Village of Albion, New York

Fire Department Review
and
Future Options Analysis

ESCI Emergency Services Consulting International

Albion Fire Department
New York

Agency Review
and
Future Options Analysis

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Acknowledgments

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Albion Village Board

Mayor Dean Theodorakos

Trustee Kevin Sheehan, Deputy Mayor

Trustee Jeannette Riley

Trustee Fred Miller

Albion Fire Department

Eric Bradshaw, Fire Chief

Jeremy Graham, 2nd Lieutenant

Other Acknowledgments

Officers and Firefighters of Albion Fire Department

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Richard DeCarlo, Supervisor – Town of Gaines

Executive Summary

This Agency Review and Future Options Analysis is offered in response to a request by the Village of Albion, New York. The purpose of this study was to review and analyze current deployment and practices of Albion Fire Department (AFD) and Central Orleans Volunteer Ambulance (COVA) resources within the Village of Albion and throughout the Towns of Albion and Gaines and to assess future needs specific to resource deployment, staffing, and operational policies, and to determine feasible options for the continued delivery of emergency services to the community.

ESCI would like to thank the staff and elected officials of the Village of Albion, as well as the staff and volunteer members of Albion Fire Department and COVA, for their outstanding cooperation in the preparation of this report. All involved were candid in their comments and provided an enormous amount of information in a short period of time.

Each report section provides the reader with general information about that element, as well as specific observations and analysis of any significant issues or conditions that are pertinent to the topic discussed. Observations are supported by data collected during the information gathering process, through analysis of the collected data, and from the collective emergency services experience of ESCI. Finally, specific findings and conclusions are included to resolve identified issues and to take advantage of any opportunities that may exist.

Section I – Evaluation of Current Conditions

Section I includes a detailed review of the fire department and its relationship to the Village and Towns. The review also provides a snapshot of the department's management, personnel and staffing, and resource deployment and performance of the current operations.

The criteria used to evaluate the department have been developed over many years. These criteria include relevant guidelines from national accreditation criteria, the National Fire Protection Association (NFPA), federal and state mandates for fire and EMS systems,

recommendations by various organizations such as the Center for Public Safety Excellence (CPSE), and generally accepted practices within the Fire and EMS industry.

The evaluation of the fire department revealed that the organization is operating with fewer stations and pumpers/engines than departments serving similar geographies and demographics nationally and a lower than average number of volunteers than similarly sized organizations regionally (based on NFPA statistics). Similarly, AFD is experiencing a lower rate of both fire and overall incidents per 1,000 persons than other organizations regionally. Conversely per capita funding for AFD ($26) is significantly less that both the New York and national averages ($146 and $114, respectively).

An analysis of the incident response staffing by the fire department was accomplished through the comparison of its incident staff response performances to national standards, local and national task analyses, and observations. The average monthly staffing levels in 2008 declined slightly as the year progressed. Staffing levels improved during the weekends. The average staffing levels are higher during the late afternoon and early evening hours.

The service delivery section of the report evaluated both AFD and COVA individually. AFD workload has had periods of stability over the last eight to nine years but has begun to increase slightly since 2006. It should be noted that actual fires have remained relatively stable, which is a testament to code enforcement and public prevention education activities. Currently calls for service for medical assistance make up the majority of fire service calls. This is not unusual for fire departments providing either first responder or ambulance transport services.

COVA provided three years of incident data for analysis by ESCI. Overall, workload for COVA has shown a slight increase over the three-year period and this trend is expected to continue. An analysis of workload by hour of day revealed that workload for COVA is highest between the hours of 8:00 a.m. and 10:00 p.m., a time historically difficult for volunteers to respond due to other professional commitments.

Total response time is the amount of time a resident or business waited until an apparatus arrived at the scene of an emergency, beginning from when they first called the designated emergency number, often 9-1-1. Since the fire department has no influence on call processing time, their performance is typically measured on response time from the time of dispatch to the arrival on scene. To report the most accurate response time performance, dispatch data was utilized for this analysis. Due to the nature of the reporting, which recorded each unit's time intervals as well as the 'announcement' alarm time, the first arriving unit on scene was utilized for the analysis.

For AFD, the most frequently recorded response times for calls are between 4 and 5 minutes. Specifically, the average is 8 minutes 50 seconds, with 80 percent of all calls answered in less than 12 minutes. For COVA, the most frequently recorded response times for calls are between five and six minutes. The average is 7 minutes 21 seconds, with 80 percent of all calls answered in less than ten minutes.

Section II – Future Delivery System Options

The second and final section of this report considers the data analysis completed throughout the evaluation of the organizations and offers long-term recommendations.

In regard to future service delivery system options, the Village has four legitimate options, each with its own intricacies.

- Strategy 1: Maintain an All-Volunteer Fire Department that Supplements COVA
- Strategy 2: Increase Funding and Personnel to AFD
- Strategy 3: Implement a Subsidy to COVA
- Strategy 4: Consider Issuing a Request for Proposal for the Provision of EMS

ESCI recommends that the most prudent short-term course of action is Strategy 1. In this model, the Village of Albion should work to first establish community performance and reliability standards and enter into a formalized agreement with the current provider. If at such

time the provider is unable to meet the community's established performance standards, ESCI would recommend pursuing Strategy 4 to determine what the market would support.

This section of the study also contains a summary of ten short and mid-term recommendations that represent potential improvement strategies for the more immediate future, typically a one to three-year period, conveniently categorized by relative priority according to the following.

- Priority One – Immediate Internal Life Safety: No issues to report
- Priority Two – Legal or Financial Exposure: No issues to report
- Priority Three – Corrects a Service Delivery of Management Issue: Six recommendations
- Priority Four – Enhances the Delivery of Service or Department Management: Four recommendations
- Priority Five – Represents an Industry Best Practice: No issues to report

In ESCI's evaluation of Albion Fire Department and Central Orleans Volunteer Ambulance, it was determined that overall the system's performance is not unlike that of most other volunteer organizations in the region and across the country. Current station placement for both organizations is adequate for current service demand. Additionally, personnel and elected officials recognize the need for periodic outside assessment and evaluation and have actively sought that assistance in an attempt to actively look for ways to enhance the service provided.

The success of adopting and implementing change, improvement, or cooperative opportunities depends on many things. In ESCI's experience with hundreds of department evaluations, leadership is the single factor that most frequently determines success. Nearly always, a key staff, councilor, or board member champions the concept, garnering the support of the various affected groups (political, member, and community). In addition, good leadership fosters an organizational culture receptive to planning, calculated risk taking, and flexibility. The manner in which leaders promote a trusting relationship between all groups and aid two-way communication between the groups is essential.

The ESCI project team began collecting information concerning the emergency services system of Albion in September 2009. The compilation of that information and the preparation of this report have required many hours on everyone's part to complete. The team members recognize that the report contains a large quantity of information and ESCI would again like to thank the volunteers and staff of AFD, COVA, and Village and Town officials for their tireless efforts in bringing this project to fruition. We sincerely hope that the information contained in this report is utilized to its fullest extent and that the emergency services provided to the citizens of Albion and the surrounding areas are improved by its implementation.

Section I – Evaluation of Current Conditions

Organization and Community Overview

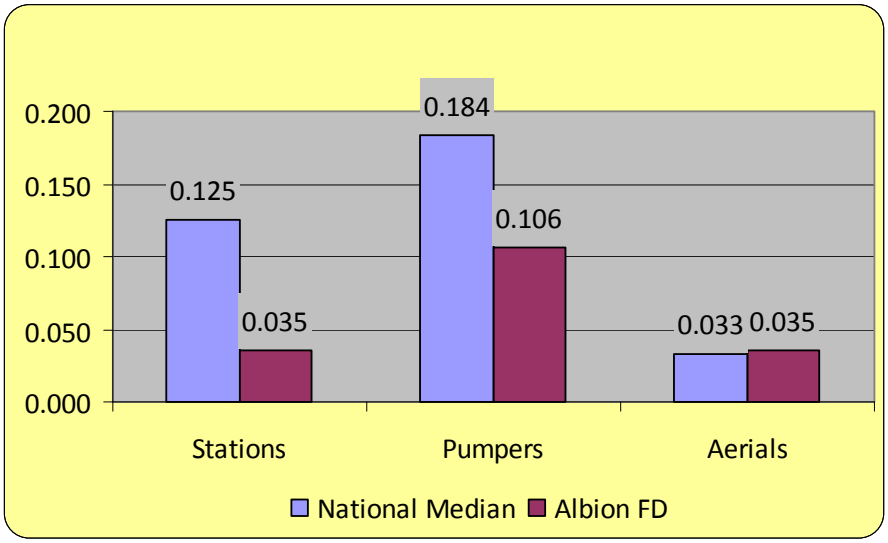
The Albion Fire Department (AFD) is located in Central Orleans County, New York, approximately half way between Rochester and Buffalo, approximately 12 miles south of Lake Ontario along the Erie Canal. The department serves the Towns of Albion and Gaines, as well as the Village of Albion. The organization is a standing department within the governance structure of the Village and serves the Towns through contract. The response area is predominately suburban and rural with a small urban center located within the Village.

AFD is a consolidation of Champion Engine Company, Rescue Hook and Ladder Company, Active Hose Company No. 2, Hart Protective Hose Company No. 3, and Dye Hose Company No. 5 dating back to 1828. Additionally, there are three separate legal organizations currently in existence: Albion Fire Department; Albion Fire Department, Inc.; and Albion Emergency Squad, Inc.

Today, services are provided to a population of approximately 28,200 in a service area covering 62.8 square miles from one centrally located station housing three engines, one aerial platform truck, one tanker, one squad, one rescue, and several command and ancillary vehicles. The department is staffed entirely with volunteer (on-call) personnel comprised of approximately 45 total active members (plus 16 Explorers), although not all are currently qualified to perform interior firefighting. The following figures illustrate how AFD compares with national and

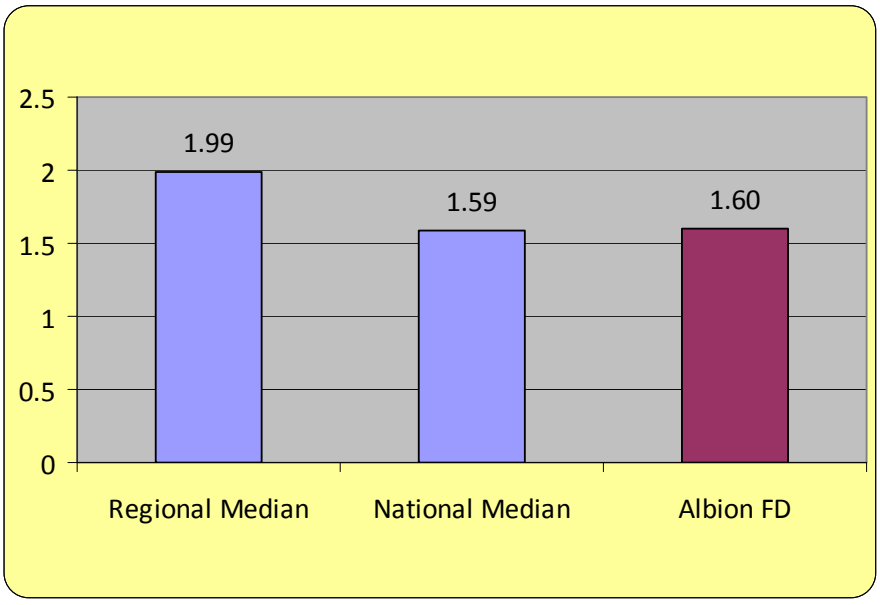
regional medians (for other agencies of similar population size) in regard to the number of stations, engines (pumpers), and aerials (trucks) per 1,000 population.

Figure 1: Comparison of Resources per 1,000 Population



Source: NFPA

Figure 2: Comparison of Volunteers per 1,000 Population

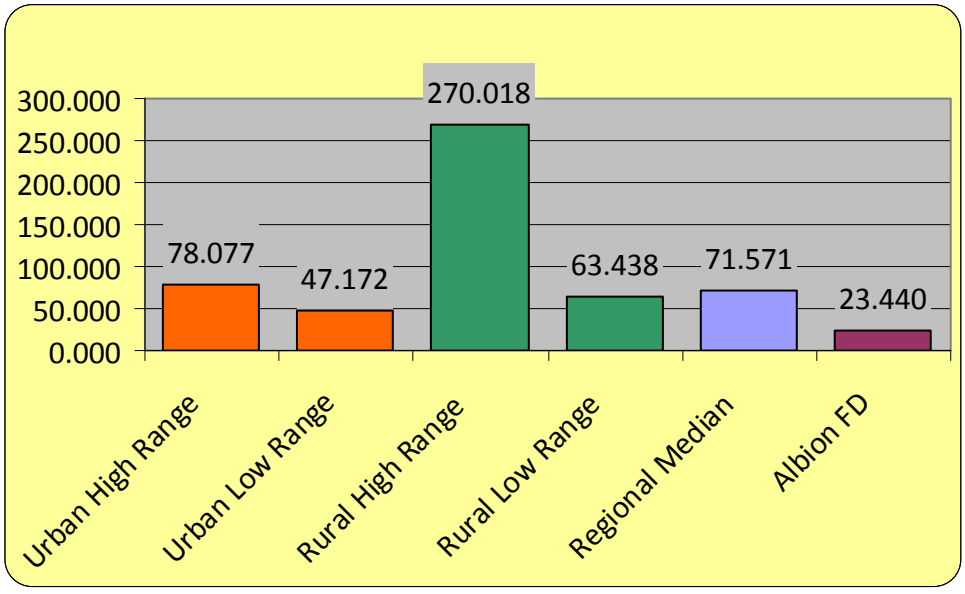


Source: NFPA

Based on the preceding figures, AFD has fewer stations and slightly fewer engines than departments serving similar populations throughout the Northeast United States. The difference in aerial apparatus is not statistically significant. In regard to volunteers, AFD has a slightly higher number of total personnel than comparable agencies. This comparison, however, can be misleading based on the total number of personnel that are qualified for interior firefighting and the ratio of incidents actually responded to by department personnel. A more detailed discussion of staffing performance will be addressed later in this report.

AFD responded to 661 total incidents in 2008, including 28 requests for mutual aid outside the department's primary response area. The following figure provides a comparison of AFD's overall workload to other communities of similar population in the Northeast United States.

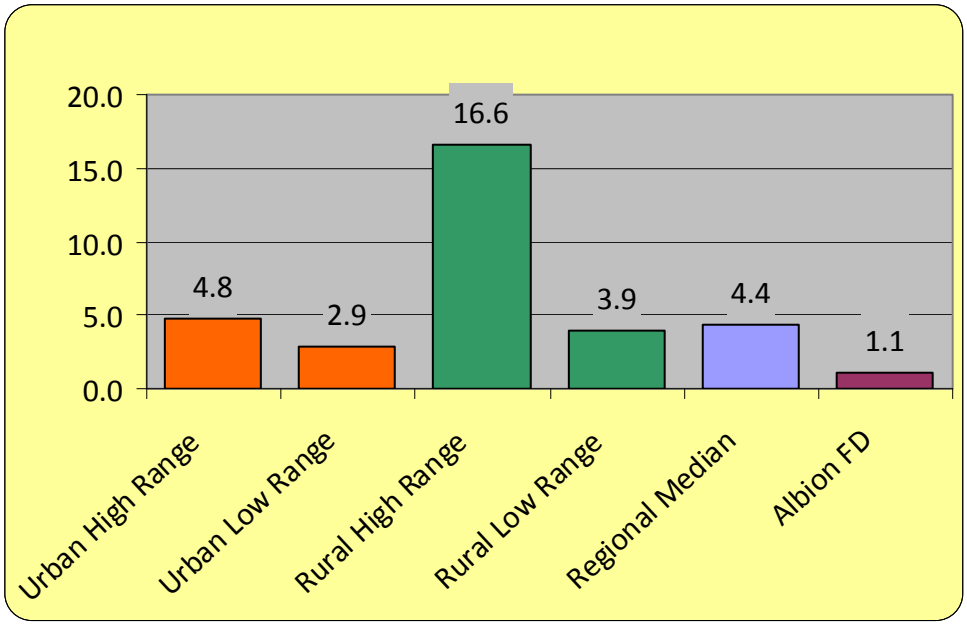
Figure 3: Comparison of Incidents per 1,000 Population



The figure above shows that AFD's overall workload is well below regional median. What should be noted here is that many fire departments throughout the region also provide either routine EMS first response or EMS transport services that tend to increase the overall workload of those agencies. AFD is not the primary provider of either EMS first response or transport services to the towns or the village and, therefore, shows a significantly lower workload.

Since AFD does not provide primary EMS first response or EMS transport services, the core mission of the department is that of fire suppression. The following figure provides a comparison of similarly sized communities in the Northeastern U.S. in regard to actual fire responses.

Figure 4: Comparison of Fires per 1,000 Population

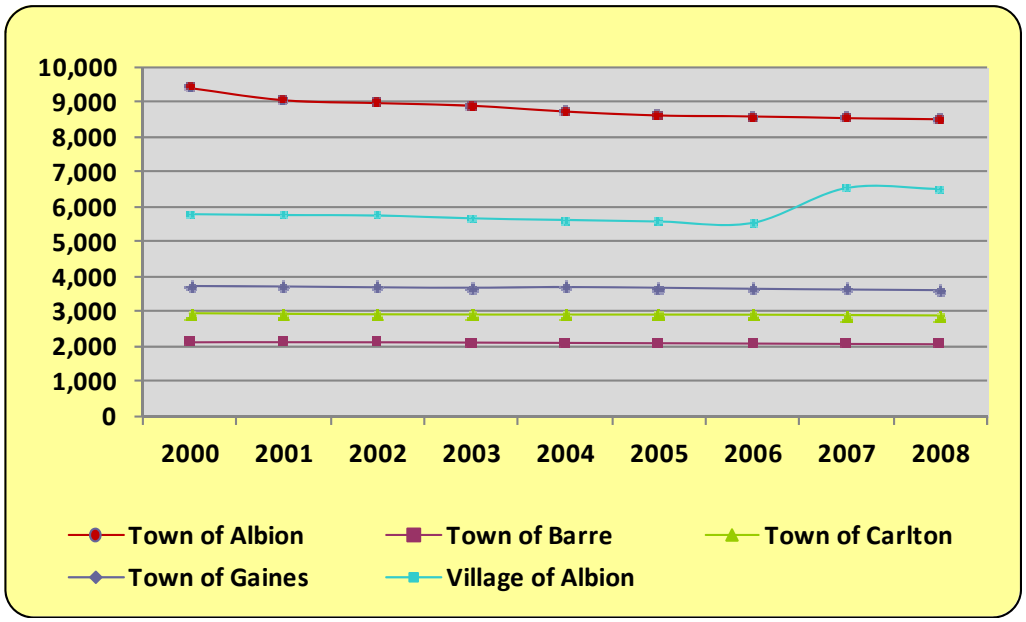


AFD's workload is significantly lower than other areas of similar populations and demographics. This should be an area of commendation as lower incidents of fire are typically due to public education and code enforcement activities within the community.

Service Area Population and Demographics

According to the U.S. Census Bureau, the estimated population of the region in 2008 was 28,200. This represents a 7 percent decrease since 2000, when a population of 30,217 was recorded. The community in the area that is estimated to have experienced an increase in population is the Village of Albion, as depicted in the chart that follows.

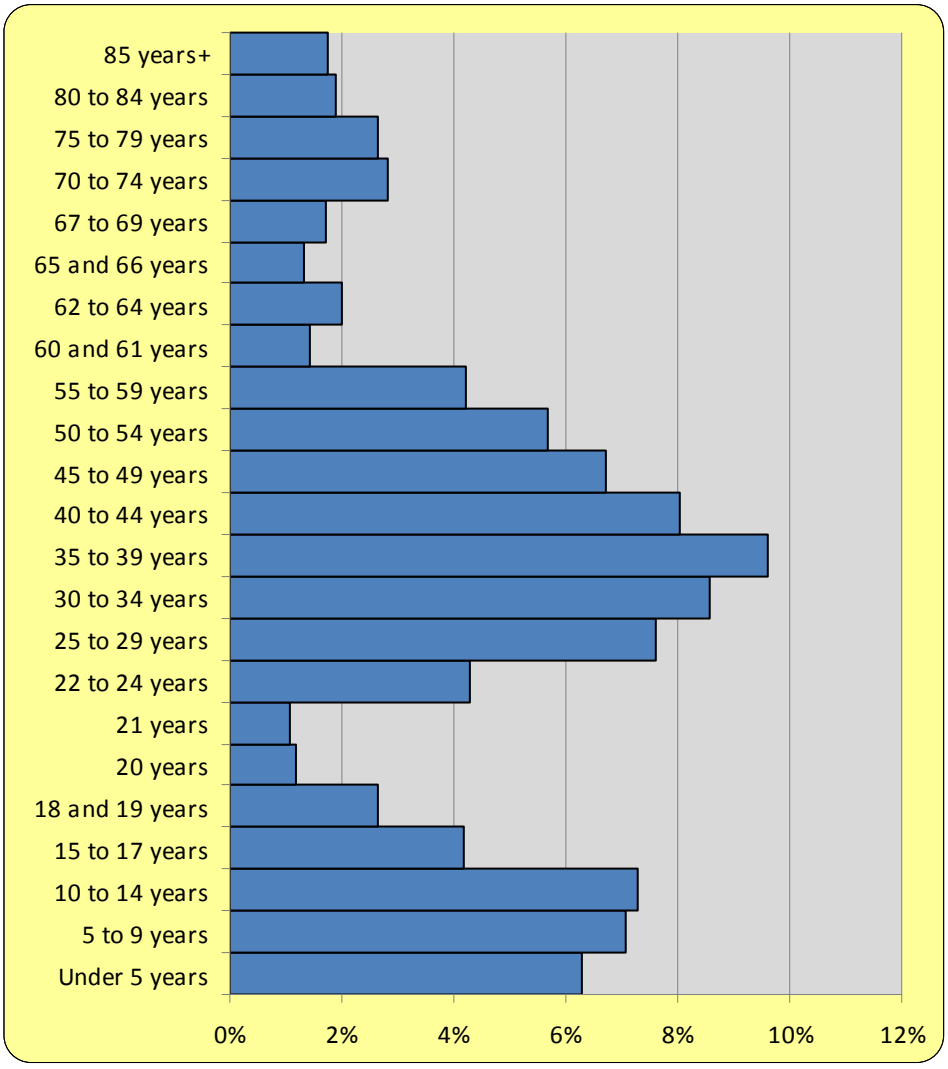
Figure 5: Population Growth History



How this population is composed by age group can have a significant effect upon the fire services. The following chart distributes the population into age groups based upon the national census information for 2000.[1]

[1] Updated decennially.

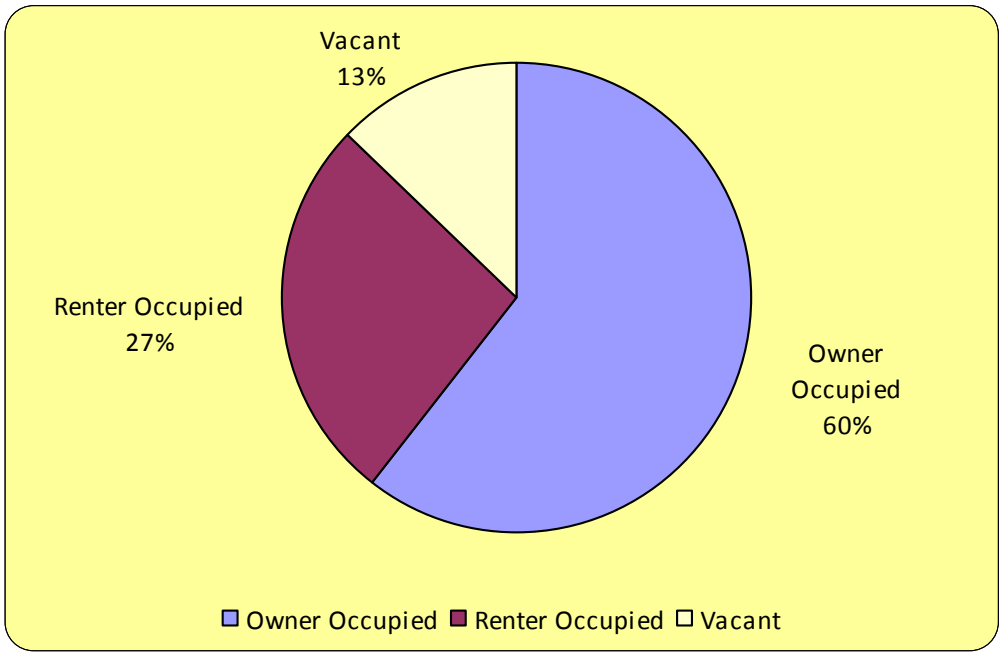
Figure 6: Population by Age



Approximately 12 percent of the population is 65 years of age or older and 6 percent of the population is under 5 years of age, placing a total of 18 percent of the area's population within the significant target age groups that pose the highest risk for fatalities in residential fire incidents. Another 13 percent of the population is between age 50 and 65, an age when medical ailments are prone to increase.

The following chart examines local housing by occupancy types in the area. Higher rates of rental occupancies and vacancies can signal negative economic conditions (except in university and resort communities), which correlate with higher incidences of emergency incidents.

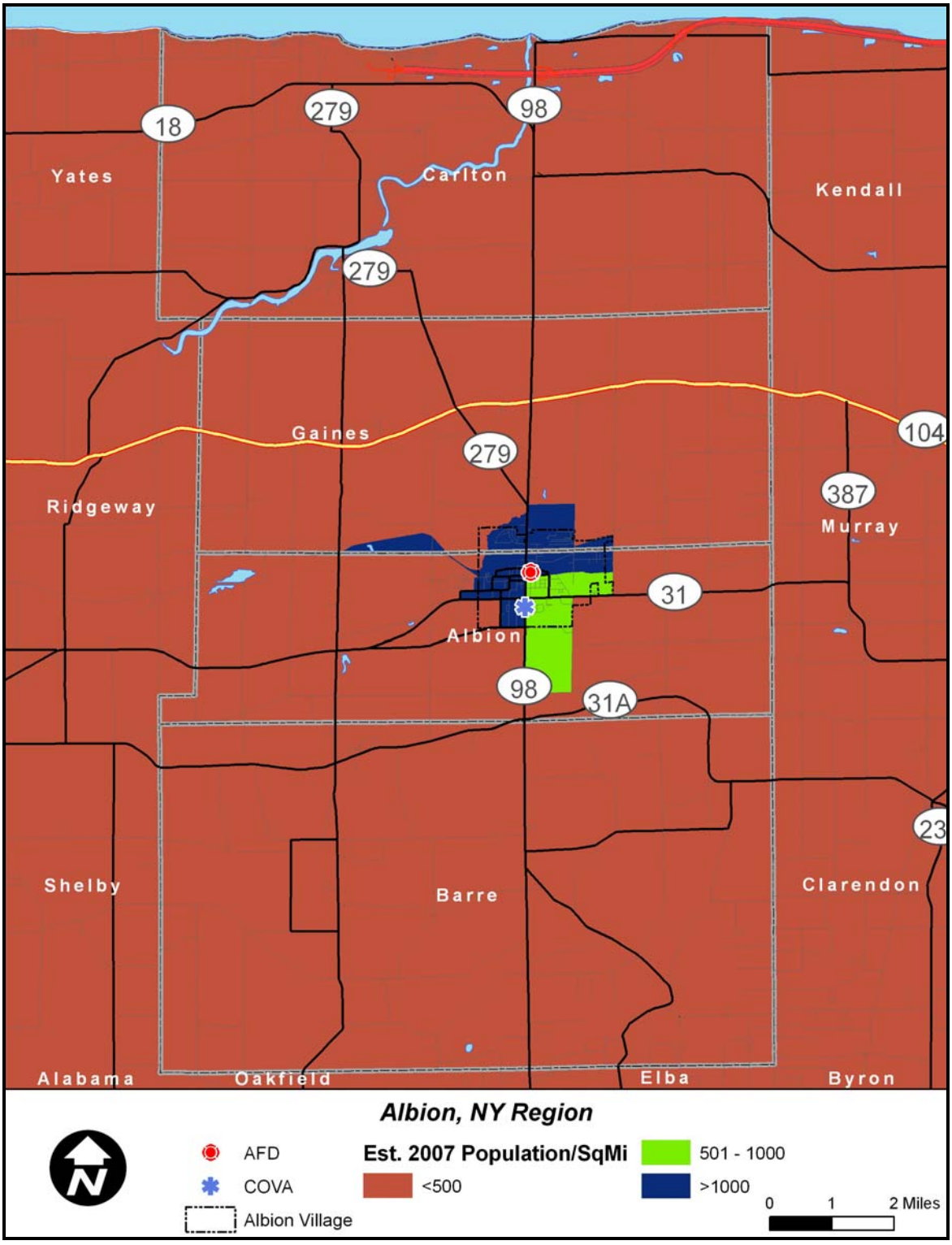
Figure 7: Housing by Occupancy



The high level of vacant and rental housing indicates a fragile economic environment that would potentially create higher service demand levels than other similarly sized communities with higher owner occupied percentages.

It is also useful to assess the distribution of the population within the area, since there is a direct correlation between population density and service demand. The following map displays the population density of the region based upon estimated total population within census block groups.

Figure 8: Population Density[2]



[2] COVA represents Central Orleans Volunteer Ambulance, discussed later in the report but noted here for identification of deployment.

The greatest concentration of population is located in and near the Village of Albion, where the fire station and ambulance headquarters are located. Service demand would be expected to be higher in this area. The remainder of the area is considered rural.

Governance and Lines of Authority

AFD is a standing department within the governance of the Village of Albion. Within the fire department itself, there are two separate organizations to which the members belong. Albion Fire Department Incorporated is a not-for-profit 501(c)(3) membership corporation, as is the Albion Emergency Squad, Inc. Articles of Incorporation are on file with the New York Department of State, which indicates both organizations are currently active and adhering to all reporting and filing requirements.

Albion Emergency Squad, Inc. (AES), remains active as a not-for-profit 501(c)(3) membership corporation. The corporation currently does not have an active membership other than the Board of Directors but does currently hold the note on the rescue unit currently in service within AFD.

The Village contracts with the corporations to provide personnel to the Village fire department; the relationship is reportedly without tension or controversy. The Fire Chief receives an annual stipend from the Village but reports both to the Mayor of the Village and the corporate Executive Committee. This type of relationship is common in the Northeastern United States. Currently, the Village owns all the facilities and apparatus while the corporation supplies the personnel to the agency. The Fire Chief is an elected position within the corporation and then appointed (typically by consent) by the Village.

Foundational Policy

Organizations that operate efficiently are typically governed by clear policies that lay the foundation for effective organizational culture. These policies set the boundaries for both expected and acceptable behavior, while not discouraging creativity and self-motivation.

A comprehensive set of departmental operating rules and guidelines should contain at least two primary sections. The following format is suggested:

1. Administrative Rules – This section would contain all of the rules that personnel in the organization are required to comply with at all times. Administrative rules, by definition, **require** certain actions or behaviors in all situations. The Village Board should adopt or approve the administrative rules since the Chief is also subject to them. However, the Board should delegate authority to the Chief for their enforcement on department personnel. The administrative rules should govern **all** members of the department: paid, volunteer, and civilian. Where rules and policies, by their nature, require different application or provisions for different classifications of members, these differences should be clearly indicated and explained in writing. Specifically, the administrative rules should contain sections which address:
   - Public records access and retention
   - Contracting and purchasing authority
   - Safety and loss prevention
   - Respiratory protection program
   - Hazard communication program
   - Harassment and discrimination
   - Personnel appointment and promotion
   - Disciplinary and grievance procedures
   - Uniforms and personal appearance
   - Other personnel management issues
2. Standard Operating Guidelines (SOGs) – This section should contain *street-level* operational standards of practice for personnel of the department. SOGs are different from administrative rules in that variances are allowed in unique or unusual circumstances where strict application of the SOG would be less effective. The document should provide for a program of regular, systematic updating to assure it remains current, practical and relevant. SOGs should be developed, approved, and enforced under the direction of the Fire Chief.

The department currently maintains one combined Standard Operating Guidelines manual that contains both Administrative Rules and Standard Operating Guidelines. The documents are in several different formats and are not segregated into sections that delineate between policies and SOGs. The following figure is provided as an example of what should be included in a department's Administrative Rules and SOG manual. Those areas highlighted green are already contained in the AFD manual.

Figure 9: Sample List of SOG and Administrative Policy Documents

Non-Emergency Ops	Emergency Ops	
Station Operations	***Alarms and Response Procedures***	***Medical Emergencies***
Station Operations - General	Alarm Response Procedures	Operational Guidelines for Medical Aid Responses
Station Maintenance	Alarm Response Areas	Operations with Ambulance Personnel
Station Alerting System	Automatic Aid	Emergency Medical Technician - Defibrillator (EMT-D)
Purchasing Procedures	Mutual Aid	Major Medical Incidents
National Flag/National Anthem	Contractual Agreements	Triage
Equipment Loan Out	***Fire Company Operations***	Exposure to Infectious Diseases and Hazardous Materials
Yard Maintenance	Standard Company Operations	Suspected Drug Overdose
Emergency Power Systems	First to Arrive Duties	Animal Bites
Miscellaneous Station Duties	Returning Companies to Service	Vial of Life and Medic Alert Tags
Personal Locker Assignments	Use of Civilians	Attempted Suicide
Telephone Use	Fire Scene Investigations	Suspected Homicide
Station Libraries	High Volume Smoke Removal System	DOA (Dead on Arrival)
Scheduling Use of Media Center	Personal Alert Safety Devices	Suspected Child Abuse
Energy Conversation	On-Scene Equipment Inventory	Suspected Sexual Assault
Apparatus Operations	Personnel Accountability System	Hospital Disaster Notification
Apparatus Maintenance	2 IN 2 OUT	EMS Reports
Vehicle Out of Service Procedure	Initial Fireground Operations	EMS Radio Procedures
Testing Apparatus Pumps	Flourescent Safety Vests	Drug Box Exchange Policy
Driving Emergency Vehicles	Highway Incident Safety	BLS Rules and Regulations
Warning Devices	***Command Operations***	ALS Rules and Regulations
Apparatus Operational Limits	General Strategic Guidelines	***Electrical Emergencies***
Fueling Procedure	Incident Management System	Electrical Emergency Operations
Reserve Apparatus	Command Post Procedures	***Rescue Operations***
Apparatus Snow Chains	Welfare	Vehicle Rescue and Extrication
Apparatus Movement to Training Center	Helicopter Operations	Life Line Operations
Driver Operator - Pump Certification	Public Health Considerations	Rescue from Machinery
Equipment Operations	Incident Critique	Escalator Emergencies
Equipment Repairs	Area Evacuation	Elevator Emergencies
Equipment Out of Service	Incident Command Resource Request	Cave-in and Manhole Rescues
Color Coding Equipment	Building Evacuation	Building Collapse
Radio Repair Procedure	***Firefighting***	Rescue at Structure Fires
Pressure Vessel Maintenance	Metal Fires	***Transportation Emergencies***
Hose Maintenance	Structure Fires (General)	Interstate Operations
Self-Contained Breathing Apparatus (SCBA)	Operations in Sprinklered Buildings	Railroad Emergencies
Preventive Maintenance - SCBA's	On-Site Auxiliary Fire Equipment	Aircraft Emergencies
Respiratory Breathing Air Systems	High Rise Fires	***Hazardous Materials Incidents***
Ladder Maintenance	Wildland Fires	Hazardous Materials (General)
Nozzle Maintenance	Vehicle Fires	Flammable Fuel Spill (Liquid or Gas)
Fire Extinguishers	Fire Stream Management	LPG Emergencies
Hydrant Maintenance	Industrial Dumpster Fires	Fumigation Emergencies
Hand Tool Maintenance	Fire Watch Detail	Explosives and Bombs
Power Tool Maintenance	Fires in US Mailboxes	PCB's
Echo Chainsaw	University of Virginia Reactor Facility	Pesticide Procedures
Jonsered Chainsaw	High Rise Pack	Radioactive Materials
Public Education	Bowstring Truss Roof - Operations Procedures	Natural Gas Filled Structures - No Fire
General Policy	Carbon Monoxide Hazards	Natural Gas Fed Fire - Inside Structure
Public Education Scheduling Policy	Thermal Image Camera	Broken Natural Gas Main - Fire
Public Relations	***Major Emergency Operations***	Broken Natural Gas Main - No Fire
Station Tours	Emergency Operations Plan	
Fire Extinguisher Demonstrations	***Law Enforcement Liaison***	
Engine Demonstrations	Law Enforcement Liaison - General Operations	
Special Activities Engine - Engine One	***Public Assistance Operations***	
Radio Controlled Education Robots	Public Assistance Alarms	
Fire Prevention		
Fire Company Fire Prevention Inspections - General		
Fire Prevention Inspection Guideline		
Fire Investigation		
Related Codes		
Pre-Fire Plans		

ESCI noted that the current AFD manual includes certain policies and procedures specific to the Albion area that are not included in the sample list above.

Recommendations:

- The department should consider a complete revision of the current SOG manual to include specific policies and guidelines to include many of the topics from the sample provided.
- The department should segregate its administrative policies from operational guidelines to ensure ease of finding specific topics.

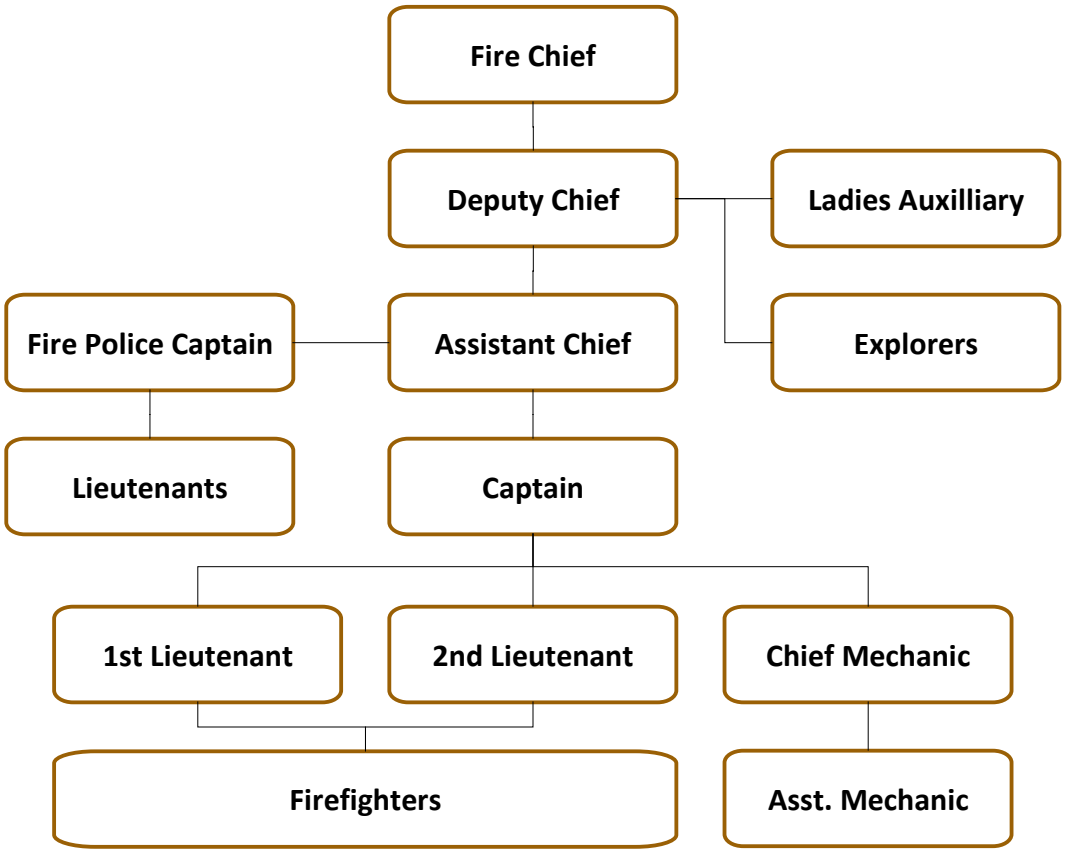
Organizational Design and Structure

A well-structured organizational design should reflect the efficient assignment of responsibility and authority, allowing the organization to accomplish effectiveness by maximizing distribution of workload. The lines on an organizational chart simply clarify accountability, coordination, and supervision. Thorough job descriptions should provide the details of each position and ensure that each individual's specific role is clear and centered on the organization's overall mission.

A review of the organization's structure reveals that it is organized in a typical top-down hierarchy. The organizational structure demonstrates a clear unity of command, in which each individual member reports to only one supervisor (within the context of any given position) and is aware to whom he or she is responsible for supervision and accountability. This method of organization encourages structured and consistent lines of communication and prevents positions, tasks, and assignments from being overlooked. The overall goals and objectives of the organization can be more effectively passed down through the rank and file members in a consistent fashion.

The organizational structure is not, however, charted with clear, designated operating divisions that permit the organization's core functions to be the primary focus of specific supervisors and assigned members. Rather, primary responsibilities are assigned per position as is typical in most totally volunteer fire departments. The following organizational chart illustrates the chain of command and lines of authority within the department.

Figure 10: Current Organizational Chart



The department has not sufficiently or formally analyzed its mission and functions such that a resulting set of specific agency programs has been established. Organized, structured programs permit better assignment of resources, division of workload, development of future planning, and analysis of service delivery. Those departments that have clarified their programs with titles, assigned leadership, resources, performance objectives, and accountability are among the most successful.

Recommendations:

- The department should further analyze its core functions and ensure that responsibilities are assigned to personnel best suited to coordinate those efforts.
- The department should formally analyze its mission and functions through a formal strategic planning process that assists the agency in developing short-term (five-year) goals while assigning individuals responsible for their implementation.

Maintenance of History

AFD has done an exceptional job at recording the history of the organization, dating back to its original formation and progressing through the many transitions over its 178-year history. Appropriate records of all municipal meetings are maintained in accordance with New York State law governing public meetings and decisions involving public funds. Corporate meeting records are also maintained appropriately within the corporation.

The department maintains several scrapbooks and/or files containing items of historical significance, including pictures, newspaper articles, etc. Many of the items are on display throughout the station, which is itself a historical fixture for the department.

Although AFD does provide some response information to the Village periodically, the department should consider compiling information throughout the year and producing a formal annual report available to the general public that includes activities, accomplishments, and performance. These documents can serve as a measure of performance and as a public relations tool.

Recommendation:

- The department should consider compiling information throughout the year and publishing an annual report available to the general public.

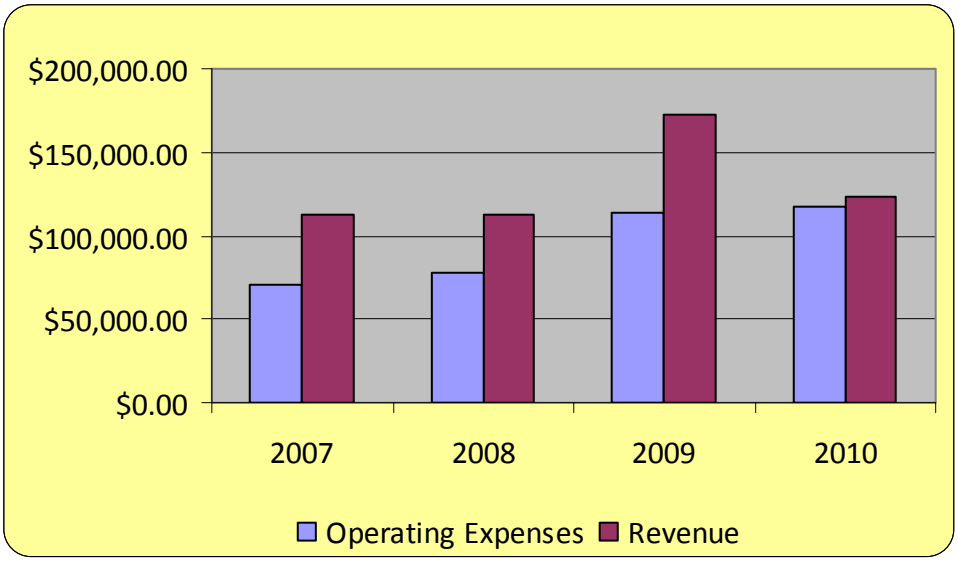
Finance and Budget

Essential to the continued success of any emergency services organization is sustainable funding. Additionally, internal financial controls that require organization officials to remain within existing financial limitations will ensure that the organization remains solvent. Financial oversight of AFD is the responsibility of an elected Mayor and Board of Trustees.

The Village uses a one-year budget cycle to prepare the annual budget based on a June 1 through May 31 fiscal year. The Village uses a modified accrual basis of accounting under which revenues and other financial resources are recognized as accrued when they are billed. Expenditures are recognized when the fund liability is incurred rather than disbursed. This method of accounting is *generally accepted* in governmental operations. The Village does not maintain a Capital Improvement Plan (CIP) for fire department facilities or apparatus.

The fire department's operating budget is funded primarily through a fire tax assessed within both the towns the agency serves. The department does not participate in transport EMS and, therefore, has no revenue from the provision of emergency medical services. Code enforcement activities are conducted through a separate Village department, again preventing the fire department from generating that potential revenue. This is common with communities served by an all-volunteer firefighting force. The following is an illustration of the department's expenditures and revenue history of the last four years, including the current fiscal cycle.

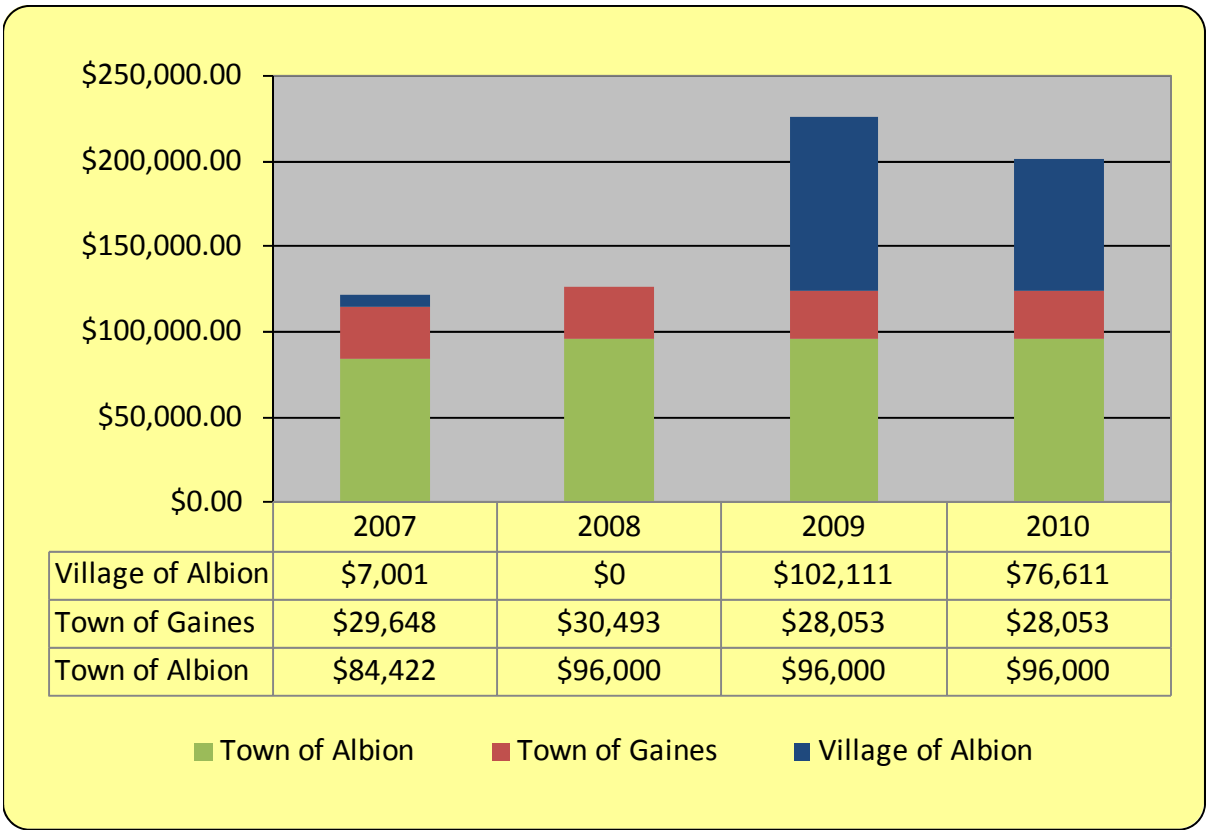
Figure 11: Historical Expenditures and Revenues



Revenues over the past four years (including the current fiscal cycle) have significantly exceeded expenditures. As mentioned previously, a majority of funding for AFD is generated through an ad valorem property tax assessed to all taxable property within the Towns of Albion and Gaines. The Village does not levy additional taxes but rather receives the fire tax assessed by the towns through contract to provide fire protection outside of the Village limits.

Although the Village does not levy additional taxes, fire protection expenses over and above the revenue generated from the Towns is provided from the Village's general fund. The following figure illustrates the revenue from each funding source.

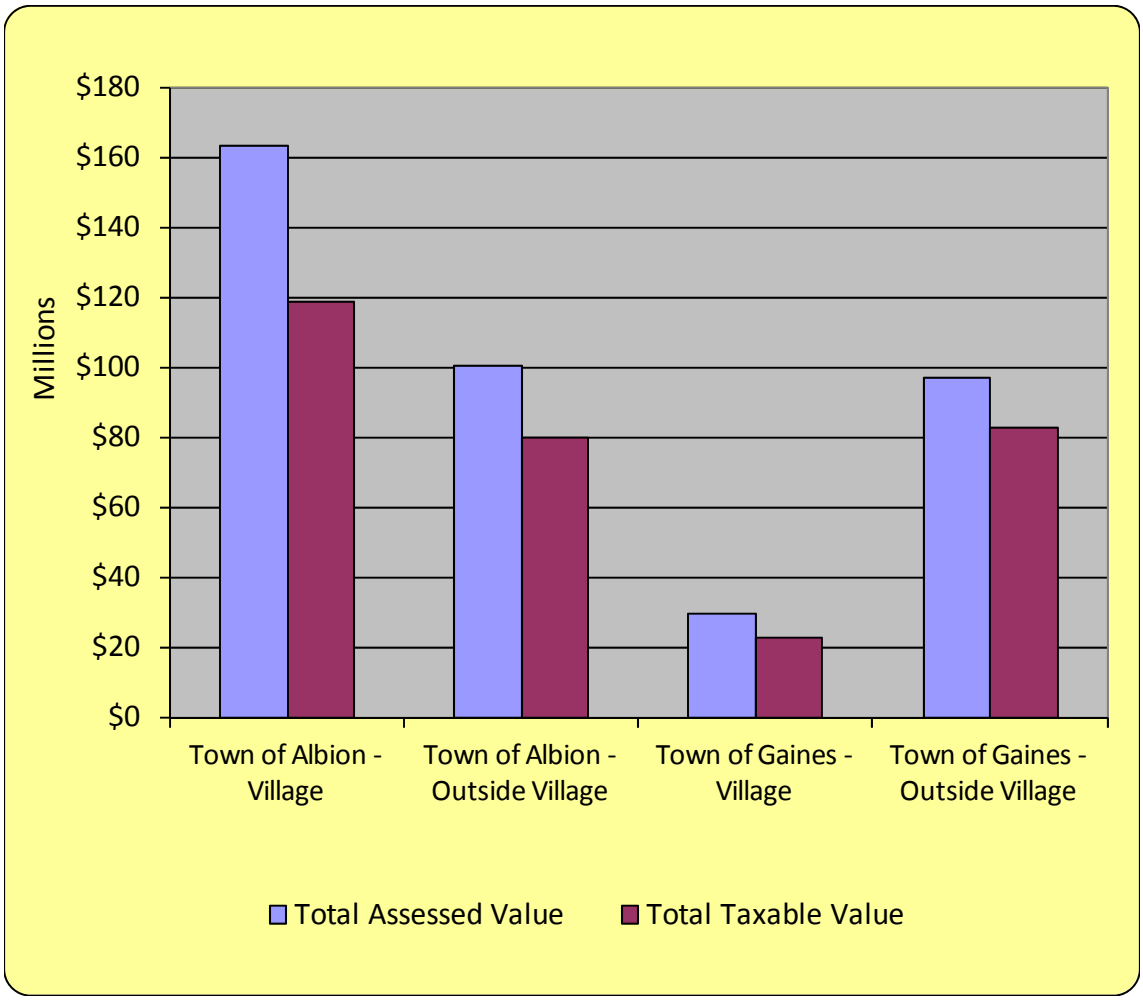
Figure 12: Funding by Source



	2007	2008	2009	2010
Village of Albion	$7,001	$0	$102,111	$76,611
Town of Gaines	$29,648	$30,493	$28,053	$28,053
Town of Albion	$84,422	$96,000	$96,000	$96,000

The following figures illustrate how the total assessed value of properties in the towns compares to the total taxable value of those properties.

Figure 13: Assessed Value Compared to Taxable Value

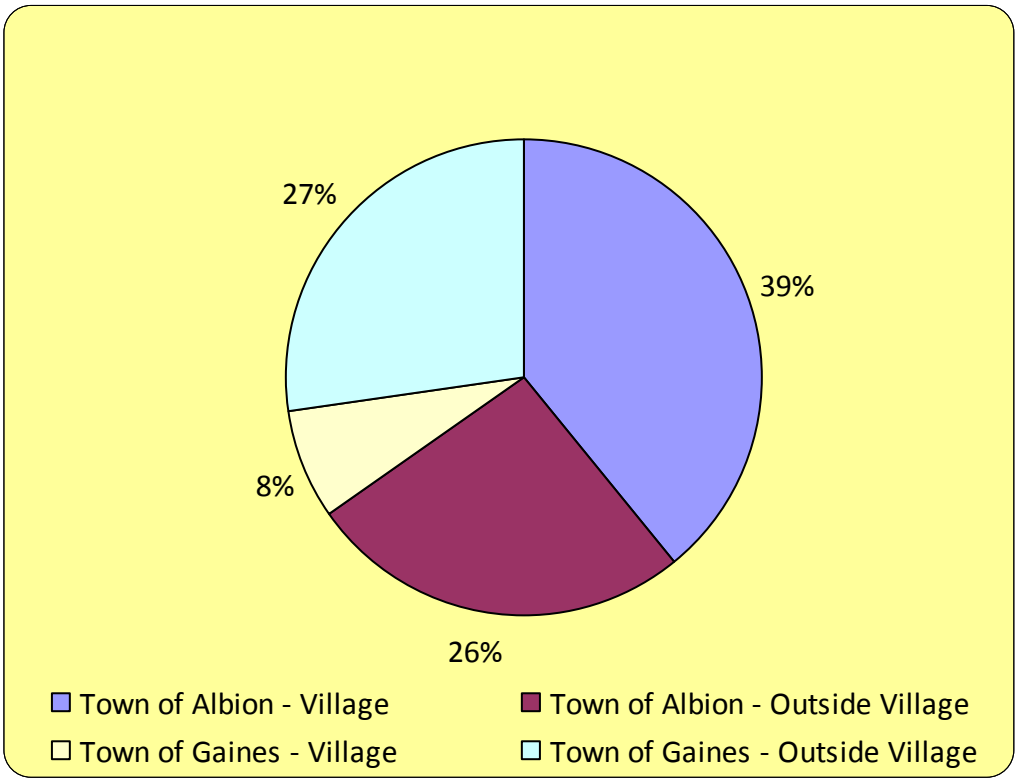


The total taxable value of properties located within both towns is significantly less than the actual property valuation. This is due to several potential factors, including public property such as schools and government-owned property, private not-for-profit property such as churches and other tax-exempt organizations, and agricultural properties. This is significant from the standpoint that, although tax-exempt, these properties continue to require fire protection services. As the total number of tax-exempt properties increases, the strain on the fire department to provide services to those properties also increases.

There also exists a disparity between the ad valorem tax rates between the towns. The current ad valorem rate for the Town of Albion is $1.04 per $1,000 taxable valuation; the ad valorem

rate for the Town of Gaines is $0.29 per $1,000 taxable valuation. The figure below illustrates how this disparity in tax rates carries over to the funding for fire protection.

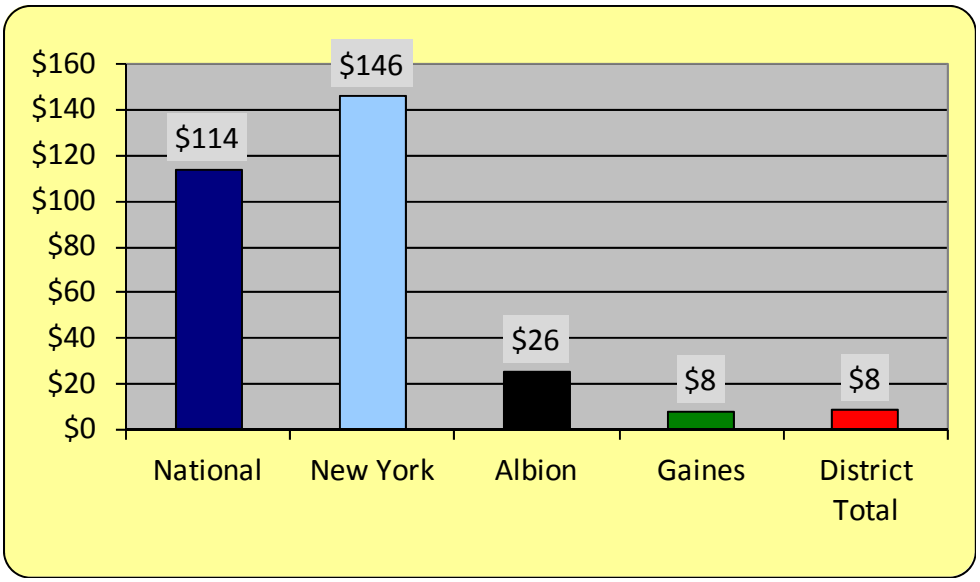
Figure 14: Funding by Taxable Value of Total Response Area



The result is that the Town of Albion carries 65 percent of the burden for funding fire protection while the Town of Gaines carries only 35 percent of that burden. This should not be surprising given the fact that the taxable values within both towns equal their current share of the fire department funding.

Determining how one jurisdiction compares to another in regard to fire protection funding can be difficult based on the variety of services that departments may or may not perform as part of their core mission. One method to benchmark one agency against others regionally is to use a per capita figure. The following chart illustrates the per capita costs for each area served by AFD in comparison to national and state averages.

Figure 15: Per Capita Funding Comparison



Per capita spending for Albion and Gaines (as well as the District Total) is well below both state and national averages. These averages could be slightly skewed, however, due to the fact that the U.S. Census Bureau reports populations for all three study entities (Town of Albion, Town of Gaines, Village of Albion) without indicating whether or not populations for the Village are included in the Town totals. The figure above removes the population reported by the Census Bureau for the Village and focuses instead on the total reported populations for the Towns. It should also be noted that the per capita figures noted above were based on the total taxable valuation at the applicable tax rate and does not take into account that fire protection funding is actually less than what is currently generated. Additionally, amounts paid toward debt service each year were not included in the above representation.

Experience has shown that it is very common for the cost of fire protection to exceed $100 per capita in urban settings, trending up to about $150 in some cases. The higher cost of fire service in an urbanized zone is usually a function of the level of sophistication required by that system (i.e., career staffing, paramedic services, and fully-staffed fire prevention bureaus). Costs usually trend downward as one compares an urban fire system to suburban and rural settings.

Personnel Management

An organization's people are its most valuable resource. Careful attention must be paid to managing that resource to achieve maximum productivity for the organization and maximum satisfaction for the individual. A safe working environment, fair treatment, and recognition for a job well done are key components of membership and job satisfaction.

Personnel Policies and Rules

It is important that members of the organization know to whom they should go when they have a problem, question, or issue related to their relationship to the department. In large companies, this function is typically handled by a human resource department. Staff within such a department handles questions, issues, and tasks related to appointment, benefits, performance, disciplines, promotion, or termination.

Personnel issues within AFD are handled by the corporation and all policies pertaining to membership, discipline, termination, etc. are contained in the by-laws of the corporation. In addition to corporate by-laws, Village personnel policies and guidelines may also apply to department personnel. All new members of the department must be approved and appointed by the Village Board, giving the Village ultimate control over the membership of the organization.

Disciplinary Processes

A formal progressive disciplinary process for members should be clearly identified and available. The process should provide for various levels of discipline focused on correcting unacceptable behaviors with the most reasonable actions considered appropriate and effective. The process under which discipline is applied should be clear and unambiguous.

A multi-level appeals process must be documented to afford the employee who feels aggrieved by an unreasonable disciplinary action the opportunity to have his/her issues reviewed by an impartial party. Informal interviews with employees give the impression that members feel

organizational discipline practices are reasonable, fair, and consistently and equitably applied to all involved.

The disciplinary process for AFD is outlined in the *By-laws of the Albion Fire Department, Inc.*, Article II Section 8 – Expulsion and Suspension. The process describes the grounds for disciplinary action (including suspension and expulsion), complaint and investigation procedures, and the process by which discipline is delivered by a vote of the membership.

Ongoing Competency Evaluation

Once achieving active membership, individuals should be evaluated periodically to ensure their continued ability to perform their duties safely and efficiently. Technical and manipulative skills should be evaluated on a regular basis. This provides documentation about a person's ability to perform their responsibilities and provides valuable input into the training and education development process.

Physical capacity testing cannot detect all potential limiting conditions of an individual's health and fitness levels. A periodic medical evaluation is necessary. National safety standards for firefighters recommend annual medical evaluations and bi-annual physical examinations. The examinations should include all the criteria included in the entry-level exam, as well as periodic stress EKGs for persons over 40 and regular blood toxicology screening. Communicable disease vaccinations can also be updated as needed during this process. The NFPA standard on medical requirements for firefighters (*NFPA 1582*) or its equivalent should be used as a resource for establishing the criteria of both entry-level and on-going medical evaluations for operational personnel.

The department has reportedly not placed a high priority on training over the past several years. This deficiency is currently being rectified with a new and more aggressive approach to initial and continued training. Formal continuous competency evaluations are not currently

being performed, and members are evaluated based on cursory evaluations during regularly scheduled training and drills.

Counseling Services

Emergency services bring otherwise ordinary people into life and death situations that sometimes end very tragically. Even though fire department personnel are trained responders, they do not have an impregnable shield that prevents them from being affected by traumatic events. Critical incident stress is a very real condition that affects all emergency service workers to some degree or another. It is how emergency workers deal with that stress that makes the difference. The trigger for significant psychological trauma may be a single event or a series of events compounding on each other.

Progressive emergency services organizations have recognized the need to provide a support system for their personnel who are exposed to traumatic incidents. Critical incident stress interventions by this group are short-term processes only. Though normally sufficient to help emergency personnel cope with the event, on occasion longer-term support is needed. Failure to provide that support can ultimately lead to the loss of a very valuable member.

Employee assistance programs (EAPs) should be readily available for employees of the fire department as a long-term stress intervention tool. An employee assistance program can provide additional support for other life problems that may affect a member's motivation and work quality such as substance abuse, marital difficulties, financial complications, and the like. The costs are reasonable, and the potential payback significant.

The department does currently offer formalized counseling services through a County Critical Incident Stress Debriefing team.

Recommendation:

- The department should arrange for formal use of regional Critical Incident Stress Debriefing services through a local public or mental health agency or through local medical facilities.

Personnel Records

The maintenance of adequate and up-to-date personnel records is critical in every organization that depends on the effective performance of its people. The fire department maintains certain written and computerized records of its personnel at the fire station, as well as full personnel records within the Village offices. Original application materials are retained in an attempt to create a full historical record of the member's participation in the organization, from initial appointment to separation. Additional documents and records referring to assignments, promotions, commendations, discipline, and other personnel actions are maintained as well both at the department and Village levels. Forms or other documentation pertaining to performance of members are retained and reports describing details of accidents or other injuries or injury-related incidents are maintained should future reference and cumulative evaluation or analysis be needed.

Promotions

The department does not currently follow a formal promotional process from firefighter to officer ranks. All officer positions (Lieutenant, Captain, Deputy Chief, Assistant Chief, and Chief) are elected by the membership of the corporation and approved by the Village.

Recommendation:

- The department should develop specific requirements for each officer position and implement a process by which personnel (members) apply for the position and undergo a competitive process for promotion.

Staffing

Fire departments must provide adequate staffing in three key areas: emergency services, administration, and support. ESCI surveyed AFD to determine how the balance between the three areas is maintained given the realities of available local resources.

Several industry standards address staffing issues. Specifically, the Occupational Safety and Health Administration (O*SHA) Respiratory Protection Standard 29 CFR 1910, 134*; the National Fire Protection Association (*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; and NFPA 1720 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments* are frequently cited as authoritative documents. In addition, the Center for Public Safety Excellence (CPSE) publishes a sample for the number of personnel suggested on the emergency scene for various levels of risk.[3]

Span of control, also known as span of management, is a human resources management term that refers to the number of subordinates a supervisor can effectively manage. Developed in the United Kingdom in 1922 by Sir Ian Hamilton, the concept of span of control evolved from the assumption that managers have finite amounts of time, energy, and attention to devote to their jobs. In his research of British military leaders, Hamilton found that leaders could not effectively control more than three to six people directly.

This generally accepted *rule of thumb* for span of control is still considered relevant today and applies not only to the military, but correspondingly to the fire service. It is important to note that all managers experience a decrease in effectiveness as their span of control exceeds the optimal level. In other words, the limitations implied by span of control are not short-comings of certain individual managers, but rather of managers in general. In addition, it is important to

[3] CPSE: formerly the Commission on Fire Accreditation International (CFAI).

understand that span of control refers only to direct reports, rather than to an entire corporate hierarchy (all personnel in the fire company).

"Extending span of control beyond the recommended limits engenders poor morale, hinders effective decision making, and may cause loss of the agility and flexibility that give many entrepreneurial firms their edge."[4]

Administration and Support Staff

One of the primary responsibilities of any department's administration and support staff is to ensure that the operational entities of the organization have the ability and means to accomplish their responsibilities on an emergency incident. Efficient and effective administration and support are critical to the department's success. Without sufficient oversight, planning, documentation, training, and maintenance, the operational entities will fail any operational test. Like any other part of the department, administration and support require appropriate resources to function properly.

Analyzing the ratio of administration and support positions to the total positions facilitates an understanding of the relative number of resources committed to this important function. The appropriate balance of the administration and support component to the operational component is crucial to the success of the department's mission and responsibilities. The following figure indicates how many personnel are assigned to administrative responsibilities within AFD. It should be understood, however, that many of these individuals also have fire suppression responsibilities.

[4] Hendricks, Mark. *Span Control* Entrepreneur, January 2001.

Figure 16: Administrative and Support Staff Complement

Position	AFD, Inc.	AES, Inc.
President	1	1
Vice-President	1	
Secretary		1
Treasurer	1	1
Recording Secretary	1	
Director	1	1
Fire Chief	1	
Financial Secretary	1	
Deputy Chief	1	
Assistant Chief	1	
Sergeant at Arms	1	
Total	**10**	**4**

Emergency Services Staff

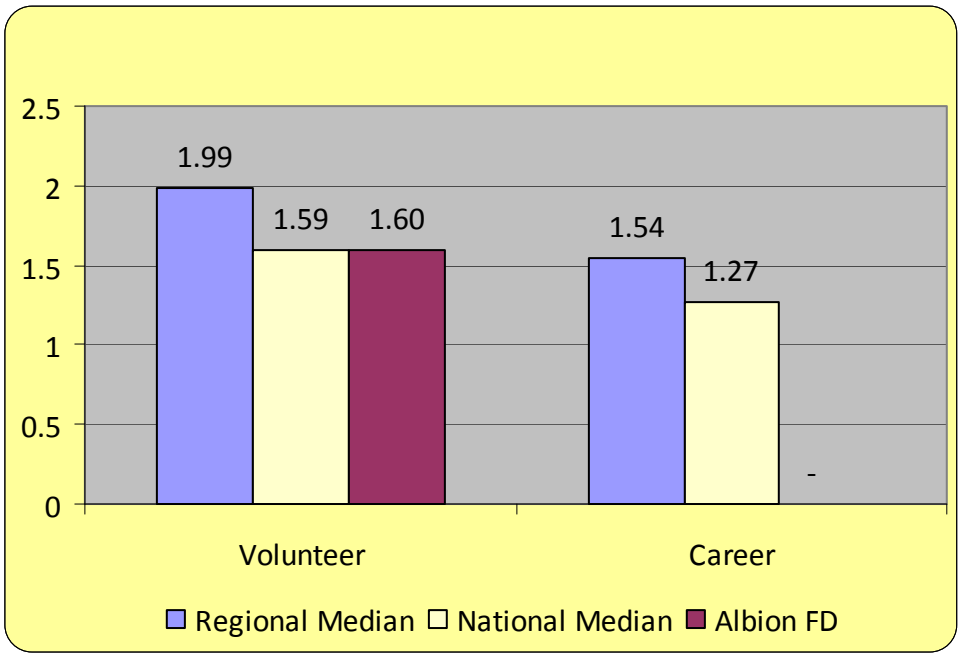
It takes an adequate and well trained staff of emergency responders to put the appropriate emergency apparatus and equipment to its best use in mitigating incidents. Insufficient staffing at an operational scene decreases the effectiveness of the response and increases the risk of injury to all individuals involved. The following figures summarize the AFD personnel assigned to *street-level* service delivery.

Figure 17: Emergency Services Staff Complement

Position	Number
Captain	1
1st Lieutenant	1
2nd Lieutenant	1
Interior Firefighter/EMT	6
Interior Firefighter	13
Driver/EMT	2
EMT	3
Driver	3
Chief Mechanic	1
Exterior	1
Fire Police	6
Probationary Member	4
Total	**42**

The following figure illustrates how AFD compares with other departments from both a volunteer and career staffing perspective.

Figure 18: Volunteer/Career Firefighters per 1,000 Population



The area is enjoying a slightly higher rate of volunteerism than the national median but nearly identical to the regional median. The portion of the chart related to career personnel is provided in order to provide the Village with a comparison of other agencies and how they are staffed. NFPA benchmark data does not include data specific to combination fire departments and the preceding chart is a combination of the available data from the closest matching population groups.

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 sufficient 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 action, the command officer must prioritize the tasks and complete some in chronological order rather than concurrently. These tasks include:

- Command
- Scene safety
- Search and rescue
- Fire attack
- Water supply
- Pump operation
- Ventilation
- Back-up/rapid intervention

The Commission for Public Safety Excellence (CPSE) of the International Association of Fire Chiefs (IAFC) has developed a *sample* critical tasking analysis for the number of personnel required on scene for various levels of risk. This information is shown in the following chart. This information illustrates sample critical tasking only and is not intended to illustrate conclusively the actual personnel necessary based on risk.

Figure 19: Sample of Critical Task Staffing by Risk

Minimum Firefighting Personnel Needed Based on Level of Risk				
Critical Task	**Maximum Risk**	**High Risk**	**Moderate Risk**	**Low Risk**
Attack line	4 (16-18*)	4	2	2
Search and rescue	4	2	2	
Ventilation	4	2	2	
Back-up line	2	3	3	
Pump operator	1	1	1	1
Water supply	1	1	1	
Utilities	1	1	1	
Command/safety	2	2	1	1#
Forcible entry	*			
Accountability	1			
Salvage	*			
Overhaul	*			
Communication	1*			
Chief's aide	1	1		
Operations officer	1			
Administration	*			
Logistics	1			
Planning		1*		
Staging		1*		
Rehabilation	1			
Sector officers	1 (4*)			
High-rise evacuation	10-30*			
Stairwell support	10*			
Relief	*			
Investigation	*			
Totals	**25-65***	**17**	**13**	**3-4**

 # Can often behandled by the first due officer
** At maximum and high-risk fires, additional personnel may be needed*

The fire service assesses the relative risk of properties and occurrences based on a number of factors. Properties with high fire risk often require greater numbers of personnel and apparatus to effectively mitigate the fire emergency. Staffing and deployment decisions should be made with consideration of the level of risk involved. The level of risk categories identified by the CPSE relate 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.

The first 15 minutes is the most crucial period in the suppression of a fire. How effectively and efficiently firefighters perform during this period has a significant impact on the overall outcome of the event. This general concept is applicable to fire, rescue, and medical situations.

Critical tasks must be conducted in a timely manner in order to control a fire or to treat a patient. Three scenarios routinely encountered are commonly utilized by fire departments when conducting field validation and critical tasking. They are a medium risk structure fire, a traffic collision with a trapped victim, and a cardiac arrest. Each scenario is conducted using standard operating procedures and realistic response times based on actual system performance. Each scenario is normally run multiple times with a variety of fire companies to validate and verify observations and times.

To further validate the analysis process, results are compared with records from actual working fires and similar incidents from previous years. Overall results are reviewed to determine if the actions taken within the early minutes of an incident resulted in a stop loss or not and to determine if additional resources were required. The critical task analysis process demonstrates the rate in which the current deployment plan results in stopping loss a high percentage of time within initial critical time goals. The critical task analysis may demonstrate important differences based on apparatus configuration and staffing in the ability to enter a building on a working structure fire when it comes to executing the *two-in, two-out* rule and fire ground operations.

Critical tasks are those activities that must be conducted in a timely manner by firefighters at emergency incidents in order to control the situation, stop loss, and to perform necessary tasks

required for a medical emergency. AFD is responsible for ensuring that responding apparatus and personnel are capable of performing all of the described tasks in a prompt, efficient, and safe manner.

AFD personnel were asked to perform a desktop analysis of critical tasking for the various types of incidents and risk levels common to the response district. This information was used in the review and recommendation of standards of coverage.

Figure 20: AFD Critical Task Analysis/Number of Firefighters

Incident Type	Personnel
Low Rise Residential Structure Fire	21
High Rise Residential Structure Fire	24
Moderate Risk Commercial Structure Fire	22
High Risk Commercial Structure Fire	22
Grass/Brush Fire	10
Car Fire	5
Emergency Medical Incident	3
Motor Vehicle Crash	11
Hazardous Materials Incident	13

Assignment of Responsibilities and Activity Levels of Personnel

In communities around the country, the number of fire calls has declined over the past decade. Yet as the frequency of fires diminishes, in part due to stricter fire codes and safety education, the workload of fire departments has risen sharply — medical calls, hazardous materials calls, and every sort of household emergency is now addressed by fire departments. Although the frequency of fires has diminished, the need for a ready group of firefighters has increased.

Although modern codes tend to make fires in newer structures more infrequent, today's energy-efficient construction (designed to hold heat during the winter) also tends to confine the heat of a hostile fire. In addition, research has shown that modern furnishings generally burn hotter (due to synthetics), and roofs collapse sooner because prefabricated roof trusses separate easily after a very short exposure to flame. In the 1970s, scientists at the National

Institute of Standards and Technology found that after a fire breaks out, building occupants had about 17 minutes to escape before being overcome by heat and smoke. Today that estimate is three minutes.[5] The necessity of firefighters arriving on the scene of a fire in the shortest span of time is more critical now than ever.

Along with a quick response, a robust, well-trained, and appropriately equipped complement of emergency workers is needed to successfully mitigate structural fires. Too few firefighters at an emergency scene decreases effectiveness and increases the risk of injury to all. While many requests for emergency assistance are comparatively low risk requiring few personnel, the number of emergency workers needed to mitigate a structure fire is greater. A house fire involving just one room and its contents is considered a moderate risk incident in the industry; the Commission for Public Safety Excellence recommends 13 firefighters be assembled to combat a moderate risk emergency.

Nationally, the number of volunteer firefighters available during daytime hours is declining. While it was once common for departments to rely on employees from local businesses to respond during emergencies, the practice is much less prevalent now. Today, people frequently work more than one job. Family responsibilities and long commutes only compound the difficulties for volunteers, lessening the time available for training and emergency duty.

The NFPA issued a response performance standard for all or mostly volunteer-staffed fire departments. This standard, among other things, identifies a response time performance objective for fire departments and a target staffing standard for structure fires. *NFPA 1720* is not a legal mandate, but it does provide a useful benchmark against which to measure the fire department's performance.

[5] National Institute of Standards and Technology, *Performance of Home Smoke Alarms, Analysis of the Response of Several Available Technologies in Residential Fire Settings,* Bukowski, Richard, et al.

Of significance to the Staffing Objective of this study is that *NFPA 1720* establishes that a response company consists of four personnel. The standard does not require that all four be on the same vehicle but does expect that the four will operate as a single functioning unit once on scene. The *NFPA 1720* response time standard also requires that all four personnel be on scene within the recommended response time guidelines.

There is another reason the arrival of four personnel is critical for structure fires. As mentioned earlier, OSHA regulations require that before personnel can enter a building to extinguish a fire, at least two personnel must be on scene and assigned to conduct search and rescue in case the fire attack crew becomes trapped. This is referred to as the two-in, two-out rule.[6] The only exception to this regulation is if it is known that victims are trapped inside the building.

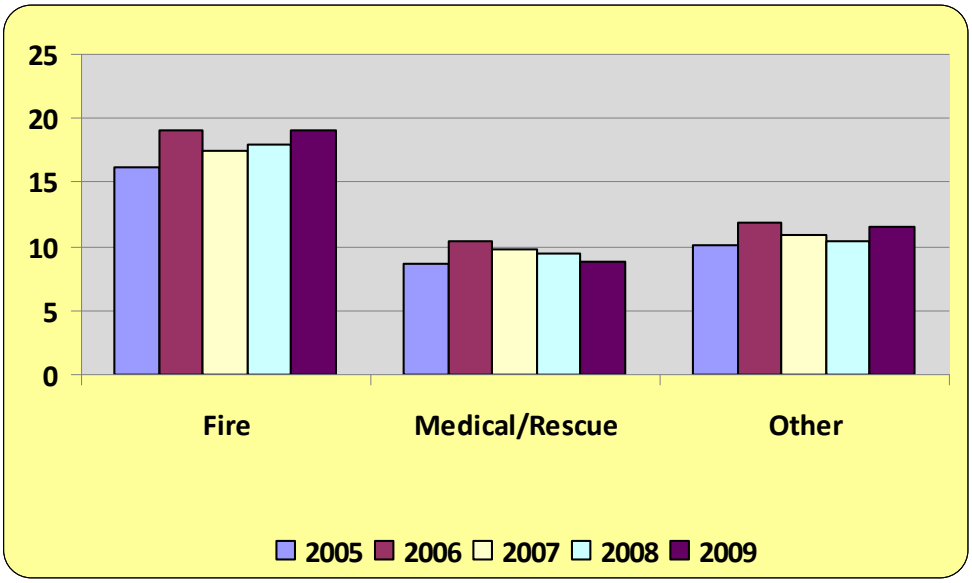
Given volunteer staffing of engines, the time it takes for the second unit to arrive becomes very important to achievement of the NFPA standard. If additional help is a considerable time away, the fire will continue to grow rapidly contributing to significantly more damage to the property.

Incident Staffing Performance

An analysis of the incident response staffing by the fire department was accomplished through the comparison of its incident staff response performances to national standards, local and national task analyses, and observations. The following charts illustrate the department's staffing performance both by staff type and temporally.

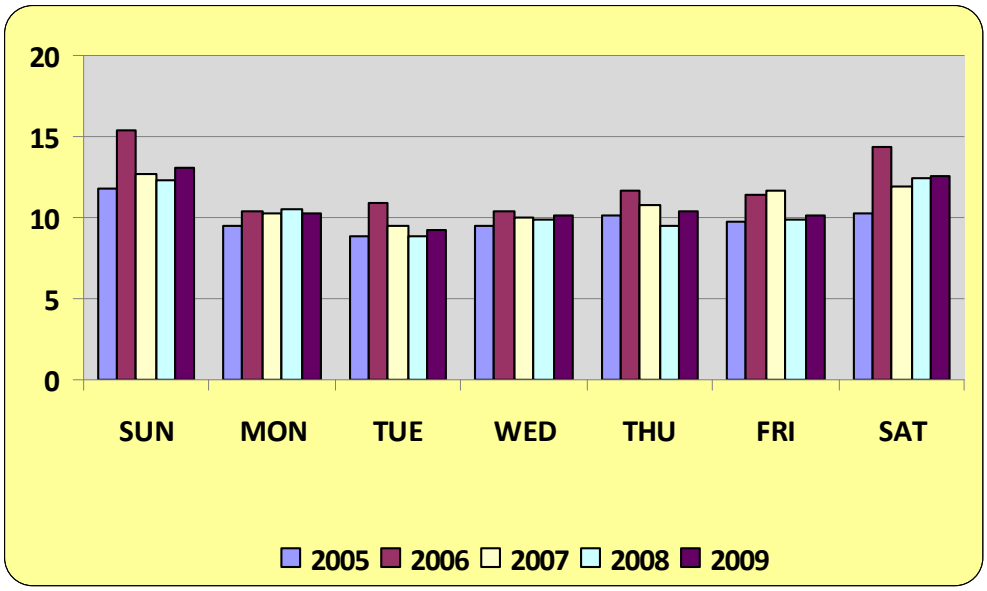
[6] 29 CFR 1910.134(g)(4).

Figure 21: AFD Average Staffing per Call by Type



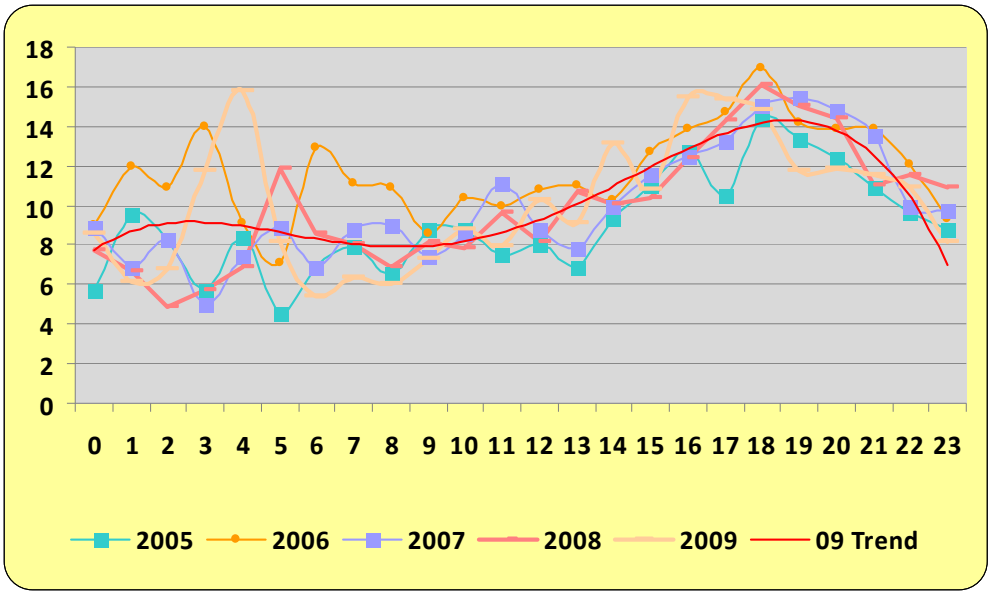
More staff are required for fire calls and these types of incidents are responded to in kind by AFD members. "Other" call types include alarms, smell of smoke, etc. The average monthly staffing levels in 2008 declined slightly as the year progressed. Staffing levels improved during the weekends.

Figure 22: AFD Average Staffing per Call by Day of Week



The average staffing levels are higher during the late afternoon and early evening hours.

Figure 23: AFD Average Staffing per Call by Hour of Day



Retention and Recruitment

For volunteer and combination fire departments across the United States, recruitment and retention of volunteer members has been one area that has suffered far more than actual service delivery. Several articles of research have been published over the past decade in an attempt to assist volunteer and combination departments in addressing the issue of declining numbers of volunteer or POC (paid-on-call) personnel. One such study, conducted by the National Volunteer Fire Council, offered an extensive list of statistics and suggestions focusing on the following issues:

- What makes members want to volunteer?
- What keeps volunteers serving?
- What makes your members leave your organization?

The study evaluated these questions and offered a vast array of information but little in the way of solid suggestions on how to address these issues. A summation of the study is provided in the appendix of this report.

It is no secret within the fire service, as well as other industries that rely on volunteer members, that volunteerism has been on the decline for many years. Since September 11, 2001, however, volunteerism in general saw an enormous increase, from 59.8 million in 2002 to 65.4 million Americans in 2005; that surge has since subsided. During that time frame, only 25 percent of males volunteered compared to 32.4 percent of females. In addition, the age with the highest percentage of volunteerism was the 35 to 44 years of age bracket. Unfortunately, only 1.3 percent of all volunteerism goes into public safety organizations, of which fire departments comprise only a fraction.[7]

In the Northeastern United States, including New York, volunteer rates are somewhat lower than the national averages. Between 2005 and 2007, the rate of volunteerism in the Northeast was estimated at 24.4 percent overall. Subsequently, public safety only accounted for a small percentage of the total volunteerism rate in during that period. In fact, New York ranked 50th out of all 50 states plus the District of Columbia, with an overall volunteerism rate of 19.2 percent.[8]

Statistics specific to the state of New York indicate that only 16.6 percent of males volunteer, compared to 21.6 percent of females, and the age range with the highest volunteerism was the 45 to 54 years of age bracket (23.2 percent). [9]

With a shift in demographics throughout the United States, the groups that fire departments have relied upon for decades are no longer available or no longer have the desire to volunteer. As shown from the statistics noted above, public safety organizations, including fire departments, must be willing to thoroughly evaluate the demographics of their communities and then take an in-depth look at the organization to identify what they have to offer, as well as incentives that could be implemented and/or improved.

[7] Corporation for National and Community Service. *Volunteering in America: State Trends and Rankings,* June, 2006.
[8] Ibid.
[9] Ibid.

Based on the report issued by the National Volunteer Fire Council, in general, individuals are willing to volunteer when:

- The experience is rewarding and worth their time
- The training requirements are not excessive
- The time demands are not excessive
- They feel valued
- Conflict is minimized

There are caveats, however, attached to these generalizations. Time is a precious commodity in today's society, as many of us work more hours at one, two, or three jobs in order to offset the rising cost of living and inability of most salaries to keep up with the current rates of inflation. With this in mind, fire departments must be able to make any time commitment by their members worthwhile and ensure that time is not wasted on repetitive or needless exercises that serve little purpose other than to occupy time meant for practical training. This is increasingly important as training requirements continue to rise (as does call volume).

Individuals charged with operating emergency services agencies with an ever-increasing level of efficiency must realize that in today's economic environment volunteerism may be the best method for accomplishing a mission that is vital to community sustainability. Administrators must be able to recognize and swiftly deal with factors that cause a decline in volunteerism, such as:

- Abuse of the emergency services system
- Sociological conditions
- Internal leadership problems, either in the administrative or field operational ranks
- Community demographics, such as an aging community

In an environment of tax roll-backs, property tax capping, hiring freezes due to local government budgetary overruns, and an overall decrease in fires throughout the country,

emergency services administrators may be better served to bolster the volunteer ranks of their departments rather than continuing the push for more career personnel.

With these issues in mind, combined with the statistics noted at the beginning of this section, ESCI suggests that the Village and AFD consider the demographics of the community as noted below to develop a sustainable volunteer/POC recruitment and retention program:

- Largest age bracket: Age 35-39
- Percentage of single households: 33.2 percent (66.8 percent married couples)
- Male-to-female ratio: Statistically even (50.1 percent male)
- Marital Status: Married (61.8 percent)

Using this information, AFD should focus their recruitment efforts on the 35-39 years of age bracket, particularly those living in married or family households; and attention should be focused on males and females equally, as those populations are statistically even.

Once an effective recruitment program has been implemented, tested, evaluated, and modified based on results, the department should then focus on retention of those volunteers/POCs. In today's economic environment, monetary incentives are becoming increasingly rare. Many departments rely on the formal paid-on-call staff (those that receive a standard rate of pay per hour or per call for work performed) rather than the typical volunteer member that works in a strictly volunteer (no-pay) status. Which option to utilize rests with the jurisdictional authorities who have insight and control of the budget.

Regardless of which compensatory mechanism is chosen by the companies, there are other, non-monetary aspects that tend to maintain a volunteer's interest in the organization. As indicated in the report issued by the National Volunteer Fire Council, department leadership is a major factor in a member's decision to leave an organization. Conflicts between members and leadership cause tension throughout the organization and tend to increase anxiety, even among those members not directly involved in the conflict. It is beneficial, therefore, for

leadership to recognize that conflict resolution is essential to maintaining an effective organization.

Once individuals become part of an organization, those who truly are volunteering for the good of the community take a great deal of pride in the organization and expect the same from other members. This takes form in many ways, including pride in the uniform, public outreach through education and/or demonstrations and fundraising, pride in the building and apparatus, and involvement in organizational development and advancement.

Another important aspect of retaining volunteers is recognition. Most volunteers do not expect any compensation for their time and efforts, but many express the desire that their dedication be acknowledged. This can be accomplished through informal programs such as a simple "thank you" or cards and letters that recognize individuals for special contributions. Formal programs can also be initiated where members are recognized for completion of various courses or years of service. The use of the local media is a key component to this aspect of retention. Although members build respect for one another internally, the use of local newspapers, television, and radio can bring external positive recognition to departments. This can also, in turn, have the effect of producing more members as the image of the organization is positively portrayed in the media.

As mentioned previously, many volunteers do not expect monetary compensation. This does not mean that monetary compensation cannot be used as an incentive to both recruit and retain volunteers. Many organizations have developed programs to make volunteering more attractive through the use of either direct or indirect monetary incentives. Some examples include:

- Indirect Monetary Incentives
  - Retirement plans
  - Pension plans
  - IRAs
  - Tax exemptions (local, state, and federal)
  - Tuition assistance
  - Health club memberships
  - Local business gift certificates
- Direct Monetary Incentives
  - Length of service bonus plans
  - Pay-per-call or pay-by-hour
  - Annual reimbursement for time

All fire and emergency services personnel within the State of New York are allowed an annual tax credit when filing an individual state tax return. AFD does not, however, provide any other means of Length of Service Award Program (LOSAP) or monetary incentive program. There are many variations of the LOSAP program across the United States, and each program is tailored to meet the needs of the organization while operating within the constraints of the local economy and fiscal abilities of the jurisdiction.

> Article 11-A of the General Municipal Law authorizes certain local governments in New York State to establish and sponsor length of service award programs (LOSAP's) for volunteer firefighters. These programs provide municipally funded pension like benefits based on an individual's length of volunteer firefighting service. The programs are established at local option and are administered at the local level. There appears to be more than 500 programs in operation with what we estimate to be over a quarter of a billion dollars invested in these programs by local governments on behalf of volunteer firefighters.
>
> Service award programs for volunteer firefighters were authorized by legislation that became effective on September 1, 1989. The purpose of the legislation was to facilitate the recruitment and retention of volunteer firefighters.
>
> Contact: New York State and Local Retirement System. 110 State Street, Albany, NY 12244-0001. Phone: (866) 805-0990. Fax: (518) 402-4433.[10]

[10] http://www.nvfc.org/index.php?id=876. Accessed 12/7/2009.

The demands of today's society and a shift in demographics have made it harder to find individuals willing to volunteer the necessary time and energy to an organization that offers little tangible return. Although there are many resources available that identify the issues with attracting volunteers, it is impossible to define a specific set of incentives and programs that work for every jurisdiction. Each organization must evaluate its own internal needs and then match those to the demographics of the community it serves to maximize its abilities to recruit and retain volunteer personnel.

AFD currently does not have an active formal recruitment process. Most applicants result from current volunteers recruiting individuals they feel might be interested. No physical ability standards have been established for the department. A written examination for aptitude or knowledge is not included as part of the recruitment process. New York State Department of Labor requires a medical evaluation and fit-test for personnel to qualify for interior firefighting, and all new personnel receive this examination at the department's expense.

All individuals who submit an application for membership must be approved by a vote of a majority of the membership in attendance at a meeting of the corporation. If successful, the department submits the applicant to the Village for approval. AFD follows New York State statutes in regards to performing an arson background investigation on all potential department members.

Recommendation:

- The Village should investigate the feasibility of implementing a Length of Service Awards Program (LOSAP) for AFD to encourage recruitment and retention of volunteers.

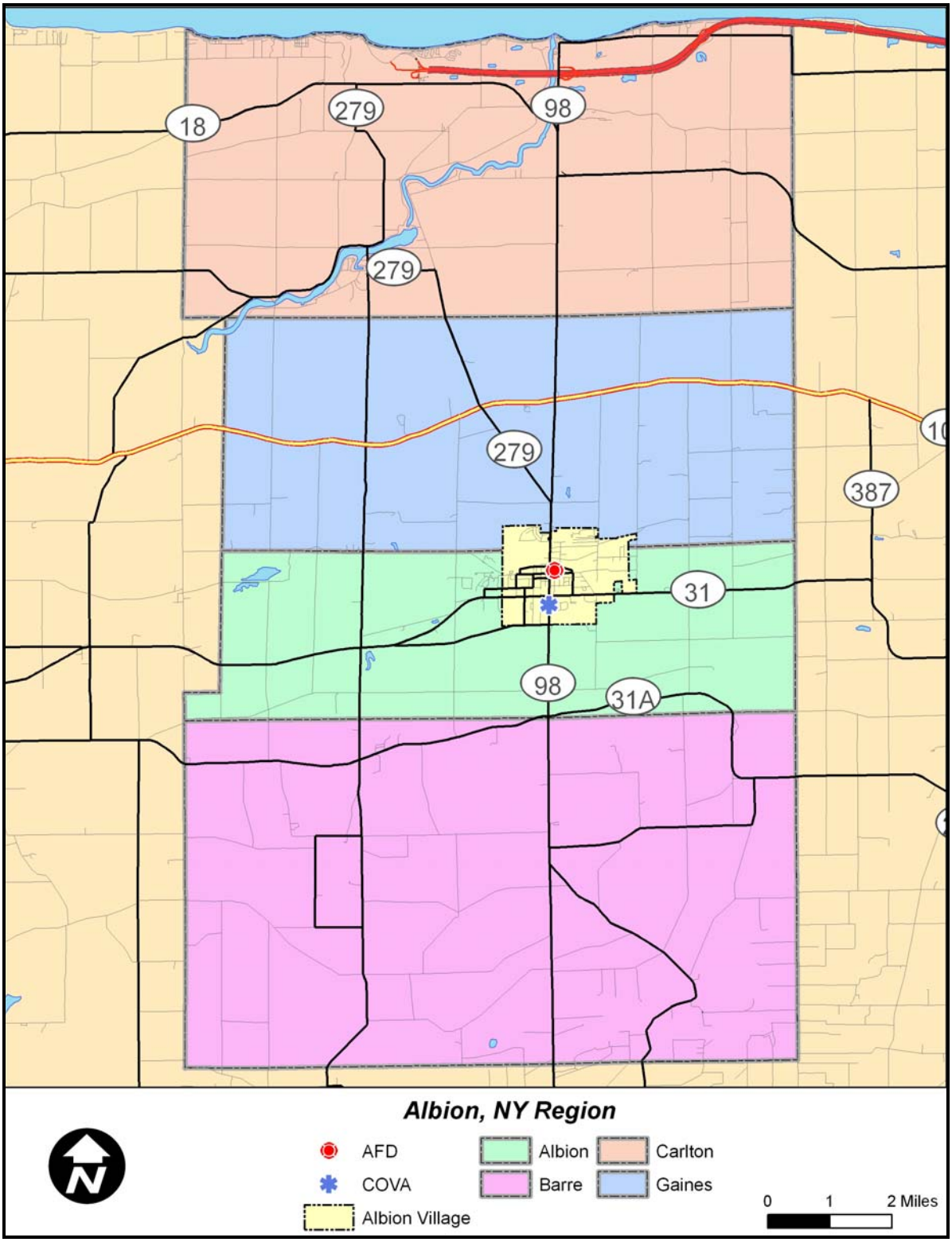
Service Delivery

In this section, an analysis of current conditions as they relate to the fire department's facility, resources, service demand, and performance is conducted.

Distribution Analysis

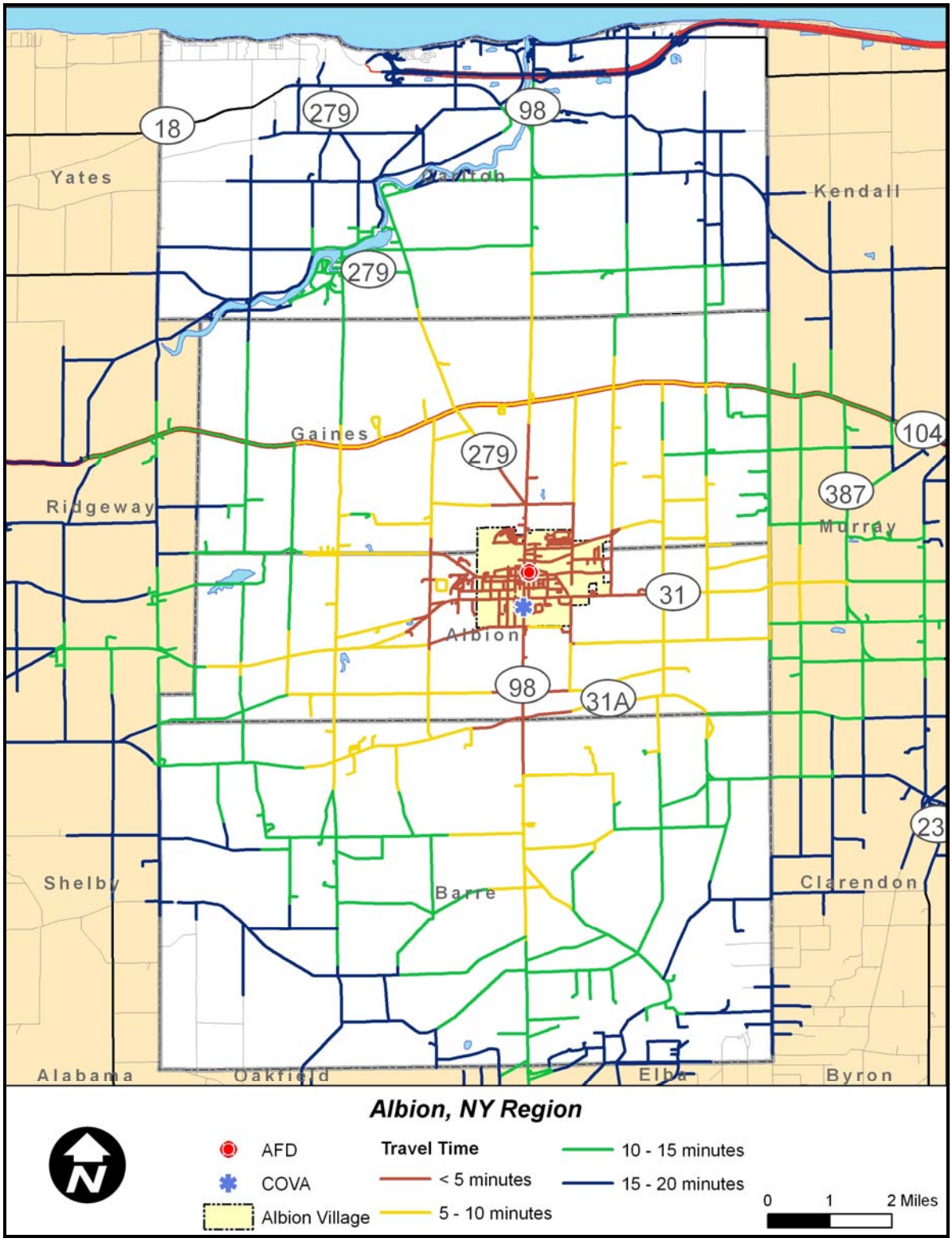
Each agency (AFD and COVA) operates from its own single facility in Albion. The service area encompasses the Town of Albion, the Village of Albion, and the Town of Gaines for both agencies. COVA, to be discussed later, also covers the Town of Barre and the Town of Carlton. This region is south of Lake Ontario in upstate New York, between the cities of Buffalo and Rochester. The following figure depicts the locations of the fire station and ambulance headquarters within the service area.

Figure 24: Current Facility Deployment



The extent of the service area that can be reached within a certain travel time from each station exists regardless of staffing patterns. The following map demonstrates the travel time capability of emergency apparatus when it leaves the facility. Adjustments to speed capability of the streets were made to account for negotiating turns and intersections.

Figure 25: Travel Time Capability



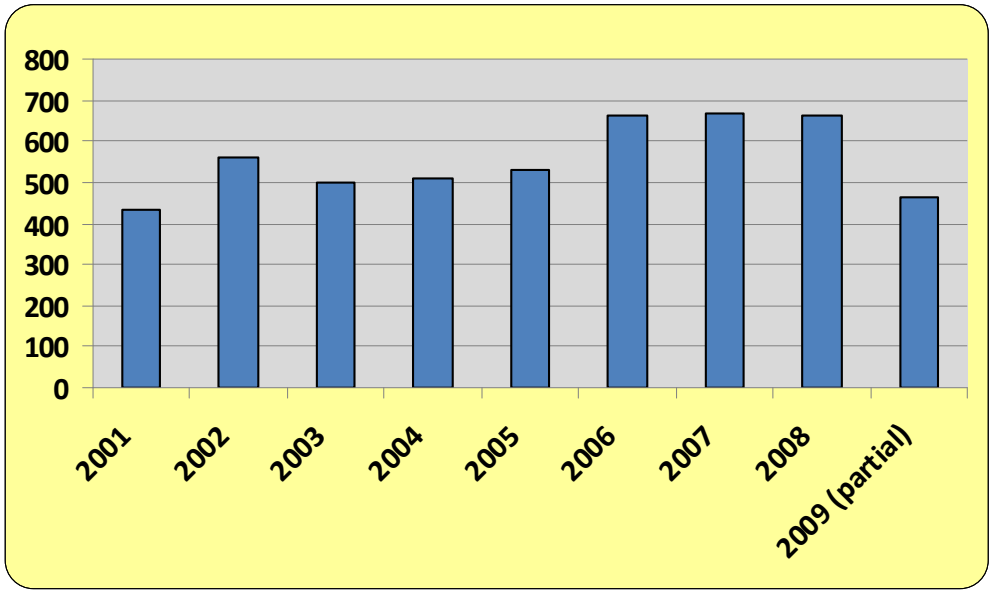
Much of the service area can be reached within a 20-minute timeframe, except for the far corners that would require additional travel time. The areas proximal to the Village of Albion enjoy shorter travel times from each station.

Demand Analysis

Albion Fire Department

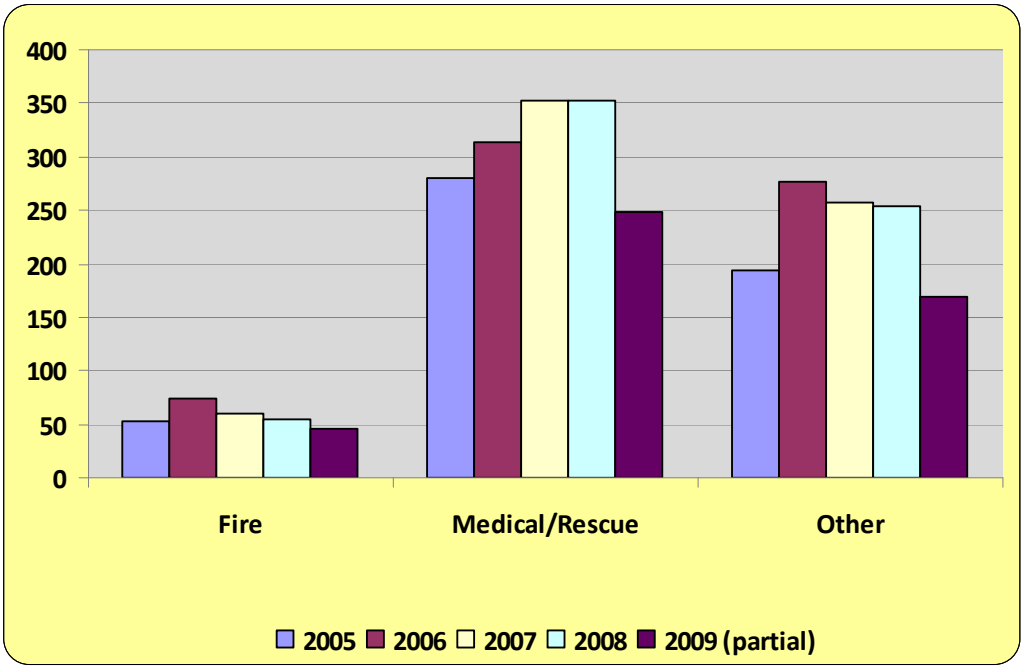
AFD has provided access to its Emergency Reporting System for call data between 2001 and partially through 2009. The following details the volume of calls by type over the last eight years. COVA provided incident data since the beginning of 2007 and partially through 2009 and is analyzed in subsequent figures.

Figure 26: AFD Total Workload



Workload has had periods of stability but since 2006 has increased from the previous several years. The next figure provides a breakdown of these calls by type. Calls that are not fires or medical/rescues (such as alarms, smell of smoke, etc.) are listed as "other".

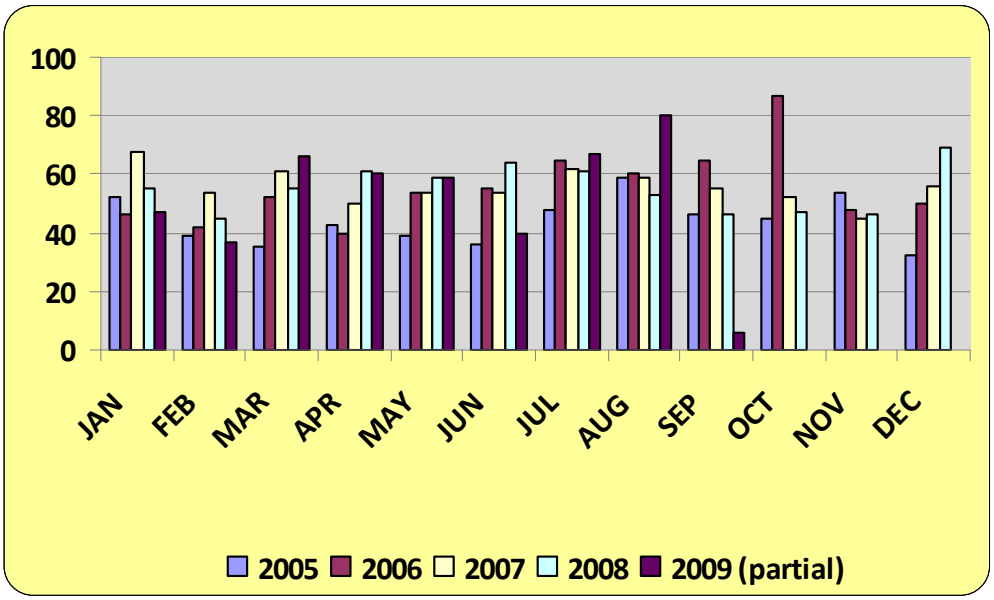
Figure 27: AFD Workload Historical Data



It should be noted that actual fires have remained relatively stable, which is a testament to code enforcement and public prevention education activities. Currently calls for service for medical assistance make up the majority of fire service calls. This is not unusual for fire districts providing either first responder or ambulance transport services.

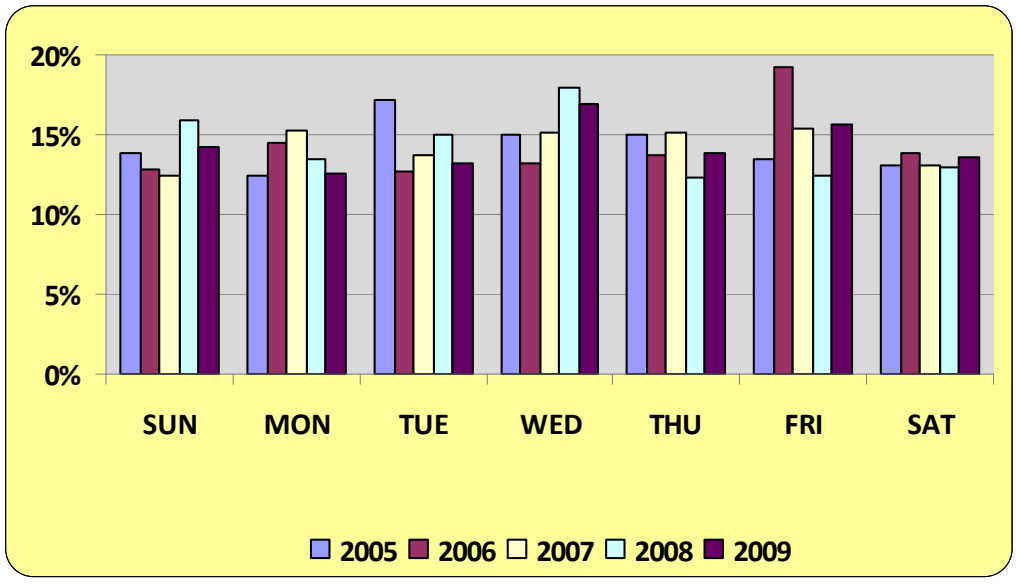
A review of incidents by time of occurrence also reveals when the greatest response demand is occurring. The following charts show how activity and demand changes for AFD based on various measures of time. ESCI began by breaking down yearly workload into monthly increments.

Figure 28: AFD Monthly Workload



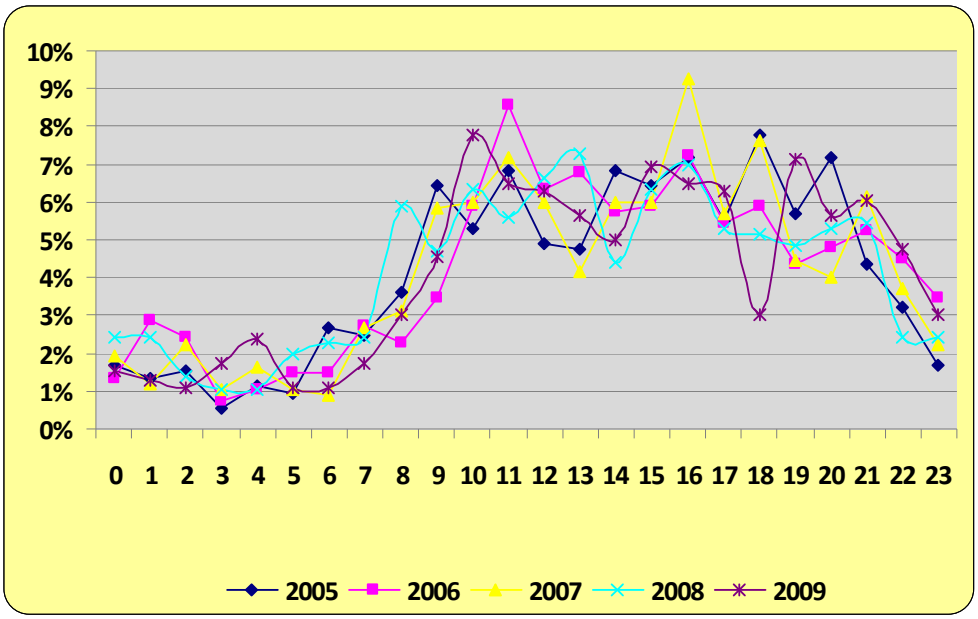
Monthly workload for emergency calls varies in any given year. Generally, service demand is higher in the summer and December. In further analysis, workload is examined by day of the week. Over the last two years, the busiest day of the week for AFD was Wednesday.

Figure 29: AFD Workload by Day of Week



The final analysis of historical workload concludes with examination of call types by hour of day. The hours of peak activity can strain an under-equipped or under-staffed fire district. Understanding when peak activity occurs begins the process of developing deployment strategies and needs assessment.

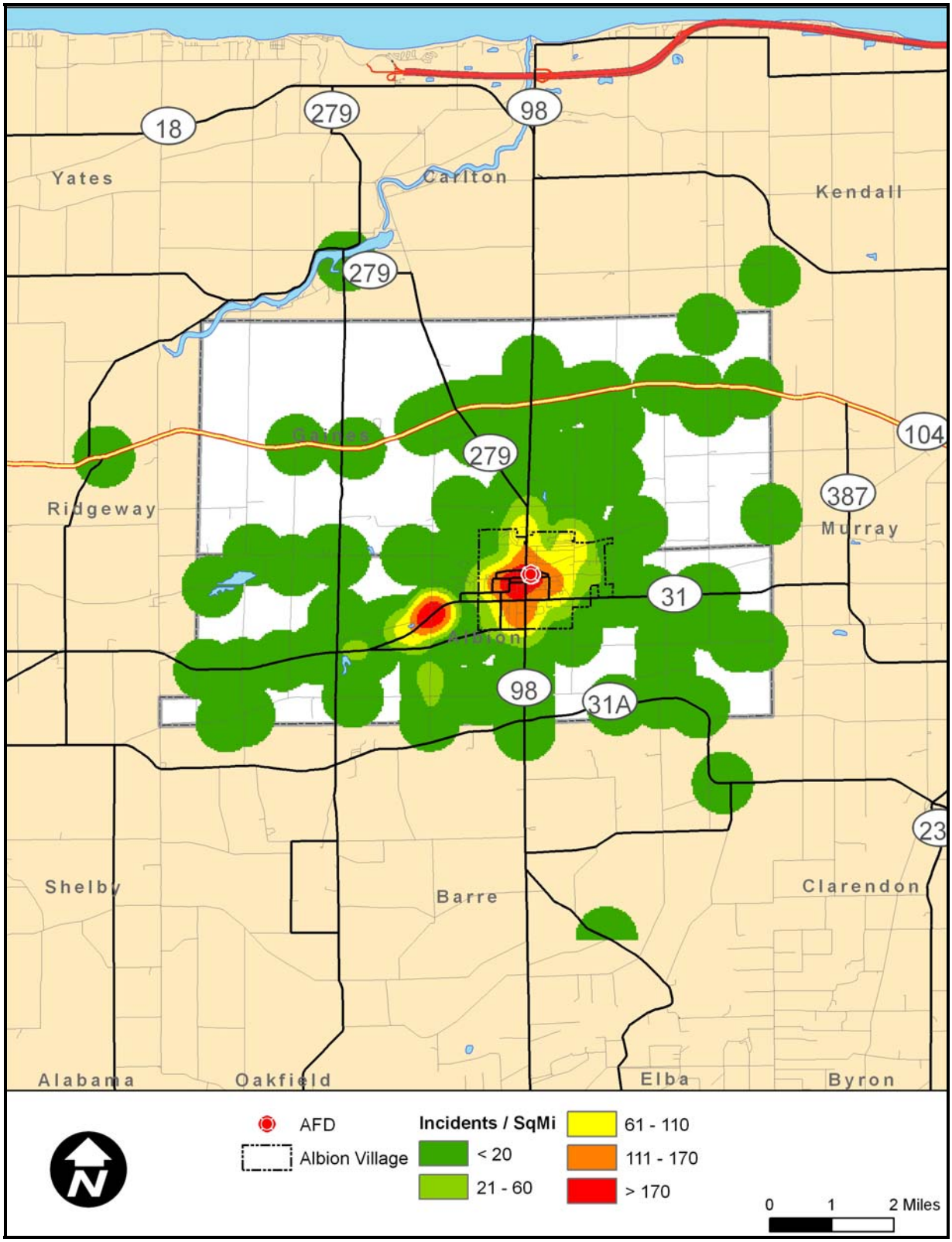
Figure 30: AFD Workload by Hour of Day



Activity for fire calls generally begins to increase at 6:00 a.m., reaching peak volume during the afternoon hours before gradually declining into the evening. Peak activity times can be reflected in response time performance in certain cases. The impact of response time on the outcome of emergency incidents has been exhaustively studied, both in the laboratory and in historical data, with predictable correlation between the two. Though seemingly intuitive, it is still useful to review how longer response times can have a negative effect on the ability to suppress fires, particularly in structures, or to successfully intervene in a life-threatening medical emergency. Response time performance is examined in a separate section of this report.

In addition to the temporal analysis of the current service demand, it is useful to examine geographic distribution of service demand. Later in this study, this will allow for assessing the location of stations in comparison to the actual service demand within the area. The following maps indicate the distribution of incidents responded to by COVA and the fire department during the last 12 months of data.

Figure 31: AFD Service Demand Concentration

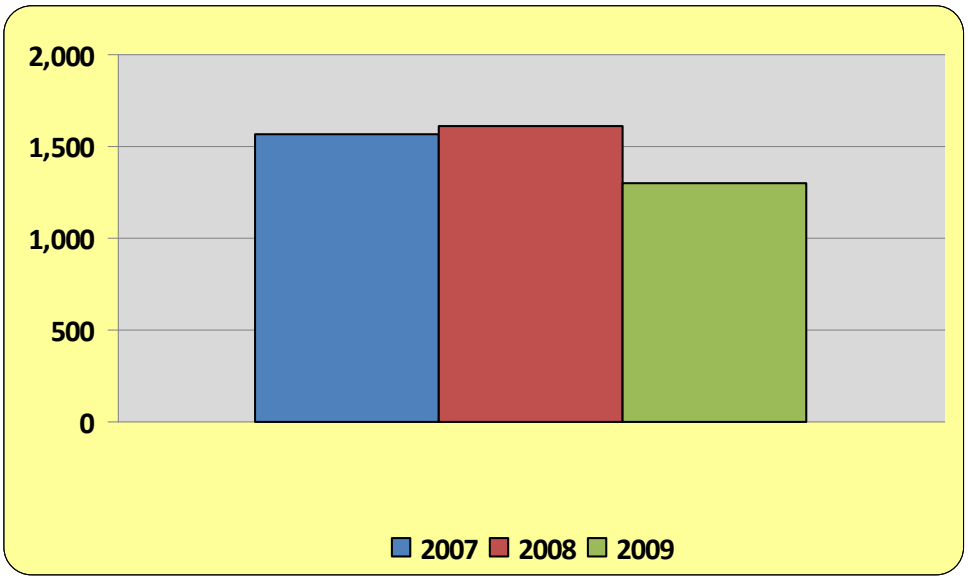


The highest concentration for service demand is located within Albion Village as well as at a location west of the Village on Highway 31. Aerial images of this area indicate a large nursing home located here. The most concentrated area of service demand for COVA is within Albion Village and the nursing home as well. Generally, the service demand is otherwise well scattered throughout the service area.

Central Orleans Volunteer Ambulance

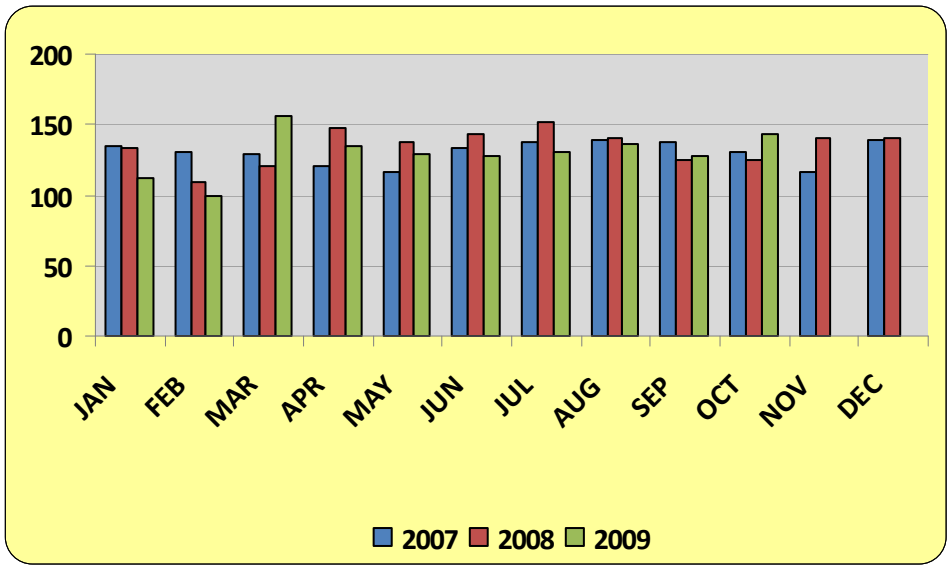
COVA provided three years worth of incident data for analysis by ESCI. The following figure details the volume of calls over that three-year period including partial year 2009. The analysis of COVA's incident data mirrors that of AFD. ESCI began its analysis by evaluating the overall annual workload of the organization as illustrated below.

Figure 32: COVA Total Annual Workload



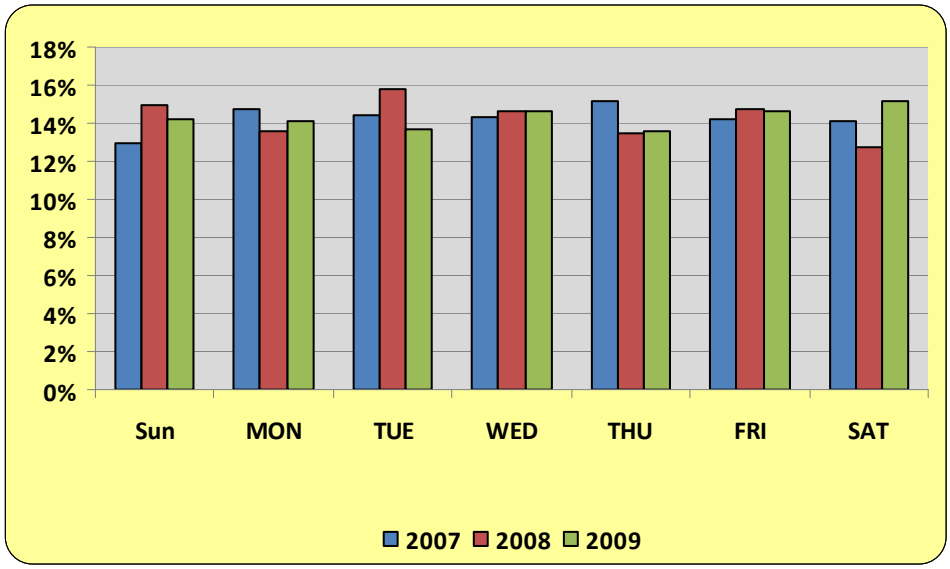
Workload has been relatively stable and indicates a moderate increase over the data period including incidents through October 2009. A review of incidents by time of occurrence also reveals when the greatest response demand is occurring. The following charts show how activity and demand changes for COVA based on various measures of time. ESCI began by breaking down yearly workload into monthly increments.

Figure 33: COVA Monthly Workload



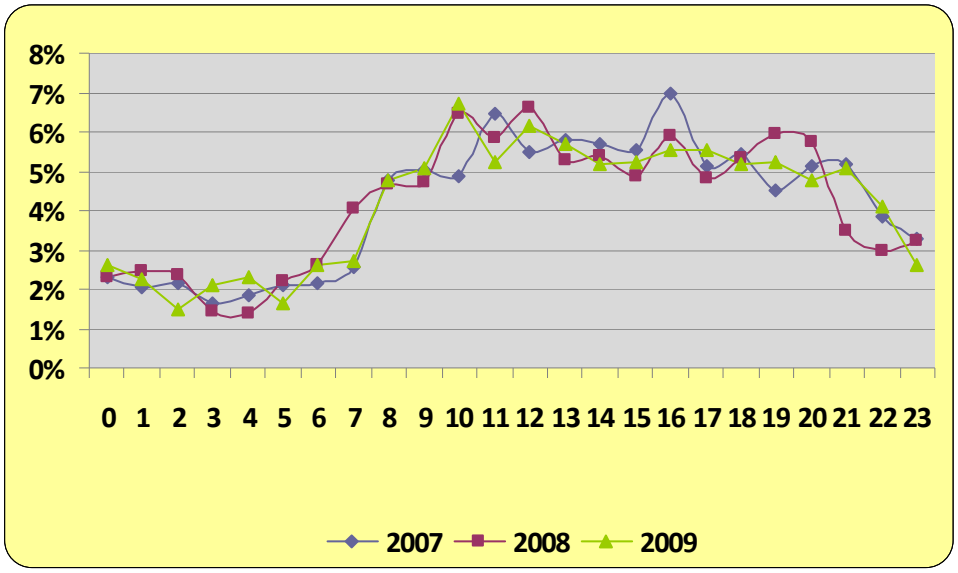
Monthly workload for emergency calls varies in any given year. Generally, service demand is higher in the spring and fall. In further analysis, workload is examined by day of the week. Over the last two years, the busiest day of the week for COVA was Friday.

Figure 34: COVA Workload by Day of Week



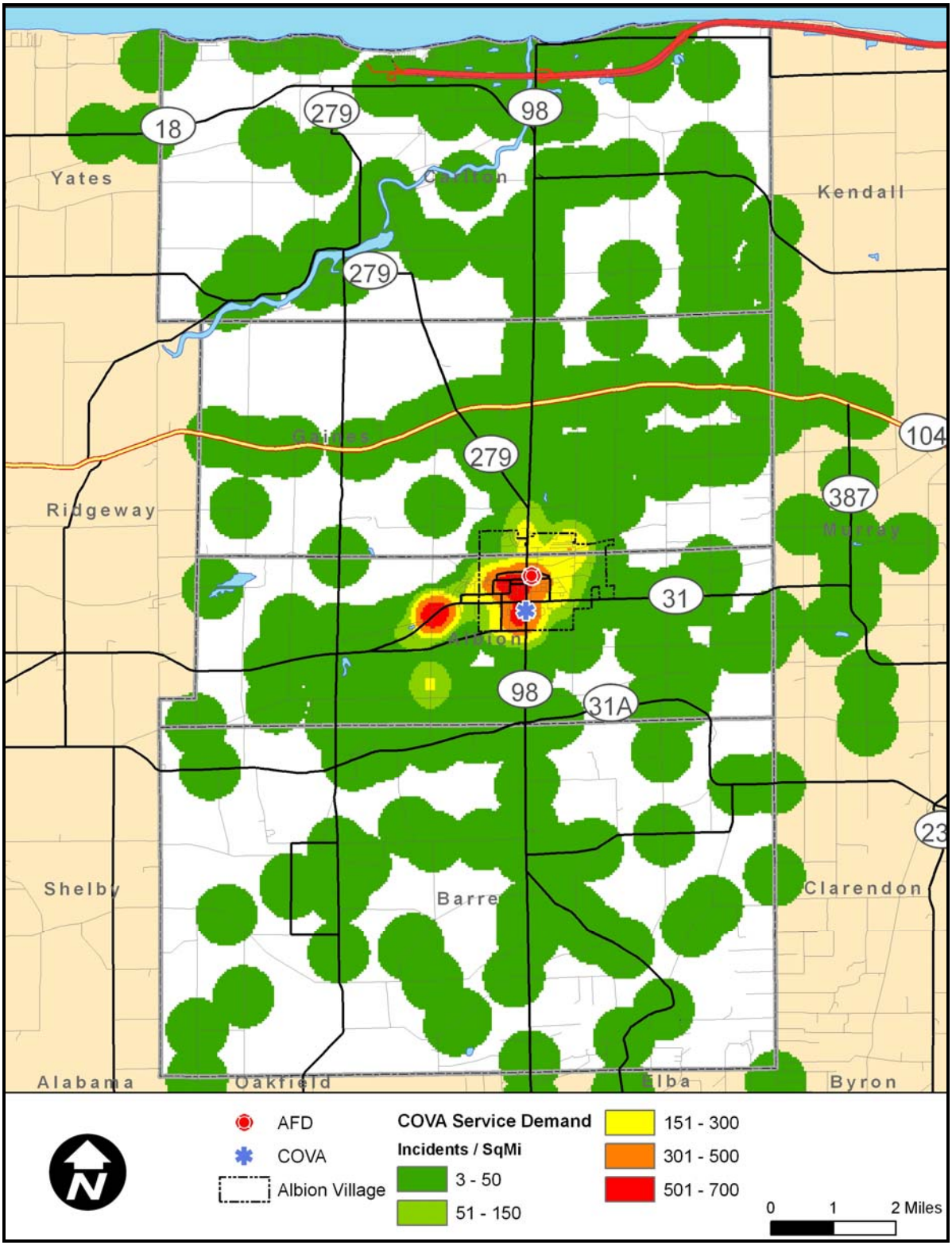
The final analysis of historical workload concludes with examination of call types by hour of day. The hours of peak activity can strain an under-equipped or under-staffed organization. Understanding when peak activity occurs begins the process of developing deployment strategies and needs assessment.

Figure 35: COVA Workload by Hour of Day



As was evident from COVA's workload by hour of day, activity for EMS calls generally begins to increase at 6:00 a.m., reaching peak volume during the afternoon hours before gradually declining into the evening.

Figure 36: COVA Service Demand Concentration



Recorded System Response Time Performance

Throughout this document, certain descriptive statistical measures are utilized which may not be familiar to all readers. In an effort to reduce confusion or the drawing of inaccurate conclusions, this section seeks to provide a brief explanation of these measures. The measures most often used which require clarification are the use of *average* and *percentile* measures.

Average

The average measure is a commonly used descriptive statistic also called the mean of a data set. It is a measure which is a way to describe the central tendency, or the center of a data set. The average is the sum of all the points of data in a set divided by the total number of data points. In this measurement, each data point is counted and the value of each data point has an impact on the overall performance. Averages should be viewed with a certain amount of caution because the average measure can be skewed if an unusual data point, known as an outlier, is present within the data set. Depending on the sample size of the data set, the magnitude of skew can be either very large or very small.

As an example, assume that a particular fire station with a response time objective of six minutes or less had five calls on a particular day. If four of the calls had a response time of 8 minutes while the other call was across the street and only a few seconds away, the average would indicate the station was achieving its performance goal. However, four of the five calls, or 80 percent, were beyond the stated response time performance objective.

The opposite can also be true where one call with an unusually long response time can make otherwise satisfactory performance appear unacceptable. These calls with unusually short or long response time have a direct impact on the total performance measurements and the farther they are from the desired performance, the greater the impact.

The average is typically reported because of its common use and ease of understanding. The most important reason for not using averages for performance standards is that it does not

accurately reflect the performance for the entire data set. As illustrated above, one extremely good or bad call skewed the entire average. While it does reflect all values, it does not really speak to the level of accomplishment in a strong manner.

Percentile

With the average measure, it is recognized that some data points are below the average and some are above the average. The same is true for a median measure which simply arranges the data set in order and finds the value in which 50 percent of the data points are below the median and the other half are above the median value. This is also called the 50th percentile.

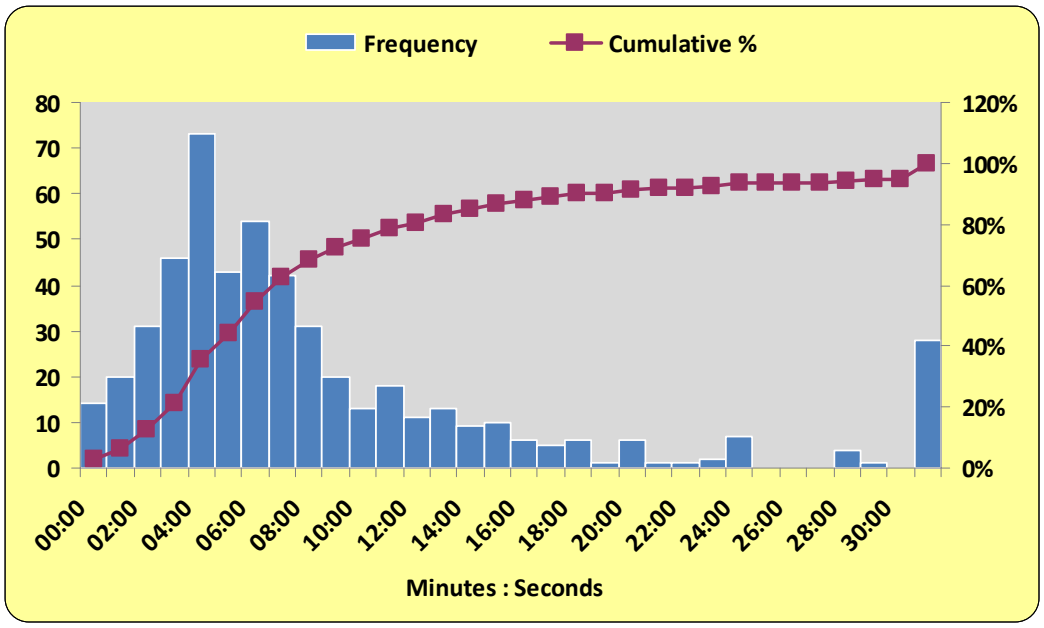
When dealing with percentages, the actual value of the individual data does not have the same impact as it did in the average. The reason for this is that the fractile is nothing more than the ranking of the data set. The 90th percentile means that 10 percent of the data is greater than the value stated and all other data is at or below this level.

Higher fractile measurements are normally used for performance objectives and performance measurement because they show that the large majority of the data set has achieved a particular level of performance. This can then be compared to the desired performance objective to determine the degree of success in achieving the goal.

Total response time is the amount of time a resident or business waited until an apparatus arrived at the scene of emergency beginning when they first called the designated emergency number, often 9-1-1. It is made up of several elements which were discussed earlier (See "Response Time Performance Objectives"). Since the fire department has no influence on call processing time, their performance is typically measured on response time from the time of dispatch to the arrival on scene. To report the most accurate response time performance, dispatch data was utilized for this analysis. Due to the nature of the reporting which recorded each unit's time intervals as well as the 'announcement' alarm time, the first arriving unit on scene was utilized for the analysis. The following charts illustrate the response time frequency

for AFD from a computer-aided dispatch (CAD) report for 2008[11] and for COVA over the last full year of data provided.

Figure 37: AFD Response Time Performance History

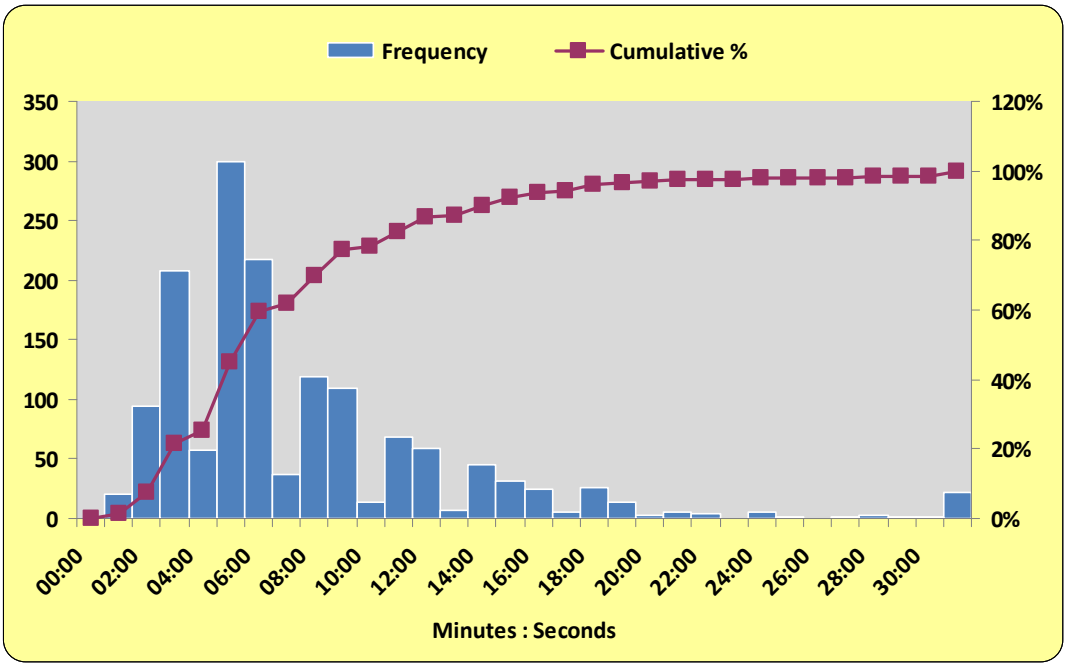


The most frequently recorded response times for calls are between four and five minutes. Specifically, the average is 8 minutes 50 seconds, with 80 percent of all calls answered in less than 12 minutes.

[11] Mutual aid calls and non-emergent calls were removed from response time analyses as they were found.

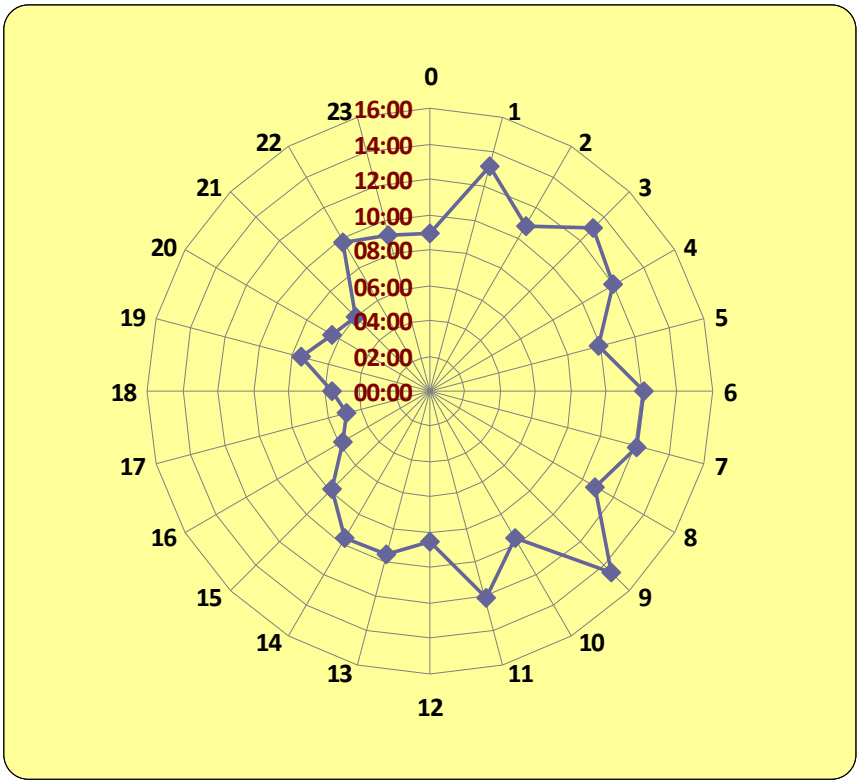
For COVA, the most frequently recorded response times for calls are between five and six minutes. The average is 7 minutes 21 seconds, with 80 percent of all calls answered in less than 10 minutes. The following chart details the response time frequency for COVA emergent calls.

Figure 38: COVA Response Time Performance



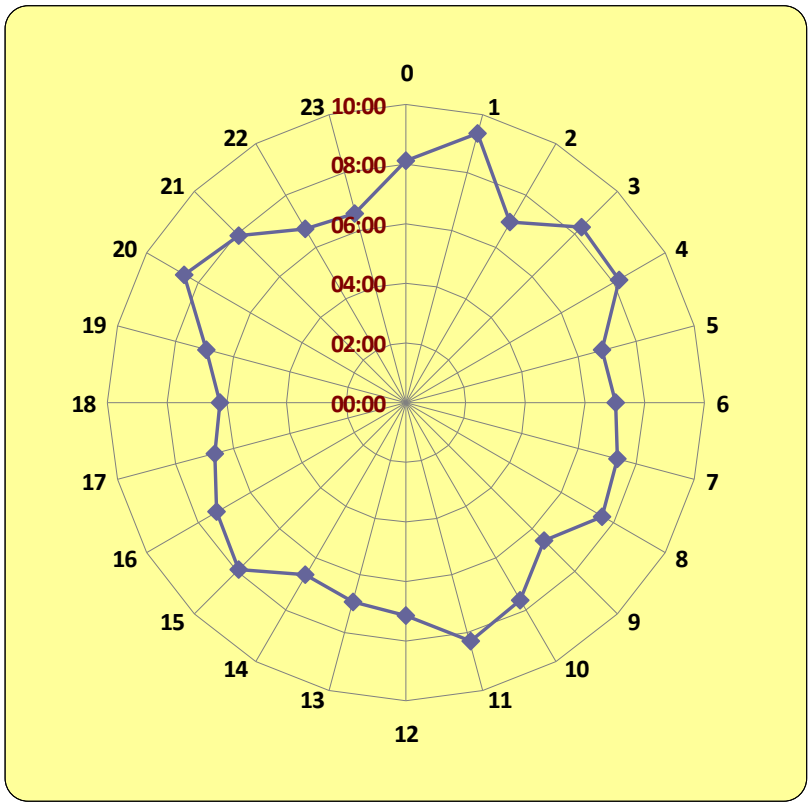
Response times can vary by time of day in reflection of service demand workload, traffic congestion, weather, and distance to the call from the station to name but a few. The *average* total response time for AFD calls ranged from a high average of 14 minutes 28 seconds for all calls between 9:00 a.m. and 10:00 a.m., to a low average of 4 minutes 56 seconds for incidents between 5:00 p.m. and 6:00 p.m. The following chart illustrates how the average response time performance varies by the hour of day.

Figure 39: AFD Average Response Time by Hour of Day



The *average* total response time for COVA calls ranged from a high average of 9 minutes 21 seconds for all calls between 1:00 a.m. and 2:00 a.m., to a low average of 6 minutes 14 seconds for incidents between 6:00 p.m. and 7:00 p.m.

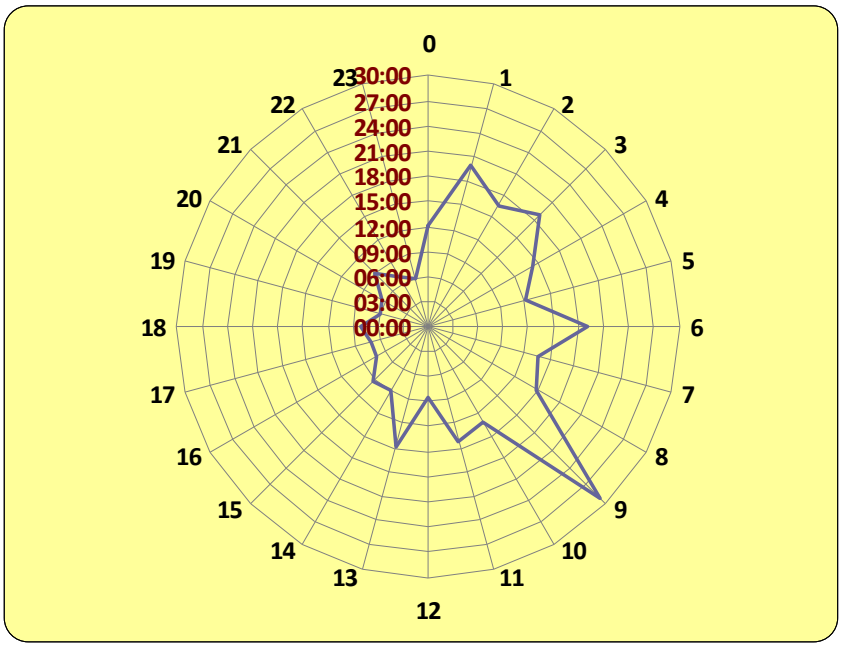
Figure 40: COVA Average Response Time by Hour of Day



Average response time is one useful measure to determine how well geographic-based coverage is achieved. As discussed previously, more significant is how well the majority of emergency response demand is being serviced. One useful way to determine how well demand-based coverage is achieved is by determining maximum response time to a larger percentage of the incidents.

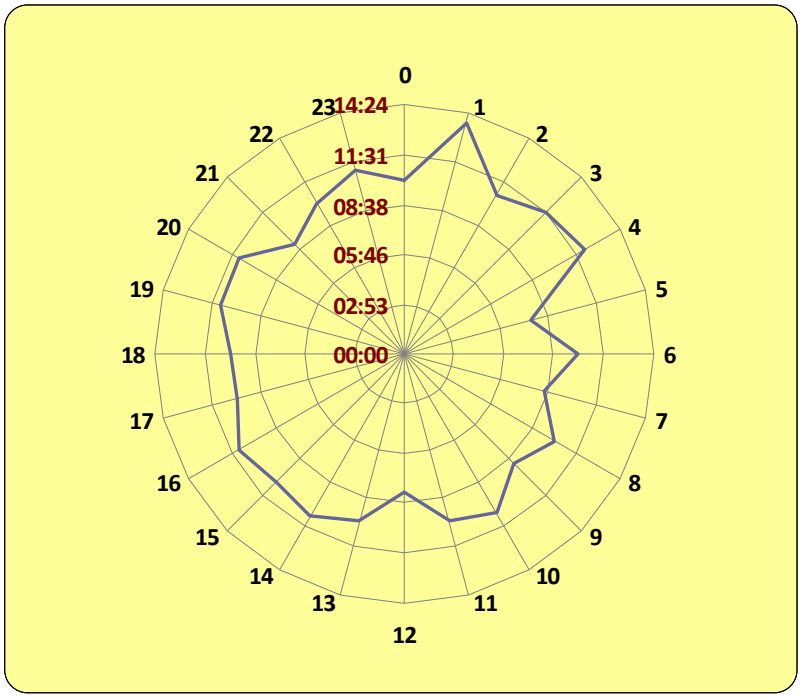
The *80th percentile* response time for emergent AFD calls ranged from a high of 29 minutes between 9:00 a.m. to 10:00 a.m., to a low of 6 minutes between 7:00 p.m. and 11:00 p.m. The following figure displays the 80th percentile response time performance by hour of day for AFD.

Figure 41: AFD 80th Percentile Response Time by Hour of Day



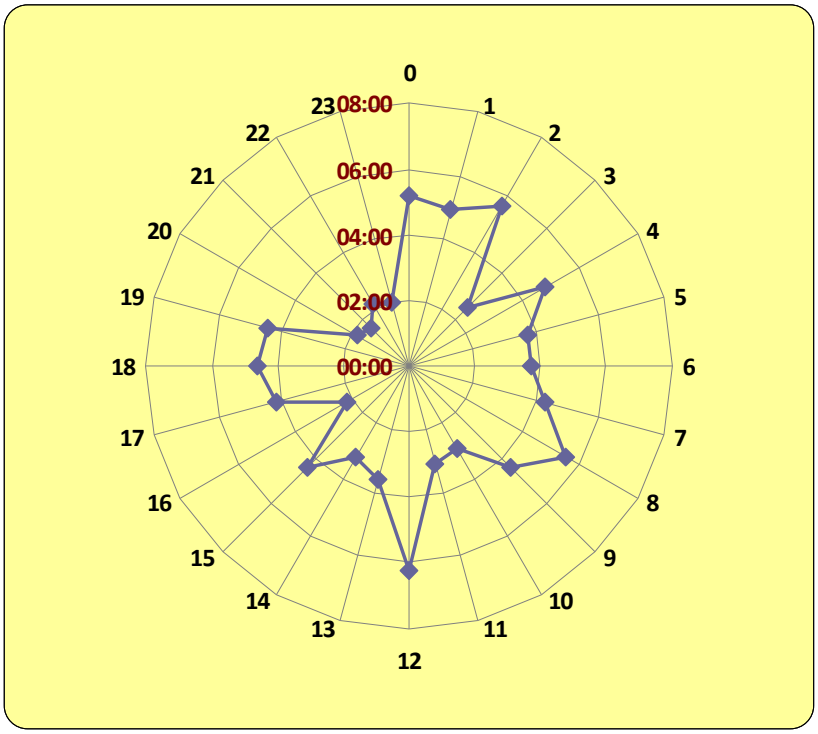
The *80th percentile* response time for emergent COVA calls ranged from a high of 13 minutes 40 seconds between 1:00 a.m. to 2:00 a.m., to a low of 7 minutes 36 seconds during the 5:00 a.m. hour. The following figure displays the 80th percentile response time performance by hour of day for COVA.

Figure 42: COVA 80th Percentile Response Time by Hour of Day



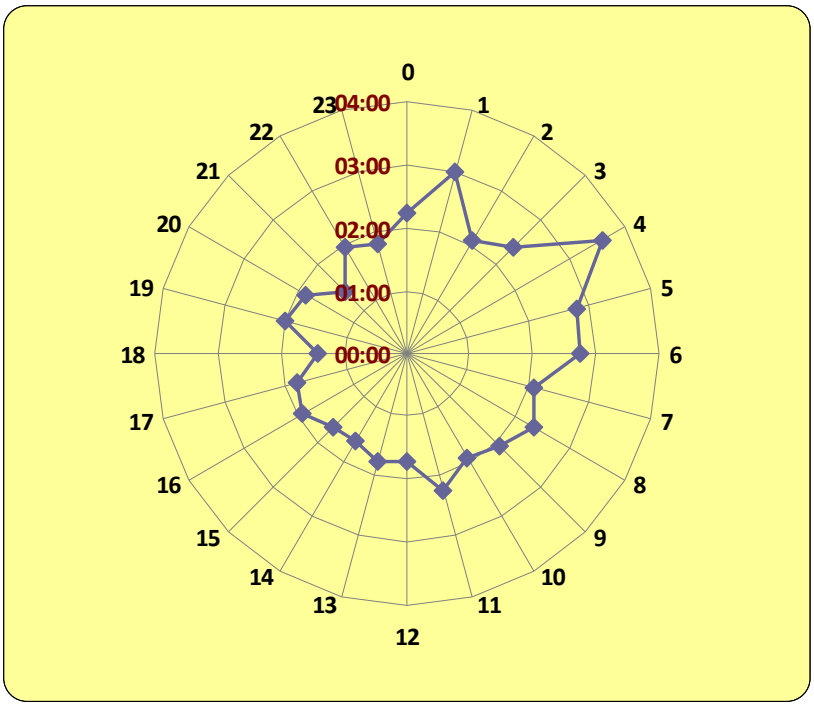
There are several factors that affect overall response time including, but not limited to, weather, distance, construction, and traffic congestion. However, one element of the overall response time performance that firefighters can control is the turnout time interval. The AFD average turnout time was 3 minutes 42 seconds. As this can vary by the time of day as well, the following figure details the average hourly turnout time for AFD in 2008.

Figure 43: AFD Average Turnout Time



COVA data also included the time stamp indicating apparatus en route and, therefore, this interval was similarly measured on an average hourly basis. The overall average COVA turnout time was 1 minute 59 seconds.

Figure 44: COVA Average Turnout Time



Emergency Medical Services Support and System Oversight

Emergency Medical Services within the region is provided by the Central Orleans Volunteer Ambulance (COVA) Inc. This section of the report provides a cursory evaluation of the organization without the detail that would be necessary to serve as an in-depth review of the agencies performance. ESCI met with COVA personnel and decision-makers and received data and information necessary to produce the following evaluation.

Organizational Overview

Central Orleans Volunteer Ambulance Inc. was established in 1979 as a fully volunteer ambulance organization providing emergency and non-emergency ambulance services to central Orleans County, New York, including the Village of Albion, the Town of Albion, the Town of Gaines, the Town of Barre, the Town of Carlton, and the New York State correctional facilities located within the area.

The organization functions without a formal written agreement or contract with any of the municipalities served. As such, the organization is not held to any performance measures such as response time or staffing minimums.

Recommendations:

- COVA should pursue formal written agreements with each municipality served to protect both the organization and the municipalities.
- Formal performance objectives or measures should be designated in the formal agreement or contract and tied to funding mechanisms from each municipality.

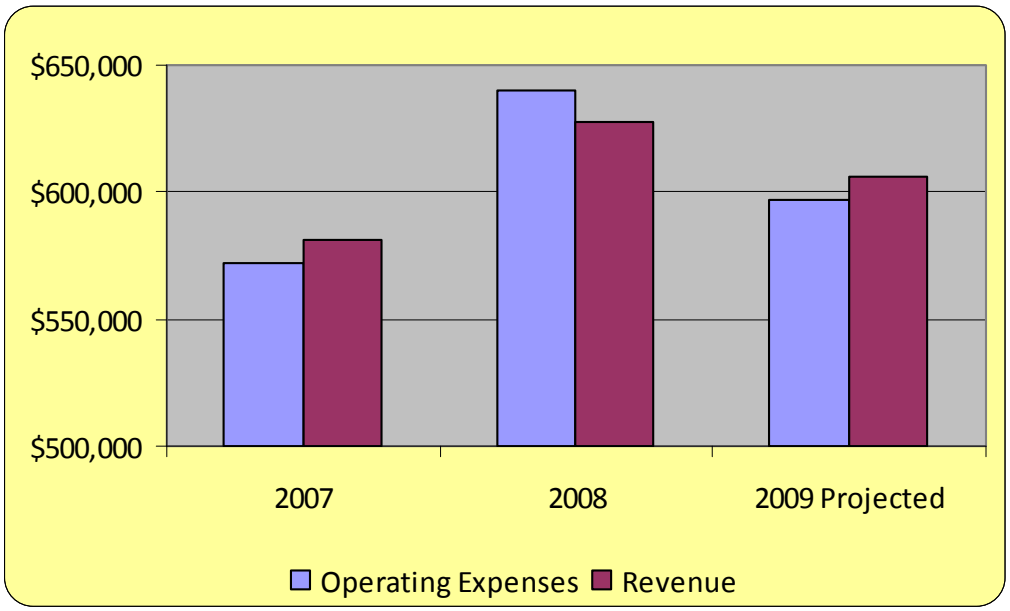
Finance and Cost Recovery

COVA uses a one-year budget cycle to prepare the annual budget based on a January 1 through December 31 fiscal year. A modified accrual basis of accounting is used under which revenues and other financial resources are recognized as accrued when they are billed. Expenditures are recognized when the fund liability is incurred rather than disbursed. This method of accounting

is *generally accepted* in governmental operations. COVA does not maintain a formal Capital Improvement Plan (CIP) for facilities or apparatus but does have an informal plan in place to replace two ambulances and the ALS fly car within the next two fiscal years.

COVA's operating budget is funded primarily through revenue generated by billing for transport services. Additional revenue is generated through donations, fund raising, training courses, and other miscellaneous income. The following is an illustration of the department's expenditures and revenue history of the last three years, including the current fiscal cycle, obtained from statements provided by COVA.

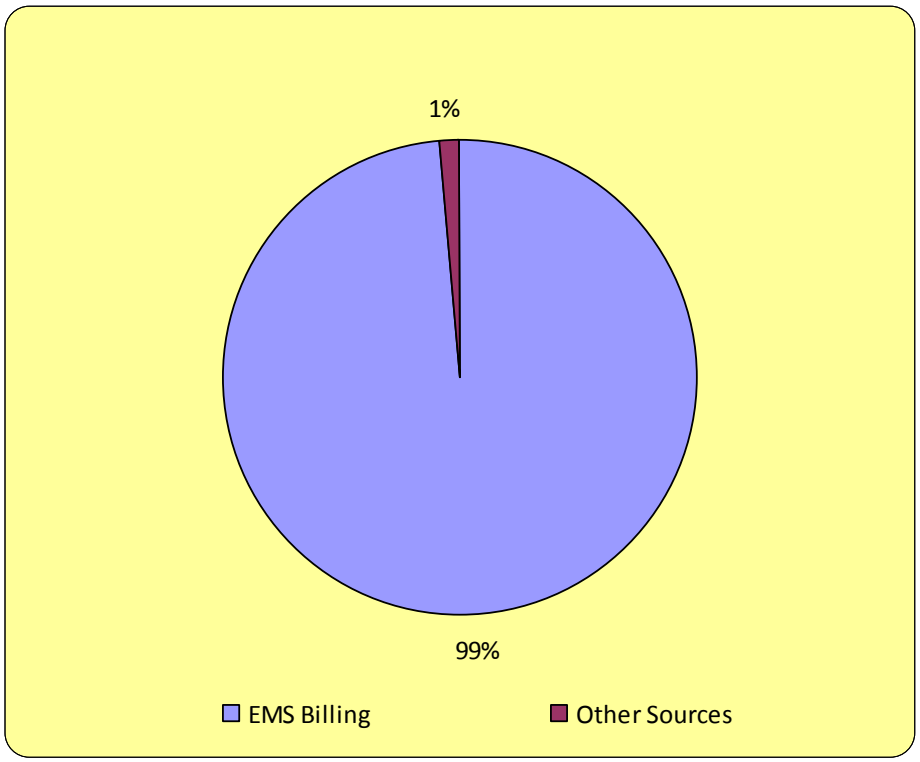
Figure 45: Historical Expenditures and Revenues



With the exception of the 2008 fiscal year, revenues have outpaced expenditures. COVA has no outstanding bonds, leases, or outstanding debt that poses a financial risk to the organization.

For fiscal year 2008 ending December 31, 2008, COVA posted total revenues of $621,830. A vast majority of this total revenue was generated from EMS billing, as illustrated in the figure below.

Figure 46: COVA Revenue Sources - 2008



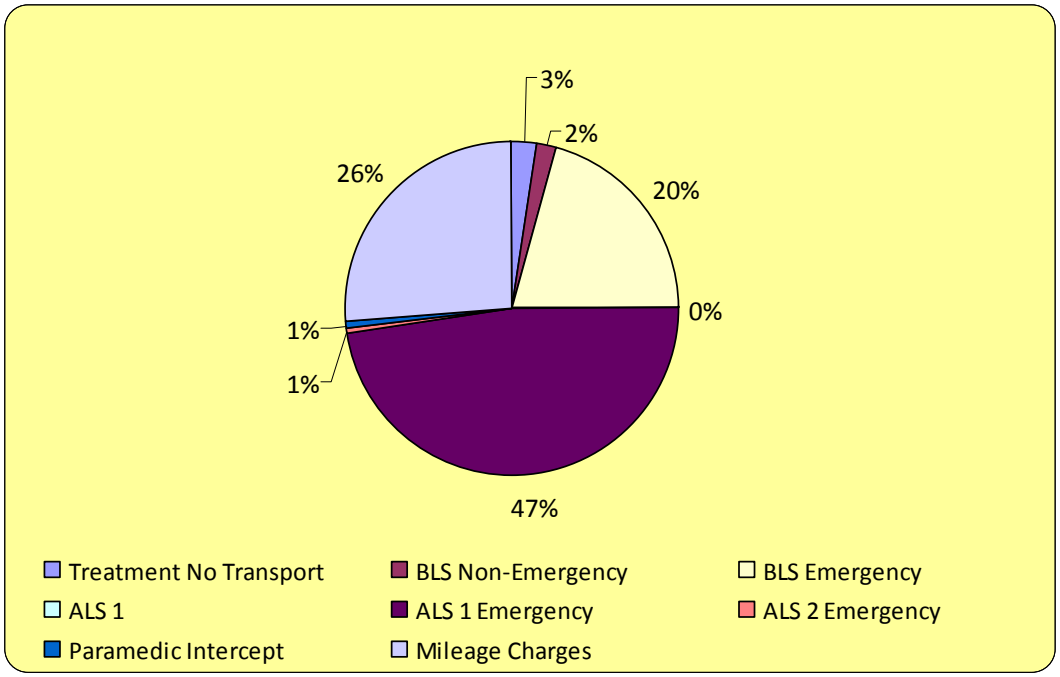
As required by the Centers for Medicare and Medicaid Services (CMS), COVA bills each call based on the services performed for each individual patient. CMS identifies the types of services that qualify for each billing code and publishes an Ambulance Fee Schedule updated annually. The following figure illustrates how COVA's total billings were segregated across the various fees allowed under CMS for 2008.

Figure 47: COVA Detail of Charges - 2008

Charge Type	Total	Count	Average
Treatment No Transport	$25,357	161	$157
BLS Non-Emergency	$19,110	52	$368
BLS Emergency	$197,252	427	$462
ALS 1	$528	1	$528
ALS 1 Emergency	$462,993	731	$633
ALS 2 Emergency	$5,901	8	$738
Paramedic Intercept	$5,198	9	$578
Mileage Charges	$255,584	19569	$13
Total	**$971,923**		

The following chart illustrates how the total charges for COVA during 2008 were distributed across the various fees.

Figure 48: COVA Charge Distribution - 2008



Of note from the two preceding figures is that the total charges for 2008 equal $971,923, whereas total revenue for 2008 totaled only $621,830, including miscellaneous revenue sources. The major difference in charges to revenue stem from the ability of COVA, through its billing provider, to collect on billings each year. During 2008, COVA generated 1,500 billable

events but only billed 1,376, presumably due to Medicare contractual allowances, Medicaid contractual allowances, courtesy write-offs, insurance only agreements, etc. The total collection ratio for charges to collectibles was 73.1 percent.

Unfortunately, there are no national statistics on the average per capita spending for EMS providers as there is in the fire service; therefore, no comparisons can be made against state, regional, or national trends. The defining issue for COVA and the jurisdictions it serves is to determine what level of service is desired and/or expected from the ambulance provider.

Staffing

Although COVA's name suggests the organization is staffed by volunteers, several paid personnel are on staff. With any emergency services organization, there must be the proper ratio of administration and support personnel to emergency services staff. Too many administrative and support personnel can result in a bureaucratic system that loses focus of the primary mission of the organization. Too few administrative staff can lead to an organization that suffers from a lack of leadership and loss of direction. This section will evaluate how COVA addresses these issues, as well as illustrating how personnel are distributed throughout the system in support of the organization's mission.

Administration and Support Staff

As with AFD, COVA must maintain a certain level of administration and support to ensure the organization operates as intended. The following figure illustrates how administrative and support staff are distributed within COVA.

Figure 49: COVA Administrative and Support Staff

Title	Number	Status
President of the Board	1	Volunteer
Vice President of the Board	1	Volunteer
Administrator	1	Part-Time
Assistant Administrator	1	Part-Time
Director of Operations	1	Part-Time
Assistant Director of Operations	1	Part-Time
Maintenance Supervisor	1	Part-Time
Training Coordinator	1	Part-Time
Bookkeeper	1	Part-Time
Total	**9**	

Based on the total personnel level of 47 individuals, COVA maintains a ratio of 16 percent administrative and support staff as compared to the total. The typical ratio expected in an organization of this type should be between 10 and 15 percent. It should be understood, however, that many of the identified administrative and support staff also function as emergency services staff; therefore, the aforementioned ratio is less representative of the actual staff distribution within COVA.

Emergency Services Staff

Emergency services staff are those that are actively involved in the delivery of services to the community that COVA serves. ESCI understands that some of the administrative and support staff may also provide hands-on services in the field but they are not counted again here for purposes of clarity. The following figure identifies the total number of direct service delivery personnel currently on the COVA roster.

Figure 50: COVA Emergency Services Staff

Position	Number
Paramedic: Full-time	1
Paramedic: Part-time	21
Paramedic: Volunteer	4
EMT: Part-time	10
EMT: Volunteer	9
Driver: Part-time	1
Driver: Volunteer	1
Total	**47**

Staffing Performance

Since COVA does not enter data into the National Fire Incident Reporting System (NFIRS) as AFD does, it is not possible to evaluate the number of personnel responding on each unit dispatched to incidents within the primary response area. Typically, ambulances are expected to respond with a minimum of two qualified personnel. New York State regulations require that Advanced Life Support (ALS) providers to respond with at least one ALS trained personnel, usually an Emergency Medical Technician–Paramedic, and one driver. This is the minimum staffing required by the State of New York for an approved ALS transport provider.

Capital Assets and Resources

COVA operates from one facility located in the Village of Albion and maintains a fleet of three ambulances and one paramedic 'fly car' that can be used as an ALS first responder if staffing is available. ESCI did not conduct an evaluation of the facility or the vehicles but, instead, relied on information provided by COVA to include in this report.

Facility

A detailed evaluation of COVA's facility was not conducted by ESCI. Suffice it to say that the facility is space limited and not conducive to continuous staffing based on modern emergency services industry expectations or standards.

Apparatus

COVA operates a fleet of three transport ambulances and one 'fly car' that can be used as an ALS level first responder under certain circumstances. The following is a cursory description of COVA vehicles supplied by COVA personnel.

Ambulance 60
2007 Chevrolet Type 3 Ambulance
Mileage: **25,000**
Condition: **Excellent**

Ambulance 61
2002 Ford Type 3 Ambulance
Mileage: **123,377**
Condition: **Good**

Ambulance 62
2000 Ford Type 3 Ambulance
Mileage: **138,593**
Condition: **Good**

ALS Flycar 90
1998 Ford Expedition
Mileage: **60,879**
Condition: **Fair**

Section II – Future Delivery System Options

The information contained in this study provides an in-depth analysis of the Albion Fire Department and (to a lesser extent) Central Orleans Volunteer Ambulance, Inc., and their delivery of emergency services to the community. In the evaluation section of this report, ESCI described the initial findings and provided a review of conditions or issues that require the attention of the departments. In many cases, these issues require relatively short-term effort or corrective action.

However, the main objective of this study is to provide strategies that are long term in nature and to identify the most critical issues the agencies will face over the next several decades. ESCI initiated that process in the previous section of this report.

Analysis of Critical Issues

In regard to future service delivery system options, the Village has four legitimate options, each with its own intricacies. Each option is presented below with discussion of each strategy.

Strategy 1: Maintain an All-Volunteer Fire Department that Supplements COVA

This option is the most fiscally attractive to the Village of Albion as it maintains a flat contribution to public safety. However, the potential of increased demand for fire department supplemental EMS response may strain the fire response resources and create volunteer fatigue, which has already been identified as a potential challenge.

This option relies solely on COVA being able to generate enough revenue to financially attract appropriate staffing levels to assure adequate peak performance. It is important to note that in ESCI's review and community meetings the issue of COVA's response performance reliability does not appear to be a significant issue of public discussion. This may be more of an educational issue of public expectation as opposed to an actual perception of response concerns. If the Village selects Strategy 1 as the preferred public policy approach, it would be

advisable to continually to monitor COVA performance and reliability and any impact that performance may be having on fire department response and/or performance.

At this time, COVA provides a well-established EMS response and, through its own efforts, is attempting to address any performance opportunities for improvement. It would be prudent for the Village to review and establish response time performance and reliability measures it expects of its EMS provider/system and let this public policy expectation serve as a guide in reviewing each of the service delivery options as a community.

Strategy 2: Increase Funding and Personnel to AFD

This strategy would require a significant financial investment in personnel, operating and, potential capital outlay. This would present a fiscal challenge during a period of time during which Albion faces economic challenges. These challenges exist globally due to economic downturn driven largely by property devaluations from a housing market correction and overall recession. Without the establishment of a cost recovery mechanism, AFD would be unable to recoup transport fees requiring a predominantly public subsidy to operate a system designed to supplement the area's long-standing EMS provider. Certainly, this option would require careful on-going system performance monitoring of COVA and its response time reliability, particularly to the extent that it may impact AFD services.

Option 3: Implement Subsidy to COVA

This option would necessitate that the Village establish a response performance standard for COVA, ideally through contractual agreement. The Village would then provide a public subsidy to COVA (similar to that provided to the fire service provider) to facilitate adequate staffing levels to accomplish the desired response performance and reliability. The subsidy would enhance the existing service that is currently facing staffing challenges inherent in a 24/7 operation. As with Strategies 1 and 2, it would be prudent for the Village to first establish a response time performance reliability standard for the EMS provider and then determine the financial subsidy that would be required in order to supplement COVA revenues to achieve such

a performance goal. This would be best accomplished through a performance-based agreement with the Village, which includes accountability measures.

Strategy 4: Consider Issuing a Request for Proposal for the Provision of EMS

This strategy would allow the Village and current service area to, after establishing performance expectations, provide the opportunity to competitively bid for providing such services. This would establish the viability of other qualified providers and could potentially validate COVA's role as the current provider. If COVA remains the service provider, prudent public policy may be well served to work closely to monitor and, when necessary, work in collaboration to facilitate a municipal assistance agreement.

Fiscal Analysis

This section of the report evaluates the fiscal impact of each strategy described above.

Strategy 1

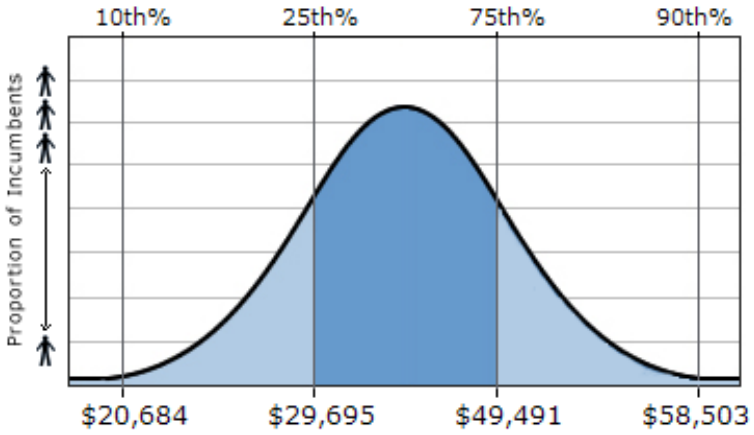
Based on the current method of funding AFD through the Village and the Towns, Strategy 1 would not create an additional fiscal impact.

Strategy 2

Strategy 2 would continue to allow COVA to operate as it does currently while providing funding to AFD in order to implement some method of full-time or part-time staffing to supplement COVA's medical responses within the area. This strategy would also allow AFD to staff units for non-medical responses throughout the primary response area while not assisting COVA.

In order to calculate the cost of adding firefighters to AFD for the purposes noted above, ESCI obtained regional salary information along with calculated benefits associated with full-time personnel. The following figure illustrates the base salary range.

Figure 51: Base Salary Range for Firefighters



The following table is a summary of salary and benefits based on the median salary of firefighters within the region.

Figure 52: Estimated Total Compensation for Mid-Range Firefighters

Benefit	Median Amount	% of Total
Base Salary	$39,592	69.30%
Bonuses	$0	0.00%
Social Security	$3,029	5.30%
401k / 403b	$1,425	2.50%
Disability	$396	0.70%
Healthcare	$5,722	10.00%
Pension	$1,821	3.20%
Time Off	$5,177	9.10%
Total	**$57,163**	**100%**

Based on a calculation of 1.25 Full-Time Equivalent (FTE) for every full-time employee hired to account for benefit leave time and other absences, the total per employee cost would total $71,453 annually. The following is provided to illustrate what some example variations in staffing would cost the Village if it chose to implement Strategy 2.

Figure 53: Estimate of Total Personnel Costs

Strategy	# of Personnel	Total Cost
Supplemental Staffing		
24 Hour Shifts (2 per shift)	6	$428,718
12 Hour Shifts (2 per shift)	8	$571,624
Peak Demand (Monday - Friday Daytime)	2	$142,906
Full Response Staffing		
24 Hour Shifts (4 per shift)	12	$857,436
12 Hour Shifts (4 per shift)	16	$1,143,248
Supervisory Staff		
Fire Chief	1	$83,692
Captain (Shift Supervisor) - 24 Hour Shift	3	$207,501
Captain (Shift Supervisor) - 12 Hour Shift	4	$276,668

Included in the preceding figure are estimated costs of administrative and supervisory personnel as well as operational staff. Any system transitioning from volunteer to combination or career should have an effective leader at the helm as well as competent supervisory staff to oversee day-to-day operations and activities of line personnel. Costs not included here are those hard costs associated with capital renovation to the existing station to house paid personnel and the additional costs that may be incurred due to prolonged or continuous facility usage such as utilities, maintenance, and repair.

Strategy 3

The costs of this strategy would have to be determined once the community's expectations are affirmed and a response performance standard is implemented and agreed to through contract. Based on that response performance measure, an appropriate subsidy should be determined to assist the agency in closing the gap between the total cost of operations and existing cost recovery efforts.

Strategy 4

The final strategy is multi-phased and begins with construction of a Request for Proposal to solicit bids from external organizations to provide EMS services to the community. The cost associated with the development, advertisement, and administration of this process varies and will depend on whether or not the Village obtains external assistance with this process.

Continued costs would only be incurred based on the outcome of the solicitation and/or continued implementation of any of the other strategies described previously.

Preferred Concept

ESCI recommends that the most prudent short-term course of action is Strategy 1. In this model, the Village of Albion should work to first establish community performance and reliability standards and enter into a formalized agreement with the current provider. If at such time the provider is unable to meet the community's established performance standards, ESCI would recommend pursuing Strategy 4 to determine what the market would support.

Future Staffing Options

Many departments throughout the United States are grappling with the question of adding paid firefighters to their historically all-volunteer organizations. Within the departments themselves, however, there seems to be a clear separation between the two sides of the issue. Many of the older generation that have served the department as volunteers for several years believe that the department should remain as it always has. Conversely, many of the younger generation suggest that the organization begin transitioning to a combination department in preparation for someday becoming a fully paid career department.

Unfortunately, there is no solid answer by which policymakers can be guided. Some research points to workload as the determining factor of when to add paid personnel while other research takes a more economic approach.

When using workload to determine when to add paid personnel to a department, policymakers must first understand the services that are being provided and how the workload of each of those services affects the workload of other services. For example, if medical calls account for a majority of the department's overall workload, policymakers must understand how those incidents affect the organization's ability to deal with the non-medical incidents. This concept is known as concurrency.

It is common for fire departments involved in the provision of emergency medical services, either transport or first response, to have medical calls account for a large percentage of overall workload. This is the case with AFD in that medical responses account for approximately 53 percent of the department's total workload.

In a time of widespread municipal financial struggle, economics is a major concern when considering the addition of paid staff to a historically volunteer organization. Very little research has been conducted on this topic and the research that has been completed is from the early to mid-1990s. One would think that a volunteer organization is always more economical that a paid organization, but a study published in Public Finance Review suggests otherwise. Using a complex combination of formulas and statistics to validate the research, William Duncombe and Jeffrey Brudney found that there is a point at which paid personnel are actually more economical that volunteers.[12] The study suggests that,

> *…the analysis of municipal fire departments in New York State shows that if the annual administration costs per volunteer are less than $600, the department should continue to be staffed solely by volunteers. However, if per volunteer costs climb beyond this level, local official should consider adding paid firefighters.*[13]

The research continues to suggest that if costs top $3,500 per volunteer, that the jurisdiction would be wise to convert to a fully career organization.

Based on the information provided in the Duncombe study, recruitment, training, and supervising personnel (RTC) are considered personnel costs. Capital costs (KC) and materials and supply (MC) are unlikely to change significantly unless current facilities are inadequate to support career personnel. The resulting total cost of volunteers (TC_v) can be calculated as:

$$TC_v = RTC + KC + MC$$

[12] Duncombe, William D., Brudney, Jeffrey L. "The Optimal Mix of Volunteer and Piad Staff in Local Governments: an Application To Municipal Fire Departments." *Public Finance Review*. 1995; 23; 356. Downloaded from http://pfr.sagepub.com by Kent Greene on August 3, 2009.
[13] Ibid.

In evaluating the current personnel costs to the Village of Albion for fire and emergency services, ESCI first analyzed what costs would be included in determining true cost. ESCI found that the following would apply to this determination:

Chief's Stipend	$5,000
OSHA Training	500
Physicals	2,500
Schools and Conferences	1,000
Total	**$9,000**

This equates to a total of approximately $200 per volunteer in personnel costs, below the threshold determined by Duncombe. Based on this method of determining the need for paid staff, ESCI would not recommend the addition of career personnel at this point; however, the Village should continuously evaluate the costs associated with operation of the fire department to judge the cost effectiveness of volunteer staffing.

Even with the previously presented options, policymakers must continue to understand the culture that has remained within AFD through its many transitions, mergers, and progressions to the department it is today.

Summary of Short and Mid-Term Recommendations

The following list summarizes all of the recommendations provided throughout this report that are achievable in the short or mid-term, typically within a maximum of five years. These recommendations have been compiled into a prioritized list for easy reference. The prioritization system is as follows:

1. **Immediate Internal Life Safety**
   The objective deals with an improvement or initiative that solves an issue affecting the safety of firefighters and/or other department personnel. These are not matters that simply make it easier to do a particular function, but in fact make a currently unsafe situation, safe. For example, using self-contained breathing apparatus (SCBAs) that have not passed service tests.

2. **Legal or Financial Exposure**
   The objective resolves a situation that is creating or is likely to create the opportunity for legal action against the department or its members. It may also be a situation that could subject the department to a significant expense, such as resolving a leaking underground storage tank.

3. **Corrects a Service Delivery or Management Issue**
   This objective addresses a service delivery situation that, while it doesn't create an immediate safety risk to personnel or the public, does affect the department's ability to deliver service or maintain service in accordance with its standards of performance. For example, adding a response unit to compensate for a growing response workload or delivering training needed to allow personnel to deal effectively with emergency responses already being encountered.

4. **Enhances the Delivery of Service or Department Management**
   This objective improves the delivery of a particular service. For example, relocating a fire station to improve response times to a particular part of town or adding a specialized piece of equipment that will improve the delivery of a service.

5. **A Good Thing To Do**
   The objective doesn't fit within any of the above priorities but is still worth doing.

Each recommendation is also accompanied by a page reference to identify where the recommendation first appears in the report so that the reader can quickly locate the explanatory narrative.

Priority One - Immediate Internal Life Safety

No Priority One Issues Noted

Priority Two - Legal or Financial Exposure

No Priority Two Issues Noted

Priority Three - Corrects a Service Delivery or Management Issue

- The department should consider a complete revision of the current SOG manual to include specific policies and guidelines to include many of the topics from the sample provided. 18
- The department should further analyze its core functions and ensure that responsibilities are assigned to personnel best suited to coordinate those efforts. 20
- The department should formally analyze its mission and functions through a formal strategic planning process that assists the agency in developing short-term (five-year) goals while assigning individuals responsible for their implementation. 20
- The department should develop specific requirements for each officer position and implement a process by which personnel (members) apply for the position and undergo a competitive process for promotion. 30
- COVA should pursue formal written agreements with each municipality served to protect both the organization and the municipalities. 74
- Formal performance objectives or measures should be designated in the formal agreement or contract and tied to funding mechanisms from each municipality. 74

Priority Four - Enhances the Delivery of Service or Department Management

- The department should segregate its administrative policies from operational guidelines to ensure ease of finding specific topics. 18
- The department should consider compiling information throughout the year and publishing an annual report available to the general public. 20
- The department should arrange for formal use of regional Critical Incident Stress Debriefing services through a local public or mental health agency or through local medical facilities. 30
- The Village should investigate the feasibility of implementing a Length of Service Awards Program (LOSAP) for AFD to encourage recruitment and retention of volunteers. 48

Priority Five - Represents Industry Best Practice (A Good Thing To Do)

No Priority Five Issues Noted

It is common for those in emergency services to tout themselves or their department in terms such as *a pride-driven organization that is at its best every day*, and *the best by test*, or more simply, *the best*. The true mark of quality of the best emergency services agencies, however, is found in those that work continuously for measurable improvement in organizational performance. By undertaking this study of future options, the leadership of the Village of Albion, as well as the fire department and COVA, has begun the task of organizational and system evaluation that is necessary to plan for and reach the goal of truly being the best.

> *Success is peace of mind, a direct result of self-satisfaction in knowing that you did your best to become the best that you are capable of becoming.*
>
> — John Wooden

ESCI in no way intends to suggest that the AFD and COVA are not already operating at a high level. In fact, we are pleased to report that all available evidence shows that the organizations are providing an expected level of service to the citizens of the protected communities within the limited resources allotted to each agency. However, in keeping with the notion of continuous improvement wherein an unending loop of performance, measurement, and evaluation leads to system enhancements that would otherwise be impossible, ESCI offers recommendations to assist the organizations will best benefit the public.

Kohm, Piana, and Gowdy term the establishment of an ongoing relationship between two or more independent organizations as strategic restructuring. The relationship is generally created to increase the administrative efficiency and/or further the programmatic mission of one or more of the participating agencies through shared, transferred, or combined services, resources, or programs. Restructuring may be thought of as a continuum that ranges from jointly managed programs (such as mutual aid agreements) to complete organizational merger.

The ESCI project team began collecting information concerning the emergency services systems for the Albion community in September 2009. The team members recognize that the report contains an extremely large quantity of information and ESCI would like to thank the staff of the Village of Albion and the Towns of Gaines and Albion as well as volunteers and staff from Albion

Fire Department and COVA for their tireless efforts in bringing this project to fruition. ESCI would also like to thank the various individuals and external organizations for their input, opinions, and candid conversations throughout this process. It is ESCI's sincere hope that the information contained in this report is utilized to its fullest extent and that the emergency services provided to the citizens of the Albion area are improved by its implementation.

Appendices

Appendix A: Apparatus Condition Evaluation Ratings

Excellent	Like new condition. No body or paint defects. Clean compartmentation. Interior cab complete, in full working order with no modifications. No significant defect history. Age is less than 25 percent of life expectancy.
Good	Body and cab have good appearance with no rust and only minor cosmetic defects or dents. Clean compartmentation with no visible rust or corrosion. Interior cab is in full working order and good appearance. Normal maintenance history with no significant defects or high downtime. Age is less than 75 percent of life expectancy.
Fair	Body and cab have weathered appearance with minor surface rust and some cosmetic defects or dents. Unimpeded compartmentation with only surface rust or corrosion. Interior cab is in reasonable working order and appearance. Only repairable tank or plumbing leakage. Showing increasing age-related maintenance, but with no major defects or unreasonable downtime. Age is less than 100 percent of life expectancy.
Serviceable	Body and cab have weathered appearance with surface corrosion, cosmetic defects or dents, and minor rust-through of non-structural metals (body panels). Unimpeded compartmentation with significant surface rust or corrosion and/or minor rust-through (not affecting use). Interior cab is in rough, but working order, often with local repairs or modifications to compensate for problems. Occasional or intermittent tank or plumbing leakage. Showing increasing age-related maintenance, but with no major defects or unreasonable downtime. Most service parts still available. Age is greater than 100 percent of life expectancy.
Poor	Body and cab have weathered appearance with surface corrosion, cosmetic defects or dents, and visible rust-through of non-structural metals (body panels). Significant rust or corrosion is present in structural or support members. Use of compartmentation is impeded with significant corrosion and rust-through. Interior cab is in rough condition with defects impeding safe and proper use. Unrepairable tank or plumbing leakage. Problematic age-related maintenance, major defects, or unreasonable downtime are evident. Service parts difficult or impossible to obtain. Age is greater than 100 percent of life expectancy. Vehicle exceeds its GVWR.

Appendix B: Volunteer Recruitment and Retention

What Makes Members Want to Volunteer?

- Response to emergencies – 83.6 percent
- Family traditions – 61.9 percent
- Part of a team – 55.4 percent
- Social Opportunities – 48.9 percent
- Need for affiliation – 29.3 percent
- Helping neighbors – 81.5 percent
- Feel needed – 41.3 percent
- Career development – 42.3 percent
- Personal skill and knowledge development – 39.1 percent

What Keeps Volunteers Serving?

- State and local tax credits – 77.1 percent
- Length of service award from fire company/municipality – 63.0 percent
- Tuition reduction – 59.7 percent
- Access to group health insurance programs – 45.6 percent
- Group rates for auto and home insurance – 39.1 percent
- Access to group dental insurance programs – 32.6 percent
- Regular purchases of apparatus – 53.2 percent
- Friends/families also members (fraternalizing) – 52.1 percent
- Frequent social activities – 41.3 percent
- Praise – 44.5 percent
- Cash per call responded to – 41.3 percent

What Makes Your Members Leave Your Organization?

- No time to volunteer – 92.3 percent
- Conflicts in the organization – 47.8 percent
- Organizational leadership creates adversity – 46.7 percent
- Too much training – 45.6 percent
- Attitude of existing personnel to newcomers – 39.1 percent
- Criticism received from officers and older members – 38.0 percent

People are willing to volunteer in the fire and rescue service provided the following are true:

- The experience is rewarding and worth their time.
- The training requirements are not excessive.
- The time demands are not excessive.
- They feel valued.
- Conflict is minimized.

The roots of retention and recruitment challenges are briefly identified in the following chart:

Figure 54: Roots of Recruitment and Retention Challenges

Sources of Challenges	Contributing Factors
Time Demands	• The two income family working multiple jobs • Increased training time demands • Higher emergency call volume • Additional time demands within the dept.
Training Requirements	• Higher training standards and federal requirements • Greater public expectation of FD's response capabilities • Additional training demands to provide broader range of services • Recertification demands
Increasing call volume	• Fire Departments assuming wider roles • Increasing medical call volume • Increasing automatic fire alarms • Greater reliance by public on FD services
Changes in the "nature of the business"	• Abuse of emergency services by the public • Less of an emphasis on social aspects of volunteering
Changes in sociological conditions	• Transience • Loss of community feeling • Less community pride • Less of an interest or time for volunteering • Two-income family and time demands • "Me" generation
Leadership problems	• Poor leadership and lack of coordination • Authoritative management style • Failure to manage change
Federal Legislation and regulation	• FLSA interpretations • "Two-in, two-out" rulings requiring four firefighters on scene before entering hazardous environments
Increasing use of combination departments	• Disagreements among Chiefs or other department leaders • Friction between volunteer and career members
Higher cost of housing	• Volunteers cannot afford to live in the community they serve
Aging communities	• Greater number of older people today • Lack of economic growth and jobs in some towns

Retention and Recruitment for the Volunteer Emergency Services: Challenges and Solutions provides a comprehensive analysis of volunteer retention and recruitment challenges and solutions. The following topical list of retention and recruitment challenges and solutions represents an outline of this analysis as an indication of the value of this reference to JFD. Generally, the primary headings (Letters) represent the challenge topics and the sub-headings (numbers) represent the solution topics.

1. Retention
    - A. Leadership
        1. Management style
        2. Mission statement
        3. Long range planning, goals and objectives
        4. Selection and tenure of the Chief
        5. Selection and tenure of the officers
        6. Training of the Chief and officers
        7. Internal communications
        8. Volunteer coordinator
        9. Adopting department standards
    - B. Department image
        1. Pride in the uniform
        2. Pride in the department and community
        3. Training in public
        4. Delivering public fire safety and prevention programs
        5. Well-maintained gear and apparatus
        6. Demonstrating financial benefit to the community
        7. Community newsletter
        8. Use of the media
        9. Customer service
        10. Working with local politicians
    - C. Risks
        1. Health risks
        2. Medical examinations
        3. Concerns of the family
        4. Death and disability coverage
        5. On duty injury and hospitalization insurance
        6. Line of duty death and disability benefits
        7. Liability coverage
    - D. Relocation
        1. Transferring to other departments
        2. Reciprocity of training credentials

E. Diversity of people and interests
    1. Fire and EMS members
    2. Females
    3. Minority groups
    4. Retired firefighters
    5. Non firefighting personnel
    6. “Burned out” or disabled members
    7. Learning disabled/mentally challenged

F. Consolidation

G. Attitude and motivational research
    1. Attitude research
    2. Motivational research
    3. Member surveys
    4. Exit interviews
    5. Evaluations

H. Cohesiveness
    1. Cliques
    2. Females and minorities
    3. EMS and firefighters
    4. Handling grievances and problem volunteers
    5. Combination departments
    6. Encouraging teamwork

I. Emotional support
    1. Nurturing new members
    2. Nurturing all members
    3. Handling specific personal problems
    4. Employee assistance programs/member assistance programs
    5. The department as a family
    6. Stress debriefings

J. Training requirements
    1. The dilemma of reducing training requirements
    2. Provide training schedules
    3. Training in modules
    4. Training in context
    5. Instructor competency
    6. Provision of remedial help
    7. Diversifying instruction
    8. Out-of town training weekends
    9. Training competitions

K. Time demands
    1. Evaluating requirements and improving efficiency
    2. Narrowing assignments
    3. Duty shifts
    4. Leaves of absence
    5. Screening calls and alarm malfunctions
    6. Involving the family in the department
    7. A new take on fire department auxiliaries
    8. Involving the family in social functions
    9. Selective paging
    10. Handing the most demanding hours: weekday hours
    11. Supplementary full-time personnel

L. Recognition
    1. Newsletters
    2. Thank you notes and greeting cards
    3. Pictures
    4. Press releases
    5. National volunteer awards
    6. State recognition
    7. Local community recognition and heroism awards
    8. Award banquets
    9. Graduation ceremonies
    10. Pats on the back

M. Incentives
    1. Setting up an incentive system
    2. Direct financial incentives
        a) Retirement plans
        b) Pension plans
        c) Length of service award programs
    3. IRAs
    4. Pay per call or per hour
    5. Monthly Pot
    6. Annual reimbursement
    7. Tax exemptions and deductions
    8. Health insurance
    9. Tuition assistance
    10. Housing assistance
    11. Special low interest housing loans
    12. In-season bonus

N. Indirect monetary incentives
    1. Local business accounts
    2. Chamber of Commerce dollars and gift certificates
    3. Health club memberships
    4. Other indirect monetary incentives

O. Uniform and department paraphernalia

P. Other incentives

Q. Equality in incentive system

R. Qualifying for benefits and incentives

S. The fun factor
    1. Social committee/social director
    2. Parties
    3. Prevention activities
    4. Making training enjoyable
    5. Other ways to have fun
    6. Increased range of services
    7. What to avoid
        a) Alcohol
        b) Drugs

2. Recruitment

A. Citizens corps

B. Needs assessment

C. Qualities and skills to look for in volunteers

    1. Character qualities

    2. Education

D. Daytime availability

E. Geographically well-located

F. Young firefighters

G. Cadet training information

H. Previous public safety experience

I. Special skills

J. Who should do the recruiting
    1. Members
    2. Recruitment coordinator
    3. Recruitment committee
    4. County, district, or City-level recruiting

K. Where to look
    1. Personal contacts
    2. Door-to-door
    3. Dedicated recruitment telephone number
    4. Newcomer to town
    5. Schools
    6. Retirement homes
    7. Civic associations and churches
    8. Fire departments
    9. County fairs
    10. Resorts
    11. Local businesses
    12. Events
    13. Utility companies and county and local government employees
    14. Military bases and personnel
    15. Other emergency personnel
    16. Local stores, government offices, restaurants and gyms
    17. Training the public

L. Recruiting messages

M. Message examples

N. Volunteering as career advancement

O. The true nature of the job

P. Firefighter checklist

Q. Use of various media
    1. Television, radio and print media
    2. Videotapes and multimedia shows
    3. Brochures
    4. Direct mail
    5. Posters
    6. Signs at stations
    7. Advertisements on apparatus
    8. Informal station open house
    9. Movie theater
    10. World Wide Web
    11. Other places to advertise

R. Informational sessions
    1. Volunteer firefighter job description

S. Screening recruits
    1. Who to accept
    2. Motivations
    3. Tests and background checks
    4. Interviews
    5. Driving and criminal records
    6. Immigration status
    7. Commitment agreements

T. Follow-through
    1. Follow up on initial contacts
    2. Follow up after acceptance
    3. Opportunities to leave

U. Barriers to recruiting
    1. Exclusivity image
    2. Training burden
    3. Residency requirements
    4. Tenure requirements

V. Recruiting special groups
    1. Females
    2. Hispanics
    3. African Americans
    4. Native Americans
    5. Other minorities
    6. White-collar workers/college students
    7. Retirees

W. The annual recruitment plan

X. The national 1-800-FIRE-LINE recruitment campaign

Appendix C: Fire & Emergency Medical Event Dynamics

Dynamics of Fire in Buildings

Most fires within buildings develop in a predictable fashion, unless influenced by highly flammable material. Ignition, or the beginning of a fire, starts the sequence of events. It may take some minutes or even hours from the time of ignition until flame is visible. This smoldering stage is very dangerous, especially during times when people are sleeping, since large amounts of highly toxic smoke may be generated during early phases.

Once flames do appear, the sequence continues rapidly. Combustible material adjacent to the flame heats and ignites which in turn heats and ignites other adjacent materials if sufficient oxygen is present. As the objects burn, heated gases accumulate at the ceiling of the room. Some of the gases are flammable and highly toxic.

The spread of the fire continues quickly. Soon the flammable gases at the ceiling reach ignition temperature. At that point, an event termed *flashover* takes place; the gases ignite, which in turn ignites everything in the room. Once flashover occurs, damage caused by the fire is significant and the environment within the room can no longer support human life.

Flashover usually happens about five to eight minutes from the appearance of flame in typically furnished and ventilated buildings. Since flashover has such a dramatic influence on the outcome of a fire event, the goal of any fire agency is to apply water to a fire before flashover takes place.

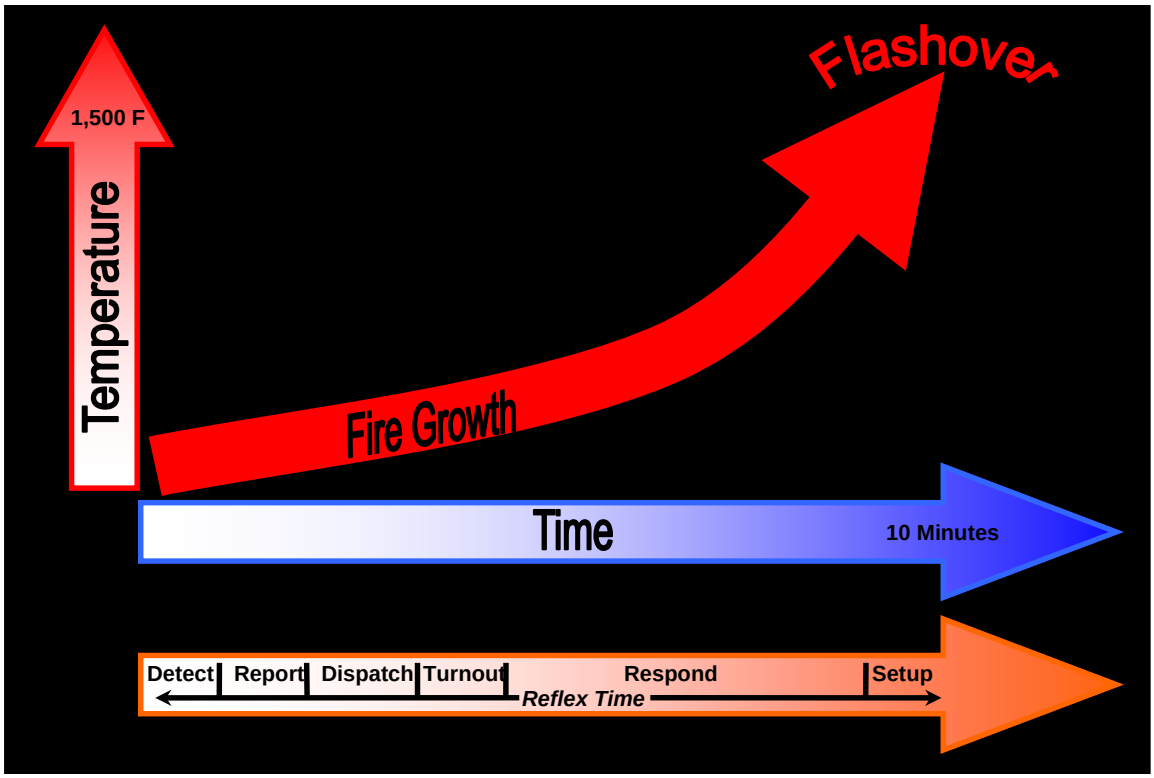
Perhaps as important as preventing flashover is the need to control a fire before it does damage to the structural framing of a building. Materials used to construct buildings today are often less fire resistive than the heavy structural skeletons of older frame buildings. Roof trusses and floor joists are commonly made with lighter materials more easily weakened by the effects of fire. Light-weight roof trusses fail after five to seven minutes of direct flame

impingement. Plywood I-beam joists can fail after as little as three minutes of flame contact. This creates a very dangerous environment for firefighters.

In addition, the contents of buildings today have a much greater potential for heat production than in the past. The widespread use of plastics in furnishings and other building contents rapidly accelerate fire spread and increase the amount of water needed to effectively control a fire. All of these factors make the need for early application of water essential to a successful fire outcome.

A number of things must happen quickly to make it possible to achieve fire suppression prior to flashover. The figure below illustrates the sequence of events.

Figure 55: Fire Growth vs. Reflex Time



The reflex time continuum consists of six steps, beginning with ignition and concluding with the application of (usually) water. The time required for each of the six components varies. The

policies and practices of the fire department directly influence four of the steps, but two are only indirectly manageable. The six parts of the continuum are:

1. **Detection**: The detection of a fire may occur immediately if someone happens to be present or if an automatic system is functioning. Otherwise, detection may be delayed, sometimes for a considerable period.
2. **Report**: Today most fires are reported by telephone to the 9-1-1 center. Call takers must quickly elicit accurate information about the nature and location of the fire from persons who are apt to be excited. A citizen well trained in how to report emergencies can reduce the time required for this phase.
3. **Dispatch**: The dispatcher must identify the correct fire units, subsequently dispatch them to the emergency, and continue to update information about the emergency while the units respond. This step offers a number of technological opportunities to speed the process including computer aided dispatch and global positioning systems.
4. **Turnout**: Firefighters must don firefighting equipment, assemble on the response vehicle, and begin travel to the fire. Good training and proper fire station design can minimize the time required for this step.
5. **Response**: This is potentially the longest phase of the continuum. The distance between the fire station and the location of the emergency influences reflex time the most. The quality and connectivity of streets, traffic, driver training, geography, and environmental conditions are also a factor.
6. **Set up**: Last, once firefighters arrive on the scene of a fire emergency, fire apparatus are positioned, hose lines stretched out, additional equipment assembled, and certain preliminary tasks performed (such as rescue) before entry is made to the structure and water is applied to the fire.

As is apparent by this description of the sequence of events, application of water in time to prevent flashover is a serious challenge for any fire department. It is critical, though, as studies of historical fire loss data can demonstrate.

The National Fire Protection Association studied data from residential structures occurring between 2000 and 2004 in order to analytically quantify the relationship between the growth of a fire beyond the room of origin and losses in life and property. As the figure below clearly indicates, fires contained to the room of origin (typically extinguished prior to or immediately following flashover) had significantly lower rates of death, injury, and property loss when compared to fires that had an opportunity to spread beyond the room of origin (typically

extinguished post-flashover). Incidents in which a fire spreads beyond the room where it originates are likely to experience six times the amount of property loss and have almost nine times greater chance of resulting in a fatality.

Figure 56: Fire Extension in Residential Structures

Fire Extension in Residential Structure Fires 2000-2004 Annual Averages			
Extension	**Per 1000 Fires**		**Direct Property Loss Per Fire**
	Civilian Deaths	**Civilian Injuries**	
Confined to Object of Origin	3.8	30.9	$7,730
Confined to Room of Origin	6.3	69.2	$9,821
Beyond Room of Origin, Confined to Floor of Origin	16.9	83.7	$30,955
Beyond Floor of Origin	26.4	61.0	$52,033

Data from the National Fire Protection Association publication "Home Structure Fires." January 2009. Table 10

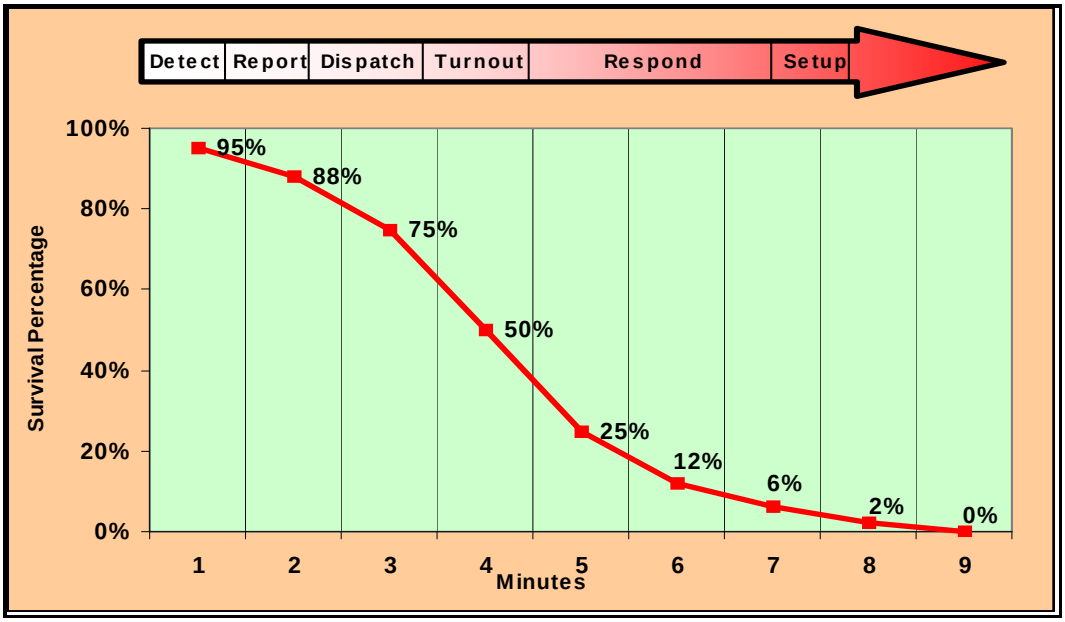
Emergency Medical Event Sequence

Cardiac arrest is the most significant life threatening medical event. A victim of cardiac arrest has mere minutes in which to receive definitive lifesaving care if there is to be any hope for resuscitation.

Recently, the American Heart Association (AHA) issued a new set of cardiopulmonary resuscitation guidelines designed to streamline emergency procedures for heart attack victims, and to increase the likelihood of survival. The AHA guidelines included new goals for the application of cardiac defibrillation to cardiac arrest victims.

Heart attack survival chances fall by seven to ten percent for every minute between collapse and defibrillation. Consequently, the AHA now recommends cardiac defibrillation within five minutes of cardiac arrest. As with fires, the sequence of events that lead to emergency cardiac care can be visually shown, as in the following figure.

Figure 57: Cardiac Arrest Event Sequence



The percentage of opportunity for recovery from cardiac arrest drops quickly as time progresses. The stages of medical response are very similar to the components described for a fire response. Recent research stresses the importance of rapid cardiac defibrillation and administration of certain drugs as a means of improving the opportunity for successful resuscitation and survival. An Oregon fire department recently studied the effect of time on cardiac arrest resuscitation and found that nearly all of their *saves* were within one and one-half miles of a fire station, underscoring the importance of quick response.

People, Tools, and Time

Time matters a great deal in the achievement of an effective outcome to an emergency event. Time, however, isn't the only factor. Delivering sufficient numbers of properly trained, appropriately equipped, personnel within the critical time period completes the equation.

For medical emergencies this can vary based on the nature of the emergency. Many medical emergencies are not time critical. However, for serious trauma, cardiac arrest, or conditions that may lead to cardiac arrest, response time is very critical.

Equally critical is delivering enough personnel to the scene to perform all of the concurrent tasks required to deliver quality emergency care. For a cardiac arrest, this can be up to six personnel - two to perform CPR, two to set up and operate advanced medical equipment, one to record the actions taken by emergency care workers, and one to direct patient care. Thus, for a medical emergency the real test of performance is the time it takes to provide the personnel and equipment needed to deal effectively with the patient's condition, not necessarily the time it takes for the first person to arrive.

Fire emergencies are even more resource critical. Again, the true test of performance is the time it takes to deliver sufficient personnel to initiate application of water on the fire. This is the only practical method to reverse the continuing internal temperature increases and ultimately prevent flashover. The arrival of one person with a portable radio does not provide fire intervention capability and should not be counted as *arrival* by the fire department.

In order to legally enter a building to conduct interior firefighting operations at least four personnel must be on scene. The initial arrival of effective resources should be measured at the point in time when at least four personnel, properly trained and equipped, have assembled at the fire.

Emergency service agencies should have clearly defined response performance objectives established to allow evaluation of capability and service delivery. An organization's performance objectives should clearly state both the current and desired emergency service capabilities in very measurable terms. For emergency response, performance objectives should define response performance using both time and resource criteria. For example:

- *Provide for the arrival of adequate resources to initiate basic emergency medical services at the scene of any medical emergency within "X" minutes following dispatch, 90 percent of the time.*
- *Provide for the arrival of adequate resources to initiate interior fire suppression operations at the scene of any fire within "X" minutes following dispatch, 90 percent of the time.*

With specific performance criteria, a fire department can develop deployment methodologies to achieve desired levels of performance, and can quickly identify when conditions in the environment degrades performance.

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