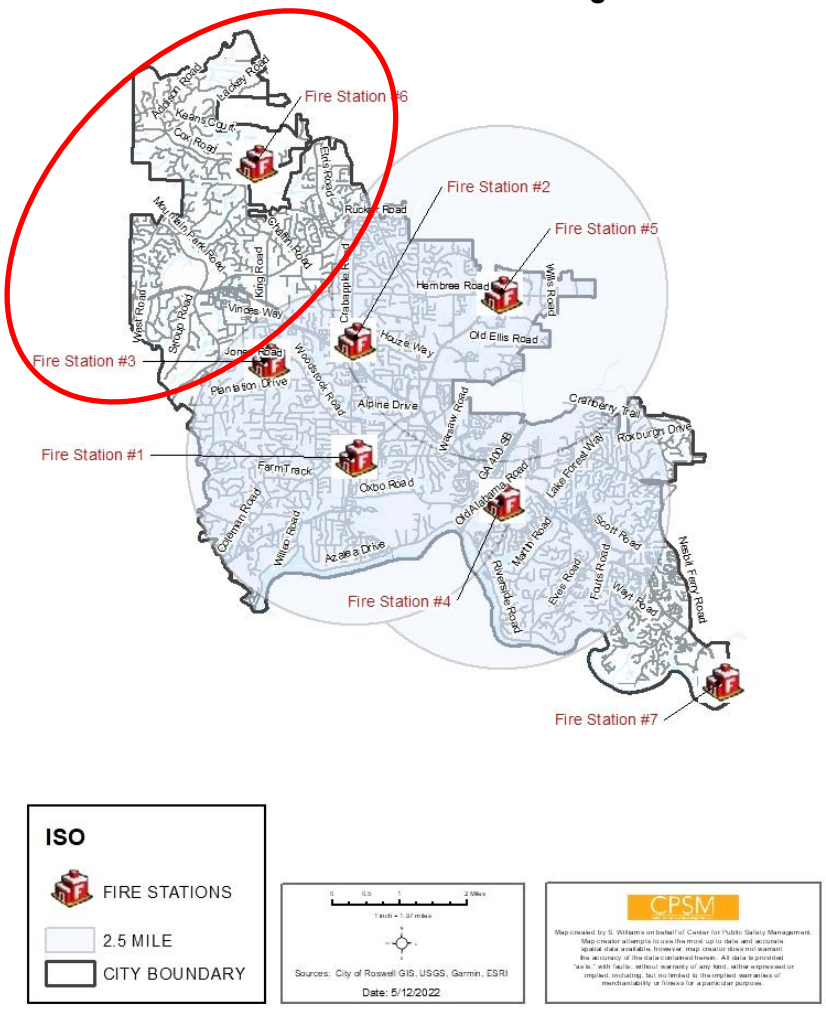
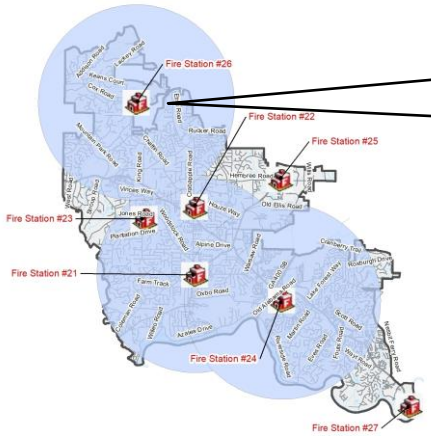


FIGURE 2-2: ISO 2.5-Mile Coverage by Ladder Companies

Current ISO Ladder Coverage



ISO Ladder Coverage with Ladder Apparatus at Station 26



Quint at Station 26

Engine at Station 25

Quint or Engine/Ladder at Station 26

Quint at Station 25

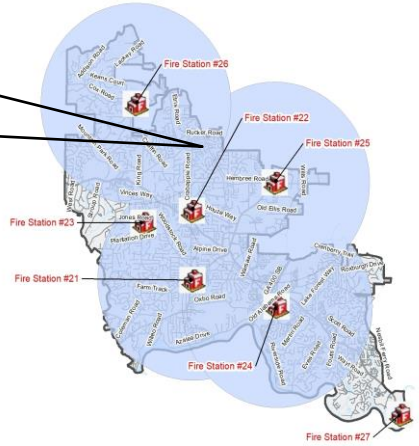


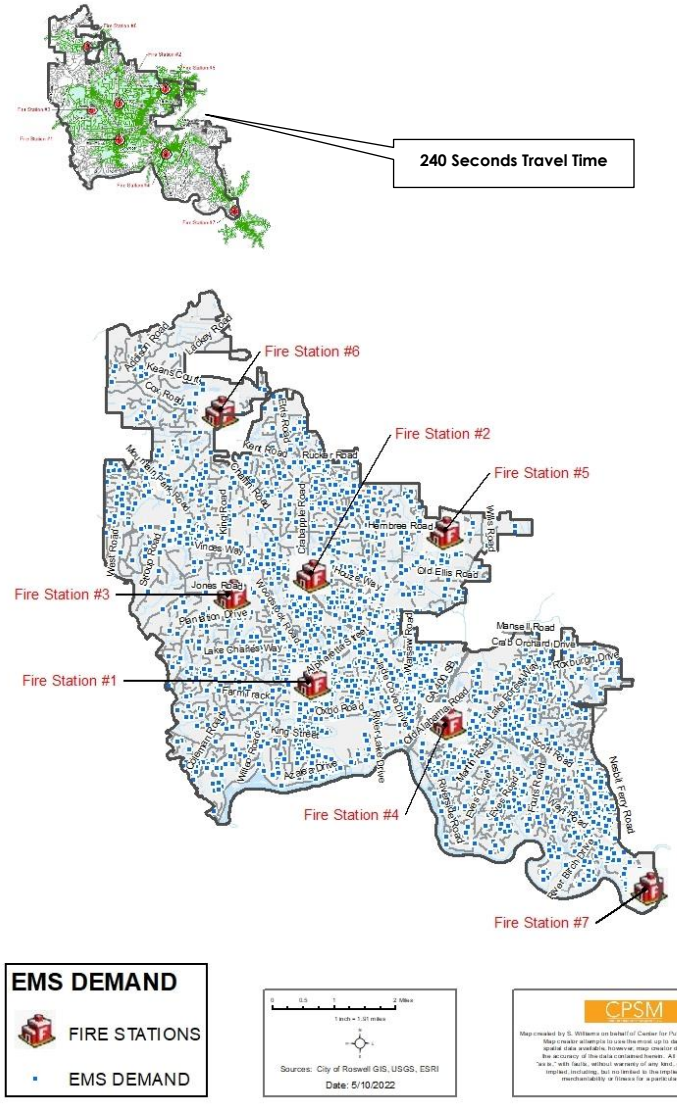
TABLE 2-3: Total Runs by Run Type and RFD Primary Station Unit

Station	Unit	EMS	Fire-NS	Fire Alarm	Hazard	Outside Fire	Public Service	Structure Fire	Total
21	AL21	1	0	0	0	0	3	2	6
	BOAT21	0	1	0	0	0	4	0	5
	E21	861	21	267	114	44	189	79	1,575
	GAT21	9	2	0	0	0	2	0	13
	R21	1,663	5	1	33	2	12	67	1,783
	SQ21	9	1	0	2	0	4	0	16
	T21	142	17	430	65	7	159	71	891
	Total	**2,685**	**47**	**698**	**214**	**53**	**373**	**219**	**4,289**
22	E22	935	24	118	52	16	158	67	1,370
	R22	62	0	0	0	0	1	0	63
	Total	**997**	**24**	**118**	**52**	**16**	**159**	**67**	**1,433**
23	BR23	1	0	0	0	2	0	0	3
	E23	769	6	138	48	17	73	49	1,100
	Total	**770**	**6**	**138**	**48**	**19**	**73**	**49**	**1,103**
24	B2	167	10	197	76	13	24	123	610
	E24	747	26	180	66	56	191	57	1,323
	R24	1,201	3	2	13	1	5	32	1,257
	T24	184	7	197	43	14	172	57	674
	Total	**2,299**	**46**	**576**	**198**	**84**	**392**	**269**	**3,864**
25	E25	620	11	124	31	19	72	49	926
	HR25	61	2	3	40	5	28	69	208
	T25	0	0	2	0	1	2	0	5
	Total	**681**	**13**	**129**	**71**	**25**	**102**	**118**	**1,139**
26	E26	**399**	**40**	**83**	**23**	**16**	**61**	**22**	**644**
27	E27	749	44	123	29	22	107	49	1,123
	E55	67	2	10	10	2	5	35	131
	R27	0	0	0	0	0	1	0	1
	Total	**816**	**46**	**133**	**39**	**24**	**113**	**84**	**1,255**
Total		**8,647**	**222**	**1,875**	**645**	**237**	**1,273**	**828**	**13,727**

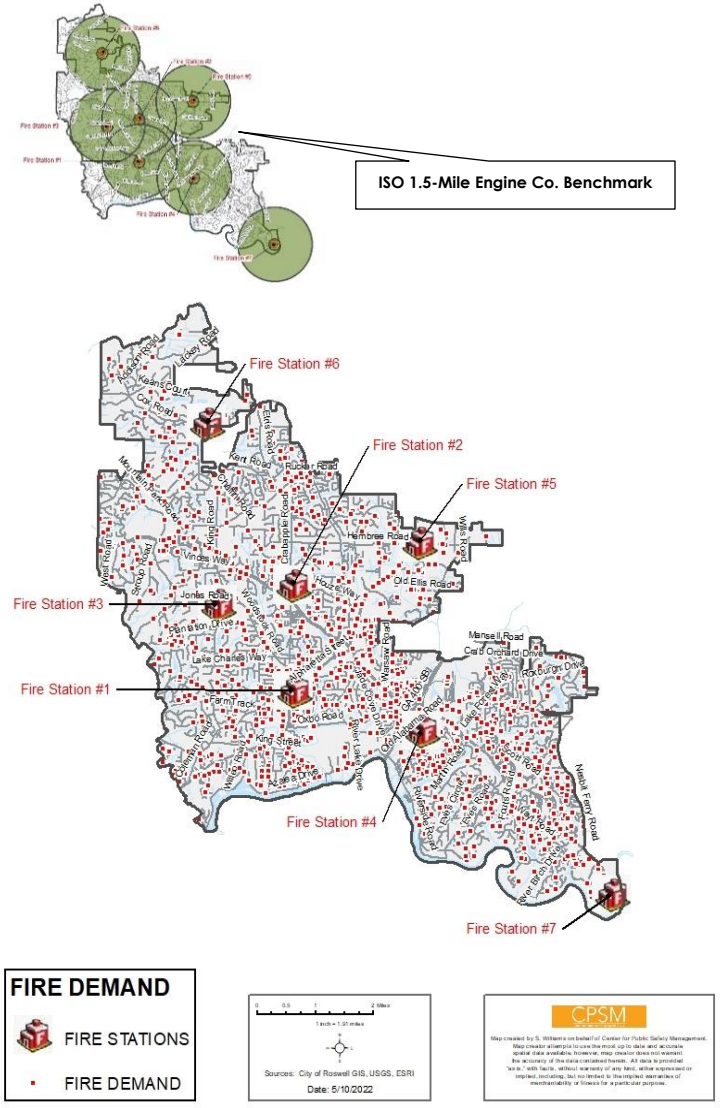
- Station 21 made the most runs (4,289, or an average of 11.8 runs per day) and had the highest total annual deployed time (1,114.6 hour or an average of 3.1 hours per day).
- Unit R21 was the busiest rescue unit. Among all RFD units, it made the most runs (1,783, or an average of 4.9 runs per day) and had the highest total annual deployed time (471.8 hours or an average of 77.6 minutes per day).
- Unit E21 was the busiest engine. Among all RFD units, it made the second-most runs (1,575, or an average of 4.3 runs per day) and had the second-highest total annual deployed time (371.5 hours or an average of 61.1 minutes per day).

FIGURE 2-3: Fire and EMS Demand

EMS Demand, All EMS Call Types



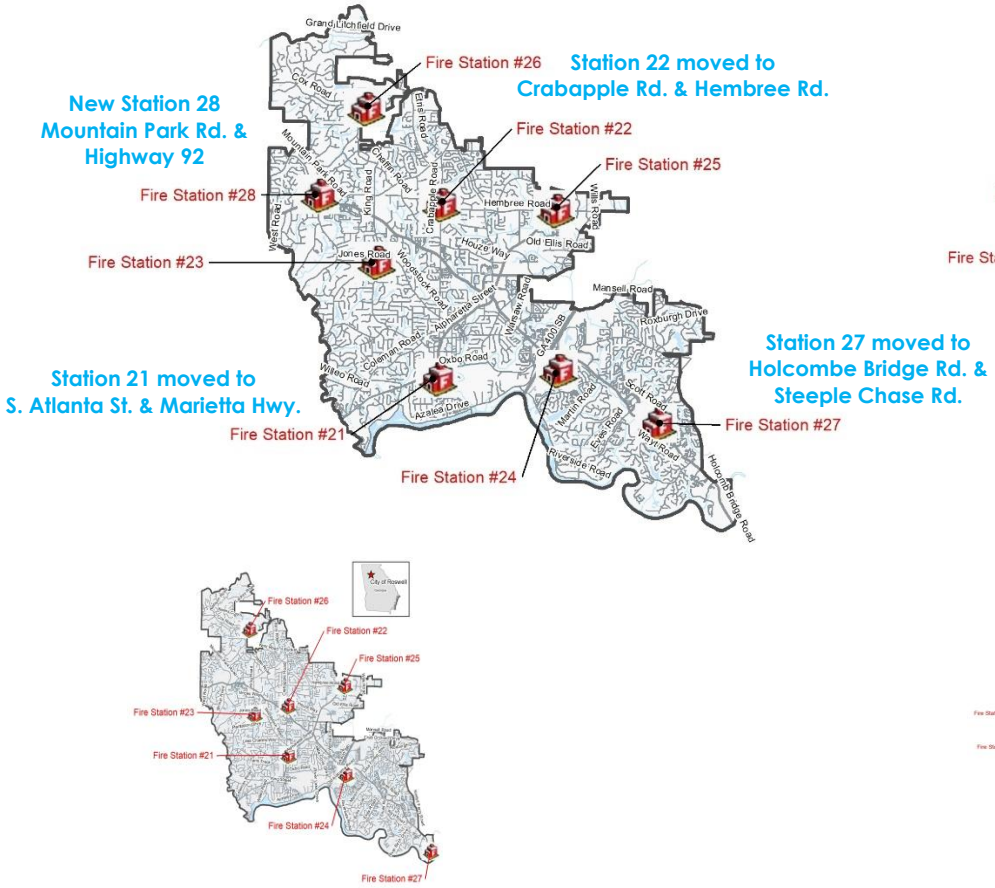
Fire Demand, All Fire Call Types



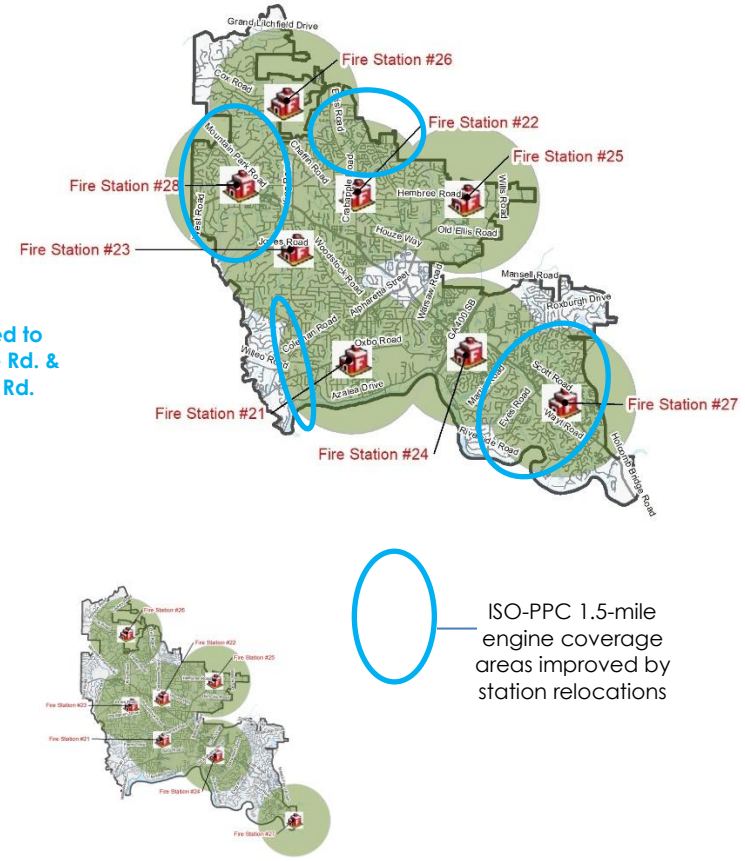
The next set of maps provides strategic planning alternatives for planned and unplanned station movements to close the NFPA and ISO response gaps.

FIGURE 2-4: Proposed Station Relocation and ISO 1.5-Mile Improvements

Proposed Station Relocation



ISO 1.5-Mile Engine Co. Benchmark Improvements



ISO-PPC 1.5-mile engine coverage areas improved by station relocations

The RFD has several facility issues that need to be addressed in the strategic planning process.[21] These include:

- Station capital improvements:
  - Fire Station 22 (Crabapple Rd.) and 23 (Jones Rd.) are each approximately 45 years old. The septic systems have reached the end of their service life.
  - The total living quarters are only about 1,100 sq. ft. and are far too small for the crew assigned there.
  - There are open bunkrooms that are cramped and do not provide needed privacy and gender separation.
  - Each station has only two (relatively small) apparatus bays, both of which are "back-in" and not "pull-through."
    - Station 22 has to shut down traffic on Crabapple Rd. to back into the station.
  - There is no turnout gear storage area, no equipment storage area, and the parking lots are at capacity.
  - Alignment with NFPA 1581 *Standard on Fire Department Infection Control Program, 2022 Edition - Chapter 5 Fire Department Facilities* with regards to infection control and decontamination areas and equipment.
  - Replacement of these stations should be strongly considered and planned for.
- Public Safety Complex
  - The Roswell Fire Department Headquarters is co-located with Transportation and Public Works on the first floor of 1810 Hembree Rd., where it has been for over a decade. Prior to this the RFD was located in City Hall.
  - The current location is too small and the fire department has outgrown the space as reviewed by CPSM. The majority of the storage closets have been converted into offices. A budget request to add cubicles and remodel to accommodate staff has been submitted.
  - There is an opportunity to partner with the Roswell Police Department and the Roswell 911 Center to construct a public safety complex.
  - This project capitalizes on an economy of scale approach to combine Roswell Police Department (RPD) and RFD headquarters, the 911 center, and the city's emergency operations center (EOC). This would allow public safety to work more cohesively and provide an opportunity to share infrastructure costs such as redundant communications systems, backup generators, etc.
  - A public safety center complex should be strongly considered and planned for.
- Station 28
  - The RFD should include in any strategic long-term planning the location of a new station in the northwest portion of the city (Station 28) to close response time gaps. Staffing and deployment should include at a minimum one engine apparatus and three personnel (Captain, Engineer, Firefighter) 365/24/7

21. Roswell Fire Department, January 2022

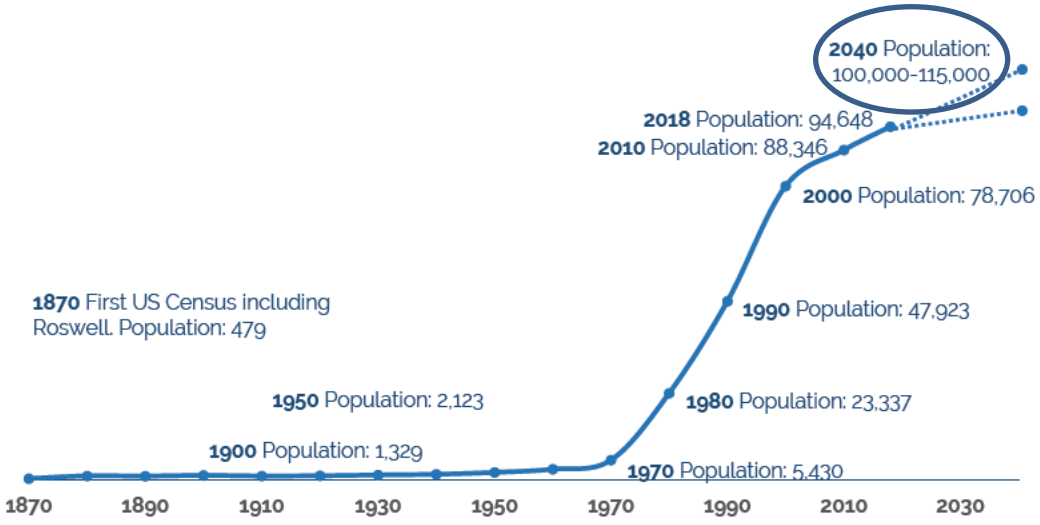
SECTION 3. ALL-HAZARDS RISK ASSESSMENT AND EMERGENCY RESPONSE DEPLOYMENT

POPULATION AND COMMUNITY GROWTH

The U.S. Census Bureau indicates the population of Roswell in 2020 was 92,833. This is a 5 percent increase in population since the 2010 census.

Roswell is one of the most populous municipalities in the metropolitan Atlanta region. While Roswell's growth has slowed recently since the explosive growth it experienced in the 1970s, 1980s, and 1990s, the city is still estimated to have grown by around 6,000 people between 2010 and 2020. According to the Roswell 2040 Comprehensive Plan, the city is expected to continue to grow to a population of more than 100,000 in the next twenty years.

FIGURE 3-1: Roswell Historical Population and Projection[22]



In terms of fire and EMS risk, the age and socio-economic profiles of the population can have an impact on the number of requests for fire and EMS services. Evaluation of the number of seniors and children by fire management zones can provide insight into trends in service delivery and quantitate the probability of future service requests. In a 2021 National Fire Protection Association (NFPA) report on residential fires, the following key findings were identified for the period 2015–2019:[23]

- Males were more likely to be killed or injured in home fires than females and accounted for larger percentages of victims (57 percent of the deaths and 55 percent of the injuries).
- The largest number of deaths (19 percent) in a single age group was among people ages 55 to 65.

22. City of Roswell 2040 Comprehensive Plan.
23. M. Ahrens, R. Maheshwari "Home Fire Victims by Age and Gender," Quincy, MA: NFPA, 2021.

- 59 percent of the victims of fatal home fires were between the ages of 39 and 74, and three of every five (62 percent) of the non-fatally injured were between the ages of 25 and 64.
- Slightly over one-third (36 percent) of the fatalities were age 65 or older; only 17 percent of the non-fatally injured were in that age group.
- Children under the age of 15 accounted for 11 percent of the home fire fatalities and 10 percent of the injuries. Children under the age of 5 accounted for 5 percent of the deaths and 4 percent of the injuries.
- Adults of all ages had higher rates of non-fatal fire injuries than children.
- Smoking materials were the leading cause of home fire deaths overall (23 percent) with cooking ranking a close second (20 percent).
- The highest percentage of fire fatalities occurred while the person was asleep or physically disabled and not in the area of fire origin, key factors to vulnerable populations.

In Roswell the following age and socioeconomic factors are considered herein when assessing and determining risk for fire and EMS preparedness and response:[24]

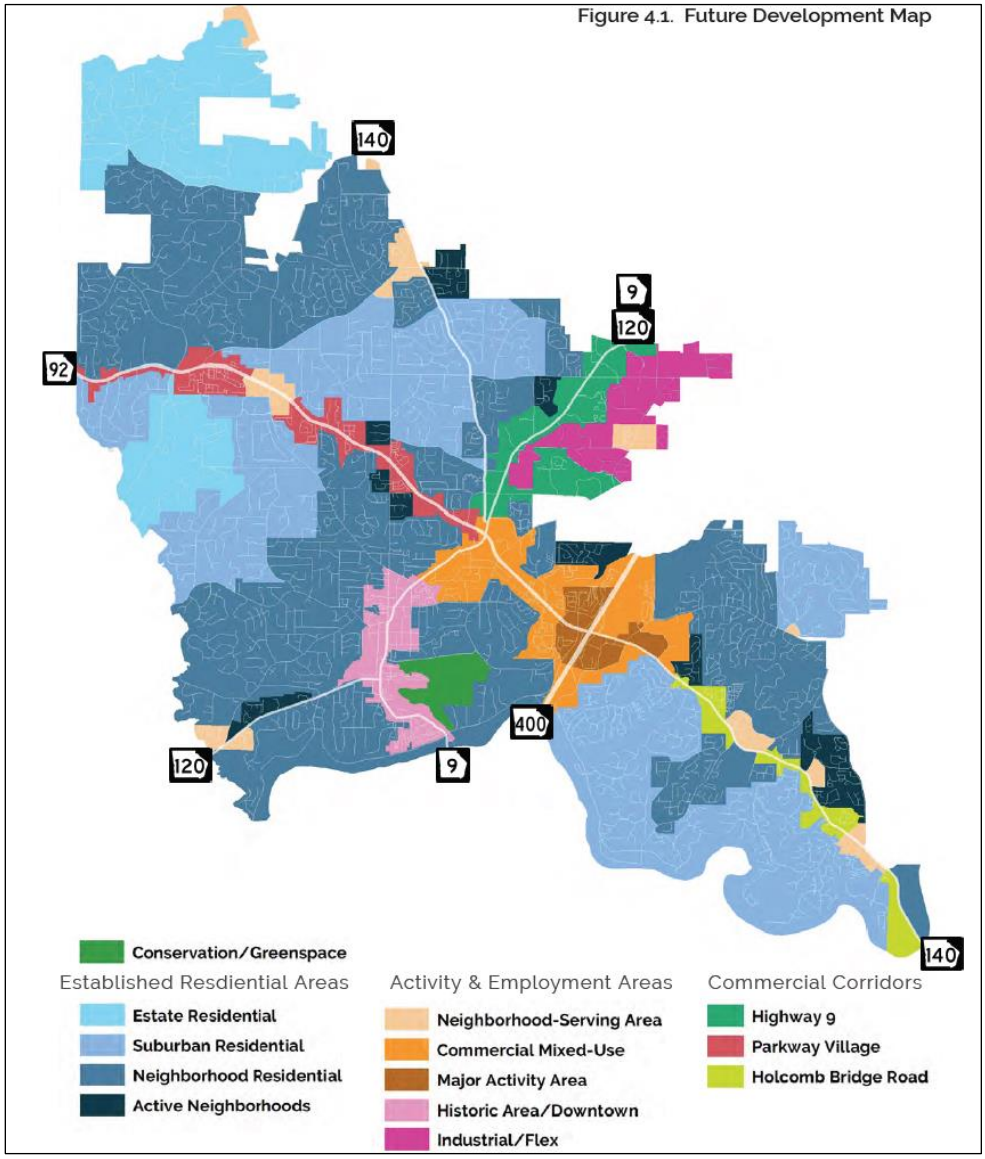
- Children under the age of five represent 6.6 percent of the population.
- Persons under the age of 18 represent 25.1 percent of the population.
- Persons over the age of 65 represent 14.3 percent of the population.
- Female persons represent 50.8 percent of the population.
- There are 2.71 persons per household in Roswell.
- The median household income in 2019 dollars is $105,913.
- Persons living in poverty make up 6.2 percent of the population.
- Black or African-American alone represents the 13.3 percent of the population. The remaining percentage of population by race includes White alone at 72.9 percent, American Indian or Alaska Native alone at 0.3 percent, Asian alone at 3.7 percent, two or more races at 5.7 percent, and Hispanic or Latino at 15.6 percent.

The Roswell 2040 Comprehensive Plan outlines future growth in the city as established residential areas, activity and employment areas, and commercial corridors. Each is broken down further by area in the plan and includes a vision and implementation strategy. Each area includes either all or some type of residential zoning, unless designated as non-residential. This plan if implemented would further increase the population and commercial properties, which in turn will increase call demand, and building, transportation, and hazard risks for the RFD. The Roswell 2040 Comprehensive Plan, and community population and growth projections should be included in all RFD staffing, deployment, and facility strategic planning sessions.

Planned growth in the city is illustrated in the following figure.

24. https://www.census.gov/quickfacts/roswellcityga

FIGURE 3-2: Roswell 2040 Comprehensive Plan Future Development Map



ENVIRONMENTAL FACTORS

The City of Roswell is prone to and will continue to be exposed to certain environmental hazards that may impact the community. The most common natural hazards prevelant to the region, according to the City of Roswell Emergency Operations Plan, are in order of hazard risk from highest risk to lowest risk according to the hazard type category:[25]

- Lightning storm.
- Tornado.

25. City of Roswell Emergency Operations Plan Version 2.2, June 2016.

- Winter storm.
- Flood.
- Windstorm.
- Hurricane.
- Drought.
- Biological.
- Extreme heat/cold.
- Earthquake.

Lightning storms are typically associated with heavy rain and strong winds and are common throughout the warm months in Georgia. While lightning storms have not been directly responsible for injuries or deaths in the past, the potential for such effects remain very probable. Lightning is and will remain a high risk to life safety and property damage in the city.[26]

Like lightning storms, Georgia is very susceptible to tornados during certain weather patterns. Roswell has experienced many instances where tornado-like damage has impacted the city but in most of the cases actual tornados were not verified. Research has determined that before April 2006 the only verified tornado that touched down within the city limits was in the early 1970s. Since April 2006, two tornadoes have been verified in the city with one causing moderate damage to property along the northern city boundaries. Tornadoes are considered a moderately high risk due to the potential for injury and death and a high degree of property damge.

The risk associated with a dam or levee break involves possible life-safety hazards and property damage downstream but the frequency and probability of such an event is considered to be unlikely. However, it should remain a planning component.

The greatest threat to the City of Roswell resulting from a dam break would be a breach of the Buford Dam on the Chattahoochee River. The flood model of a Buford Dam breach was developed by the Army Corps of Engineers and indicates a catastrophic impact to the citizens of Roswell. It is estimated the initial wall of water would strike the Holcomb Bridge Road eight to ten hours following the breach with high pool reaching Roswell in 14 to 16 hours. Areas within 0.3 miles from the river and within 0.1 miles of tributaries would be underwater in some areas.

The hazards posed by hurricanes impacting the city are similar to those associated with power outages, winter storms, and flooding. The city has been impacted by the effects of Hurricanes Opal, Francis, and Ivan over the past 12 years. In each instance the hazards involved flash flooding and damage from fallen trees. Other concerns associated with hurricanes include possible dam/levee breaches and motorists stranded in high water.

There are certain areas within the city that are historically have shown to be susceptible to flooding. The area along the Chattahoochee River and other waterways that traverse the city create flooding issues during some rain events. Areas prone to flooding include Martian's Landing, Brookfield West, Warsaw Road at BainbridgeLane, and Oxbow Road. Flash or urban flooding poses the greatest hazard to life safety especially as drivers try to ford water moving

26. City of Roswell Emergency Operations Plan Version 2.2 June 2016

across flooded roadways, their vehicles stall, and passengers become stranded or try to wade through the water to higher and dryer land.

Windstorms, unlike hurricanes, tornados, and winds associated with thunderstorms, involve winds that sustain a constant velocity as opposed to gusting winds. The major hazard associated with windstorms is the weakening of trees' root systems from constant swaying, thus causing trees to uproot. This poses more hazards to property and above-ground utilities than it does to life safety, although life safety in these conditions should remain a concern and a planning risk.[27]

BUILDING AND TARGET HAZARDS FACTORS

A community risk and vulnerability assessment will evaluate the community, and regarding buildings, it will review all buildings and the risks associated with each property and then classifying the property as either a high-, medium-, or low-hazard depending on factors such as the life and building content hazard and the potential fire flow and staffing required to mitigate an emergency in the specific property. According to the NFPA *Fire Protection Handbook*, these hazards are defined as:

High-hazard occupancies: Schools, hospitals, nursing homes, explosives plants, refineries, high-rise buildings, and other high life-hazard (vulnerable population) or large fire-potential occupancies.

Medium-hazard occupancies: Apartments, offices, and mercantile and industrial occupancies not normally requiring extensive rescue by firefighting forces.

Low-hazard occupancies: One-, two-, or three-family dwellings and scattered small business and industrial occupancies.[28]

Roswell has the following building types. There are no high-rise structures in Roswell.

- Single family housing units: 23,147
- Townhomes/condos: 6,123.
- Apartment building units–garden style (2-story, etc.): 8,918.
- Assisted Living: 1,821
- Commercial/industrial structures: 5,882.
- Strip malls: 65.

Residential over commercial does exist in the city posing additional risks and includes 79 units

In terms of identifying target hazards, consideration must be given to the activities that take place (public assembly, life safety vulnerability, manufacturing, processing, etc.), the number and types of occupants (elderly, youth, handicapped etc.), and other specific aspects related to the construction of the structure.

Roswell has a variety of target hazards that have been assigned a hazard class by the RFD and which include:

27. City of Roswell Emergency Operations Plan Version 2.2 June 2016.
28. Cote, Grant, Hall & Solomon, eds., *Fire Protection Handbook* (Quincy, MA: National Fire Protection Association, 2008), 12.

High Hazard

- One healthcare facility (Wellstar North Fulton Hospital).
- Twenty-nine facilities that include assisted living/nursing facilities.
- Thirty-three schools.
- A hazardous materials site classified as mixed use business/storage/ mercantile/industrial.
- Four water/sewage treatment plants classified as industrial.

Medium Hazard

- Six important government offices that are classified as mixed use assembly, business, storage, and industrial.
- Two emergency operation centers classified as mixed use, assembly, business, and storage.
- Two communications systems classified as mixed use business/storage/ industrial.

The greatest amount of building risk in Roswell is of a low hazard (single family dwellings-predominately wood frame construction). Roswell does have a significant number of high risk/vulnerable population risks (nursing/assisted living facilities) and schools and multifamily residential structures (apartments/condos). All of these buidling risks present the RFD with life-safety concerns. The industrial and mercantile building risk, while a lower life safety risk, is gernerally a higher hazard risk based on processes, storage, and overall occupancy type.

All current and planned building risks should be contemplated during RFD staffing and deployment strategic planning sessions.

The following figure illustates RFD-designated target hazards in Roswell.

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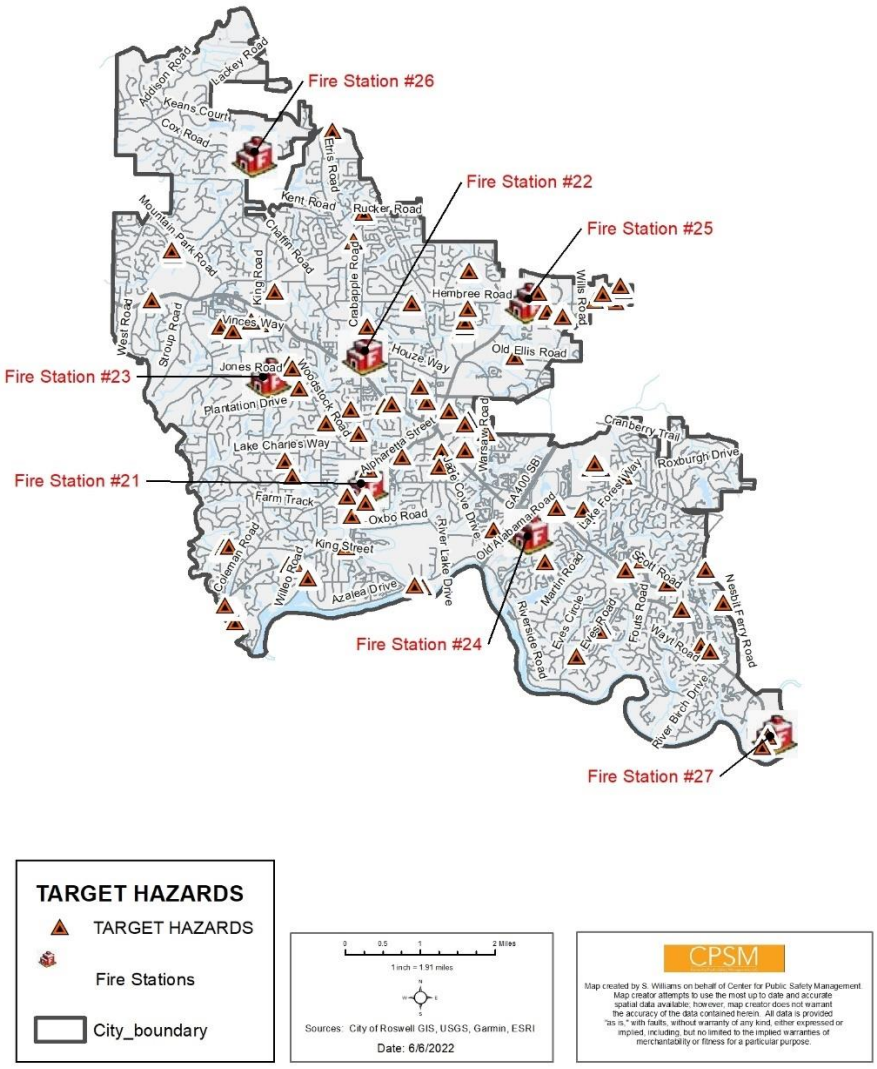
FIGURE 3-3: RFD Designated Target Hazard Locations



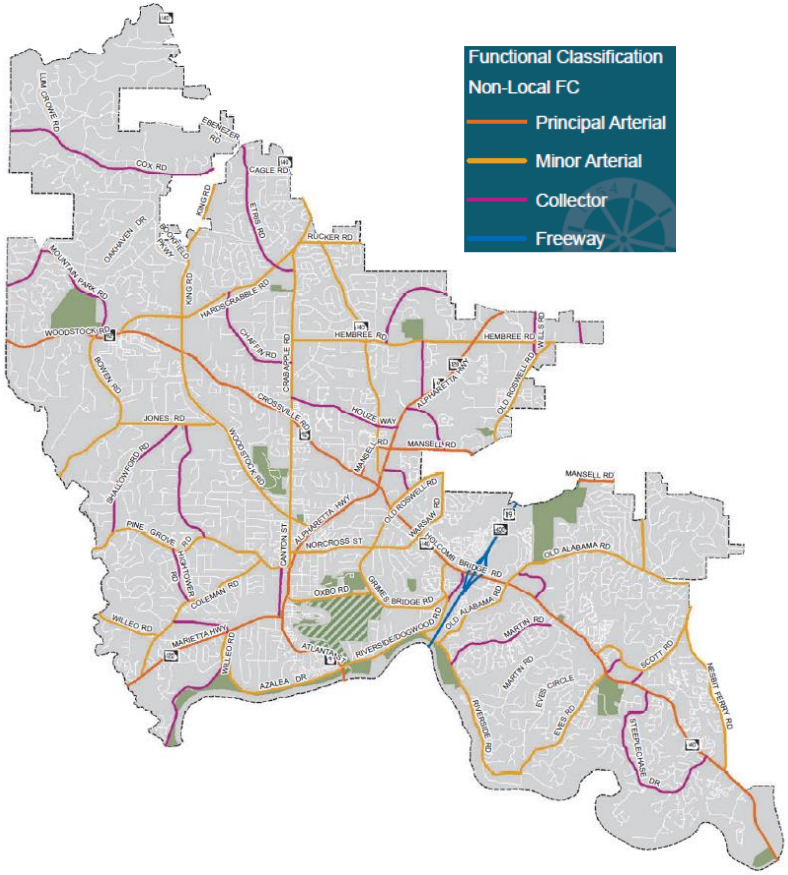
TRANSPORTATION FACTORS

The existing public street network within the city limits consists of roadways on the state roadway system and city maintained roadways. The public street network totals 409 miles (more than 800 lane-miles). Lane-miles include the length of travel lanes in both directions along a street and as well as accounts for multilane roads. Of the total lane-miles, GDOT maintains 17.7 lane-miles (primarily SR 400) and the city maintains 786.8 lane-miles including about 84 miles on the state roadway system.

The following figures illustrate the principal road network in Roswell.

FIGURE 3-4: Roswell Road Transportation Network

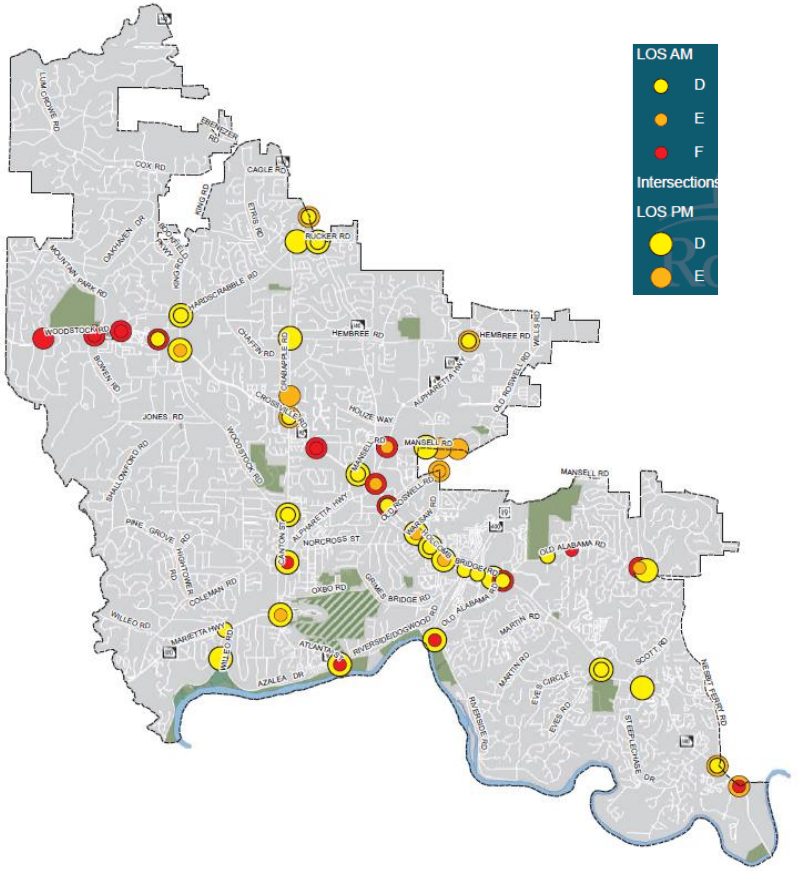
Roswell Road Functional Classification



Roswell Congested Intersections

Level of Service D, E, F Roads

Indicates high capacity, at capacity, and over capacity roadway respectively



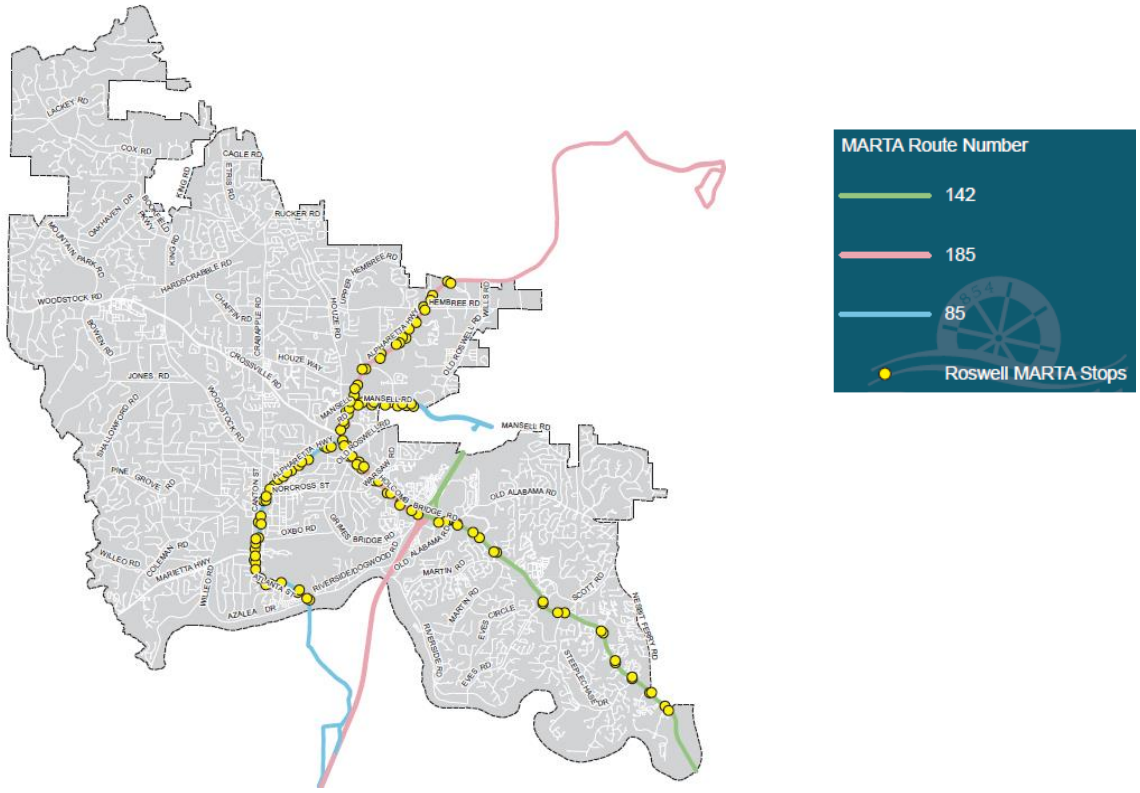
Map source: City of Roswell Transportation Master Plan

The residents of Roswell are also served by three MARTA bus routes within the city limits. The existing MARTA bus service is as follows:

- Route 85 (Roswell/Mansell Road) starts at the MARTA North Springs rail station traveling north on SR 400 exiting at Northridge Road, travels north along Atlanta Street (SR 9) from the Chattahoochee River, past City Hall, through the Holcomb Bridge Road (SR 140) intersection and then east along Mansell Road to the MARTA Park/Ride lot at the Mansell Road/SR 400.
- Route 142 (East Holcomb Bridge Road) starts at the Mansell Road Park & Ride Lot and travels south on Georgia 400 to Holcomb Bridge Road. The route runs east on Holcomb Bridge Road to Spalding Road and River Exchange Drive in Sandy Springs, then returns west.
- Route 185 (Alpharetta/Holcomb Bridge Road) starts at the MARTA North Springs rail station traveling north on SR 400 exiting at Holcomb Bridge Road. During peak hours, the bus travels east along Holcomb Bridge Road (SR 140), turns right on Market Way, then makes a left on Market Boulevard, and turns west on Holcomb Bridge Road. During off-peak hours, the bus exits SR 400 and proceeds west on Holcomb Bridge Road, travels north along Alpharetta Highway (SR 9/120) through Alpharetta to Windward Parkway, terminating at the Windward Park/Ride lot at the Windward Parkway/SR 400 interchange.

The following figure illustrates MARTA bus transit in Roswell. The yellow dots indicate the Roswell MARTA stops.

FIGURE 3-5: Roswell MARTA Transportation Network



The road and transportation network described herein poses risks for a vehicular accident, some at medium to greater than medium speeds, as well as vehicular-versus-pedestrian risks. There are additional transportation risks since tractor-trailer and other commercial vehicles traverse the

roadways of Roswell to deliver mixed commodities to business locations. Fires involving these products can produce smoke and other products of combustion that may be hazardous to health. All current and planned transportation risks to include roads, bicycle and walking paths, golf cart transportation allowance, and mass transit expansion should be contemplated during RFD staffing and deployment strategic planning sessions.

FIRE AND FIRE-RELATED RISK

An indication of the community's fire risk is the type and number of fire-related incidents the fire department responds to. CPSM conducted a data analysis for this project that analyzed RFD incident responses and workload.

The following table details the call types and call type totals for these types of fire-related risks for CY 2021.

TABLE 3-1: Fire Call Types,2021

Call Type	Total Calls	Calls per Day
Fire (non-specific)	175	0.5
Fire alarm	1,008	2.8
Hazard	290	0.8
Outside fire	171	0.5
Public service	845	2.3
Structure fire	119	0.3
Fire Total	**2,608**	**7.1**

EMS Risk

As with fire risks, an indication of the community's pre-hospital emergency medical risk is the type and number of EMS calls to which the fire department responds. The following table outlines the call types and call type totals for these types of EMS risks.

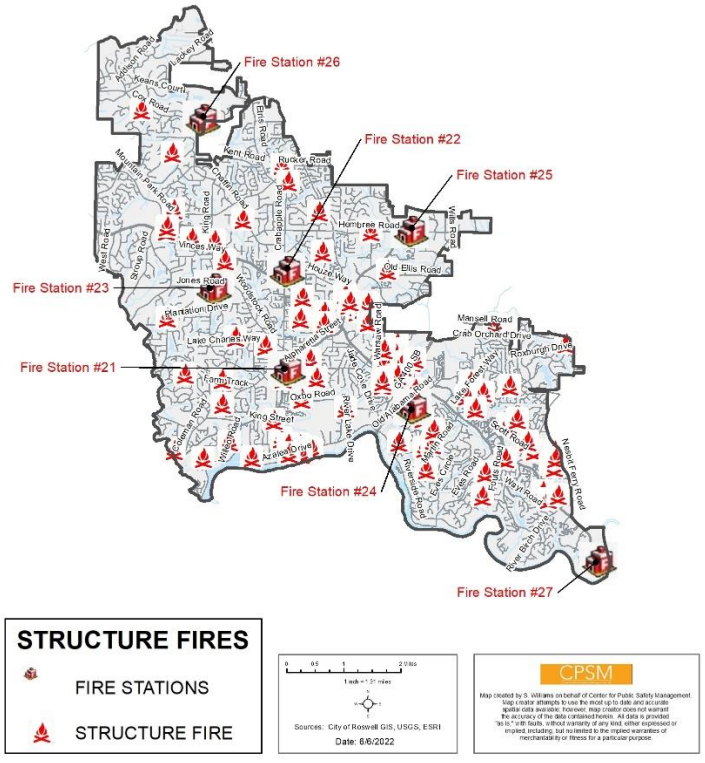
TABLE 3-2: EMS Call Types, 2021

Call Type	Total Calls	Calls per Day
Breathing difficulty	733	2.0
Cardiac and stroke	808	2.2
Fall and injury	1,894	5.2
Illness and other	1,861	5.1
MVA	596	1.6
Overdose and psychiatric	494	1.4
Seizure and unconsciousness	747	2.0
EMS Total	**7,133**	**19.5**

Analyzing where the fire and EMS incidents occur, and the demand density of fire and EMS incidents, helps to determine adequate fire management zone resource assignment and deployment. **As already illustrated above, the RFD has a high overall demand for fire and EMS resource response in the central and southern areas of the city.** The following figures illustrate fire and EMS demand in a more defined manner by specific call types These include a breakout of structural and outside fire incidents; other types of fire-related incidents such as good intent and public service calls, which are calls for service such as smoke scares (no fire), wires down, lock outs, water leaks, etc.; false alarms (typically fire alarms); and EMS incident demand that breaks out breathing difficulty, cardiac, stroke, and motor vehicle accidents.

FIGURE 3-6: Fire Demand: Structure and Outside Fire Incidents

Structure Fires



Outside Fires

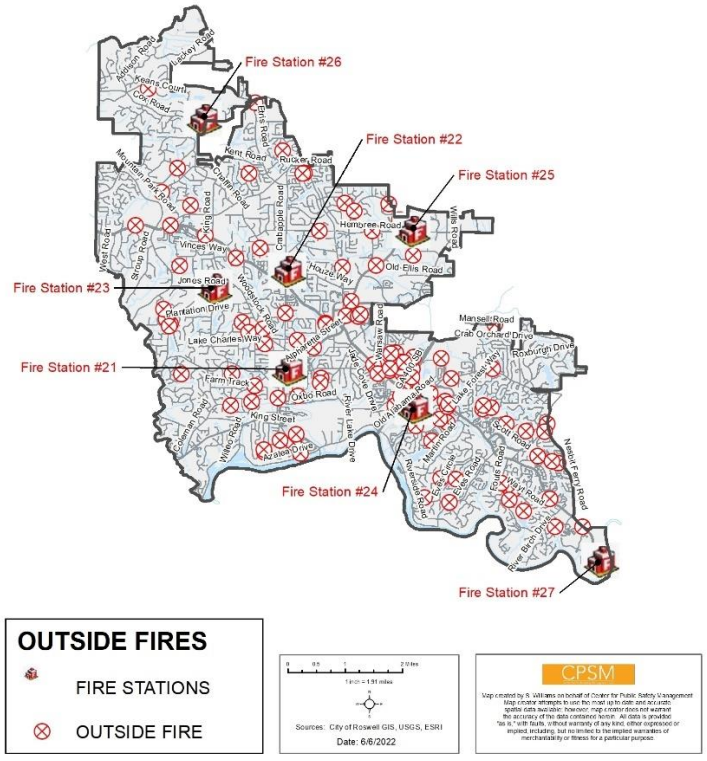
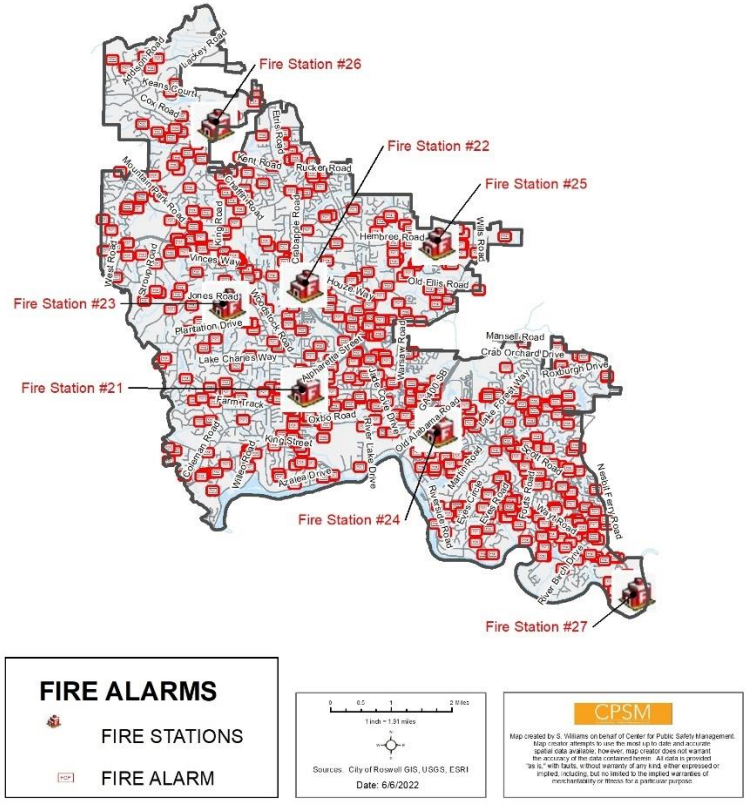


FIGURE 3-7: Fire Demand: Fire Alarms and Fire-Related Incidents

Fire Alarms



Fire-Related Incidents

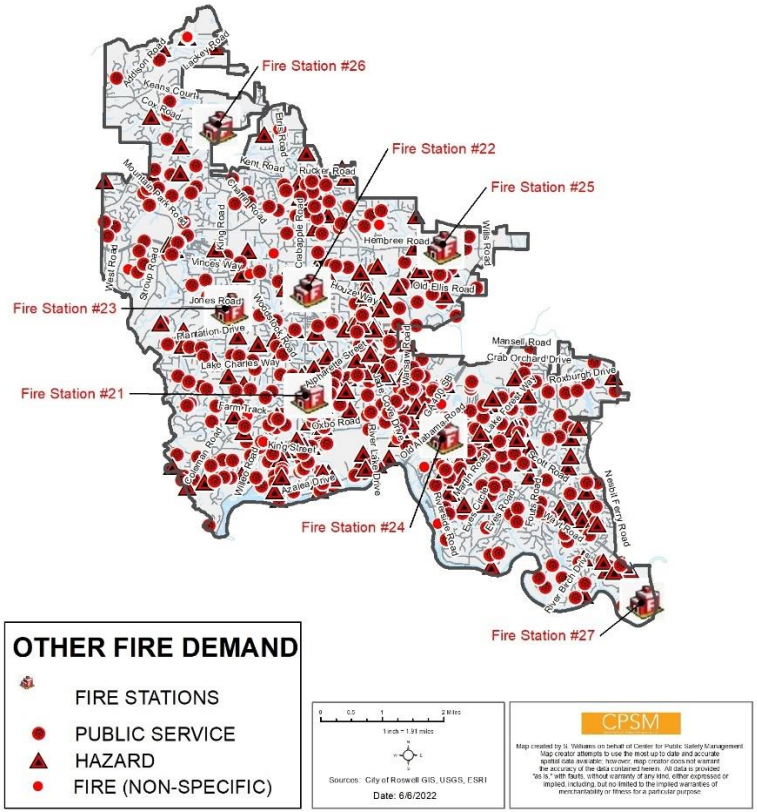
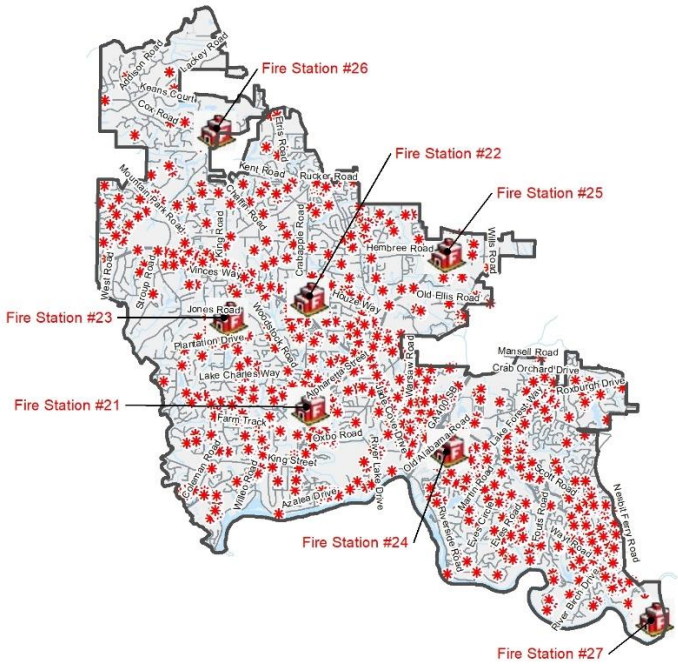
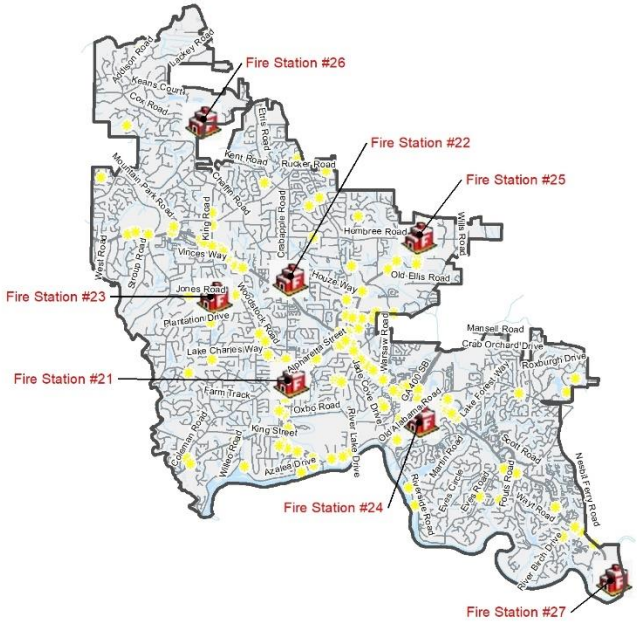


FIGURE 3-8: EMS Demand: Breathing Difficulty, Cardiac, Stroke, and MVA Incidents

Breathing Difficulty, Cardiac, and Stroke



Motor Vehicle Accidents



Congested Intersections

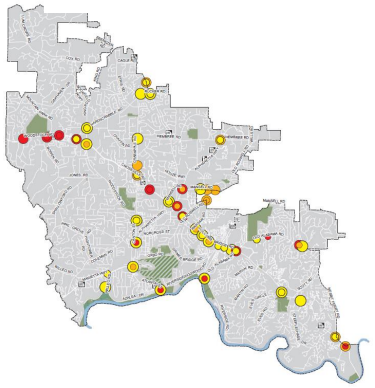
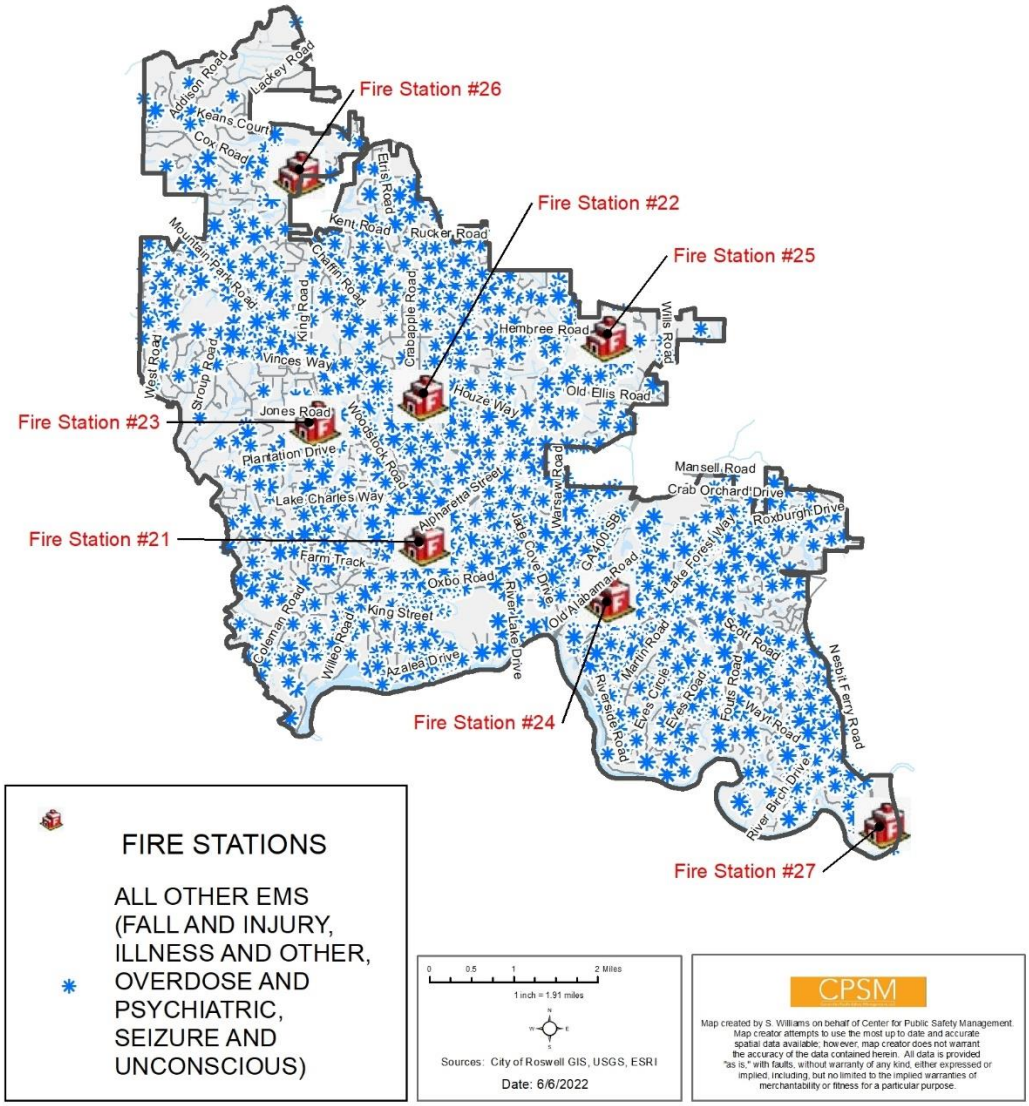


FIGURE 3-9: All Other EMS Incidents



Community Loss and Save Information

Fire loss is an estimation of the total loss from a fire to the structure and contents in terms of replacement. Fire loss includes contents damaged by fire, smoke, water, and overhaul. Fire loss does not include indirect loss, such as business interruption.

In a 2021 report published by the National Fire Protection Association on trends and patterns of U.S. fire losses, it was determined that home fires still cause the majority of all civilian fire deaths, civilian injuries, and property loss due to fire. Key findings from this report include:[29]

29. *Fire Loss in the United States During 2020*, National Fire Protection Association.

- Public fire departments responded to 1,338,500 fires in 2020, a 7.5-percent increase from the previous year.
- 490,500 fires occurred in structures (37 percent). Of these fires, 379,500 occurred in residential structures and 86,000 occurred in apartments or multifamily structures.
- 2,230 civilian fire deaths occurred in residential fires, and 350 deaths occurred in apartments or multifamily structures.
- Home fires were responsible for 11,500 civilian injuries.
- An estimated $21.9 billion in direct property damage occurred as a result of fire in 2020 (includes fires in the California wildland-urban interface and a large loss naval ship fire in California).

The following table shows overall fire loss in Roswell in terms of dollars for the years indicated. This information should be reviewed regularly and discussed in accordance with response times to actual fire incidents, company level training, effectiveness on the fireground, and effectiveness of incident command. Property loss information should also be included in strategic planning discussions regarding response times, training, incident command, staffing, and deployment of resources.

TABLE 3-3: Content and Property Loss, 2017–2021

2017	2018	2019	2020	2021
$5,283,933.00	$3,001,169.00	$1,245,693.00	$1,463,066.00	$2,363,250.00

RISK CATEGORIZATION

A comprehensive risk assessment is a critical aspect of creating standards of cover and can assist the RFD in quantifying the risks that it faces. Once those risks are known, the department is better equipped to determine if the current response resources are sufficiently staffed, equipped, trained, and positioned.

In this component, the factors that drive the service needs are examined and then link directly to discussions regarding the assembling of an effective response force (ERF) and when contemplating the response capabilities needed to adequately address the existing risks, which encompasses the component of critical tasking.

The risks that the department faces can be natural or manufactured and may be affected by the changing demographics of the community served. With the information available from the CPSM data analysis, the RFD, the city, and public research, CPSM and the RFD can begin an analysis of the city's risks and can begin working towards recommendations and strategies to mitigate and minimize their effects. This section contains an analysis of the various risks considered within the RFD's service area.

Risk is often categorized in three ways: consequence of the event on the community, the probability the event will occur in the community, and the impact on the fire department. The following three tables look at the probability of the event occurring (Table 3-4) which ranges from unlikely to frequent; consequence to the community (Table 3-5), which is categorized as ranging from insignificant to catastrophic; and the impact to the organization (Table 3-6), which ranges from insignificant to catastrophic.

TABLE 3-4: Event Probability

Probability	Chance of Occurrence	Description	Risk Score
Unlikely	2%-25%	Event may occur only in exceptional circumstances.	**2**
Possible	26%-50%	Event could occur at some time and/or no recorded incidents. Little opportunity, reason, or means to occur.	**4**
Probable	51%-75%	Event should occur at some time and/or few, infrequent, random recorded incidents, or little anecdotal evidence. Some opportunity, reason, or means to occur; may occur.	**6**
Highly Probable	76%-90%	Event will probably occur and/or regular recorded incidents and strong anecdotal evidence. Considerable opportunity, means, reason to occur.	**8**
Frequent	90%-100%	Event is expected to occur. High level of recorded incidents and/or very strong anecdotal evidence.	**10**

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TABLE 3-5: Consequence to Community Matrix

Impact	Consequence Categories	Description	Risk Score
Insignificant	Life Safety	■ 1 or 2 people affected, minor injuries, minor property damage, and no environmental impact.	**2**
Minor	Life Safety Economic and Infrastructure Environmental	■ Small number of people affected, no fatalities, and small number of minor injuries with first aid treatment. Minor displacement of people for <6 hours and minor personal support required. ■ Minor localized disruption to community services or infrastructure for <6 hours. Minor impact on environment with no lasting effects.	**4**
Moderate	Life Safety Economic and Infrastructure Environmental	■ Limited number of people affected (11 to 25), no fatalities, but some hospitalization and medical treatment required. Localized displacement of small number of people for 6 to 24 hours. Personal support satisfied through local arrangements. Localized damage is rectified by routine arrangements. ■ Normal community functioning with some inconvenience. Some impact on environment with short-term effects or small impact on environment with long-term effects.	**6**
Significant	Life Safety Economic and Infrastructure Environmental	■ Significant number of people (>25) in affected area impacted with multiple fatalities, multiple serious or extensive injuries, and significant hospitalization. ■ Large number of people displaced for 6 to 24 hours or possibly beyond. External resources required for personal support. Significant damage that requires external resources. Community only partially functioning, some services unavailable. Significant impact on environment with medium- to long-term effects.	**8**
Catastrophic	Life Safety Economic and Infrastructure Environmental	■ Very large number of people in affected area(s) impacted with significant numbers of fatalities, large number of people requiring hospitalization; serious injuries with long-term effects. General and wide-spread displacement for prolonged duration; extensive personal support required. Extensive damage to properties in affected area requiring major demolition. ■ Serious damage to infrastructure. Significant disruption to, or loss of, key services for prolonged period. ■ Community unable to function without significant support. ■ Significant long-term impact on environment and/or permanent damage.	**10**

TABLE 3-6: Impact on RFD

Impact	Impact Categories	Description	Risk Score
Insignificant	Personnel and Resources	One apparatus out of service for period not to exceed one hour.	**2**
Minor	Personnel and Resources	More than one but not more than two apparatus out of service for a period not to exceed one hour.	**4**
Moderate	Personnel and Resources	More than 50 percent of available resources committed to incident for over 30 minutes.	**6**
Significant	Personnel and Resources	More than 75 percent of available resources committed to an incident for over 30 minutes.	**8**
Catastrophic	Personnel, Resources, and Facilities	More than 90 percent of available resources committed to incident for more than two hours or event which limits the ability of resources to respond.	**10**

This section also contains an analysis of the various risks considered in the city. In this analysis, information presented and reviewed in this section (All-Hazards Risk Assessment of the Community) have been considered. Risk is categorized as Low, Moderate, High, or Special.

Prior risk analysis has only attempted to evaluate two factors of risk: probability and consequence. Contemporary risk analysis considers the impact of each risk to the organization, thus creating a three-axis approach to evaluating risk as depicted in the following figure. A contemporary risk analysis now includes probability, consequences to the community, and impact on the organization, in this case the RFD.

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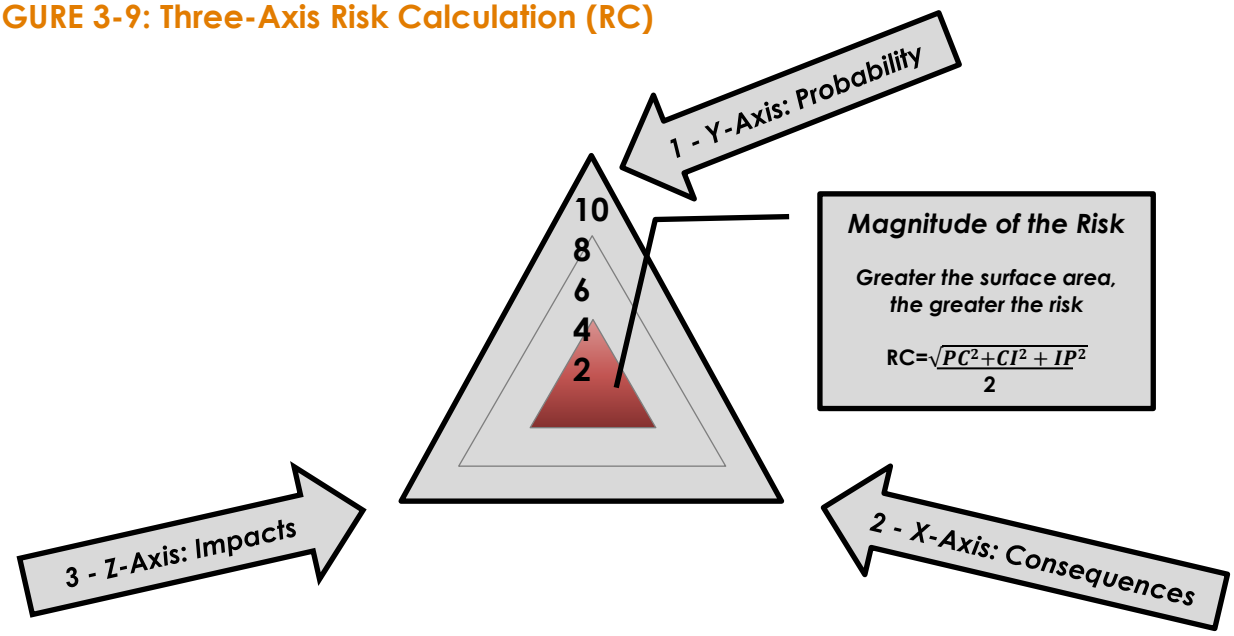
FIGURE 3-9: Three-Axis Risk Calculation (RC)



The following factors/hazards were identified and considered:

- **Demographic factors** such as age, socio-economic, vulnerability.
- **Natural hazards** such as flooding, snow and ice events, wind events.
- **Manufactured hazards** such as roads and intersections, target hazards.
- **Structural/building risks**.
- **Fire and EMS incident numbers and density**.

The assessment of each factor and hazard as listed below took into consideration the likelihood of the event, the impact on the city itself, and the impact on RFD's ability to deliver emergency services, which includes RFD resiliency and automatic aid capabilities as well. The list is not all inclusive but includes categories most common or that may present to the city and the RFD.

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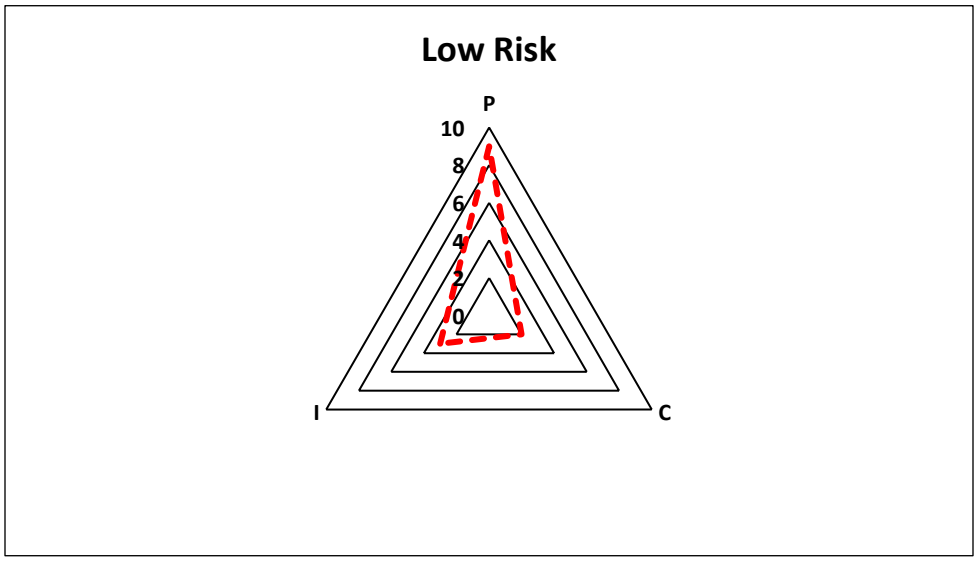
Low Risk

- Automatic fire/false alarms.
- Low Acuity-BLS EMS Incidents.
- Low-risk environmental event.
- Motor vehicle accident (MVA).
- Good intent/hazard/public service fire incidents with no life-safety exposure.
- Outside fires such as grass, rubbish, dumpster, vehicle with no structural/life-safety exposure.

FIGURE 3-10: Low Risk



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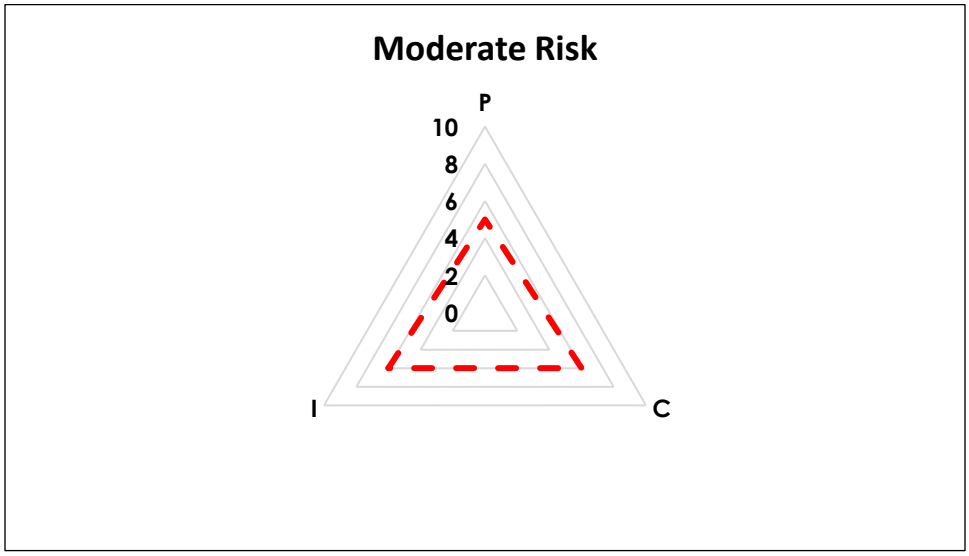
Moderate Risk

- Fire incident in a single-family dwelling where fire and smoke or smoke is visible, indicating a working fire.
- Suspicious substance investigation involving multiple fire companies and law enforcement agencies.
- ALS EMS incident.
- MVA with entrapment of passengers.
- Grass/brush fire with structural endangerment/exposure.
- Low angle rescue involving ropes and rope rescue equipment and resources.
- Surface water rescue.
- Good intent/hazard/public service fire incidents with life-safety exposure.
- Transportation event with moderate release of product or fire, and no threat to life safety.

FIGURE 3-11: Moderate Risk



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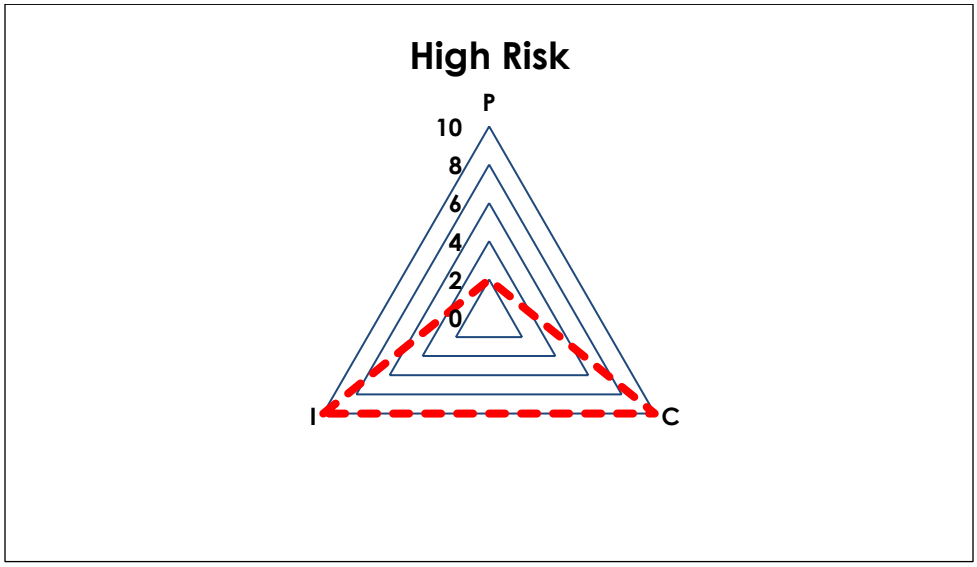
High Risk

- Working fire in a target hazard.
- Cardiac arrest.
- Mass casualty incident of more than 10 patients but fewer than 25 patients.
- Confined space rescue.
- Structural collapse involving life-safety exposure.
- High-angle rescue involving ropes and rope rescue equipment.
- Trench rescue.
- Suspicious substance incident with multiple injuries.
- Industrial leak of hazardous materials that causes exposure to persons or threatens life safety.
- Weather event that creates widespread flooding, heavy snow, heavy winds, building damage, and/or life-safety exposure.

FIGURE 3-12: High Risk



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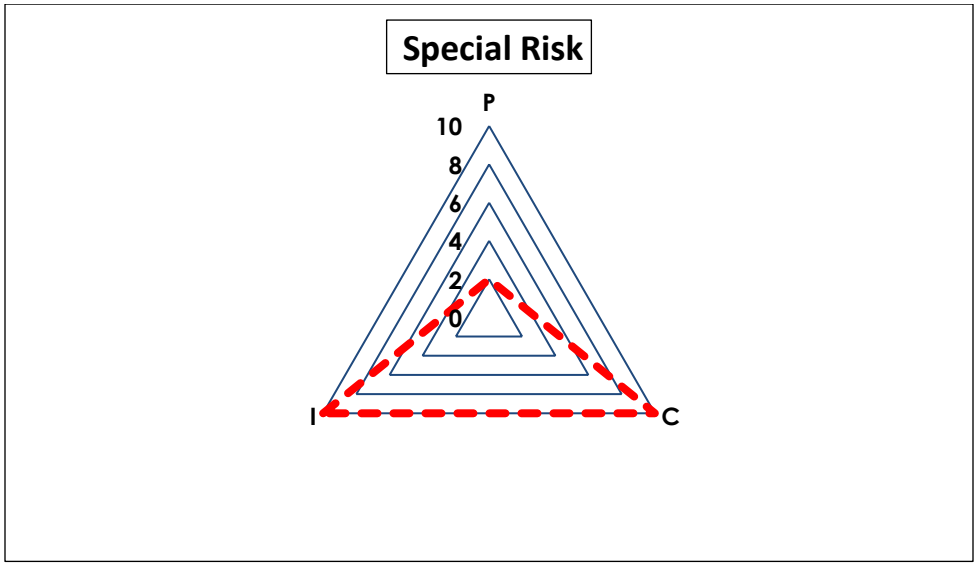
Special Risk

- Working fire in a structure of more than three floors.
- Fire at an industrial building or complex with hazardous materials.
- Fire in an occupied targeted hazard with special life-safety risks such as age, medical condition, or other identified vulnerabilities.
- Mass casualty incident of more than 25 patients.
- Transportation incident that causes life-safety exposure or threatens life safety through the release of hazardous smoke or materials and evacuation of residential and business occupancies.
- Explosion in a building that causes exposure to persons or threatens life safety or outside of a building that creates exposure to occupied buildings or threatens life safety.
- Massive river/estuary flooding, fire in a high-risk target hazard or medical institution, high-impact environmental event, pandemic.
- Mass gathering with threat fire and threat to life safety or other civil unrest, weapons of mass destruction release.

FIGURE 3-13: Special Risk



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SECTION 4. ISO PUBLIC PROTECTION CLASSIFICATION

The ISO is a national, not-for-profit organization that collects and evaluates information from communities across the United States regarding their capabilities to combat building fires. ISO conducts field evaluations in an effort to rate communities and their relative ability to provide fire protection and mitigate fire risk. This evaluation allows ISO to determine and publish the Public Protection Classification (PPC). The data collected from a community is analyzed and applied to ISO's Fire Suppression Rating Schedule (FSRS) from which a Public Protection Classification (PPC™) grade is assigned to a community (1 to 10).

A Class 1 (highest classification/lowest numerical score) represents an exemplary community fire suppression program that includes all of the components outlined below. A Class 10 indicates that the community's fire suppression program does not meet ISO's minimum criteria. It is important to understand the PPC is not just a fire department classification, but a compilation of community services that include the fire department, the emergency communications center, and the community's potable water supply system operator.[30]

A lower PPC score indicates a more favorable rating, which potentially translates into lower insurance premiums for business owners and homeowners. This lower classification makes the community more attractive from an insurance risk perspective. How the PPC for each community affects business and homeowners can be complicated because each insurance underwriter is free to utilize the information as they deem appropriate. Overall, many factors feed into the compilation of an insurance premium, not just the PPC.

A community's PPC grade depends on:

- **Needed Fire Flows** (building locations used to determine the theoretical amount of water necessary for fire suppression purposes).
- **Emergency Communications** (10 percent of the evaluation).
- **Fire Department** (50 percent of the evaluation).
- **Water Supply** (40 percent of the evaluation).

The City of Roswell has an ISO rating of ***Class 02, the second-highest rating achievable***. This rating became effective in June 2022. The final rating included the following credit by category:

- **Emergency Communications**: 8.70 earned credit points/10.00 credit points available.
- **Fire Department**: 36.46 earned credit points/50.00 credit points available.
- **Water Supply:** 32.26 earned credit points/40.00 credit points available.
- **Community Risk Reduction** (Fire Prevention/Inspection, Public Education, and Fire Investigation activities): 5.18 earned credit points/5.50 credit points available.

Overall, the community PPC rating yielded **81.05** earned credit points/105.50 credit points available. There was a 1.55 point diversion reduction assessed as well, which is automatically

30. RFD ISO PPC report; Effective June 2022.

calculated based on the relative difference between the fire department and water supply scores. **80.00 points or more qualify a community for a rating of 2.**

The following figures illustrate the dispersion of PPC ratings across the United States and in Georgia.

FIGURE 4-1: PPC Ratings in the United States[31]

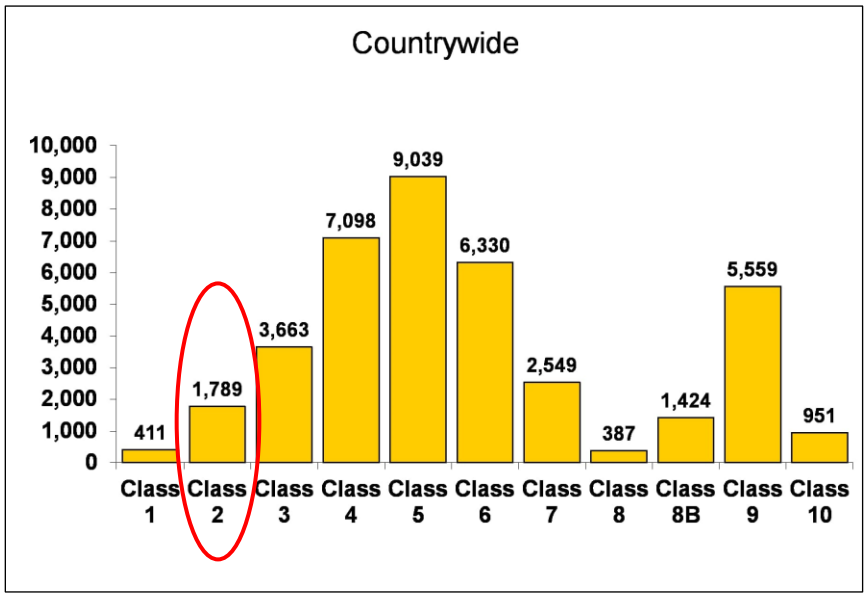
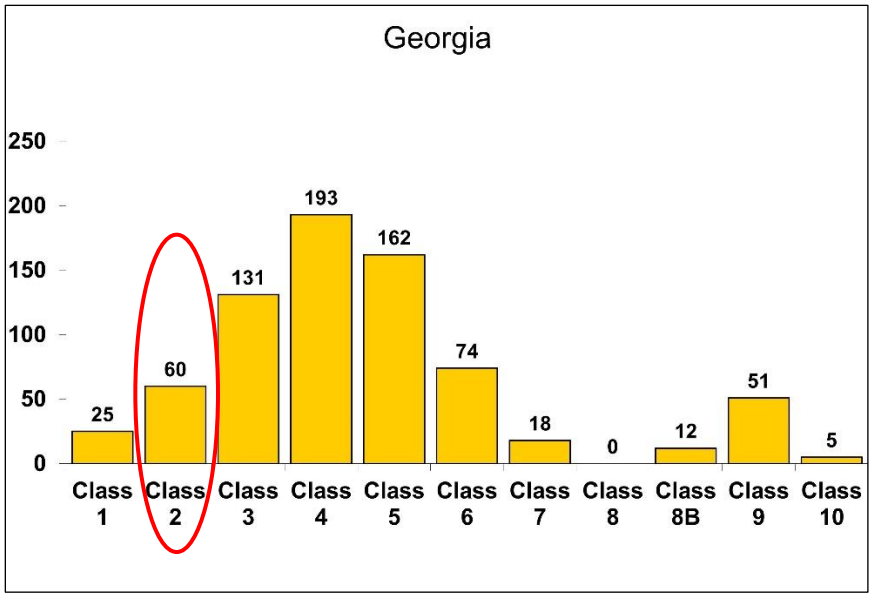


FIGURE 4-2: PPC Ratings in Georgia[32]



31. https://www.isomitigation.com/ppc/program-works/facts-and-figures-about-ppc-codes-around-the-country/
32. Ibid.

Areas of scoring that should be reviewed further internally by the city and the RFD, and which can have the most impact on individual areas evaluated and scored that connect to total section scoring include:[33]

- Item 561: Deployment Analysis. This item evaluates the number and adequacy of existing engine and truck companies in service to provide coverage to built-upon areas. Deficiencies in this item link to the discussion above regarding engine and ladder company gaps in coverage in the city. **The city received 6.39/10 points for this item.**
- Credit for Company Personnel. This item reviews the average number of existing firefighters and company officers available to respond to reported first alarm structure fires in the city. This item links to the discussion in this analysis regarding the RFD's ability to assemble an Effective Response Force for various types of structure fires. **The city received 8.70/15 points for this item.**
- Credit for Facilities and Use (Training). For maximum credit each firefighter should receive 18 hours per year in structure fire-related subjects. Deficiencies in this item link directly to issues the RFD administrative staff has in planning and implementing a consistent and effective training program with part-time employees who work inconsistent schedules. **The RFD received 13.65/35 credits for this item.**
- Credit for Company Training. For maximum credit, each firefighter should receive 16 hours per month in structure fire related subjects. Deficiencies in this item link directly to issues the RFD administrative staff has in planning and implementing a consistent and effective training program with part-time employees who work inconsistent schedules. **The RFD received 2.31/5 points for this item.**
- Existing Driver and Operator Training. For maximum credit, each existing driver and operator should receive 12 hours of driver/operator training per year. Deficiencies in this item link directly to issues the RFD administrative staff has in planning and implementing a consistent and effective training program with part-time employees who work inconsistent schedules, and to increased accidents with and maintenance costs for the heavy fire apparatus. **The RFD received 13.89/25 points for this item.**

The following table describes the scoring for the fire department analysis section of the current ISO report.

TABLE 4-1: City of Roswell June 2022 ISO Report, Fire Department Analysis

	Earned Credit	Credit Available
513. Credit for Engine Companies	6.00	6.00
523. Credit for Reserve Pumpers	0.50	0.50
532. Credit for Pumper Capacity	3.00	3.00
549. Credit for Ladder Service	3.95	4.00
553. Credit for Reserve Ladder and Service Trucks	0.48	0.50
561. Credit for Deployment Analysis	6.39	10.00
571. Credit for Company Personnel	8.70	15.00
581. Credit for Training	5.44	9.00
730. Credit for Operational Considerations	2.00	2.00
Item 590. Credit for Fire Department	**36.46**	**50.00**

33. Public Protection Classification Summary Report, Roswell, GA, June 2022, ISO.

Other scoring for the RFD included:

- Maximum credit (100/100) for Operational Considerations, which includes an analysis of the department's standard operating procedures and incident systems.
- 5.18/5.50 credits for Community Risk Reduction (fire prevention, fire safety education, fire investigation programs).

The city received 25.28/30 points for the water supply system. Areas of notable deficiency include:

- 0.00 points for fire hydrant flow testing, which indicates fire hydrants are flow tested at a frequency greater than ten years.

The RFD should include the current and all future ISO Public Protection Classification Summary Reports in strategic planning reports and discussions, with specific attention to any deficiencies outlined in these reports. The RFD should also address items external to the department with the appropriate agency responsible to ensure, to the extent possible, the external agency can develop and implement a plan to address and improve the stated deficiency.

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SECTION 5. RECOMMENDED STRATEGIC PLANNING ACTIONS

1. Review/update RFD Mission Statement.
2. Develop/update RFD Vision Statement.
3. Develop/update RFD Values Statements.
4. The RFD should develop strategic planning goals and objectives, and a funding plan that transitions the department from a part-time field operations department (battalion chiefs, **company officers, driver-operators, firefighters, in this order**) over a one- to five-year period. Supportive factors to this recommendation include:

- 21 external fire departments provide staffing to the RFD.
- When a regional emergency is occurring such as an extreme weather event or a pandemic, part-time staff may be bound to their home departments, thus leaving the City of Roswell with the potential of a severely understaffed department to respond to the same regional emergency.
- Part-time staff is typically reporting to RFD stations when they are getting off from their primary department, which is at the end of a 24-hour shift. Fatigue during their 12- or 24-hour shift with the RFD is highly probable, which can lead to errors, injuries, and reduction in productivity.
- Staggered shift start-times based on where firefighters are coming from (home department) causes problems with accountability at the station and on the fireground during shift change as the RFD does not know who is still at work. On many mornings part-time staff report to work beyond the normal shift start time of 8:00 a.m. due to travel from their home department station or mandatory overtime/hold-over.
- Equipment utilized in the RFD may not be the same as the employee's home department. This includes self-contained breathing apparatus, structural clothing ensemble, fire pumps, aerial hydraulics and stabilization equipment, heavy apparatus driving and motor components, firefighter escape devices, cardiac monitors, and the like.
- Inconsistent staffing with the same crew members disables the ability to form a cohesive team that routinely works and trains together. A more cohesive team translates to efficiencies and increased effectiveness on the emergency scene. Most part-time employees only check their email when they work so those who work infrequently are slow to respond to email requests for information.
- Different policies, protocols, procedures, and mission and vision statements in the home department than in the RFD create a situation where part-time staff must adapt when working in the RFD. This can lead to inefficiencies in and around the station and apparatus, and on an emergency incident, which reduces effectiveness.
- There is no regular full-time supervision (company officer level) in each fire station, which leads to lack of upkeep and maintenance of the facility and the apparatus.
- The RFD tends to lose part-time staff when overtime opportunities at their full-time job increase.
- It is difficult to complete regular staff evaluations due to inconsistent part-time schedule.

- High attrition rate. The RFD lost 31 part-time staff in 2021 and has lost 25 in 2022 (as of June 1, 2022). This requires dedicating copious administrative staff time recruiting, outfitting, and onboarding new firefighters.
- Tenure at the RFD: 66 of RFD's part-time firefighters have worked at the RFD for less than 2 years, and 132 (64 percent overall) have worked at the RFD for less than 5 years. Even working full-time with frequent exposure, it takes considerable time for new firefighters to learn the City of Roswell community and geography, as well as the RFD's policies, apparatus, and equipment. This process is further impeded by the inconsistent part-time schedule and lack of consistent supervision.
- Operating and maintenance costs per employee are higher for 225 part time positions as each requires uniforms, custom-fitted structural gear ensemble, etc. A full-time department is estimated at 135, which would reduce these costs.
- Difficult to implement department-wide training, health and safety, employee relations, and other fundamental fire and EMS programs due to inconsistent staffing schedules of personnel.
- Difficult to implement succession planning, particularly at the first-line and middle-manager levels (Captain and Battalion Chief).
- Any transfer, promotion, FMLA, or worker's comp injury/illness that occurs in the part-time staff's full-time department affects staffing with the RFD.
- For any given emergency to which RFD responds, there are critical tasks that must be completed. These tasks can range from the immediate rescue of trapped occupants within a burning structure to vehicle accidents with entrapment, to hazardous materials leaks and spills when needed. The department's inconsistent staffing levels has an impact on its ability to handle a moderate risk structure fire effectively and safely. Although the use of automatic and mutual aid from surrounding departments can help bridge this gap, this assistance will have built-in and at times delayed response time considerations.

Total projected costs for a transition from a part-time to full-time field operations staffing model for each position are outlined in the next table.

The second table outlines a five-year plan for implementation of a transition from a part-time to full-time field operations staffing model.

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TABLE 5-1: Projected Costs for Part-Time to Full-Time Transition (FY 2023 Salaries and Benefits)

Positions	Count	FLSA Overtime Hours Per Year	Total New & Recurring Cost
Captains	21	156	$2,309,325
Lieutenants	9	156	$925,813
Apparatus Operator	30	156	$2,706,767
Paramedics	36	156	$3,055,872
Firefighter/EMTs	36	156	$2,683,913
New Battalion Chiefs	3	0	$353,941
Total New FTE's =	**135**	Total Cost =	$12,035,631
		FY 2023 Firefighter Fees =	-$6,830,678
		Total New Cost =	**$5,204,952**

Table Source: Roswell Fire Department, June 2022

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TABLE 5-2: Five Year Part-Time to Full-Time Hiring-Staffing Transition Plan

Fiscal Year	Positions	Count
FY 2023	Captains	21
	Total	**21**
FY 2024	New Battalion Chiefs	3
	Lieutenants	9
	Paramedics	12
	Total	**24**
FY 2025	Apparatus Operators	15
	Paramedics	12
	Firefighter/EMTs	3
	Total	**30**
FY 2026	Apparatus Operators	15
	Paramedics	12
	Firefighter/EMTs	3
	Total	**30**
FY 2027	Firefighter/EMTs	30
	Total	**30**
	TOTAL NEW FTE'S	**135**

Table Source: Roswell Fire Department, June 2022

5. The RFD should develop strategic planning goals and objectives that address its ability to meet the NFPA 1710 Effective Response Force benchmark either as a department or with automatic aid for:

- Open-air strip mall/commercial building fire responses
- Apartment building fire responses

6. All current and planned building risks should be contemplated during RFD staffing and deployment strategic planning sessions.
7. All current and planned transportation risks to include roads, bicycle and walking paths, golf cart transportation allowance, and mass transit expansion should be contemplated during RFD staffing and deployment strategic planning sessions.
8. Property loss information should be included in strategic planning discussions regarding response times, training, incident command, staffing, and deployment of resources.
9. The RFD should develop strategic planning goals and objectives that address 240-second (NFPA benchmark) travel time gaps in the southeast, southwest, and northwest areas of the city.
10. The RFD should develop strategic planning goals and objectives that maintain staffing levels in the Fire Marshal division. Specifically, as the workload for fire code inspections, plan reviews, life safety education activities, and fire investigations increase as the city grows, this division, due to its importance in the prevention of fire and life safety through code enforcement, should be properly staffed to meet the workload increase. This includes the plans review activity.
11. The RFD should develop strategic planning goals and objectives that address the training and education aspects of transitioning from a part-time field operations department to a full-time field operations department. This should include officer development, recruit and incumbent officer, driver-operator, and firefighter level initial and continuing education. Training and education platforms should include web-based, digital, in-person, live fire training, multi-unit drills, and regional, state, and national training (National Fire Academy and Emergency Management Institute).
12. The RFD should develop strategic planning goals and objectives that address fleet replacement parameters, specifically alignment with NFPA 1901 and NFPA 1917.
13. The RFD should develop strategic planning goals and objectives that addresses facility and ladder apparatus locations. This gap analysis identified:

- Deficiencies in the NFPA 1710 240-second first due fire unit travel time and the ISO 1.5-mile engine company placement benchmark in the southeast, southwest, and northwest areas of the city.
    - The greater fire and EMS demand is concentrated in the Station 21, 22, 24, and 27 districts. There is a concentration of EMS demand around Leita Thompson Memorial Park. This is an area of the city (northwest) where the NFPA 1710 240-second travel time benchmark and the 1.5-mile ISO engine company benchmark for fire response are not met. Included in future strategic planning should also be the construction and staffing of Station 28 to address response time gaps in the northwest area of the city. Additionally, there is increased demand for fire and EMS response between Station 24 and Station 27 along the Holcombe Bridge Road corridor, which is an area of the city where the NFPA 1710 240-second travel time benchmark and the 1.5-mile ISO engine company benchmark for fire response are deficient.

- The RFD ladder companies (trucks 21 and 24) are located in the central portion of the city, where the greatest fire demand is. Engine 25 receives credit as a ladder as it is a 75-foot Quint (pump, water tank, hose, ground ladders, 75-foot aerial device). There is no ladder coverage in the north and northwest built-upon areas. Strategic planning should include the placement of a staffed ladder (or quint) in the north/northwest area of the city (Station 26).
- The Roswell 2040 Comprehensive Plan, and community population and growth should be included in all staffing, deployment, and facility strategic planning sessions.

14. The RFD should develop strategic planning goals and objectives that addresses capital improvements for Stations 22 and 23 (replacement and relocation of Station 22). Additionally, the RFD and city should give strong planning consideration for a new public safety complex to include the RPD and RFD headquarters, an Emergency Operations Center, and the 911 Center. This would enable public safety agencies to work more cohesively and provide an opportunity to share infrastructure costs such as redundant communications systems, backup generators, etc.
15. The RFD should develop strategic planning goals and objectives that address the current and all future ISO Public Protection Classification Summary Reports, with specific attention to any deficiencies outlined in these reports. The RFD should also address items external to the department (e.g., water supply) with the appropriate agency responsible to ensure, to the extent possible, the external agency can develop and implement a plan to address and improve stated deficiency.

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SECTION 6. DATA ANALYSIS

This data analysis examines all calls for service between January 1, 2021, and December 31, 2021, as recorded in the Roswell 911 Center's computer-aided dispatch (CAD) system and the National Fire Incident Reporting System (NFIRS).

This analysis is made up of four parts. The first part focuses on call types and dispatches. The second part explores the time spent and the workload of individual units. The third part presents an analysis of the busiest hours in the year studied. The fourth and final part provides a response time analysis of the studied agency's units.

The Roswell Fire Department is a multi-service fire department, primarily serving an area of approximately 42 square miles and 95,000 residents. It provides fire prevention, emergency medical services (EMS), fire suppression, technical rescue, and public education to the City of Roswell and surrounding communities. The department is made up of 21 full-time staff and approximately 225 part-time firefighters. It operates out of seven fire stations, a separate fire headquarters, and the Roswell-Alpharetta Public Safety Training Center (RAPSTC). It utilizes seven frontline engines (and houses Sandy Springs engine 55), two ladder trucks, two medical rescue units, a heavy rescue unit, and a command unit (battalion chief).

In 2021, the RFD responded to 9,741 calls, of which 39 percent were EMS calls. The total combined workload (deployed time) for RFD units was 3,755.6 hours. The average response time was 8.1 minutes. The 90th percentile response time was 11.7 minutes.

METHODOLOGY

In this report, CPSM analyzes calls and runs. A call is an emergency service request or incident. A run is a dispatch of a unit (i.e., a unit responding to a call). Thus, a call may include multiple runs.

We linked the CAD and NFIRS data sets. Then, we classified the calls in a series of steps. We first used the NFIRS incident type to identify canceled calls, motor vehicle accidents (MVA), and fire category call types. NFIRS incidents that were identified as EMS calls were then assigned detailed categories based on the corresponding CAD incident's Emergency Medical Dispatch (EMD) code. RFD's responses to non-canceled calls outside the City of Roswell were categorized as aid given.

The analysis was focused on all calls where an RFD unit responded either within the City of Roswell or to surrounding communities. We received records for 9,764 calls in 2021. We removed 13 test calls. In addition, ten calls to which units from RFD's headquarters were the sole responders were excluded from the analysis sections of the report. However, the workload of these units is documented in Attachment I.

AGGREGATE CALL TOTALS AND RUNS

In 2021, RFD responded to 9,741 calls, of which, 39 percent were EMS calls and 34 percent were fire calls, respectively. During the year, there were 54 structure fire calls and 64 outside fire calls that occurred within Roswell.

Calls by Type

Table 6-1 shows the number of calls by call type, average calls per day, and the percentage of calls that fall into each category. Figures 6-1 and 6-22 show the percentage of calls that fall into each EMS (Figure 6-1) and fire (Figure 6-22) type category.

TABLE 6-1: Calls by Type

Call Type	Total Calls	Calls per Day	Call Percentage
Breathing difficulty	427	1.2	4.4
Cardiac and stroke	500	1.4	5.1
Fall and injury	846	2.3	8.7
Illness and other	977	2.7	10.0
MVA	373	1.0	3.8
Overdose and psychiatric	144	0.4	1.5
Seizure and unconsciousness	509	1.4	5.2
EMS Total	**3,776**	**10.3**	**38.8**
False alarm	675	1.8	6.9
Good intent	1,185	3.2	12.2
Hazard	219	0.6	2.2
Outside fire	64	0.2	0.7
Public service	1,123	3.1	11.5
Structure fire	54	0.1	0.6
Fire Total	**3,320**	**9.1**	**34.1**
Canceled*	1,775	4.9	18.2
Aid given	870	2.4	8.9
Total	**9,741**	**26.7**	**100.0**

Note: *Out of 1,775 canceled calls, 270 calls occurred outside of Roswell.

FIGURE 6-1: EMS Calls by Type

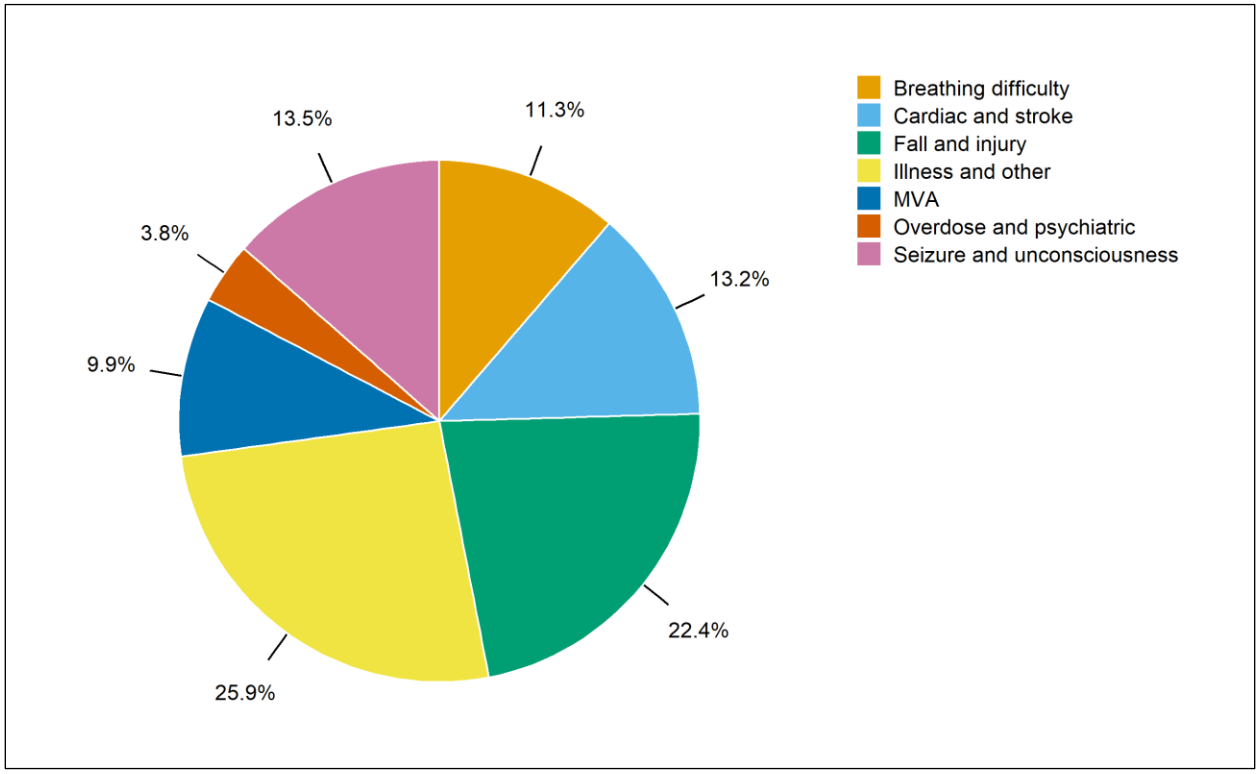
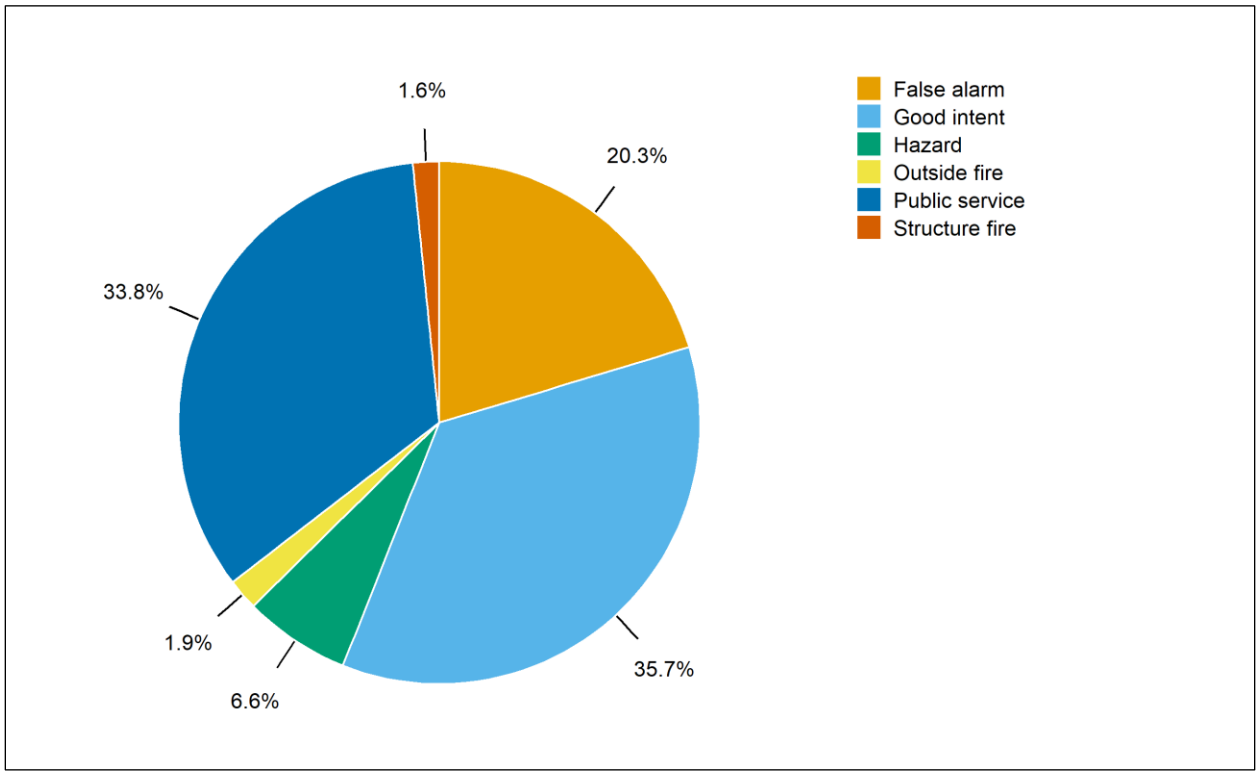


FIGURE 6-2: Fire Calls by Type



Observations:

- In 2019, RFD responded to an average of 26.7 calls per day, including 4.9 canceled and 2.4 aid given calls per day.
- EMS calls for the year totaled 3,776 (39 percent of all calls), an average of 10.3 calls per day.
  - Illness and other calls were the largest category of EMS calls at 10 percent of total calls (26 percent of EMS calls).
  - Motor vehicle accidents (MVA) made up 4 percent of total calls (10 percent of EMS calls).
  - Cardiac and stroke calls made up 5 percent of total calls (13 percent of EMS calls).
- Fire calls for the year totaled 3,320 (34 percent of all calls), or an average of 9.1 calls per day.
  - False alarm calls made up 7 percent of total calls (20 percent of fire calls).
  - Structure and outside fire calls combined made up 1 percent of total calls (4 percent of fire calls), or an average of 0.3 calls per day, or one call every three days.

Calls by Type and Duration

The following table shows the duration of calls by type using four duration categories: less than 30 minutes, 30 minutes to one hour, one to two hours, and two or more hours.

TABLE 6-2: Calls by Type and Duration

Call Type	Less than 30 Minutes	30 Minutes to One Hour	One to Two Hours	Two or More Hours	Total
Breathing difficulty	376	46	5	0	427
Cardiac and stroke	444	41	13	2	500
Fall and injury	732	105	9	0	846
Illness and other	832	134	8	3	977
MVA	304	58	7	4	373
OD	120	20	4	0	144
Seizure and UNC	435	67	6	1	509
EMS Total	**3,243**	**471**	**52**	**10**	**3,776**
False alarm	611	58	5	1	675
Good intent	1,138	43	3	1	1,185
Hazard	131	48	32	8	219
Outside fire	44	16	4	0	64
Public service	1,034	79	9	1	1,123
Structure fire	24	15	9	6	54
Fire Total	**2,982**	**259**	**62**	**17**	**3,320**
Canceled	1,759	12	3	1	1,775
Aid given	716	115	17	22	870
Total	**8,700**	**857**	**134**	**50**	**9,741**

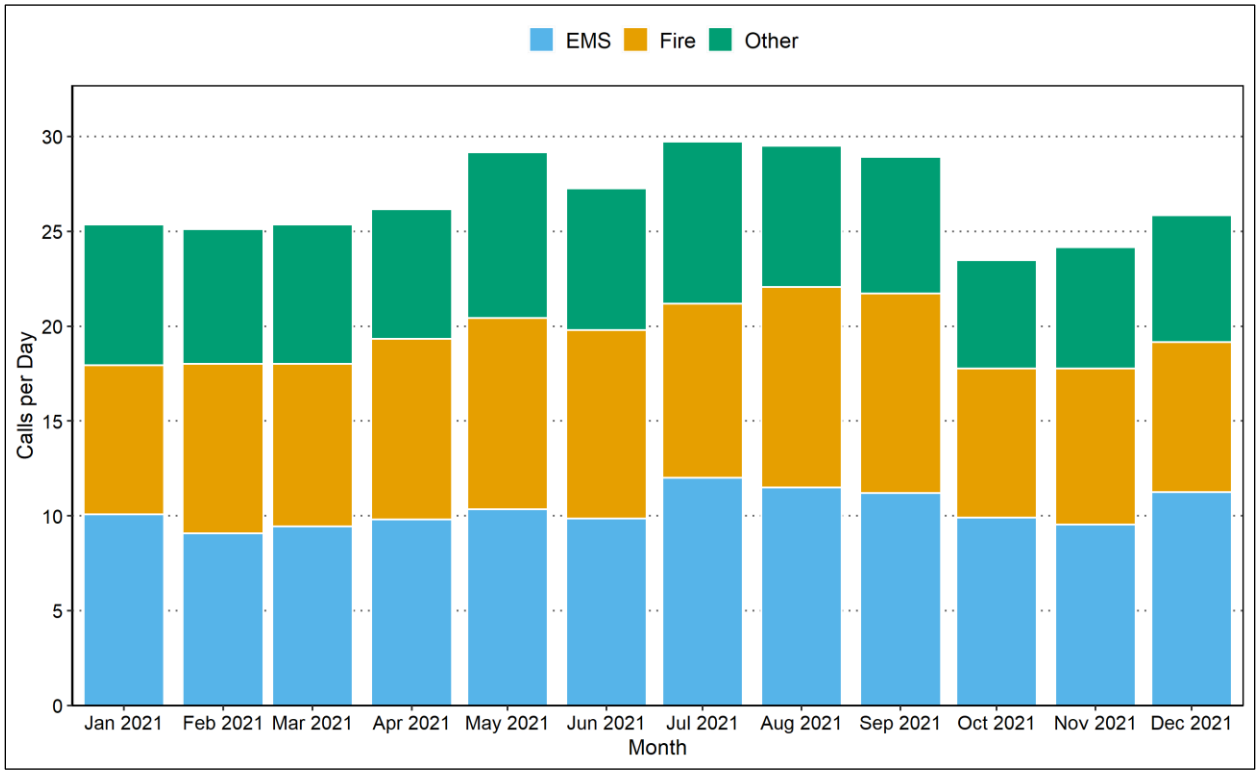
Observations:

- A total of 3,714 EMS calls (98.4 percent) lasted less than one hour, 52 EMS calls (1.4 percent) lasted one to two hours, and 10 EMS calls (0.3 percent) lasted two or more hours.
- A total of 3,241 fire calls (97.6 percent) lasted less than one hour, 62 fire calls (1.9 percent) lasted one to two hours, and 17 fire calls (0.5 percent) lasted two or more hours.
- A total of 60 outside fire calls (93.8 percent) lasted less than one hour, and four outside fire calls (6.3 percent) lasted one to two hours.
- A total of 39 structure fire calls (72.2 percent) lasted less than one hour, nine structure fire calls (16.7 percent) lasted one to two hours, and six structure fire calls (11.1 percent) lasted two or more hours.

Average Calls by Month and Hour of Day

Figure 6-3 shows the monthly variation in the average daily number of calls handled by RFD in 2021. Similarly, Figure 6-4 illustrates the average number of calls received each hour of the day.

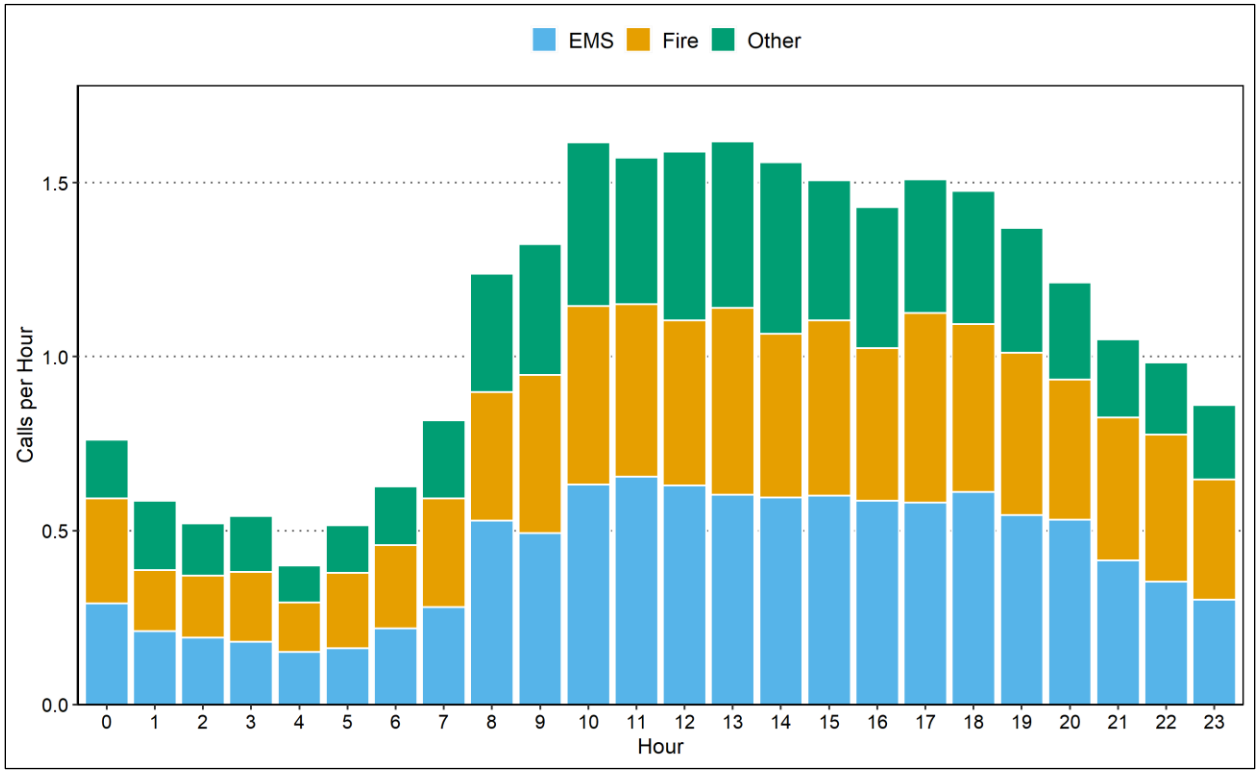
FIGURE 6-3: Average Calls by Month



Observations:

- Average EMS calls per day ranged from 9.1 in February 2021 to 12.0 in July 2021.
- Average fire calls per day ranged from 7.9 in both January and October 2021 to 10.6 in August 2021.
- Average other calls per day ranged from 5.7 in October 2021 to 8.7 in May 2021.
- Average calls per day overall ranged from 23.5 in October 2021 to 29.7 in July 2021.

FIGURE 6-4: Average Calls by Hour of Day



Observations:

- Average EMS calls per hour ranged from 0.15 between 4:00 a.m. and 5:00 a.m. to 0.65 between 11:00 a.m. and noon.
- Average fire calls per hour ranged from 0.14 between 4:00 a.m. and 5:00 a.m. to 0.55 between 5:00 p.m. and 6:00 p.m.
- Average other calls per hour ranged from 0.11 between 4:00 a.m. and 6:00 a.m. to 0.49 between 2:00 p.m. and 3:00 p.m.
- Average calls per hour overall ranged from 0.40 between 4:00 a.m. and 5:00 a.m. to 1.62 between 1:00 p.m. and 2:00 p.m.

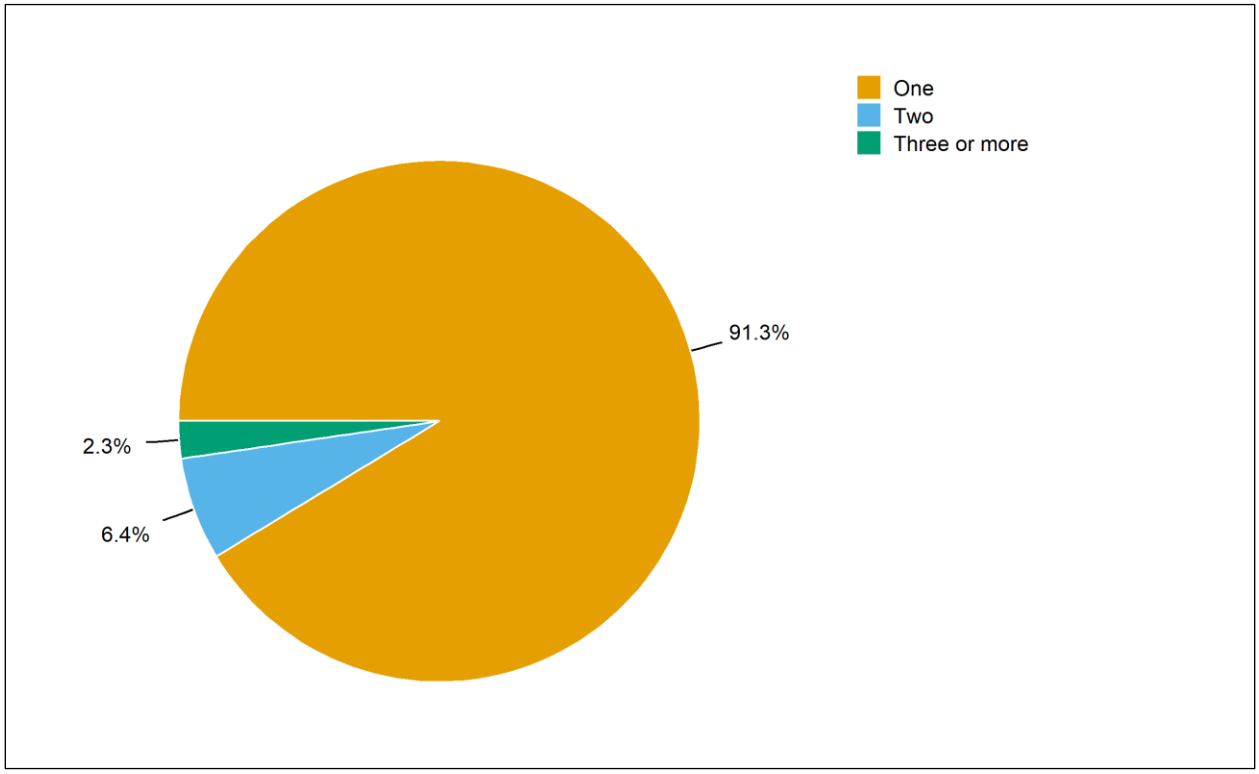
Arriving Units

Table 6-3, along with Figure 6-5, detail the number of calls with one, two, or three or more arriving RFD units by call type. In this section, we limit ourselves to calls where a unit from RFD arrives. For this reason, there are fewer calls in Table 6-1.

TABLE 6-3: Calls by Call Type and Number of Arriving Units

Call Type	Number of Units			Total Calls
	One	Two	Three or more	
Breathing difficulty	400	22	0	422
Cardiac and stroke	411	78	4	493
Fall and injury	807	16	11	834
Illness and other	941	17	8	966
MVA	249	82	36	367
Overdose and psychiatric	137	4	0	141
Seizure and unconsciousness	482	22	0	504
EMS Total	**3,427**	**241**	**59**	**3,727**
False alarm	533	128	5	666
Good intent	1,116	33	21	1,170
Hazard	161	27	31	219
Outside fire	49	8	7	64
Public service	1,072	25	8	1,105
Structure fire	11	6	37	54
Fire Total	**2,942**	**227**	**109**	**3,278**
Canceled	603	19	11	633
Aid given	767	53	16	836
Total	**7,739**	**540**	**195**	**8,474**
Percentage	**91.3**	**6.4**	**2.3**	**100.0**

FIGURE 6-5: Calls by Number of Arriving Units



Observations:

Overall

- On average, 1.1 units arrived per call; for 91 percent of calls, only one unit arrived.
- Overall, three or more units arrived at 2 percent of calls.

EMS

- On average, 1.1 units arrived per EMS call.
- For EMS calls, one unit arrived 92 percent of the time, two units arrived 6 percent of the time, and three or more units arrived 2 percent of the time.

Fire

- On average, 1.2 units arrived per fire call.
- For fire calls, one unit arrived 90 percent of the time, two units arrived 7 percent of the time, and three or more units arrived 3 percent of the time.
- For outside fire calls, three or more units arrived 11 percent of the time.
- For structure fire calls, three or more units arrived 69 percent of the time.

WORKLOAD: RUNS AND TOTAL TIME SPENT

The workload of RFD's units is measured in two ways: runs and deployed time. The deployed time of a run is measured from the time a unit is dispatched through the time the unit is cleared. Because multiple units respond to some calls, there are more runs (13,727) than calls (9,741) and the average deployed time per run varies from the total duration of calls.

Runs and Deployed Time – All Units

Deployed time, also referred to as deployed hours, is the total deployment time of RFD units deployed on all runs. Table 6-4 shows the total deployed time, both overall and broken down by type of run, for all non-administrative RFD units in 2021. Table 6-5 and Figure 6-6 present the average deployed minutes by hour of day.

TABLE 6-4: Annual Runs and Deployed Time by Run Type

Run Type	Deployed Minutes per Run	Total Annual Hours	Percent of Total Hours	Deployed Minutes per Day	Total Annual Runs	Runs per Day
Breathing difficulty	18.7	162.4	4.3	26.7	520	1.4
Cardiac and stroke	19.5	219.8	5.9	36.1	675	1.8
Fall and injury	20.0	323.7	8.6	53.2	972	2.7
Illness and other	20.4	382.7	10.2	62.9	1,127	3.1
MVA	17.1	225.9	6.0	37.1	793	2.2
OD	18.8	52.2	1.4	8.6	167	0.5
Seizure and UNC	20.5	195.0	5.2	32.1	572	1.6
EMS Total	**19.4**	**1,561.8**	**41.6**	**256.7**	**4,826**	**13.2**
False alarm	11.9	252.4	6.7	41.5	1,268	3.5
Good intent	13.8	343.2	9.1	56.4	1,493	4.1
Hazard	23.4	223.9	6.0	36.8	574	1.6
Outside fire	20.7	41.3	1.1	6.8	120	0.3
Public service	14.1	377.6	10.1	62.1	1,604	4.4
Structure fire	42.4	217.9	5.8	35.8	308	0.8
Fire Total	**16.3**	**1,456.3**	**38.8**	**239.4**	**5,367**	**14.7**
Canceled	7.2	279.4	7.4	45.9	2,333	6.4
Aid given	22.9	458.2	12.2	75.3	1,201	3.3
Other Total	**12.5**	**737.6**	**19.6**	**121.2**	**3,534**	**9.7**
Total	**16.4**	**3,755.6**	**100.0**	**617.4**	**13,727**	**37.6**

Note: OD=Overdose and psychiatric; UNC=Unconsciousness.

Observations:

Overall

- The total deployed time for the year was 3,755.6 hours. The daily average was 10.3 hours for all RFD units combined.
- There were 13,727 runs, including 2,333 runs for canceled calls and 1,201 runs for aid given calls. The daily average was 37.6 runs.

EMS

- EMS runs accounted for 42 percent of the total workload.
- The average deployed time for EMS runs was 19.4 minutes. The deployed time for all EMS runs averaged 4.3 hours per day.

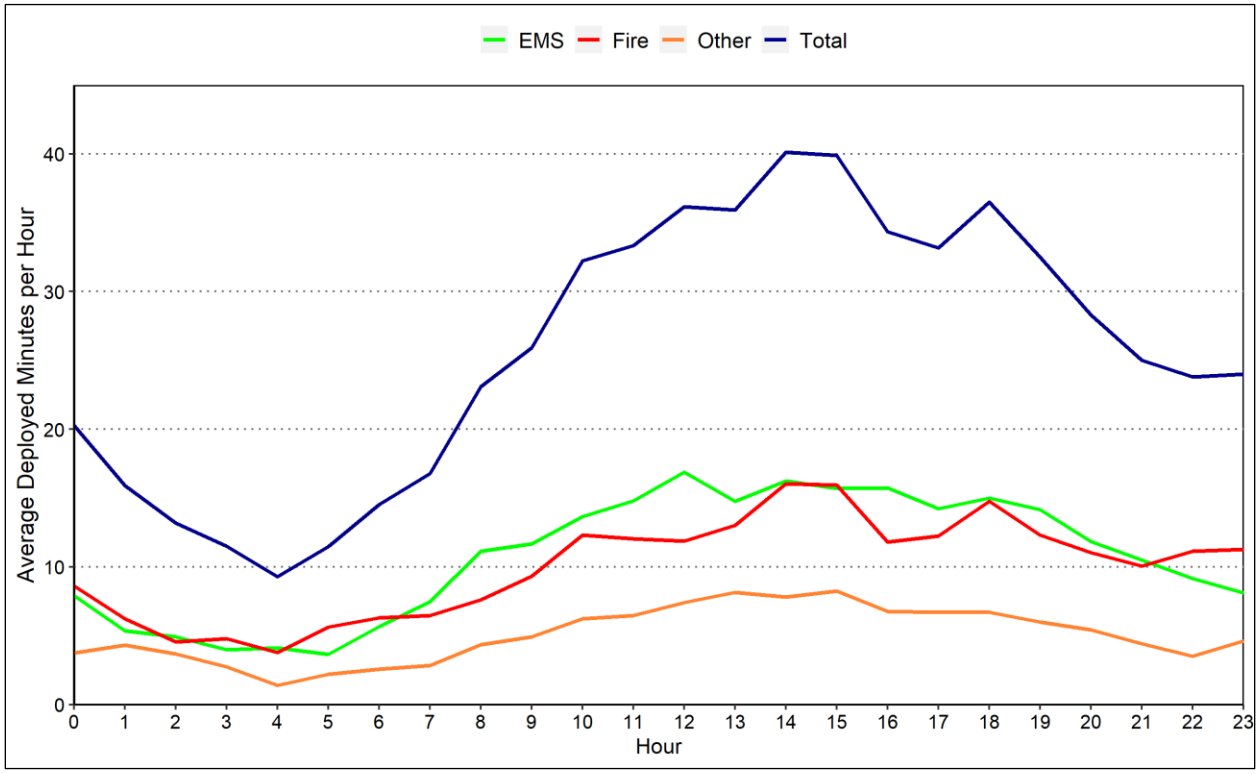
Fire

- Fire runs accounted for 39 percent of the total workload.
- The average deployed time for fire runs was 16.3 minutes. The deployed time for all fire runs averaged 4.0 hours per day.
- There were 428 runs for structure and outside fire calls combined, with a total workload of 259.2 hours. This accounted for 7 percent of the total workload.
- The average deployed time for outside fire runs was 20.7 minutes per run, and the average deployed time for structure fire runs was 42.4 minutes per run.

TABLE 6-5: Deployed Minutes by Hour of Day

Hour	EMS	Fire	Other	Total
0	7.9	8.6	3.7	20.3
1	5.4	6.2	4.3	15.9
2	4.9	4.6	3.7	13.2
3	4.0	4.8	2.7	11.5
4	4.1	3.8	1.4	9.3
5	3.6	5.6	2.2	11.5
6	5.7	6.3	2.6	14.5
7	7.5	6.5	2.8	16.8
8	11.1	7.6	4.3	23.1
9	11.7	9.3	4.9	25.9
10	13.7	12.3	6.2	32.2
11	14.8	12.0	6.5	33.3
12	16.9	11.9	7.4	36.2
13	14.8	13.0	8.2	35.9
14	16.3	16.0	7.8	40.1
15	15.7	15.9	8.3	39.9
16	15.7	11.8	6.8	34.3
17	14.2	12.3	6.7	33.2
18	15.0	14.8	6.7	36.5
19	14.2	12.3	6.0	32.5
20	11.9	11.0	5.4	28.3
21	10.5	10.1	4.4	25.0
22	9.2	11.2	3.5	23.8
23	8.1	11.3	4.6	24.0
Daily Avg.	**256.7**	**239.4**	**121.2**	**617.4**

FIGURE 6-6: Average Deployed Minutes by Hour of Day



Observations:

- Hourly deployed time was highest during the day from 10:00 a.m. to 8:00 p.m., averaging more than 32 minutes per hour.
- Average deployed time peaked between 2:00 p.m. and 3:00 p.m., averaging 40.1 minutes.
- Average deployed time was lowest between 4:00 a.m. and 5:00 a.m., averaging 9.3 minutes.

Workload by Unit

Table 6-6 provides a summary of each RFD unit's workload for the year. Tables 6-7 and 6-8 provide a more detailed view of workload, showing each unit's runs broken out by run type (Table 6-7) and its daily average deployed time by run type (Table 6-8).

TABLE 6-6: Workload by Unit

Station	Unit	Unit Type	Deployed Minutes per Run	Total Hours	Total Pct.	Deployed Minutes per Day	Total Runs	Runs per Day
21	AL21	Air & light	72.1	7.2	0.2	1.2	6	0.0
	BOAT21	Fire boat	150.5	12.5	0.3	2.1	5	0.0
	E21	Engine	14.2	371.5	9.9	61.1	1,575	4.3
	GAT21	Gator	16.4	3.5	0.1	0.6	13	0.0
	R21	Rescue	15.9	471.8	12.6	77.6	1,783	4.9
	R22	Rescue	16.0	16.8	0.4	2.8	63	0.2
	SQ21	Squad	47.2	12.6	0.3	2.1	16	0.0
	T21	Truck	15.9	235.4	6.3	38.7	891	2.4
	Total		**15.6**	**1,131.4**	**30.1**	**186.0**	**4,352**	**11.9**
22	E22	Engine	**16.0**	**364.9**	**9.7**	**60.0**	**1,370**	**3.8**
23	BR23	Brush	18.6	0.9	0.0	0.2	3	0.0
	E23	Engine	19.1	350.1	9.3	57.6	1,100	3.0
	Total		**19.1**	**351.1**	**9.3**	**57.7**	**1,103**	**3.0**
24	B2	BC	13.5	136.8	3.6	22.5	610	1.7
	E24	Engine	14.9	328.0	8.7	53.9	1,323	3.6
	R24	Rescue	17.4	365.1	9.7	60.0	1,257	3.4
	T24	Truck	16.6	186.8	5.0	30.7	674	1.8
	T25	Truck	5.7	0.5	0.0	0.1	5	0.0
	Total		**15.8**	**1,017.2**	**27.1**	**167.2**	**3,869**	**10.6**
25	E25	Engine	16.0	247.1	6.6	40.6	926	2.5
	HR25	Heavy rescue	20.9	72.4	1.9	11.9	208	0.6
	Total		**16.9**	**319.4**	**8.5**	**52.5**	**1,134**	**3.1**
26	E26	Engine	**16.9**	**181.2**	**4.8**	**29.8**	**644**	**1.8**
27	E27	Engine	18.8	351.5	9.4	57.8	1,123	3.1
	E55*	SSFD engine	17.7	38.6	1.0	6.3	131	0.4
	R27	Rescue	19.2	0.3	0.0	0.1	1	0.0
	Total		**18.7**	**390.4**	**10.4**	**64.2**	**1,255**	**3.4**
Total			**16.4**	**3,755.6**	**100.0**	**617.4**	**13,727**	**37.6**

Note: *E55 is a Sandy Springs FD engine housed in RFD Station 27. It runs automatic aid with RFD when it is available.

TABLE 6-7: Total Runs by Run Type and RFD Unit

Station	Unit	EMS	False Alarm	Good Intent	Hazard	Outside Fire	Public Service	Structure Fire	Cancel	Aid Given	Total
21	AL21	3	0	0	0	0	1	2	0	0	6
	BOAT21	3	0	0	0	0	0	0	2	0	5
	E21	559	194	157	101	22	231	35	258	18	1,575
	GAT21	11	0	0	0	0	0	0	2	0	13
	R21	1,041	18	255	33	4	52	29	341	10	1,783
	R22	30	1	11	0	0	3	0	16	2	63
	SQ21	12	0	0	0	0	2	0	2	0	16
	T21	104	301	42	64	4	175	29	142	30	891
	Total	**1,763**	**514**	**465**	**198**	**30**	**464**	**95**	**763**	**60**	**4,352**
22	E22	**466**	**80**	**229**	**43**	**7**	**267**	**31**	**204**	**43**	**1,370**
23	BR23	1	0	0	0	1	0	0	1	0	3
	E23	503	98	126	40	9	115	23	152	34	1,100
	Total	**504**	**98**	**126**	**40**	**10**	**115**	**23**	**153**	**34**	**1,103**
24	B2	141	137	38	66	10	23	46	90	59	610
	E24	474	123	89	54	26	240	20	233	64	1,323
	R24	739	8	186	14	2	59	8	203	38	1,257
	T24	92	116	23	37	8	211	17	109	61	674
	T25	2	1	0	0	1	0	0	0	1	5
	Total	**1,448**	**385**	**336**	**171**	**47**	**533**	**91**	**635**	**223**	**3,869**
25	E25	249	96	201	30	10	81	14	171	74	926
	HR25	62	5	27	33	5	11	25	20	20	208
	Total	**311**	**101**	**228**	**63**	**15**	**92**	**39**	**191**	**94**	**1,134**
26	E26	**164**	**51**	**46**	**20**	**5**	**70**	**8**	**164**	**116**	**644**
27	E27	153	37	56	28	5	58	12	204	570	1,123
	E55	16	2	7	11	1	5	9	19	61	131
	R27	1	0	0	0	0	0	0	0	0	1
	Total	**170**	**39**	**63**	**39**	**6**	**63**	**21**	**223**	**631**	**1,255**
Total		**4,826**	**1,268**	**1,493**	**574**	**120**	**1,604**	**308**	**2,333**	**1,201**	**13,727**

Note: See Table 6-7 for unit type.

TABLE 6-8: Average Deployed Minutes by Run Type and RFD Unit

Station	Unit	EMS	False Alarm	Good Intent	Hazard	Outside Fire	Public Service	Structure Fire	Cancel	Aid Given	Total
21	AL21	0.5	0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.0	1.2
	BOAT21	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	2.1
	E21	26.0	7.1	5.5	7.0	1.3	4.9	3.7	4.5	1.1	61.1
	GAT21	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6
	R21	51.3	0.6	10.5	1.1	0.1	2.4	3.4	7.6	0.4	77.6
	R22	1.6	0.0	0.4	0.0	0.0	0.1	0.0	0.4	0.1	2.8
	SQ21	1.9	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	2.1
	T21	5.7	9.1	1.6	6.0	0.3	8.4	3.5	2.0	2.1	38.7
	Total	**89.7**	**16.8**	**18.1**	**14.1**	**1.7**	**16.1**	**11.1**	**14.6**	**3.7**	**186.0**
22	E22	**21.5**	**2.6**	**7.5**	**3.0**	**0.2**	**11.4**	**3.0**	**4.0**	**6.8**	**60.0**
23	BR23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.2
	E23	30.5	4.4	5.0	2.6	0.7	5.9	1.3	3.7	3.3	57.6
	Total	**30.5**	**4.4**	**5.0**	**2.6**	**0.7**	**5.9**	**1.3**	**3.8**	**3.3**	**57.7**
24	B2	7.0	1.2	1.2	3.6	0.4	0.7	4.8	1.1	2.4	22.5
	E24	22.2	4.0	3.0	3.7	1.9	4.7	4.2	4.4	5.9	53.9
	R24	41.8	0.3	7.7	0.4	0.0	2.2	0.9	4.8	1.9	60.0
	T24	4.8	3.5	1.1	3.2	0.5	10.5	2.8	2.0	2.5	30.7
	T25	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Total	**75.8**	**8.9**	**13.0**	**10.9**	**2.9**	**18.1**	**12.7**	**12.2**	**12.7**	**167.2**
25	E25	13.0	4.2	7.2	1.9	0.5	3.1	2.0	3.2	5.4	40.6
	HR25	5.3	0.2	0.8	1.6	0.3	0.4	2.0	0.5	0.7	11.9
	Total	**18.4**	**4.4**	**8.0**	**3.5**	**0.8**	**3.5**	**4.0**	**3.7**	**6.2**	**52.5**
26	E26	**10.2**	**2.5**	**1.9**	**1.2**	**0.3**	**3.8**	**0.8**	**2.9**	**6.3**	**29.8**
27	E27	9.8	1.7	2.5	1.1	0.2	3.1	1.5	4.3	33.6	57.8
	E55	0.9	0.1	0.3	0.3	0.0	0.2	1.4	0.4	2.8	6.3
	R27	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	Total	**10.7**	**1.8**	**2.8**	**1.4**	**0.3**	**3.2**	**2.9**	**4.8**	**36.4**	**64.2**
Total		**256.7**	**41.5**	**56.4**	**36.8**	**6.8**	**62.1**	**35.8**	**45.9**	**75.3**	**617.4**

Note: See Table 6-7 for unit type.

Observations:

- Station 21 made the most runs (4,352, or an average of 11.9 runs per day) and had the highest total annual deployed time (1,131.4 hours, or an average of 3.1 hours per day).
  - EMS calls accounted for 41 percent of runs and 48 percent of total deployed time.
  - Outside and structure fire calls accounted for 3 percent of runs and 7 percent of total deployed time.
- Station 24 made the second most runs (3,869, or an average of 10.6 runs per day) and had the second-highest total annual deployed time (1,017.2 hours, or an average of 2.8 hours per day).
  - EMS calls accounted for 37 percent of runs and 45 percent of total deployed time.
  - Outside and structure fire calls accounted for 4 percent of runs and 9 percent of total deployed time.
- Unit R21 was the busiest rescue unit. Among all RFD units, it made the most runs (1,783, or an average of 4.9 runs per day) and had the highest total annual deployed time (471.8 hours or an average of 77.6 minutes per day).
  - EMS calls accounted for 58 percent of runs and 66 percent of total deployed time.
  - Outside and structure fire calls accounted for 2 percent of runs and 5 percent of total deployed time.
- Unit E21 was the busiest engine. Among all RFD units, it made the second most runs (1,575, or an average of 4.3 runs per day) and had the second-highest total annual deployed time (371.5 hours, or an average of 61.1 minutes per day).
  - EMS calls accounted for 35 percent of runs and 43 percent of total deployed time.
  - Outside and structure fire calls accounted for 4 percent of runs and 8 percent of total deployed time.

Workload by Location

Table 6-9 breaks down the workload by location. Table 6-10 provides further detail on the workload associated with structure and outside fire calls, also broken down by location. Table 6-10 includes aid given runs to outside and structure fires outside Roswell.

TABLE 6-9: Annual Workload by Location

District	Calls	Pct. Annual Calls	Runs	Runs Per Day	Deployed Minutes Per Run	Annual Hours	Pct. Annual Work	Deployed Minutes Per Day
Roswell	8,601	88.3	12,193	33.4	16.0	3,255.9	86.7	535.2
Alpharetta	903	9.3	1,257	3.4	16.1	338.1	9.0	55.6
Sandy Springs	111	1.1	123	0.3	26.1	53.5	1.4	8.8
Milton	52	0.5	56	0.2	26.2	24.4	0.7	4.0
Johns Creek	37	0.4	48	0.1	77.2	61.7	1.6	10.1
Mountain Park	32	0.3	42	0.1	24.7	17.3	0.5	2.8
Norcross	2	0.0	4	0.0	55.6	3.7	0.1	0.6
Cherokee County	1	0.0	1	0.0	18.4	0.3	0.0	0.1
Cobb County	1	0.0	2	0.0	5.0	0.2	0.0	0.0
Spalding County	1	0.0	1	0.0	21.8	0.4	0.0	0.1
Total	**9,741**	**100.0**	**13,727**	**37.6**	**16.4**	**3,755.6**	**100.0**	**617.4**

TABLE 6-10: Structure and Outside Fire Runs by Location

District	Structure Fire Runs	Structure Fires Deployed Min. per Run	Outside Fire Runs	Outside Fires Deployed Min. per Run	Hours for Structure and Outside Fires	Pct. of Structure and Outside Fire Workload
Roswell	308	42.4	120	20.7	259.2	83.3
Alpharetta	38	35.3	42	15.5	33.2	10.7
Sandy Springs	5	117.2	2	51.4	11.5	3.7
Milton	0	NA	5	76.6	6.4	2.1
Mountain Park	0	NA	2	23.7	0.8	0.3
Total	**351**	**42.7**	**171**	**21.4**	**311.1**	**100.0**

Note: All runs outside Roswell were aid given.

Observations:

Roswell

- There were 8,601 calls or 88 percent of the total calls.
- There were 12,193 runs, including 2,000 runs dispatched for canceled calls. The daily average was 33.4 runs.
- Total deployed time for the year was 3,255.9 hours, or 87 percent of the total annual workload. The daily average was 8.9 hours for all units combined.

Alpharetta

- There were 903 calls or 9 percent of the total calls.
- There were 1,257 runs, including 240 runs dispatched for canceled calls. The daily average was 3.4 runs.
- Total deployed time for the year was 338.1 hours, or 9 percent of the total annual workload. The daily average was 55.6 minutes for all units combined.

Sandy Springs

- There were 111 calls, or one percent of the total calls.
- There were 123 runs, including 44 runs dispatched for canceled calls. The daily average was 0.3 runs.
- Total deployed time for the year was 53.5 hours, or one percent of the total annual workload. The daily average was 8.8 minutes for all units combined.

Milton

- There were 52 calls, or one percent of the total calls.
- There were 56 runs, including 35 runs dispatched for canceled calls. The daily average was 0.2 runs.
- Total deployed time for the year was 24.4 hours, or one percent of the total annual workload. The daily average was 4.0 minutes for all units combined.

Other

- There were 74 calls, or one percent of the total calls.
- There were 98 runs, including 14 runs dispatched for canceled calls. The daily average was 0.3 runs.
- Total deployed time for the year was 83.6 hours, or two percent of the total annual workload. The daily average was 13.7 minutes for all units combined.

ANALYSIS OF BUSIEST HOURS

In this analysis, we included all 9,741 calls that occurred inside and outside Roswell in 2021. For these calls, there is significant variability in the number of calls from hour to hour. One special concern relates to the resources available for hours with the heaviest workload. We tabulated the data for each of the 8,760 hours in the year. Table 6-11 shows the number of hours in the year in which there were zero to six or more calls during the hour. Table 6-12 shows the ten one-hour intervals which had the most calls during the year. Table 6-13 examines the number of times a call overlapped with another call in each station area in 2021.

TABLE 6-11: Frequency Distribution of the Number of Calls by Year

Calls in an Hour	Frequency	Percentage
0	3,192	36.4
1	2,904	33.2
2	1,607	18.3
3	726	8.3
4	241	2.8
5	62	0.7
6+	28	0.3
Total	**8,760**	**100.0**

TABLE 6-12: Top Ten Hours with the Most Calls Received

Hour	Number of Calls	Number of Runs	Total Deployed Hours
10/8/2021, 2:00 p.m. to 3:00 p.m.	7	10	1.6
4/21/2021, 9:00 a.m. to 10:00 a.m.	7	9	1.8
4/5/2021, 10:00 a.m. to 11:00 a.m.	7	7	1.3
4/26/2021, 2:00 p.m. to 3:00 p.m.	6	13	4.1
7/7/2021, 4:00 p.m. to 5:00 p.m.	6	13	3.7
12/8/2021, 5:00 p.m. to 6:00 p.m.	6	13	2.6
5/25/2021, 3:00 p.m. to 4:00 p.m.	6	12	7.0
6/24/2021, 11:00 a.m. to noon	6	10	1.8
11/12/2021, 7:00 p.m. to 8:00 p.m.	6	10	1.2
1/5/2021, 8:00 a.m. to 9:00 a.m.	6	9	2.2

Note: Total deployed hours is a measure of the total time spent responding to calls received in the hour. The deployed time from these calls may extend into the next hour or hours. The number of runs and deployed hours includes all units from the studied agencies. Here we considered units from all responding agencies

TABLE 6-13: Frequency of Overlapping Calls

Station	Scenario	Number of Calls	Percent of All Calls	Total Hours
21	No overlapped call	2,521	90.3	763.3
	Overlapped with one call	258	9.2	44.9
	Overlapped with two calls	12	0.4	1.6
22	No overlapped call	1,138	96.0	298.6
	Overlapped with one call	47	4.0	6.0
23	No overlapped call	874	96.7	304.3
	Overlapped with one call	30	3.3	4.7
24	No overlapped call	2,003	92.4	633.1
	Overlapped with one call	156	7.2	27.5
	Overlapped with two calls	8	0.4	0.8
25	No overlapped call	772	97.4	199.4
	Overlapped with one call	21	2.6	3.4
26	No overlapped call	388	100.0	2.1
27	No overlapped call	366	98.1	124.9
	Overlapped with one call	7	1.9	1.7
Outside	No overlapped call	1,048	91.9	381.7
	Overlapped with one call	86	7.5	24.0
	Overlapped with two calls	5	0.4	0.6
	Overlapped with three calls	1	0.1	0.1

Note: The 1,140 calls outside of Roswell included 240 canceled calls and 870 aid given calls.

Table 6-14 examines each RFD station's availability to respond to calls within its first due area. At the same time, it focuses on calls where at least one unit eventually arrived and ignores calls where no unit arrived. In this analysis, we removed 270 canceled calls (that were also aid-given calls), 870 aid-given calls that occurred outside of Roswell, and 993 calls inside the city but without an arriving RFD unit.

TABLE 6-14: RFD Station Availability to Respond to Calls

Station	Calls in Area	First Due Responded	First Due Arrived	First Due First	Percent Responded	Percent Arrived	Percent First
21	2,448	2,407	2,397	2,375	98.3	97.9	97.0
22	1,046	926	907	895	88.5	86.7	85.6
23	836	793	789	777	94.9	94.4	92.9
24	1,944	1,922	1,920	1,916	98.9	98.8	98.6
25	678	647	642	629	95.4	94.7	92.8
26	335	321	317	313	95.8	94.6	93.4
27	321	299	294	287	93.1	91.6	89.4
Total	**7,608**	**7,315**	**7,266**	**7,192**	**96.1**	**95.5**	**94.5**

Note: For each station, we count the number of calls occurring within its first due area. Then, we count the number of calls to where at least one unit arrived. Next, we focus on units from the first due station to see if any of its units responded, arrived, or arrived first.

Observations:

- During 28 hours (0.3 percent of all hours), six or more calls occurred; in other words, the department responded to six or more calls in an hour roughly once every 13 days.
  - The highest number of calls to occur in an hour was 7, which happened three times.
- One hour with seven calls was 2:00 p.m. to 3:00 p.m. on October 8, 2021. The hour's seven calls involved ten individual dispatches resulting in 1.6 hours of deployed time. These seven calls included two canceled calls, one false alarm call, one good intent call, one mutual aid call, one public service call, and one seizure and unconsciousness call.
- Another hour with seven calls was 9:00 a.m. to 10:00 a.m. on April 21, 2021. The hour's seven calls involved nine individual dispatches resulting in 1.8 hours of deployed time. These seven calls included two breathing difficulty calls, two canceled calls, one cardiac and stroke call, one hazard call, and one illness and other call.
- Another hour with seven calls was 10:00 a.m. to 11:00 a.m. on April 5, 2021. The hour's seven calls involved seven individual dispatches resulting in 1.3 hours of deployed time. These seven calls included one canceled call, one good intent call, one motor vehicle accident call, and four public service calls.

RESPONSE TIME

In this part of the analysis, we present response time statistics for different call types. We separate response time into its identifiable components. *Dispatch time* is the difference between the time a call is received and the time a unit is dispatched. Dispatch time includes call processing time, which is the time required to determine the nature of the emergency and the types of resources to dispatch. *Turnout time* is the difference between dispatch time and the time a unit is en route to a call's location. *Travel time* is the difference between the time en route and arrival on scene. *Response time* is the total time elapsed between receiving a call to arriving on scene.

In this analysis, we included all calls within Roswell to which at least one non-administrative RFD unit arrived. Also, calls with a total response time exceeding 30 minutes were excluded. In addition, non-emergency calls were excluded (the method used to identify emergency and non-emergency calls is given in Attachment IV). Finally, we focused on units that had complete time stamps, that is, units with all components recorded, so that we could calculate each segment of response time.

Based on the methodology above, for 9,741 calls in 2021, we excluded 870 aid given calls, 1,775 canceled calls, 2,026 non-emergency calls, 49 calls where no units recorded a valid on-scene time, 21 calls with a total response time exceeding 30 minutes, and 364 calls where one or more segments of the first arriving unit's response time could not be calculated due to missing or faulty data. As a result, in this section, a total of 4,636 calls are included in the analysis.

Response Time by Type of Call

Table 6-15 breaks down the average dispatch, turnout, travel, and total response times by call type for all calls in Roswell, and Table 6-16 does the same for 90th percentile response times. A 90th percentile means that 90 percent of calls had response times at or below that number. For example, Table 6-16 shows an overall 90th percentile response time of 11.7 minutes, which means that 90 percent of the time, a call had a response time of no more than 11.7 minutes. Figures 6-7 and 6-8 illustrate the same information.

TABLE 6-15: Average Response Time of First Arriving Unit, by Call Type

Call Type	Time in Minutes				Number of Calls
	Dispatch	Turnout	Travel	Total	
Breathing difficulty	0.7	1.9	5.1	7.7	377
Cardiac and stroke	0.6	2.0	4.9	7.5	434
Fall and injury	0.7	1.9	4.8	7.4	537
Illness and other	0.8	1.9	4.9	7.7	535
MVA	1.0	1.8	4.1	6.8	237
Overdose and psychiatric	0.6	2.1	5.2	7.9	88
Seizure and unconsciousness	0.7	1.8	5.0	7.5	414
EMS Total	**0.7**	**1.9**	**4.9**	**7.5**	**2,622**
False alarm	2.8	1.9	4.8	9.6	623
Good intent	0.9	2.2	5.1	8.1	809
Hazard	3.0	2.2	4.8	10.0	188
Outside fire	3.0	2.1	5.1	10.3	45
Public service	1.9	2.0	5.4	9.3	304
Structure fire	2.7	2.2	4.1	9.0	45
Fire Total	**1.9**	**2.1**	**5.0**	**9.0**	**2,014**
Total	**1.3**	**2.0**	**4.9**	**8.1**	**4,636**

TABLE 6-16: 90th Percentile Response Time of First Arriving Unit, by Call Type

Call Type	Time in Minutes				Number of Calls
	Dispatch	Turnout	Travel	Total	
Breathing difficulty	1.3	3.3	7.8	10.8	377
Cardiac and stroke	1.2	3.2	7.8	10.7	434
Fall and injury	1.3	3.5	7.5	10.1	537
Illness and other	1.6	3.4	7.9	10.9	535
MVA	2.0	2.9	7.0	9.7	237
Overdose and psychiatric	1.2	3.5	7.9	10.8	88
Seizure and unconsciousness	1.4	3.3	8.0	10.7	414
EMS Total	**1.4**	**3.3**	**7.8**	**10.6**	**2,622**
False alarm	4.2	3.2	7.8	13.0	623
Good intent	2.0	3.6	8.1	11.5	809
Hazard	4.8	4.2	8.3	14.2	188
Outside fire	4.8	4.1	8.2	14.8	45
Public service	4.2	3.6	8.9	13.3	304
Structure fire	4.2	3.3	6.6	11.2	45
Fire Total	**3.9**	**3.5**	**8.1**	**12.7**	**2,014**
Total	**3.1**	**3.4**	**7.9**	**11.7**	**4,636**

FIGURE 6-7: Average Response Time of First Arriving Unit, by Call Type – EMS

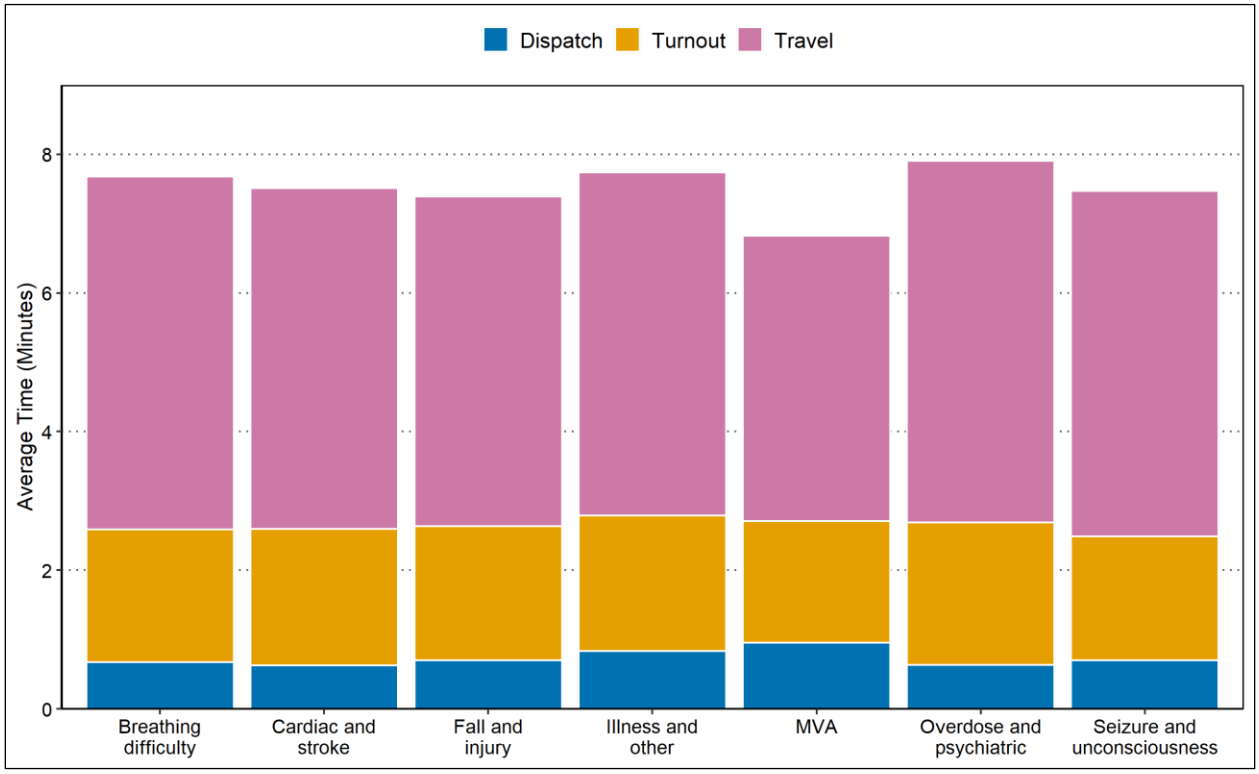
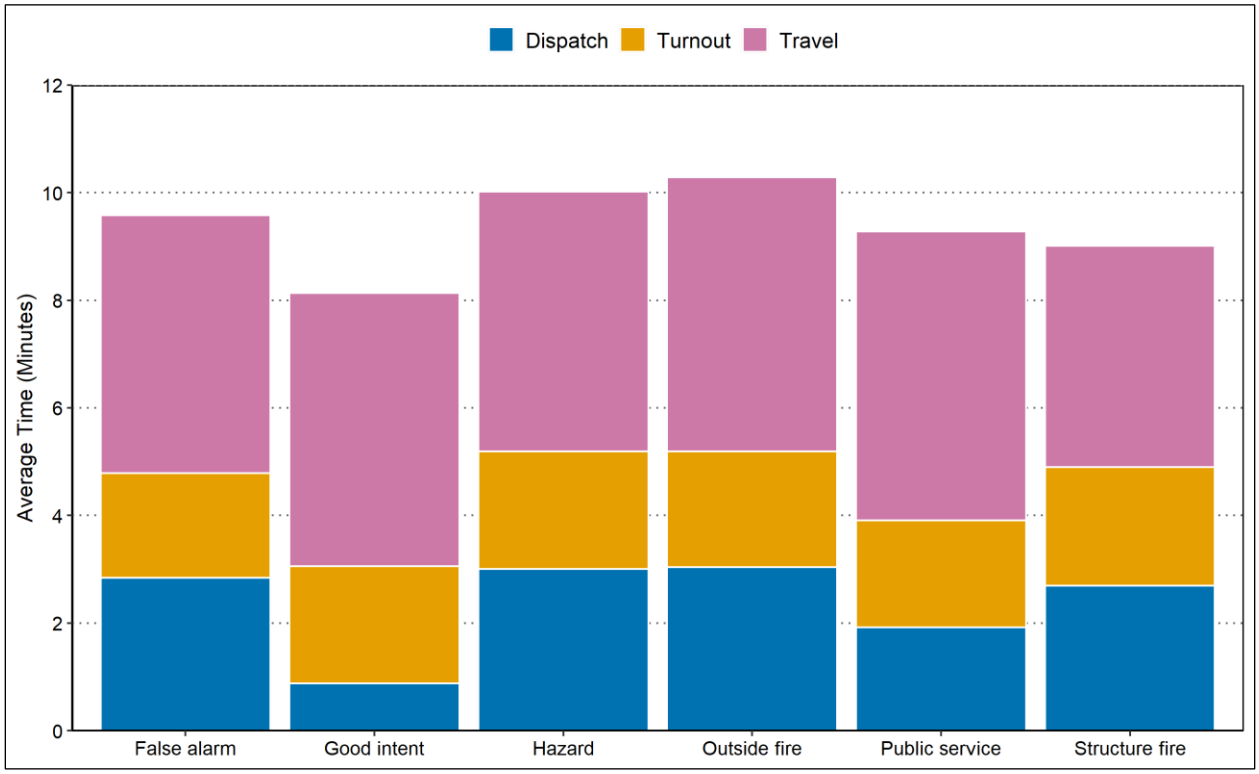


FIGURE 6-8: Average Response Time of First Arriving Unit, by Call Type – Fire



Observations:

- The average dispatch time was 1.3 minutes.
- The average turnout time was 2.0 minutes.
- The average travel time was 4.9 minutes.
- The average total response time was 8.1 minutes.
- The average response time was 7.5 minutes for EMS calls and 9.0 minutes for fire calls.
- The average response time was 10.3 minutes for outside fires and 9.0 minutes for structure fires.
- The 90th percentile dispatch time was 3.1 minutes.
- The 90th percentile turnout time was 3.4 minutes.
- The 90th percentile travel time was 7.9 minutes.
- The 90th percentile total response time was 11.7 minutes.
- The 90th percentile response time was 10.6 minutes for EMS calls and 12.7 minutes for fire calls.
- The 90th percentile response time was 14.8 minutes for outside fires and 11.2 minutes for structure fires.

Response Time by Station

Table 6-17 breaks down the average dispatch, turnout, travel, and total response times by each RFD station's response area and Table 6-18 does the same for 90th percentile response times. Figure 6-9 shows the average response time for each station's area.

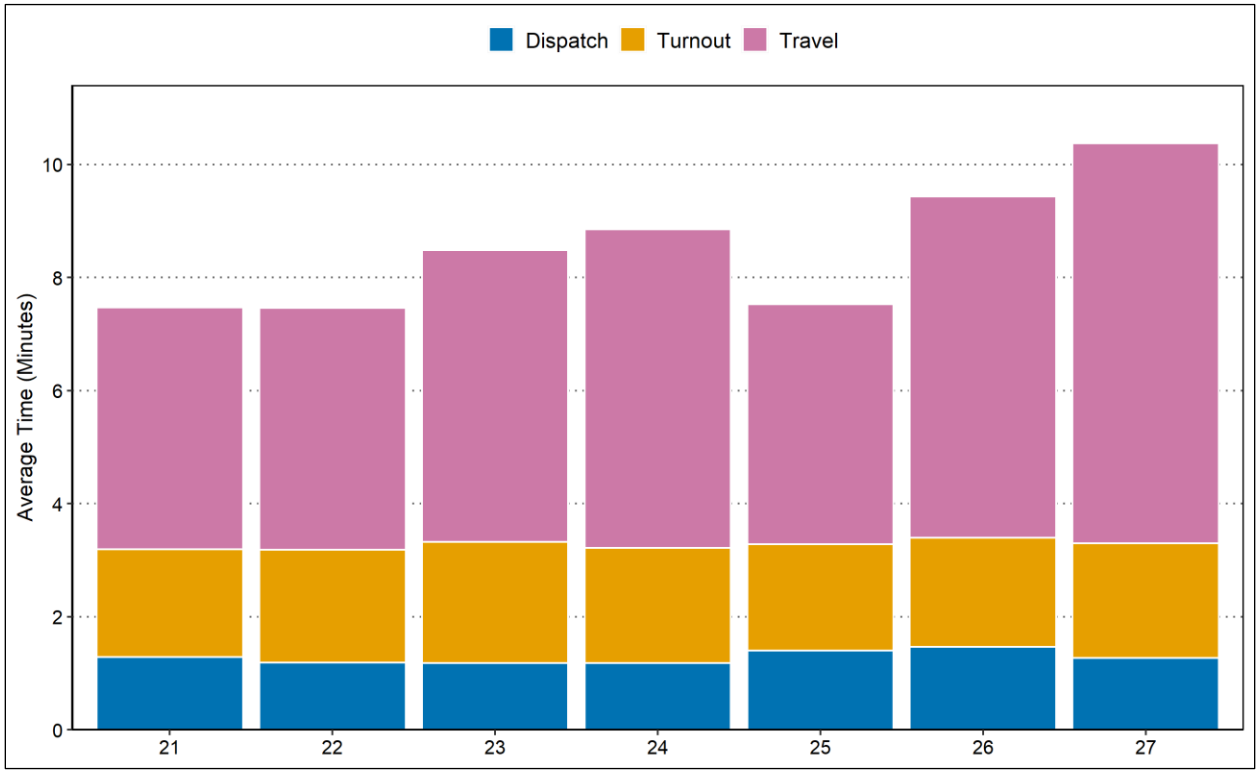
TABLE 6-17: Average Response Time of First Arriving Unit, by Station

Station	Time in Minutes				Number of Calls
	Dispatch	Turnout	Travel	Total	
21	1.3	1.9	4.3	7.5	1,517
22	1.2	2.0	4.3	7.5	580
23	1.2	2.1	5.2	8.5	555
24	1.2	2.0	5.6	8.9	1,144
25	1.4	1.9	4.3	7.5	430
26	1.5	1.9	6.0	9.4	217
27	1.3	2.0	7.1	10.4	193
Total	**1.3**	**2.0**	**4.9**	**8.1**	**4,636**

TABLE 6-18: 90th Percentile Response Time of First Arriving Unit, by Station

Station	Time in Minutes				Number of Calls
	Dispatch	Turnout	Travel	Total	
21	3.1	3.4	7.1	11.0	1,517
22	2.9	3.2	6.2	9.9	580
23	3.0	3.5	8.0	11.8	555
24	2.9	3.6	8.5	12.1	1,144
25	3.4	3.0	6.9	10.7	430
26	3.3	3.1	8.9	12.8	217
27	3.0	3.5	9.8	14.0	193
Total	**3.1**	**3.4**	**7.9**	**11.7**	**4,636**

FIGURE 6-9: Average Response Time of First Arriving Unit, by Station



Observations:

- The shortest average response times were to calls within the response areas of stations 21, 22, and 25 with an average of 7.5 minutes.
- The longest average response time was to calls within Station 27's response area with an average of 10.4 minutes.

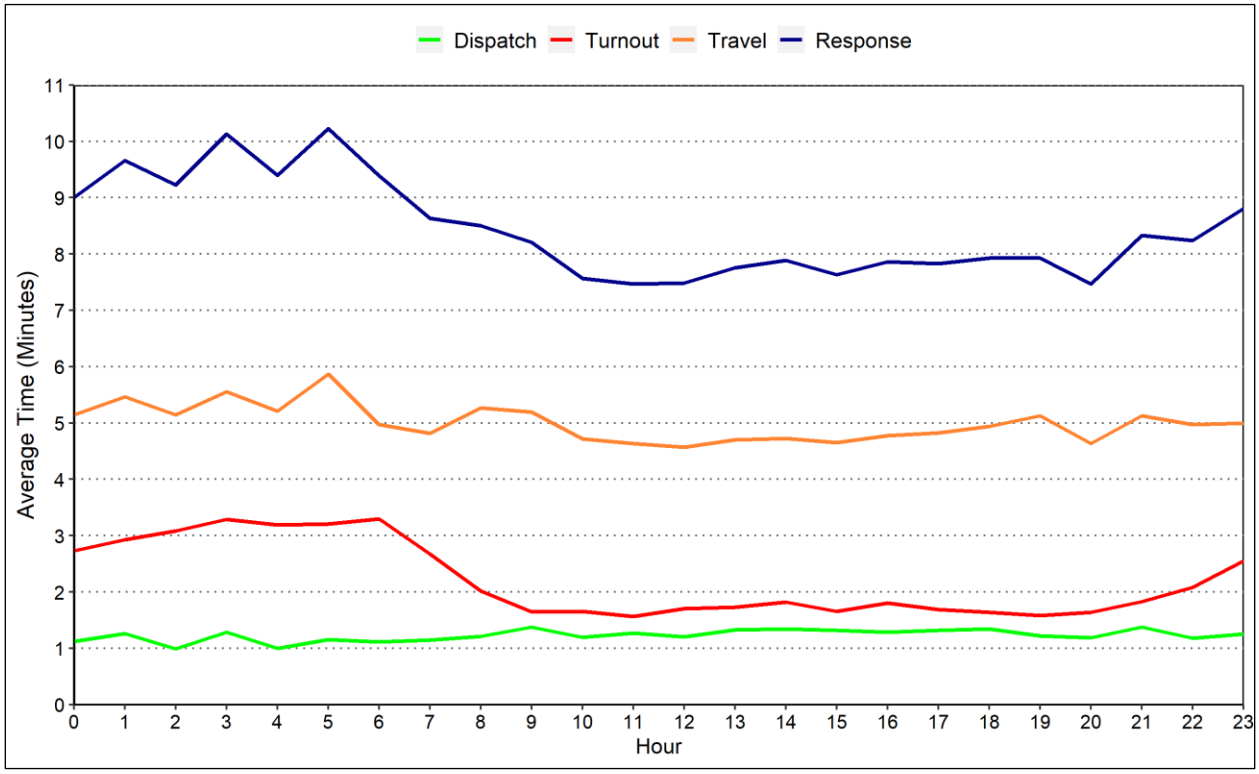
Response Time by Hour of Day

Table 6-19 shows the average response time by the time of day. The table also shows 90th percentile response times. Figure 6-10 shows the average response time by the time of day.

TABLE 6-19: Average and 90th Percentile Response Time of First Arriving Unit, by Hour of Day

Hour	Time in Minutes					Number of Calls
	Dispatch	Turnout	Travel	Response Time	90th Percentile Response Time	
0	1.1	2.7	5.1	9.0	12.8	145
1	1.3	2.9	5.5	9.7	13.1	92
2	1.0	3.1	5.1	9.2	12.0	83
3	1.3	3.3	5.6	10.1	14.1	93
4	1.0	3.2	5.2	9.4	12.1	71
5	1.2	3.2	5.9	10.2	13.8	94
6	1.1	3.3	5.0	9.4	12.6	107
7	1.1	2.7	4.8	8.6	11.7	131
8	1.2	2.0	5.3	8.5	11.7	205
9	1.4	1.6	5.2	8.2	11.8	235
10	1.2	1.7	4.7	7.6	10.4	280
11	1.3	1.6	4.6	7.5	11.0	274
12	1.2	1.7	4.6	7.5	10.2	270
13	1.3	1.7	4.7	7.8	11.5	271
14	1.3	1.8	4.7	7.9	11.6	254
15	1.3	1.7	4.7	7.6	11.2	259
6	1.3	1.8	4.8	7.9	11.4	235
17	1.3	1.7	4.8	7.8	11.2	270
18	1.3	1.6	4.9	7.9	11.8	262
19	1.2	1.6	5.1	7.9	11.6	236
20	1.2	1.6	4.6	7.5	10.8	227
21	1.4	1.8	5.1	8.3	11.7	195
22	1.2	2.1	5.0	8.2	11.3	187
23	1.3	2.6	5.0	8.8	12.2	160
Total	**1.3**	**2.0**	**4.9**	**8.1**	**11.7**	**4,636**

FIGURE 6-10: Average Response Time of First Arriving Unit, by Hour of Day



Observations:

- Average dispatch time was between 1.0 minutes (2:00 a.m. to 3:00 a.m.) and 1.4 minutes (9:00 p.m. to 10:00 p.m.).
- Average turnout time was between 1.6 minutes (11:00 a.m. to noon) and 3.3 minutes (6:00 a.m. to 7:00 a.m.).
- Average travel time was between 4.6 minutes (noon to 1:00 p.m.) and 5.9 minutes (5:00 a.m. to 6:00 a.m.).
- Average response time was between 7.5 minutes (8:00 p.m. to 9:00 p.m.) and 10.2 minutes (5:00 a.m. to 6:00 a.m.).
- The 90th percentile response time was between 10.2 minutes (noon to 1:00 p.m.) and 14.1 minutes (3:00 a.m. to 4:00 a.m.).

Response Time Distribution

Here, we present a more detailed look at how response times to calls are distributed. The cumulative distribution of total response time for the first arriving unit to EMS calls is shown in Figure 6-11 and Table 6-20. Figure 6-11 shows response times for the first arriving unit to EMS calls as a frequency distribution in whole-minute increments, and Figure 6-12 shows the same for the first arriving unit to outside and structure fire calls.

The cumulative percentages here are read in the same way as a percentile. In Figure 6-11, the 90th percentile of 10.6 minutes means that 90 percent of EMS calls had a response time of 10.6 minutes or less. In Table 6-20, the cumulative percentage of 61.3, for example, means that 61.3 percent of EMS calls had a response time under 8 minutes.

FIGURE 6-11: Cumulative Distribution of Response Time – First Arriving Unit – EMS

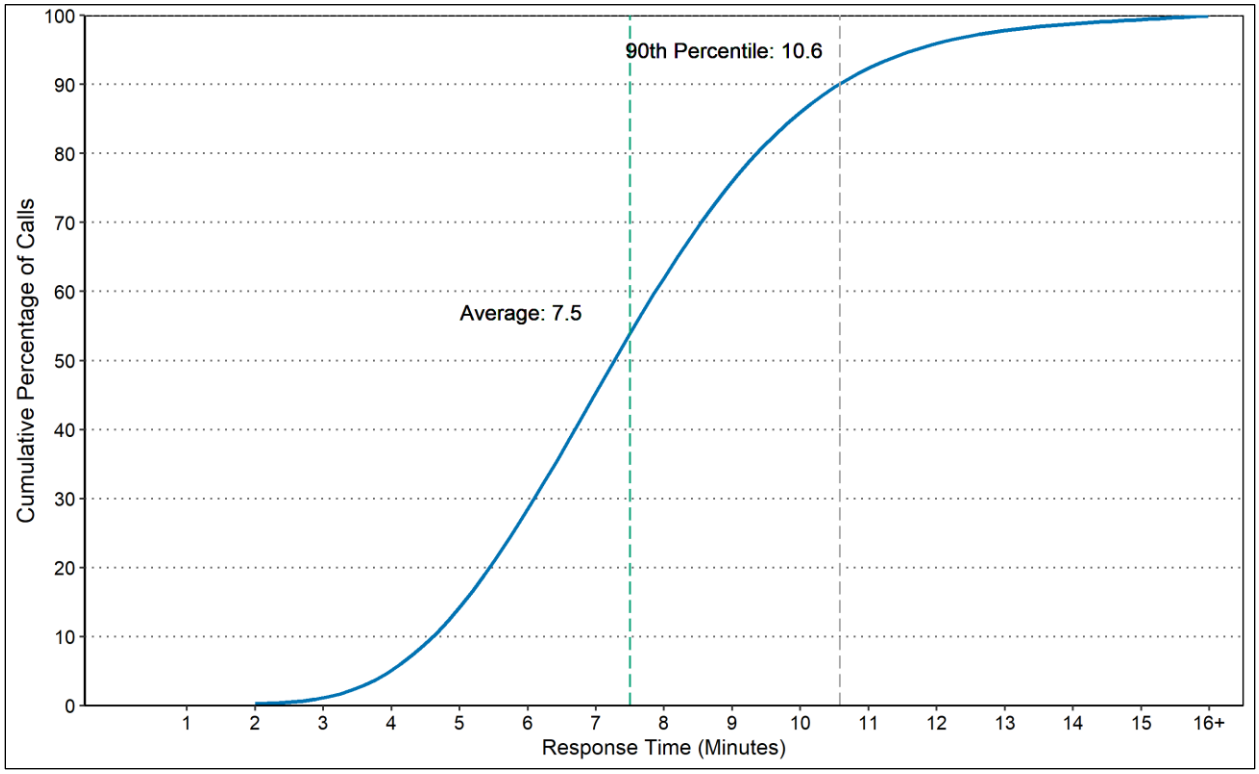


FIGURE 6-12: Cumulative Distribution of Response Time – First Arriving Unit – Outside and Structure Fires

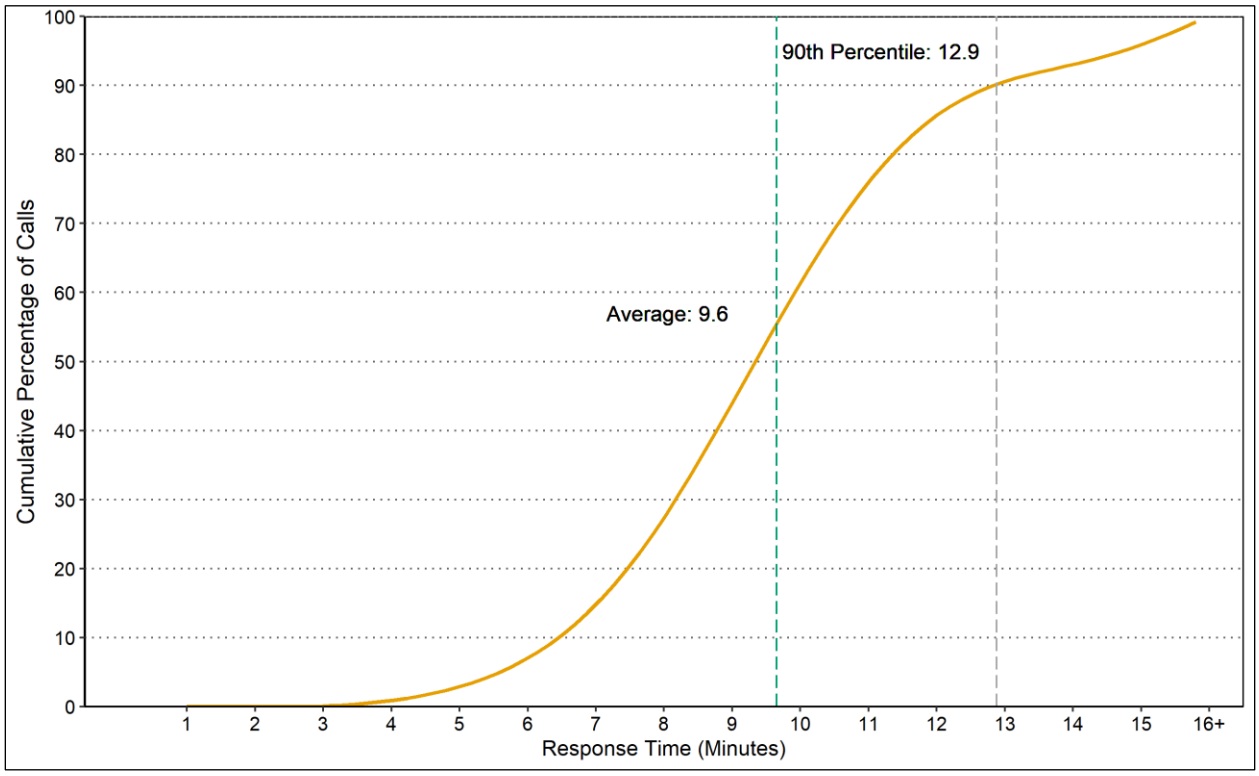


TABLE 6-20: Cumulative Distribution of Response Time – First Arriving Unit – EMS

Response Time (minute)	Frequency	Cumulative Percentage
1	1	0.0
2	7	0.3
3	23	1.2
4	106	5.2
5	215	13.4
6	399	28.6
7	452	45.9
8	405	61.3
9	398	76.5
10	250	86.0
11	164	92.3
12	94	95.9
13	52	97.9
14	25	98.8
15	14	99.4
16+	17	100.0

TABLE 6-21: Cumulative Distribution of Response Time – First Arriving Unit – Outside and Structure Fires

Response Time (minute)	Frequency	Cumulative Percentage
4	0	0.0
5	4	4.4
6	2	6.7
7	6	13.3
8	13	27.8
9	15	44.4
10	14	60.0
11	16	77.8
12	7	85.6
13	5	91.1
14	1	92.2
15	3	95.6
16+	4	100.0

Observations:

- For 61 percent of EMS calls, the response time of the first arriving unit was less than 8 minutes.
- For 28 percent of outside and structure fire calls, the response time of the first arriving unit was less than 8 minutes.

ATTACHMENT I: ADDITIONAL PERSONNEL

Table 6-22 illustrates the workload of RFD's units located at headquarters in 2021.

TABLE 6-22: Workload of Administrative Units

Unit ID	Type	Annual Hours	Annual Runs
201	Fire Administration (Chief)	5.7	12
203	Fire Administration (Chief)	10.4	10
204	Fire Administration (Chief)	17.9	32
213	Support Services	1.0	2
215	Fire Administration (Chief)	17.8	72
219	Training	0.8	1
301	Fire Marshal's Office	3.9	1
302	Fire Marshal's Office	0.2	1
303	Fire Marshal's Office	0.8	2
304	Fire Marshal's Office	8.9	11
305	Fire Marshal's Office	1.8	2
306	Fire Marshal's Office	12.6	12
307	Fire Marshal's Office	4.3	3
308	Fire Marshal's Office	2.3	6
312	Fire Marshal's Office	1.0	1

ATTACHMENT II: ACTIONS TAKEN

TABLE 6-23: Actions Taken Analysis for Structure and Outside Fire Calls

Action Taken	Number of Calls	
	Outside Fire	Structure Fire
Control traffic	2	0
Enforce codes	4	0
Extinguishment by fire service personnel	27	20
Fire control or extinguishment, other	8	1
Forcible entry	1	0
Incident command	9	9
Information, investigation & enforcement, other	1	0
Investigate	20	25
Investigate fire out on arrival	5	3
Provide water	1	0
Remove hazard	0	1
Restore fire alarm system	0	1
Restore sprinkler or fire protection system	0	1
Salvage & overhaul	3	6
Search	0	1
Ventilate	1	9

Note: Totals are higher than the total number of structure and outside fire calls because some calls recorded multiple actions taken

Observations:

- Out of 64 outside fires, 27 were extinguished by fire service personnel, which accounted for 42 percent of outside fires.
- Out of 54 structure fires, 20 were extinguished by fire service personnel, which accounted for 37 percent of structure fires.

ATTACHMENT III: FIRE LOSS

Table 6-24 presents the number of outside and structure fires, broken out by levels of fire loss. Table 6-25 shows the amount of property and content loss for outside and structure fires inside Roswell in 2021.

TABLE 6-24: Total Fire Loss Above and Below $25,000

Call Type	No Loss	Under $25,000	$25,000 plus	Total
Outside fire	48	15	1	64
Structure fire	25	23	6	54
Total	**73**	**38**	**7**	**118**

TABLE 6-25: Content and Property Loss – Structure and Outside Fires

Call Type	Property Loss		Content Loss	
	Loss Value	Number of Calls	Loss Value	Number of Calls
Outside fire	$99,700	16	$77,700	8
Structure fire	$847,866	22	$205,151	24
Total	**$947,566**	**38**	**$282,851**	**32**

Note: The table includes only fire calls with a recorded loss greater than 0.

Observations:

- 48 outside fires and 25 structure fires had no recorded loss.
- 1 outside fire and 6 structure fires had $25,000 or more in losses.
- Structure fires:
  - The highest total loss for a structure fire was $400,000.
  - The average total loss for all structure fires was $36,311.
  - 24 structure fires had content losses with a combined $205,151 in losses.
  - Out of 54 structure fires, 22 had recorded property loss, with a combined $847,866 in losses.
- Outside fires:
  - The highest total loss for an outside fire was $65,000.
  - The average total loss for outside fires with loss was $11,088.
  - 8 outside fires had content losses with a combined $77,700 in losses.
  - Out of 64 outside fires, 16 had recorded property loss, with a combined $99,700 in losses.

ATTACHMENT IV: IDENTIFICATION OF EMERGENCY CALLS

Table 6-26 describes the method used to identify emergency and non-emergency calls by the CAD priority description. The information was provided by the RFD. The call count column in the table reflects the number of calls in 2021.

TABLE 6-26: CAD Priority Description

Priority	Description	Call Count
1	Emergency	2,131
2	Emergency	1,876
3	Emergency	1,901
4	Non-Emergency	2,513
5	Non-Emergency	179
7	Non-Emergency	123
P	Emergency – Highest Acuity	1,018

- END -