FIRE DEPARTMENT MASTER PLAN

Rock Springs
Fire Department

Rock Springs, Wyoming

April 2020

Emergency Services Consulting International

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INTRODUCTION

In December 2019, the City of Rock Springs Fire Department (RSFD) retained ESCI to conduct a Master Plan study, with the intent of assessing the community demographics, associated risks, current fire department operations and service delivery, and projected future population changes. Based on this analysis, recommendations and implementation strategies were developed.

During the spring of 2020, ESCI representatives performed a comprehensive analysis of all aspects of the RSFD administration and operation. This analysis included a detailed financial review, temporal analysis of emergency incident workload and response time performance, support services delivery, working relationships, and coordination with other City departments and outside emergency response agencies.

Near the end of the project, ESCI was forced to cancel the scheduled site visit due to the COVID-19 pandemic. As a result, representatives interviewed key stakeholders by telephone in an attempt to validate the information previously gathered and analyzed, and learn more about the nuances of the community and fire department operations and challenges. Tours of the fire stations were conducted via FaceTime video service. In addition, a confidential online survey was conducted to give all department members an opportunity to provide insights, opinions, and ideas about the current status of the Department and its needs.

ESCI's analysis of the Rock Springs community, RSFD operations, resource allocation, and community risk revealed several key realities, as summarized in the following list.

- The City of Rock Springs experienced significant population growth over a decade ago. However, recently this trend has reversed, with the population stagnating and even decreasing slightly. This trend is expected to continue into the foreseeable future.
- Eleven percent of the population is at or below the poverty level and do not have health insurance.
- The financial stability and future viability of the current ground ambulance transport program in Sweetwater County are in question.
- The Fire Department does not have a current strategic plan, with updated mission, vision, or values. A Strategic Plan should be adopted and supported by all personnel.
- Limited training resources and administrative support have resulted in inconsistent training and skills maintenance across the shifts.
- Fire stations and training facilities are dated, and need significant capital improvements and repairs.
- There is no capital improvement plan for upgrading or replacing fire stations.
- The City has a significant amount of undeveloped residential and commercial property within its current boundaries.
- The current total operations staffing level should be enough to cover routine scheduled and unscheduled leave time.

- Fire Department one-time and reoccurring expenses are projected to increase by approximately 2.9% annually over the next five years, with personnel costs increasing 15% during this time period.
- The current location of fire stations appears adequate to meet the current demand for service. However, the high-density commercial and residential areas west of I-80, combined with significant undeveloped residential land, indicate the potential future need for a fire station west of I-80.
- Future service demand is projected to increase no more than 4% annually, and will likely be significantly lower than that.

Additional detailed observations are embedded in this report.

As a result, several recommendations and implementation strategies were developed and are included at the end of this report. Key recommendations include:

- Create a three to five-year Fire Department Strategic Plan, with associated goals and objectives.
- Create a Training Battalion Chief position.
- Develop a Fire Facilities Capital Improvement Plan (CIP).
- Conduct a comprehensive engineering/structural study of the fire facilities.
- Develop a Capital Apparatus and Equipment Replacement Plan and funding model.
- Engage in planning efforts to ensure a stable and financially viable ground ambulance transport program.
- Change work schedule practices to limit the number of consecutive hours an employee can work without a break period.
- Conduct a future fire station location analysis.

Other important recommendations and recommended implementation timelines are embedded in this report as well.

ESCI was very impressed with the level of engagement and commitment by all of the City and Fire Department staff who assisted with this project. It is clear they share a passion and commitment to ensure the safety of their citizens and visitors well into the future.

ACKNOWLEDGMENTS

Emergency Services Consulting International (ESCI) wishes to acknowledge the various members and leaders of the City of Rock Springs and other representatives who contributed to this project. Without their assistance, this project could not have been completed.

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ORGANIZATIONAL OVERVIEW

The following section is a general description of the City of Rock Springs, the Rock Springs Fire Department (RSFD), and the various components that comprise the emergency response system in the City.

The City of Rock Springs

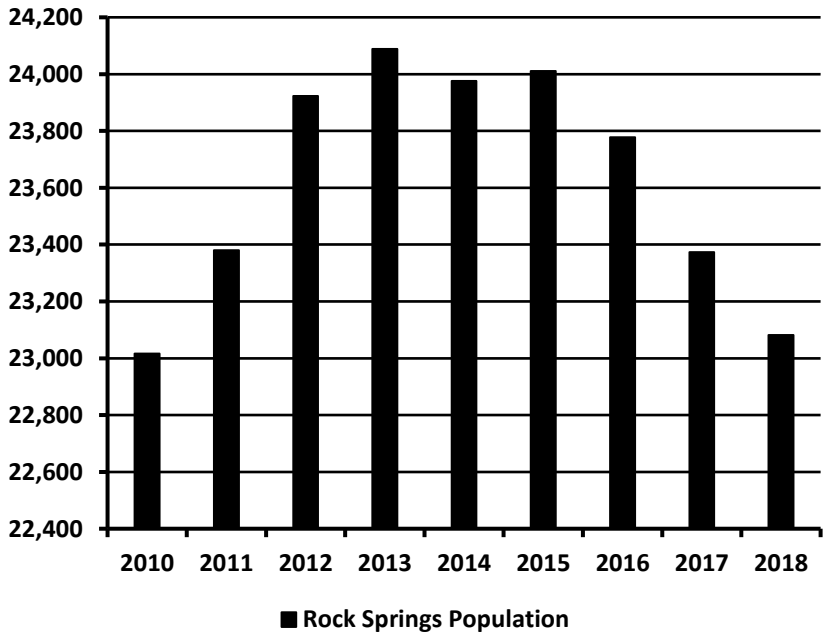
Located in Sweetwater County in the southeast portion of Wyoming, the City of Rock Springs is the fifth most populated city in the state, with an estimated population of 23,082.[1] The City encompasses approximately 19.5 square miles, of which all of it is land surrounded by foothills. The City has an elevation of 6,759 feet and is bisected by Interstate 80, which runs from east to west. The climate is classified as semi-arid, with cold winters and warm summers. The average annual snowfall is approximately 43 inches, and the average annual rainfall is just over 8.5 inches. The historical low average temperature is 11° F, while the average summer high temperature is approximately 83° F.

Community Demographics

The overall county population is approximately 43,000 persons. The county seat is in the City of Green River, approximately 20 miles away from Rock Springs. Previously a coal mining and railroad community, oil and gas exploration, as well as mining, are now the primary economic drivers in the area.[2]

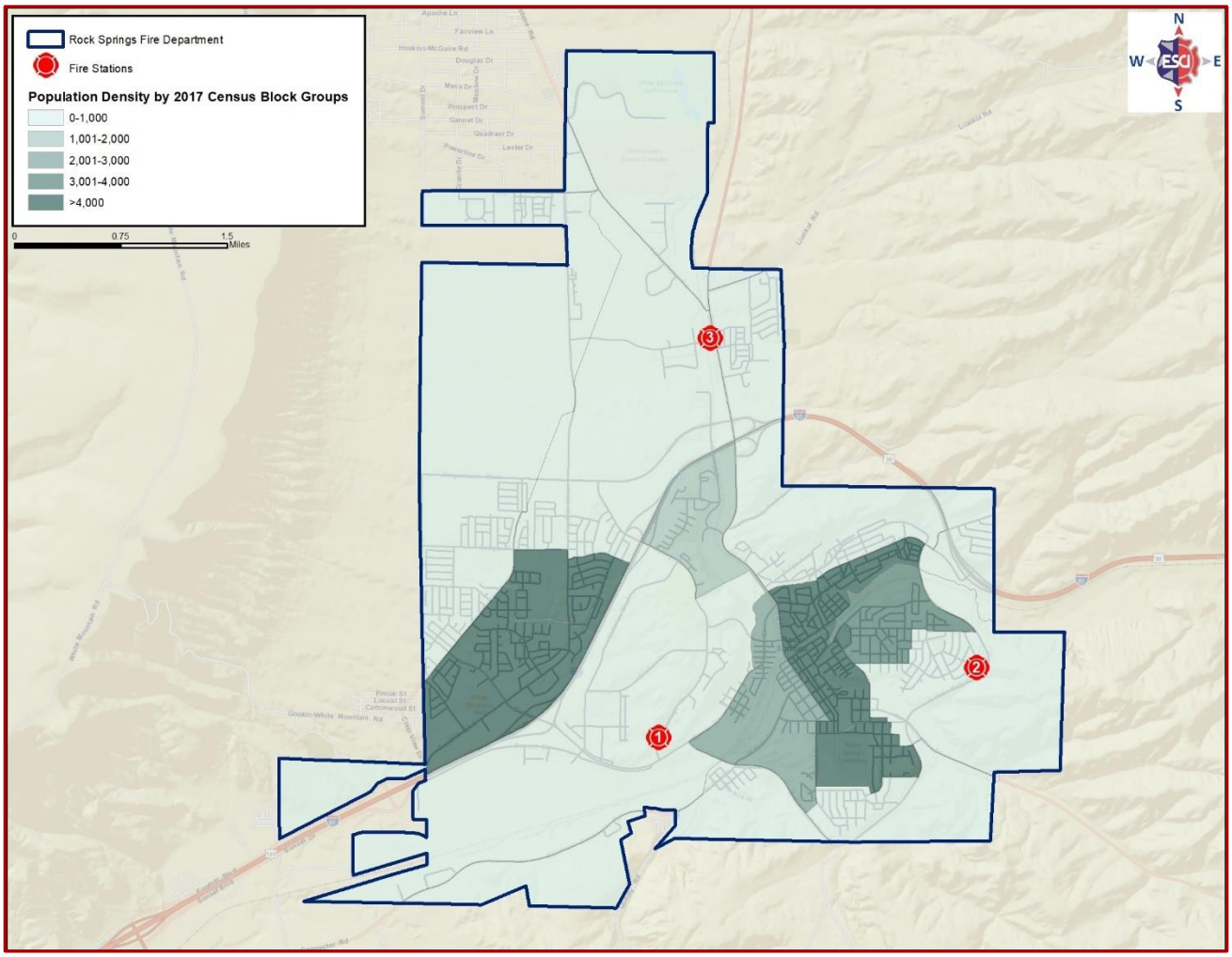
The estimated median household income in the City was approximately $74,500 in 2017. This is slightly higher than the overall county household income of $71,100.[1] There are approximately 10,600 housing units within the City limits.[3] The total assessed valuation of property in the City was $230,173,199.[4] The City's population has fluctuated over the last decade, with an overall stagnant growth rate compared to the 2010 population. The following figure illustrates these population changes since 2010:

Figure 1: Rock Springs Population, 2010–2018[1]



The distribution of population within the City is another important demographic characteristic that has a direct impact on the delivery of emergency services. The following figure illustrates the uneven population density in Rock Springs.

Figure 2: Rock Springs Population Density

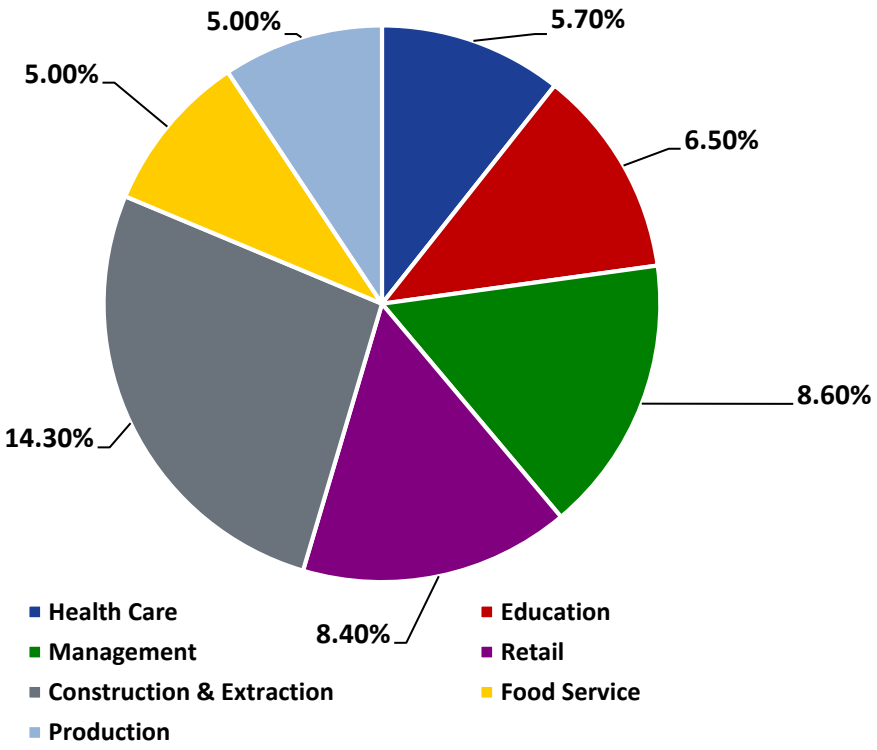


As shown above, there appear to be two main pockets of high population density, bisected by Interstate 80. The interstate poses a physical barrier that inhibits vehicle traffic traveling east-west. This barrier likely affects response times to the high-density area just west of the interstate. The railroad corridor presents another significant road travel barrier in the old downtown area as well.

Economic and Jobs Information

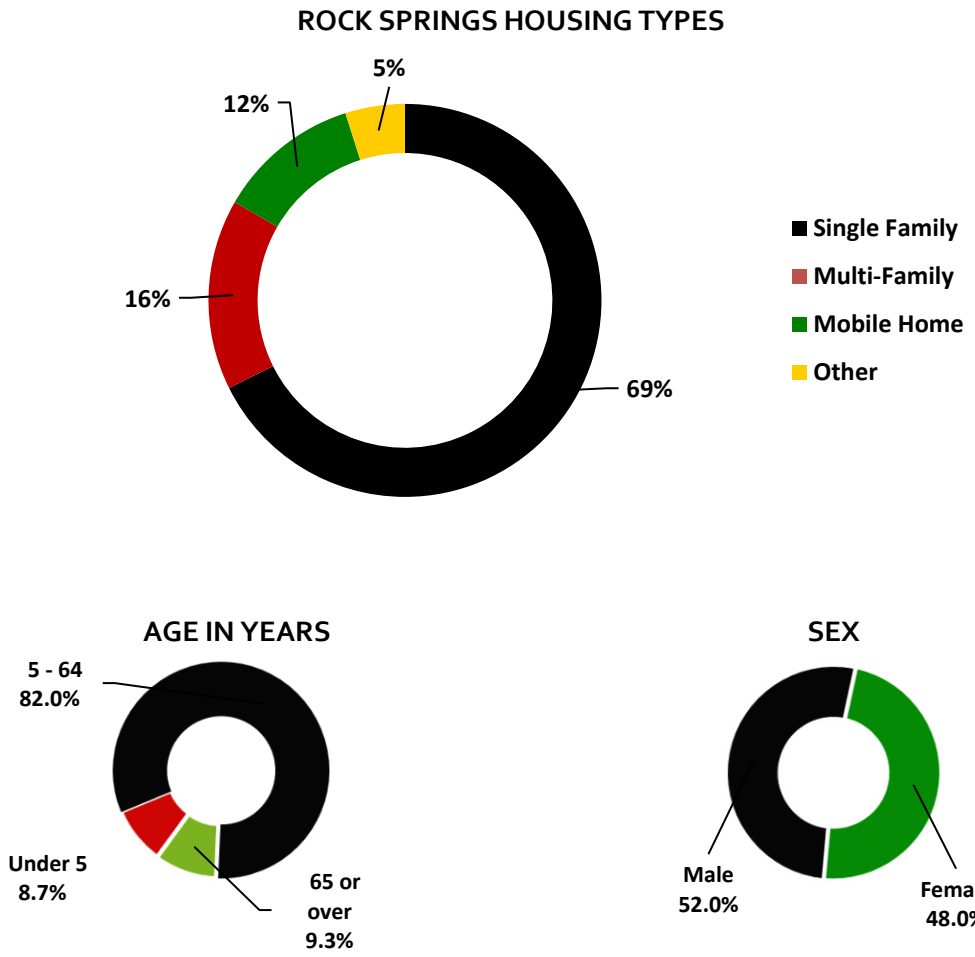
The Rock Springs labor market primarily supports the following economic sectors: Construction and Extraction, Office and Administrative Support, and Management Occupations. The community also supports jobs in Health Care and Education, Trade/Transport/Utility Services, Leisure and Hospitality Services, Manufacturing, and Business/Professional Services.[5] The following figure summarizes the various job sectors in Rock Springs as of 2017, per the U.S. Department of Labor-Bureau of Statistics ACS 5-year estimate.

Figure 3: Rock Springs Major Job Sectors, 2017



Select demographics for the City—age, sex, ethnicity, housing type, income level, primary language, education, health, and assessed property values—are shown in the following figures.

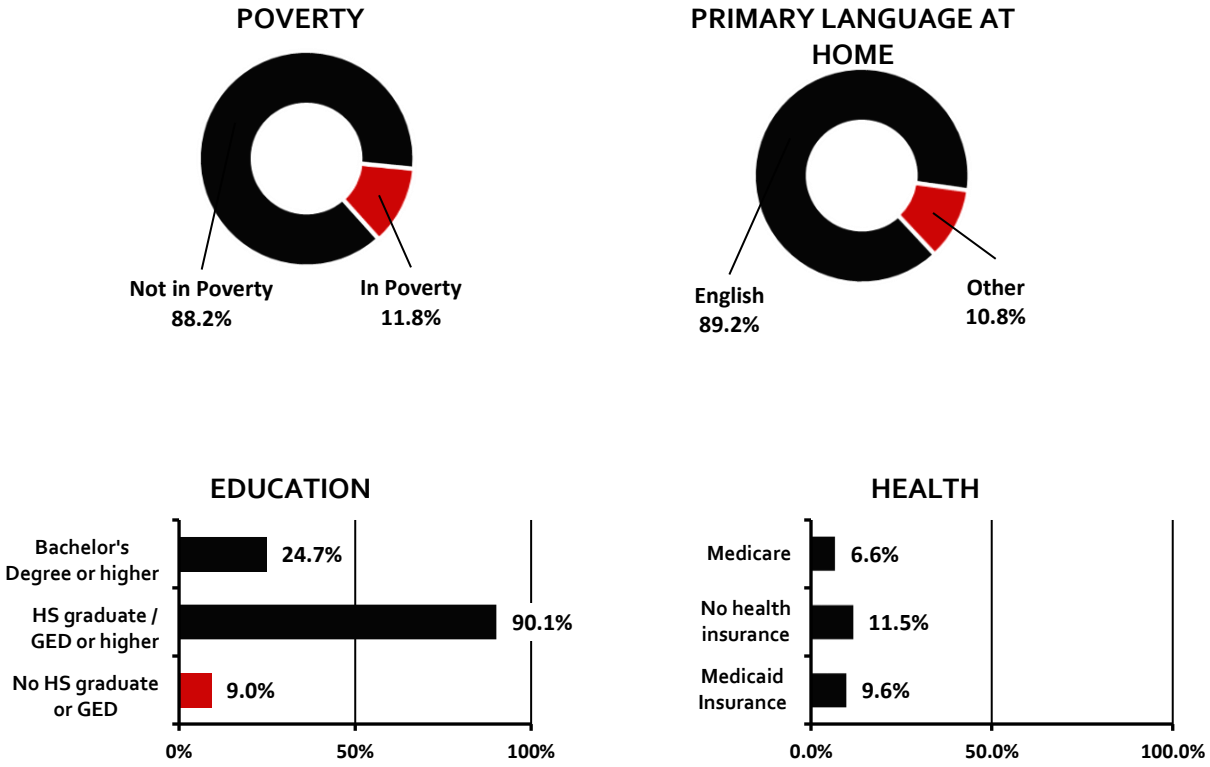
Figure 4: Select Rock Springs Demographics



The predominant races in Rock Springs are white (91%), followed by Hispanic/Latino (16.4%).[6]

The following figures summarize economic, health, and ethnic factors that may impact how emergency services are delivered.

Figure 5: Socio-Economic Health & Ethnic Factors



Demographics Discussion

In addition to the distribution of the population in Rock Springs, population demographics can affect the nature of risk and emergency service demand.

An October 2019 NFPA research report, *Home Structure Fires,* cited a study by Gilbert and Butry that determined population "frailty," defined by age- and gender-adjusted natural cause mortality rates, can identify populations vulnerable to fire death but not those vulnerable to non-fatal injuries. The NFPA report revealed that more than half (54%) of the fatal home fire victims were 55 and over, and one-third (34%) were at least 65 years old. One of every five fatal home fire victims was between 55 and 64 years of age. More than two-thirds (69%) of the people who were non-fatally injured were between 35 and 64 years of age.

Certain segments of the population are more likely to use fire department services, especially EMS, than other population groups. EMS and rescue incidents represent the majority of service demand—over 60% of all responses in the city. Below is a further explanation of these special risk groups, and their impact on emergency services.

Age: As previously noted, the elderly may have difficulty escaping from fire due to physical limitations and diminished sensory perception (primarily hearing and vision). Quality of life issues, chronic illness, and the proliferation of assisted living/nursing home facilities also increase emergency medical service demand. The very young also represent a vulnerable population, as they cannot appropriately and quickly recognize and react when faced with an immediately dangerous situation. Comparisons with other Wyoming and national communities reveal that the general population average age in Rock Springs is significantly younger.

Lack of health insurance: People under 65 years of age with no health insurance are more prone to chronic illness or exhibit poor physical condition simply because they do not seek prompt treatment. Over 11% of Rock Springs' population under age 65 do not have health insurance, which likely results in higher demand on the EMS system.

Disabilities: People with disabilities may be incapable of quickly recognizing an emergency and react appropriately. According to the Wyoming Housing Database Partnership, approximately 10% of the City's population has one or more disabilities.

Language barrier: Segments of the population may have cultural differences or language barriers that inhibit their ability to call for help when needed, or effectively communicating their needs and concerns. According to the NFPA, "Language barriers, cultural differences, and inexperience with unfamiliar home technologies are factors that mark the challenges of helping newcomers live safely from the threat of fire in the home."[7] Approximately 1.5% of the City's population is foreign-born, and 10.8% of the population speak a language other than English at home.

Low-income: Those with low incomes use fire and EMS services more often than those with higher incomes. Over 11% of Rock Springs' population live below the poverty level (the U.S. Census Bureau's 2018 poverty threshold is defined as $13,064 for an individual, $25,554 for a family of four). Low-income is often combined with other factors such as education or work status.

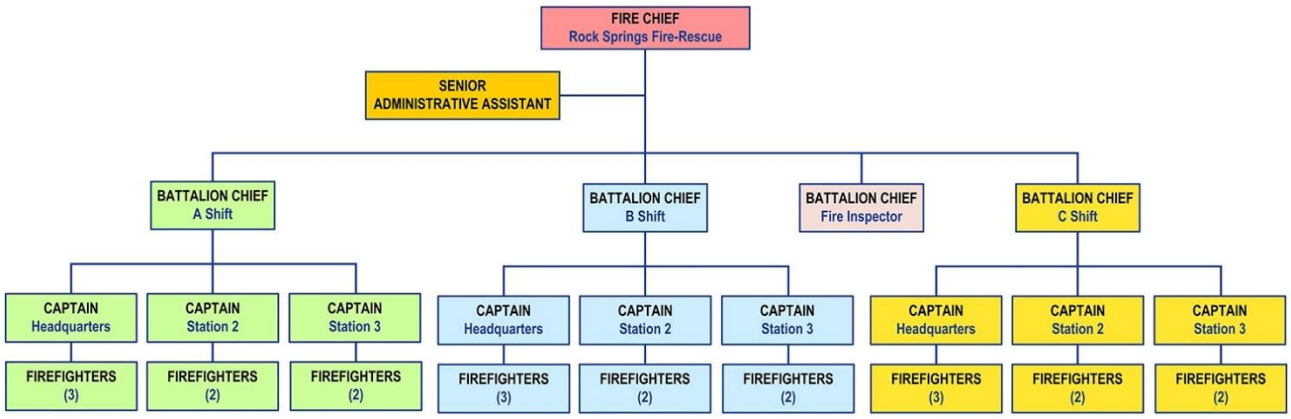
Local Governance & Authority

The Rock Springs government operates under the authority of an eight-member elected City Council, representing the City's four wards. The Council serves as the legislative and policy-setting body for City government, authorizes programs and all expenditures of City funds, and enacts Citywide regulations. An elected Mayor directly oversees seven department directors in the following departments; City Attorney, Administrative Services, Municipal Court, Police Department, Fire Department, Engineering & Public Services, and Parks & Recreation. The City operates under a bi-annual fiscal year budget. The current budget period is 2019–2020.

Rock Springs Fire Department

The RSFD is a full-time career fire department. The Fire Chief is an at-will employee who answers directly to the Mayor. The following figure illustrates the Department's organizational structure

Figure 6: RSFR Organizational Chart (2018)



RSFD employs 36 personnel, who staff three fire stations 24/7. Operations personnel are assigned to one of three shifts, each of which is supervised by a Battalion Chief (BC), along with captains on each shift. These captains supervise a crew of three firefighters assigned to each shift and station.

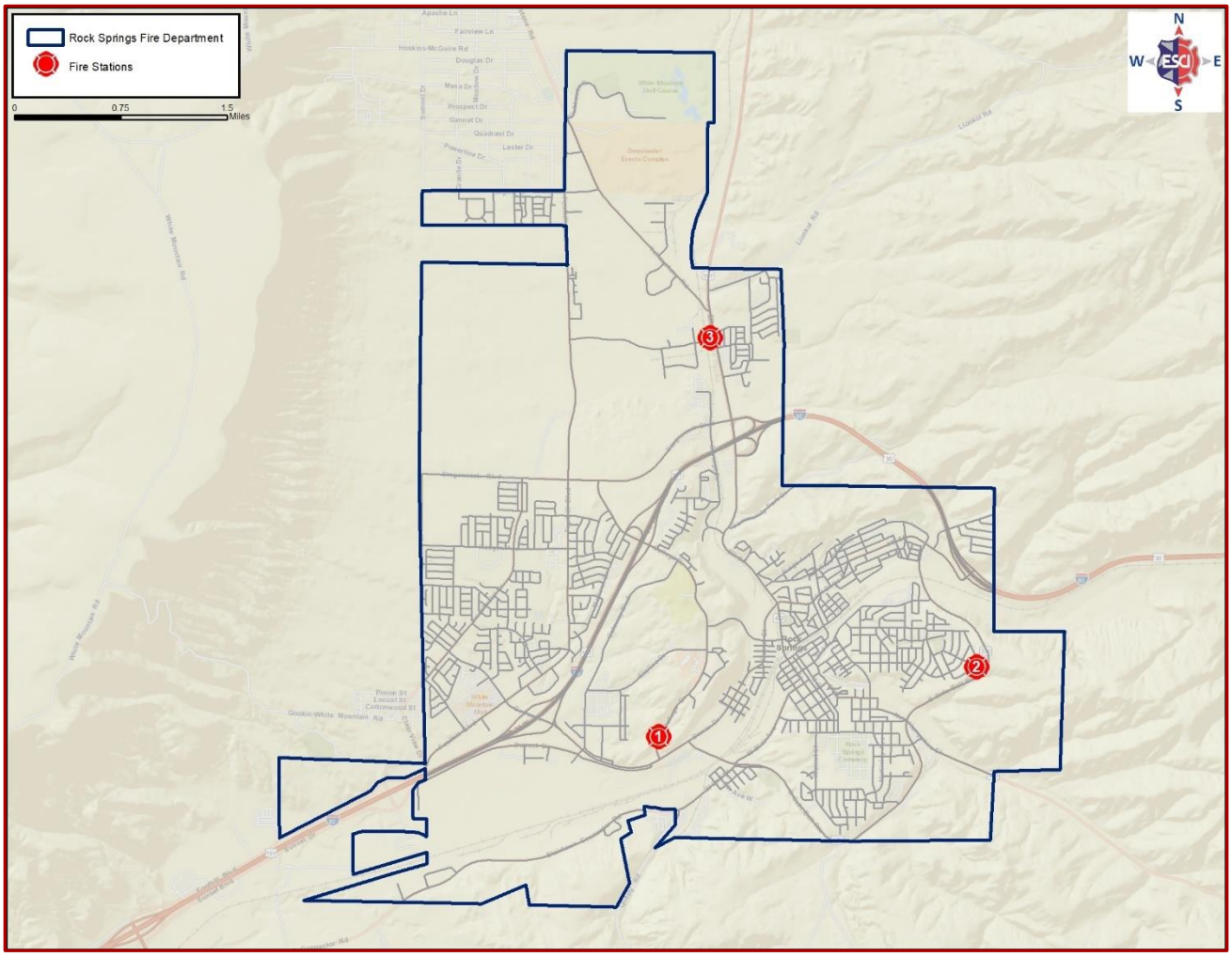
RSFD General Operations

RSFD deploys apparatus from each of its staffed fire stations, with a minimum staff of three firefighters per station. An engine company at each station is typically staffed as the first-due apparatus, although ladder trucks, wildland apparatus, and other vehicles are cross-staffed from the engines when necessary. The on-duty shift Battalion Chief is deployed from Station 1.

RSFD is an all-hazards organization that provides the conventional services typical of most fire departments: fire suppression, rescue, haz-mat, and medical first-response (MFR) utilizing Firefighter/EMTs. It also is the sponsor and Administrator of the U.S. Department of Homeland Security Region 4 Response Team, primarily providing regional hazardous materials emergency response and limited technical rescue capability. The department does not provide basic or advanced life support ambulance transport.

The following image is a Geographical Information System (GIS) representation of the RSFD service area and the locations of the three fire stations. In this report, the boundaries illustrated in this figure represent the study area.

Figure 7: RSFD Study Area Map



Protection Class Rating

As of 2020, the Department will retain its previously assigned community *Public Protection Classification* (PPC) of 3 by the *Insurance Services Office (ISO)*.

Municipal fire departments and fire protection districts in Wyoming are assigned a PC grade of 1–10, after the evaluation of the following fire protection components: Emergency Communications, Fire Department coverage and response capability, Water Supply, and Community Risk Reduction programs.[8] A Class 1 rating is the highest rating, indicating superior fire protection capabilities, and a rating of 10 indicates little to no capabilities, which are insufficient for insurance credit. Insurance companies utilize the ratings to assist in establishing premiums for fire insurance.

Other Services Provided

In addition to structure fire suppression and MFR, RSFD participates in regional and statewide wildfire mobilizations and hazardous materials response. The Department also provides technical rescue services. A Fire Inspector oversees the department's fire prevention programs, which includes building inspections, building plan reviews, fire investigation, and building pre-fire planning. In addition, the Department provides a variety of public education programs that are identified later in this report.

Components of the Emergency Services System

As in most communities throughout the United States, fire departments rely on and work with other organizations and personnel that comprise the overall emergency services delivery system. This is particularly true in EMS, which consists of more than a few elements working together in order to achieve the best patient outcomes.

Emergency Communications

The Primary Safety Answering Point (PSAP) and emergency services dispatching in Sweetwater County are provided by the *Sweetwater Combined Communications Joint Powers Board.* All emergency calls for service are handled through the Sweetwater Combined Communications Center (SWCCC), located in Green River. This center dispatches the appropriate fire, law enforcement, and EMS resources throughout Sweetwater County. Funding for the Center is provided by Sweetwater County (25%), the City of Green River (32%), and the City of Rock Springs (43%).

In 2019, Sweetwater Communications dispatchers began providing pre-arrival instructions to callers of medical, fire, and rescue-type emergencies through use of the *Medical Priority Dispatch*® system and *Emergency Fire Dispatch*® programs, which enable dispatchers to uniformly interrogate callers, determine the nature of the incident or medical severity, dispatch the appropriate emergency responders, and provide medically validated and potentially life-saving pre-arrival instructions.

Ambulance Transport

RSFD provides ALS and BLS MFR only. Basic and advanced life support ambulance transport services in Rock Springs and the immediately adjacent county areas are primarily provided by a private ambulance service called *Sweetwater Medics LLC.* This service also provides out-of-county ground patient transfers.

Hospital Services

The primary hospital for Sweetwater County is Memorial Hospital of Sweetwater County, located in Rock Springs. It is controlled by a Board of Trustees appointed by the County government. The hospital campus consists of several buildings, the largest of which is over 100,000 square feet, and has a 58-bed capacity. The hospital carries a State of Wyoming assigned Area Trauma Center (ATC) designation, which largely equates to a Level III designation.[9]

Mutual Aid Organizations

Sweetwater County Fire District #1 (SCFD1) is the closest mutual aid department to RSFD. It is a combination department with four full-time and 37 paid on-call firefighters, working out of two fire stations, one of which is located well within the Rock Springs city limits. Other mutual aid agencies include nearby Sweetwater County Fire Department, the Bureau of Land Management (BLM), and the Green River Fire Department, located approximately 15 miles southwest of Rock Springs. The Sweetwater County and BLM fire suppression resources are primarily configured for wildfire response. Lastly, the Southwest Wyoming Regional Airport, located approximately 10 miles from Rock Springs, has a small cadre of employees trained as aircraft rescue firefighters who staff a specialized crash-fire rescue apparatus during medium-sized commercial passenger aircraft operations. RSFD is the structural fire suppression response for the airport.

EMERGENCY MEDICAL SERVICES

Rock Springs Fire Department EMS

A six-member board oversees the County contract for Sweetwater Medics paramedic service in Rock Springs and the surrounding defined county service called the Ambulance Service Board, which is one of twenty county boards. Ambulance Service Board members represent the Rock Springs Fire and Police Departments, Memorial Hospital, Sweetwater County Sheriff, Wyoming Highway Patrol, and Sweetwater County government. The board meets bi-monthly.

RSFD EMS operations oversight was assigned to an Operations Battalion Chief as additional duties in January 2020. There is no separate EMS Division or budget for the RSFD MFR program.

Medical Direction & Oversight

Prehospital medical care throughout most of the County is overseen by Dr. Philip Njam, who contracts independently with three of the four EMS agencies for Medical Director oversight services. He receives no compensation for these services. On-duty emergency department physicians at Memorial Hospital provide online medical control.

ESCI understands there is very little interaction between the Medical Director and Rock Springs EMS personnel. Monthly trauma training and run reviews provided by the Medical Director have been discontinued.

Ground Ambulance Services

Four ground ambulance services provide pre-hospital EMS care and transport in Sweetwater County:

- *Sweetwater Medics LLC:* A privately owned ALS/BLS ambulance service based in Rock Springs. Two staffed units primarily serve the City of Rock Springs and the surrounding south-central areas of the county.
- *Castle Rock Ambulance:* A privately owned ALS/BLS ambulance service based in Green River. Two staffed units primarily serve the City of Green River and the surrounding western rural areas of Castle Rock Hospital District in Sweetwater County.
- *Wamsutter EMS:* A volunteer ambulance service provided by the Town of Wamsutter. One unit primarily serves the Town of Wamsutter and the surrounding eastern portion of the county.
- *Eden Valley Ambulance:* A volunteer ambulance service provided by the Eden-Farson Fire District. One unit primarily serves the rural north-central areas of the county.

Air Ambulance Services

Due to the limited hospital resources available in Sweetwater County, and relative remoteness of areas of the county from the county's only hospital, critically ill or injured patients are often transported from the hospital to Salt Lake City. Two air ambulance services provide air medical transport in Sweetwater County:

- The University of Utah's *AirMed* air ambulance service maintains a fixed-wing aircraft at the Rock Springs Airport, and a rotary-wing aircraft at Memorial Hospital.
- *Guardian Flight* air ambulance service maintains fixed-wing and rotary aircraft at five bases in Wyoming. Its closest base is located in Lander, approximately 150 miles away.

Emergency Medical Transport Discussion

ESCI identified potential issues related to the future viability of the current ambulance deployment model in the County. The County commissioned an EMS Assessment study in 2015, which made the following key observations:[10]

- There is a patchwork approach to the delivery of EMS in Sweetwater County.
- EMS is a vital and desired element of healthcare and quality of life in Sweetwater County.
- EMS in Sweetwater County has always been, and continues to be, subsidized.
- Sweetwater County has significant resources within the County to fund EMS.
- The current EMS system design is inefficient.
- Workforce recruitment and retention is and will continue to be a major challenge in Sweetwater County.
- At the writing of this report, Wamsutter EMS and Eden Valley Ambulance were out of compliance with Wyoming State EMS licenses and were not sustainable.
- There is a perceived lack of fairness among communities in Sweetwater County regarding how the financial burden of EMS is shared.
- There is a lack of clarity surrounding the kind and level of EMS for which Sweetwater County residents are willing to pay.
- The foundational structures and practices for a single, integrated, countywide EMS system already exist in Sweetwater County.

The report's recommendations included this important concept:

"Sweetwater County should create a single, integrated, countywide EMS delivery system that is overseen by the County and appropriately funded."[10]

To date, ESCI was unable to identify substantial progress towards implementing the report's recommendations. In fact, it appears that the financial and operational status of some of the current ambulance transport providers is becoming increasingly tenuous, according to a 2019 newspaper article in the Greenriver Star.

While it is outside the scope of this study to address this important issue in-depth, ESCI would be remiss if it did not make some general observations and recommendations related to the provision of ambulance service in Sweetwater County and the City of Rock Springs in particular. While the county is comprised predominately of rural and wilderness areas, with sparse population density and long response times, the citizens and visitors to the County expect high quality, reliable, and caring EMS service. A cohesive EMS administrative and medical oversight framework is critical to ensuring sustained, high quality, and consistent EMS care regardless of where the care is delivered in the County. RSFD should continue proactively engaging with County, City, and private EMS providers to plan for and implement a sustainable EMS ground transport ambulance program.

SUPPORT PROGRAMS

Training & Continuing Education

The importance of the initial and on-going training and continuing education of firefighters, EMTs, and paramedics cannot be overstated. The actions of fire department personnel on emergency responses that are less than stellar are often a direct reflection of a substandard training program. Well trained personnel who strive to continually improve are more efficient and effective in mitigating emergency incidents.

The minimum level of certifications required for all RSFD personnel are:

- Firefighter (FF) I & II
- Emergency Medical Technician-Basic (EMT-B)
- HazMat Technician
- Apparatus Driver Operator (ADO) for aerial and pumper operation.

All members are required to obtain FF I and II certification within the first year of hire, and ADO certification within the first two years of employment. Initial training of new hires begins with a recruit academy conducted internally.

Following the probation period, personnel need on-going training to retain their knowledge and skills. To this end, there has to be a sufficient number of instructors, training grounds, and adequate training materials either internally or available from outside sources. Training sessions should be formal and follow a prescribed lesson plan that meets specific objectives. Additionally, training sessions involving manipulative exercises should include a safety message and have a dedicated Safety Officer.

In this section, ESCI reviews RSFD's training practices, compares them to national and other applicable standards and best practices, and offers recommendations as are appropriate.

General Training Competencies

The basis for effective training is established standards. There exists a variety of training standards, including those from the National Fire Protection Association (NFPA) 1001 standards, the International Fire Service Training Association (IFSTA), the International Fire Service Accreditation Congress (IFSAC), and applicable Wyoming firefighter safety and training requirements. The Wyoming State Fire Marshal's Office administers the Fire Service Training Division of the state. That division administers a program that develops standards for training, testing, and certifying at all levels, including firefighting, fire prevention, public education, fire investigation, fire department management, and specialties, including fire apparatus operator, airport firefighter, hazardous materials and rescue. EMTs and paramedics must comply with the Wyoming Department of Health's (WDOH) Office of Emergency Medical Services regulations, certifications, and training requirements.

Personnel accountability at emergency incidents follows internally developed standard operating guidelines. These also include safety procedures for training activities not directly tied to emergency incidents, such as training activities involving manipulative skills. Fire department employees receive monthly training on a rotating variety of selected safety topics consistent with FF I and II competencies and Insurance Services Office (ISO) requirements.

Beyond firefighting and EMS, RSFD personnel are involved in a variety of specialized disciplines. Specialized services provided by the Department include:

- High/Low-angle rescue
- Confined space rescue
- Hazardous materials response
- Wildland firefighting
- Vehicle extrication

Each specialized service requires personnel to have initial and on-going training to maintain the level of skills necessary to operate efficiently and safely. RSFD cooperates with other regional fire departments in the delivery of hazardous materials response and wildland firefighting.

RSFD uses task books that document the competency-based skills and are used to track those skills being successfully demonstrated. Training topics are broken into monthly, quarterly, and annual requirements. Although scheduled, monthly manipulative skills training is not always completed due to interruptions from emergency responses. Using computer-based training/testing (CBT), RSFD can meet NFPA 1001, ISO, and Wyoming firefighter training requirements. RSFD conducts a variety of drill activities involving more than a single fire station or company, as shown in the following figure.

Figure 8: Training Type & Frequency

Drill Type	Frequency
Night drills	Annually
Multi-agency drills	Monthly during the summer
Disaster drills conducted	Annually, or with greater frequency
Pre-fire planning included in training	Target hazards are a focus of specific scheduled training annually
Multi-company drills	Quarterly, or with greater frequency

On-going firefighter training focuses mainly on skill maintenance and learning new techniques in accomplishing certain tasks. Officer training is also scheduled in the annual plan. In addition to regular on-going training, a path for developing future company officers is also scheduled.

Training Administration

An RSFD Operations Battalion Chief is responsible for coordinating the overall operations training program, and shift training on his assigned shift. A designated captain on the other two shifts and another coordinates EMS training. Company officers deliver most of the daily training, per the annual training plan. RSFD has had mixed success with officers completing and recording scheduled training activities.

An annual training orientation is delivered at the beginning of each year to familiarize all personnel on the yearly training requirements. Fire Instructor I certified personnel are used to deliver company training and drills. Beginning in 2019, the Department produced a year-end Training Report, with the intent of producing the report annually.

While RSFD considers training a high priority, the allocation of training oversight and administration is inconsistent with the stated intent. ESCI noted that there are no personnel dedicated primarily to administering and delivering important training programs. Instead, training coordination and delivery are parsed to Operations Battalion Chiefs, who also have Operational responsibilities that compete for their time and attention. In addition, no clerical support is provided to ensure proper documentation, tracking, and coordination of training is delivered across all three shifts.

The RSFD budget allocates $10,000 annually for outside education and seminars, plus $14,000 for related travel expenses. While these numbers are respectable for a training program within an organization the size of RSFD, these are not exclusively dedicated to the training function. The travel funds are also shared to cover meeting expenses not directly tied to training.

Training Schedule

The Battalion Chief responsible for training has a detailed four-year competency-based training plan that minimally addresses ISO-mandated training hours and requirements. It addresses ongoing training for incumbents, recruit training for new firefighters, and officer training.

According to the Battalion Chief's 2020 Training Brief, the intent of the plan is "to sustain and improve the operational, tactical, and mutual aid capabilities of the RSFD through training and meeting ISO requirements that blend online courses with instructor and drill activities. Additional training requirements will focus on maintaining and improving core competencies of All Hazard/Special Response capabilities. Lastly, EMS training will be completed to ensure personnel are meeting Continuing Education requirements for recertification."

Individual crew members are responsible for maintaining their competency by participating in scheduled training activities. Company officers are responsible for ensuring that their companies are competent as a team, and are responsible for completing NFPA 1001 and 1002 company-level training. Battalion Chiefs are responsible for reviewing monthly crew training, scheduling, and completing assigned training, while balancing other priorities and incident responses. The Department uses Target Solutions™, which is a common and well-respected online training program, to deliver, document, and manage many of the training deliveries.

An annual calendar is prepared with monthly training topics identified. Topics in each major subject area are broken down to include the specific tasks to be accomplished during each training session. Monthly subjects include individual and company skills training for:

- Structure fire operations
- EMS
- Wildland firefighting
- Hazmat
- Vehicle extrication
- Equipment use and maintenance
- Driver/Pump/Aerial operations
- Building familiarization
- Ropes & knots
- Fire stream application
- Ground ladder operations

A sample RSFD monthly training schedule is provided in the following figure.

Figure 9: Master Training Schedule, January 2020

Company Training	All Hazard Training
Firefighter Orientation, 2 hours	ACLS
Fire Behavior, 2 hours	EMS Online, 2 hours selected in categories assigned
Building Construction & Course, 4 hours	Haz-mat, 3 hours
Firefighting PPE, 3 Hours/McLendon PPE Class, 1 hour	
Officer Development Program (ODP), 1 hour	
Streets Familiarization for designated area sheets 1 & 2	
Purpose: NFPA 1001 annual training starts with basic foundational courses. Haz-mat starts the monthly rotation for Special Operations. Annual ACLS is completed before the summer.	
End State: PPE Inspections are 100% completed and annotated in the department database. ACLS is completed with all personnel available on shift. Company officers prepare and plan for 2020 company training needs.	

ESCI noted that building familiarization and pre-fire plan reviews were missing from the RSFD annual training schedule. The Department appears to have outdated preplans of existing target hazards, which may be of little to no benefit during a significant emergency event.

The four-year training plan is cyclical, and consistent with industry standards and best practices. The methodology, purpose, and end state (expected outcome) are intended to make the training schedule complete, consistent, and perpetual.

Training Facilities

An effective, standards-driven training program is a vital part of a fire department's safety and accident prevention program and vice versa. Training is especially important for high-risk/low-frequency scenarios, such as building collapse or rail accidents. Regular participation in an effective and continuous training program results in safer, more efficient, and effective emergency operations. Proficient emergency responders develop confidence in their abilities to handle emergency incidents through regular access to training centers for repetitive drills (skill maintenance and refinement) and to develop new abilities.

Emergency responders must be equipped with a balance of knowledge and skills that are periodically exercised in a realistic but safe environment. Modern fire training centers continue to evolve with the blending of suitable space, durable yet adaptable structures, and advanced technology. These facilities incorporate classroom space, computerized audio-visual equipment, incident simulation equipment, and individualized study resources, as well as a drill yard and training tower to safely conduct large, multi-company operations.

While, ideally, every fire department should have a training facility, it may not be practically or financially feasible. However, in many instances, creative, open space solutions can be identified that provide a safe area where firefighters can safely practice and maintain manipulative skill proficiency. Equally important are open spaces that include devices (props) that provide or create the realistic effects associated with fire, EMS, and rescue incidents. NFPA compliant training facilities and burn props provide a controlled and reasonably safe environment to simulate emergencies in order to develop and test the skill sets of emergency workers. The 2019 edition of *NFPA 1402: Standard on Facilities for Fire Training and Associated Props* is a standard that describes the appropriate design and construction of facilities for fire training.

Figure 10: RSFD Training Facility

RSFD has a masonry training tower and burn building. The burn building has been well used in the past, resulting in the building being condemned and reinforced twice. The burn building now has two dedicated burn rooms, which are lined with Padgenite™ fire-proof insulated battens to protect the structural integrity of the rooms. This also protects the building's exterior structure and internal framework from the constant high heat expansion and contraction process, which would not otherwise occur uniformly in a masonry structure. Further, the rooms are monitored remotely by thermocouples. The roof of the burn building is equipped with a chop-out scuttle for vertical ventilation practice; however, there is no fall-protection around the perimeter of the roof to provide safety during vertical ventilation evolutions. The Fire Chief has discontinued use of the scuttle hatch by any means except access by aerial apparatus.

The training facility has limited space for Emergency Vehicle Operator Course (EVOC) training. There is an underground vault that provides training for confined space simulations. Classroom facilities are available but in need of an upgrade, such as providing additional electrical outlets for laptop computer use. Maintenance of the facility is reportedly inadequate. Previous studies support that deferred maintenance actually costs more in deferred replacement cost and significant injury or catastrophic failures, in sudden catastrophic failure versus planned maintenance intervals and practical and financial planning for replacement. To illustrate, a 2018 study by Tom Arnold titled *Why Preventive Maintenance Is 2%: Capability Traps* estimated that deferred maintenance costs compound at 7% a year, and preventive maintenance is worth $0.33 a square foot, with a return on investment of 545%.

Sweetwater County Fire District #1 also has a training facility, located approximately 4 miles north of the City. This facility consists of a 2 ½ story burn building, four-story training tower, confined space and forcible entry props, extrication and car fire pads, and a large classroom. RSFD occasionally uses the facility. However, its location precludes multi-company drills by RSFD on-duty crews.

Training Procedures, Manuals, and Protocols

A training manual is the "playbook" that firefighters use to practice and prepare to operate safely and efficiently. This playbook is used to standardize techniques and processes between individual fire companies, shifts, and in the case of RSFD, adjacent automatic and mutual aid departments. It is appropriate to consider adding partner agencies to operate out of a shared training playbook to the extent emergency operations are similar. RSFD relies mainly upon commercial lesson plans created and accessed through the *Target Solutions*® web-based training program for training consistency and continuity. These tools are augmented with department training and safety standard operating guidelines and the annual training orientation created and delivered by the Battalion Chief assigned to training. Post-incident analysis may occur informally on each shift (often referred to as tailboard talks), or on the scene after operations are completed. However, larger significant incidents should be formally debriefed in detail so that lessons learned can be captured and used in future training exercises to improve incident flow and mitigation efforts.

Training Record Keeping

Training records are entered and archived on Target Solutions™ software. Company officers or higher rank can manually enter training records, and individual records are available to all personnel as a report. Individual certifications are also maintained in this database.

The individual, company, and daily training activities are documented here, with the Battalion Chief in charge of training responsible for the management of all training records. Company officers are responsible for recording training activity. Target Solutions™ has the capability to produce reports showing the training received by individual employee, category, or type of training received and the number of hours of instruction. This software can also assist in the development of training activities and certification plans.

In 2019, 34 RSFD personnel received a total of 4,168 hours of training. Fire-related training averaged 16 hours per month per employee, and five hours of EMS training per month per employee. Other training activities completed included hazmat (6 hours), driver training (12 hours), officer training (12 hours), and facility training (18 hours) per employee.

Life-Safety Services

An aggressive fire and life safety program is essential for a fire department seeking to minimize life and property losses associated with fires and other community risks. Fire departments must embrace their role in providing fire prevention and public fire education as part of the planning process to reduce community risk.

Administration

The RSFD Prevention Division is led by a Fire Inspector that is functionally equivalent to a Battalion Chief. The Fire Inspector is assisted by the Operations Division, coordinated by the three Shift Battalion Chiefs. The Fire Inspector is qualified to conduct fire inspections. They are supported by two Fire Investigators and two Cause and Origin Technicians who are assigned to Operations. The Fire Inspector also conducts construction plan reviews and oversees all code enforcement activities. There is no personnel dedicated to public education. However, all members of the department are expected to participate fully in public education activities as assigned. There is one administrative assistant assigned to support the Prevention Division.

ESCI noted that the Fire Inspector position used to be a civilian position in the Building Department. It recently moved into the Fire Department as a uniformed position. There are excellent communication and coordination of code enforcement activities between the two departments. However, the Building Department noted there are occasional delays in plan reviews or other code enforcement activities when the Fire Inspector uses PTO.

Code Enforcement

The most effective way to combat fires is to prevent them before they start. A strong fire prevention program—based on locally identified risk and relevant codes and ordinances—reduces the loss of life, property, and community disruption that accompanies a catastrophic fire.

The City of Rock Springs adopted the 2018 version of the International Codes Council suite of codes, including the International Fire Code, including Appendices D (Fire Apparatus Access Roads), E (Hazard Categories), F (Hazard Ranking), and G (Cryogenic Fluids—weight and Volume Equivalents). Other codes adopted by the City include the 2018 International Building Code (IBC), the International Mechanical Code (IMC), the International Electrical Code (IEC), and the International Existing Building Code (IEBC). No other amendments or additions have been made to the IFC. There is no sprinkler ordinance provision in the City, other than those specifically required in the IFC.

Occupancy Inspection Program

RSFD operations crews conduct annual existing commercial occupancy inspections. If violations are noted, the information is relayed to the Fire Inspector for follow up and compliance. Citations may be issued for significant code violations or serial non-compliance through the Fire Chief, Building Official, and the City Attorney. Once a citation is issued, the municipal court assumes jurisdiction. Inspections are currently handwritten in the field and manually entered in the Emergency Reporting® (ERS) database.

New Construction

An essential component of a fire prevention program is new construction plan reviews. The City's Building Department is responsible for overall development and building plan reviews. The Fire Department has the responsibility to protect the structure for the life of the building and has a fundamental interest and duty to ensure all buildings within the jurisdiction are properly constructed and protected.

The Fire Inspector participates in all new construction plan reviews. For changes of use in an existing occupancy, the Fire Inspector consults with the Building Department. When tenant improvements are considered, the Fire Inspector participates where life-safety systems are involved for new construction or remodel/renovations of commercial occupancies. The Fire Inspector does not charge a fee for inspections or reviews, but the Building Department assesses a fee for plan reviews and building permits.

Residential structures are only inspected upon request, other than inspection of the common areas in multi-family residential structures. Special risk inspections are also performed in daycares, healthcare facilities and Unable to Self-Evacuate (UTSE) occupancies, as well as other special hazards, including storage tank inspections in newly constructed buildings.

Key-boxes are regulated for after-hours or non-occupied facilities or accessways via City ordinance. RSFD maintains hydrant flow testing records and inspection records in the ERS.

Fire Safety and Public Education

The RSFD uses all personnel as informal public educators. One Battalion Chief has received training in assuming Public Information Officer (PIO) duties. However, it is not a formal position within the Department. The Department delivers the following public education topics:

- Calling 9-1-1—Annual school presentations by the Fire Prevention Education Team
- Exit Drills in the Home (EDITH)
- Smoke Alarm program
- Carbon Monoxide program
- Kitchen Safety—Taught to Home Economics class in High School
- Child Safety Seat
- Fire Extinguisher use
- NFPA Fire Prevention school curriculum—Annually delivered
- Monthly CPR training
- Blood pressure checks
- Prevention Materials—Bilingual NFPA materials available
- Juvenile Fire-setter program

These activities are detailed and published in the RSFD annual report. ESCI noted that the RSFD has an excellent and very close working relationship with Sweetwater School District #1, providing annual fire and life safety education during Fire Prevention Week, attending and facilitating regular fire evacuation drills, as well as delivering Incident Command training to key school district administrators and staff. The Department participates in the District's Fire/Law/Leadership Academy, providing mentorship, training, and ride-along opportunities to 11th and 12th grade Academy students. The Department has a very proactive school safety program that includes periodic full-scale evacuation and reunification drills, where students are evacuated off-site, accounted for, and released to parents. RSFD provides significant planning, logistical, and operational support in these efforts.

Fire Cause Determination & Documentation

Fire cause determination is the RSFD's responsibility. The Department has four certified Fire Investigators. An additional firefighter is currently undergoing Fire Investigator training. Suspicious origin fires are investigated jointly with the Police Department. The investigation and disposition of juvenile arson suspects is managed in cooperation with the Rock Springs Police Department (RSPD). Eligible offenders may be placed in the Juvenile Fire-setter program, depending on the age of the suspect and the nature of the incident.

Incident scene control practices are in place, including entry management by an Incident Commander and Fire Investigator. Collected evidence is handled and secured by the RSPD. Investigative records related to fire cause investigation and determination are securely filed in the Department's RMS, including digital fire scene and evidence photographs.

Planning and Risk Reduction

The City does not have a contemporary Community Risk Assessment (CRA). Developing a local CRA helps specifically quantify the risks posed within the community. The CRA included later in this report can assist with developing a more comprehensive and detailed CRA in the future. Once quantified, a Community Risk Reduction (CRR) plan can be developed that targets the risks specifically. The advantage of this approach is that it uses limited resources to address targeted, higher risks in the community versus theoretical risks that, if manifested, may or may not produce significant consequences. Further, actual incident trends can be factored into the CRR plan to help address community education gaps or other definitive steps that can be taken to reduce community risk.

A recent example of this approach is a current community risk reduction effort that has been implemented through the Wyoming State Fire Marshal's Office. The initial focus of this effort is reducing the number of injuries and fatalities resulting from fires involving home oxygen equipment. Many residents in Wyoming suffer from Chronic Obstructed Pulmonary Disease (COPD) as a result of smoking or mining occupations, and must use supplemental oxygen at home. In the presence of flame or heat, nearby combustible materials and clothing may readily ignite, causing a significant flash fire. To reduce this hazard, the State recently implemented what is called the *307 CRR program*, and began distributing educational materials and special oxygen valve fittings to reduce the likelihood and impact of oxygen fed fires.[11] RSFD anticipates additional hazard and risk topics, and resources will be identified and distributed to fire departments across the state in the future.

MANAGEMENT COMPONENTS

Effectively managing today's fire department is increasingly complex, given the often-competing community expectations, elected and appointed official mandates, employee demands, expanding safety standards, and constrained financial resources. Contemporary fire departments have faced these challenges by implementing effective management systems and processes, managing expectations, educating key stakeholders, establishing collaborative relationships, and developing efficient organizational structures. At the same time, fire service leaders must:

- Identify (and working towards) a common vision,
- Stay abreast of new technologies and methods,
- Clearly articulate the leader's intent and constraints,
- Lead from the front; modeling desired behaviors, and
- Promote and effectively communicate the organization's mission, performance, and future needs.

This section of the report analyzes the management elements and processes used by RSFD.

Mission, Vision, and Values

An effective and efficient fire department must develop, promote, follow, and evaluate an organizational plan that has realistic and achievable goals and objectives. This includes establishing metrics to measure progress towards the goals and objectives. RSFD has an established mission statement, which is posted in the training room at Fire Station 3, and a set of organizational values. However, it has not adopted a vision statement or specific department goals or objectives. These tenants and concepts are typically incorporated into a strategic planning process. A strategic plan typically includes the following elements:

- Internal and external environmental scan (SWOT Analysis)
- Mission, vision, and values
- Initiatives, goals and subordinate objectives with performance metrics or outcome statements
- Timelines assigned to each objective
- Assigned Initiative Managers
- Responsible persons assigned to coordinate the achievement of each objective

A comprehensive strategic plan establishes timelines for achieving goals and objectives and assigns them to specific personnel. In compiling a strategic plan, the goals and objectives are prioritized, and a timeline for completion is established for each objective. This helps ensure a realistic work schedule that avoids overwhelming the organization at any single point in time.

RSFD should conduct a formal strategic planning for a three to five-year period. Conducting a strategic planning process that is formally adopted by the organization helps ensure that all personnel have a clear understanding of what the department wants to achieve over the next three to five years, and who is responsible for managing those goals. All non-emergency work that does not align with the strategic plan should be evaluated for its importance and relevance, as it can detract from achieving established goals and objectives.

Management Documents and Processes

Fire departments use a variety of methods to manage business practices, including policies, procedures, guidelines, rules, and regulations. These methods should align and enhance accomplishing the mission and operation of the department. They also must be routinely reviewed for relevance and compliance with laws, regulations, and standards.

In addition, municipalities typically have overarching policies and procedures that pertain to all departments. These include—but are not limited to—the following subjects: Civil service, discipline, information technology use, proper use of government property, communicating with the public, and purchasing.

The rules and procedures used by fire departments can often be segregated into three categories: Regulatory, Policy, and Guidance. Examples of the contents of each of these categories include the following:

- **Regulatory**: Includes rules and regulations, code of conduct, and code of ethics.
- **Policy**: Includes those written or adopted by the elected or appointed authority. These are essentially the rigidly enforced practices of the department.
- **Guidance**: includes standard operating procedures, guidelines, or other direction of the leader's intent. These documents explain how something is performed or provides a framework for decision-making.

The City has a Civil Service Commission, and civil service rules in place to establish consistency in hiring, discipline, promotions, and other personnel actions. The rules were last reviewed and revised in 2017. The department uses Standard Operating Guidelines (SOGs) in providing direction to employees. ESCI understands these guidelines are continuously under review and are modified as appropriate.

Department policies are also in place, but are not routinely reviewed for consistency, nor are they trained on within RSFD. The Department should use a pragmatic and organized approach when considering the review and update of policies and procedures. RSFD's policies, procedures, and operating guidelines should be formally reviewed and revised as appropriate on a planned cycle. ESCI recommends that one-third of the documents be reviewed each year so that the complete set is reviewed and revised every three years.

Critical Issues

All public safety agencies face critical issues and challenges. Effective leadership in addressing these issues often involves leveraging the latent talents and expertise of organizational teams, department personnel, and, on occasion, outside resources. ESCI asked the Fire Chief to identify four critical issues facing the Department. These issues are:

- Insufficient staffing to meet basic fire incident needs (9 personnel minimum per shift).
- Lack of vision for facilities and capital improvements.
- Not enough management to accomplish consistency across all shifts/crews.
- Auto-aid agreements needed.

These are significant issues, which should not be considered as strictly a fire department problem. Adequately addressing these issues will require extensive involvement with City elected officials and other City department heads. Specific recommendations and implementation timeframes are addressed later in this report.

Internal and External Communications

The RSFD is a small-to-midsized fire department responsible for managing a workforce distributed across three shifts and three fire stations. Consistently and concisely communicating with shift workers across three shifts poses logistical challenges, requiring strategic, accurate, and affirming approaches to ensuring everyone "gets the message." Clear, consistent, and open communication is vital to the health of any fire service organization, as rumors and inaccurate information can quickly spread and undermine the mission and morale of the organization.

The Fire Chief holds monthly staff meetings with Battalion Chiefs, expecting that the communication flow will continue between Battalion Chiefs and the line personnel on each shift. It is important that the communication flow be two-way, with the Battalion Chiefs bringing information and issues from the line to the management team for discussion and resolution.

E-mail is a communication tool used often by fire departments, and Rock Springs is no exception. However, it is important to use it appropriately if communicating important or sensitive topics, as email lacks contextual perspective, and is a poor substitute for two-way communication. RSFD is utilizing most communication methods used by today's modern fire department. Intranet is a useful (although passive) tool in communicating larger topics. Fire departments often rely on intranet for training and certification materials, regulatory documents, and other resources.

All-hands meetings (all personnel gathered for one meeting) can be a powerful communication method. However, they are often expensive and logistically challenging to set up. This should be reserved for dealing with very specific circumstances that require sensitive and immediate wide-spread dissemination of information. Conversely, shift meetings and station "roundtable" meetings are excellent communication mediums that can facilitate powerful and intimate two-way communication and information sharing between senior command staff and operations personnel. The Department's chain of command, as noted in the organizational chart, clearly delineates authority and respective communication channels, and the Fire Chief and Command Staff meet monthly.

In today's "hyper speed" world of communication, the public expects strategic, frequent, responsive, and transparent communication from government agencies. Engaging external stakeholders—citizens, other City departments, and surrounding emergency response agencies—is also important to the credibility and success of RSFD.

RSFD uses passive methods that require citizens to take affirmative action to receive information, such as accessing the fire department website or using a survey only when interacting with the Fire Inspector. The Department's Facebook page is regularly updated and has over 870 followers.

Additional tools are available to push the communication and information out to the community. Examples include additional platforms like Instagram®, Twitter®, Fire Department newsletter (included with utility bills, etc.), community open-houses, or speakers bureau membership.

Establishing clear expectations of how department members should conduct themselves on social media—on and off the job—is critical to ensuring the community holds the department and its members in high regard. Over the past few years, public employees and their agencies nationally have been criticized for inappropriate social media posts. Examples include, but are not limited to, sharing of confidential patient information, derogatory racial slurs, discriminatory or slanderous statements, or crude and inappropriate jokes. In many cases, employees have received significant discipline, including termination, and the agency's reputation has been needlessly sullied.

To address these issues, ESCI recommends adopting and enforcing a department social media use policy prohibiting public statements by employees that:

- Are defamatory, obscene, discriminatory, slanderous, or unlawful; and/or
- Tend to compromise administration of agency discipline; and/or
- Damage or impugn the reputation and/or efficiency of the Department or member.

Security and Record-Keeping

Either manual keypad locks secure RSFD buildings and facilities, or in the case of Station 3 and Headquarters, manually locked doors. Apparatus bay doors are occasionally left open for station activities/public access, which can compromise station security if not closely monitored. Fire department offices are not secured, which can be a problem in protecting sensitive records. Computer systems are password protected and managed by the City's Information Technology department. Response vehicles rely on locked fire stations to provide security (which can be defeated with open bay doors as identified above). When parked outside, keys are kept in lockboxes.

The department performs all hose testing, and maintains all relevant test records. Minor repairs to self-contained breathing apparatus (SCBA) are performed in house, along with fit testing, while pump, ladder, and breathing air testing are contracted to a third party. Fire apparatus repair records are not maintained at RSFD, and some paper records are kept at the City Garage. The lack of a searchable database makes future decision-making on apparatus replacement very difficult and time-consuming. Additional information on this can be found in the Capital section of this report. Atmospheric gas monitor calibration and testing are also performed internally.

Proper record-keeping and secure record archiving are essential to meet legal, regulatory, and business best practices for government agencies. Secure document archiving can also assist in addressing legal and/or other administrative actions confronting a fire department.

Non-EMS incident reporting is conducted through the Emergency Reporting® cloud-based records management system. This system, and an in-house investigation companion program, are compatible with Wyoming State Fire Marshal requirements. EMS records are kept on an Image-Trend® based program coordinated through the Wyoming Office of Emergency Medical Services.

Fire department management, financial, or operational reports are not routinely provided to the City Council. However, an annual report is produced and distributed to the City Council and posted on the RSFD website for public consumption. Included in the report are major activity centers (fire prevention, training, and emergency operations. The operations section includes some incident demand analysis (mostly geographical and temporal analysis). It does not include response performance data or analysis. This is a critical omission since residents do not know what an effective response (time-based or personnel-based) performance is.

RSFD appears to have an informal process in place for public records access, and requests are typically routed through the Mayor's Office or Fire Chief. The process should be more clearly defined via City policy and clearly communicated to internal stakeholders and the general public. Personnel records are kept in hard copy and electronic form in the City's Human Resources Department and/or archived City files depending on the type of record. Employee exposure reports should be included in a separate medical section of individual personnel files maintained at Human Resources. These are sound practices in the fire service industry and City government.

Lastly, ESCI understands the City recently eliminated the Human Resources (HR) Department, and distributed HR specific functions to individual departments. The future implications and impacts of this change are not yet known. However, Department staff are concerned about the loss of this expert resource in assisting with future complex HR and personnel issues.

STAFFING AND PERSONNEL

Managing personnel to achieve maximum efficiency, professionalism, and personal satisfaction is an art as much as a science. Consistency, fairness, safety, and opportunities for personal and professional growth are key values in a healthy management culture.

Several national organizations recommend standards to address staffing issues. The *Occupational Health & Safety Administration* (OSHA) *Respiratory Protection Standard*, and the *National Fire Protection Association* (NFPA) Standard 1710 are frequently cited as authoritative documents.[12,13] In addition, the *Center for Public Safety Excellence* (CPSE) publishes benchmarks for the number of personnel recommended on an emergency scene for various levels of risk.

An appropriate balance of administration and support staff, compared to operational resources and service levels, is an important consideration to achieving organizational success. It is important to remember that key administrative and logistical support positions are critical in maintaining an efficient and effective fire department.

Personnel Policies & Processes

RSFD's administrative components were evaluated to determine if they were contemporary and consistent with the best practices used by other fire departments studied by ESCI. The Department maintains a personnel policy manual and archives old policies. However, the policies are not evaluated and updated regularly. Interestingly, City personnel policies are codified by City ordinance. Personnel records are kept by the Department and at City Hall, depending on the type of record. However, some past employee personnel records, including injury and accident reports and medical and exposure records, have been lost.

Ensuring the health and safety of employees should be a high priority in any business or government organization. Many fire service organizations offer proactive wellness programs designed to promote and support healthy lifestyles and to ward off illness and injury. Many of these programs also support mental health wellness, which is even more important for those working in emergency services. The Department has firefighter medical standards, a formal Safety Committee, and Critical Incident Debriefing and Employee Assistance Programs.

Hiring, promotional processes, and discipline fall under the purview of the City's Fire Civil Service Commission (FCSC). Newly hired firefighters serve as at-will probationary employees for one year, after which they must have successfully passed examinations related to familiarity of City streets and topography and have obtained State of Wyoming Firefighter I & II certifications. Employees must have at least four years of progressive firefighter experience with RSFD to be eligible for promotion.

Medical Assessment Discussion

RSFD has established medical standards and requires a comprehensive firefighter medical examination after being conditionally hired, and annually after that. The physical's components consist of the same components as its annual Hazardous Materials physical. The Department is currently investigating if the components and testing conform with NFPA 1582: *Standard on Comprehensive Occupational Medical Program for Fire Departments*.

Confirming that firefighters are medically fit to meet the strenuous duties associated with emergency response and fireground tasks is paramount. State and federal law mandate respiratory medical assessment, clearance, and fit-testing for anyone required to wear a respirator. *CFR 1910.134(e)(1)* requires that employees obtain a medical clearance from a physician or other licensed healthcare professional before they can wear a respirator (including N95, N100, P100, and HEPA respirators), and must be annually fit-tested.

Firefighter Hiring & Selection Process

Recruiting, selecting, and retaining firefighters takes a considerable investment of time, effort, and money to ensure high-quality individuals are employed with the organization. Selecting the best candidates that fit within the Department and its culture requires a deliberate and comprehensive evaluation. The process used by RSFD is generally similar to other career fire department selection processes, which includes a formal application, background check, written examination, physical agility assessment, interview(s), and medical examination after acceptance of conditional employment. RSFD's process does not include a reference check or psychological examination.

The Department typically advertises for the testing process approximately 60 days before the deadline for submitting applications. Firefighter candidates must be at least 19 years old at the time of hire. Candidates submit applications via mail or in person, and complete a candidate testing process consistent with Rock Springs' FCSC Rules. This process consists of:

- A written examination (minimum 73% passing score)
- Physical Agility Test
- Oral Interview

Candidates must complete the written test within two hours, and pass with a score of 73% or higher. Upon successful completion, candidates are sent to complete a physical agility test. The in-house administered physical agility test is pass-fail, and consists of the following components, which must be completed within 6 minutes, 30 seconds:

- Hose shoulder carry-up four flights of stairs (42 lbs.)
- Pick up and carry a smoke ejector fan 75 feet and place on window sill (50 lbs.)
- Sledge hammer-Keiser sled beam slide (9 lbs. sledgehammer)
- Obstacle course walk (140 feet) around traffic cones
- Advance charged hose line 75 feet
- Dummy drag 85 feet (170 lbs. dummy)

All test stations are completed while wearing a 50-pound weighted vest and turnout gear.

The members of the FCSC then interview candidates who successfully complete the preceding test components. Candidates must pass the oral interview with a score of 75% or higher. Subsequently, background are performed by the Department. Finally, the written and oral interview scores are ranked by the FCSC, a background check is conducted, and a formal hiring list is established when backgrounds and references are complete. For each vacancy, the Fire Chief asks the Commission for the top five names on the hiring list for further consideration, which consists of an interview with the Department's command staff. The Department always maintains a hiring list of at least five candidates.

Upon offer of conditional employment, the candidate(s) must successfully pass a comprehensive medical examination as previously noted.

Hiring Process Discussion

RSFD use of the FCSC in overseeing the testing process is consistent with most other municipal fire department testing processes, and helps ensure impartiality.

Over the past few years, the hiring practices in fire departments across the country have been challenged by allegations of bias and discrimination. For example, the New York City Fire Department's and Los Angeles Fire Department's new hire testing practices were questioned, resulting in the suspension of the hiring process and revocation of some conditional job offers. Outside experts were brought in to analyze historical hiring outcomes, existing hiring administrative procedures, and subsequently make recommendations for improvement.[14] As a result, significant changes were made, at great expense, to ensure a fair and impartial hiring process.

Regarding physical agility testing for entry-level firefighters, past legal challenges alleging discrimination and unfair administration in testing led to the creation of the Candidate Physical Agility Test (CPAT). The City of Chicago faced this reality in 2011, when several female firefighter and paramedic candidates filed a federal lawsuit, claiming the department's in-house created physical agility testing process was discriminatory against women.[15] The lawsuits were settled after the city spent millions in settlements and legal fees, and the city now requires a current CPAT card to apply for the department.

The CPAT program, created jointly by the *IAFF* and *IAFC* in the late 1990s, has been scientifically and legally vetted, and is now considered the standard in fairly assessing a candidate's physical abilities to perform basic fireground tasks.

Many jurisdictions find the CPAT program difficult to adopt and administer due to the extensive, and often expensive, requirements for licensing. To address this issue, some departments allow candidates to apply for the hiring process if they have a current (within one year) CPAT card. Laramie and Cheyenne Fire Departments use this approach, along with administering the CPAT testing process for those without current cards. Due to RSFD's distance from the nearest CPAT testing location (Laramie, Wyoming, and Orem, Utah), requiring candidates to take this test in either location during the RSFD testing period would be problematic, and likely result in fewer applicants. Allowing candidates with current CPAT cards to forego the physical agility test is also problematic, as the RSFD physical agility test is significantly different, and may be viewed as inequitable.

Union Agreement

Operations personnel are represented by the *International Association of Firefighters* (IAFF) Local 1499. The local is within the jurisdiction of IAFF District 9. The current collective bargaining agreement (CBA) expires at the end of June 2020, and negotiations are underway at the time of this study. The non-uniformed full-time administrative employee is represented by the United Mine Workers of America Local 4893.

Administrative Support Staffing

No progressive fire department can operate without strong and expert administrative support. Efficient management and administration require personnel with specific administrative and technical skills to effectively support the organization's core mission. With that said, ESCI noted that the department has only one administrative support position to serve the entire department.

Administrative Staffing Discussion

Analyzing the ratio of administrative and support positions to the total operational positions of a fire department facilitates an understanding of the relative number of resources committed to this important function. The ratio of RSFD administrative uniformed and civilian support staff is very low. ESCI questions if this arrangement is sustainable in the long term, due to the lack of "bench depth"—an absence of functional redundancies that can result in the crippling of normal operations if the administrative employee or Fire Chief becomes unavailable for work for an extended period of time.

Emergency Operations Staffing

ESCI evaluated the type and number of career operations staff positions. The following figure summarizes the number of career operations positions.

Figure 11: Career Operations Staff Positions

Operations Positions	RSFD
Battalion Chief AEMT/EMT-I	2
Battalion Chief Paramedic	2
Captain AEMT/EMT-I	9
Firefighter EMT	2
Firefighter AEMT/EMT-I	11
Firefighter Paramedic	7
Total Operations Positions:	**33**
Percent Officers to Firefighters:	**36%**

ESCI calculated the theoretical total number of full-time employees required to meet the various average leave hours used by employees in 2018 and compared the results to the current number of operations employees assigned to 24-hour staffed units.

The analysis compared the average available scheduled weekly work hours per employee, subtracted the average various leave types—based on 2018–2019 historical leave-use data—and calculated sick and vacation relief factors. ESCI then multiplied the number of personnel needed to cover a single position at 24-hours daily, with the relief factor, to determine the total number of employees theoretically required to meet daily minimum staffing. Personnel working a 40-hour work schedule were not included in this calculation.

ESCI consolidated unscheduled leave usage, including sick, FMLA, funeral, military, and workers compensation leaves in calculating the sick leave relief factor. To estimate vacation leave usage, ESCI averaged the vacation hours used between June 2017 and June 2019, and divided by the number of operations employees.

The following figure summarizes the results of these calculations.

Figure 12: Theoretical Relief Factor Calculation (2018)

Relief Factor	RSFD
Sick Leave	1.21
Vacation Leave	1.17
Total Relief Factor:	**1.27**

Simply stated, the *Total Relief Factor* was multiplied by the minimum number of personnel needed to cover one 24-hour position seven days a week, and then multiplied by the minimum number of positions required on a 24-hour basis. The following figure compares the theoretical number of employees needed with the current number of employees assigned to the operations work schedule.

Figure 13: RSFD Calculated Operational Staff Shortage/Overage

No. Positions Required 24/7	Total No. Operations FTEs	Theoretical No. FTEs	Shortage/Overage
9	33	34	**-1**

It is important to note that this is a theoretical assessment. ESCI understands that 2018 sick leave usage was inordinately high due to several factors, including two long-term injuries, and a military reserve deployment.

Emergency Operations Staffing Discussion

Reconciling the results of this staffing resource analysis with current staffing levels and resource allocation strategies should be approached carefully. In ESCI's experience, the theoretical analysis does not necessarily account for any inherent scheduling or staffing flexibility by a department, which potentially can be leveraged to reduce workload and personnel costs.

Nor does it take into consideration the ongoing costs of providing the various benefits to full-time employees, which can be as high as 35% of the total cost of salaries, or the one-time cost of selecting, hiring, and outfitting new employees. These inherent expenses must be considered when analyzing the cost of adding full-time employees versus using overtime or part-time employees who do not receive benefits.

Wages & Benefits

ESCI evaluated the salary and benefits provided to RSFD employees. The following figure summarizes the salaries paid for the respective positions.

Figure 14: RSFD Staff Salaries, 2019

Positions	Starting Salary	Top Step Salary	Average Salary
Fire Chief	$101,348	$126,570	**$113,959**
Administrative Assistant	$49,524	$61,849	**$53,040**
Battalion Chief (Operations)	$76,980	$96,132	**$86,556**
Fire Captain	$69,780	$87,108	**$78,444**
Firefighter/EMT	$55,836	$69,780	**$62,808**
Firefighter/Paramedic	$57,580	$71,524	**$64,552**
Firefighter/AEMT/EMT-I	$56,917	$70,861	**$63,889**

None of the positions in operations that have firefighter responsibilities listed in the preceding figure include regularly scheduled FLSA overtime pay—as the work schedule and job duties qualify for the *FLSA 7(K)* exemption.

ESCI analyzed the various benefits provided by RSFD, which are summarized in the following figure:

Figure 15: Uniformed Employee Benefits Provided

Benefits Description	RSFD
Uniform Allowance	No
Educational Incentives	Yes
Social Security	No
Workers Compensation	Yes
Pension (PERS)	Yes
Deferred Compensation/Match	Yes
Medical	Yes
Dental	Yes
Long-term Disability	No
Vision	Yes
Life Insurance	Yes
Educational Incentives	No

RSFD firefighters are enrolled in the *Wyoming Retirement System Paid Fire B Pension Plan* program. Retirement payments are based on years of service multiplied by 2.8 and are capped at 70% of the highest average salary. The 70% accrual threshold is reached at 25 full years of service.

Non-uniformed administrative personnel are enrolled in the *Wyoming Retirement System Tier 2 Plan*.

Benefit costs average approximately 35% of total salary and wages across all positions, which includes monthly scheduled overtime pay.

Salaries & Benefits Discussion

ESCI noted that the CBA includes language that addresses a wage and salary survey that was conducted in 2000. The language states:

> *The Firefighters agree to recognize the Comprehensive Wage and Classification Study conducted by Personnel Concepts, Inc., and accepted by the City of Rock Springs pursuant to Resolution numbers 2000-174 and 2000-176, which, among other things, included a recommendation that Fire Department employees be paid within certain ranges having a minimum and a maximum monthly pay rate as identified within the study. The Firefighter Union agrees to have its members placed within the ranges recommended by the study as follows: Firefighter—Range No. 48, Captain—Range No. 57, Battalion Chief - Range No. 61. The Union agrees that once a member reaches the maximum monthly base rate within the range, the member may receive a base wage increase based exclusively upon the increase in the cost of living for southwest Wyoming, as negotiated and agreed upon by the Firefighters Union and the City.*

ESCI noted very little information and data are available for comparable fire departments in Wyoming. This is because there are only six other full-time career fire departments in Wyoming: The cities of Laramie, Cheyanne, Sheridan, Casper, and Natrona County Fire Departments.

Annual benefits costs appear to be in line with costs found in other fire departments studied by ESCI, which can range from 30% up to 45% or more, depending on the types of benefits paid, and the medical insurance packages selected.

Operations Work Schedule

RSFD operations employees are assigned to one of three platoons, and work a rotating 48 hours-on, 96 hours-off shift rotation, with no Kelly Days or other regularly scheduled shifts off to reduce the overall average workweek hours. This schedule results in an average 56-hour workweek. The following figure summarizes the shift schedule, FLSA work periods, and average scheduled hours for operations employees.

Figure 16: Operations Staff Work Schedule at the Districts

Schedule Components	RSFD
Shift Rotation	48-on/96-off
Average Workweek Hours	56 hours
FLSA Work Period	24 days
Total Annual Hours	2,918 hours
Shift Start Time	0700 hours

Operations BCs are occasionally used to backfill for Captain vacancies on fire apparatus.

Work Schedule & Staffing Discussion

The current average workweek schedule is 56 hours; which translates to an annual average of 2,918 hours. ESCI noted RSFD firefighters work two consecutive 24-hour shifts, followed by 96 consecutive hours off duty. The 24-hour shift remains the predominant schedule for fire departments in the western United States.

The 48-hour shift is an especially attractive shift schedule if employees must commute from long distances due to high housing costs, low housing inventory, or other demographic factors. However, the 48-hour schedule has been questioned due to concerns about sleep deprivation and safety impacts during the latter portion of the 48-hour shift. Given the frequency of overtime hire-back to meet minimum daily staffing, and shift trades, this schedule frequently results in employees working 72 hours up to 96 hours consecutively. ESCI noted that the Department does not have a written policy limiting the number of consecutive shifts/hours an employee can work.

As previously noted, RSFD should theoretically have additional personnel to provide coverage for scheduled and unscheduled leaves. The continued reliance on routinely hiring operations personnel back on overtime to cover for scheduled and unscheduled leaves should be carefully scrutinized, especially from a worker fatigue perspective of employees working 72 hours straight or more. Additionally, backfilling vacant company officer positions with an Operations Battalion Chief helps in reducing overtime expenditures, but reduces the available number of overall personnel available for response to significant incidents, and reduces overall administrative oversight on a shift by shift basis.

In looking at worker fatigue, and the impacts on safety, ESCI references *Federal Motor Carrier Safety Administration* (FMCSA) regulations. This agency aggressively regulates and monitors commercial transportation workers, including commercial pilots, railroad workers, long-haul truck drivers, and ship workers due to fatigue concerns. Regarding long-haul truck and passenger-carrying drivers, there are very restrictive rules in place to address potential driver fatigue. ESCI highlights these specific requirements because fire and EMS employees routinely drive emergency vehicles in all types of weather conditions.

The following figure is a summary of the rules for truck drivers. This is presented to provide context on the level of the federal government's concern on driver fatigue.[16]

Figure 17: Commercial Driver Rules for Work Hours

Property Carrying Drivers	Passenger Carrying Drivers
11-Hour Driving Limit May drive a maximum of 11 hours after 10 consecutive hours off-duty.	**10-Hour Driving Limit** May drive a maximum of 10 hours after 8 consecutive hours off-duty.
14-Hour Limit May not drive beyond the 14th consecutive hour after coming on duty, following 10 consecutive hours off-duty. Off-duty time does not extend the 14-hour period.	**15-Hour Limit** May not drive after having been on duty for 15 hours, following 8 consecutive hours off-duty. Off-duty time is not included in the 15-hour period.
Rest Breaks May drive only if 8 hours or less have passed since the end of the driver's last off-duty or sleeper-berth period of at least 30 minutes.	**60/70-Hour Limit** May not drive after 60/70 hours on duty in 7/8 consecutive days.

As noted in the preceding figure, the focus is not only on the length of the work periods, but also *the length of the off-duty/rest periods.* Given the 48-hour work schedule, relying on overtime hire back as a primary means of covering scheduled and unscheduled absences (vacation or scheduled training, for example), firefighter fatigue and burnout should be viewed as a legitimate concern within RSFD.

Staff Survey

As part of this study, ESCI used a confidential online survey to solicit feedback on various topics related to department operations and culture. The ten-question survey asked members how much they agreed or disagreed with various statements related to department operations, training, supervision, and response readiness. The full survey results, including individual comments, are listed in Appendix A. The following is a summary of the most significant findings of the survey.

Twenty members took the survey, which is approximately 55% of all Department members. The majority of the respondents were fire service veterans, with 79% having been a Department member for at least five years, and 58% having at least 10 years' experience.

The adequacy of fire suppression equipment was affirmed by 85% of the respondents. However, 40% of these respondents only somewhat agreed with the survey question, and 15% disagreed.

The survey question related to adequate training facilities and resources elicited a somewhat tepid response. While 85% agreed overall that training resources and facilities were safe and effective, 50% only somewhat agreed with the statement.

The question about the adequacy of station facilities and maintenance showed that members feel their stations are not adequate for their mission, with 70% either not having an opinion or disagreeing with the statement.

Department personnel feel the administration and officers hold safety as a high priority, with 70% agreeing or strongly agreeing, and 20% somewhat agreeing. In general, EMS training was ranked very high, with 90% of respondents feeling they are adequately trained, and a slightly lower percentage (85%) feeling like they had excellent equipment to treat EMS patients.

Fifty-five percent of the respondents felt they were familiar with the target hazard buildings in the city. However, 45% only somewhat agreed to this statement. Interestingly, no one felt that they did not have at least some familiarity with the target hazards.

Eighty percent felt ICS was appropriately used on emergency scenes, and notably, 35% only somewhat agreed, and 20% disagreed ICS was used consistently and appropriately.

Survey Discussion

Overall, the survey indicates that Department members feel fairly well prepared and equipped to respond to emergencies. However, there appear to be significant concerns about the adequacy and safety of the fire stations and training facilities. A summary and analysis of these facilities are discussed in other sections of this report.

Effective Response Force Analysis

ESCI reviewed RSFD's daily staffing level and compared it to national consensus standards related to providing enough personnel and resources to quickly mitigate emergency incidents—specifically, structure fires and critical EMS situations.

Critical Task Analysis

Tasks that must be performed at a fire can be broken down into two key components: life-safety and fire-flow. Life-safety tasks are based on the number of building occupants and their location, status, and ability to take self-preservation action. Life-safety related tasks involve the search, rescue, and evacuation of victims. The fire-flow component involves delivering enough water to extinguish the fire and create an environment within the building that allows entry by firefighters.

The number and types of tasks needing simultaneous action will dictate the minimum number of firefighters required to combat different types of fires. In the absence of adequate personnel to perform concurrent actions, the incident commander must prioritize the tasks and complete some in chronological order. These tasks include command, scene safety, search and rescue, fire attack, water supply, pump operation, ventilation, and back-up/rapid intervention. An initial full-alarm assignment should provide for the following:

- Establishment of incident command outside of the hazard area for the coordination and direction of the initial full-alarm assignment. A minimum of one individual shall be dedicated to this task.
- Establishment of an uninterrupted water supply of a minimum 400 GPM for 30 minutes. Supply line(s) shall be maintained by an operator who shall ensure an uninterrupted water flow application.
- Establishment of an effective water-flow application rate of 300 GPM from two handlines; each of which shall have a minimum of 100 GPM. Each attack and backup line shall be operated by a minimum of two individuals to effectively and safely maintain the line.
- Provision of one support person for each attack and backup line, deployed to provide hydrant hookup and to assist in line lays, utility control, and forcible entry.
- A minimum of a single-victim search and rescue team shall be part of the initial full alarm assignment. Each search and rescue team shall consist of a minimum of two individuals.
- A minimum of one ventilation team shall be part of the initial full alarm assignment. Each ventilation team shall consist of a minimum of two individuals.
- If an aerial device is used in operations, one person shall function as an aerial operator that always maintains control of the aerial device.
- Establishment of an IRIC (Initial Rapid Intervention Company, Rapid Intervention Team) that shall consist of a minimum of two properly equipped and trained individuals.

The *Commission on Fire Accreditation International* provides a sample critical tasking analysis for the number of emergency workers required for various levels of risk.[18] This is summarized as follows.

Figure 18: Sample Critical Task Staffing Need Based on Level of Risk

Critical Task	Maximum Risk	High Risk	Moderate Risk	Low Risk
Attack line	4	4	4	2
Search and rescue	4	2	2	
Ventilation	4	2	2	
Backup line/rapid intervention[2]	4	3	2	2
Pump operator	1	2	1	1
Water supply	1	1	1	
Utilities support	1	1	1	
Command/safety[3]	2	2	2	1
Forcible entry[1]	0			
Salvage[1]	0			
Overhaul	1			
Communication	1			
Chief's aide	1	1		
Operations section chief	1	1		
Logistics	1			
Planning	1			
Staging[1]	1			
Rehabilitation	1	1		
Division/group supervisors[1]	2			
High-rise evacuation[1]	10			
Stairwell support[1]	10			
Total Required:	**51**	**20**	**15**	**4–6**

[1]At maximum and high-risk fires, additional personnel may be needed for these tasks.

[2]Backup line may not be required for certain incidents.

[3]Can often be handled by the first due officer.

Delivering enough personnel to the scene to accomplish the various tasks required to mitigate an emergency is essential, and many of these tasks must be completed quickly. However, it should be noted that not all the tasks listed need to be completed simultaneously.

Typically, structure fires are the most labor-intensive incidents. As shown in the preceding figure, national criteria recommend at least 15 personnel should arrive at the scene of a fire in a single-family residence, to ensure safe and effective operations. Even more personnel may be required as dictated by the size of the building, incident complexity, and/or special hazards that may be encountered.

The fire service assesses the relative risk of properties and occurrences based on several factors. Properties with high risk for fire often require greater numbers of personnel and apparatus to mitigate the fire emergency effectively. Staffing and deployment decisions should be made with consideration of the level of risk involved. The level-of-risk categories used by CFAI are as follows:

- ***Low Risk*:** Areas and properties used for agricultural purposes, open space, low-density residential, and other low intensity uses.
- ***Moderate Risk*:** Areas and properties used for medium density single-family residences, small commercial and offices uses, low-intensity retail sales, and equivalently sized business activities.
- ***High Risk*:** Higher density business districts and structures, mixed-use areas, high-density residential, industrial, warehousing, and large mercantile structures.
- ***Maximum Risk*:** A structure or area where an incident could or does result in many severe injuries requiring hospitalization and/or fatalities. Significant damage—temporary or permanent—that impacts essential services or the environment. May result in substantial financial loss, general displacement for an extended duration.

Effective Response Force Discussion

Because of the limited daily operations staffing, it is clear RSFD is unable to muster an effective response force alone for anything other than a low-risk incident, and must rely on automatic aid from SWCFD1, SWCFD, and Green River Fire Department for moderate to high-risk incidents. This observation is not meant to denigrate the abilities or professionalism of the career responders. Rather, it is meant to highlight the very limited initial response capabilities and capacity to respond to high risk or concurrent incidents due to the Department's limited resources.

FINANCIAL ANALYSIS

A financial analysis is an important part of determining the long-term financial health and sustainability of the Rock Springs Fire Department and its ability to maintain and sustain an acceptable level of service. A model was developed for the RSFD expenditure budget, which was designed to fairly and consistently represent the financial practices of the Department. Modeling is designed to neutralize the normal differences usually found in unilateral fiscal practices and to account for any financial peculiarities. This approach allows an estimation of the public cost of the RSFD's operation and provides a means for the financial evaluation of sustainability under status quo conditions. The modeled budget yields a baseline estimate of the current and projected public cost of services.

The following section provides background information on the historical and current financial condition of the RSFD. Understanding of fire service financial resources and costs begins with an overview of the current operating conditions, including analysis and discussion of the financial structure for the RSFD. This includes a multi-year historical review followed by a status quo financial forecast from FY 2020 through FY 2025, utilizing historical trend data and key assumptions about future trajectory. This analysis relies on the extensive financial documentation provided by staff, including actual and projected budgets for the period 2013–2019 and 2020, respectively.

As noted earlier in this document, Rock Springs is an independent city of the first-class incorporated on October 6, 1888, in Sweetwater County, in southwestern Wyoming. The City operates under a Council-Mayor form of government with the mayor and eight council members serving four-year terms. The City Council sets policy and the City Mayor executes that policy through various department heads, including the RSFD Fire Chief. Department heads are appointed by the Mayor and subject to approval by Council. The City operates under a July 1 to June 30 fiscal year. The City utilizes the current financial resources measurement focus and a modified accrual basis of accounting for governmental funds, including the General Fund (GF).[17,18]

The Rock Springs Fire Department provides traditional fire rescue services, including Basic Life Support (BLS) first response Emergency Medical Service (EMS) to assist Sweetwater Medics, which is the third-party Advanced Life Support (ALS) and transport agency serving the City. The RSFD is a major external service department of the City whose operating budget (110-12-1205) resides within the City General Fund (Fund 110). Fire department-specific revenues and operating expenses, including major capital expenditures, are funded through the RSFD annual operating budget. Capital equipment is defined as having an initial value of greater than $5,000 and other capital (buildings, improvements, land, and other infrastructure) is defined as having a value of greater than $25,000. Capital items are expensed in the year in which they are acquired. The City maintains a capital reserve into which funds are deposited each year based upon a long-range capital improvement plan (CIP). Capital reserve funding is included in the fire department's annual expenditure budget as appropriate.

The following snapshot of historical financial results and the status quo projection for the department—assuming no changes in organizational structure and working conditions—sets the stage for modeling various alternatives to the status quo should the Department wish to do so in the future. The status quo projection utilizes a series of expenditure assumptions based upon historical trajectory and known or expected future conditions in the community. Revenue projections are not included since the fire department is one of several within the City General Fund, and there is no appreciable fire department-specific funding.

Historical Revenue and Expense

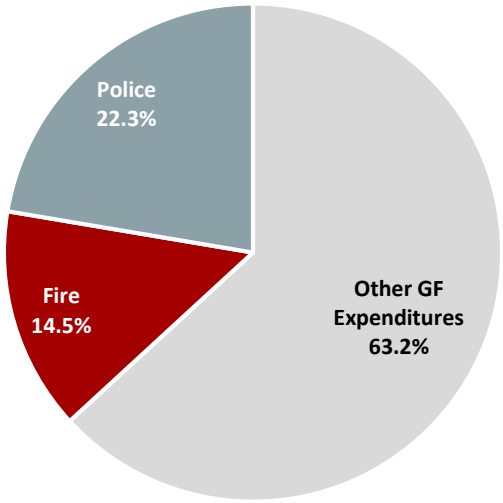
Revenue

As mentioned above, the Rock Springs Fire Department is one of several internal and external service departments housed withing the City General Fund. Other than some minor grant funding, there are no fire department-specific revenues to offset department expenditures. As with other GF departments, the expenses are offset with City general revenues, the largest of which is the sales and use tax.

Expense

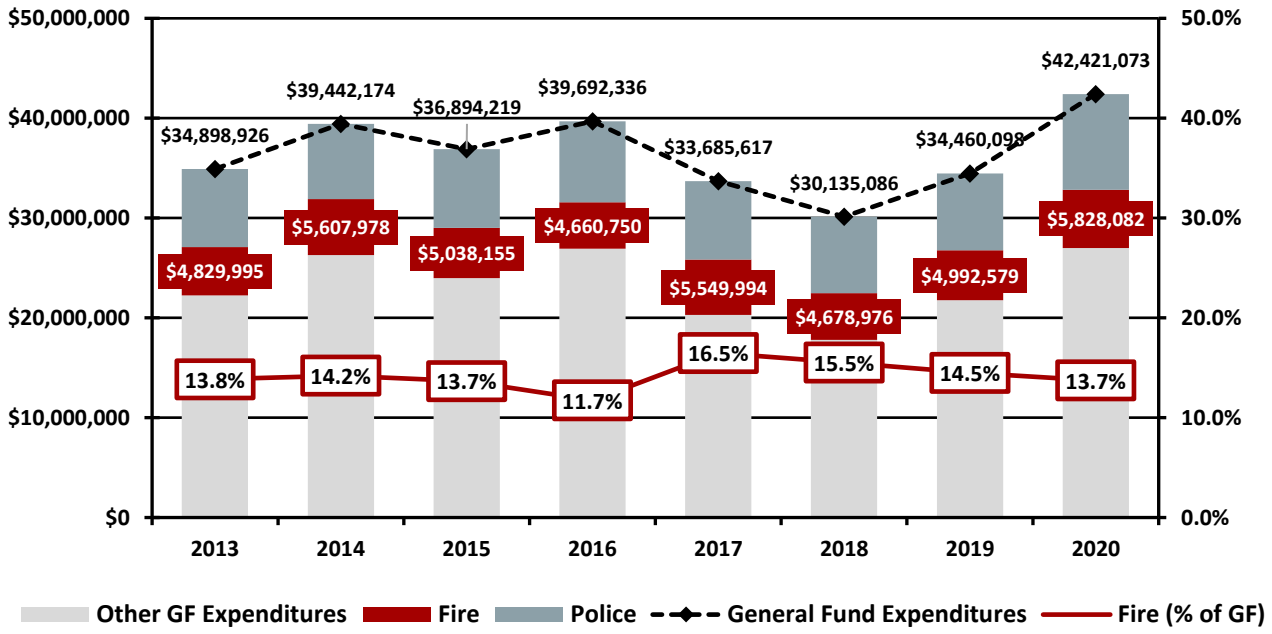
The Rock Springs Fire Department is one of four City Public Safety departments located within the City's General Fund (GF). The four include the Police (110-12-1201), Fire (110-12-1205), Animal Control (110-12-1202), and Emergency Management (110-12-1204) departments. The Police and Fire departments comprised just under 40% of the total GF expenditures in FY 2019, as shown in the following figure.

Figure 19: Comparison of FY 2019 Actual Police & Fire Department vs. Other GF Department Expense



It is important to note that the City is part of a Joint Powers Agreement (JPA) with Sweetwater County and the City of Green River to operate a combined 911 communications center. There are three members from each agency on the board of the JPA, and the City's prorated cost is 43% of the total for the three agencies. The City reports the entire cost of its portion of the JPA in the Police Department expenditure budget ($1.35 million for FY 2020). The RSFD is dispatched through the combined communications center; therefore, a portion of the City's share of the JPA could reasonably be attributed to the fire department through an allocation process as part of its total cost to the City. Further, other supporting costs of maintaining a fire department such as Human Resources, Budget and Finance, Legal, and other similar costs could be attributed to the fire department through an allocation process to understand the fully burdened cost of running the fire department. Since the RSFD is part of the GF, there would be no change in the GF expenditure budget by implementing a full cost allocation methodology. However, at least performing the analysis would provide elected officials and the public with a better idea of the full cost of providing fire service to the City.

Figure 20: Historical Comparison of Fire Department to Police & Other GF Department Expense (FY 2013–2019 Actual, FY 2020 Adopted)



A review of the expenditure relationships in the GF for the period FY 2013–2019 Actual and FY 2020 as budgeted, shows in Figure 20 that the actual overall GF expenditure budget has fluctuated significantly over the period, rising from just under $35 million in FY 2013 to between near $37 million and $40 million from FY 2014 to FY 2016, before falling back to a low of $30 million in FY 2018. Total GF expense then rose to almost $34.5 million in FY 2019 and is budgeted at $42.4 million in FY 2020. The bulk of this fluctuation is driven by non-recurring capital expenditures and the movement of funds into the capital reserve. Fire department expenditures as a percentage of the actual GF expenditure budget have varied from a low of 11.7% in FY 2016 to a high of 16.5% in FY 2017; again, driven primarily by variability in non-recurring capital charges (either in actual capital purchases or transfers to the capital reserve). Although transfers to capital reserves are not actual expenditures, they do reflect committed reserves for future capital spending.

The following figure shows actual Rock Springs Fire Department expenditures for the period FY 2013–2019 and adopted expenditures for FY 2020, which are divided into recurring and non-recurring expense. Recurring expenses are those such as employee wages and benefits, operations and maintenance costs, and debt service (P & I) that are reasonably predictable and expected to continue from year-to-year. In some cases, larger fire departments have such a large fleet that they can spend a predictable amount each year on apparatus and equipment replacement. Typically, they consider this a recurring cost and can budget such with an offsetting recurring revenue.

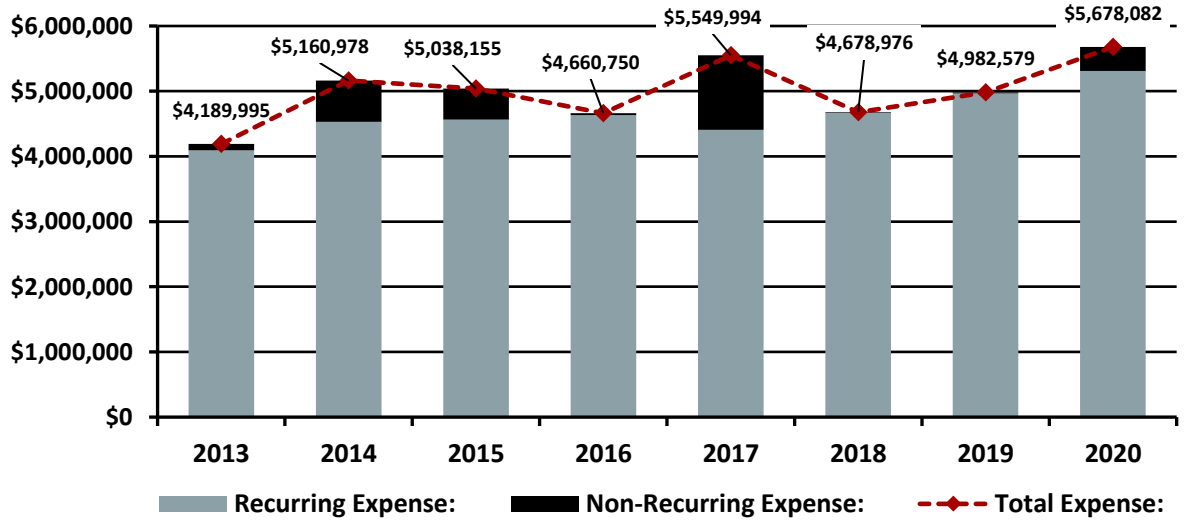
Non-recurring expenses, on the other hand, are more sporadic in nature and may be difficult to predict, such as land acquisition, facility construction, and major renovation and large-scale equipment or apparatus purchases. Budgeted transfers to the capital replacement fund are documented in Figure 21 since they are shown in City actual expenditure budgets with funds committed to future capital acquisition. However, they have not been included in the total annual expense since the expenditure for the capital item had not yet occurred during the fiscal year in which the transfer occurred. In this analysis, all capital expenditures are treated as non-recurring expenses.

Figure 21: Rock Springs Fire Department Expenses (FY 2013–2019 Actual; 2020 Adopted)

Expense	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Adopted
Personnel Services	3,880,719	4,319,404	4,374,410	4,462,641	4,229,111	4,479,255	4,694,572	5,018,489
Regular	*2,365,377*	*2,654,999*	*2,404,690*	*2,545,210*	*2,493,266*	*2,539,396*	*2,511,070*	*2,735,000*
Overtime	*244,186*	*324,911*	*560,576*	*496,464*	*386,406*	*494,540*	*652,490*	*551,000*
Benefits	*1,271,156*	*1,339,494*	*1,409,145*	*1,420,968*	*1,349,440*	*1,445,320*	*1,531,013*	*1,732,489*
Operations & Maint.	211,455	212,253	191,387	170,200	175,605	189,260	273,726	289,618
Recurring Expense:	4,092,174	4,531,657	4,565,797	4,632,841	4,404,716	4,668,516	4,968,298	5,308,107
Capital	97,821	629,321	472,358	27,909	1,145,278	10,461	14,281	369,975
Building Improvements	*60,676*	*14,562*	*43,294*	*20,426*	-	-	*2,700*	*243,730*
New Equipment	*29,045*	*90,106*	*11,678*	*7,483*	*8,546*	*2,183*	*3,927*	*28,695*
Replacement Equipment	*8,100*	*16,912*	*417,386*	-	*3,310*	*8,278*	*4,178*	*3,000*
Vehicle Purchases	-	*507,740*	-	-	*1,133,422*	-	*3,476*	*94,550*
Non-Recur Expense:	97,821	629,321	472,358	27,909	1,145,278	10,461	14,281	369,975
Total Expense:	**4,189,995**	**5,160,978**	**5,038,155**	**4,660,750**	**5,549,994**	**4,678,976**	**4,982,579**	**5,678,082**
Reserve (transfer to)	640,000	450,000	-	-	-	-	10,000	150,000
Equip Reserve	*140,000*	*150,000*	-	-	-	-	*5,000*	-
Engine Rep-6 Year Reserve	*200,000*	*300,000*	-	-	-	-	*5,000*	*150,000*
Facility Const Reserve	*300,000*	-	-	-	-	-	-	-

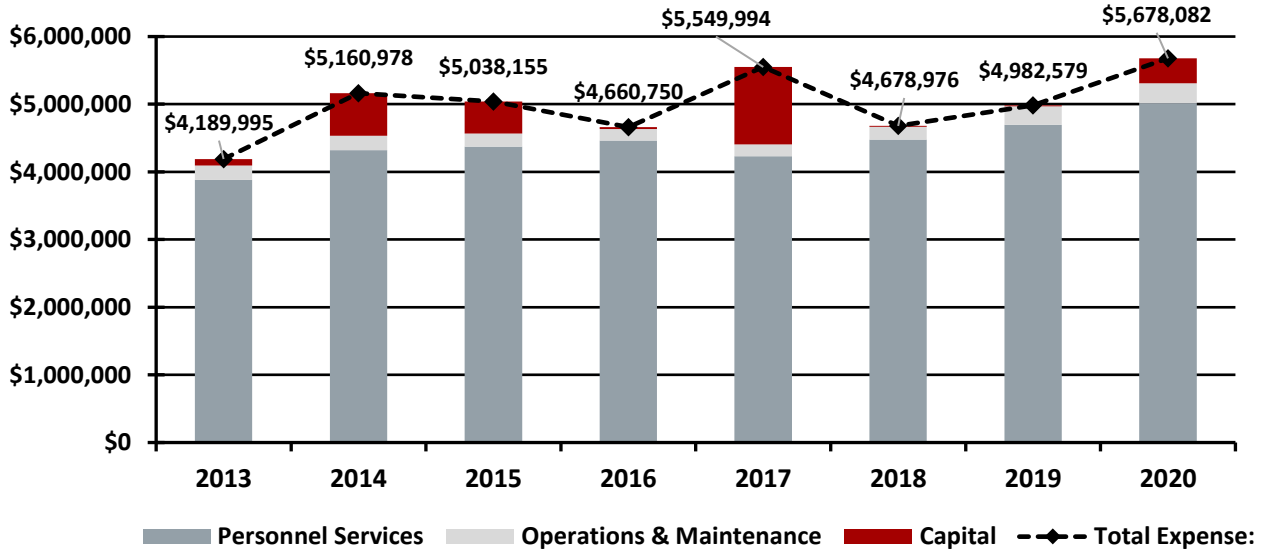
The following figure compares recurring, non-recurring, and total departmental expenses (excluding transfers to reserve) from FY 2013 through FY 2019 actual with FY 2020 budgeted. The recurring expense for the department has fluctuated, driving the overall department expenditures upward from just under $4.1 million in FY 2013 to an average of near $4.6 million between FY 2014 and FY 2016 before dropping back to $4.4 million in FY 2017 after which it increased steadily to a budgeted $5.3 million in FY 2020. Non-recurring expenses have varied considerably from less than $100,000 in FY 2013, FY 2016, FY 2018, and FY 2019, to a high of $1.15 million in FY 2017.

Figure 22: Relationship of Recurring to Non-Recurring Expenses (FY 2013–2019 Actual; FY 2020 Adopted)



Another way to view RSFD expenditures is to compare major expense categories to total departmental expenses, as shown in Figure 23. Capital expenditures have varied from less than 0.5% in FY 2016, FY 2018, and FY 2019, to a high of almost 21% of total expenditures in FY 2017 with the higher percentages occurring with capital apparatus or major equipment purchases and/or building renovations.

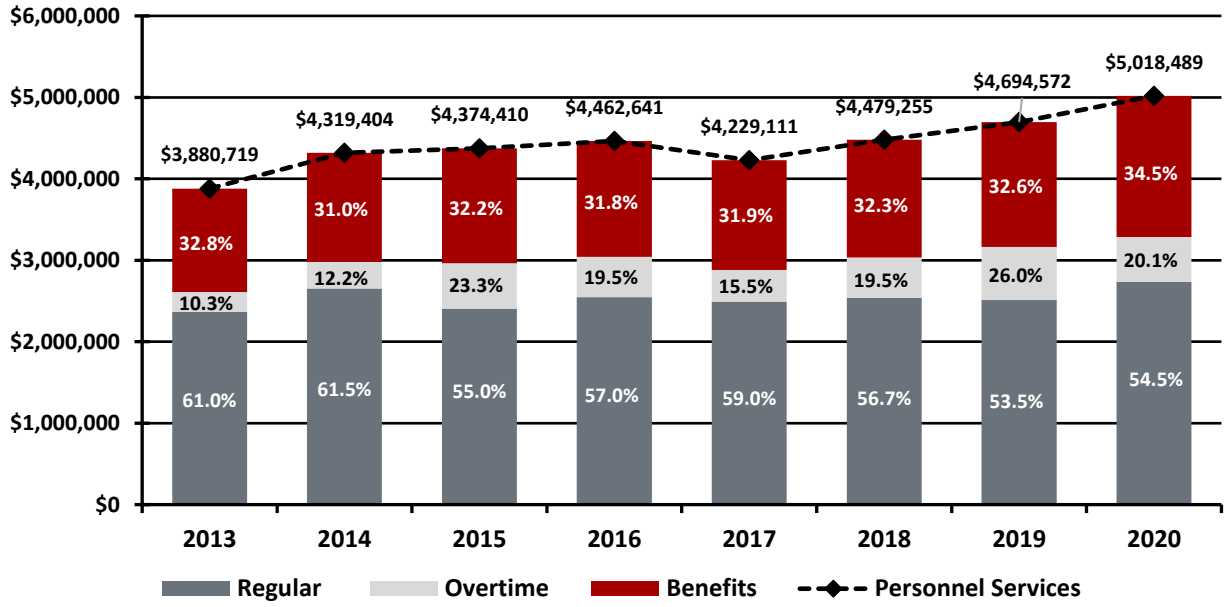
Figure 23: Relationship of Major Expenditure Categories to total Expense (FY 2013–2019 Actual; FY 2020 Budget)



Generally, background capital expense for the department has not been a significant percentage of the total, and most expense through 2019 has been recurring in nature. Personnel costs as a percentage of annual recurring costs have fluctuated very tightly around an average of 95.4%. Operations and Maintenance costs generally run less than 5% of recurring costs averaging 4.6%. Recurring expenses can be divided into major categories described as follows:

- **Personnel Services**—included in this category are regular wages and salaries, overtime wages, and employee benefits. Figure 24 shows the increase in total Personnel costs (dashed line) and the component parts of total compensation; Regular Salaries/Wages (dark grey bars), Overtime (light gray bars) and Benefits (red bars), from FY 2013 to 2019 actual and FY 2020 as budgeted. Dollar amounts are shown as bars while the numbers within the bars represent regular wages as a percent of total compensation (for Regular), overtime wages as a percent of regular pay (for Overtime), and Benefits as a percent of total compensation (for Benefits).

Figure 24: Personnel Services Cost Breakdown (FY 2013–2019 Actual; FY 2020 budget)



Between FY 2015 and FY 2019, the period for which staffing data are available, the Department added one Battalion Chief position at an approximate FY 2019 cost of $132,000. Subtracting the estimated cost of this additional position from the FY 2019 Personnel Services total expense leaves $4,562,572. Therefore, the total adjusted cost increase experienced between FY 2015 and FY 2019 was $188,162 or 4.3%, or an average annual increase of just 1.2%.

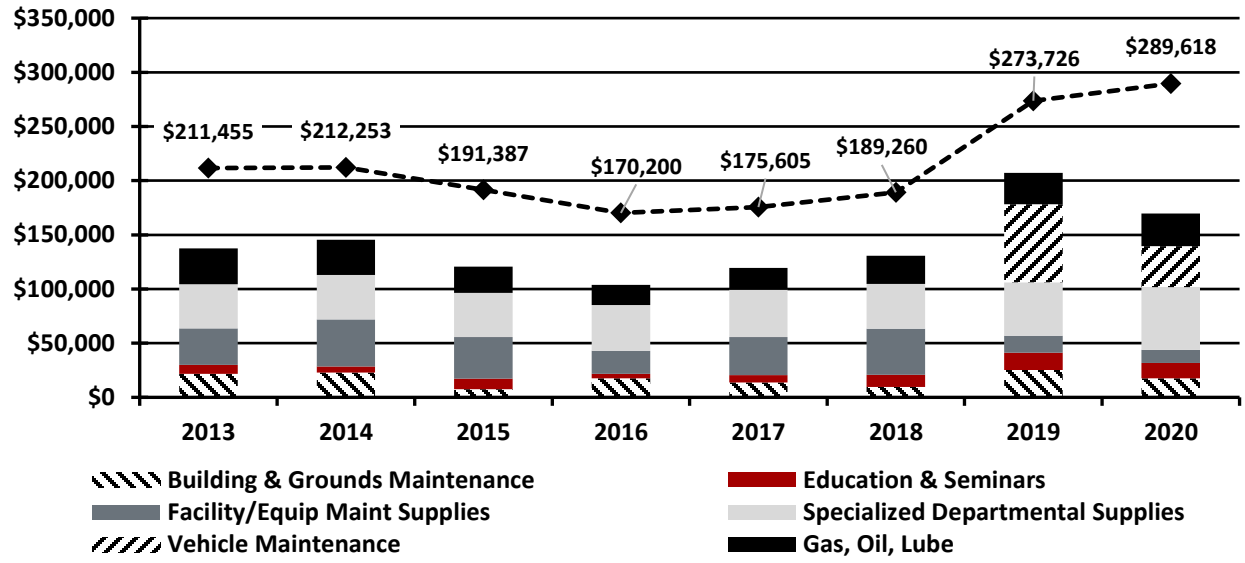
Overtime, as a percentage of Regular wages, has increased from just over 10% in FY 2013 to 26% as of FY 2019, a significant increase that should be further reviewed.

Benefits as a percentage of total compensation have generally varied tightly around an average of 32%.

- **Materials and Services**—this category of expenditures is comprised of utilities, equipment, and apparatus maintenance costs, books and office supplies, training, prevention, operating supplies, and other related costs, among others. The following figure shows total historical costs for this category along with the six-line items making up over 75% of the total cost for FY 2019 in this category. The largest components in FY 2010 were: Education Seminars (5.8%), Building and Grounds Maintenance (9.3%), Facilities and Equipment Maintenance Supplies (5.7%), Vehicle Maintenance (26.3%), Specialized Department Supplies (18.1%), and Gas, Oil, and Lubricants (10.6%).

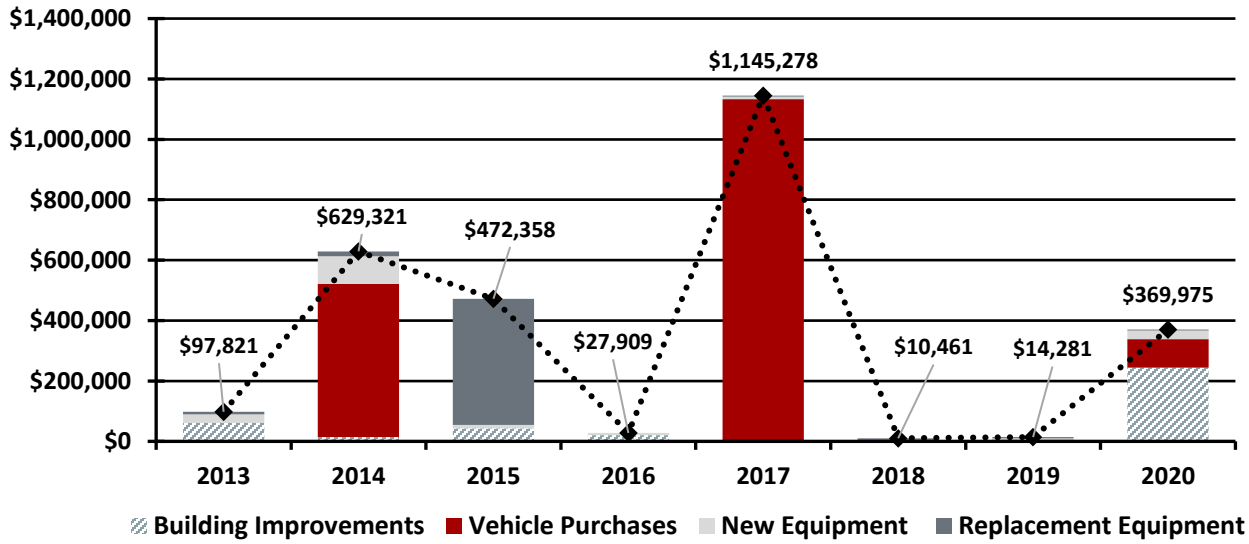
  The category of recurring expenses declined from just over $210,000 in FY 2013–2014 to a low of $170,000 in FY 2016 before gradually climbing to almost $190,000 in FY 2018. The addition of vehicle maintenance charges in FY 2019 caused a large increase in costs for this component, which rose to $273,726 and is proposed to increase again in FY 2020 to almost $290,000.

Figure 25: Total Materials and Services Cost vs. Major Components (FY 2013–2019 Actual; 2020 Budget)



As mentioned previously, non-recurring expenses have varied considerably from less than $100,000 in FY 2013, FY 2016, FY 2018, and FY 2019, to a high of $1.15 million in FY 2017. The department generally spends less than $100,000 annually on capital items, including equipment and apparatus and facility improvements. However, when larger apparatus such as fire engines are replaced, this amount can range from one-half to over $1 million in any given year based upon the Department's portion of the City CIP. Non-recurring expenses by category are shown in the following figure, where the major increase in FY 2017 is due to the purchase of a replacement engine.

Figure 26: Rock Springs FD Capital Expenses by Category (FY 2013–2019 Actual; FY 2020 Adopted)



Status Quo Projection

ESCI evaluated the historical information provided by the Department, City CAFRs, and past budgets, as well as portions of the adopted FY 2020 budget to prepare a status quo forecast for RSFD. The forecast relies on trends previously developed through the historical review period along with forecast information available from the department, in order to understand potential anomalies due to personnel changes, apparatus acquisitions, and other major events. No fire department-specific revenues sources were assumed to be generated, and it is anticipated that the department remains within the City General Fund with expenses offset by GF revenues. Certain assumptions were made about expenses. These assumptions are described in Figure **27**.

Expense Assumptions

The expense assumptions used in the Rock Springs Fire Department forecast are described in the following figure.

Figure 27: Rock Springs Fire Department Expenditure Forecast Assumptions (FY 2021–2025 Forecast)

Expense Category	Assumptions
Personnel Services	Comprised of Regular and Overtime pay plus Benefits, the total has historically increased at an average annual rate of 3.3% from FY 2013–2019 (includes the addition of a Battalion Chief in FY 2019). • Regular salaries and wages rose at an average annual rate of 1% during the historical period. The adopted FY 2020 budget includes a 1.8% COLA. Forecast uses FY 2020 Regular salaries as the basis, which increases at 1% annually. • Overtime, with some significant fluctuation as shown in the next figure, has increased at an average annual rate of 17.8% through FY 2019. The Department has lowered the estimated overtime in the FY 2020 adopted budget, which may lower the future average annual increases. Forecast uses FY 2020 OT as the basis and an average annual increase of 10%. • Benefits, shown in the next figure, while experiencing a flattening out and slight dip in FY 2016–2017 have increased over the historical period at an average annual rate of 3.2%. The increase has been driven by increases in Health Insurance and Retirement costs, which together comprise 83% of total benefits over the historical period. The forecast uses FY 2020 as a basis with an average annual increase of 3%.
Operations & Maintenance	Total cost trended down from $211,455 in FY 2013 to a low of $170,200 in FY 2016 before beginning to rebound but has fluctuated around an average of $191,000. With the addition of the vehicle maintenance line item in FY 2019, costs increased to $273,000. FY 2020 costs include consulting services, which should not be recurring. Therefore, FY 2019 is used as a basis and the forecast assumes a 1% annual increase.

Expense Category	Assumptions
Capital	Capital expenses have been sporadic and generally based upon the five-year CIP. Over the historical period, the average annual cost has been approximately $48,000 for Building Improvements, $23,000 for New Equipment, $58,000 for Replacement Equipment, and $217,000 for Vehicle Purchases. The forecast assumes no expenditure. Rather, these annual average amounts are forecast for the respective transfer to capital reserves to be spent as needed and budgeted in the CIP.
Transfer to Reserve	See discussion under "Capital" for the annual transfer forecast.

The following figures summarize the historical overtime and benefits costs FY 2013 through FY 2020 budgeted.

Figure 28: Rock Springs Fire Department Historical Overtime Expense (FY 2013–2019 Actual; FY 2020 Adopted)

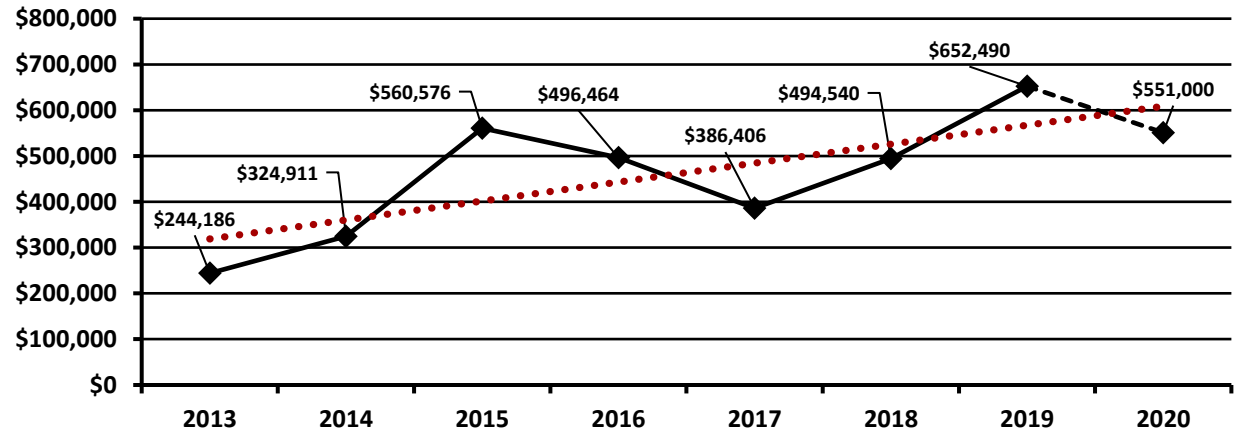
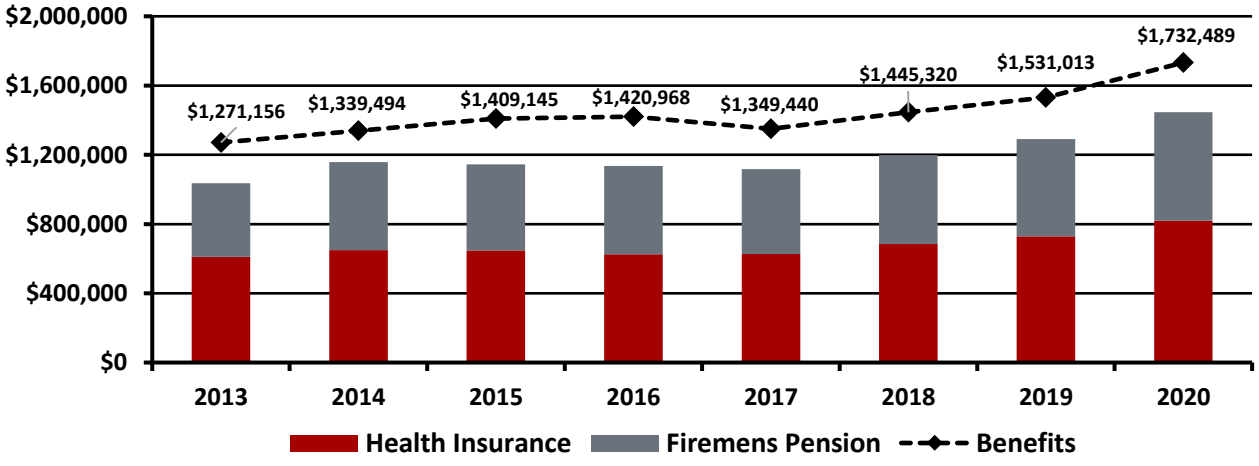


Figure 29: Rock Springs Fire Department Total Benefits Cost vs. Retirement/Health Insurance Expense (FY 2013–2019 Actual; FY 2020 Adopted)



Status Quo Forecast

The following figure is the status quo expenditure forecast for the RSFD for the period FY 2019 actual through 2025 forecast.

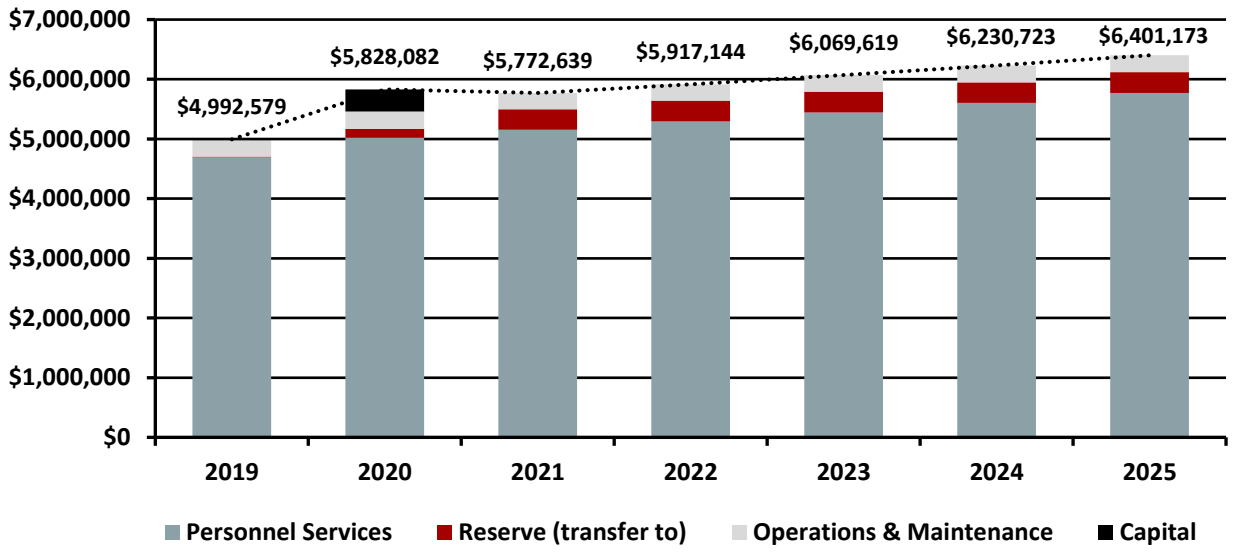
Figure 30: Rock Springs Fire Department Expenditure Forecast (FY 2019 Actual–FY 2025 Forecast)

Expense	2019 Actual	2020 Adopted	2021 Forecast	2022 Forecast	2023 Forecast	2024 Forecast	2025 Forecast
Personnel Services	4,694,572	5,018,489	5,152,914	5,294,681	5,444,392	5,602,703	5,770,333
Regular	*2,511,070*	*2,735,000*	*2,762,350*	*2,789,974*	*2,817,873*	*2,846,052*	*2,874,512*
Overtime	*652,490*	*551,000*	*606,100*	*666,710*	*733,381*	*806,719*	*887,391*
Benefits	*1,531,013*	*1,732,489*	*1,784,464*	*1,837,998*	*1,893,138*	*1,949,932*	*2,008,430*
Operations & Maint.	273,726	289,618	273,726	276,463	279,228	282,020	284,840
Recurring Expense:	4,968,298	5,308,107	5,426,639	5,571,144	5,723,619	5,884,723	6,055,173
Capital	14,281	369,975	-	-	-	-	-
Building Improv	*2,700*	*243,730*	-	-	-	-	-
New Equipment	*3,927*	*28,695*	-	-	-	-	-
Replacement Equip	*4,178*	*3,000*	-	-	-	-	-
Vehicle Purchases	*3,476*	*94,550*	-	-	-	-	-
Non-Recurring Expense:	14,281	369,975	-	-	-	-	-
Total Expense:	4,982,579	5,678,082	5,426,639	5,571,144	5,723,619	5,884,723	6,055,173
Reserve (transfer to)	**10,000**	**150,000**	**346,000**	**346,000**	**346,000**	**346,000**	**346,000**
Equipment Reserve	*5,000*	*-*	*23,000*	*23,000*	*23,000*	*23,000*	*23,000*
Apparatus Reserve	*5,000*	*150,000*	*275,000*	*275,000*	*275,000*	*275,000*	*275,000*
Facility Const Reserve	*-*	*-*	*48,000*	*48,000*	*48,000*	*48,000*	*48,000*

Based upon a series of expenditure assumptions, as previously outlined—and assuming no further changes to service level other than historical average additions to various capital reserves or known capital expenditures from the CIP—a status quo forecast is provided to give elected officials and fire department administration some idea of what the financial outlook might be over the next five years. It is understood that many factors may affect this, and that various other assumptions might be made. However, this can be considered a "first order" glimpse of where the Department may be headed financially with no changes. Forecasting is reliant upon historical trending absent known factors affecting the future, such as negotiated labor cost increases, unanticipated capital equipment needs, etc. The better the understanding of future factors, the better the financial projection.

The following figure shows both recurring Personnel and Operations & Maintenance expenses and non-recurring Capital expenses for FY 2019 actual and FY 2020 as adopted. Rather than projecting CIP expenses, the model uses historical annual averages for various capital categories and shows those as an average annual addition to capital reserves. This can then be treated as a recurring expense, and provide a better long-range model for the total GF revenue needed to fund fire department operations fully. As with many career fire departments, personnel expense is the largest annual cost. The status quo forecast projects an increase in personnel costs of $751,844, or 15% over the forecast period. This represents an average annual increase of approximately 2.9%.

Figure 31: Relationship of Recurring/Non-Recurring Expense and Transfer to Reserve (FY 2019 Actual–FY 2025 Forecast)



CAPITAL FACILITIES AND APPARATUS

Three basic resources are required to successfully carry out the mission of a fire department: Trained personnel, firefighting equipment, and fire stations. No matter how competent or numerous the firefighters, if appropriate capital equipment is not available for use by responders, it would be impossible for the Department to deliver services effectively. The most essential capital assets for use in emergency operations are facilities and apparatus (response vehicles). Of course, the fire department's financing ability will determine the level of capital equipment it can acquire and make available for use by emergency personnel. This section of the report is an assessment of RSFD's respective capital facilities, vehicles, and apparatus.

Fire Stations & Other Facilities

Fire stations play an integral role in the delivery of emergency services for several reasons. To a large degree, a station's location will dictate response times to emergencies. A poorly located station can mean the difference between confining a fire to a single room and losing the structure. Fire stations also need to be designed to adequately house equipment and apparatus, as well as meet the needs of the organization and its career and volunteer personnel—as well as administrative support staff where applicable. It is important to research needs based on service-demand, response times, types of emergencies, and projected growth prior to making a station placement commitment.

Consideration should be given to a fire station's ability to support the fire department's mission as it exists today and into the future. The activities that take place within a fire station should be closely examined to ensure the structure is adequate in both size and function. Examples of these functions may include the following:

- The housing and cleaning of apparatus and equipment; including decontamination and disposal of biohazards
- Residential living space and sleeping quarters for on-duty personnel (all genders)
- Kitchen facilities, appliances, and storage
- Bathrooms and showers (all genders)
- Administrative and management offices; computer stations and office facilities for personnel
- Training, classroom, and library areas
- Firefighter fitness area
- Public meeting space

In gathering information from RSFD, ESCI asked the Department to rate the condition of each of its fire stations using the criteria in the following figure.

Figure 32: Criteria Utilized to Determine Fire Station Condition

Excellent	Like new condition. No visible structural defects. The facility is clean and well maintained. Interior layout is conducive to function with no unnecessary impediments to the apparatus bays or offices. No significant defect history. Design and construction match the building's purposes. Age is typically less than 10 years.
Good	The exterior has a good appearance with minor or no defects. Clean lines, good workflow design, and only minor wear of the building interior. Roof and apparatus apron are in good working order, absent any significant full-thickness cracks or crumbling of apron surface or visible roof patches or leaks. Design and construction match the building's purposes. Age is typically less than 20 years.
Fair	The building appears structurally sound with weathered appearance and minor to moderate non-structural defects. The interior condition shows normal wear and tear, but flows effectively to the apparatus bay or offices. Mechanical systems are in working order. Building design and construction may not match the building's purposes well. Showing increasing age-related maintenance, but with no critical defects. Age is typically 30 years or more.
Poor	The building appears to be cosmetically weathered and worn, potentially with structural defects, although not imminently dangerous or unsafe. Large, multiple full-thickness cracks and crumbling of concrete on apron may exist. The roof has evidence of leaking and/or multiple repairs. The interior is poorly maintained or showing signs of advanced deterioration, with moderate to significant non-structural defects. Problematic age-related maintenance and/or major defects are evident. May not be well suited to its intended purpose. Age is typically greater than 40 years.

Due to the COVID-19 Coronavirus pandemic, ESCI was unable to visit each station. Instead, a virtual video tour was conducted, and combined with the information provided on each, resulted in the observations listed in the following figures.

Figure 33: RSFD Fire Station 1 (Headquarters)

Address/Physical Location:	600 College Drive			
	**General Description:** Headquarters station, with a primary engine and truck apparatus. Also houses Administrative Assistant and Fire Chief offices. Specialized emergency response trailers stored outside.			
Structure				
Construction Type	Block Masonry			
Date of Construction	1978			
Seismic Protection	Unknown			
Auxiliary Power	Yes			
General Condition	Fair			
Number of Apparatus Bays	3	Drive-through bays	0	Back-in bays
Special Considerations (ADA, etc.)	No gender-specific accommodations			
Square Footage	8,934			
Facilities Available				
Separate Rooms/Dormitory/Other	2	Dormitory	12	Beds
Maximum Station Staffing Capability	5			
Exercise/Workout Facilities	Yes (end of Bay 3)			
Kitchen Facilities	Yes			
Individual Lockers/Storage Assigned	Informally in locker room; lockers in bedrooms			
Shower Facilities	Single shower stall in restroom			
Training/Meeting Rooms	None			
Washer/Dryer	Washer/dryer and turnout extractor			
Safety & Security				
Sprinklers	No			
Smoke Detection	No			
Decontamination/Biohazard Disposal	No			
Security	Limited			
Apparatus Exhaust System	Yes			

Figure 34: RSFD Fire Station 2

Address/Physical Location:	1117 Hillcrest Drive

General Description:
Fire Station located in a primarily residential city area, immediately adjacent to the southern edge of the city limits. Fire Inspector office is located on the bottom floor.

Structure				
Construction Type	Block Masonry			
Date of Construction	1982			
Seismic Protection	Unknown			
Auxiliary Power	Yes			
General Condition	Fair (needs roof and windows replaced)			
Number of Apparatus Bays	0	Drive-through bays	2	Back-in bays
Special Considerations (ADA, etc.)	None			
Square Footage	4,656			
Facilities Available				
Separate Rooms/Dormitory/Other	3	Dormitory	9	Beds
Maximum Station Staffing Capability	3			
Exercise/Workout Facilities	Yes			
Kitchen Facilities	Yes			
Individual Lockers/Storage Assigned	In bedrooms			
Shower Facilities	Single shower in common restroom			
Training/Meeting Rooms	No			
Washer/Dryer	Washer, dryer, and turnout extractor			
Safety & Security				
Sprinklers	No			
Smoke Detection	No			
Decontamination/Biohazard Disposal	No			
Security	Limited			
Apparatus Exhaust System	Yes			

Figure 35: RSFD Fire Station 3

Address/Physical Location:	145 Industrial Drive
	**General Description:** Combined fire station and training facility, with a large classroom. North end of lot houses a 4-story drill tower with standpipe, and 2 ½ story burn building, with 2 Class A burn rooms on separate floors.

Structure				
Construction Type	Block Masonry			
Date of Construction	1982			
Seismic Protection	Unknown			
Auxiliary Power	No			
General Condition	Fair (needs doors and windows replaced)			
Number of Apparatus Bays	1	Drive-through bays	1	Back-in bays
Special Considerations (ADA, etc.)	None			
Square Footage	4,656			
Facilities Available				
Separate Rooms/Dormitory/Other	3	Dormitory	9	Beds
Maximum Station Staffing Capability	Nine			
Exercise/Workout Facilities	Yes			
Kitchen Facilities	Yes			
Individual Lockers/Storage Assigned	In bedrooms			
Shower Facilities	Single shower in restroom			
Training/Meeting Rooms	Capacity of 45			
Washer/Dryer	Washer, dryer, turnout extractor			
Safety & Security				
Sprinklers	No			
Smoke Detection	No			
Decontamination/Biohazard Disposal	Yes			
Security	Limited			
Apparatus Exhaust System	Yes			

Training Facility

RSFD maintains a separate training tower and burn room adjacent to, but separate from, Fire Station 3. The facilities are located on 1.5 acres of property. More details on the Department's training center are addressed later in this report.

Summary of the RSFD Fire Stations

RSFD operates from three fire stations ranging from 38–42 years of age. The following figure is a summary of the various capacities of the Rock Springs fire stations.

Figure 36: Summary of the RSFD Fire Stations Capacities

Fire Station	Apparatus Bays	Maximum Staffing	Square Footage
Fire Station 1	3	5	8,934
Fire Station 2	2	3	4,656
Fire Station 3	2	9	4,656
Totals:	**7**	**17**	**18,246**

All three stations have limited apparatus floor space, resulting in narrow clearances around the sides of parked fire apparatus. Fire Stations 2 and 3 need significant upgrades and repairs (doors, windows, roof), and the burn building located at Station 3 shows signs of significant thermal stress cracking in mortar joints in external wall areas that will likely need repair.

ESCI noted that beds are not shared among crews. Instead, each firefighter has their own station assigned bed. Station 2's Fire Inspector's office shares space with the station workout area. Station 3 is the only station with ADA compliant bathrooms and a bio-hazard decontamination area; however, the decon-room requires travel through the living quarters for access.

In general, the stations have adequate living space, and limited apparatus bay space and storage space, resulting in outside storage of trailered equipment and cluttered storage in the apparatus bays. Currently, Rock Springs Fire-Rescue does not have a Capital Improvement Plan (CIP) to upgrade or replace its fire stations in the future.

Apparatus & Vehicles

Fire suppression apparatus, special operations and support units, and some command vehicles are unique and expensive pieces of equipment customized to operate for a specific community and defined mission. Other than its firefighters, officers, and support staff, emergency apparatus and vehicles are the next most important resources in a fire department that has a direct impact on service delivery.

Apparatus must be in good condition, regularly maintained, and configured in a way that ensures reliable, safe, and effective deployment and operations at emergency incidents. As a result, most fire apparatus are very expensive to purchase and maintain, and offer little flexibility in use and reassignment to other missions.

The next figure lists RSFD's frontline apparatus and vehicle fleet inventory, along with the age, condition, and basic features of each. As will be shown, the Department maintains two Type 1 pumpers, a Type 6 engine, two aerial apparatus, and four command and support vehicles.

Figure 37: Rock Springs Fire-Rescue Frontline Apparatus Inventory (2020)

Apparatus	Type	Make	Year	Condition	Features
Engines (Pumpers)					
Engine 2	Pumper	Spartan	2008	Fair	1000 gal., 1500 gpm
Engine 3	Pumper	Spartan	2013	Good	750 gal., 1250 gpm
Engine 463	Wildland	Ford F-550	2009	Good	300 gal., 10 gal. foam
Aerials					
Ladder 1	75-ft. aerial	Central States	1999	Fair	340 gal., 1500 gpm
Truck 1	100-ft. Platform	Ferrara	2016	Good	300 gal., 2000 gpm
Command/Support					
Unit 1	Command	Chevrolet	2009	Good	Assigned to Fire Chief
Unit 3	Support	Dodge	1997	Poor	Snow plow in winter
Unit 5	Support	Chevrolet	2014	Good	High-angle rescue equip.
Unit 6	Support	Chevrolet	2004	Good	Rapid decon. equipment
Inspector	Staff vehicle	Chevrolet	2013	Good	Fire Inspector vehicle

As shown in the preceding figure, most of the frontline vehicles have been rated by RSFD as in "Good" condition, with Ladder 1 and Engine 2 considered to be in "Fair" condition, and Unit 3 in "Poor" condition. RSFD currently maintains Engine 1 in reserve, which is a 1997 Spartan considered to be in "Good" condition. Truck 1 is relatively new at four years of age and in good condition.

The following figure shows the current mileage of each of the frontline engines and aerial apparatus.

Figure 38: Current Mileage & Age of RSFD Engines & Aerials (2020)

Apparatus	Apparatus Age	Mileage
Frontline		
Engine 2	12 years	122,974 miles
Engine 3	7 years	53,600 miles
Engine 463	10 years	50,581 miles
Truck 1	3 years	12,045 miles
Reserve		
Ladder 1	11 years	146,674 miles
Engine 1	20 years	40,302 miles

As shown, Engine 2 and Ladder 1 each have a considerable amount of mileage. The two frontline pumpers (engines) are 7 and 12 years of age respectively, while Truck 1 is relatively new. The next figure lists vehicles utilized for special operations and support.

Figure 39: Special Operations & Support Vehicles (2020)

Apparatus	Type	Make	Year	Condition	Features
ATV 1	ATV Ranger	Polaris	2015	Good	Multipurpose for access
Hazmat 1	Tractor/Trailer	Chevrolet	2004	Good	All hazards response unit
Air 1	Trailer	BAS	2010	Good	Air trailer for scene support
Utility 1	Staff Vehicle	Chevrolet	2009	Fair	
Utility 2	Staff Vehicle	Chevrolet	2013	Good	
Utility 3	Pick up truck	Dodge	1997	Fair	

Hazmat 1 is utilized for hazardous materials and other incidents. It is also used for the Wyoming Office of Homeland Security Region 4 Team.

Apparatus Maintenance

RSFD utilizes the City's Fleet Maintenance Division of the Public Services Department for the majority of its apparatus repairs and maintenance. In addition, the Department outsources other repairs and maintenance to several companies with special capabilities. The City does not utilize an electronic RMS to document apparatus and vehicle maintenance, but instead uses paper forms.

Fire apparatus are special vehicles requiring special skills and knowledge to effectively maintain and repair them. Because of this, in many communities, fire departments utilize maintenance staff who have been trained and certified through the *EVT Certification Commission.* There are no certified *Emergency Vehicle Technicians* (EVT) currently available in the area or at the City's Fleet Maintenance Division. Neither are the City's apparatus maintenance personnel training and certified as *Automotive Service Excellence* (ASE) Technicians.

Future Apparatus Serviceability

An important consideration for fire departments is the cost associated with the future replacement of major equipment. Apparatus service lives can be readily predicted based on factors including vehicle type, call volume, age, and maintenance considerations.

NFPA 1901: *Standard for Automotive Fire Apparatus* recommends that fire apparatus 15 years of age or older be placed into reserve status, and apparatus 25 years or older should be replaced.[19] This is a general guideline, and the standard recommends using the following objective criteria in evaluating fire apparatus lifespan:

- Vehicle road mileage.
- Engine operating hours.
- The quality of the preventative maintenance program.
- The quality of the driver-training program.
- Whether the fire apparatus was used within its design parameters.
- Whether the fire apparatus was manufactured on a custom or commercial chassis.
- The quality of workmanship by the original manufacturer.
- The quality of the components used in the manufacturing process.
- The availability of replacement parts.

It is important to note that age is *not* the only factor for evaluating serviceability and replacement. Vehicle mileage and pump hours on engines must also be considered. A two-year-old engine with 250,000 miles may need replacement sooner than a 10-year-old one with 2,500 miles. The following figure represents a relatively simple example that RSFD could use for determining the condition of fire apparatus and vehicles.

Figure 40: Example Criteria & Method for Determining Apparatus Replacement

Evaluation Components	Points Assignment Criteria	
Age:	One point for every year of chronological age, based on in-service date.	
Miles/Hours:	One point for each 10,000 miles or 1,000 hours	
Service:	1, 3, or 5 points are assigned based on service-type received (e.g., a pumper would be given a 5 since it is classified as severe duty service).	
Condition:	This category takes into consideration body condition, rust interior condition, accident history, anticipated repairs, etc. The better the condition, the lower the assignment of points.	
Reliability:	Points are assigned as 1, 3, or 5, depending on the frequency a vehicle is in for repair (e.g., a 5 would be assigned to a vehicle in the shop two or more times per month on average; while a 1 would be assigned to a vehicle in the shop an average of once every three months or less.	
Point Ranges	**Condition Rating**	**Condition Description**
Under 18 points	Condition I	Excellent
18–22 points	Condition II	Good
23–27 points	Condition III	Consider Replacement
28 points or higher	Condition IV	Immediate Replacement

Apparatus Maintenance & Replacement Planning

Clearly, no piece of mechanical equipment or vehicle can be expected to last indefinitely. As apparatus age, repairs tend to become more frequent and more complex. Parts may become more difficult to obtain, and downtime for repair and maintenance increases. Given that fire protection, EMS, and other emergencies are so critical to a community, downtime is one of the most frequently identified reasons for apparatus replacement. Because of the expense of fire apparatus, most communities develop replacement plans. To enable such planning, fire departments often turn to the accepted practice of establishing a life-cycle for apparatus that results in an anticipated replacement date for each vehicle.

RSFD uses a similar approach in identifying vehicle replacement dates and estimated replacement costs. Each apparatus was evaluated, and a point score applied in each of the following six categories:

- Vehicle age (1 point per year)
- Mileage/Engine hours (1 point for every 10,000 miles/500 hours-whichever is greater)
- Type of use (light – 1 point, medium – 3 points, heavy – 5 points)
- Reliability (Shop hours ÷ age ÷ 30)
- Maintenance and Repair costs (20% of maintenance cost as a percentage of original price = 1 point)
- Overall Condition (1–5 grading scale, 1 point = excellent)

The points are then added together to determine an overall condition score for replacement purposes per the following:

- Under 19 points: Excellent Condition
- 20–25 points: Good Condition
- 26–29 points: Qualifies for Replacement
- 30 points or greater: Needs immediate consideration for replacement

In 2018, RSFD previously identified a replacement schedule and estimated costs for replacement of front-line engine and aerial apparatus. The following figure lists the approximate apparatus replacement costs and anticipated replacement dates. Reserve apparatus (Engine 1 and Ladder 1) replacement dates were not calculated.

Figure 41: Estimated Replacement Schedule for RSFD Engines & Aerials

Apparatus	Estimated Replacement Cost[A]	Annual Cash Requirements	Life Expectancy	Replacement Year
Engine 2	$850,958	$56,730	15 years	2028
Engine 3	$895,913	$59,727	20 years	2033
Truck 1	$1,975,575	$98,778	20 years	2036
Total	**$3,722,446**	**$215,208**		

[A]Using a 3.1% rate of inflation.

ESCI noted that approximately $150,000 is currently set aside for apparatus replacement. This is significantly short of what would be needed for the replacement of Engine 2 in 2028, as identified in the preceding table. If $56,730 is set aside for the next eight years, and the $150,000 set aside balance is applied, the Department will still have to identify approximately $250,000 of additional funds to replace the engine.

SERVICE DELIVERY & PERFORMANCE

ESCI analyzed the operational components of service delivery and performance from multiple perspectives, including service demand, distribution, resource concentration and reliability, and response performance. In order to provide the highest level of service to the citizens and visitors of the City of Rock Springs, the sum of all these components must be effective and efficient. To achieve the highest level of service, it is necessary for the department to have efficient notifications of incidents and rapid responses from effectively located facilities, with appropriately typed apparatus, staffed with an adequate number of properly trained personnel. This section will provide a current analysis of service delivery and response performance in the RSFD's service area.

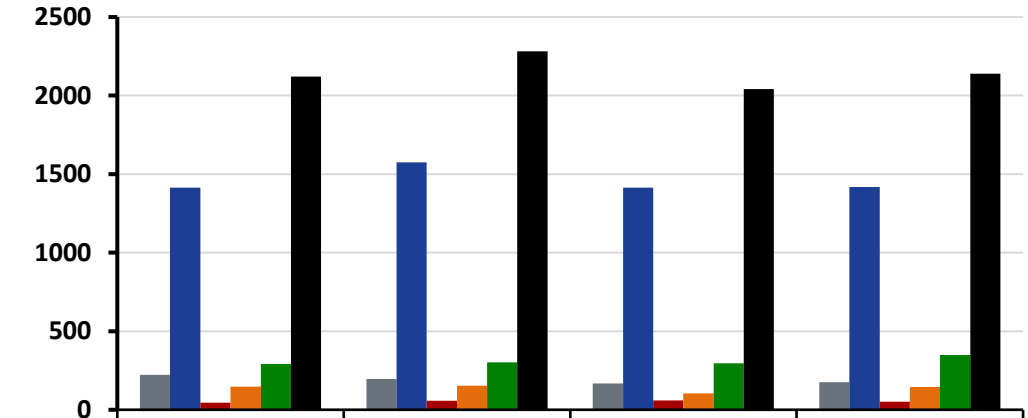
Service Demand Analysis

Incident Type Analysis

In the service demand analysis, ESCI reviewed current and historical service demand by incident type and temporal variation. GIS software provides a geographic display of demand. National Fire Incident Reporting System (NFIRS) data provided by RSFD was utilized to illustrate the specific call types and volume increases over the past three calendar years.

The following figures display RSFD's historical and overall service demand for the previous four calendar years and a breakdown by NFIRS incident category for incidents between January 2016 and December 2019 (study period). The incidents displayed in the following figure represent all incident types. For the purposes of this analysis, NFIRS 200, 500, 600, 800, and 900 incident-types were combined into the "Other" category.

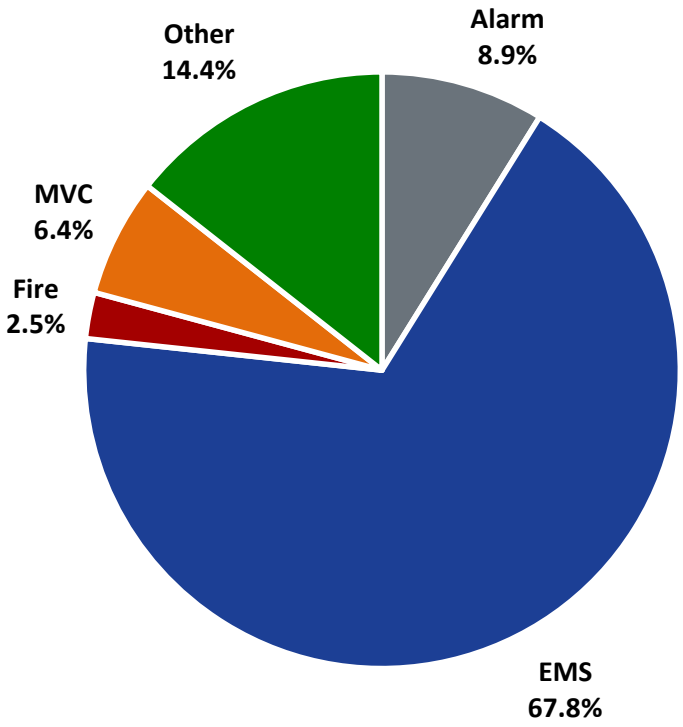
Figure 42: Rock Springs Fire Department Service Demand by Incident Type (2016–2019)



	2016	2017	2018	2019
Alarm	223	195	167	176
EMS	1415	1574	1414	1419
Fire	45	58	60	52
MVC	147	153	104	145
Other	291	301	296	348
Total	2,121	2,281	2,041	2,140

Overall, this demonstrates a slight increase in service demand, with an overall increase of 0.4% from 2016 through 2019. The following figure illustrates the service demand by incident type during the study period.

Figure 43: Rock Springs Fire Department Service Demand by Incident Type (2016–2019)

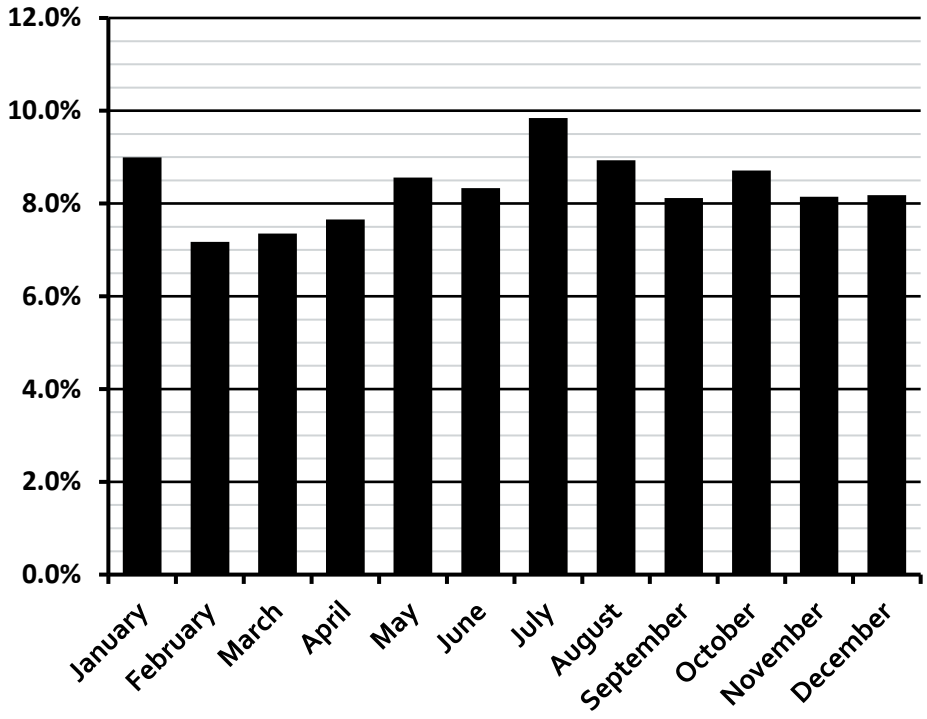


Over the course of the four-year study period, the percentages vary from a low of over two percent (2.5%) for incidents typed as "Fire," to a high of over 67 percent (67.8%) for EMS incident types. Clearly, the CAD data indicates that EMS incidents comprise the highest percentage of service demand. This is similar to the distribution by incident type found in many fire service organizations providing emergency medical response.

Temporal Analysis

It is also useful to evaluate service demand temporally in order to determine if there are specific trends during certain periods where staffing can be modified to better fit the demand. The next figure demonstrates service demand during the study period by month.

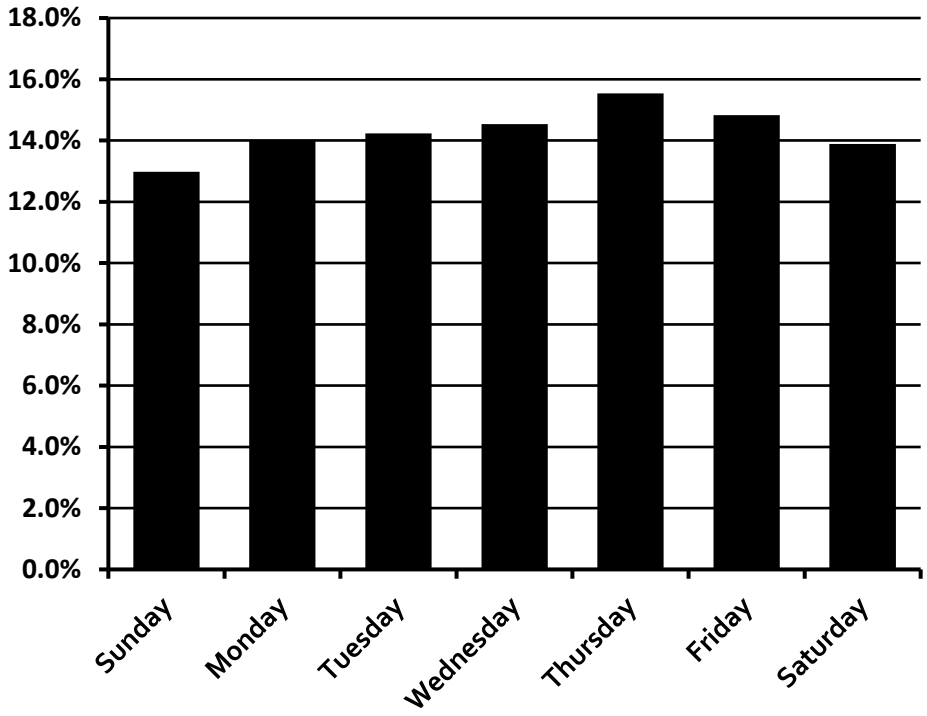
Figure 44: Rock Springs Fire Department Service Demand by Month of the Year (2016–2019)



Service demand varies throughout the year. July is the busiest month for RSFD, accounting for just under ten percent (9.8%) of the total call volume over the course of the study period (845 incidents). February was the slowest month accounting for just over seven percent (7.2%) of the total call volume (616 incidents). The range between the busiest month and the slowest month is under three percent (2.7%).

The next figure continues the temporal analysis with an examination of service demand by day of the week.

Figure 45: Rock Springs Fire Department Service Demand by Day of Week (2016–2019)

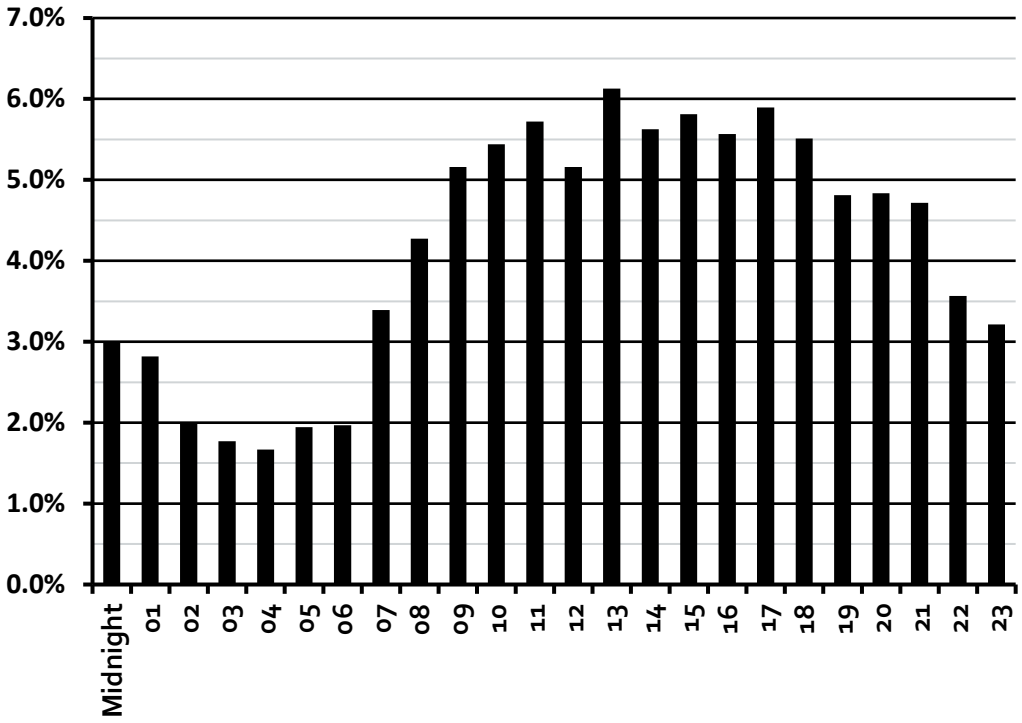


Unlike the service demand by month, the demand by day of the week remained relatively consistent. The slightest variation occurs during the weekends when service demand decreases. This is not uncommon and is expected as more activity occurs during the work week resulting from an increase in transient population tied to the retail/commercial labor force. In general, more activity occurs during the work week.

Thursdays are the busiest day for RSFD and account for over 15 percent (15.5%) of the total call volume over the course of the study period (1,334 incidents). Sundays are the slowest day accounting for 13 percent (13.0%) of the total call volume (1,114 incidents). While demand varies from day to day, the percentage range between the busiest and the slowest day is no more than two percent (2.6%).

The final temporal analysis of service demand examines service demand by the hour of the day.

Figure 46: Rock Springs Fire Department Service Demand by Hour of the Day (2016–2019)



Analysis of service demand regarding specific times of the day revolves largely around the activities of the general population, with workload increasing during daytime hours and decreasing during nighttime hours, as illustrated in the preceding figure. Incident activity is at its highest between 9:00 a.m. and 7:00 p.m. Over 60 percent (60.8%) of Rock Springs calls for service occurred between these hours, which is to be expected. The highest incident activity occurred at 1:00 p.m., with just over six percent (6.1%) of the total activity per day (526 incidents). The slowest hour for activity occurred at 4:00 a.m., which accounted for slightly under two percent (1.7%) of the days call activity (143 incidents).

It should be noted that while demand is lower in the early morning hours, fatal residential fires occur most frequently late at night or in the early morning when occupants are sleeping. In a recent study, from 2014 to 2016, fatal residential fires were highest between 1:00 a.m. to 2:00 a.m. The 8-hour peak period (11 p.m. to 7 a.m.) accounted for 48 percent of fatal residential fires.[20]

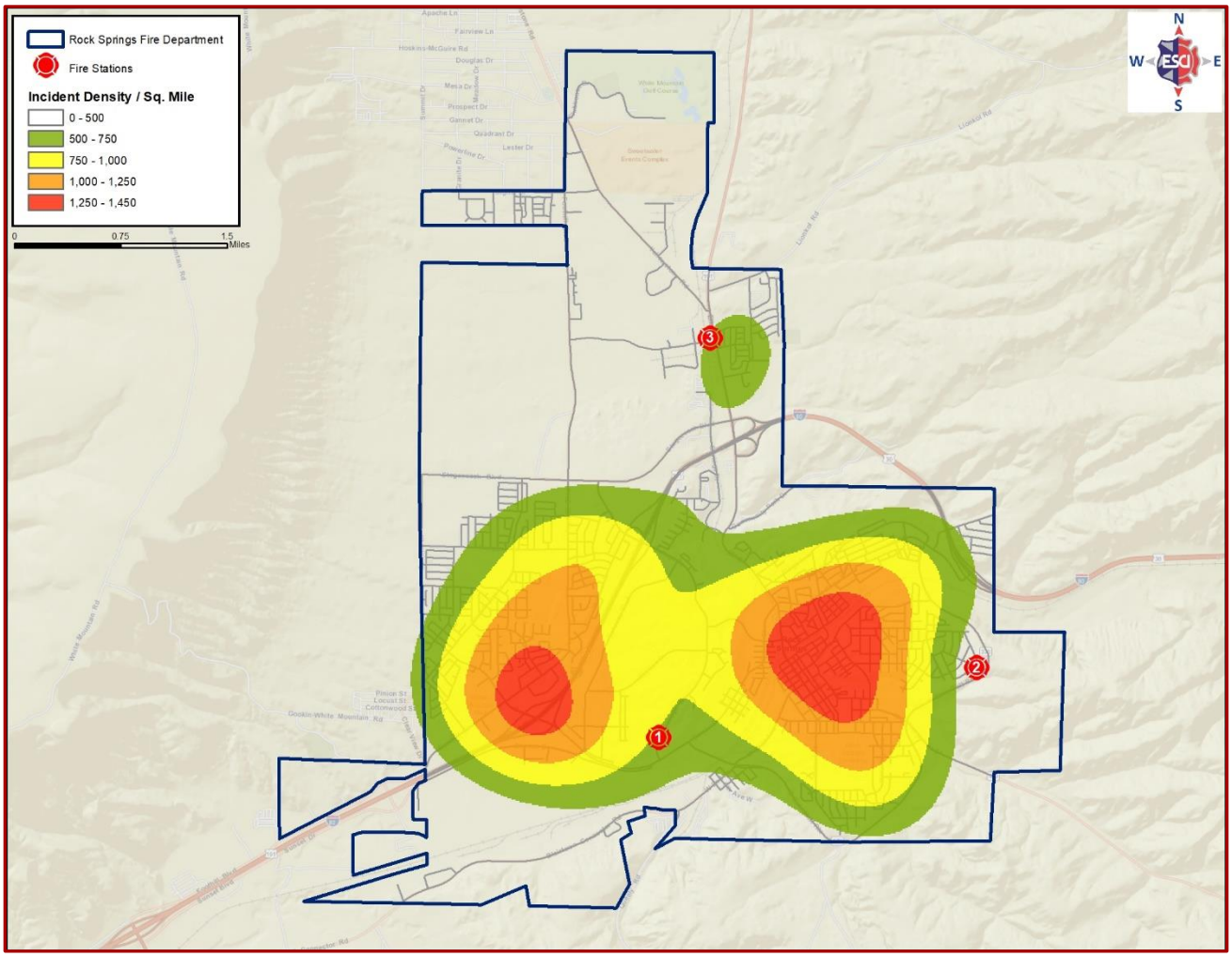
Geographical Analysis

In addition to the temporal analysis, it is useful to examine the geographic distribution of service demand. Utilizing RSFD CAD data and GIS software, ESCI plotted incident locations showing the geographic service demands for both fire and EMS incidents during the January 2016 to December 2019 study period throughout the Department's service area.

Incident Density

The next figure demonstrates the mathematical density of all incidents, summarized as incidents per square mile.

Figure 47: Rock Springs Incident Density, All NFIRS Incident Types (2016–2019)



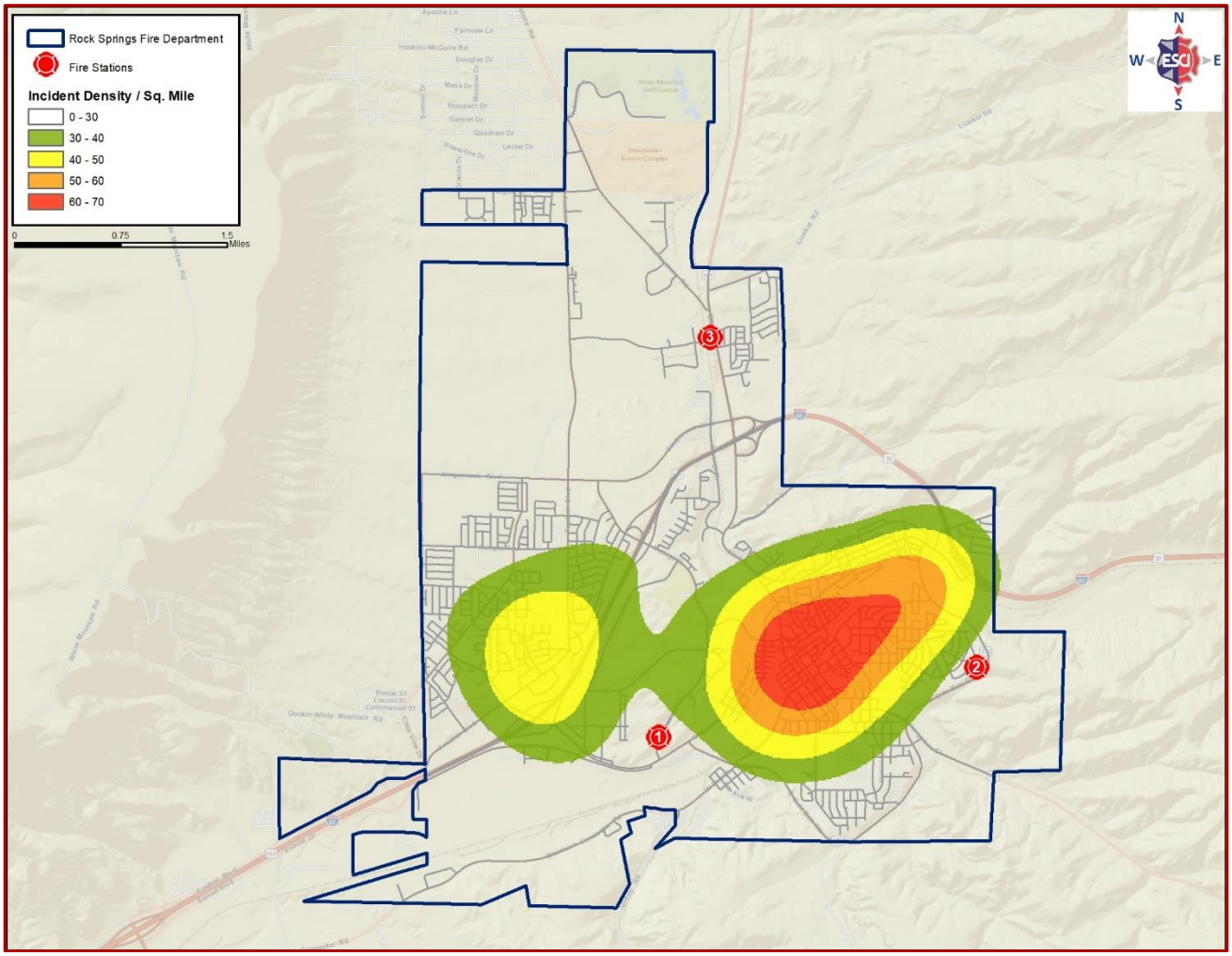
Service demand is mostly concentrated across the southern half of the Rock Springs service area, with the greatest concentrations being west of Station 1, and west of Station 2. This area includes the city's downtown, which includes the conversion of old industrial buildings into multi-family dwellings. While both fire and EMS incidents are included, a majority of the incidents displayed in the figure are EMS incidents.

As can be expected, areas of high incident density are typically linked to areas of higher population counts.

Similar to the pattern displayed with all incidents, fire only incidents are centralized in the southern half of Rock Springs. It is worth noting the development of a hot spot northwest of Fire Station 1. This area should be monitored to see if it is isolated or continuing to worsen. Regardless of the distribution of fire incidents, it is important to maintain an initial and effective fire response capability for the entire city response area.

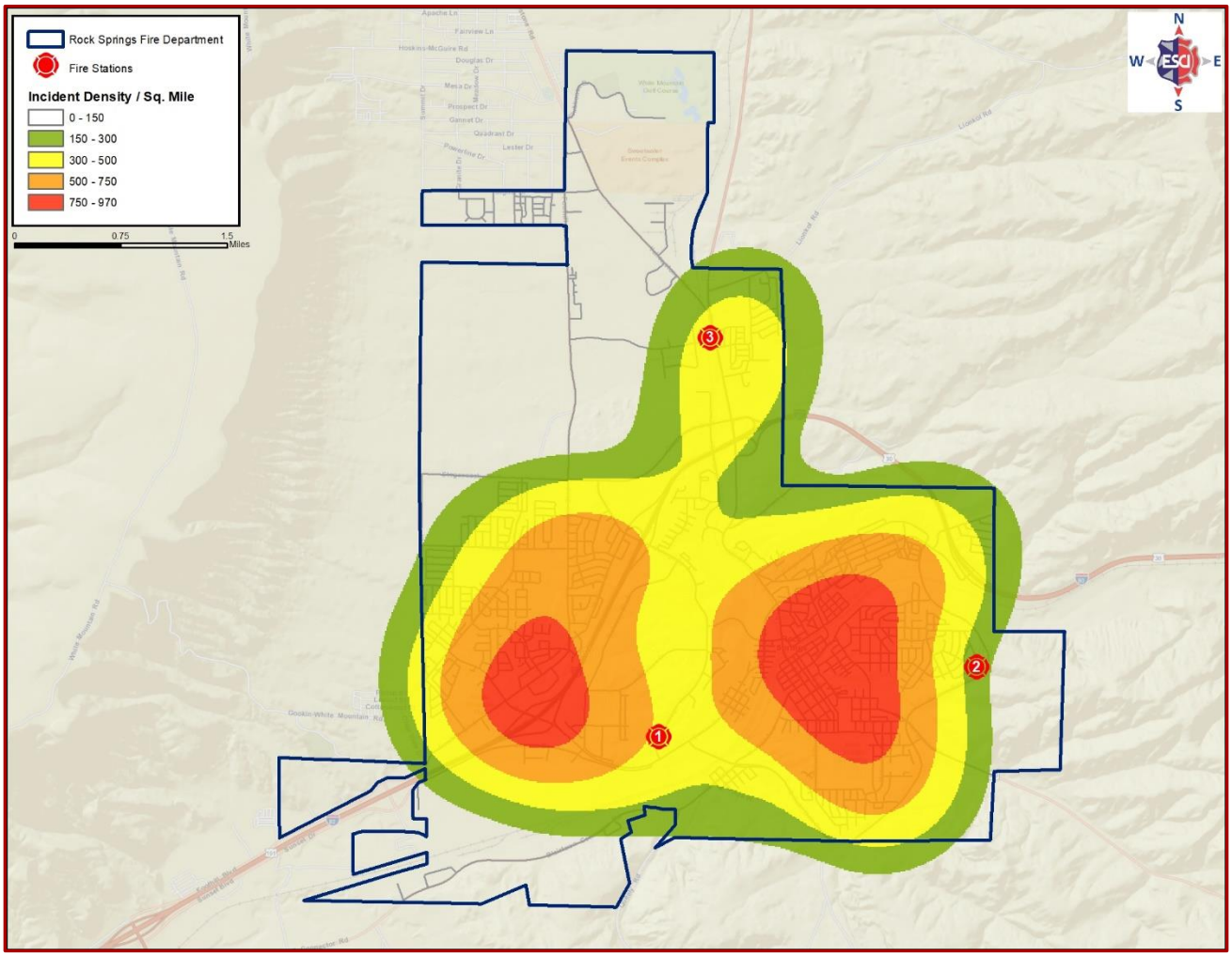
The following figure illustrates incidents categorized as fires in the NFIRS data summarized as incidents per square mile.

Figure 48: Rock Springs Incident Density, NFIRS 100 Incident Types (2016–2019)



The next figure displays the distribution of EMS incidents.

Figure 49: Rock Springs Incident Density, NFIRS 300 Incident Types (2016–2019)



This hot spot map reinforces that EMS incidents are the primary driver of service demand in the community. There are two primary areas of highest demand, which are adjacent to Fire Stations 1 and 2. ESCI noted that these demand areas are either in or immediately adjacent to the highest population densities in Rock Springs.

Resource Distribution Analysis

The distribution analysis presents an overview of the current distribution of RSFD resources within the Rock Springs service area.

ISO Distribution

The Insurance Services Office, Inc. (ISO©), a subsidiary of Verisk Analytics, is a national data analytics provider that evaluates fire protection for communities across the country. ISO assesses fire protection through the use of a proprietary Fire Suppression Rating Schedule (FSRS) that details specific requirements for each of four major categories—emergency communications, fire department, water supply, and community risk reduction.

Following an on-site evaluation, ISO assigns a Public Protection Classification (PPC®) rating using a scale of 1 to 10, with Class 1 representing the highest degree of fire protection and Class 10 designating a fire protection program that does not meet ISO's minimum criteria. According to a recent report, the ISO's Public Protection Classification program, or PPC, "is a proven and reliable predictor of future fire losses." All other factors equal, commercial property insurance rates are expected to be lower in areas with lower (better) ISO PPC Class rating.

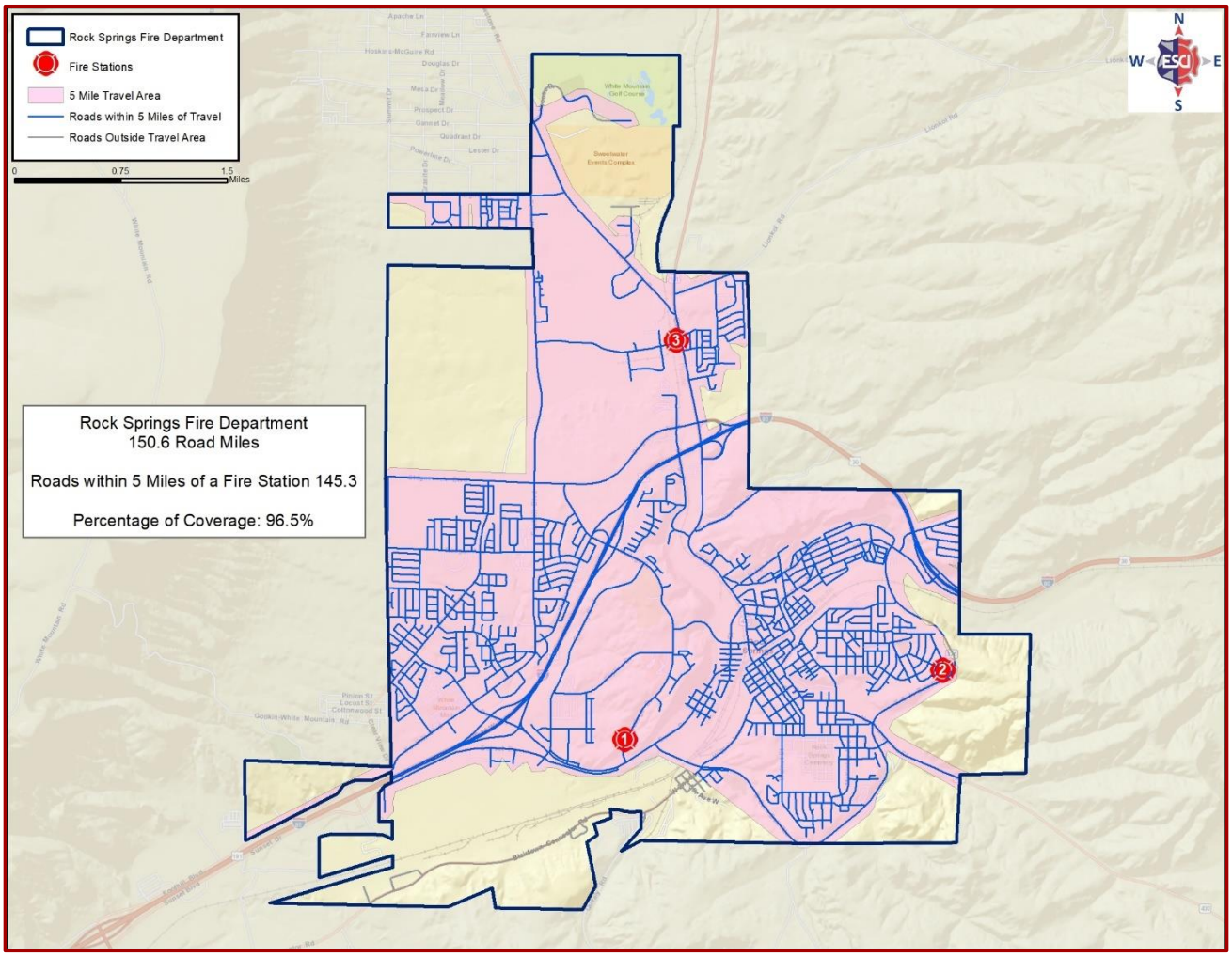
A community's ISO rating is an important factor when considering fire station and apparatus concentration, distribution, and deployment due to its effect on the cost of fire insurance for the residents and businesses. To receive maximum credit for the station and apparatus distribution, ISO evaluates the percentage of the community (contiguously built upon area) that is within specific distances of fire stations, central water supply access (fire hydrants), engine/pumper companies, and aerial/ladder apparatus.

The first component of ISO distribution is the ability of a fire department to arrive on-scene equipped with personnel, equipment, and water sufficient to safely and effectively mitigate a fire. To determine if a structure is eligible to take advantage of the jurisdiction's PPC rating (versus a PPC rating of 10 indicating no fire protection), a service area of five road miles from the fire station is generally used.

ISO is concerned with the provision of fire suppression services in contiguously built upon areas only. The maximum service area that a fire engine can effectively travel away from the facility to conduct fire suppression operations is 1.5 road miles according to ISO guidelines.

The following figure shows the five-mile ISO criteria.

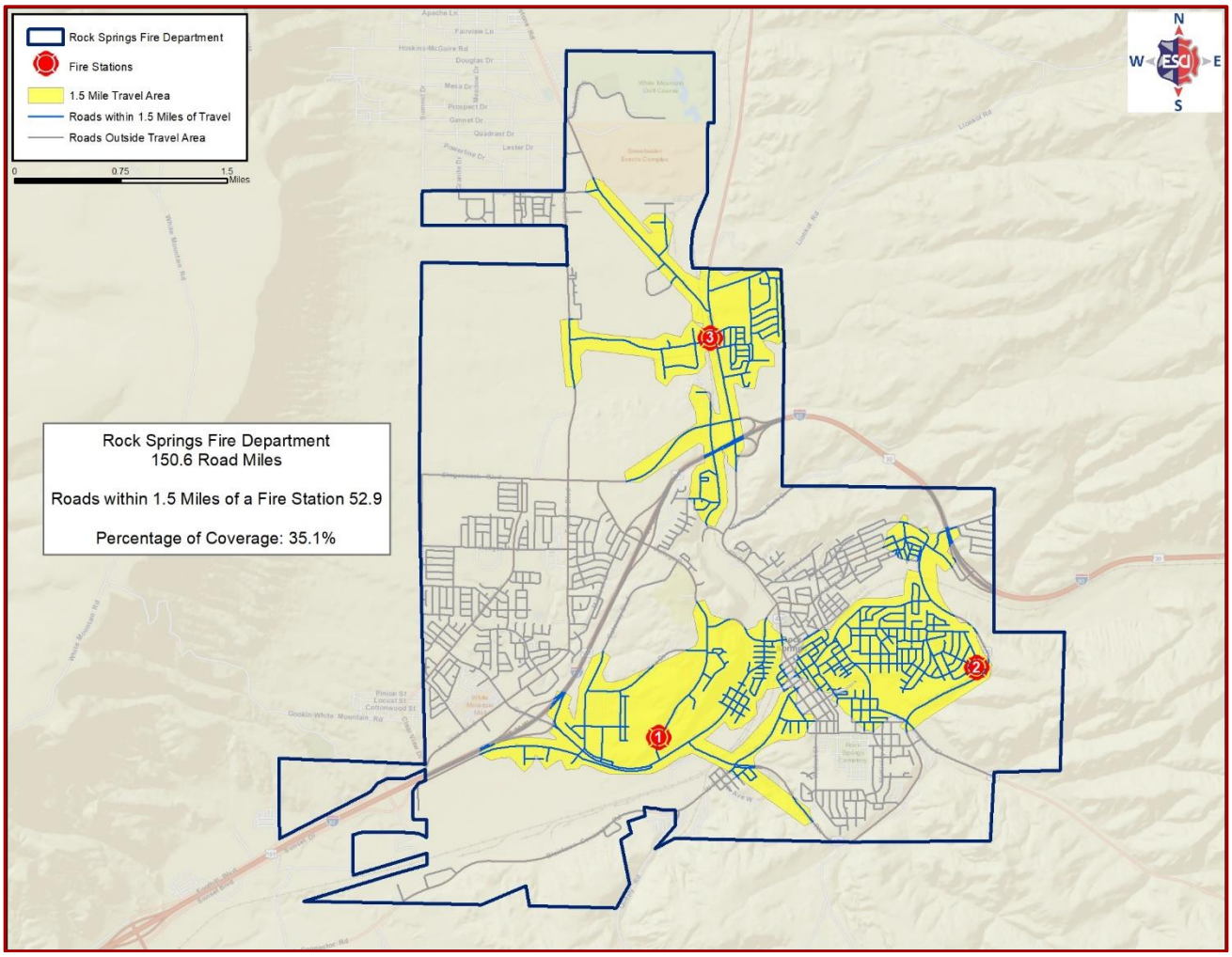
Figure 50: ISO 5-Mile Travel Distance



The preceding figure illustrates the ISO 5-mile travel distance for the RSFD service area. With more than 96% of the service area's street miles falling within 5 miles, most of the structures lie within the expected standard and limits the number of structures that may encounter difficulty in obtaining affordable insurance coverage.

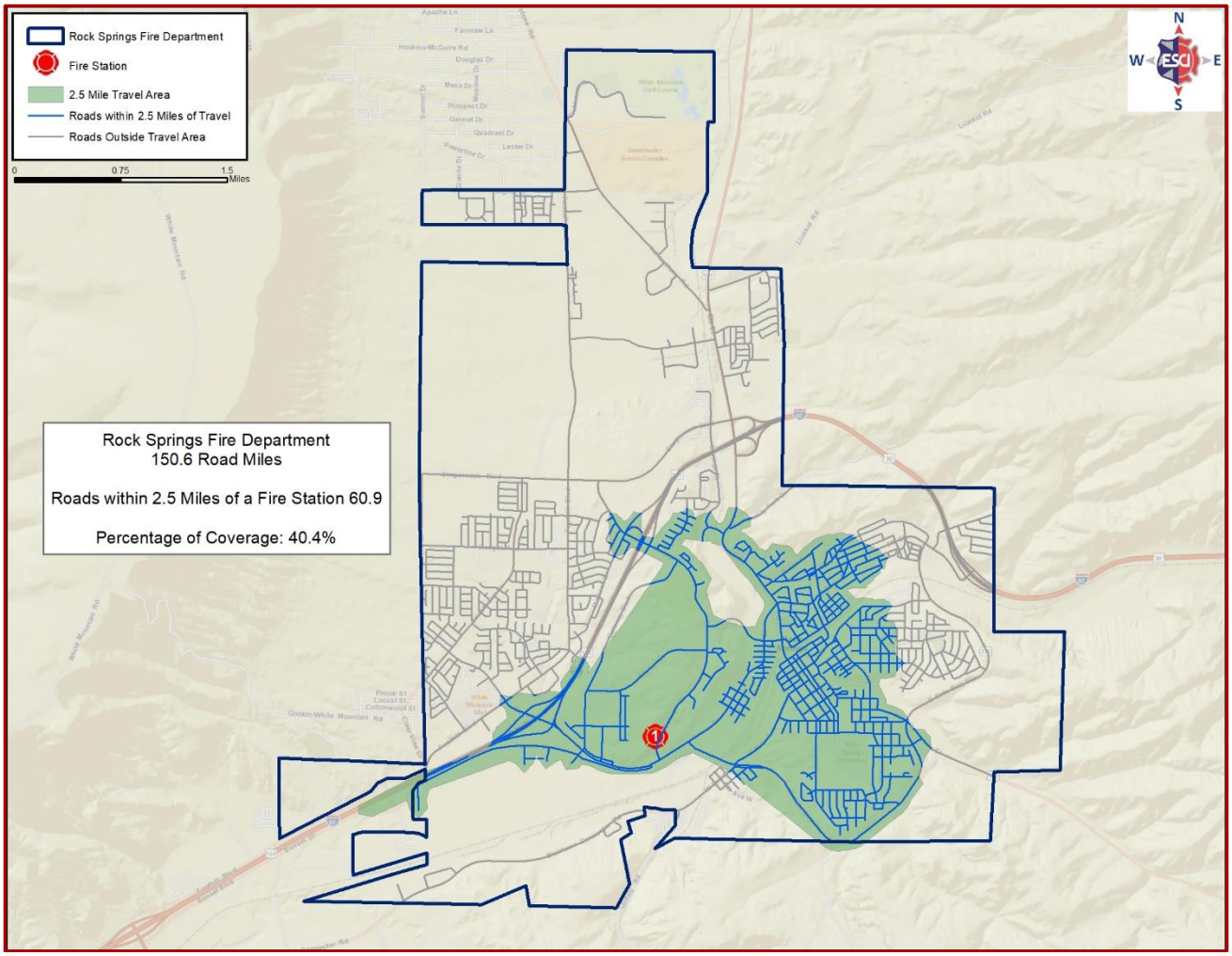
The next figure illustrates the ISO 1.5-mile travel distance for the RSFD service area. With only 35.1% of streets falling within the 1.5-mile travel distance, a significant number of structures fall outside of the expected standard.

Figure 51: ISO 1.5-Mile Engine Travel Distance



The next figure illustrates the ISO 2.5-mile travel distance for the RSFD service area. This distance is measured from those stations at which aerial ladder apparatus are located. With only 40% of the streets falling within the 2.5-mile distance, a significant number of structures fall outside of the travel distance standard.

Figure 52: ISO 2.5-Mile Aerial Ladder Truck Travel Distance

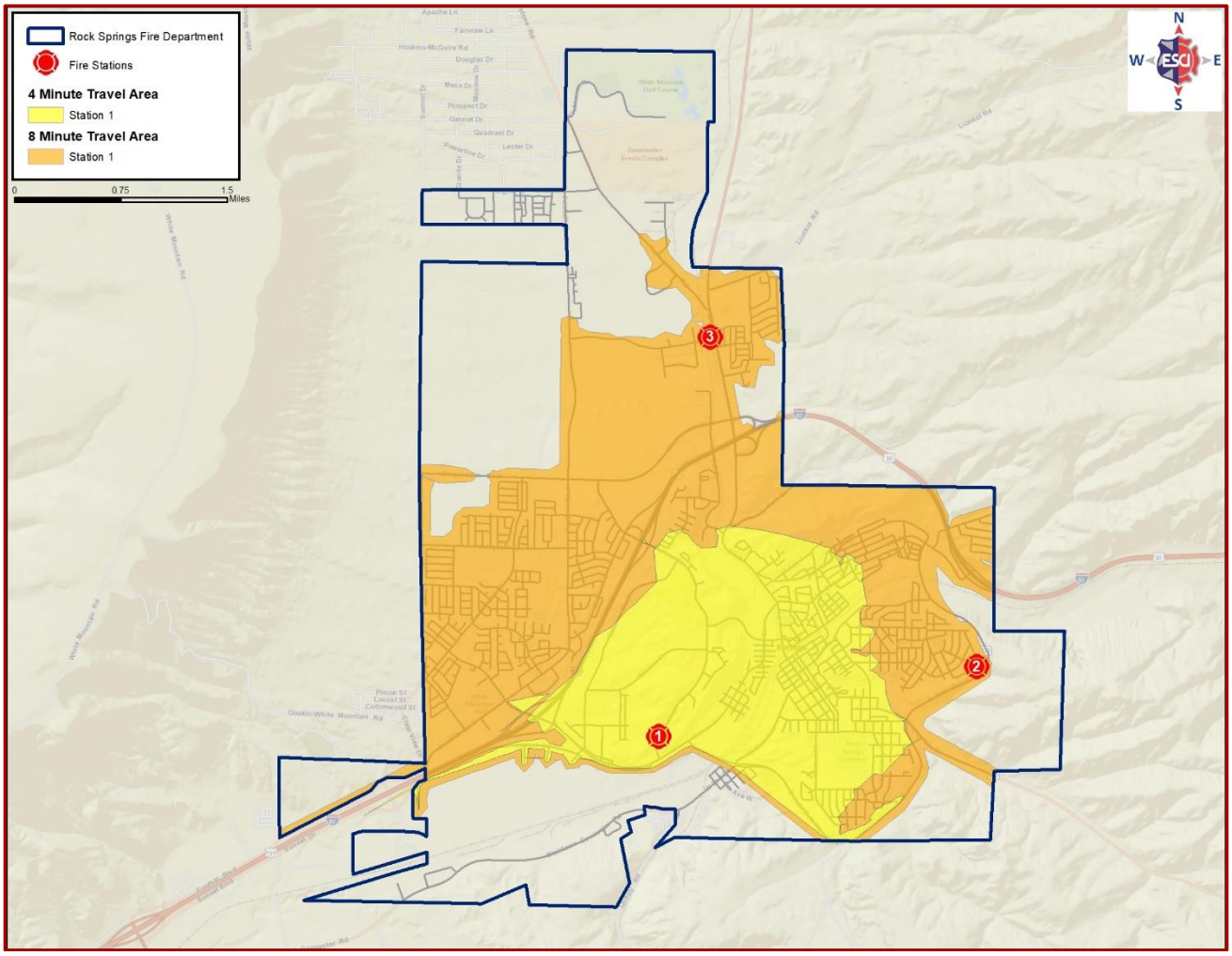


NFPA Distribution

While ISO criteria are focused on fire suppression activities exclusively, NFPA standards establish benchmarks for all areas of responsibility for a fire department. In this analysis, four- and eight-minute travel time criteria are applied to each fire station. A four-minute travel time standard, derived from 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*, was applied, as it is the consensus standard for the initial arriving unit.

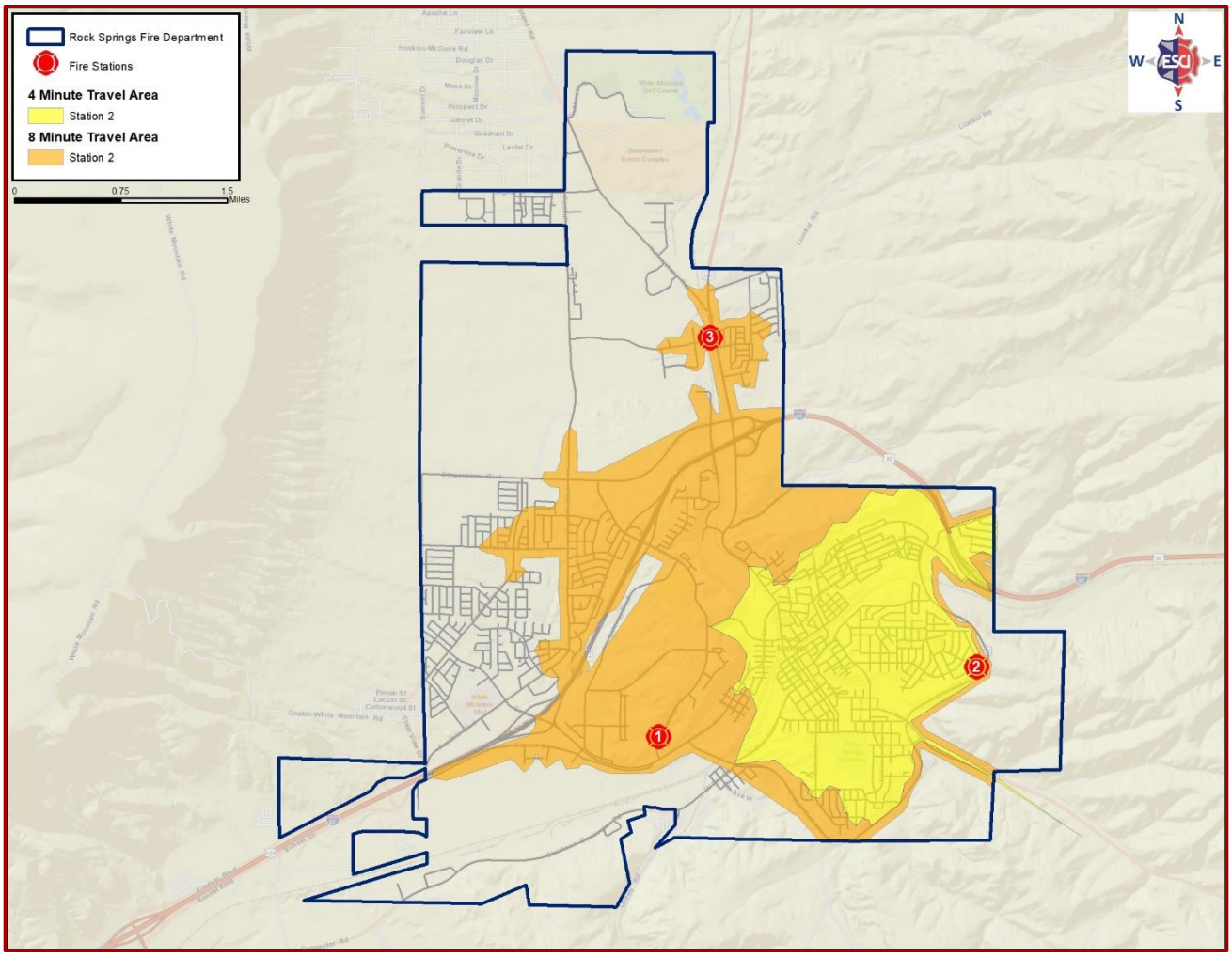
The eight-minute travel time is the established period of travel time for an initial alarm assignment, meaning that all units needed to conduct fire suppression operations must arrive on-scene and commence operations within that period of travel time. NFPA 1710 allows for organizations to establish benchmarks based upon current performance, and establish benchmarks, or goals, for service delivery objectives. However, the NFPA initial suppression arrival time benchmark for the first arriving fire apparatus is four minutes or less 90 percent of the time, and eight minutes or less 90 percent of the time for the arrival of the entire first alarm assignment. The following figure illustrates the projected travel times from Fire Station 1.

Figure 53: Projected 4-Minute & 8-Minute Travel Time from Fire Station 1



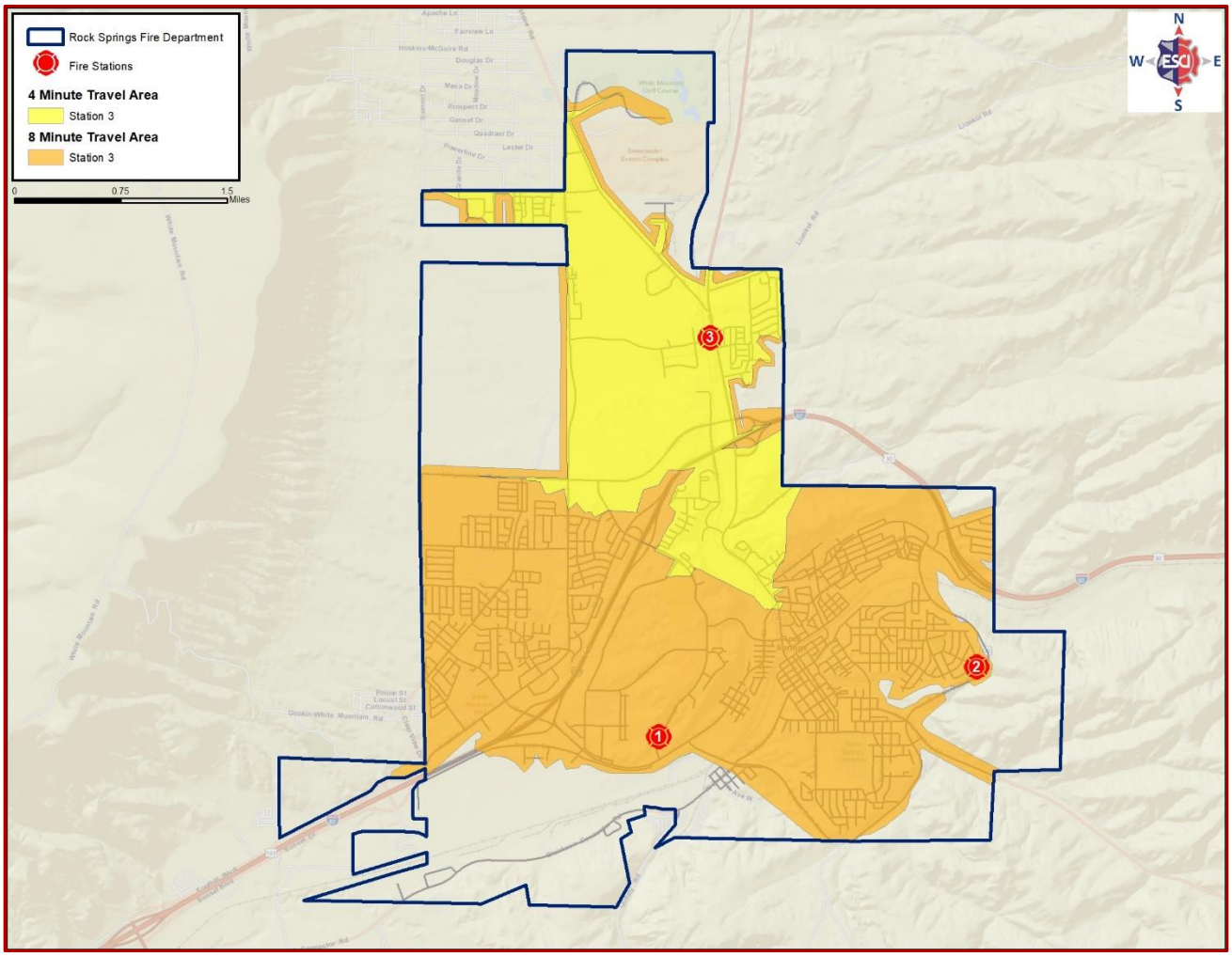
The following figure illustrates the projected travel times from Fire Station 2.

Figure 54: Projected 4-Minute & 8-Minute Travel Times from Fire Station 2



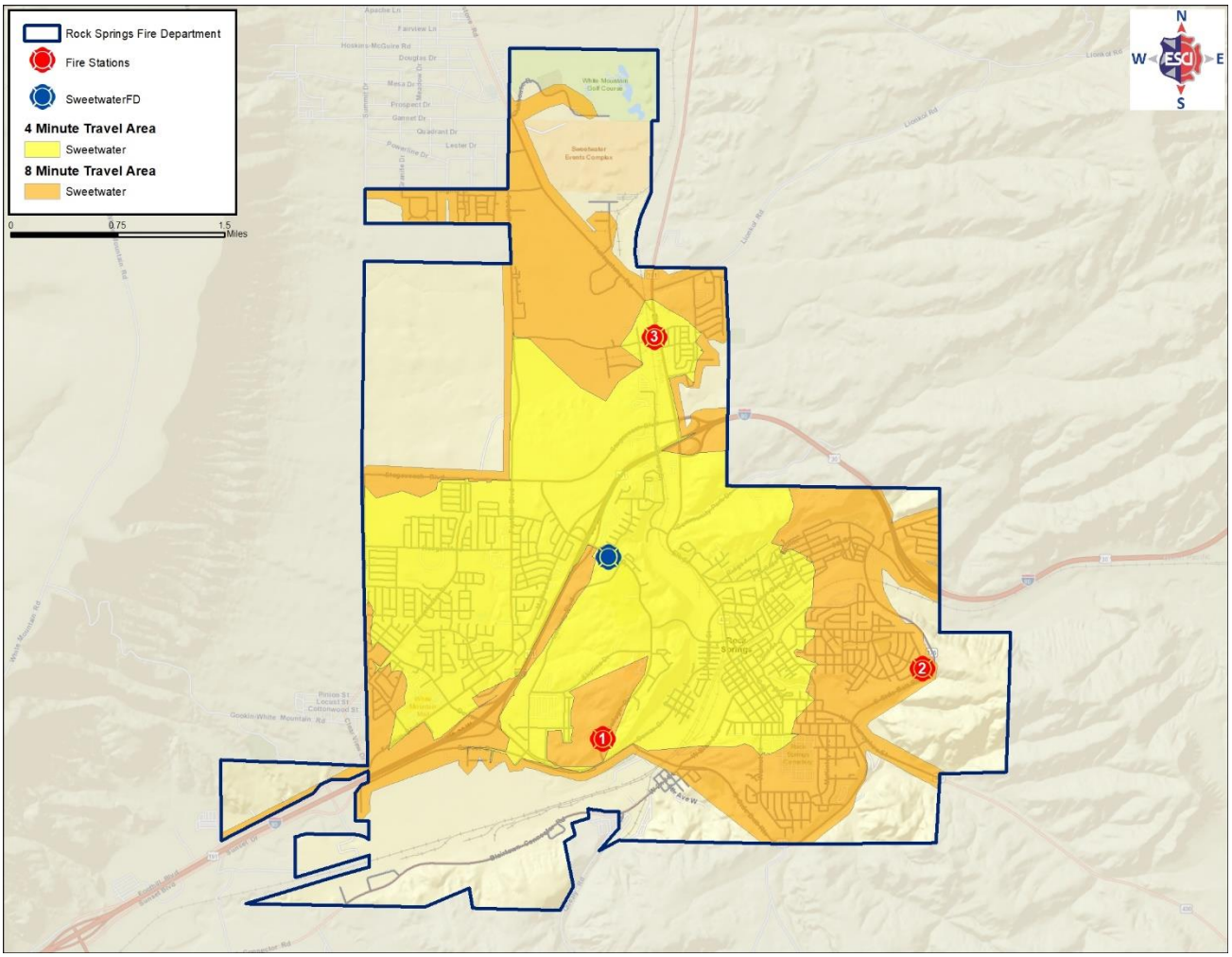
The following figure illustrates the projected travel times from Fire Station 3.

Figure 55: Projected 4-Minute & 8-Minute Travel Times from Fire Station 3



In addition, ESCI noted that Sweetwater County Fire District 1, Station 1 is located in the middle of the City. While these resources are not currently deployed through auto-aid agreement to respond to incidents within the City, the location of the station compelled ESCI to quantify travel times from this station as well. The following figure illustrates these travel times.

Figure 56: Projected 4-Minute & 8-Minute Travel Times from SWCFD1 Station 1



Projected Travel Time Discussion

In comparing the 4-minute travel response time from RSFD's Station 1, and SWCFD1's Station 1, ESCI noted that the theoretical 4-minute response coverage area west of the freeway was much greater than the 4-minute response coverage from RSFD Station 1 as noted in *Figure 53: Projected 4-Minute & 8-Minute Travel Time from Fire Station 1.*

ESCI noted that Sweetwater County Fire District #1 Station 1 resources are not automatically dispatched to reported structure fires or other significant incidents in the City requiring rapid response and significant resources, even though a 40-hour a week staffed station is located in the middle of the City. Conversely, RSFD resources are not routinely dispatched to similar incidents in the District's response area within a reasonable response distance from an RSFD station. Instead, units from the neighboring jurisdiction must be requested to respond to assist.

SWCFD1's station is located where it could theoretically provide faster response into portions of the City west of I-80, depending on the time of the call as the station is staffed only during the day, and relies on paid-on-call personnel who have to respond from home or work.

Workload & Response Reliability

The reliability of response is impacted by the percentage of time that units are available to respond to incidents when they occur. For example, if a unit is committed to incidents 30% of the time, if another incident occurs in their first response zone during this time, other response units must travel from further away to handle the incident. Additionally, when multiple incidents occur at the same time—also known as concurrent calls—it strains fire department resources and affects its ability to muster additional resources to respond to additional incidents.

Unit Hour Utilization

Unit hour utilization (UHU) is calculated by measuring the amount of time individual apparatus are committed to an incident and dividing the result by the total number of hours in a year (8,760). This measure quantifies the amount of time a unit is not available for response to additional incidents because it is already committed to an incident.

While there are limited formal performance measures to use as a target measure, Henrico County (VA) Division of Fire studied its EMS workload and developed a general commitment factor scale for the department. [11] The next figure summarizes the results of the 2016 study as it relates to commitment factors.

Figure 57: Commitment Factors as Developed by Henrico County Division of Fire, 2016[21]

Factor	Indication	Description
16%–24%	Ideal Commitment Range	Personnel can maintain training requirements and physical fitness and can consistently achieve response time benchmarks. Units are available to the community more than 75% of the day.
25%	System Stress	Community availability and unit sustainability are not questioned. First-due units are responding to their assigned community 75% of the time, and response benchmarks are rarely missed.
26%–29%	Evaluation Range	The community served will experience delayed incident responses. Just under 30% of the day, first-due ambulances are unavailable; thus, neighboring responders will likely exceed goals.
30%	"Line in the Sand"	Not Sustainable: Commitment Threshold—the community has less than a 70% chance of timely emergency service, and immediate relief is vital. Personnel assigned to units at or exceeding 0.3 may show signs of fatigue and burnout and may be at increased risk of errors. Required training and physical fitness sessions are not consistently completed.

The following figure illustrates the UHU for RSFD units in 2019, expressed as a percentage of the total hours in the year. The number of responses and average time committed to each incident is displayed as well.

Figure 58: Rock Springs Unit Hour Utilization (2019)

Unit	Incident Count	Average Time	% UHU	UHU
E1	92	0:28:06	0.2%	0.002
E2	654	0:27:24	1.7%	0.017
E3	593	0:28:20	1.6%	0.016
L1	694	0:30:59	2.0%	0.020

Incident Concurrency

Simultaneous—or concurrent—incidents can tax a fire department's ability to summon sufficient resources to respond to additional emergency incidents, resulting in extended response times from units located outside of designated response zones and service areas.

In the following figure, ESCI examined the percentage of time RSFD resources were committed to more than one incident at the same time during the study period.

Figure 59: Concurrent Incidents (2016–2019)

Concurrent Incidents	Percentage
1 Incident	86.9%
2 Incidents	12.3%
3 or more Incidents	0.8%

Unit Hour Utilization & Concurrent Incident Discussion

The analysis of historical out of service times and concurrent incidents reveals that the primary assigned units should be able to respond to a significant majority of incidents occurring in their response territories. However, this analysis does not take into consideration other non-emergent department and operational activities that can impact response readiness and response times. Examples of these activities include drills, out of district training, administrative duties, vehicle maintenance and repairs, public education activities, or fire inspections/code enforcement. The Department should continue to monitor UHU and the frequency of concurrent calls in the future.

Response Time Performance

Response time performance is perhaps the most publicly emphasized aspect of the quality of an emergency services delivery system. Policymakers and citizens want to know how quickly they can expect to receive emergency services. For policymakers and citizens to make informed decisions concerning response performance, it is essential that jurisdictions record and report the various components of the jurisdiction's current response time performance.

ESCI uses percentile measurements in analyzing response time performance. The use of percentile measurements to assess the components of overall response time is considered an industry best practice, as defined by the Center for Public Safety Excellence (CPSE), Standard of Cover document and the National Fire Protection Association (NFPA) 1710: *Standard for the Organization & Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments*.

The "average" measure (also called the "mean") is a commonly used descriptive statistic of a dataset. The most important reason for not using the average for performance standards is that it may not accurately reflect the performance for the entire dataset and may be skewed by outliers, especially in small datasets. One extremely good or bad value can skew the average for the entire dataset.

The "median" measure is another acceptable method of analyzing performance. This method identifies the value in the middle of a dataset and is not skewed as severely by data outliers.

Percentile measurements are a better measure of performance because they show that most of the dataset has achieved a certain level of performance. The 90th percentile means that 10% of the values are greater than the value stated, and all other data are at or below this level. This can be compared to the desired performance objective to determine the degree of success in achieving the goal.

In reviewing this performance analysis, it is important to remember that each component is analyzed individually, and then combined and analyzed as total response time. The *response time continuum*—the interval between when the caller dials 911 and when assistance arrives—is comprised of several components:

- **Call Processing Time**—the interval between when a dispatcher receives the call and the unit is dispatched.
- **Turnout Time**—the time between unit notification of the incident and when it is responding.
- **Travel Time**—the interval between when the unit begins responding until it arrives on the scene.
- **Response Time**—a combination of turnout time and travel time. Commonly used to measure response performance when the fire district does not have direct control over the PSAP and/or dispatch center. It excludes the alarm-handling and call-processing time.
- **Total Response Time**—the interval between when the 911 call is answered until the dispatched unit arrives on the scene. This is the true measure of response-time performance.

Total response time is the amount of time a resident or business waits for resources to arrive at the scene of an emergency beginning when they first placed a 911 call. This process begins for the fire department once the communications center dispatches the appropriate unit. The NFPA standard for alarm handling and call processing is derived from NFPA 1221: *Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems* and provides for communication centers to have alarm handling times of not more than 15 seconds, 90% of the time and not more than 20 seconds, 95% of the time. Additionally, NFPA 1221 requires the processing of the call to occur within 64 seconds, 90% of the time for high-priority incidents. Similarly, NFPA 1710 requires the call processing time to be 60 seconds or less, 90% of the time, as does the Insurance Services Office (ISO). The following figure summarizes the NFPA 1710 response time standards for a first arriving fire engine at a fire suppression incident.

Figure 60: NFPA 1710 Standards for Fire & EMS Responses

Response Interval	NFPA/CFAI Recommendations
Call Processing	64 seconds or less, 90% of the time
EMS Incident Turnout Time	60 seconds or less, 90% of the time
Fire Incident Turnout Time	80 seconds or less, 90% of the time
Travel Time	240 seconds or less, 90% of the time

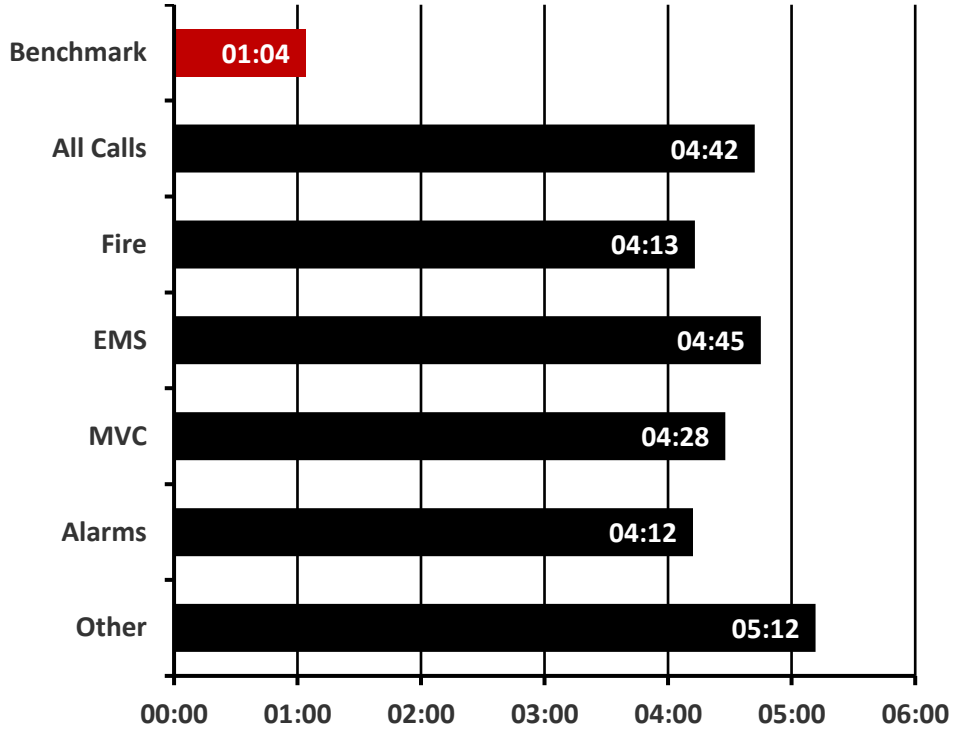
Tracking the individual components of response time enables jurisdictions to identify deficiencies and areas for improvement. In addition, knowledge of current performance for the components listed in the preceding figure is an essential element of developing response goals and standards that are relevant and achievable. Fire service best practice documents recommend that fire jurisdictions monitor and report the components of total response time.[22]

While RSFD does not meet all the NFPA 1710 response time performance goals, this does not infer that RSFD is performing poorly. However, it is imperative that the fire department track its performance, which can then be used to identify adjustments and corrective actions to improve response performance.

Call Processing Time Performance

The call processing component includes the time interval from the point at which dispatch receives the call to when the resources are dispatched to an incident. The following figure illustrates the call processing performance for RSFD's response area during the study period.

Figure 61: Rock Springs 90th Percentile Call Processing Time Performance (2016–2019)



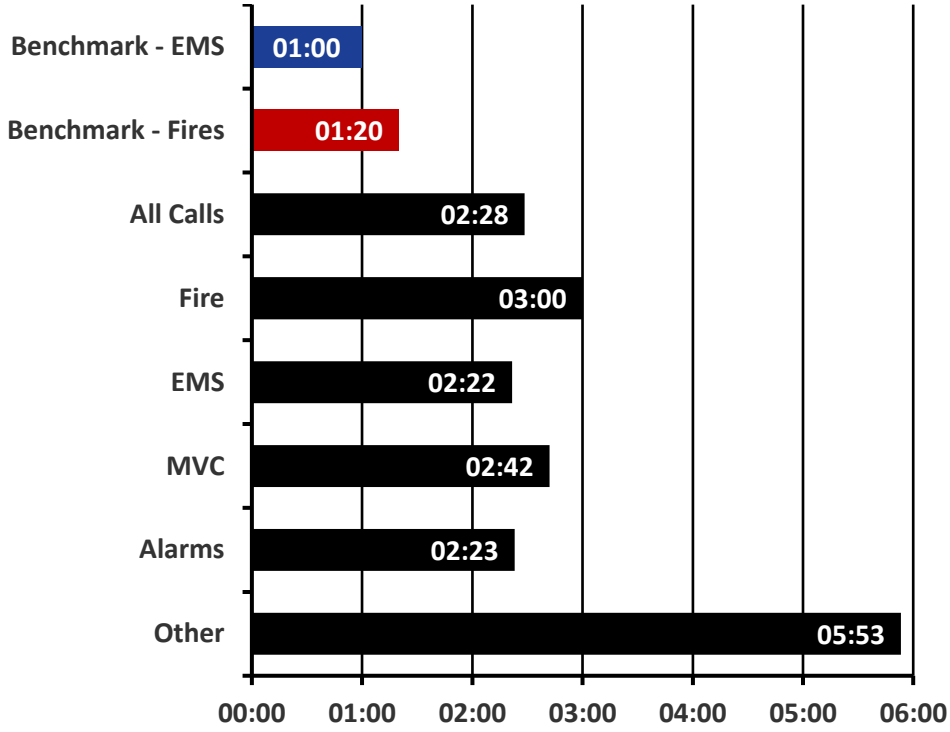
As displayed in the preceding figure, SWCCC call processing time performance measured at the 90th percentile for all incident types exceeds the 64-second benchmark by 3 minutes, 38 seconds. Examination of the RSFD 2016 through 2019 data reveals that call processing time exceeded the benchmark in all incident categories at the 90th percentile.

Turnout Time Performance

The turnout time component begins when emergency personnel are notified to respond by the dispatch center and ends when the apparatus begins to respond. Turnout time is one area of the overall response time that field personnel have at least some ability to control, given proper facilities that allow for rapid and efficient movement of personnel.

The following figure illustrates RSFD's 90th percentile turnout time performance for the first apparatus on-scene at all incident types where a lights-and-siren response mode was used during the study period.

Figure 62: Rock Springs 90th Percentile Turnout Time Performance (2016–2019)



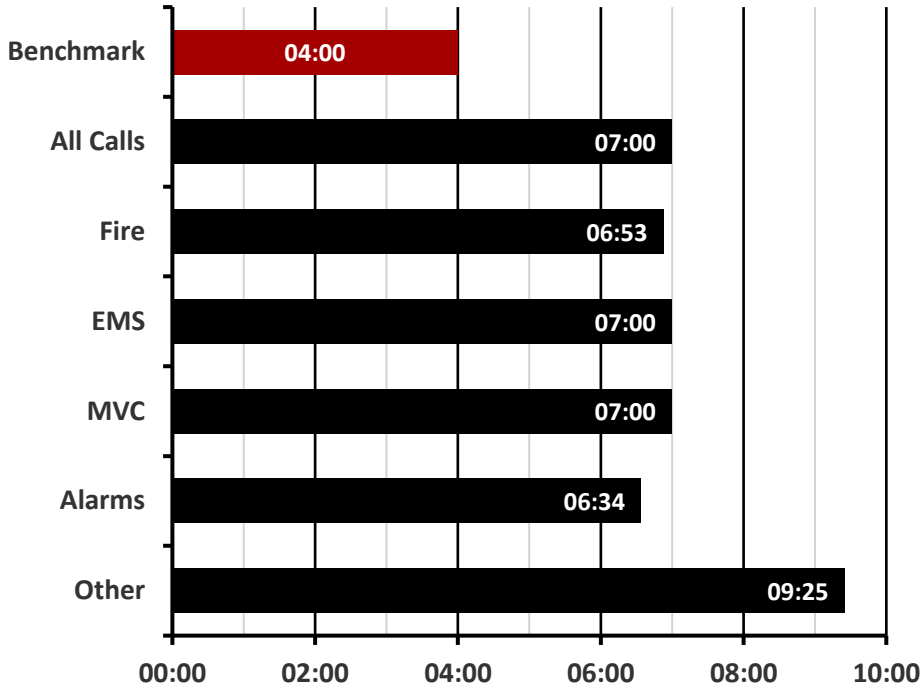
As seen in the previous figure, RSFD did not meet the NFPA 1710 60-second and 80-second benchmarks. The highest turnout time was in the Other incident type category, followed by the Fire Incident type category.

Travel Time Performance

Travel time begins when an apparatus leaves the station and stops when the apparatus reaches the scene of an emergency. Travel time is one component of total response time that is rarely directly controllable by fire department personnel. The existing road network, traffic congestion, intersections, construction, and distance between stations all play crucial roles in travel time performance.

The following figure illustrates travel time performance for the first arriving engine company at the 90th percentile throughout RSFD's response area during the study period. Only incidents with a lights-and-siren response were included in this analysis.

Figure 63: Rock Springs 90th Percentile First-Arriving Travel Time Performance (2016–2019)

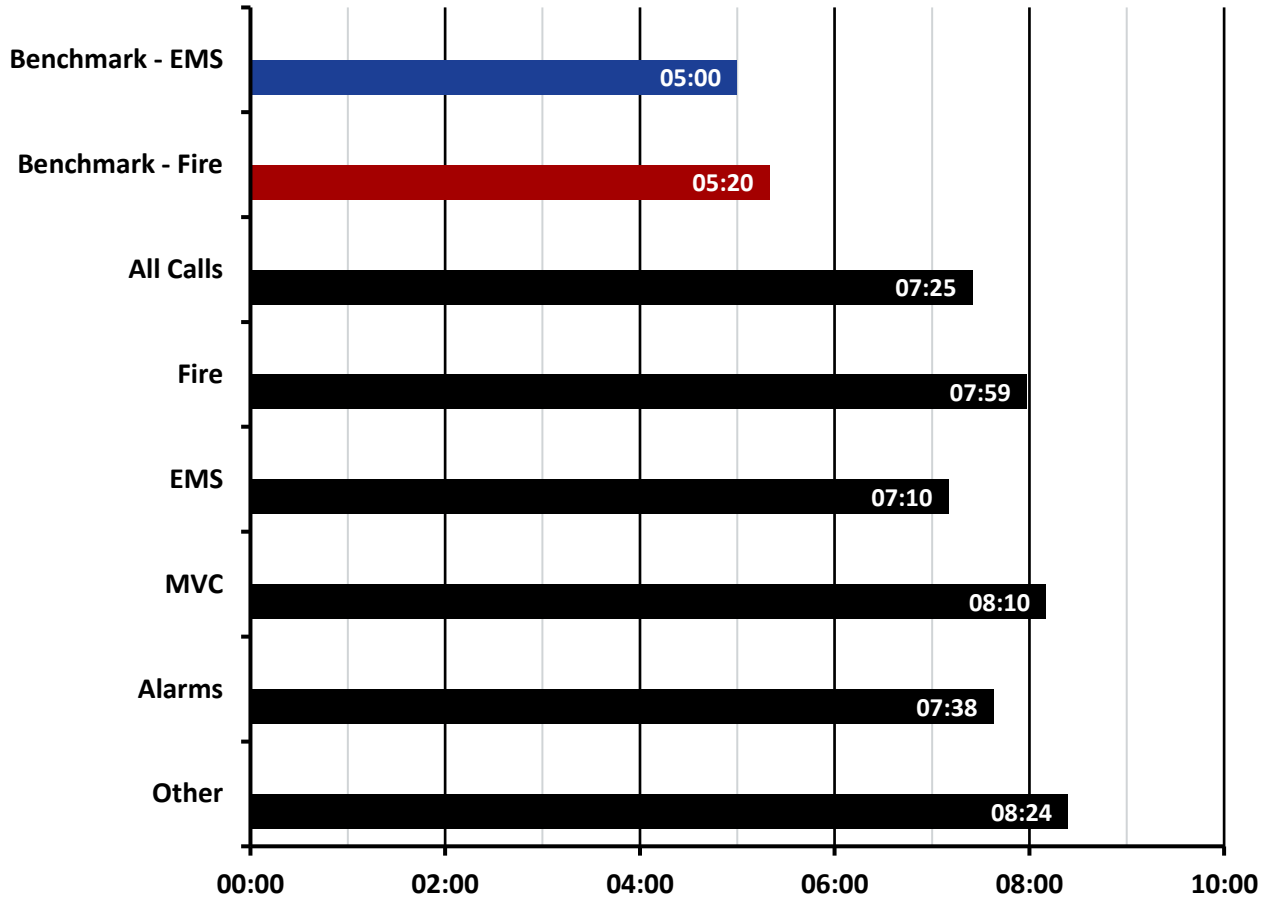


As illustrated, the first-arriving engine company travel time performance for RSFD exceeds the NFPA 1710 benchmark of 4 minutes in all categories. RSFD exceeds the 4-minute benchmark for all calls combined by 3 minutes.

Turnout & Travel Response Time Performance

As previously discussed, the most utilized measure of fire department response is a combination of turnout time and travel time, referred to as total response time or response performance. This is the time from when fire personnel are notified of an incident by dispatch until the unit arrives on the scene. The following figure illustrates the turnout and travel time emergency response performance for RSFD's response area during the study period. Only incidents with a lights-and-siren response were included in this analysis.

Figure 64: Rock Springs 90th Percentile Turnout & Travel Time Response Time Performance (2016–2019)



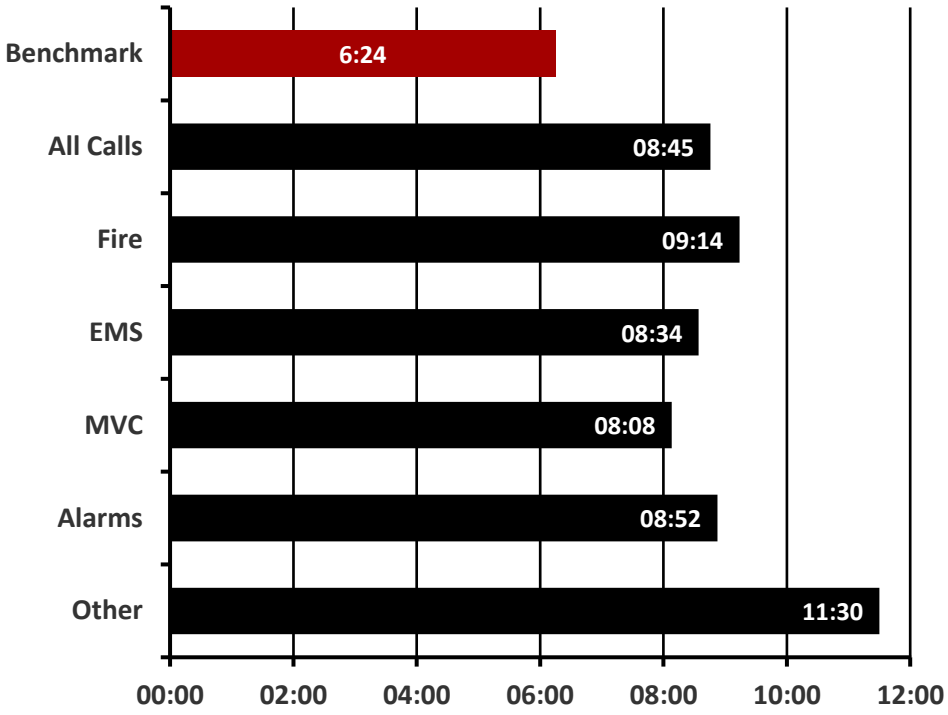
NFPA 1710 establishes a benchmark of 60 seconds for turnout time and 4 minutes for travel time, for a total of 5 minutes (300 seconds) response time to EMS incidents. An additional 20 seconds is added to the turnout time benchmark for fires, for a total response benchmark time of 5 minutes, 20 seconds (320 seconds). RSFD's total response time exceeded the 5-minute benchmark in all categories. RSFD exceeds the benchmark for all calls combined by nearly 3 minutes.

Total Response Time Performance

Total response time performance is the time from when the 911 call is answered by dispatch until the first apparatus arrives on the scene of the incident. Utilizing the total response time continuum from NFPA 1710, the recommendation for total response time at the 90th percentile for fire incidents s is 6 minutes, 24 seconds, and 6 minutes, 4 seconds for EMS incidents

The next figure illustrates RSFD's Total Response Time performance during the study period. For illustrative purposes only the fire incident benchmark is noted.

Figure 65: Rock Springs Total Response Time Performance (2016–2019)



Again, as can be expected since RSFD exceeds the benchmarks in all analyzed components, total response time performance exceeds the 6-minute benchmark in all categories. RSFD's total response time is 8 minutes, 45 seconds for all calls combined at the 90th percentile, which exceeds the benchmark by 2 minutes, 21 seconds.

Response Time Performance Discussion

A fire department's response time performance is one of the foundational ways that internal and external stakeholders measure overall service delivery performance. While it is recognized that there are aspects beyond the fire department's control—call processing time or incident location, for example—there may be ways in which overall response time performance can be improved.

ESCI initially analyzed 7,647 records. However, after removing errant data (0:00 and missing timestamps), the total count of incident records was 6,458, or slightly more than 15 percent (15.5%).

Any call processing time of 15 minutes (15:00) or greater were deemed outliers and removed from the call processing performance analysis, which was approximately 2% of all incidents analyzed. In total, 1,304 (17%) were removed from either call processing or travel time analysis.

The call processing times appeared lengthy for all incident categories. However, ESCI was unable to differentiate between non-emergent and emergent incidents based on caller interrogation. Incident severity was deduced by noting if the units responded with lights-and-siren. This response time component should be evaluated for specific circumstances only. In other words, evaluate call processing times for critical situations, where rapid response times may make a difference in patient or incident outcomes. Examples of these critical incident types include reported structure fires, cardiac arrest, possible heart attacks and strokes, and high mechanism motor vehicle collisions.

ESCI also noted problems with the incident data provided, including missing time stamps on key components of incident response times. For example, when reviewing concurrent incidents, 3% had to be excluded due to missing dispatch times or missing unit available times. These are both required fields when submitting NFIRS data to the State or U.S. Fire Administration, and likely result in additional review and correction time by fire department or dispatch center staff. Fortunately, several third-party software solutions can be integrated into dispatch RMS programs that can identify and correct common time entry errors.

ESCI emphasizes the importance of establishing—and measuring against—response time standards and targets. Once established, these standards can assist a department in continually assessing how well it is providing service to the community, measure impacts on operational or deployment changes, identify impacts of community demographical changes, and subsequently make informed decisions on adjusting operations that serve the community in a cost-effective way. Examples of the time elements routinely measured and reported include:

- **Structure Fire Incident:**
  - First arriving engine company
  - Arrival of full first alarm assignment (Effective Response Force)
- **Emergency Medical Incident**:
  - First apparatus (medically equipped with AED) on the scene
  - First Advanced Life Support (ALS) apparatus on the scene
- **Hazardous Materials Incident**:
  - First apparatus on the scene
  - Level A entry team assembled
- **Technical Rescue**:
  - First apparatus on the scene

- Full Technician Entry Team arrival on the scene

Within each of these categories, the individual response time components should be quantified and evaluated at the 90th percentile level.

ESCI has reviewed RSFD's general response performance and believes the Department should work with the community and the City Council in determining acceptable response time standards. This effort would hopefully result in increased community engagement and Department transparency in reporting its performance against these standards.

COMMUNITY RISK ANALYSIS

A credible community risk analysis should focus on the built-up environment within the response area (buildings and improvements to property). Land use and zoning classifications should be consulted, along with specific target hazard information, to analyze and classify community fire protection risk by geographical area. This analysis considers:

- Population and population density
- Demographics
- Land use planning & zoning
- Hazardous substances and processes

Population demographics were discussed previously in this report. The City of Rock Springs' *2012 Master Plan: Today's Plan for Tomorrow's Future* is heavily relied upon for major portions of this section of the report. To avoid confusion, the City of Rock Springs' *2012 Master Plan* will be referred to as the **City Master Plan**.

Land Use Planning & Zoning

Title 15 of the Wyoming Statutes govern cities and towns, with Article 5 specifically authorizing these communities to develop master plans. Wyoming Statute 15-1-504 provides in part: "The plan shall be made for the general purpose of guiding and accomplishing a coordinated, adjusted and harmonious development of the municipality which will best promote the general welfare as well as efficiency and economy in the process of development."

According to the current version of the City Master Plan, *"some 48.5% of the parcels in the City Limits are developed and 51.5% are not. If all of the vacant property within the City Limits were fully developable, the City would be able to support double its current population without having to annex additional property."*

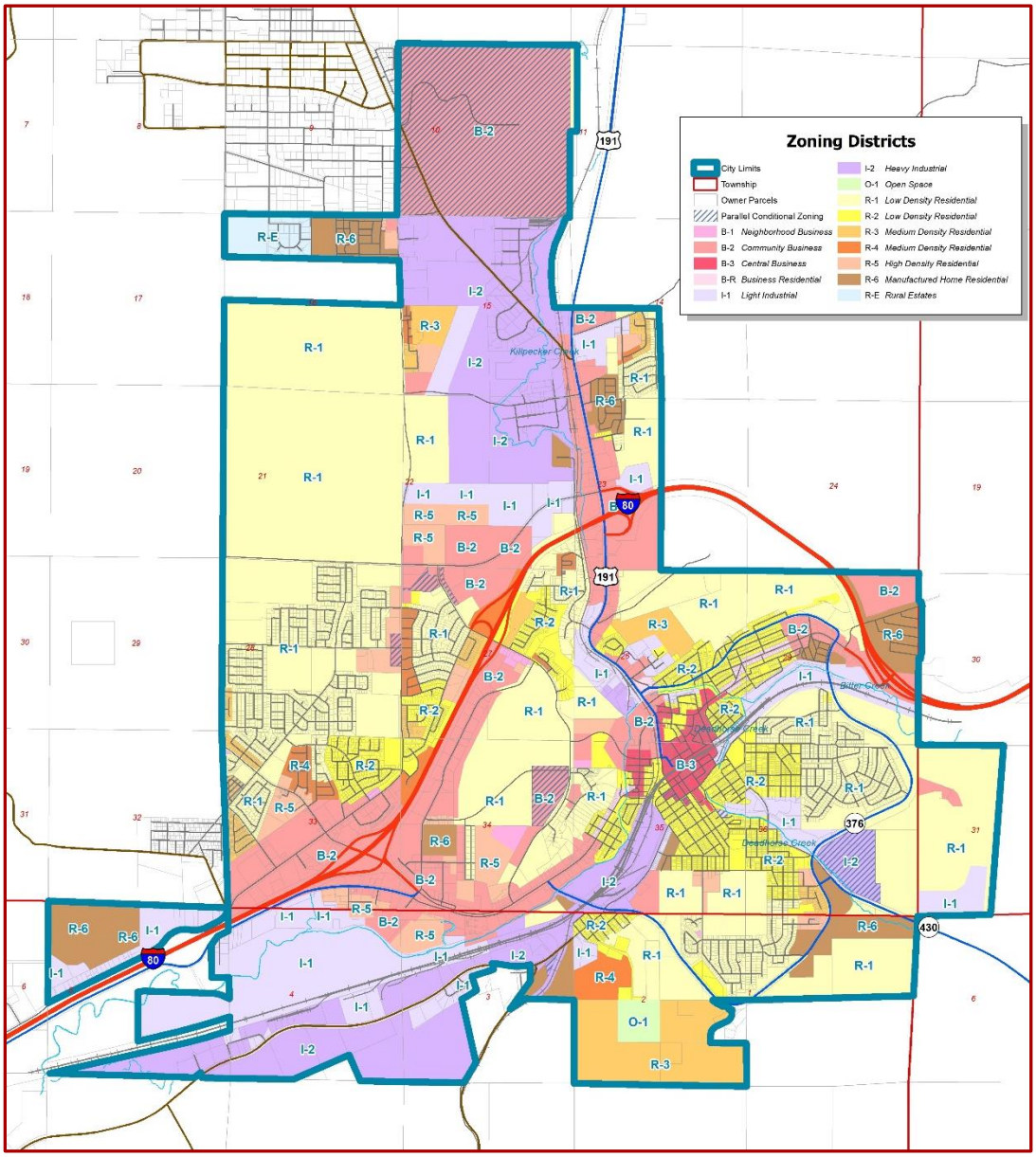
The City of Rock Springs, within the City planning and zoning function and City ordinances, has adopted zoning that is intended to aid in wise and controlled development consistent with the City Master Plan. The City Master Plan was published in 2013 and has been revised four times since then.

The growth and development experienced since the initial adoption of the City Master Plan are likely well below planned levels due to previously optimistic population growth projections, which were not realized. The following two figures define the City's zoning categories, definitions, and zoned areas.

Figure 66: Rock Springs Zoning Classifications

Zone	Zone Type	Description
O-1	Open Space/Unclassified	Lands appropriate for outdoor/open land nature or for a specific use has yet to be determined
R-E	Rural Estates Planned Unit Development	Very low density single-family detached dwellings in subdivided areas of a semi-rural environment, particularly within City/County interface boundary
R-1	Low Density Residential	Low density single-family detached dwellings and directly related complementary uses
R-2	Low Density Residential	Low density single-family detached dwellings, accessory dwelling units, and directly related complementary uses
R-3	Medium Density Residential	Low to moderate housing densities and directly related complementary uses
R-4	Medium Density Residential	Medium density housing in multiple-family structures and directly related complementary uses
R-5	High Density Residential	High density housing in multiple-family structures and directly related complementary uses
R-6	Manufactured Home Residential	Provides for Manufactured and Mobile Homes. Primarily for Manufactured Home Subdivisions & Manufactured Home Parks
B-1	Neighborhood Business	Local centers for convenient retail or service outlets which deal directly with the consumer for whom the goods or services are intended
B-2	Community Business	Low intensity retail or service outlets which deal directly with the consumer for whom the goods or services are intended
B-3	Central Business District	Commercial retail and service establishments with carefully integrated multiple-family residential, entertainment, and public parking facilities in the "downtown" sector of the City
B-R	Business Residential	Mixed use district allowing both business and residential land uses
I-1	Light Industrial	Industrial, warehousing, and office facilities which do not cause adverse off-site environmental impacts
I-2	Heavy Industrial	Industries which, due to their operation, appearance, traffic generation, or emissions, would not be compatible with land uses in the Light Industrial Zone (I-l), but which, nevertheless, are necessary and desirable activities in the City
PUD	Planned Unit Development Overlay	Any development having one or more principal uses or structures on a single parcel of ground or contiguous parcels; consisting of a harmonious selection of uses and groupings of buildings, parking areas, circulation and open spaces, and shall be designed as an integrated unit in such manner as to constitute a safe, efficient, & convenient urban area

Figure 67: City of Rock Springs Zoning Map



Industrial zoning generally parallels railroad right-of-way and surrounds the City of Rock Springs Municipal Airport. These areas are typically where target hazards are located from a fire, hazardous materials, and community economic loss perspective. Commercial zones generally act as a buffer between industrial and residential areas, primarily in the downtown area. Pockets of high-density residential occupancies are located adjacent to the industrial and commercial areas as well. These high-density residential occupancies have the potential for high life risk in a fire or hazardous materials release situations.

In terms of fire station placement, agencies should avoid placing fire stations and other critical infrastructure at "ground zero" of these high-risk targets. However, they should be located close enough for a prompt response without requiring personnel at these critical resources from having to shelter in place.

The Rock Springs 2009 Emergency Operations Plan (currently being updated) categorizes the risks the City faces as low, moderate, and high risk. These are further broken down (not necessarily in priority order) as shown in the following figure:

Figure 68: Community Risk by Category

High Risk
Hazardous Materials Incident (fixed and/or transportation)
Transportation Incidents (crash, or system failure)
Severe Weather
Utility Failure
Pipeline Rupture
Land Shift (subsidence)
Moderate Risk
Terrorism (domestic, international, and/or eco)
Pandemic
Tornado
Wild Land Fire
Structure Fire
Low Risk
Earthquake
Civil Disorder
Drought

Hazardous Materials

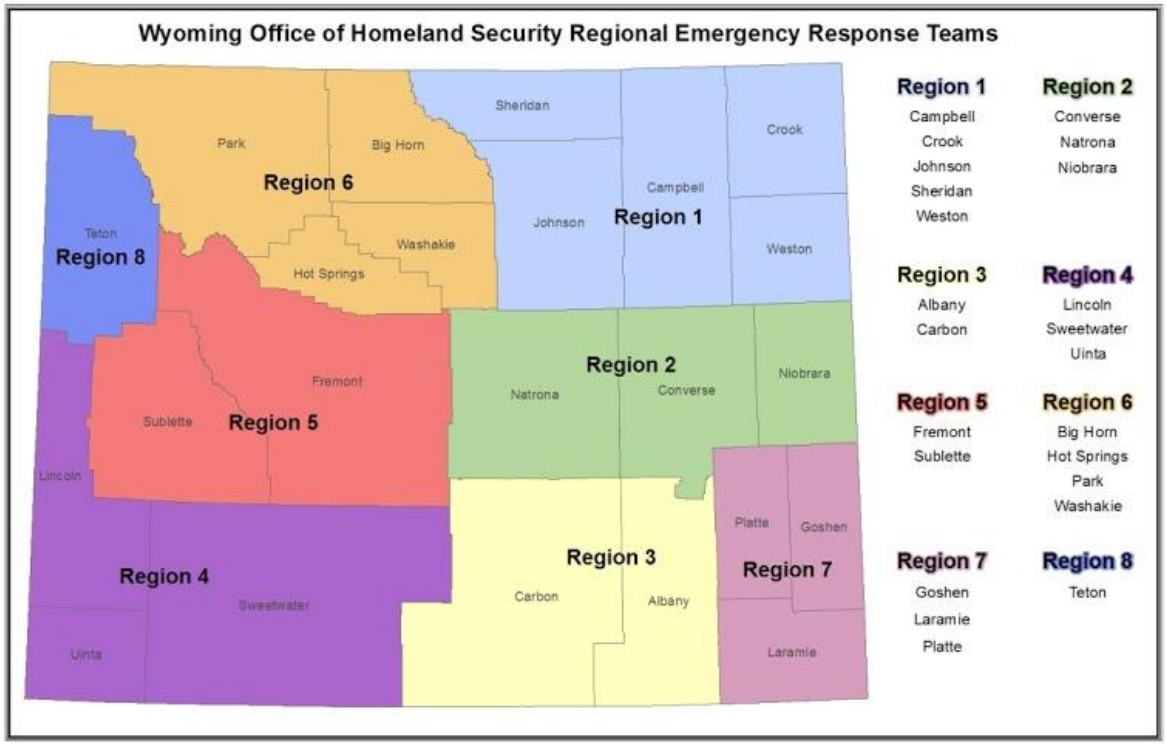
Buildings that have been identified as containing hazardous materials can create a dangerous environment for the community as well as the firefighters during an uncontrolled release or fire. The use of special equipment, protective clothing, detection equipment, and specialized training is necessary to successfully and safely mitigate these types of incidents. The Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA), commonly known as SARA Title III requires that any location that has an amount of hazardous chemical equal to or greater than the following limits must file and maintain information on these chemicals with the local authorities, planning committees, and State Emergency Response Commission.

- 10,000 pounds for hazardous chemicals; or
- The Threshold Planning Quantity (TPQ) for extremely hazardous substances (EHS).

According to the City Master Plan, there are 28 Tier II reporting facilities within the City of Rock Springs. There are two primary hazardous materials (haz-mat) risks posed in communities; those at fixed sites, which are most often known by the local fire department, and those in transit, most often unknown by the local fire department.

RSFD is part of a statewide, regional response system, serving Region 4 and the southern portion of Region 5 in Sublette County. Those regions are depicted in the following figure.

Figure 69: Wyoming Haz-Mat Regions



Fixed Haz-Mat Sites

The Sweetwater County Local Emergency Planning Commission (LEPC) meets quarterly to discuss plan amendments, plan contingencies, and other haz-mat mitigation preparedness strategies. More frequent meetings may also be in order with owners of fixed facilities to address specific concerns.

The following facilities and their hazards have been identified as hazardous materials target hazards in Rock Springs.

Simplot Phosphates: Located just outside the City limits of Rock Springs on US Highway 430 approximately six miles south of Rock Springs, this plant generates fertilizer and agribusiness-related products. The raw commodities it has on hand include Ammonia (atmospheric and high-pressure storage) and molten Sulphur. These products are used to produce Sulfur Dioxide (SO_2), Sulfur Trioxide (SO_3), and Phosphoric Acid. The final products of the processes used include Ammonium Nitrate (powder form). This facility is not within City limits but is close enough to pose a hazard.

Homax Petroleum: Located at 505 D Street and 1781 Blairtown Connector Road, Rock Springs, WY. This site contains diesel, gasoline, and other finished petroleum goods stored on site.

Haliburton: Located at 1801 Blairtown Connector Road, this site is closed; however, previously-stored chemicals associated with oil and gas production, including up to 150 pounds of explosives and a radiological source, make this more than a typical risk if a fire is reported here.

Schlumberger: Located at 2901 Yellowstone Road, this site is closed; however, previously-stored chemicals associated with oil and gas production make this more than a typical risk if a fire is reported here.

Phillips 66: Located at 90 Foothill Boulevard, this facility contains bulk storage of gasoline and diesel. This facility experienced a gasoline spill of 1,100 barrels in 2012, which was contained within the designated containment area. This facility is not within the City limits but is close enough to pose a hazard.

Airgas: Located at 1895 Foothill Boulevard, this facility contains welding supplies. There are significant quantities of liquid nitrogen and liquid oxygen stored on-site.

NORCO: Located at 1315 Elk Street, this facility contains industrial welding supplies of a similar nature to Airgas.

RSFD has listed these sites as target hazards due to their actual or potential hazardous materials storage or latency (in the case of closed facilities). The department recognizes that the prefire plans in place for these facilities could be improved, including suppression crews training on scenario-based incident simulations at these sites. As target hazards, building schematics and critical infrastructure for these facilities have been obtained from the facility owners and relationships built with the on-site personnel (if still open and operating) in the event of an emergency.

Highway Network

With a primary interstate commerce highway and heavy rail corridors transecting the City, the community likely has substantial haz-mat products being transported within the footprint of the City on an hourly basis with much of the community unaware. Indeed, a commodity flow study for highway commerce was conducted in December 2017 by Sweetwater County at the following three waypoints:

- I-80 at Mile Post 66
- US-30 Mile Post 100
- US-191 Mile Post 5

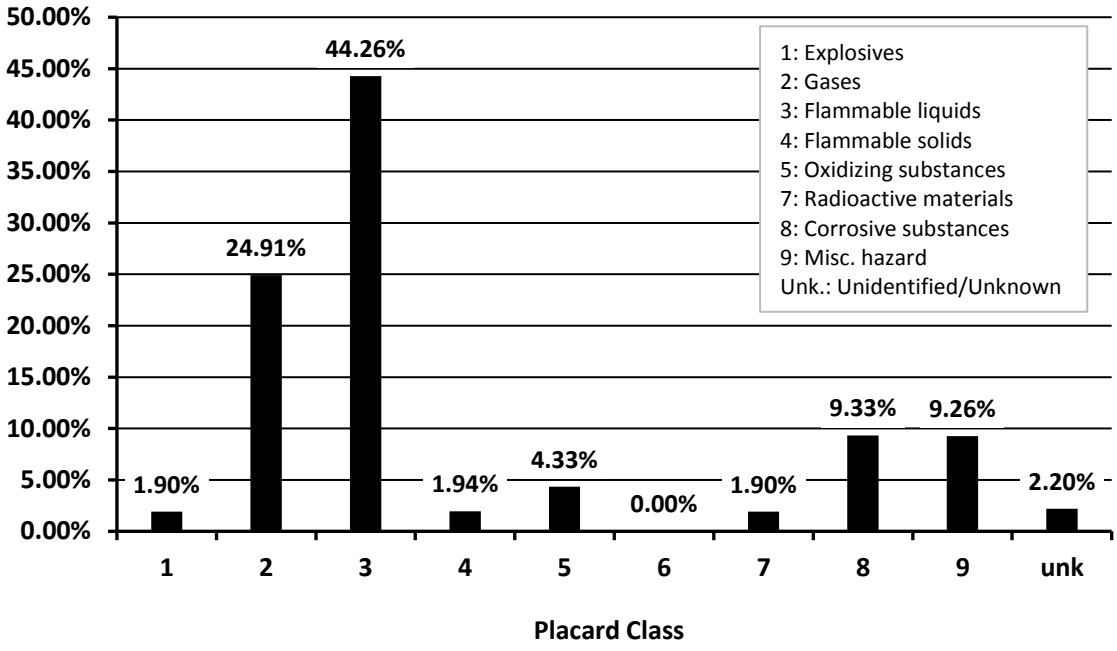
The hazardous materials transporters counted during the three consecutive days of evaluation (12 hours per day) are reflected in the following figure.

Figure 70: Haz-Mat Transporters-Highway Count

Location	# of Haz-Mat Trucks	Extrapolated Annual Truck Traffic[1]
Interstate 80	321	77,682
US 30	129	31,218
US 191	94	22,748

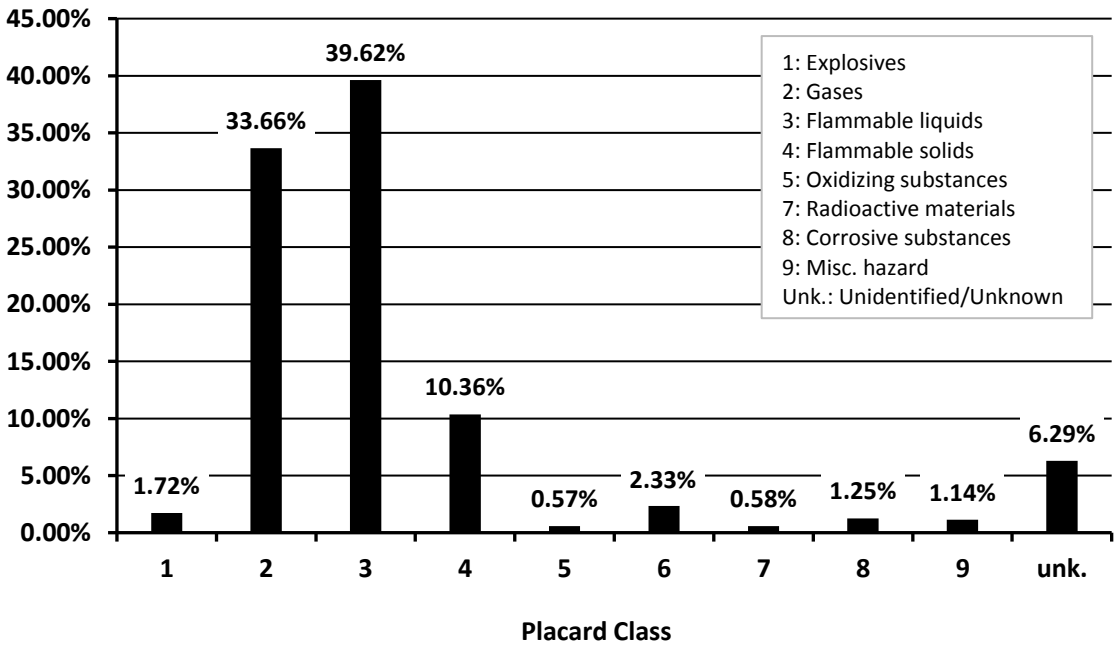
The extrapolated numbers shown in the preceding figure are based only on the traffic counted during the three-day period, and are intended only to illustrate the significant potential hazards related to over-the-road transportation of hazardous materials. The evaluation also revealed, in general terms, that the physical characteristics of the hazardous commodities being transported via the local highway network primarily fell into two categories. For Interstate 80, almost 25% of the hazardous cargo hauled on Interstate 80 was placarded as gases, and over 44% was flammable liquids. The following figure summarizes the hazards inventoried by hazard class.

Figure 71: Haz-Mat Transporters, Interstate 80 Highway Count



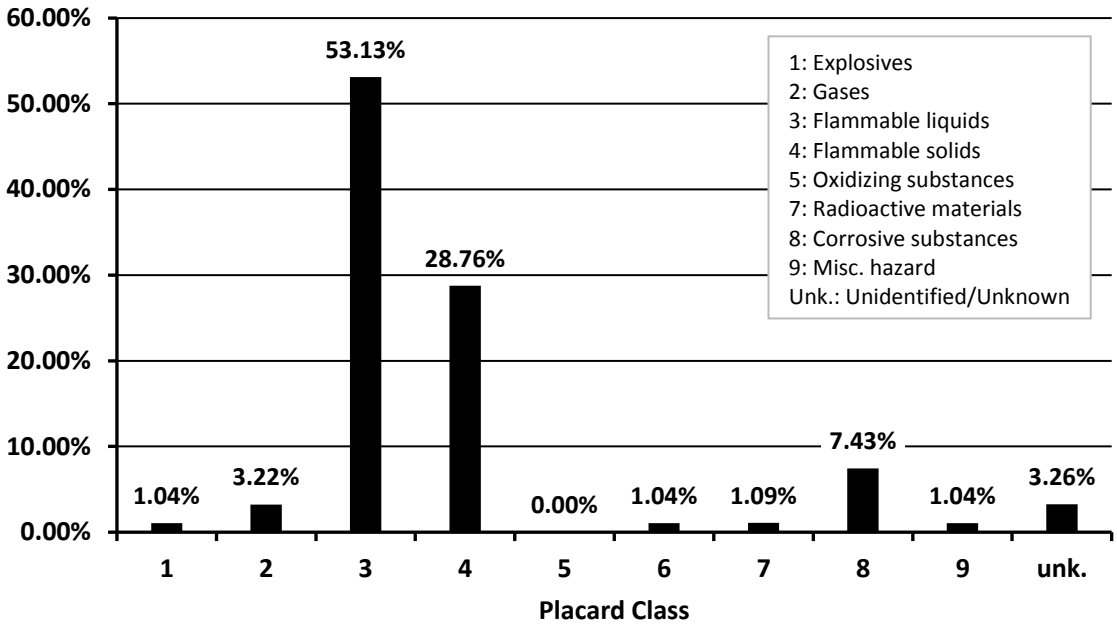
As shown in the following figure, the hazardous materials hauled on US 30 were similar to those hauled on Interstate 80, where over one-third of the placarded hazards are gases, and almost 40% are flammable liquids.

Figure 72: Haz-Mat Transporters, US 30 Highway Count



US 191 has a slightly different hazard profile, in that well over 50% of the placarded loads are flammable liquids, and well over one-fourth of the placarded loads are flammable solids, as noted in the following figure.

Figure 73: Haz-Mat Transporters, US 191 Highway Count



The remaining hazards surveyed on all three highways were well below ten percent of the remaining hazards placarded. This is not to say that these are less hazardous. On the contrary, explosives are a very low percentage of the total hazardous cargo hauled for each highway. Still, they are nonetheless significant in their potential to wreak havoc on the highways and surrounding communities. In fact, low frequency hazards often pose the highest consequence when an incident does occur.

These haz-mat risks are greatest in a community due to their unpredictability of where and when they may be involved in a release. In the event of an incident, the type and quantity of the product(s) involved is often initially unknown, and the topography, exposure potential, and weather often add complexity to accurately sizing up the incident and efficiently deploying resources. The frequent hazardous haulers transiting the highways increases the likelihood that two or more haz-mat haulers are involved in the same incident where their combined cargoes make for an extremely dangerous combination.

Railroad Network

Union Pacific Railroad (UPRR) bisects Rock Springs. Historically, Rock Springs has had passenger and freight trains stopping at separate depots within Rock Springs. This transportation network contributed significantly to the growth in population, commercial business, and industry. Today, rail freight is the primary rail activity in Rock Springs. Rail freight is also substantial throughout Wyoming, with the number of rail cars originating in the state far exceeding the number of rail cars terminating here. This dichotomy is shown in the following two figures.

Figure 74: Number of UP Rail Cars Originating in Wyoming

Source: Union Pacific 2018 Fast Facts

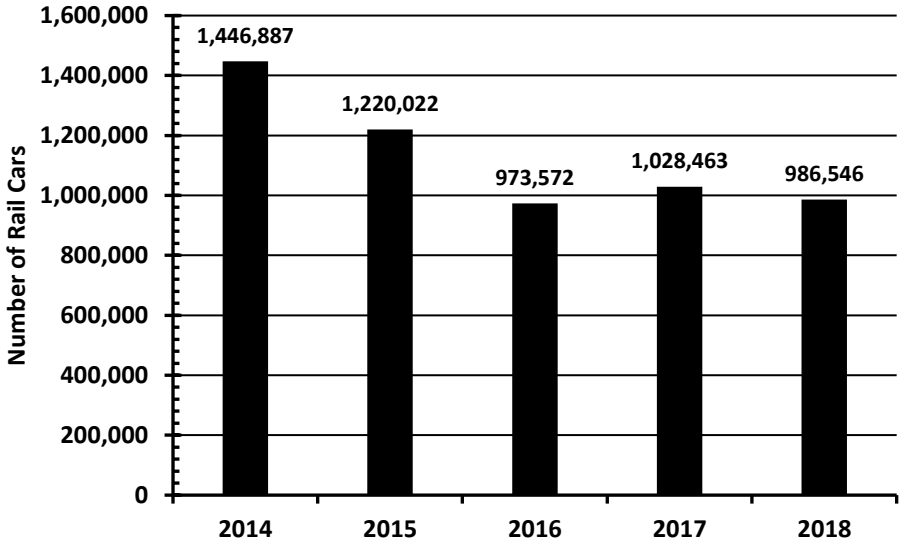
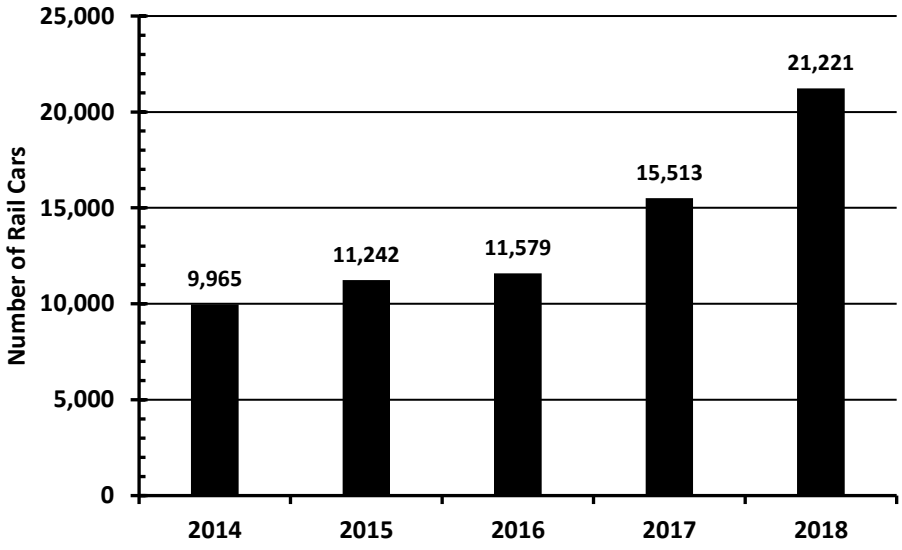


Figure 75: Number of UP Rail Cars Terminating in Wyoming

Source: Union Pacific 2018 Fast Facts



While the number of freight cars originating in Wyoming is declining year-over-year (-32% between 2014–2018), they continue to far outpace the inbound freight, which is increasing year-over-year (+213% between 2014–2018). These two figures reflect that most of the rail traffic comes from products sourced in Wyoming and exported to other locations.

Rock Springs experiences significant inbound and outbound rail activity. A commodity flow study (CFS) was conducted for Sweetwater, Uinta, and Lincoln Counties in 2014. While the numbers are not specific to Rock Springs, it is reasonable to conclude that a plurality of the commodity observed and reported in the Sweetwater County CFS traveled through Rock Springs.

Information about the specific commodities transiting the County is considered security-sensitive information. However, general trends can be identified for planning purposes. The following figure reflects the general hazards of the top twelve products shipped by rail in Sweetwater County, and the number of rail car loads shipped.

Figure 76: Top Twelve General Rail Commodities Shipped in Sweetwater, 2014

General Hazard	Rail Loads
Flammable Liquid (4)	22,274
Unspecified HM	11,155
Corrosive (3)	5,024
Flammable Liquid (2)	4,155
Flammable Liquid (1)	3,871
Flammable Liquid (1)	3,663
Corrosive (3)	1,872
Multi-hazard Liquid (3)	1,590
Multi-hazard Liquid (4)	1,327
Health (3)	1,107
Flammable Liquid (4)	1,103
Multi-hazard (4)	1,081

1 = Low hazard 2 = Moderate hazard 3 = Significant hazard 4 = Severe hazard

Hazardous cargo and chemicals are constantly transported through the City by rail. Some of the hazardous goods being hauled are extremely dangerous if released. A hazardous materials incident in Rock Springs, whether at a fixed facility, by truck, or by rail, is the most significant humanmade risk the City faces.

Regional Haz-Mat Response Resources

As noted previously in this report, the Department operates Regional Response Team 4, under the auspices of the Wyoming Office of Homeland Security. RSFD has 34 members of its department that are certified Hazardous Materials Technicians. The members train quarterly to maintain skills and review procedures. The Team has a response trailer housed at the headquarters station, and works closely with the Wyoming National Guard 84th Civil Support Team based in Cheyenne. This team provides sophisticated chemical hazard analysis, containment, and mitigation resources to civil authorities and jurisdictions at a domestic chemical, biological, radiological, or nuclear, also known as CBRN, incident site.

Other Built Environment Risks

According to the City Master Plan, some areas of Rock Springs have fire flow limitations due to the existing water system infrastructure. This requires close monitoring by building officials and the fire department of proposed new development that might be impacted by these limitations. Building design, built-in fire mitigation measures, or changes in construction methods may be required to stay within the fire flow limitations. Additionally, the Rock Springs Water Master Plan contains recommended fire flows for use in the design of future service areas. The City Master Plan strongly encourages the use of these recommended fire flows when considering development proposals in these future service areas.

Occupancy type also factors into fireground strategy and tactics based on life risk, risks posed by building contents, or risks posed by the building structure itself. The following figure reflects all commercial buildings within Rock Springs, including their occupancy classification and examples of the types of businesses they contain.

Figure 77: Rock Springs Commercial Occupancy Classifications

Occupancies by Type, Commercial	Number	Examples
Assembly (A occupancies)	129	Theaters, restaurants, churches, places of public assembly
Business (B occupancies)	373	Banks, storefronts, professional offices, clinics, showrooms, laundromats
Educational (E occupancies)	41	Daycare/preschool, public or private schools
Factory or Industrial (F occupancies)	46	Body shop, equipment repair, oilfield services, welding, and fabrication
High Hazard (H occupancies)	2	Flammable, pyrophoric, pose physical hazard
Institutional (I occupancies)	14	Treatment centers, group homes, assisted living centers
Mercantile (M occupancies)	81	Convenience and department stores, drug stores, home improvement, showrooms, supermarkets
Misc. (U occupancies)	34	Other
Residential (R occupancies)	70	Apartments, boarding homes, hotels, dormitories
Storage facilities (S occupancies)	9	Storage for combustible materials

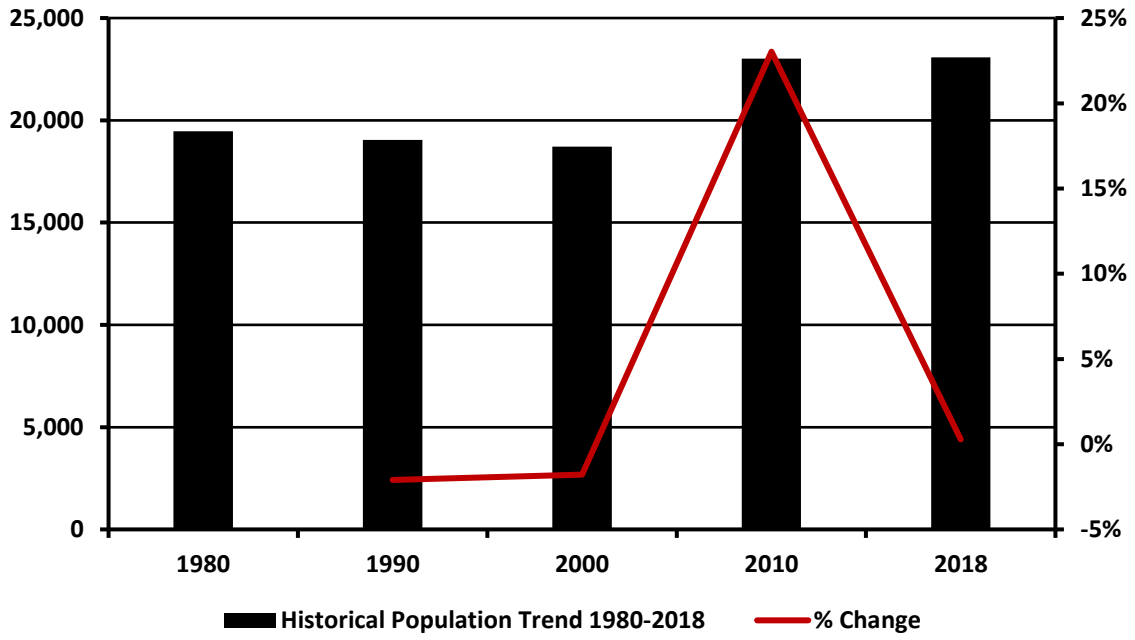
The configuration of buildings and other real property improvements also significantly impact the fire department's ability to mitigate an emergency. Building height can impact evacuation of occupants, and building setback requirements (especially combined with beautification efforts such as permanent planters, terraced landscapes, or aesthetic trees) can negatively impact fire department access and operations. Both building height and setback limitations can significantly impact the fire department's ability to quickly and effectively control a fire and rescue occupants.

The nexus between crew size and risk is discussed in the *Staffing & Personnel* section of this report. However, it is important to recognize that a moderate risk is considered a two-story, 2,000 square foot single family home with no basement and no exposures. RSFD does not have sufficient personnel on duty on any given day—without mutual aid or automatic aid—to muster the staffing level required for a moderate risk incident. This may result in the inability to simultaneously complete critical initial fire ground tasks during the first few minutes during a significant emergency incident, which may slow fire suppression and rescue efforts.

POPULATION & SERVICE DEMAND PROJECTIONS

Future emergency service demand, especially EMS incidents, is largely tied to changes to the service area population, economic activity, and demographics. Analyzing historical population data can assist in forecasting future service demand. ESCI used data from the U.S. Census Bureau and Wyoming Department of Administration and Information Economic Analysis Division to assist in projecting future growth. The following figure shows the historical population growth in Rock Springs.[23]

Figure 78: Historical Population Trends



As you can see, the City experienced a 19% percent increase in population between 2000 and 2010. The overall annual average growth rate was 4% over this period. However, this average includes the over 20% "spike" in population growth, which is likely the result of the influx of oil and mining extraction workers and their families. Since then, the City's population growth trend has slowed substantially (.13% annual average growth), and even declined since 2014.[24]

According to the U.S. Census, the population estimate for Rock Springs was 23,082 (as of July 1, 2018). The previous eight years (from the 2010 census to 2018) is reflected in the following figure.

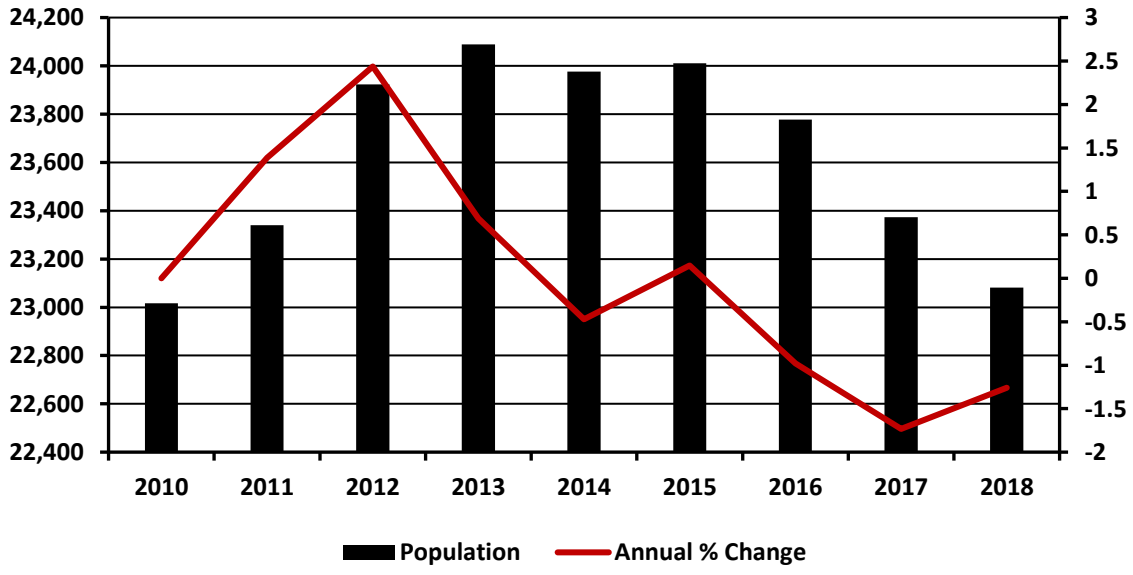
Figure 79: Rock Springs Historical Population Estimates

Source: U.S. Census

Year	Population Estimate	Annual Change
2010	23,016	—
2011	23,340	1.39%
2012	23,923	2.44%
2013	24,089	0.69%
2014	23,976	-0.47%
2015	24,011	0.15%
2016	23,778	-0.98%
2017	23,373	-1.73%
2018	23,082	-1.26%

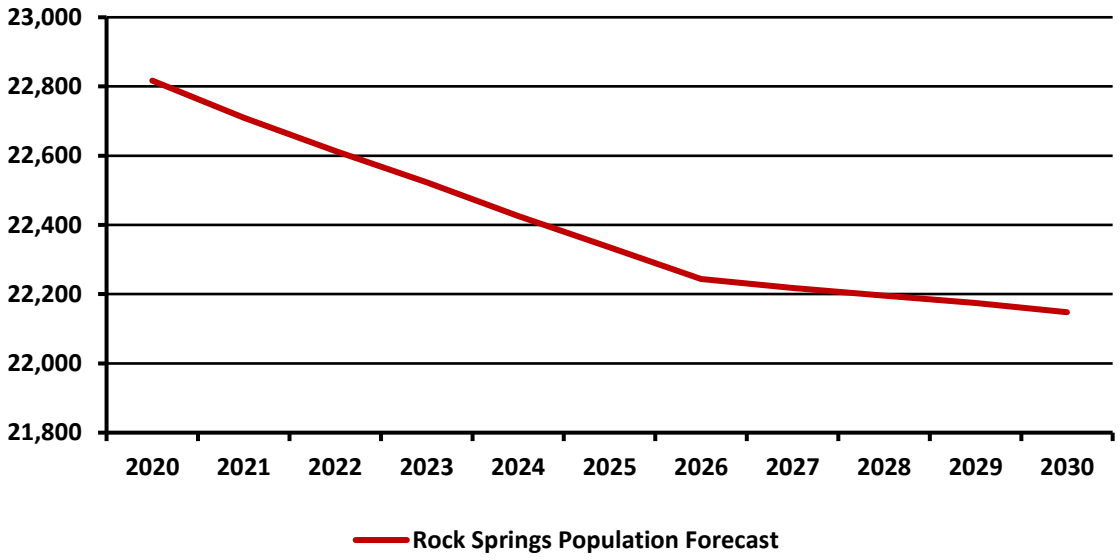
The historical population change between the 2010 U.S. Census and 2018 was sporadic, with three years of modest growth, followed by no change or modest declines, year-over-year through 2018. In the eight years following the 2010 U.S. Census, Rock Springs grew by a total of 66 people, or .29% over the most recent eight years. This is consistent with the State of Wyoming as a whole, which saw a three-year population decline of .2% of the state population during the last three years. According to the Cody Enterprise, "The Census Bureau attributed much of the [decline in population] to improved labor markets in nearby states, with Wyoming residents leaving for employment opportunities in Colorado, Utah, and Idaho." The population change between 2010 and 2018 for Rock Springs is graphically displayed in the following figure.

Figure 80: Annual Population Changes, 2010–1018



The Wyoming Department of Administration and Information Economic Analysis Division developed long-range population projections for all counties and cities. The following figure displays the population projection for Rock Springs for the next decade.

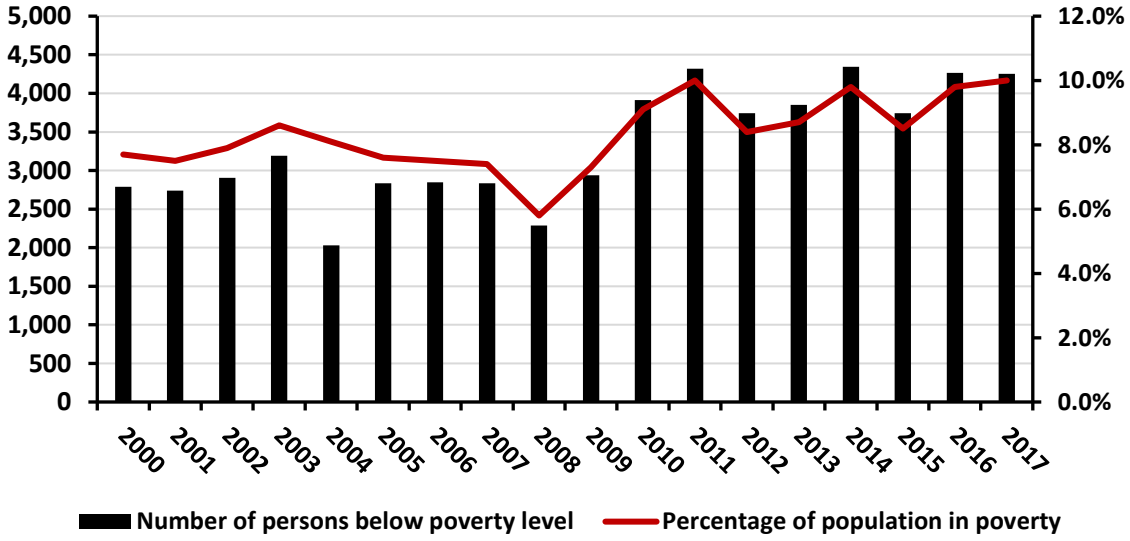
Figure 81: Future Population Growth Projections, 2020–2030



As you can see in the preceding figure, the Division projects that the City's population will continue to incrementally decline over the next decade.

Poverty is another population demographic that must be considered when projecting future service demand, as those in poverty typically use EMS services more, and are at higher risk for fires. The following figure summarizes the annual poverty levels in Sweetwater County since 2000.[24]

Figure 82: Sweetwater County Poverty Population, 2000–2017



As you can see in the preceding figure, the poverty level has incrementally increased from its lowest point in 2008, with an average poverty rate of 8.3% over the entire 17-year time span, and an average rate of 8.7% between 2008 and 2017. Of note, given the economic reliance on the oil, gas, and mining industries, the regional economy is susceptible to "boom and bust" periods, resulting in transient increases in poverty levels. As noted previously in this study, those suffering in poverty tend to use emergency services more often than those who are more affluent.

Land Development Projections

Residential and commercial land development are also significant drivers in placing increased demand on emergency services. The City Master Plan 2019 update surveyed the available undeveloped land within the existing City limits. Adjusting for existing infrastructure, topography, and undevelopable land, the Master Plan calculated that 60% of the currently vacant land is available for commercial development, 70% for residential development, and 30% for industrial development. Added together, the Plan predicted that the City could absorb up to an additional 22,655 residents without annexing additional land. However, the plan estimated that approximately 5,499 new residents would be added to the City's population from 2012 to 2022.

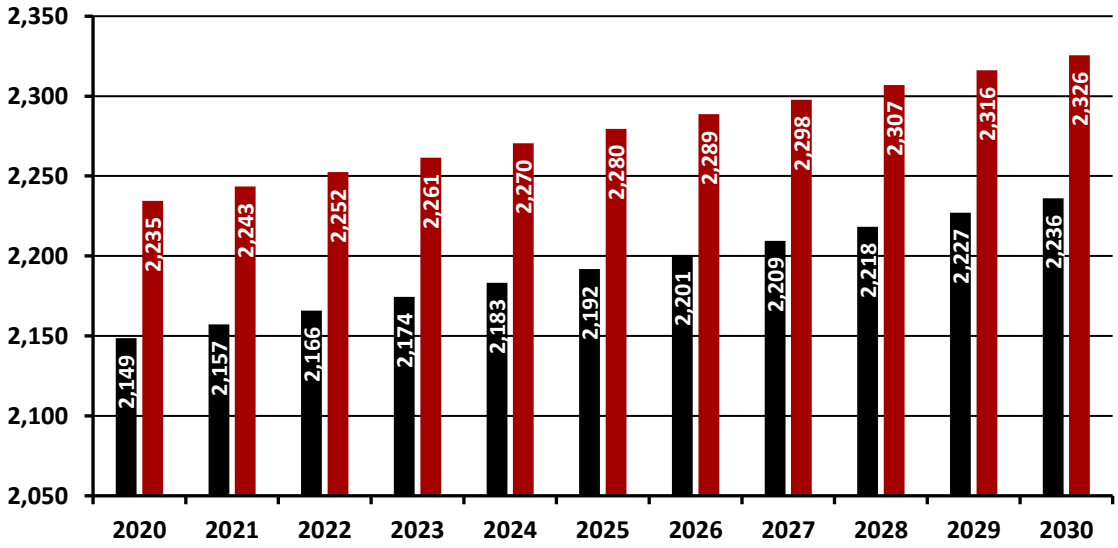
ESCI noted there is little mention or consideration of potential impacts on fire department service levels in the City Master Plan. Public safety impacts related to growth should be key considerations that are codified in community master planning.

The 2019 City Master Plan update shows significant undeveloped available low-density residential land in the west-northwest and south-southeast City areas. It also shows the availability of significant undeveloped industrial zoned land in the southern City area. The City's Planning Department predicts that undeveloped property owned by the BLM and Andadarko north of Stagecoach Drive will be developed first.

Future Service-Demand Projections

The next figure represents annual projected RSFD service demand from 2018 through 2028. ESCI utilized two different methods to determine these estimates. The first entails projections at the low end, using the overall incident increase from 2016–2019 (.04%), applied each year. The higher end uses the same formula, but with a 4% annual increase. Likely, future service-demand increases will probably fall somewhere between the two of these.

Figure 83: Projected Incident Demand, 2020–2030



It is important to note that the number of fires, alarms, and motor vehicle collisions are projected to remain static over this timeframe. The largest increases, albeit slight, are projected to be in the EMS and Other incident categories. Of course, if population decline trends continue, the call load may continue to remain static, or may even slightly decrease during this period.

RECOMMENDED IMPROVEMENT GOALS

This Master Plan culminates in a series of recommendations based on the observations and analysis previously discussed. These recommendations are grouped by specific timeframes to address, as it would be impossible to address all of them simultaneously. Facilitating the adoption and implementation of many of these recommendations will take significant time, resources, and commitment to implement. The suggested timeframes are intended to introduce a realistic "blueprint" for implementation. However, environmental conditions and circumstances may provide challenges or opportunities to address a recommendation(s) outside of the timeframes identified here.

ESCI has grouped the recommendations into three implementation timeline categories: Short-Term (6 months–1 year), Mid-Term (1–3 years), and Long-Term (3–5 years), and estimated one-year costs are included where appropriate.

Lastly, these recommendations are just that—recommendations. They are ESCI's best effort in providing guidance in addressing issues and deficiencies identified during the study period. City leaders hold the ultimate authority in embracing, revising, or discounting the following guidance.

Short-Term Improvement Goals

Improvement Goal 1-A: Create a strategic plan for Rock Springs Fire-Rescue, spanning a three-to-five-year period as a follow-up to this Master Plan.

This Master Plan should be considered an initial step in charting a future course for the Department and City in addressing future challenges. However, many of the issues and recommendations in this study will take a "team effort" to address. Identifying the mission, vision, values, goals, and objectives of the Department will be critical to ensuring everyone is pulling in the same direction in accomplishing future goals.

Estimated Cost: $18,000 based on the typical cost for ESCI Strategic Plan development and facilitation. The cost could be less if internal City or local resources are used.

Improvement Goal 1-B: Establish a code of ethics—or code of conduct.

Establishing a code of conduct—and holding employees accountable for their conduct—is critical to maintaining the public's confidence in their fire department, and employees' confidence in their leadership. This goal was included in the short-term timeframe, as it could be addressed immediately after the creation of the Strategic Plan, which should identify the vision of the organization, and important values that could help shape the creation of the Code of Ethics.

Improvement Goal 1-C: Review and revise policies and procedures as necessary on a three-year planning cycle.

This recommendation may be viewed as simply a "housekeeping" item. However, ensuring policies and procedures are contemporary can help ensure business and operational practices are in line with best practices, and consistent with local, state, and federal regulations, and fire service standards. Scheduling periodic review on a three-year cycle should be achievable, despite having limited administrative resources.

Improvement Goal 1-D: Create a dedicated Training Chief position.

This is perhaps one of the most important recommendations in this study. Reliance on a designated Shift Battalion Chief to administer the Department's entire training program is inadequate. The Department should hire or appoint a qualified Battalion/Division Chief level officer who administers and delivers fire and EMS operations level training across all shifts and disciplines.

Estimated Cost: First year estimated costs are summarized in the following figure.

Figure 84: Training Chief Estimated Costs

Cost Item	Estimated Amount
Starting Wage	$76,980
Benefits	$52,588
Medical Exam	$400
Uniforms	$600
Turnout Gear	$4000
Communications Gear	$1000
Miscellaneous	$300
Total First Year Cost	**$135,868**

Implementation Goal 1-E: Develop and implement a Post Incident Analysis (PIA) process.

All significant or complex incidents should be objectively analyzed and documented using a formal analysis process to identify learning opportunities and necessary corrective actions.

Implementation Goal 1-F: Develop a Fire Facilities Capital Improvement Plan.

The survey of fire stations and training facilities identified programmatic and building envelope deficiencies, all of which will require significant financial resources to address. The City should create a Fire Facilities Capital Improvement Plan that identifies necessary repairs and improvements, sets aside funds to pay for repairs, renovations, or improvements, and avoids the latent costs of deferred maintenance.

Implementation Goal 1-G: Conduct a comprehensive engineering and structural evaluation of the fire facilities.

A qualified outside engineering firm should be engaged to perform an evaluation of each fire station and training facility. This should include determining the viability of upgrading and repairing the existing fire stations, or the necessity of replacing them and the necessary features. Using the criteria identified in NFPA 1402: *Standard on Facilities for Fire Training and Associated Props,* the analysis should evaluate the stability, viability, and suitability for continued use or recommend replacement. The analysis should also determine options for upgrading the stations to be compliant with the Americans with Disabilities Act (ADA), as well as modifications to add enough bathrooms and shower facilities to accommodate both genders.

Improvement Goal 1-H: Develop Capital Apparatus and Equipment Replacement Plans.

The cost of replacing capital apparatus and equipment, including fire engines, aerial ladder trucks, portable radios, self-contained breathing apparatus, and information technology equipment should be analyzed, and planned for by establishing anticipated replacement dates, and routinely set aside funds sufficient to replace the equipment consistent with the plan.

Improvement Goal 1-I: Proactively engage and support regional efforts to develop a sustainable and cohesive ground ambulance transport system.

It appears the current EMS delivery system throughout the County is fragmented and vulnerable to becoming financially unsustainable. RSFD should ensure they are active participants in any future EMS system planning process, and ensure it has resources and plans in place in the event the current ambulance transport program ceases to function effectively.

Improvement Goal 1-J: Update Pre-Incident plans of target hazard occupancies, and include information in Department training activities.

Ensuring operations personnel have access to accurate target hazard information is a critical firefighter safety issue. Training on these occupancies, which ideally include building familiarization "walk-throughs," should be implemented as well.

Improvement Goal 1-K: Establish an auto-aid agreement and response parameters between Sweetwater County Fire District #1 and RSFD.

Given the location of SCFD1's headquarters station within the City limits, and each department's limited available on-duty resources at any given time, establishing an auto-aid agreement with response protocols and minimum qualifications for responding personnel should be given high priority. Neither department has enough available on-duty staff to meet NFPA 1710 requirements for fighting a structure fire, even if all on-duty units were available to respond immediately. In addition, crews from each department should periodically train together in multi-company drills to ensure fast and efficient fireground operations.

Improvement Goal 1-L: Adopt a social media use policy and increase social media usage.

Given the prevalence of social media usage in today's fire service, along with many examples of inappropriate use by employees across the country, establishing and enforcing a Department social media policy should be initiated. In addition, RSFD should consider using additional platforms, such as Instagram® and Twitter®, to communicate with the community.

Mid-Term Improvement Goals

Improvement Goal 2-A: Establish response time goals and expand the emergency operational analysis included in the annual report to include actual performance against these goals.

Establishing, analyzing, and periodically reporting response time performance is standard practice in contemporary fire departments. It can help ensure the deployment of operations personnel is timely, consistent throughout the operations division, and consistent with adopted response-time standards.

Improvement Goal 2-B: Establish a policy that prohibits working more than 72 consecutive hours.

To reduce the potential for workplace injury, accidents, or employee burnout, a policy should be adopted, and procedures created, that prohibits operations personnel from working more than 72 consecutive hours without at least a 12-hour break.

Improvement Goal 2-C: Continue to pursue state and federal grants.

Significant funds are available through the Assistance for Firefighters Grants (AFG), Staffing for Adequate Fire and Emergency Response (SAFER) Grants, and Department of Homeland Security state pass-through grants. Given RSFD's unique regional specialized response program, it is well-positioned to access these funds to support and enhance its emergency response programs.

Improvement Goal 2-D: Carefully monitor overtime expenditures.

The Department should monitor the spending of overtime used for minimum staffing assurance, and develop mitigation strategies, which may include adding staff.

Improvement Goal 2-E: Acquire and implement an electronic fleet maintenance records management system.

An electronic fleet maintenance database management program would allow the City's Fleet Division to better track and archive fleet maintenance records. Ideally, the program would interface with RSFD's RMS.

Improvement Goal 2-F: Ensure fire apparatus are maintained and repaired by qualified technicians.

The City should provide the support and funding to the Fleet Maintenance Division to ensure mechanics who maintain fire apparatus are Emergency Vehicle Technician (EVT) and Automobile Service Excellence (ASE) certified.

Improvement Goal 2-G: Maintain site-specific plans and training for industrial facilities required to file Tier II reports.

Target hazard occupancies that store hazardous materials in enough quantities or toxicity to require Tier II reporting should be carefully pre-planned, with subsequent periodic "walk-throughs" and site-specific training. This should be done via table-top exercises or, if possible, on-site exercises in coordination with facility staff and site emergency response employees.

Improvement Goal 2-H: Amend the City's Master Plan to include Fire Service Delivery considerations and needs.

During the next Master Plan update, the Fire Department should be consulted and included in the planning effort to ensure future development impacts and related costs are given appropriate consideration, and specifically codified in the City's Master Plan document. This will help ensure the characteristics and implementation of future growth appropriately address public safety needs, and occurs in a way that ensures adequate fire and life safety services throughout the City.

Long-Term Improvement Goals

Improvement Goal 3-A: Explore new revenue streams.

Given the inflationary factors influencing Department expenses, strong consideration should be given to implementing the following new revenue sources:

- Fees for plan reviews, new construction inspections, annual fire code inspections, hazardous materials responses, and stand-by services.
- Impact fees on new construction/development, for future capital expenditures.
- Non-ad valorem fee as a per parcel assessment for fire protection services.

Improvement Goal 3-B: Conduct a fire station location analysis.

ESCI noted that the area within the current city limits can absorb considerable residential and commercial growth. When new development is being planned, the Department should proactively conduct a fire station location analysis, using historical incident data, population growth projections, and growth management planning concepts. Focus should be given to evaluating incident demand and response times to the densely populated commercial and residential area south and west of I-80.

Improvement Goal 3-C: Participate in future Commodity Flow Studies

The Department should encourage, and subsequently participate in, an update to the regional rail commodity flow study. If the regional approach is not possible, a City-specific rail commodity flow study should be undertaken to fully understand and quantify the hazards and risks associated with the transportation of goods through the City.

Improvement Goal 3-D: Implement a formal Community Risk Reduction Plan

The Department should leverage the Community Risk Assessment information included in this study to develop customized mitigation strategies to address the local hazards identified, consistent with NFPA 1300: *Standard on Community Risk Assessment and Community Risk Reduction Plan Development*.

CONCLUSION

The recommendations previously noted are the result of ESCI's holistic evaluation of the Rock Springs Fire Department. This "10,000-foot" level approach included honest input from various City staff, elected officials, and Department members about the delivery of Fire Department services. Through these conversations, ESCI learned the community holds the Fire Department in high regard, and Department members are highly competent and professional.

ESCI hopes the information in this document will help guide the Fire Department and City in ensuring the delivery of safe, effective, and efficient fire protection and life safety services well into the future. Doing so will take a team approach with City leaders, as significant future investments in apparatus, facilities, and personnel will be necessary. ESCI's team stands ready to assist these future efforts as well.

APPENDIX A: STAFF SURVEY RESULTS

The following is a summary of the survey that was sent to all RSFD staff. Twenty department members completed the survey. The percentages have been rounded.

Survey Instructions: Emergency Services Consulting International (ESCI) is conducting a Master Plan study for the Rock Springs Fire Department. As part of this study, we want to provide an opportunity for you to *confidentially* share your thoughts and observations about the department and programs. The survey should take less than 10 minutes to complete. You may also contact the ESCI Project Manager, Bill Boyd, at 360-305-1102 if you have any questions or wish to share additional information beyond any comments you provide in the survey answers. Thank you for your participation!

Question 1: I feel adequately trained for fire suppression operations.

Level of Agreement	Percentage of Respondents
Strongly Agree	25%
Agree	50%
Somewhat Agree	15%
Neither Agree or Disagree	5%
Somewhat Disagree	5%
Disagree	0%
Strongly Disagree	0%

Question 2: I feel adequately prepared for fire suppression operations.

Level of Agreement	Percentage of Respondents
Strongly Agree	10%
Agree	35%
Somewhat Agree	40%
Neither Agree or Disagree	0%
Somewhat Disagree	10%
Disagree	5%
Strongly Disagree	0%

Question 3: I feel our training resources and facility are adequate for safe and effective training.

Level of Agreement	Percentage of Respondents
Strongly Agree	15%
Agree	20%
Somewhat Agree	50%
Neither Agree or Disagree	0%
Somewhat Disagree	0%
Disagree	15%
Strongly Disagree	0%

Question 4: Our fire stations are adequate for supporting our current mission, and are well maintained.

Level of Agreement	Percentage of Respondents
Strongly Agree	0%
Agree	10%
Somewhat Agree	20%
Neither Agree or Disagree	10%
Somewhat Disagree	25%
Disagree	25%
Strongly Disagree	10%

Question 5: Our officers and department culture pace my personnel safety above all else.

Level of Agreement	Percentage of Respondents
Strongly Agree	20%
Agree	50%
Somewhat Agree	20%
Neither Agree or Disagree	5%
Somewhat Disagree	0%
Disagree	0%
Strongly Disagree	5%

Question 6: I feel adequately trained and prepared to evaluate and treat EMS patients.

Level of Agreement	Percentage of Respondents
Strongly Agree	40%
Agree	40%
Somewhat Agree	10%
Neither Agree or Disagree	5%
Somewhat Disagree	5%
Disagree	0%
Strongly Disagree	0%

Question 7: I feel we have excellent equipment to evaluate and treat EMS patients.

Level of Agreement	Percentage of Respondents
Strongly Agree	20%
Agree	65%
Somewhat Agree	15%
Neither Agree or Disagree	0%
Somewhat Disagree	0%
Disagree	0%
Strongly Disagree	0%

Question 8: I am familiar with the building layouts, special features, and special hazards of the target hazards in my community.

Level of Agreement	Percentage of Respondents
Strongly Agree	10%
Agree	45%
Somewhat Agree	0%
Neither Agree or Disagree	0%
Somewhat Disagree	0%
Disagree	0%
Strongly Disagree	0%

Question 9: We always operate appropriately under the Incident Command System (ICS) on all significant emergency incidents.

Level of Agreement	Percentage of Respondents
Strongly Agree	10%
Agree	35%
Somewhat Agree	35%
Neither Agree or Disagree	0%
Somewhat Disagree	5%
Disagree	15%
Strongly Disagree	0%

Question 11: How long have you been with RSFD?

Years of Service	Percentage of Respondents
Less than 1 year	0%
1–5 years	21%
5–10 years	21%
10–20 years	32%
20+ years	26%

Additional Comments Submitted:

Question 1:

- With firefighting only comprising 5% of our operations, it has become the new high-risk: low-frequency event for our department. I would like to see a re-focusing of our efforts to be proficient in firefighting tasks.
- I do; not sure about these guys around 20 years who just talk about retirement and never do anything. Not sure why we pay them to sit around all day and allow them to not complete their required tasks. Last I checked, showing up to work doesn't make you competent. But, they know how to complain.

Question 2:

- We have old outdated equipment that is always needing worked on or replaced.
- Aging fleet of apparatus and equipment causes reliability concerns.
- Fleet is falling apart. Refurbishment is a waste of money. Truck 1 is too large to maneuver through the city. Can't do much if we don't get to a call.

Question 3:

- The facilities are more than adequate. The policies and procedures for using those facilities are not the most up to date concerning cancer prevention.
- Burn building is cracking and ready to fall apart, and we never get any new training resources. We can't even get speakers in the classroom that don't have feedback, or have working computers in our stations.

Question 4:

- Apparatus bays are cramped with the increasing size of apparatus and need for equipment storage. Fire stations are outdated.
- We need to look at our station locations and response times to areas with heavy call volume, possibly relocating for efficiency. Also, need much more room for equipment and apparatus storage.
- Many of the facilities lack the necessary updates to facilitate our job tasks. Computers and MDTs, as well as programming to run on those computers, are the biggest problems.
- What maintenance? Chief's big reno (sic) of HQ won't even meet the new standards and guidelines required of fire stations. But, we'll have a female bathroom for the cost of a new hours (sic). Still working out in carcinogens; still no fresh air dampers at doorways. Now, we'll get to wash our station clothes in those carcinogens as well! Maybe while drying my clothes, the diesel exhaust can bake into my uniform. When somebody has never lived as a career firefighter, it makes it difficult to understand the conditions, I guess. On top of that, our people are just gross, and don't take care of what we do have.

Question 5:

- Depends on the Crew and Captain for the day.
- Good to see an EAP, but we should have had it years ago. Nothing mind-blowing by it, common practice everywhere else in the nation.

Question 6:

- I am not currently a certified EMT, but with the crew I run with, I feel more than comfortable that the patient Is in good hands.
- I feel strong in my EMS knowledge base.
- I was probably better trained when I studied for the recertification test. Not sure why ACLS is taught. We could just fill out the paperwork based on what we do for it, and call it a day.

Question 7:

- Maybe just need to update our kits as they have stayed basically the same forever. Can definitely remove some items and add others.

Question 8:

- There are areas I still don't have the best knowledge of.
- I have a good base of knowledge; however, with changing occupancy, it can be challenging to keep up to date.

Question 9:

- We understand the ICS system very well. Implementing it is different from crew to crew.

Question 10:

- Just over 2 years now. But one of those years from June 2018–2019.

APPENDIX B: TABLE OF FIGURES

APPENDIX C: REFERENCES

[1] U.S. Census Quick Facts.

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[4] 2019–2020 City of Rock Springs Final Budget.

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[7] Serving immigrant and refugee populations, National Fire Protection Association, 2017.

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[9] Wyoming Department of Health.

[10] Final Report-Assessment of Emergency Medical Services in Sweetwater County, Wyoming, Safetech Solutions, December 2015.

[11] Sundance Times, January 23, 2020.

[12] Respiratory Protection Standard 29 CFR 1910.134; Occupational Health & Safety Administration.

[13] NFPA 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, to the Public by Career Fire Departments; National Fire Protection Association.

[14] Recommendations for Improving the Recruiting & Hiring of Los Angeles Firefighters, Rand Corp., 2015.

[15] Chicago Sun Times, October 31, 2016.

[16] 349 Code of Federal Register 395.1-5.

[17] This approach focuses on financial transactions or events of the period, typically the current fiscal year, that have increased or decreased the resources available to offset expenditures in the near-term.

[18] Accounting method which recognizes revenues at the time they are earned to the extent they are collectible within the period or soon enough afterwards. Under this method, debt service payments and specific accrued liabilities are recognized as expenditures at the time payment is due and they are liquidated with expendable available financial resources.

[19] NFPA 1901: Standard for Automotive Fire Apparatus; Section D.3.

[20] Fatal Fires in Residential Buildings (2014–2016), Topical Fire report Series Volume 19, Issue 1/June 2018, U.S. Department of Homeland Security, U.S. Fire Administration, National Fire Data Center.

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[22] NFPA 1710: Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, to the Public by Career Fire Departments; National Fire Protection Association.

[23] U.S. Census Bureau, Annual Estimates of the Resident Population, 2018.

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