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Executive Summary

Purpose

Emergency Services Consulting inc. (ESCi) was engaged by Millcreek Township (Township), Pennsylvania, to conduct a master planning process for the delivery of fire and emergency medical services (EMS) throughout the Township. Fire protection is provided by five independent fire companies:

- Belle Valley Fire Department (BVFD)
- Kearsarge Fire Department (KFD)
- Lake Shore Fire Department (LSFD)
- West Lake Fire Department (WLFD)
- West Ridge Fire Department (WRFD)

Emergency medical services (EMS) are provided by the Millcreek Paramedic Service (MPS), which was created by, and is owned by the five Township fire departments.

The planning process consisted of the following elements:

- ✓ An emergency service agency analysis of the fire and EMS delivery system
- ✓ An analysis of future system demand
- ✓ Development of future delivery system models
- ✓ A fiscal analysis of the organizations currently delivering service and the fiscal impact of future delivery system models

Township and fire department staffs were generous with their time and provided a great deal of written and verbal information used to develop this report. The project team is grateful for their able assistance and cooperation throughout this process.

Agency Analysis

The assessment process compares the major elements of the organization against acceptable industry standards and best practices. The ESCi team gathered information from a number of sources that included background data provided by each department, interviews with key

personnel, site visits, and research via the World Wide Web. Whenever possible, the project team made quantifiable comparisons to other fire service organizations.

The organizational assessment provides the Township with an evaluation of the condition of its fire and EMS delivery system. The information and data that was collected, by its very nature, is often dynamic and changes from moment to moment. Every effort has been made to compile data that is as comprehensive and accurate as possible. The result or output of the assessment process is a list of recommendations for organizational improvement. The recommendations are listed below.

Foundational Policy

- The Township fire departments should develop a common set of standard operating guidelines using a cooperative committee or workgroup.

Organizational Structure

- The Lake Shore and West Lake fire departments should develop a formal organizational chart that divides responsibility among qualified officers. Unity of command and distribution of authority will achieve a more balanced span of control for the fire chief.
- The Township fire departments should develop formal position descriptions for all volunteer positions describing primary functions and critical tasks, levels of supervision and authority, and minimum qualifications.

Maintenance of History

- The Township fire departments should prepare and distribute an annual report of activities and accomplishments, and ensure adequate efforts are in place to maintain the ongoing history of their organizations.

Operating Budget, Funding, Fees, Taxation, and Financial Resources

- The Lake Shore, Belle Valley, West Lake, and Kearsarge fire departments should prepare long-range capital plans for the replacement of fire apparatus, facilities, and equipment.

Administration and Support Staff

- The Township fire departments should prepare a plan for acquiring shared paid or volunteer administrative assistance.

Emergency Services Staff

- The Township fire departments should develop a plan for establishing an on-call volunteer response force that will cover periods when volunteer response is insufficient.

Staff Allocation to Functional Responsibilities

- The Township fire departments should establish and codify a safety committee.
- Each Township fire department should develop job descriptions for each position in the organization.

Fire Stations

- Develop and adequately fund a long-range facilities management plan in accordance with recommendation for projected service delivery for all stations.
- Initiate efforts to correct existing deficiencies as indicated.

Fire Apparatus and Small Equipment

- Develop a cooperative purchase system between all five fire departments in Millcreek Township.
- Develop and fund a small equipment replacement program that anticipates replacement schedules and builds necessary funding in order to spread cost over multiple years.
- Review equipment to determine if duplicate equipment represents unnecessary redundancy and can be eliminated.
- Establish a record system for maintenance, usage, and repairs of small equipment.

Turnout Gear

- Develop a group purchase program to save with a volume purchase system for all five fire departments.
- Develop and fund a replacement program that anticipates replacement of turnout gear.
- Consider a group purchase of a commercial extractor and mobile turnout drying rack for all fire departments.

- Establish a semi-annual inspection plan.
- Establish a record system for maintenance, uses, and repairs of turnout gear.

Dispatch

- A functionally redundant dispatch site should be developed with computer aided dispatch access and encoded radio transmitter. Evacuation and transfer drills should be held at least annually.

Training

- Standardize training manuals and methods across all fire departments.
- Conduct a training needs analysis for each department, and for the Township overall, for the development of a comprehensive Township-wide training program.
- Establish consistent training goals and objectives for each fire department and across the Township.
- Establish joint training schedules and conduct joint training exercises among all Township departments.
- Each department should adopt an SOG that specifies training practices.
- Each department should adopt an SOG that specifies training safety practices.

MPS Training

- Adopt SOGs that specify training practices and safety.
- Include incident command system and National Incident Management System training in training schedule.

Future Delivery System Options

Based on the data and analysis in the first sections of the report, ESCi developed the following options for future service delivery.

Option 1 – Do Nothing

Option 2 – Functional Consolidations

Option 2a – Consolidate Training Function

Option 2b – Consolidate Administrative Functions

Option 2c – Joint Planning

Option 3 – Service Delivery Modifications

Option 3a – Township-wide standard operating guidelines (SOGs)

Option 3b – Enhance Mutual Aid

Option 3c – Optimize Response Districts

Option 3d – Addressing Underserved Areas

Option 3e – Improve Daytime Response

Option 4 – Corporate Mergers

Option 4a – Five Fire Departments Merged into Two

Option 4b – Five Fire Departments Merged into One

Option 5 – Township Provides Support for Fire Protection

Option 5a – Fire protection is provided by a single independent fire department to which the Township provides financial support

Option 5b – Township provides administrative and operational oversight and the current fire departments own and maintain the assets

Option 5c – Township acquires all facility and apparatus assets, and operates the fire department

Recommendations

Based on the analysis and information provided, ESCi recommends that the Township and fire departments consider a combination of options that will stabilize funding and enhance future service delivery. The options recommended are:

Option 3e – Improve Daytime Response

Option 4b – Five Fire Departments Are Merged into One

Option 5a – Fire protection is provided by an independent organization(s) to which the Township provides financial support

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Emergency Service Agency Analysis

Organizational Overview

The organizational overview provides a description and analysis of Millcreek Township, the fire departments, and Millcreek Paramedic Service.

Millcreek Township, Pennsylvania is situated in the northwestern portion of the Commonwealth of Pennsylvania, directly west of the City of Erie along the shore of Lake Erie. The Township is home to an estimated 52,762 residents[1] and consists primarily of suburban residential neighborhoods, community commercial centers, and an older urban core area surrounding Erie International Airport.

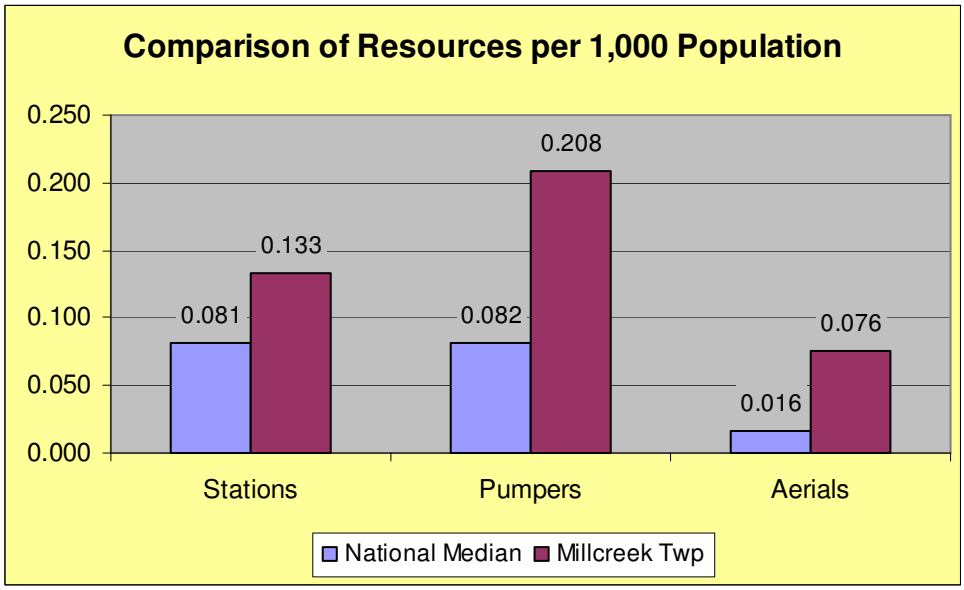
Fire protection in the Township is provided by five independent volunteer fire departments established as a result of citizen efforts and supported primarily by community donations for the past several decades. The fire departments also receive assistance from the Millcreek Fire Incident Response Unit, a group of Township employees who are certified firefighters and authorized to respond when requested for major incidents during workday hours. The Township Fire Prevention Division provides code enforcement and prevention services.

Emergency medical services are provided primarily by the Millcreek Paramedic Service, a non-profit organization developed and operated cooperatively by the five volunteer fire departments. This service uses primarily on-duty career staffing with certified paramedics.

The following figure provides an overview of the fire suppression capital resources of Millcreek Township and compares these with the average rate of resource allocation in other communities of similar size within the United States.[2]

[1] U.S. Census Bureau, 2004 population estimates.
[2] Comparison data from the National Fire Protection Association *Fire Department Profiles* 2003.

Figure 1: Resource Allocation Comparison



The chart demonstrates that Millcreek Township has a higher than median allocation of stations compared to other communities. The Township has a significantly higher allocation of pumpers, more than two and a half times higher than similar sized communities. In addition, Millcreek has a significantly higher allocation of aerial devices, more than four times higher than the median across the nation.

The following section describes the community baseline information for the Millcreek Township fire departments. Included is general information about governance and structure of the organizations, size and general nature of the area for which services are provided, and a general overview of available resources dedicated to the fire and EMS functions.

Belle Valley

The Belle Valley Fire Department, Inc. (BVFD) is a private, not-for-profit corporation formed by citizens to provide fire protection and emergency medical response to a designated area of southeast Millcreek Township. The response area includes mostly suburban residential area with occasional undeveloped pockets of Erie County, and situated directly south of the City of Erie. The department began providing fire protection services in 1938.

BVFD provides emergency services to a population of 6,950[3] in an area of roughly 5.8 square miles. These services are provided from one facility located within the jurisdiction. The department maintains a fleet of vehicles including two fire engines, one aerial truck, one rescue truck, and one specialty/utility vehicle. BVFD maintains a reserve aerial apparatus.

There are 50 individuals[4] involved in delivering these services to the jurisdiction. The department has a fire chief, two deputy chiefs, president, vice president, treasurer, secretary, and board members. A part-time clerical assistant provides additional support services. Staffing coverage for emergency response is primarily through volunteer personnel responding on radio call.

The department provides a variety of services including fire suppression, victim rescue, emergency medical first response, operations-level hazardous materials (hazmat) response, and public fire safety education.

Kearsarge

The Kearsarge Fire Department, Inc. (KFD) is a private, not-for-profit corporation formed by citizens to provide fire protection and emergency medical response to a designated area of northwest Millcreek Township. The response area includes urban commercial areas, older neighborhoods, and suburban residential areas, as well as some pockets of undeveloped property of Erie County, and situated directly south of the City of Erie.

The department began providing fire protection services in 1939 as the Kearsarge Hose Company, but has informal history much earlier than that date.

KFD provides emergency services to a population of 11,825[5] in an area of roughly 5.3 square miles. These services are provided from one facilities located within the jurisdiction. The department maintains a fleet of vehicles including two fire engines and one aerial truck. No vehicles are available in reserve.

[3] U.S. Census Bureau, 2000 Census data.
[4] Current number at time of field research.
[5] U.S. Census Bureau, 2000 Census data.

There are 25 individuals[6] involved in delivering these services to the jurisdiction. The department has a fire chief, three deputy chiefs, president, vice president, secretary, and treasurer. There is no specified staff to provide additional support services. Primary staffing coverage for emergency response is through volunteer personnel responding on call.

The department provides a variety of services including fire suppression, victim rescue, emergency medical first response, operations-level hazmat response, and public fire safety education.

Lake Shore

The Lake Shore Fire Department, Inc. (LSFD) is a private, not-for-profit corporation formed by citizens to provide fire protection and emergency medical response to a designated area of northwest Millcreek Township. The response area includes a mix of urban commercial areas and suburban residential areas of Erie County and is situated along the shore of Lake Erie, about ten miles west of the City of Erie. The department began providing fire protection services in 1947.

LSFD provides emergency services to a population of 1,542[7] in an area of roughly 0.7 square miles. These services are provided from one facility located within the jurisdiction. The department maintains a fleet of vehicles including two fire engines, no aerial truck, one tanker, no rescue trucks, one ambulance, one wildland firefighting vehicle, and one specialty/utility vehicle. Currently, no vehicles are available in a reserve fleet.

There are 32 individuals[8] involved in delivering these services to the jurisdiction. The department has a fire chief, 1st and 2nd assistant chiefs, president, vice president, treasurer, and secretary. There is no specified staff to provide additional support services. Primary staffing coverage for emergency response is through volunteer personnel responding on radio call.

[6] Current number at time of field research.
[7] U.S. Census Bureau, 2000 Census data.
[8] Current number at time of field research.

West Lake

The West Lake Fire Department, Inc. (WLFD) is a private, not-for-profit corporation formed by citizens to provide fire protection and emergency medical response to a designated area of northern Millcreek Township. The response area includes densely populated urban residential and commercial areas of Erie County, and situated on the shore of Lake Erie, just west of the City of Erie. This response area includes the popular Presque Isle State Park. The department began providing fire protection services in 1937, when it incorporated as the West Lake Hose Company.

WLFD provides emergency services to a population of 9,906[9] in an area of roughly 5.2 square miles. These services are provided from two facilities located within the jurisdiction. The department maintains a fleet of vehicles including three fire engines, one aerial truck, one rescue truck, and one specialty/utility vehicle. There are no vehicles available in reserve.

There are 50 individuals[10] involved in delivering these services to the jurisdiction. The department has a fire chief, two assistant chiefs, president, vice president, and board chairman. There is no specified staff to provide additional support services. Primary staffing coverage for emergency response is through the use of volunteer personnel responding on radio call.

The department provides a variety of services including fire suppression, victim rescue, emergency medical first response, operations-level hazmat response, certain types of technical rescue, and public fire safety education.

West Ridge

The West Ridge Fire Department, Inc. (WRFD) is a private, not-for-profit corporation formed by citizens to provide fire protection and emergency medical response to a designated area of central Millcreek Township. The response area includes densely populated urban areas as well as suburban residential areas of Erie County, and situated just west of the City of Erie. The department began providing fire protection services in 1940.

[9] U.S. Census Bureau, 2000 Census data.
[10] Current number at time of field research.

WRFD provides emergency services to a population of 21,900[11] in an area of roughly 12.3 square miles. Services are provided from two facilities located within the jurisdiction. The department maintains a fleet of vehicles including two fire engines, one aerial truck, one air/utility vehicle, and a fire-police utility truck. Currently, no vehicles are available in a reserve fleet.

There are 64 individuals[12] involved in delivering these services to the jurisdiction. The department has a fire chief, assistant chief, two deputy chiefs, president, secretary, and treasurer. There is no specified staff to provide additional support services. Primary staffing coverage for emergency response is through the use of volunteers responding to radio call.

The department provides a variety of services including fire suppression, victim rescue, emergency medical first response, operations-level hazmat response, and public fire safety education.

All Departments

The Erie County Hazardous Materials Response Team, within the region, provides technician-level hazardous materials emergency response service for all of the fire department in the Township. The Millcreek Emergency Communications Center provides emergency call receipt and dispatch service. Enhanced-911 telephone service, computer-aided dispatch, and a multi-channel radio system are in place.

Responsibilities and Lines of Authority

Belle Valley

Belle Valley Fire Department, formed under the laws of the State of Pennsylvania, operates as an U.S. Internal Revenue Code (IRC) 501(c)(4) not-for-profit agency that is provided the authority through contract with Millcreek Township to operate a fire protection system in its designated response jurisdiction.

The agency operates under a board of directors' form of government, and the board is provided with limited power and authority to govern the operation. Full authority remains vested in the

[11] U.S. Census Bureau, 2000 Census data.
[12] Current number at time of field research.

overall membership, which uses a voting process in regular meetings to authorize actions and expenditures.

The role and authority of the board of directors is further clarified within organization Constitution and By-Laws and written policy documents describing their function and tasks.

Kearsarge

Kearsarge Fire Department was formed under the laws of the State of Pennsylvania, and operates as an IRC 501(c)(3) not-for-profit agency that is provided the authority through contract with Millcreek Township to operate a fire protection system in its designated response jurisdiction.

The agency operates under a board of directors' form of government; the board is provided with limited power and authority to govern the operation. Full authority remains vested in the overall membership, which uses a voting process in regular meetings to authorize actions and expenditures.

The role and authority of the board of directors is further clarified within organization Constitution and By-Laws and written policy documents describing their function and tasks.

Lake Shore

Lake Shore Fire Department was formed under the laws of the State of Pennsylvania, and operates as an IRC 501(c)(3) not-for-profit agency that is provided the authority through contract with Millcreek Township to operate a fire protection system in its designated response jurisdiction.

The agency operates under a board of directors' form of government, and the board is provided with limited power and authority to govern the operation. Full authority remains vested in the overall membership, which uses a voting process in regular meetings to authorize actions and expenditures.

The role and authority of the board of directors is further clarified within organization Constitution and By-Laws and written policy documents describing their function and tasks.

West Lake

West Lake Fire Department, formed under the laws of the State of Pennsylvania, operates as an IRC 501(c)(4) not-for-profit agency that is provided the authority through contract with Millcreek Township to operate a fire protection system in its designated response jurisdiction.

The agency operates under a board of directors' form of government; the board is provided with limited power and authority to govern the operation. Full authority remains vested in the overall membership, which uses a voting process in regular meetings to authorize actions and expenditures.

The role and authority of the board of directors is further clarified within organization Constitution and By-Laws and written policy documents describing their function and tasks.

West Ridge

West Ridge Fire Department was formed under the laws of the State of Pennsylvania, and operates as an IRC 501(c)(4) not-for-profit agency that is provided the authority through contract with Millcreek Township to operate a fire protection system in its designated response jurisdiction.

The agency operates under a board of directors' form of government, and the board is provided with limited power and authority to govern the operation. Full authority remains vested in the overall membership, which uses a voting process in regular meetings to authorize actions and expenditures.

The role and authority of the board of directors is further clarified within organization Constitution and By-Laws and written policy documents describing their function and tasks.

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 department 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. 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, 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 process should provide for a program of regular, systematic updating to assure SOGs remains current, practical, and relevant. SOGs should be developed, approved, and enforced under the direction of the fire chief.

Lake Shore

LSFD maintains two primary policy manuals: Administrative By-Laws and Standard Operating Guidelines.

The manuals were given a basic review for quality and content. The documents are fairly well organized, and it appears that a great deal of time went into writing the various policies and

procedures in a professional and clear manner. The manual does not contain all of the appropriate policies focused on reducing the risk of civil liability. Such policies should always include a sexual harassment policy, non-discrimination policy, and other similar issues. Other policies should fully cover routine procedures, complaint handling, orientation of new members, and uniform use.

Standard operating guidelines are well organized, easy to understand and apply, and reflect an effort to achieve best practices. The procedures are reported to be reasonably up-to-date, but with no prescribed system in place to review and update the procedures on a periodic basis. The procedures do not appear to contain adequate sections on emergency scene operations and cannot provide field personnel with sufficient guidance on fire ground operations such as fire streams, pump operations, search procedures, and evacuations.

West Ridge

The department maintains two primary policy manuals: Administrative By-Laws and Standard Operating Guidelines.

The manuals were given a basic review for quality and content. The By-Laws were fairly well organized, and it appears that a great deal of time went into writing them in a professional and clear manner. The manual includes appropriate policies either required by law or focused on reducing the risk of civil liability. These include a sexual harassment policy, non-discrimination policy, and disciplinary policy. Other policies cover routine procedures, complaint handling, orientation of new members, and uniform use, etc.

The standard operating guidelines are somewhat disorganized, difficult to use on a practical basis, and do not necessarily reflect current industry standards and best practices. The procedures are reported to be somewhat out-of-date, and there is no prescribed system in place to review and update the guidelines on a periodic basis. The procedures do not appear to contain adequate sections on emergency scene operations and cannot provide field personnel with sufficient guidance on fire ground operations such as fire streams, pump operations, search procedures, and evacuations.

Belle Valley

The department maintains two primary policy manuals: Administrative By-Laws and Standard Operating Guidelines.

The manuals were given a basic review for quality and content. The By-Laws are not particularly well organized, and it appears that an insufficient amount of time was invested to produce a professional and clear set of guiding policies and procedures. Sections of the document are quite old and several appear to be hand written. Conflicting sections have not been fully rectified. The manual does not contain all of the appropriate policies either required by law or focused on reducing the risk of civil liability. Such policies should always include a sexual harassment policy, non-discrimination, and disciplinary policy. Other policies should fully cover routine procedures, complaint handling, orientation of new members, and uniform use. The By-Laws are in significant need of complete overhaul and revision.

Standard operating guidelines, however, are well organized, easy to understand and apply, and reflect current industry standards and best practices. The procedures are reported to be reasonably up-to-date, with a system in place to review and update the procedures on a periodic basis. The procedures contain impressive and thorough sections on emergency scene operations and can provide field personnel with guidance on fire ground operations such as fire streams, pump operations, search procedures, and evacuations.

West Lake

WLFD maintains two primary policy manuals: By-Laws and the Standard Operating Procedures.

The manuals were given a basic review for quality and content. Both documents are fairly well organized. The By-Laws do not contain all of the appropriate policies either required by law or focused on reducing the risk of civil liability, though a harassment policy was found in the standard operating procedures. Such policies should always include a non-discrimination policy, etc. Other policies should fully cover routine procedures, complaint handling, orientation of new members, and uniform use.

The SOGs are well organized and only two years old. There is no prescribed system in place to review and update the procedures on a periodic basis. The procedures for emergency scene

operations are rather limited, and cannot provide field personnel with sufficient guidance on certain fire ground operations such as fire streams, pump operations, search procedures, and evacuations.

Kearsarge

KFD maintains two primary policy manuals: Administrative By-Laws and Standard Operating Guidelines.

The manuals were given a basic review for quality and content. The documents are fairly well organized, and it appears that a great deal of time went into writing the various policies and procedures in a professional and clear manner. The manual does not contain all of the appropriate policies focused on reducing the risk of civil liability. Such policies should always include a sexual harassment policy, non-discrimination policy, and other similar issues. Other policies should fully cover routine procedures, complaint handling, orientation of new members, uniform use, etc.

Standard operating guidelines are well organized, easy to understand and apply, and reflect an effort to achieve best practices. The procedures are reported to be reasonably up-to-date, but there is no prescribed system in place to review and update the procedures on a periodic basis. The procedures do not appear to contain adequate sections on emergency scene operations and cannot provide field personnel with sufficient guidance on fire ground operations such as fire streams, pump operations, search procedures, and evacuations.

All Departments

Whenever two or more fire departments operate in very close alliance, particularly with the use of extensive automatic and mutual aid, there is a benefit to the agencies using a common set of incident standard operating guidelines. Though individual guidelines related to specific department apparatus of facilities must, by nature, be unique to an agency, the procedures to follow on a fire ground or other emergency incident are typically not. Departments should strive to follow industry best practices.

Up-to-date technical procedures and the development of cooperative standard operating guidelines are an immediate opportunity for the agencies to develop closer working relationships.

For this reason, ESCi strongly recommends that the five Millcreek Township fire departments pursue the development of a common set of emergency incident standard operating guidelines. Following the recommended format discussed earlier, the SOG manual should be expanded to include a far greater collection of guidelines for actual incident actions, including special hazard incidents such as technical rescue, hazardous materials releases, etc. Several model documents are available through industry trade organizations. The resulting document should be considered for publication in a pocket-sized field guide format.

Recommendation:
The Lake Shore, West Ridge, Belle Valley, West Lake, and Kearsarge fire companies should develop a common set of standard operating guidelines using a cooperative committee or workgroup.

Organizational Structure

A well-designed organizational structure 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 overall mission of the organization.

Unity of command describes an organizational condition in which each member reports to only one supervisor and each is fully aware to whom they report and are accountable. A member with more than one direct supervisor is at risk of receiving conflicting information, being assigned to an unreasonable workload, or simply being overlooked in the chain of command. Likewise, for the member, lines of communication may be unclear and loyalties can become fractured between multiple points of supervision.

Lake Shore

Though the department does not have a formal organizational chart, a review of this agency's organization reveals that they are organized in a typical top-down hierarchy. Since personnel are not routinely assigned to a specific officer for administrative supervision or oversight, members are somewhat free to determine which officer they wish to approach with questions of issues. Likewise, two officers of similar rank may provide direction to the same member with limited coordination between the two. Thus, the organizational structure of the department fails to demonstrate adequate unity of command, with some positions reporting to more than one supervisor and lines of accountability becoming blurred.

By his own admission, the fire chief appears to directly supervise thirty other individuals, including virtually every member. Therefore, the chief's span of control exceeds the range typically considered normal and acceptable. Many times chief officers accept or encourage a span of control that greatly exceeds their ability to maintain good communication and leadership, often with good intentions but just as often to the detriment of the department. An excessive span of control is not necessarily a good reflection of efficiency or even ability and should be corrected.

The department maintains inadequate job classifications and descriptions that do not fully and accurately reflect responsibilities and activities of all positions within the agency. These documents should be revised to adequately describe primary functions and activities, critical tasks, levels of supervision and accountability, as well as reasonable qualifications of each class or position within the organization.

West Ridge

A review of this agency's organizational chart reveals that they are organized in a typical top-down hierarchy. Members are assigned into crews with a line officer assigned to each crew. As a result, the organizational structure of the department 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. If this organizational

structure is properly used, 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 fire chief appears to directly supervise three other individuals, including one assistant chief and two deputy chiefs. The chief's span of control falls within the range typically considered normal and acceptable.

The fire chief has been provided with the disciplinary authority for suspension, as well as the authority to recommend expulsion.

The department maintains inadequate, incomplete, or out-of-date job classifications and descriptions that no longer accurately reflect the typical responsibilities and activities of all positions within the agency. These documents should be completely revised to adequately describe the primary functions and activities, critical tasks, levels of supervision and accountability, as well as reasonable qualifications of each class or position within the organization.

Belle Valley

A review of this agency's organizational chart reveals that they are organized in a typical top-down hierarchy. Members are assigned into crews with a line officer assigned to each crew. As a result, 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.

The fire chief appears to supervise two other individuals, the two deputy chiefs. The chief's span of control falls within the range typically considered normal and acceptable.

The fire chief has been provided with the authority to discipline, up to and including termination if necessary.

The department maintains a set of job classifications and descriptions that have been provided to each officer and are posted in the department bulletin board. BVFD should consider reviewing and revising the job classifications to adequately describe the primary functions and

activities, critical tasks, levels of supervision and accountability, as well as reasonable qualifications of each class or position within the organization.

West Lake

A review of this agency's organizational chart reveals that they are organized in a typical top-down hierarchy. Since personnel are not routinely assigned to a specific officer for administrative supervision or oversight, members are somewhat free to determine which officer they wish to approach with questions of issues. Likewise, two officers of similar rank may provide direction to the same member with limited coordination between the two. Thus, the organizational structure of the department fails to demonstrate adequate unity of command, with some positions reporting to more than one supervisor and lines of accountability becoming blurred.

The fire chief appears to directly supervise two other individuals, the assistant chiefs. The chief's span of control falls within the range typically considered normal and acceptable.

The fire chief has been provided with the authority to up to and including suspension and termination, subject to appeal.

The department maintains inadequate, incomplete, or out-of-date job classifications and descriptions that no longer accurately reflect the typical responsibilities and activities of all positions within the agency. These documents should be completely revised to adequately describe the primary functions and activities, critical tasks, levels of supervision and accountability, as well as reasonable qualifications of each class or position within the organization.

Kearsarge

A review of this agency's organizational chart reveals that they are organized in a typical top-down hierarchy. Members are assigned into crews with a line officer assigned to each crew. As a result, 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.

The fire chief appears to directly supervise three other individuals, including the three deputy chiefs. The chief's span of control falls within the range typically considered normal and acceptable. The fire chief has been provided with the authority to up to and including suspension or termination, subject to appeal process.

The department maintains inadequate, incomplete, or out-of-date job classifications and descriptions that no longer accurately reflect the typical responsibilities and activities of all positions within the agency. These documents should be completely revised to adequately describe the primary functions and activities, critical tasks, levels of supervision and accountability, as well as reasonable qualifications of each class or position within the organization.

Recommendations:

- The Lake Shore and West Lake fire companies should develop a formal organizational chart that divides responsibility among qualified officers. Unity of command and distribution of authority will achieve a more balanced span of control for the fire chief.
- The fire companies should develop formal position descriptions for all volunteer positions describing primary functions and critical tasks, levels of supervision and authority, and minimum qualifications.

Maintenance of History

A regularly maintained historical record serves as a valuable tool for planning and decision-making. It allows quick recollection of how the department has adapted to changes in the community. It provides valuable historical data to agencies, such as the Insurance Services Office (ISO), for evaluation purposes. It also allows for permanent memory of the people who have contributed to the success of the department in its service to the community.

A well-produced annual report can serve to satisfy this need. In addition, an annual report is a wonderful communications tool to share the efforts and activities of the department with the public.

At a minimum, an annual report should include:

1. Brief history of the department
2. Summary of events and activities during the report year
3. Description of major incidents handled by the department
4. Descriptions of new or improved services and programs
5. List of people who served with the department during the year
6. Awards received by the department or individuals
7. Financial summary including revenues and expenditures, grants, etc.
8. Statistical analysis, with trends, of key community service level indicators

The annual report should be printed and distributed to the community and made available at such places as the local chamber of commerce and library.

Lake Shore

The LSFD has informal levels of history retention programs in place. Appropriate records of all corporate meetings are maintained in accordance with the laws of the state governing registered corporations.

The department maintains a *scrapbook* or file containing items of historical significance, including pictures, newspaper articles, etc. These are helpful when updating a historical perspective of the organization and the major events in its development. Individual members are currently accepting responsibility for this function.

The department does not publish or distribute an annual report of activities and accomplishments, failing to provide any specific historical record or measurement of its performance.

West Ridge

West Ridge has significant levels of history retention programs in place. Appropriate records of all corporate or municipal meetings are maintained in accordance with the laws of the state governing various types of public meetings and decisions involving public funds.

The department maintains a scrapbook or file containing items of historical significance, including pictures, newspaper articles, etc. These are helpful when updating a historical

perspective of the organization and the major events in its development. One member of the department has accepted responsibility for this function.

The department does not publish or distribute an annual report of activities and accomplishments, failing to provide any specific historical record or measurement of its performance.

Belle Valley

Belle Valley has significant levels of history retention programs in place. Appropriate records of all corporate or municipal meetings are maintained in accordance with the laws of the state governing various types of public meetings and decisions involving public funds.

The department maintains items of historical significance, including pictures, newspaper articles, etc. These are helpful when updating a historical perspective of the organization and the major events in its development. The fire chief, with help from other members, is currently accepting responsibility for this function.

The department has published a history book that details the department's history from the beginning to 1994. In addition, the chief publishes an annual report.

West Lake

West Lake has significant levels of history retention programs in place. Appropriate records of all corporate or municipal meetings are maintained in accordance with the laws of the state governing various types of public meetings and decisions involving public funds.

The department maintains items of historical significance, including pictures, newspaper articles, etc. These are helpful when updating a historical perspective of the organization and the major events in its development. A member of the department has accepted responsibility for this function.

The department does not publish or distribute an annual report of activities and accomplishments, failing to provide any specific historical record or measurement of its performance.

Kearsarge

The KFD has some level of a history retention program in place. Appropriate records of all corporate or municipal meetings are maintained in accordance with the laws of the state governing various types of public meetings and decisions involving public funds.

Though the station houses many items of memorabilia from its long history, the department does not formally maintain a file containing items of historical significance, including pictures, newspaper articles, etc. This is a missed opportunity; as such items are helpful when updating a historical perspective of the organization and the major events in its development. No specific member is currently accepting responsibility for this function.

The department does not publish or distribute an annual report of activities and accomplishments, failing to provide any specific historical record or measurement of its performance.

Recommendation:

The Lake Shore, West Ridge, Belle Valley, West Lake, and Kearsarge fire companies should prepare and distribute an annual report of activities and accomplishments, and ensure adequate efforts are in place to maintain the ongoing history of their organizations.

Operating budget, funding, fees, taxation, and financial resources

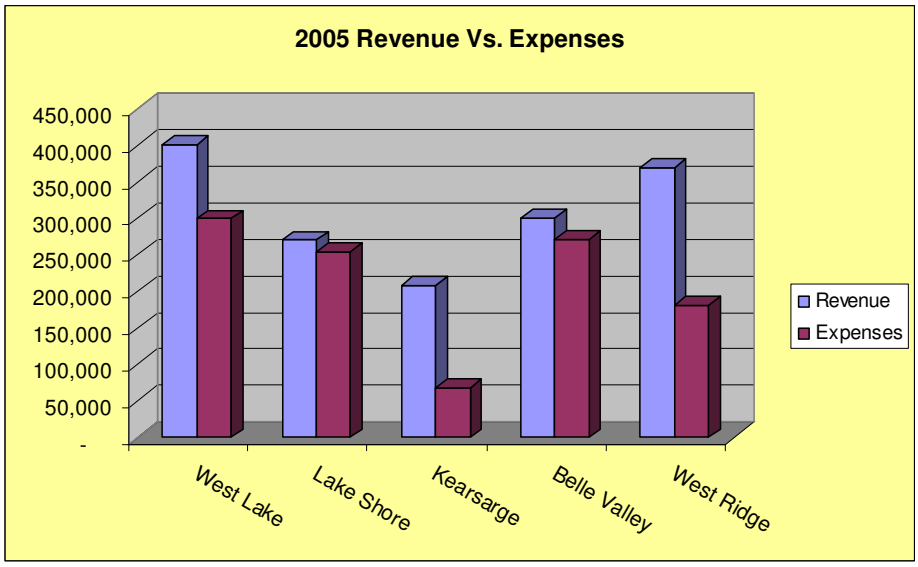
Revenue

All five fire departments operate as not-for-profit organizations and have provided evidence that they have obtained an IRC 501(c)(3) or 501(c)(4) tax exempt status.

The primary revenue sources for the departments are annual fund drives and/or charitable gaming (bingo), which accounts for an average of 56 percent of revenue. All of the departments receive some additional revenue from a variety of sources that include rent, sales of excess equipment, soda pop sales, grants, Millcreek Paramedic Service, and others.

The illustration in figure 2 provides an overview of the revenues received and operating expenditures for 2005 for each department. Revenue figures include all revenue sources as provided by each agency. The operating expense figures include normal operating expenses and do not include depreciation, capital expenditures, or transfers to capital reserve funds.

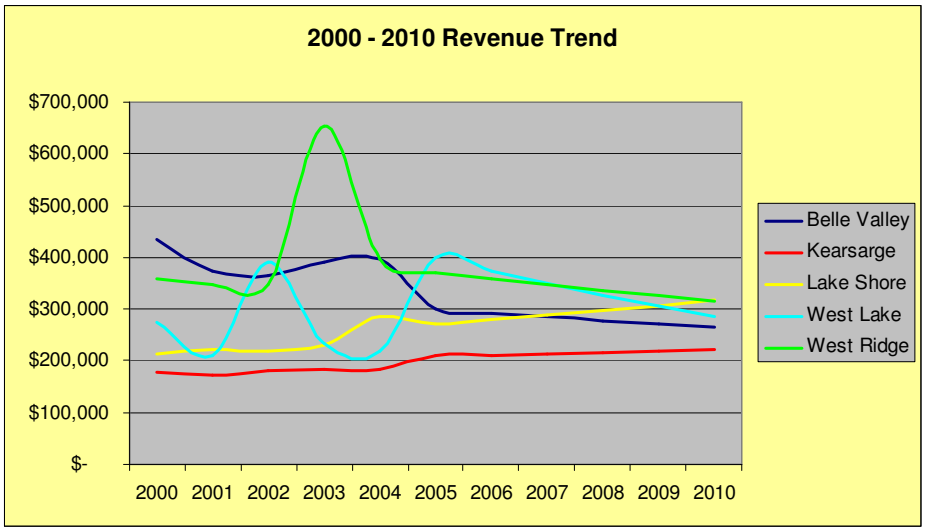
Figure 2: 2005 Revenue & Operating Expense Comparison



According to the data provided by the fire departments, 2005 revenue was greater than each department's operating expense. It should be noted that WLFD included $295,000 in cash transfers from reserves in their revenue over a five-year period.

The Township fire department leaders expressed concern to ESCi regarding revenue and stated that the departments were carefully monitoring revenue and expenses. ESCi analyzed each department's revenue and developed a revenue trend based on the past five years of experience. The illustration in figure 3 shows each department's five-year revenue experience and projected revenues through 2010 based on that trend.

Figure 3: 2000 – 2010 Revenue Trends



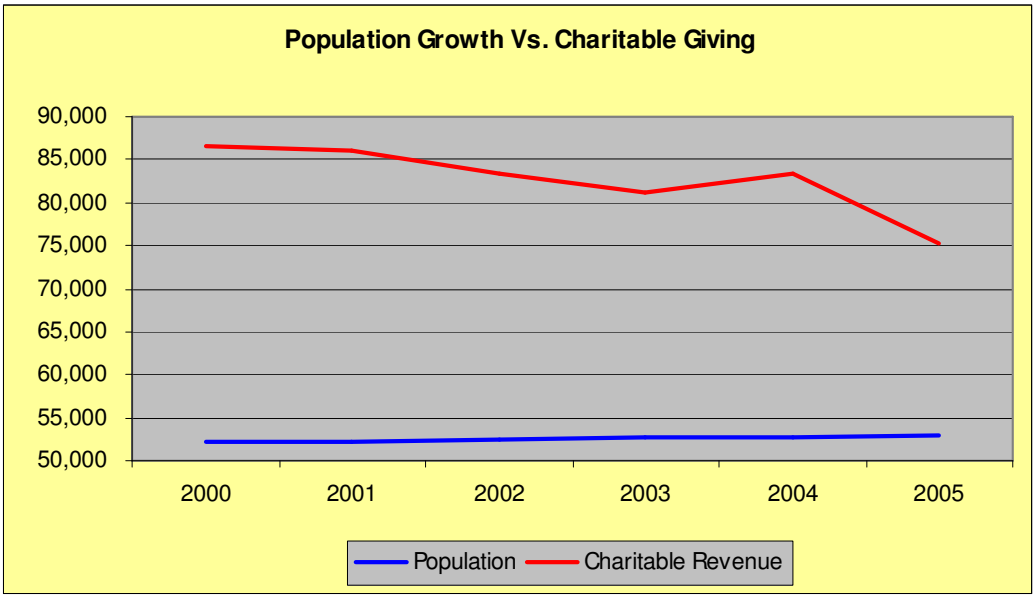
The illustration above shows that Lake Shore and Kearsarge fire departments could expect modestly increasing revenue through 2010. Conversely, Belle Valley, West Lake, and West Ridge fire departments may see decreasing revenues through the same period.

Taken together, the revenue generated by the Township fire departments has fluctuated between a positive 11.68 percent and negative 14.13 percent per year. While there has been a wide variance in revenue collected, the total revenue in 2005 was $1,548,291.00, which is 5.95 percent more than the total in 2000. The average increase in revenue is 0.65 percent per year.

Over 50 percent of the study fire departments revenue is from charitable giving or gaming. Nationally, local charities have experienced a decline in support. A number of economic factors influence charitable giving. However, recent high profile national and international disasters have drawn attention away from local charities. Charities in many communities are experiencing donor fatigue, a situation that occurs when the same people are asked on multiple occasions to donate. Eventually the donors decide to stop donating or their interest shifts to another cause.

The following graph contrasts the townships population growth to the total charitable giving revenue of all the departments.

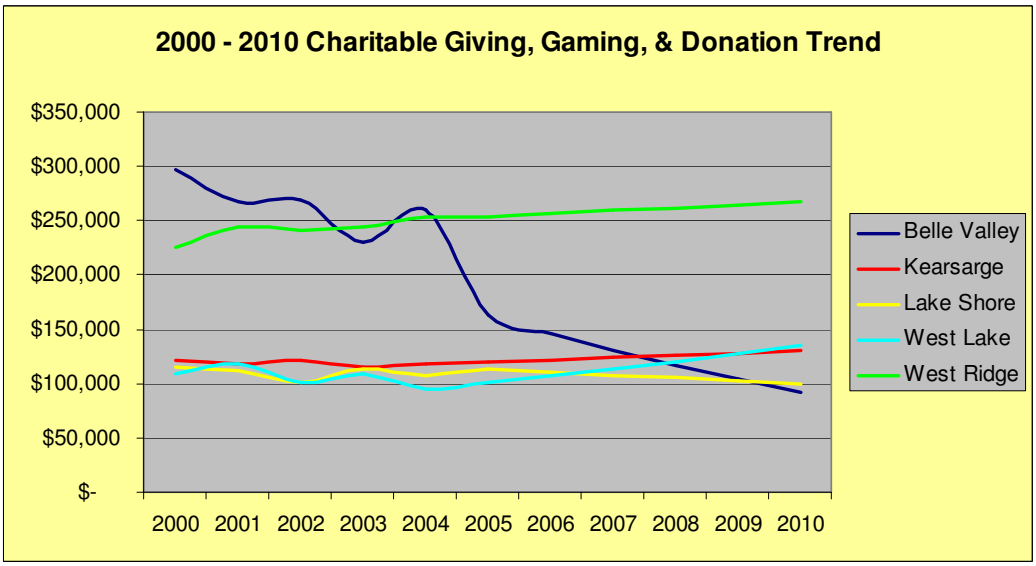
Figure 4: Population Growth Vs. Charitable Giving



While the Township has experienced modest growth, the fire departments have experienced a steady decline in charitable giving.

The illustration in the figure below shows that the trend in charitable giving, gaming, and donations is flat or increasing slightly, or for Belle Valley and Lake Shore, declining.

Figure 5: 2000 – 2010 Charitable Giving, Gaming, & Donation Trend



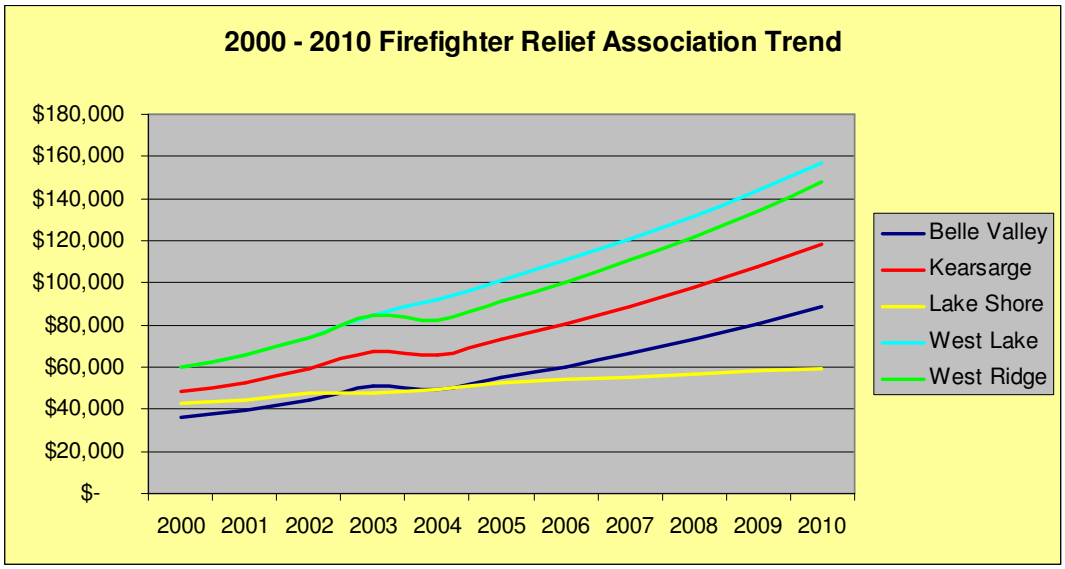
Based on the data provided, ESCi believes that the revenue outlook is not favorable. The fire departments will continue to experience wide fluctuations in revenue and will likely see declining revenues for some time into the future.

Other Revenue

The departments do not receive tax revenues except for an allocation from the State of Pennsylvania for each of their volunteer firefighter relief associations. Firefighter relief associations are authorized by the Volunteer Firemen's Relief Association Act, commonly referred to as Act 84. The Act establishes criteria and standards to ensure that support is available to volunteer firefighters and their families that are injured or killed in the line of duty. Act 84 is funded through the Municipal Pension Plan Funding Standard and Recovery Act, which imposes a tax on fire insurance premiums to fund the activities of relief associations. The utilization of relief association funds is specific, and intended to be used to support health and safety initiatives as well as projects that ensure that the organization will accomplish its objectives.

The illustration in the figure below shows that the trend in relief association revenue is for a continuing increase for all of the departments. The original figure provided by West Lake for 2005 was over $166,000, which was most likely skewed by the sale of equipment. ESCi adjusted this figure to reflect a constant increase in revenue instead of a spike.

Figure 6: 2000 – 2010 Firefighter Relief Association Trend

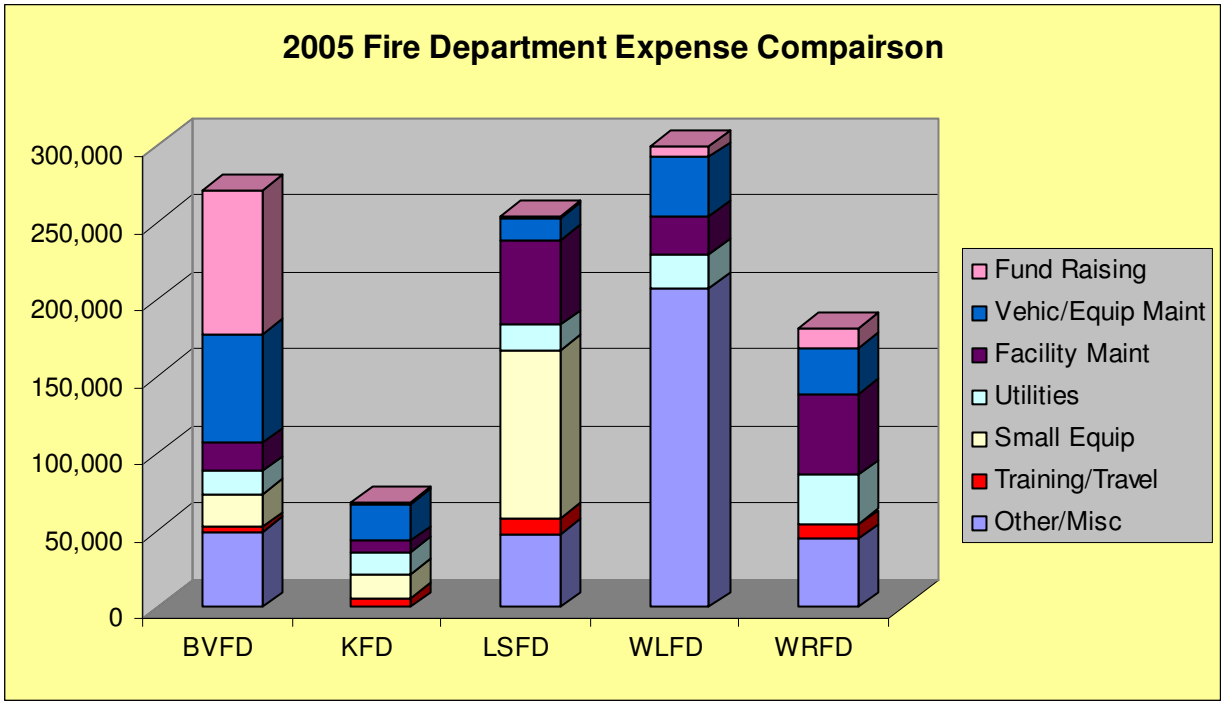


Operating Expenditures

The combined operational budget for all five departments in 2005 was $1,073,506, not including capital expenditures. As illustrated in the following figure, each department expends it operational budget in widely varying ways.

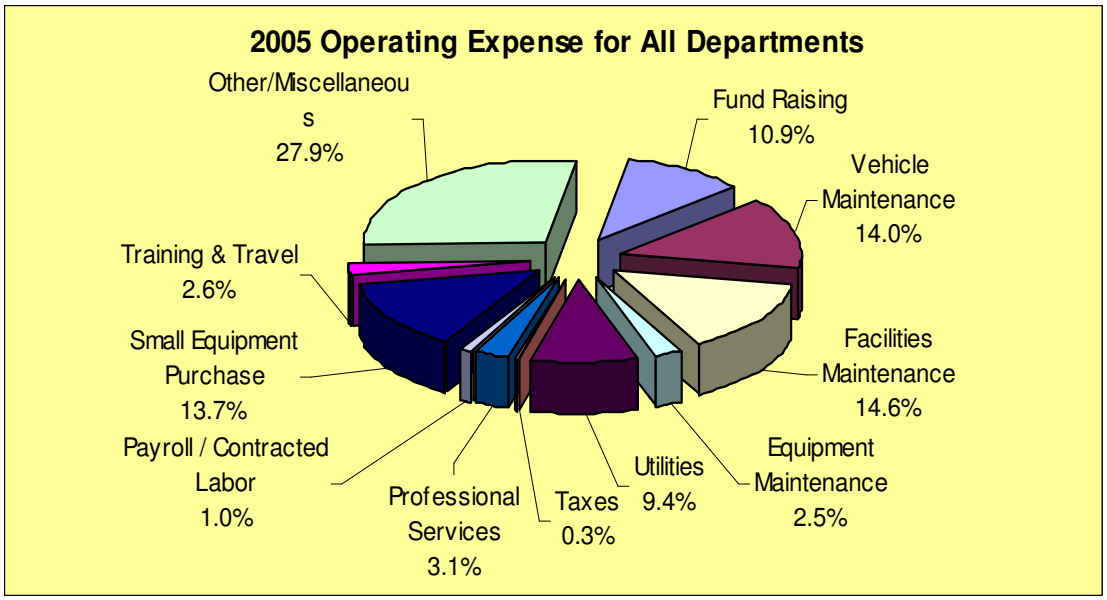
A portion of each department's budget is utilized for raising money, and in the case of Belle Valley, fund raising accounts for 18 percent of the 2005 expenditures. It should be noted that training and travel averages only 3.59 percent of the budgets, while purchases of small tools and equipment averages 14.82 percent, which indicates that training is not a high budget priority any of the departments. The Other/Misc category is a catchall for a broad number of miscellaneous expenditures.

Figure 7: Comparison of Operational Expenditures



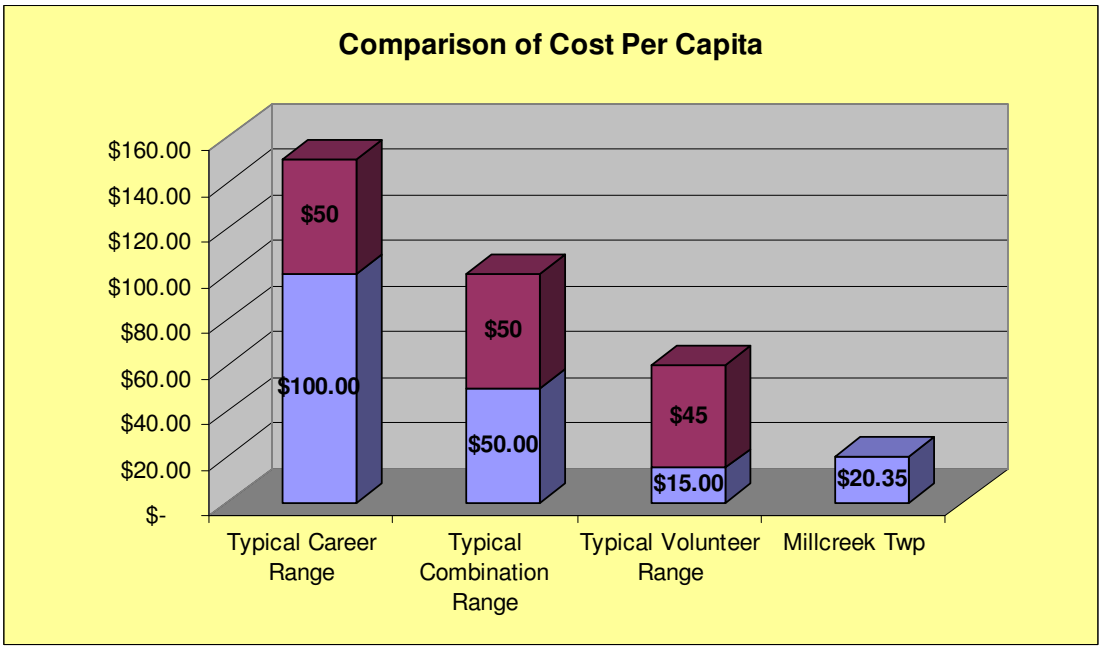
Professional services and payroll expenses, which are included in the Other/Misc category, account for five percent of total amount spent by the departments. This is normal for all volunteer organizations. Career, and combination career and volunteer fire agencies will typically have a 70 to 90 percent salary and benefit expense.

Figure 8: 2005 Operating Expense for All Departments



Given the population receiving direct fire department services in Millcreek Township, figure 9 illustrates fire protection costs per 1,000 population and contrasts this with career and combination departments serving populations of similar size in the Northeastern United States.

Figure 9: Comparison of Cost per Capita



The Township cost per 1000 population is $5.35 higher than bottom range of the typical volunteer department. The moderate cost can be attributed to an all-volunteer workforce in a suburban community, and that EMS services are provided by a separate agency.

The comparison of cost per capita has been developed by ESCi and, as such, represents the company's collective experience with fire service costs as observed while conducting agency evaluations, growth management and master plans, staffing studies, station location studies, merger and consolidation studies, and strategic planning in fire service agencies.

Capital (Cash) Reserve Funds

The Township fire departments have a total accumulated reserve of $1,319,297 (figure 10). There is a small amount of debt carried by several of the departments, and West Ridge is carrying a note for $10,490 as an unrestricted cash reserve. Belle Valley has no cash reserves.

Figure 10: Reserve Funds

Reserve Funds			
	Unrestricted	Restricted	Total
Belle Valley	0	0	0
Kearsarge	235,648	0	235,648
Lake Short	50,606	225,000	275,606
West Lake	170,802	0	170,802
West Ridge	18,441	618,800	637,241
		Total Reserves	1,319,297

West Ridge has the largest reserve funds and has established a five-year capital financing plan. The plan calls for the expenditure of $100,000 in facilities projects and $930,000 in vehicle replacement funding.

The other departments have not conducted a capital planning process.

Recommendation:

The Lake Shore, Belle Valley, West Lake, and Kearsarge fire companies should prepare long-range capital plans for the replacement of fire apparatus, facilities, and equipment.

EMS budget, resources, and cost recovery

The Township fire departments are responsible for medical response in addition to their other responsibilities. In 1999, medical call volumes were affecting the departments' response capabilities, and the Millcreek Paramedic Service (MPS) was formed to provide a professional and consistent level of medical response.

MPS is owned by the five Township fire departments and operated as a separate not-for-profit 501(c)(3) business entity. A seven-member board of directors made up of a representative from each fire department, and two at-large community members governs the organization.

ESCi was not provided with revenue or expenditure budgets and cannot thoroughly analyze the MPS financial condition.

Based on information provided during interviews, ESCi learned that MPS derives it revenue from ambulance transport billing and a membership campaign. Since MPS provides its services with a career staff, ESCi assumes that the majority of its expense is salary and benefits.

MPS was originally financed by the five fire departments, and still carries some debt with two of the departments. Vehicles account for current long-term debt and are their largest capital expense. The organization operates out of the existing fire stations, and has an office in the Township municipal building and does not own real estate.

Staffing

Fire departments must be appropriately staffed in order to deliver effective public safety services. Staffing is provided on two levels, administrative or support and operational or response. This section of the report analyzes the current staffing levels for the Township's fire and emergency medical services.

Administration and Support Staff

One of the primary responsibilities of the department's administration and support staff is to ensure that the operational members 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 success of the department. Without sufficient oversight, planning, documentation, training, and maintenance, the operational entities of the department 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 of a department 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. Based on our experience with fire departments throughout the country, ESCi has determined that emergency services agencies require a 10 to 15 percent ratio of administration and support to operational personnel.

All Departments

The five fire departments use volunteer members to provide emergency services to the Township and for administrative functions. As such, no data comparison can be made with regards to administrative and support staff to operations personnel. Of the five fire departments, only BVFD has a part-time clerical assistant.

Based on the number of personnel engaged in the direct delivery of service, and utilizing a 10 and 15 percent ratio of operational personnel to administrative staff, the individuals providing administrative and support functions for the fire departments need to provide the following number of administrative and support hours illustrated in the following figure. The same number of hours is required of career support personnel as volunteer.

Figure 11: Millcreek Township Fire Departments' Support and Administration Staffing

Support and Administration Staffing Hours per Week					
	Lake Shore	**West Ridge**	**Belle Valley**	**West Lake**	**Kearsarge**
Operations personnel	41	56	37	35	20
Current Support Staff	0	0	.5	0	0
Support Staff at 10%	.4 (16 hr)	.6 (24 hr)	.4 (16 hr)	.4 (16 hr)	.2 (8 hr)
Support Staff at 15%	.6 (24 hr)	.8 (32 hr)	.6 (24 hr)	.5 (20 hr)	.3 (12 hr)

If the fire departments were to share administrative and support personnel, the number of personnel required for support would be 2.0 to 2.8.

Recommendation:
The Township fire departments do not have an appropriate level of administrative staffing and should prepare a plan for acquiring paid or volunteer administrative assistance.

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 mitigating incidents. Insufficient staffing at an operational scene decreases the effectiveness of the response and increases the risk of injury to citizens and firefighters alike. The following figure summarizes the personnel assigned to operations, or street-level service delivery for the fire departments.

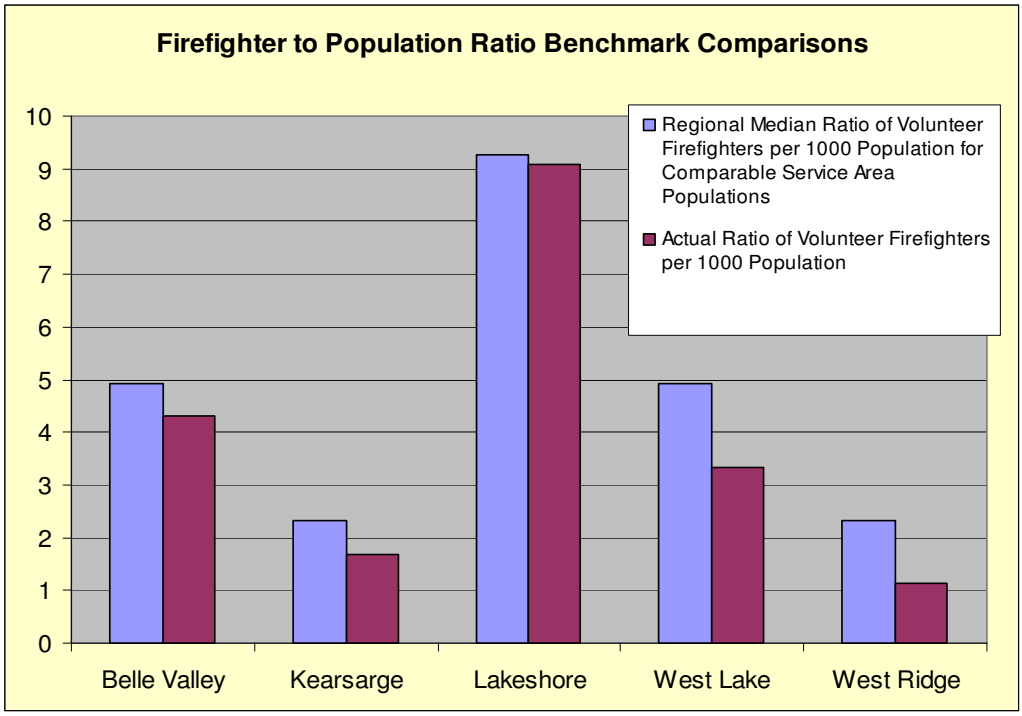
Figure 12: Department Staffing Summary

Millcreek Township Fire Departments' Staffing Summary						
Member Qualifications	**Belle Valley**	**Kearsarge**	**Lake Shore**	**West Lake**	**West Ridge**	**Total All Agencies**
Interior structural firefighting	30	20	14	33	25	122
In training	2	1	5	4	2	14
Exterior operations or light duty	1	3	5	6	9	24
Pump apparatus operators	18	17	9	27	24	95
Fire police or scene assistants	5	3	5	4	7	24
Junior or cadet	3	0	0	113	4	20
Retired or honorary (non-response)	5	0	1	0	1	7
Auxiliary (non-response)	2	0	10	0	26	38
Total members	**39**	**26**	**23**	**53**	**47**	**188**

An analysis of emergency service staffing begins with a comparison of available emergency service personnel to other communities of similar size and organization. There are 188 volunteer personnel serving the Township. The actual number of fully qualified, structural fire response personnel is 122, after compensating for fire police, junior firefighters, and other members not involved in structural firefighting.

The following chart, using benchmark data for the region,[13] provides an overview of the staffing level of the Township fire departments based on firefighters per 1,000 population. The chart uses comparison date from the Northeast region of the United States, which breaks out the information by population served. Thus, the different departments have different comparison data based on the number of persons directly served in their initial response area.

Figure 13: Comparison of Firefighters per 1,000 Population



All of the departments are below the regional comparison figure for the number of volunteer firefighters as a ratio to population served. This is an initial indication that the agencies are understaffed. The problem is particularly pronounced in West Lake and West Ridge, with the latter having a ratio less than one-half of the regional median figure for its population size.

Regardless of the raw number of personnel available to a department, what matters most is the actual number of emergency responders the agency is able to muster at an emergency scene. Anecdotally, the departments are concerned about daytime response and the ability to field

[13] U.S. Fire Administration/National Fire Protection Association, *Fire Department Profiles, 2003*, Quincy, MA.

sufficient personnel. The data collected from each agency indicates that is very likely to be the case.

The following table provides information regarding the number of qualified structural firefighters that are routinely available for response during the daytime from each department.

Figure 14: Daytime Staffing Availability

Estimated Number of Qualified Daytime Firefighting Personnel						
	Belle Valley	**Kearsarge**	**Lake Shore**	**West Lake**	**West Ridge**	**Total All Agencies**
Qualified Firefighters	7	6	4	5	5	27
Percent of total	23%	30%	29%	15%	20%	22%

The National Fire Protection Association's (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*[14] provides a recommended response standard for volunteer fire departments in Table 4.3.2. This table is shown in the following figure.

Figure 15: NFPA Volunteer Staffing and Response Targets

NFPA 1720 Volunteer Department Staffing and Response Target[15]				
Classification	Population Density[16]	Response Time Performance Target	Staffing Performance Target	Percentile
Urban	>1,000	9 Min.	15	90th
Suburban	500 – 999	10 Min.	10	80th
Rural	<500	14 Min.	6	80th

Since most of Millcreek Township is populated at an urban density as defined by this table, the fire departments in Millcreek Township should be capable of generating a response of at least 15 firefighters within nine minutes of a dispatch 24 hours a day. When compared to the information provided in a previous figure, it can be seen that this would not be possible for any one of the five departments. At least three departments would need to response to all structure fires with all available daytime manpower to accomplish the *NFPA 1720* staffing target. The

[14] *Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Volunteer Fire Departments*, Section 4.3.2, National Fire Protection Association, Quincy, MA,
[15] Ibid.
[16] Per square mile.

response of the Township Fire Incident Response Unit may help, but assurance of a nine-minute response throughout the Township is unlikely.

With only about 25 firefighters from all five departments reporting that they are routinely available for daytime response, and given that no formal program is in place to monitor the availability or status of these members, it must be assumed that there are times when even these daytime personnel are committed to personal activities or are out of the area. This leads to the conclusion that availability of daytime staffing is at or near a critical stage throughout the Township.

Additional information on the effect of staffing levels at emergency scenes will be provided in the Service Delivery section of this report.

Recommendation:

- The Township fire departments should develop a plan for establishing an on-call volunteer response force that will cover periods when volunteer response is insufficient.
- The Township should consider other methods of assuring adequate daytime staffing, including the use of paid firefighters, either full-time, part-time, or a combination of both.

Millcreek Paramedic Services

Millcreek Paramedic Services uses primarily on-duty career staffing with certified paramedics. One supervisor handles day-to-day operations, while three other supervisors work in the field. Fifteen full and part-time paramedics provide advanced life support services, with 20 to 25 emergency medical technicians providing basic life support response. Staff are assigned to twelve hour shifts, running 24 hours out of the Kearsarge and West Ridge fire stations, and a 10-hour peak-activity unit (8:30am to 6:30pm) is housed at the Belle Valley station.

Staff Allocation to Functional Responsibilities

In order to be successful, organizations must assign clear responsibilities to its members. Job responsibilities and functions should be outlined in job descriptions, and are assigned by the leadership of the organization.

In the case of independent fire departments, the organizations articles of incorporation and/or by-laws should specify the organizations job classifications and how the positions are filled. Job descriptions should also be available that specify the knowledge, skills, and abilities required for each position as well the positions functional responsibilities and working conditions.

West Ridge

The West Ridge fire company is administered under a set of by-laws that were enacted in 1993 and amended March 2006. The by-laws specify the types (classes) of membership and describe the board of directors and their responsibilities. The membership elects the officers of the company and the fire chief.

The responsibilities of various department committees are described and appointment to committees is specified. A safety committee is not specified. In addition to other information regarding membership in the organization, qualifications for the organization's members, firefighter through chief, are specified. Specific job descriptions are not utilized.

West Lake

The West Lake fire company is administered under a set of by-laws that were adopted in 1995 that have been amended several times since. The by-laws specify the types of membership and give a short description of the duties of its officers and committees. The chief, 1st and 2nd assistant chiefs, and solicitor are elected by the active company members.

The responsibilities of various department committees are described and membership in a committee is by a vote of the membership. A safety committee is not specified. In addition to other information regarding membership in the organization, qualifications for the organization's members, junior firefighter through chief, are specified. Specific job descriptions are not utilized.

Kearsarge

The Kearsarge fire company is administered under a set of by-laws that were revised in 1997 and 2005. The by-laws specify the types of members, business officers, and directors. A description is provided of the duties of its officers and committees in the by-laws as well as their standard operating guidelines. The officers and directors of the company are elected by the membership.

The only committee described in the by-laws is the nominating committee. A safety committee is not specified. In addition to other information regarding membership in the organization, and qualifications for the organization's members, firefighter through chief, are specified. Specific job descriptions are not utilized, except for limited specifications in the SOGs.

Belle Valley

The Belle Valley fire company is administered under a set of by-laws that were enacted in 1974 and have been amended several times since. The by-laws specify the types of membership and describe the board of directors and their responsibilities. The membership elects the fire chief and deputy chiefs.

A safety committee is not specified. In addition to other information regarding membership in the organization, qualifications for the organizations members, lieutenant through chief, are specified.

Lake Shore

The Lake Shore fire company is administered under a set of by-laws. The documents have the appearance of having been recently revised, but were not dated. The by-laws specify the types of membership and give a description of the duties of its directors and officers. The directors, chief, and 1st and 2nd assistant chiefs are elected by the company members. A safety committee is not specified.

In addition to other information regarding membership in the organization, qualifications for the organization's members, firefighter through chief, are specified. Specific job descriptions are not utilized.

Recommendations:

- Each Township fire company should establish and codify a safety committee.
- Each Township fire company should develop job descriptions for each position in the organization.

Standard of Coverage and Staffing Performance

ESCi was not provided with electronic data regarding the staffing performance of the Township fire departments. Furthermore, the fire departments have not adopted a standard of coverage or written performance objectives for staffing performance. The current staffing for the fire departments is described in the following table:

Figure 16: Fire Company Minimum Staffing

	Standard Engine/Ladder	Typical Engine/Ladder	Turnout Time Standard
BVFD	2 / 3	4 / 4	5 Min.
KFD	3 / 3	4 / 3	5 Min.
LSFD	3 / -	5 / -	5 Min.
WLFD	3 / 2	1 / 2	6 Min.
WRFD	2* / -	3 / -	5 Min.

*SCBA Trained/certified

Capital Assets and Improvement Programs

Millcreek Township has five volunteer fire departments that need a balance of three basic resources to carry out their emergency mission: specifically people, equipment, and facilities. Because firefighting is an extremely physical pursuit, the adequacy of personnel resources is a primary concern, but no matter how competent or numerous the firefighters are, the department will fail to execute its mission if it lacks sufficient fire apparatus distributed in an efficient manner.

As previously mentioned, the Millcreek Township fire departments combined have millions of dollars worth of capital assets. These assets are necessary to provide service and must be maintained and replaced as needed. Maintenance and replacement plans should be created and maintained for facilities, apparatus, and other high value equipment. A funding mechanism should be established to ensure money is available to cover the cost of this effort and that resources are not duplicated within the Township.

While volunteer, career, and even combination departments have different facility requirements, there are basic needs each fire station has to address, more specifically, quick response time and housing of apparatus and equipment. Everything else depends on a particular department's budget and needs. Fire station designs are unlike any other type of project as there are many subtle elements and specialized systems that go into a fire station. For example, fire departments across the country are wrestling with the question of how to address the gender issue within the boundaries of both existing and new fire stations. Important issues and or goals to consider when designing a fire station suitable for both men and women, would be the design of bunk rooms, restrooms, locker rooms, and common areas. It appears that Township fire departments, in general, have not considered these issues in the design of newer stations and the remodeling of some older stations. There is no doubt that, in the future, Millcreek Township will need to consider staffing the fire stations and the gender issue will need to be addressed.

Volunteer Fire Stations

The Township fire departments that ESCi reviewed do not have a formal facilities plan for the volunteer fire stations, though it has recognized that there may need to replace and relocate fire stations. Given the current trend of steady growth and healthy economic conditions in the

community, the time is right to develop a comprehensive and long-range facilities management plan.

Inadequate facilities for housing firefighters and apparatus detract from the department's mission. Limited space can significantly affect the available options for resource assignment, hinder the ability to maintain a well-trained and fit workforce, and may affect employee morale. In the case of the Township volunteer fire departments, the design and construction of the fire stations are suitable for volunteer operations, as it exists today. The commitment of the departments and the community to providing adequate facilities is commendable, and ESCi recommends that a study regarding community growth, annexation, and staffed fire stations should not be delayed.

Consideration should be given to the ability of the facilities to support the functions of the department, as it may exist today and into the future. The primary functions that should take place within the fire station environment should be closely examined and adequate, efficient space for all functions should be provided. Here are some examples:

- Housing and cleaning apparatus and equipment
- Administrative office duties
- Firefighter training
- Firefighter fitness
- Future residential living for on-duty crewmembers (male and female)

While this list may seem elementary, the lack of dedicated space compromises the ability of the facilities to support any of these functions, and can detract from its primary purpose for existing. At this time, Township fire departments continue to operate these facilities that may be unable to support one or more of the primary functions.

Station #5 Lake Shore Station

5310 West Lake Rd.

Built in 1953 and remodeled in 1991, this modern volunteer fire station, blends well with surrounding area. This facility consists of five apparatus bays. Very clean well maintained. Any specific problems with this facility can be classified into the following seven categories.

• **Design:**	*Size of facility is adequate for its use. The apparatus exit to flow of traffic is not safe and effective. The building blends well with surrounding area. The structure is adaptable to future needs of the community. There is adequate parking for staff and visitors.*
• **Construction:**	*Block construction type. Flat roof type with a rubber membrane. Forced air and radiant heating system. Has central air conditioning.*
• **Safety:**	*Automatic door stops operating properly. No automatic sprinklers. Has an ADT smoke/heat monitored alarm system. Has adequate building fire extinguishers not on apparatus. Commercial cooking equipment present in Social Hall. Proper hood, duct, and grease filters in place. There is a fixed fire extinguishing system present. Flammable and combustible liquids are not in approved storage. No SCBA compressor. There is a back-up generator.*
• **Environment:**	*Has apparatus exhaust removal system - direct connect. Does not have underground storage tanks. No apparatus floor drain oil separation in use.*
• **Code Compliance:**	*ADA compliant.*
• **Staff Facilities:**	*There is adequate space for working in and around apparatus, also space for working on small equipment. There is adequate space for safe and rapid response. By using Social Hall there is adequate space for cooking and eating. There is adequate space for training and company drills.*
• **Efficiency:**	*This station could be remodeled to staff firefighters if the bingo hall and social hall were reduced in size.*

Station # 46 West Ridge Station

3142 West 26th

Built in 1946 and remodeled in 1982, this modern, volunteer fire station blends well with surrounding area. This facility consists of 3-fire bays and 2-EMS bays located on the side of the building. Any specific problems with this facility can be classified into the following seven categories.

• **Design:**	*The size of facility is adequate for its current use. There are no warning signs or lights when apparatus exits into traffic flow. The building blends well with its surrounding area. The structure is adaptable to future needs of the community. Building site close to street (West 26th).*
• **Construction:**	*Block constuction type. Flat roof, tar and gravel. Heating system and fuel type is natural gas. Central air conditioning.*
• **Safety:**	*No automatic door stops . No automatic sprinklers. Has monitored smoke/heat alarms. Has adequate building fire extinguishers not on apparatus. Commercial cooking equipment is present. Proper hood, duct, and grease filters are in place.*
• **Environment:**	*There is a direct connect exhaust removal system which has evidence of use. No underground storage tanks. There is no apparatus floor drain oil separation in use.*
• **Code Compliance:**	*Exit lights out. ADA compliant.*
• **Staff Facilities:**	*There is adequate space for working in and around apparatus also space for working on small equipment. There is adequate space for safe and rapid response. By using Social Hall, there is adequate space for cooking and eating. There is adequate space for training and company drills.*
• **Efficiency:**	*High natural gas bills.*

Station # 47 West Ridge South Station

West 4775 Sterrettenia

Built in 1997, this modern volunteer fire station blends well with surrounding area. This facility consists of three apparatus bays. Any specific problems with this facility can be classified into the following seven categories.

• **Design:**	*The size of facility is adequate for its current use. There are no warning signs or lights when apparatus exits into traffic flow. The building blends well with its surrounding area. The structure is adaptable to future needs of the community.*
• **Construction:**	*Block constuction type. Flat roof, tar and gravel. Heating system and fuel type is natural gas. Central air conditioning.*
• **Safety:**	*No automatic door stops . No automatic sprinklers. Has monitored smoke/heat alarms. Has adequate building fire extinguishers. Commercial cooking equipment is present. Proper hood, duct, and grease filters are in place.*
• **Environment:**	*There is a direct connect exhaust removal system which has evidence of use. No underground storage tanks. There is no apparatus floor drain oil separation in use.*
• **Code Compliance:**	*Exit light out.*
• **Staff Facilities:**	*There is adequate space for working in and around apparatus also space for working on small equipment. There is adequate space for safe and rapid response. By using Social Hall, there is adequate space for cooking and eating. There is adequate space for training and company drills.*
• **Efficiency:**	*Natural gas bills.*

Station #3 Belle Valley Station

1514 Norcross

Built in 1944, this older volunteer fire station blends in well with surrounding area. This facility consists of five apparatus bays. Building needs a general cleaning. Any specific problems with this facility can be classified into the following seven categories.

• **Design:**	*The size of this facility is not adequate for its current use. The apparatus exit to traffic flow is not safe and effective. Traffic back up at rush hour.*
• **Construction:**	*Block construction with flat roof. Water leaks on roof.*
• **Safety:**	*All doors should be equipped with automatic door stops. Poor lighting throughout the station. Flammable and combustible liquids not in approved storage - in metal cabinet.*
• **Environment:**	*No apparatus exhaust removal system. Exhaust fan, no CO monitor.*
• **Code Compliance:**	*ADA compliant. ADA issues - Social Hall.*
• **Staff Facilities:**	*Space is tight for rapid response turnout. Day room and small training room possible expansion for future.*
• **Efficiency:**	*Many additions over the years.*

Station #44 Kearsarge Station

4930 West Street

Built in 1988, this up-to-date volunteer station blends in well with surrounding area. This facility consists of five apparatus bays. Any specific problems with this facility can be classified into the following seven categories.

• **Design:**	*There is enough room for the staff and equipment. This facility is adequately designed for its functions and to accomadate two gender staffing.*
• **Construction:**	*Block constuction type. Flat roof, tar and gravel. Heating system and fuel type is natural gas. Central air conditioning.*
• **Safety:**	*No automatic door stops. No spinkler system. No cooking equipment central point shut down in place.*
• **Environment:**	*No underground storage tanks. Fuel tank free standing no dike.*
• **Code Compliance:**	*ADA compliant.*
• **Staff Facilities:**	*Adequate room for the staff. Plenty of room to maneuver around vehicles. There is enough room for the current staff and equipment. This facility is adequately designed for its functions.*
• **Efficiency:**	*Windows leak. Block wall leak air - not staggered.*

46 West Lake Fire Station #1

3762 West Lake Road

Built in 1976, this relatively newer facility consists of five apparatus bays. Clean and well kept. Any specific problems with this facility can be classified into the following seven categories.

• **Design:**	*Size of facility not adequate for its current use. Apparatus exit to traffic flow is not safe and effective. Could use second floor.*
• **Construction:**	*Block construction with flat roof. Plumbing issues and water leaks on roof.*
• **Safety:**	*No cooking equipment central point shut down in place.*
• **Environment:**	*No underground storage tanks. No apparatus floor drain oil separation in use.*
• **Code Compliance:**	*Not ADA compliant. No problems noted.*
• **Staff Facilities:**	*There is adequate space for working in and around apparatus also space for working on small equipment. There is adequate space for safe and rapid response. By using Social Hall there is adequate space for cooking and eating. There is adequate space for training and company drills.*
• **Efficiency:**	*No showers - needed for women. Chief and two assistant chiefs share one office.*

47 West Lake Station #2

2942 West 12th

Built in 1955. Blends well with surrounding area. This facility consists of two apparatus bays. Older building with no room for expansion, minimal land. Any specific problems with this facility can be classified into the following seven categories.

• **Design:**	*Apparatus exit to traffic flow not safe and effective. Structure is not adaptable to future needs of the community.*
• **Construction:**	*Block construction with flat roof. Plumbing issues and water leaks on roof. No air conditioning.*
• **Safety:**	*No cooking equipment central point shut down in place. No commercial cooking equipment present. No fixed fire extinguishing systems present. Flammable and combustible liquids not in approved storage. Pressure cylinders not properly stored. No SCBA compressor.*
• **Environment:**	*No underground storage tanks. No apparatus floor drain oil separation in use.*
• **Code Compliance:**	*Not ADA compliant. Small station - no public access. No building code issues.*
• **Staff Facilities:**	*Older single company volunteer station. Not enough adequate space for training and company drills. Not enough space for personal hygeine. Not enough adequate space for sleeping. No two-gender staffing.*
• **Efficiency:**	*None.*

This section of the report deals only with analysis of current facilities. However, ESCi is recommending development of a full long-range facilities management plan, as well as specific plans to address any current problems.

A long-range facilities management plan should include a variety of items, such as:

- Location, timing, and cost of any new facilities
- Identified long-term maintenance needs for existing facilities

- Ongoing funding plan

Recommendations:

- Develop and adequately fund a long-range facilities management plan in accordance with recommendation for projected service delivery for all stations.
- Initiate efforts to correct existing deficiencies as indicated.

Apparatus

The Township fire departments maintain a fleet of response vehicles that is well maintained, and with nearly half the fleet in excess of the typical anticipated front-line lifespan for its type. Average age of all fire apparatus is 8.4 years. Average condition of all fire apparatus is considered good. The Township and fire departments need to make apparatus replacement a significant issue in both the short and long term to ensure continued reliability for emergency service use. At this time, it would be good policy not to purchase any equipment until the Township has completed the consolidation study.

If the Township fire departments were to merge, a comprehensive study would need to be conducted to evaluate apparatus requirements for the Township as a whole. The current deployment of ten engines and four ladders could not be justified in a merged organization, and the revenue required to purchase this equipment could be used for other functional needs. Furthermore, if the Township fire departments were to merge, a funding mechanism would need to be identified for future capital replacement including EMS apparatus.

The following chart lists all current primary heavy apparatus and front line vehicles used by the Township fire departments, excluding smaller commercial-style utility or staff vehicles. It includes current age, life expectancy, and roughly estimated replacement-funding requirements. The following figure describes the replacement cost for equipment that is in use today at all five fire departments.

Figure 17: Millcreek Township Fire Department Apparatus Replacement Funding

UNIT	YEAR	REPLACEMENT COST	ANNUAL FUND CONTRIBUTIONS	CURRENT CASH REQUIREMENTS
Lake Shore				
Ambulance # 52	1999	$ 130,000	$ 13,000	$ 91,000
Brush # 54	2001	$ 145,000	$ 9,667	$ 48,333
Tanker # 56	1991	$ 210,000	$ 10,500	$ 157,500
Engine # 55	2002	$ 345,000	$ 17,250	$ 69,000
Engine # 53	1994	$ 345,000	$ 17,250	$ 207,000
West Ridge				
Tower # 10	2003	$ 775,000	$ 31,000	$ 93,000
Engine # 17	1993	$ 345,000	$ 17,250	$ 224,250
Engine # 16	1993	$ 345,000	$ 17,250	$ 224,250
Truck Utility #12	2001	$ 85,000	$ 5,667	$ 28,333
Belle Valley				
Engine # 32	1992	$ 345,000	$ 17,250	$ 241,500
Engine # 31	1987	$ 345,000	$ 17,250	$ 327,750
Tower # 30	1989	$ 775,000	$ 31,000	$ 527,000
Rescue # 38	1996	$ 410,000	$ 20,500	$ 205,000
Kearsage				
Engine # 442	1992	$ 345,000	$ 17,250	$ 241,500
Engine # 443	1992	$ 345,000	$ 17,250	$ 241,500
Tower # 449	1995	$ 775,000	$ 31,000	$ 341,000
Engine # 9	2005	$ 345,000	$ 17,250	$ 17,250
West Lake				
Ladder # 2	1989	$ 775,000	$ 31,000	$ 527,000
Rescue # 1	1993	$ 345,000	$ 17,250	$ 224,250
Engine # 4	1997	$ 410,000	$ 20,500	$ 184,500
Rescue # 5	2004	$ 185,000	$ 9,250	$ 18,500
Millcreek Paramedic				
Ambulance MP 27	2002	$ 130,000	$ 13,000	$ 52,000
Ambulance MP 33	1993	$ 130,000	NA	$ 130,000
Ambulance MP 14	2002	$ 130,000	$ 13,000	$ 52,000
		TOTALS	***$ 411,583***	***$ 4,473,417***

In order to meet apparatus replacement needs of current resources, $411,583 should be contributed to a reserve fund each year, if there were to be a merger of the fire departments. Also, based on the age and replacement schedule of apparatus in use today, the merged fire department, or the current fire departments in aggregate, should already have $4,473,417 available in a reserve fund. This is based on a continuation of the current number and type of apparatus that the Township fire departments maintain. The Township has no capital planning in place for apparatus replacement today.

The current equipment maintained by the Township fire departments is greater than number needed to for response in the Township. A merger of the five fire departments would reduce the redundancy of fire fighting equipment and reduce the funds required to maintain and the firefighting inventory.

It should be noted that the chart represents funding levels needed for a capital replacement fund that is both adequate and up-to-date, assuring cash is available for purchase at the expected time of replacement. This is not meant to exclude other funding methods from consideration. For instance, when the market provides low rates, municipal lease-purchase programs can be financially efficient. However, a firm commitment is required on the part of the elected officials toward a scheduled apparatus replacement program. It is far too common, when faced with a large capital purchase that is competing with other community needs, for departments to delay such purchases to the point where efficiency or safety are compromised. Millcreek Township can avoid such conditions by remaining firmly committed to a reasonable and effective capital replacement program for fire apparatus, if all the fire departments are merged.

The apparatus of Millcreek Township was reviewed and a basic inspection was performed to determine the condition and the life expediency of the following apparatus.

Please refer to the apparatus condition chart in the Appendix for the criteria used by ESCi in evaluating apparatus condition. Each heavy piece of apparatus was given a basic review for condition and safety. The following paragraphs describe any notations made during this review.

Lake Shore

Ambulance 52

1999 Wheel Coach Type III

Seating Capacity: **2**

Pump Capacity: **N/A**

Tank Capacity: **N/A**

Condition: **Good**

Additional Comments or Observations: No problems noted. Equipment is neat and mounted securely.

Brush 54

2001 American LaFrance / Brush/Mini

Seating Capacity: **2**

Pump Capacity: **350**

Tank Capacity: **480**

Condition: **Excellent**

Additional Comments or Observations: Unapproved gas cans. Equipment is neat and mounted securely.

Tanker 56

1991 SS Fire Top Kick Tanker

Seating Capacity: **2**

Pump Capacity: **500**

Tank Capacity: **1800**

Condition: **Excellent**

Additional Comments or Observations: 2200 Port A Tank. Unapproved gas cans. Equipment is neat and mounted securely.

Engine 55

2002 American La France Engine

Seating Capacity: **6**

Pump Capacity: **1500**

Tank Capacity: **100**

Condition: **Excellent**

Additional Comments or Observations: No Problems noted. Equipment is neat and mounted securely.

Engine 53

1994 KME Rescue/Engine

Seating Capacity: **5**

Pump Capacity: **1000**

Tank Capacity: **750**

Condition: **Very Good**

Additional Comments or Observations: Unapproved gas cans. Equipment is neat and mounted securely.

West Ridge

Tower - 10

2003 Sutphen Tower

Seating Capacity: **6**

Pump Capacity: **2000**

Tank Capacity: **400**

Condition: **Excellent**

Additional Comments or Observations: No problems noted

Engine 17

1993 Sutphen Engine

Seating Capacity: **7**

Pump Capacity: **1750**

Tank Capacity: **1000**

Condition: **Very Good**

Additional Comments or Observations: No problems noted.

Engine 16

1993 Sutphen Engine

Seating Capacity: **7**

Pump Capacity: **1750**

Tank Capacity: **1000**

Condition: **Good**

Additional Comments or Observations: No problems noted.

Truck 12

2001 Union City Body Utility

Seating Capacity: **2**

Pump Capacity: **0**

Tank Capacity: **0**

Condition: **Very Good**

Additional Comments or Observations: No problems noted.

Belle Valley

Engine 32

1992 Suphen Engine

Seating Capacity: **6**

Pump Capacity: **2000**

Tank Capacity: **750**

Condition: **Good**

Additional Comments or Observations: No problems noted.

Engine 31

1987 Sutphen Engine

Seating Capacity: **4**

Pump Capacity: **1500**

Tank Capacity: **500**

Condition: **Fair**

Additional Comments or Observations: Looking to get refurbished in near future.

Tower 30

1989 Sutphen Tower 90

Seating Capacity: **6**

Pump Capacity: **1500**

Tank Capacity: **0**

Condition: **Fair**

Additional Comments or Observations: Refurbished in 2000. Should have over 100,000 miles but currently show 5,924 miles. 0 miles on odometer at refurb. Purchased as a reconditioned tower.

Rescue 38

1996 KME Rescue

Seating Capacity: **6**

Pump Capacity:

Tank Capacity:

Condition: **Very Good**

Additional Comments or Observations: No problems noted.

Kearsage

Engine 442

1992 KME Renagade Engine

Seating Capacity: **6**

Pump Capacity: **1500**

Tank Capacity: **750**

Condition: **Very Good**

Additional Comments or Observations: History of light tower problems. Comcerns about head sets. History of electrical grounding problems.

Engine 443

1992 KME Engine

Seating Capacity: **6**

Pump Capacity: **1500**

Tank Capacity: **750**

Condition: **Very Good**

Additional Comments or Observations: Light tower. Head sets. Rebuilt engine. History of electrical problems.

Tower 449

1995 KME Tower

Seating Capacity: **6**

Pump Capacity: **2000**

Tank Capacity: **0**

Condition: **Excellent**

Additional Comments or Observations: 102 Platform. Rebuilt engine. Repainted twice.

West Lake Station #1

Engine 9

2005 Marion Engine

Seating Capacity: **6**

Pump Capacity: **1500**

Tank Capacity: **1000**

Condition: **Excellent**

Additional Comments or Observations: New - no problems noted.

Ladder 2

1989 Grumman Ladder

Seating Capacity: **6**

Pump Capacity: **1500**

Tank Capacity: **150**

Condition: **Very Good**

Additional Comments or Observations: SCBA's not secured. Unapproved gas cans.

Rescue 1

1993 KME Engine/Rescue

Seating Capacity: **6**

Pump Capacity: **1500**

Tank Capacity: **500**

Condition: **Very Good**

Additional Comments or Observations: SCBAs not secures. Unapproved gas cans.

West Lake Station #2

Engine 4

1997 KME Engine

Seating Capacity: **6**

Pump Capacity: **1500**

Tank Capacity: **750**

Condition: **Good**

Additional Comments or Observations: Paint lifting around metal. Paint problems - has been painted.

Rescue 5

2003 Marion Rescue Mini

Seating Capacity: **2**

Pump Capacity: **0**

Tank Capacity: **0**

Condition: **Excellent**

Additional Comments or Observations: No problems noted.

Millcreek Ambulance

MP 27

2004 Braun Ambulance

Seating Capacity: **2**

Pump Capacity: **N/A**

Tank Capacity: **N/A**

Condition: **Excellent**

Additional Comments or Observations: Unit runs out of the rear of fire station

MP 33

2002 Ford Demers Type II ?

Seating Capacity: **2**

Pump Capacity: **N/A**

Tank Capacity: **N/A**

Condition: **Good**

Additional Comments or Observations: No problems

MP 14

1993 Ford Horton Ambulance

Seating Capacity: **2**

Pump Capacity: **N/A**

Tank Capacity: **N/A**

Condition: **Fair**

Additional Comments or Observations: No problems

Support and Small Equipment

Small equipment can take a significant bite out of an annual budget. Small equipment can be quite expensive and has the additional challenge of having its life limited by technology improvements and a small equipment replacement plan should also be established. At this time,

Millcreek Township does not have such a plan. The Township does include replacement funding in their annual budget for equipment that is known to be in need of replacement, but this is not done by a scheduled replacement plan.

The plan, like facilities and apparatus, should include a schedule of equipment covered, estimated life expectancy, replacement cost, and annual contributions required to replace equipment as needed. It is recommended that all equipment with a value of more than $5,000, as well as groups of equipment with an aggregate value of more than $5,000, be included in the plan. Examples include:

- Heart monitor/defibrillators
- Portable and mobile radios
- Computer equipment and systems
- Shop diagnostic and maintenance equipment
- Breathing apparatus
- Computer software (major systems)

Recommendations:

- Develop a cooperative purchase system between all five fire departments in the Township.
- Develop and fund a small equipment replacement program that anticipates replacement schedules and builds necessary funding in order to spread cost over multiple years.
- Review equipment to determine if duplicate equipment represents unnecessary redundancy and can be eliminated.
- Establish a record system for maintenance, uses and repairs of small equipment.

Pump Testing and Hose Testing

Two necessary procedures that are required annually and must be documented are pump testing and hose testing. The life expectancy of a section of fire hose is determined by the care it receives. Hose is susceptible to mechanical injury, heat and fire damage, mold and mildew, and damage due to chemical contact and excessive pressures. An inventory of all fire hose should be recorded along with a history of each section of hose. After reviewing the hose

procedures of the Township fire departments, it appears they have done an excellent job in hose testing and record keeping.

Fire pumps are one of the most important and expensive parts of any fire apparatus. The care and routine check of a fire pump is a daily necessity and appears to be done by the assigned driver/operator position. Part of the preventative maintenance programs requires that all fire pumps be serviced every six months. This test includes drain and refills the fluids in the transfer case, grease the bearings, lube all ball valves, linkage, drain valves and pressure relief valves. In addition to the above checks, the booster tank water level gauge is inspected along with all other gauges and pump panel lights. This test is performed every six months, with an annual pump test is performed every twelve months. After reviewing the pump test procedures of the department, it appears they are doing an excellent job in pump testing and record keeping.

Turnout Gear Maintenance Program

The fire department's most expensive and valuable asset is its personnel. Statistical data indicates today's firefighter's health and safety are at a much higher risk due to exposure and the buildup of contaminants found in the day-to-day activities at fire situations.

At this time, departments in the Township do not have an acceptable means of cleaning turnout gear in house and residential washers and dryers will not clean turnout gear properly. Many fire departments purchase extractors that are designed for cleaning turnout gear, as less sophisticated cleaning methods will remove dirt and perspiration, but will not remove severe contaminates or hydrocarbons. Not only does this residue in the garment shorten its useful life, it many times causes unnecessary expense of early gear retirement.

In the latest revisions to *NFPA 1500,*[17] *1581,*[18] and *1971,*[19] the fire service has addressed the health and safety risks associated with contaminated turnout gear by requiring that protective clothing be cleaned at least once every six months.

[17] *NFPA 1500: Fire Department Occupational Safety and Health Programs*, 2002.
[18] *NFPA 1581: Fire Department Infection Control Program*, 2005.
[19] *NFPA 1971: Protective Emsemble for Structural Fire Fighting*, 2000.

With the new requirements put into place by the NFPA, and similar changes being made by OSHA, fire departments across the country are trying to find inexpensive ways to effectively comply with new standards. The wear life depends on the type of department, number and type of fires fought, and the aggressiveness of the firefighters. Proper care will enable fire departments to lengthen their replacement cycle for new gear and reduce yearly capital expenditures.

Many fire departments have realized significant savings by having gear professionally cleaned, evaluated, and if necessary, repaired by certified departments. These efforts replace a time when contaminated or slightly damaged gear was simply discarded and replaced at a much higher cost. Millcreek Township fire departments inspect and send turnout gear out for cleaning and repairs, but do not have a semi-annual program for all turnout gear inspection, cleaning, and maintenance.

When the Township does any renovation or construction of a new fire station, it should consider enclosed turnout gear rooms with the installation of a separate ventilation system. Currently there are no enclosed, ventilated turnout gear rooms in any of the fire stations.

Replacing Turnout Gear

The nature of fire fighting and associated injuries has evolved substantially over the years. Many departments are consistently reporting that there are less structural fires and more vehicle extrication and EMS calls.

With a lower percentage of calls involving structural fires and the high percentage of firefighter deaths and injury resulting from stress and fatigue of cumbersome protective gear, ESCi suggests that fire departments should be focusing attention on stress reduction, and increasing firefighter mobility and comfort.

It is important for all fire departments when preparing to purchase new turnout gear to first perform a comprehensive evaluation of the environment in which the Township firefighters work. The evaluation should consider the following:

- What is the total number of calls made per year
- What are the department's fire attack procedures

- What is the percentage of calls that involve structural fires
- What is the percentage of calls that involve vehicle extrication
- How many calls between summer and winter season
- What is the local climate (e.g. temperate & wet, cold or hot & dry, etc.)
- What is the physical conditioning and age of its firefighters
- What is the percentage of calls that are EMS related

Turnout gear design is no less important than the fabrics used to make the outfit. The criteria the fire service should consider in evaluating the design of any turnout gear should include:

- Comfort and fit
- Lightness
- Mobility
- Protection
- Availability of extra features

Recommendations:

- Develop a group purchase program to save with a volume purchase system for all five fire departments.
- Develop and fund a replacement program that anticipates replacement of turnout gear.
- Consider a group purchase of a commercial extractor and mobile turnout drying rack for all five fire departments.
- Establish a semi-annual inspection plan.
- Establish a record system for maintenance, use, and repairs of turnout gear.

Delivery System

ESCi analyzed the current emergency service delivery system, focusing on service levels and performance.

Dispatch Notification System

Millcreek Township maintains and operates its own communications center, staffed by a minimum of two dispatchers, 24-hours a day. This center functions as the dispatch point for all police, fire, and EMS calls within the Township. The center is managed by a full-time supervisor and employs both full-time and part-time dispatchers.

This dispatch center is not the primary Public Safety Answering Point (PSAP) for the Township, so calls must be transferred by direct line from the PSAP located at the Erie County Emergency Communications Center located in Erie. This facility has 48 incoming phone lines, and is staffed 24 hours by a minimum of three, and a maximum of six, call processors. Call transfer to the Millcreek Center is a one-button process and includes transfer of the ANI/ALI (automatic number and location identification) information on all 9-1-1 calls. The Millcreek Center handled about 27,000 telephone calls in 2005, and monitors urgent calls for public works after hours in addition to its public safety activities.

Computer-aided dispatch (CAD) software is available to the fire dispatcher. Once transferred, call processing and dispatch is handled quickly, with automated processes that must take place in order to identify the correct police unit or fire stations to dispatch. The CAD system is manufactured by New World Software, and is a table-based system that is maintained by the dispatch personnel.

Performance standards and regular monitoring of dispatcher performance is as important as fire company response time, as the call receipt and notification process are the first critical component of any department's total reflex time to an incident. Formal call processing time standards have been established at both Erie County and Millcreek centers, and there is a system for quality control. The Erie center uses state standards for call processing time of one minute or less, but has an informal goal of thirty seconds. Calls are reviewed using statistical software, broken down by temporal and personnel analysis. Millcreek uses a standard of one

minute or less for processing and dispatch, with a random review of calls performed monthly by a senior dispatcher.

Dispatch takes place by fire station general announcement only and does not include *specific unit dispatch*, providing no programmed assignment of specific apparatus quantities and types. Apparatus availability for the communities is not tracked automatically by the CAD system, and back-up assignments must be determined with assistance from the dispatcher or incident commander. Computer tracking of dispatch, arrival, and control times is available and tracked by CAD.

Dispatch of fire stations takes place by tone-encoded radios. There is no integrity-monitored dispatch circuit to the station, and no secondary dispatch system aside from seven-digit dialing.

Dispatchers are fully certified in the emergency medical dispatch system allowing them to provide pre-arrival instructions to bystanders at medical incidents. Medical priority dispatching is currently not utilized, providing little variation in resources that respond to various types of medical emergencies, based on described conditions and symptoms.

Millcreek's radio system operates on conventional analogue UHF. There are six frequencies allocated to fire department use. Four fire ground frequencies are available for tactical operations on scene. Even with approximately 75 field units, however, dispatchers report that system *queuing* happens only occasionally.

The dispatch centers have adequate contingency plans for system failure. Back-up power is in place with spare consoles available. A back-up transmitter is also available. A functionally redundant dispatch site is available, though no CAD terminal is present, at the West County Fire Control Center. Improvements in system redundancy, including secondary site access to CAD and an encoding transmitter is recommended. Evacuation and transfer drills should be conducted at least annually to test the system and train dispatchers for emergency relocation.

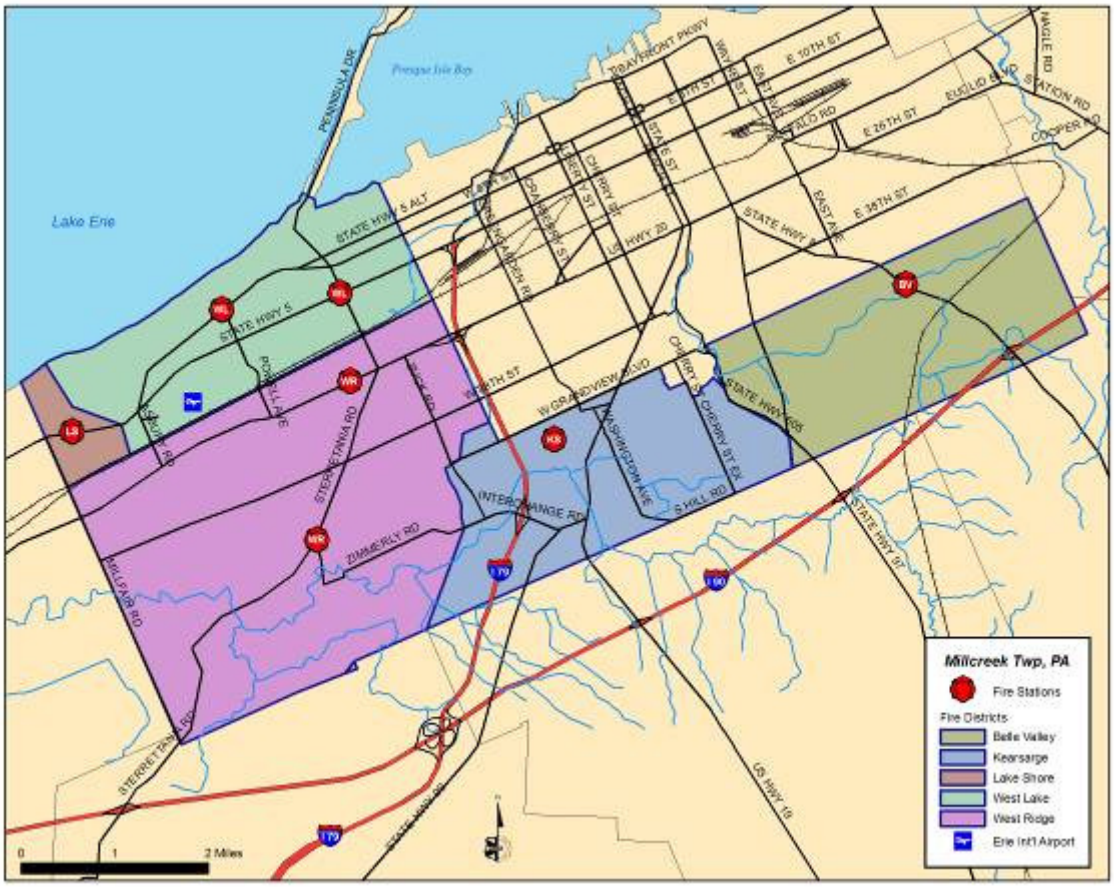
Recommendation:

A functionally redundant dispatch site should be developed with CAD access and encoded radio transmitter. Evacuation and transfer drills should be held at least annually.

Resource Distribution

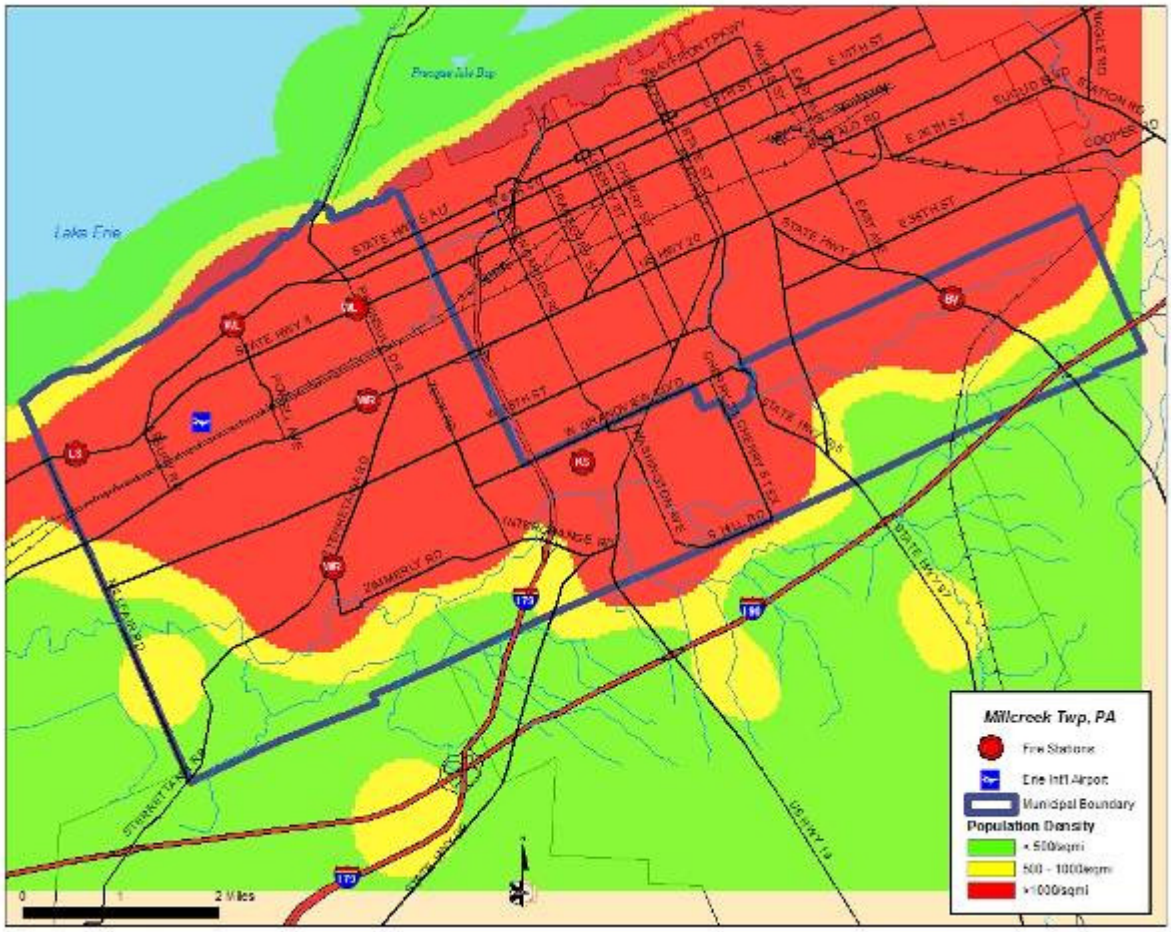
The following map depicts the location of all emergency service facilities within Millcreek Township and their respective districts. Each of the fire departments has a prescribed jurisdiction to which they provide initial or first-due response. In most cases, these jurisdictions have been assigned by way of agreement with the municipality or municipalities served, including the townships. The following map depicts the jurisdictional response boundaries of the fire departments.

Figure 18: Millcreek Township Emergency Services Facilities



It can be seen from these response zone maps that many of the fire and EMS stations are not necessarily centrally located within their response jurisdictions. However, most are located in the areas of highest population densities. In order to evaluate this more readily, the following map provides a depiction of the population density for all of Millcreek Township. Information is from the 2000 U.S. Census.

Figure 19: Millcreek Township Population Density



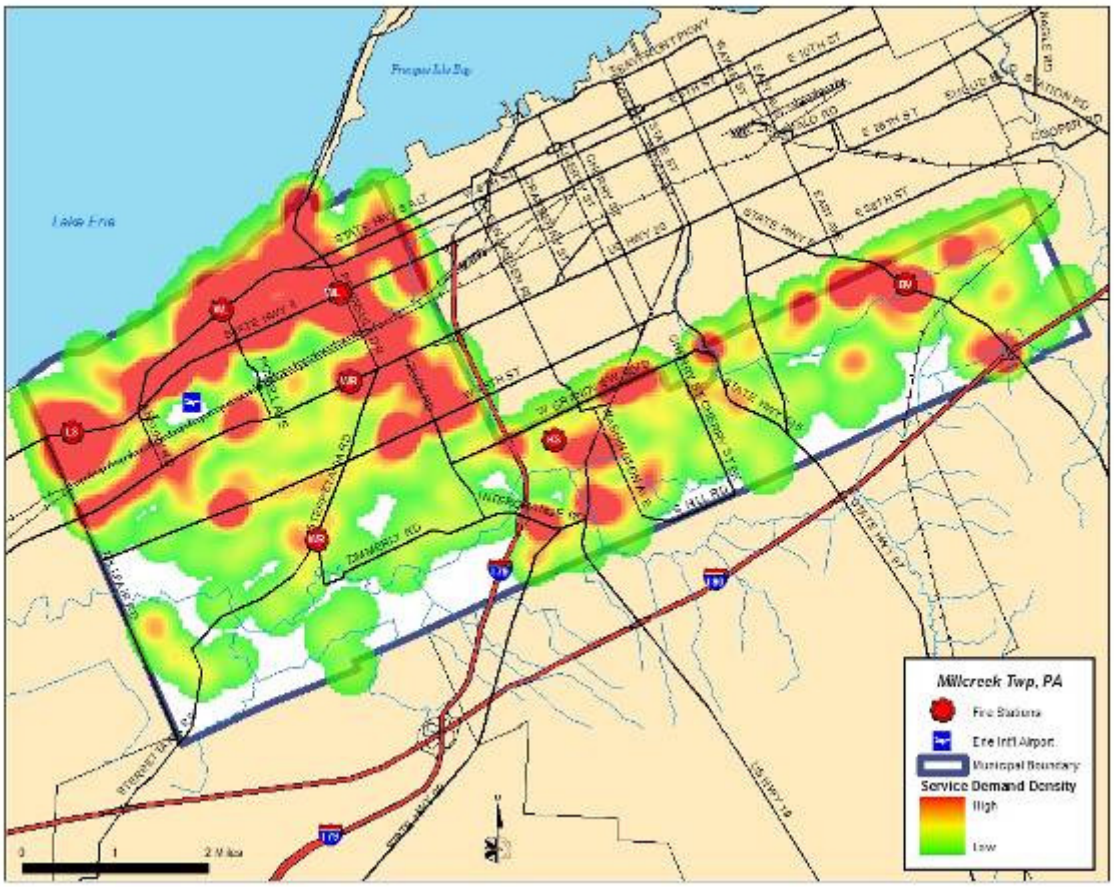
Due to the immediate proximity to the City of Erie on Pennsylvania's lakeshore region, higher population densities are realized closest to the city border. The density calculation is based upon population parameters prescribed in *NFPA 1720* guidelines for determining response time standards for volunteer departments.

Service Demand

In order to evaluate the distribution of facilities and resources, it is important to understand the distribution of emergency incidents, or service demand, across the Township. It is an established fact the variations in land use, population density, and other risk factors affect the number of emergency calls any given geographic area will generate. Thus, the study of service demand distribution is important in evaluating the effectiveness of any given service delivery system.

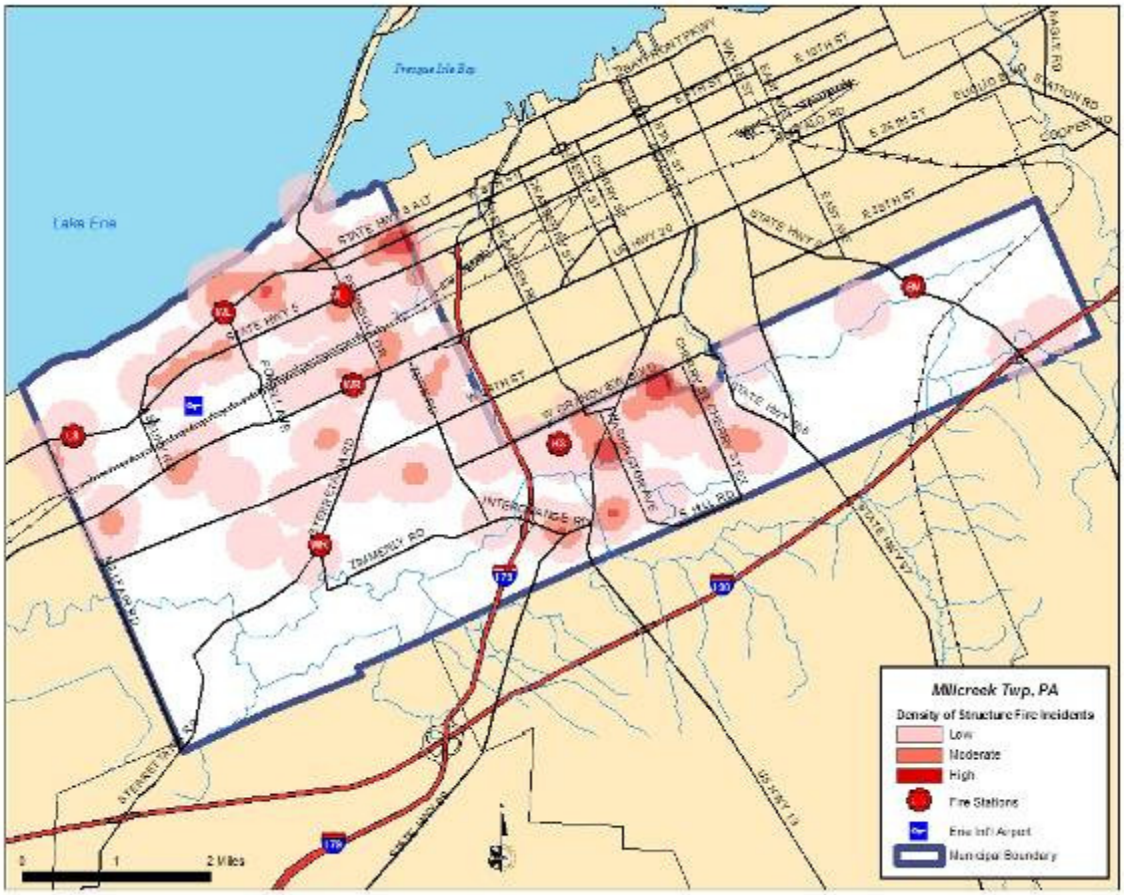
In order to do this, incident data from 2005 is compiled in geographic information system (GIS) software to establish locations on a map. In the case of the Township, the data was obtained from the communications center's records and manually *cleaned* for errors and address corrections. The following map depicts the relative density of call volume (service demand) throughout the Township for fire and emergency medical incidents.

Figure 20: Service Demand Density for Millcreek Township - 2005



In addition to examining service demand for all types of calls, it is also useful to review the distribution of actual structure fire incidents, since these are among the most resource-intensive types of calls. The following map depicts the location of structure fire incidents for 2005.

Figure 21: Structure Fire Incidents in Millcreek Township - 2005

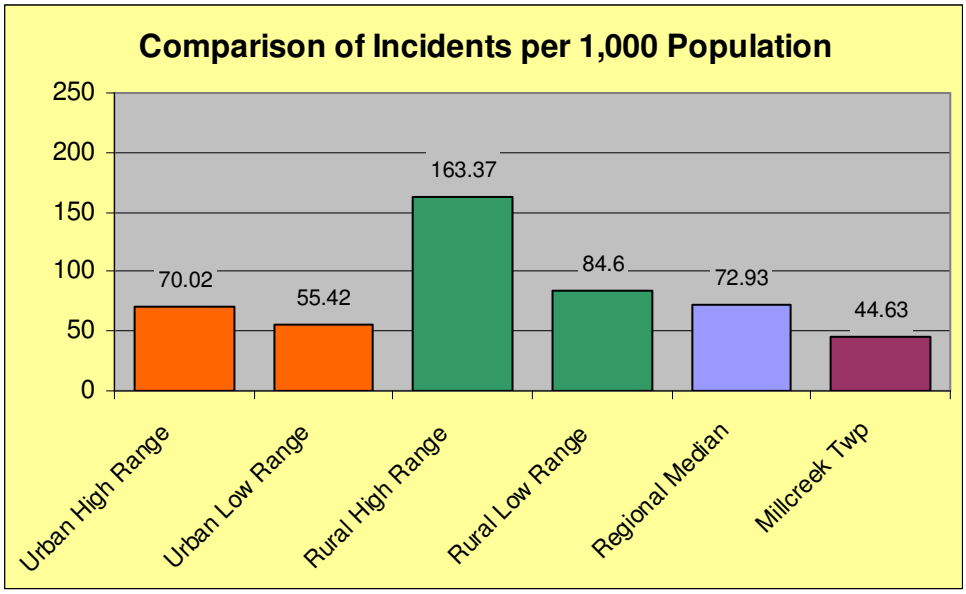


Further examination of service demand includes workload, temporal, and response performance analyses. Before examining each agency that provides service within the Township, the statistics for the Township as a whole are examined. The EMS unit (Millcreek Paramedics) is not included in these figures as they respond simultaneously with many of the fire departments. For an in-depth analysis of this agency, see the individual agency section.

Emergency Response Activity

Millcreek Township has experienced an increasing number of fire department responses. In comparison to other communities of its size within the Western region,[20] the fire departments within the Township experience a much higher number of emergency incident responses based on population. The following figure shows that Millcreek Township is well above the median range of incident volume per population for similar communities.

Figure 22: Millcreek Township Comparison of Incident Rates by Population

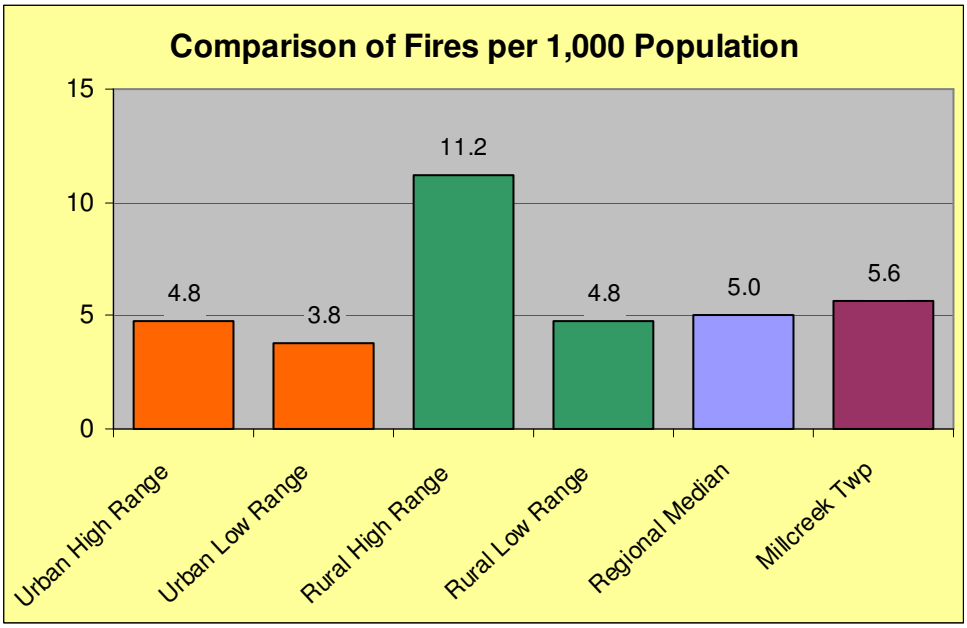


However, it should be remembered that the statistics include many communities that do not provide any type of emergency medical services through their fire departments. This factor should be considered when evaluating the benchmark comparison data.

As can be seen in the following figure, the Township experiences a higher number of fires per 1,000 population for a community of its size.

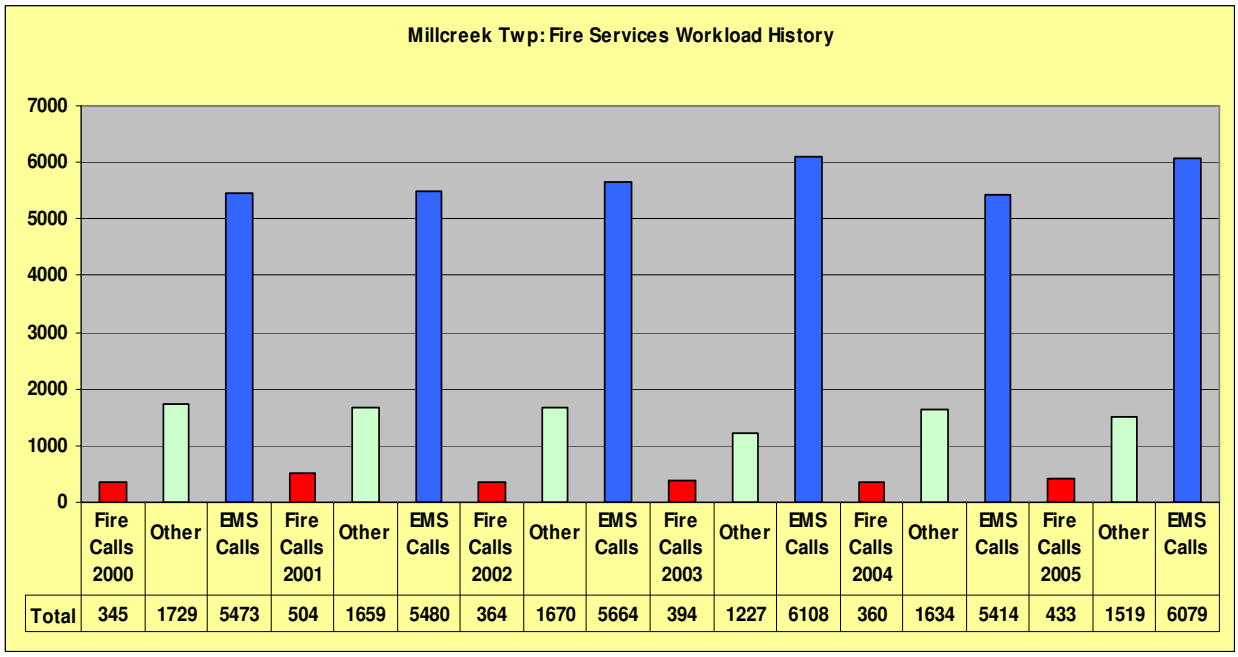
[20] Data source for this section is the National Fire Protection Association *U.S. Fire Department Profile*, October 2003. This publication breaks down benchmark data into four regions: Northeast, Northcentral, South, and West. Western regional data was selected for this report.

Figure 23: Millcreek Township Fires Per 1,000 Population



The following figures show how response volume has changed over the last two years and give an overview of the workload history of the departments within the Township.

Figure 24: Millcreek Township Workload History 2000 – 2005

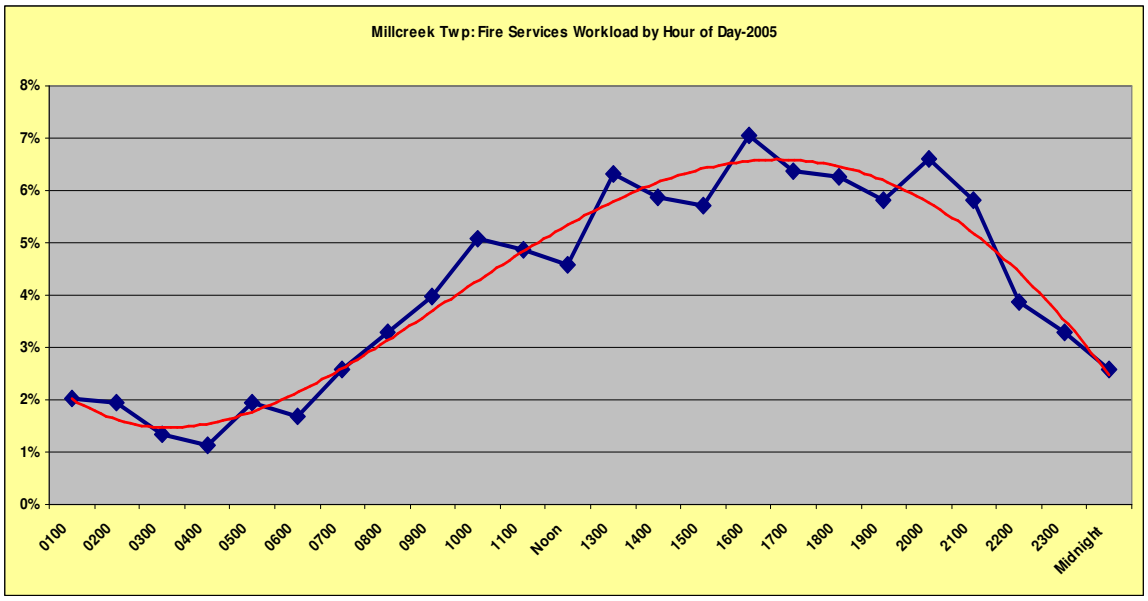


	Fire Calls 2000	Other	EMS Calls	Fire Calls 2001	Other	EMS Calls	Fire Calls 2002	Other	EMS Calls	Fire Calls 2003	Other	EMS Calls	Fire Calls 2004	Other	EMS Calls	Fire Calls 2005	Other	EMS Calls
Total	345	1729	5473	504	1659	5480	364	1670	5664	394	1227	6108	360	1634	5414	433	1519	6079

Although actual fire incidents and other type responses have remained relatively stable over the last two years, EMS calls have increased over nine percent. As the community increases in population, and if the composition of the population continues to age, Millcreek Township could expect these increases in EMS calls to continue. This will be examined fully in Section 2 of this report.

A review of incidents by time of occurrence reveals when the greatest response demand is occurring. The following charts show how activity and demand changes for Millcreek Township based on time of day, day of week, and month of year.

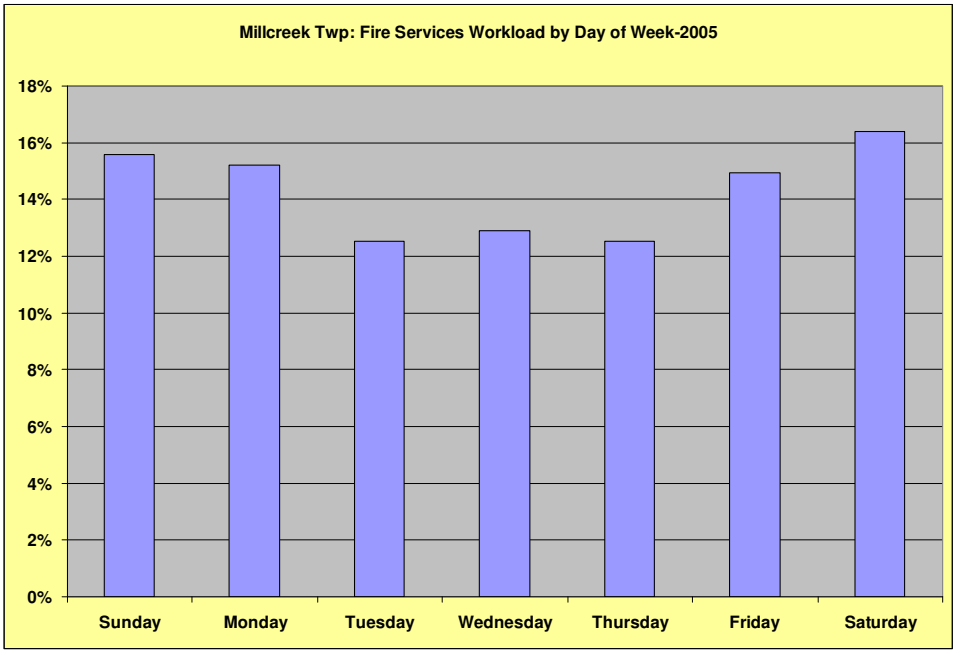
Figure 25: Millcreek Township Workload by Time of Day



Peak response activity occurs between the hours of 9:00am and 9:00pm. This is typical of most fire agencies' experience, and reflects a higher level of activity in the community throughout the workday hours.

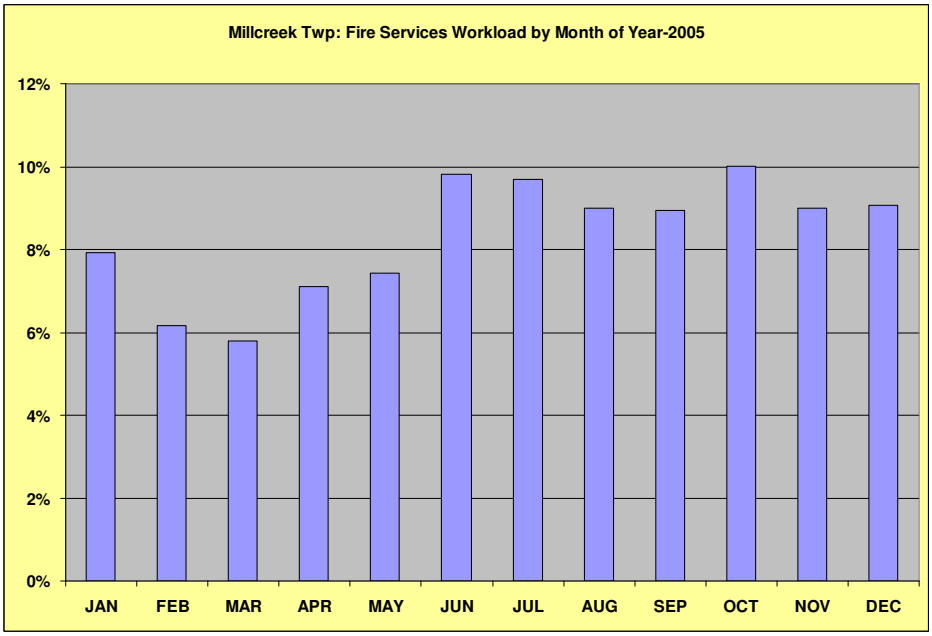
Incident volumes are relatively lower throughout the middle days of the week, with slight increase toward week's end.

Figure 26: Millcreek Township Workload by Day of Week



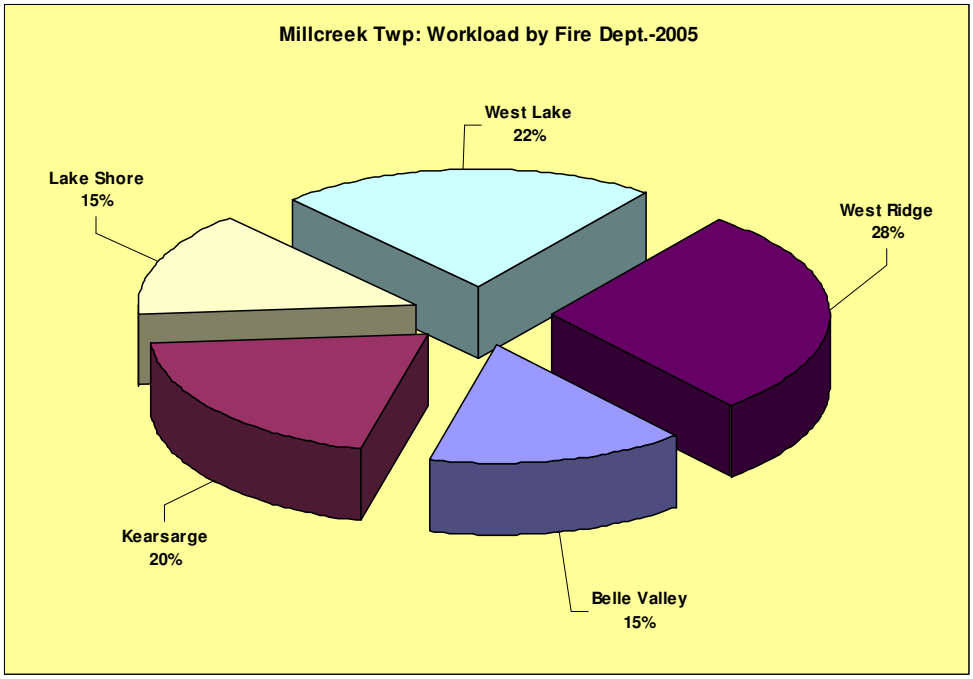
Incident volumes are relatively uneven throughout the months of the year, as shown in the following figure, given the increases in service demand in beginning in April through July and remaining relatively stable until the end of the year.

Figure 27: Millcreek Township Workload by Month of Year



The following figure illustrates the workload level by agency within the Township; you can see the correlations between the workload and population densities. Whereby, the higher population densities have higher workloads.

Figure 28: Millcreek Township Workload by Agency



It can be seen that West Ridge has nearly double workload of Kearsarge and Belle Valley fire departments. West Lake and Lake Shore are slightly busier.

Travel Time Capability/Resource Concentration

The ultimate goal of any emergency service delivery system is to minimize the loss of life and property by rapidly providing sufficient resources (personnel, apparatus, and equipment) at the scene of an emergency in time to take effective action. Fire and EMS agencies should adopt performance measures and benchmarks by which they can measure the performance of their organization. Periodic measurement provides decision makers with the tools to determine the efficiency and effectiveness of the services provided, and can be use as triggers or thresholds for the addition of resources.

ESCi has provided additional information in the Appendix regarding the dynamics of fire and medical emergencies, and how those dynamics affect incident outcomes. An understanding of the dynamics of emergencies is essential to the proper selection of performance objectives and analysis of performance.

NFPA 1720

The National Fire Protection Association has 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.

The recommended standards are classified according to population densities. Communities with populations greater than 1000 persons per square mile are deemed urban under the *1720* guidelines. Within theses types of communities, *NFPA 1720* recommends that the first company arrive at the scene of a structure fire within nine minutes of dispatch, 90 percent of the time. NFPA uses fractal analysis, rather than average as this allows an evaluation of a department's performance on the vast majority of incidents.

In communities that have 500-1000 persons per square mile in population, *1720* recommends a response time objective of ten minutes from time of dispatch, 80 percent of the time. A 14-minute response time, 80 percent of the time is permissible for more rural communities with less than 500 persons per square mile.

The standard 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 period.

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.[21] The only exception to this regulation is if it is known that victims trapped are 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.

Millcreek Township Response Time Capabilities

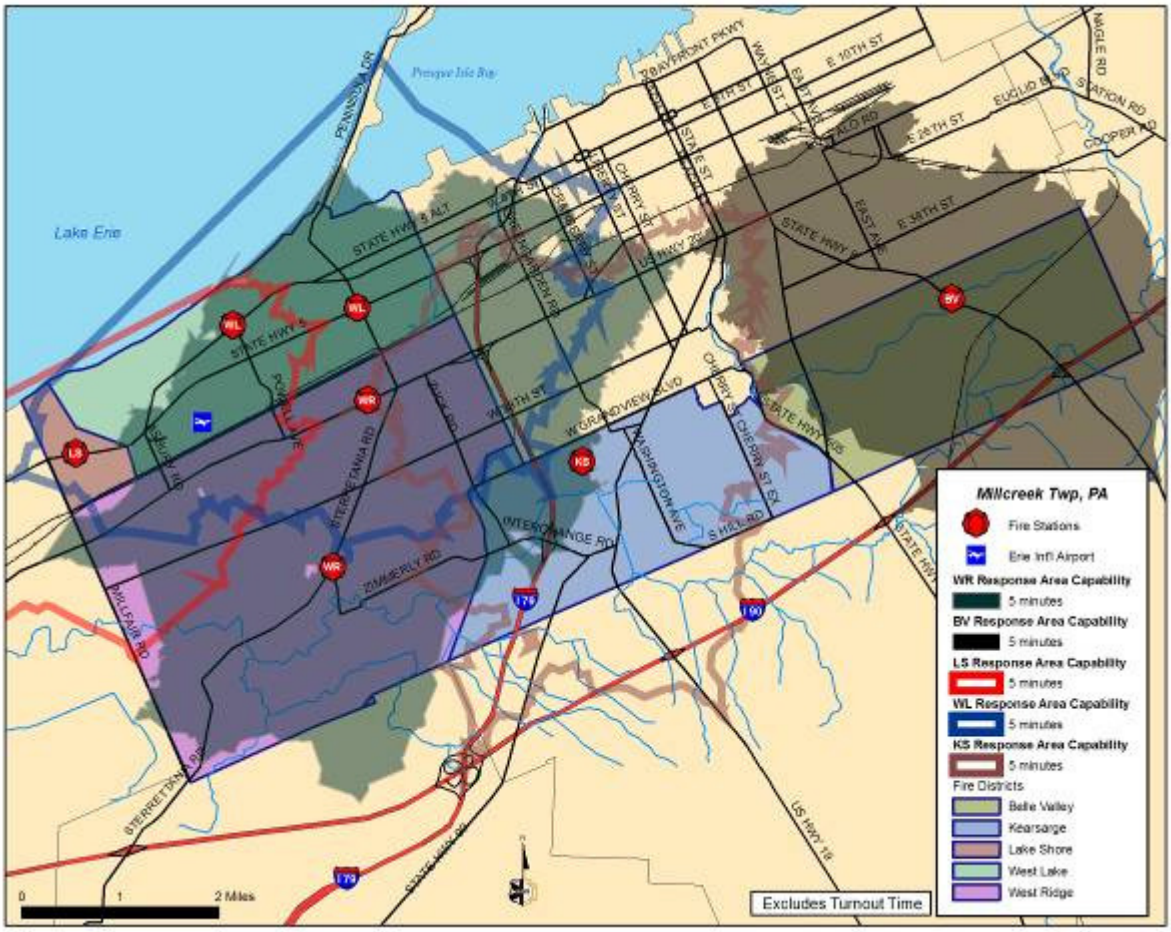
Sufficient data was made available to evaluate and analyze the response time performance of all of the fire departments in Millcreek Township. The Millcreek Emergency Communications Center provided electronic incident data for each department. A workload and temporal analysis of actual recorded response times is provided in their individual agency evaluation sections.

In order to evaluate agency performance, ESCi analyzes the response time capability of an emergency service system by using computer modeled travel time from each facility on the actual roadway network. Since all of the fire departments in Millcreek Township depend heavily on the use of volunteers, turnout time of the departments, or how long it will take for an adequate number of volunteers to assemble and leave the station on an apparatus should be added to projected travel time.

The following travel time model is of use in evaluating the current deployment, as well as the assignment of first-due response territories.

[21] 29 CFR 1910.134(g)(4).

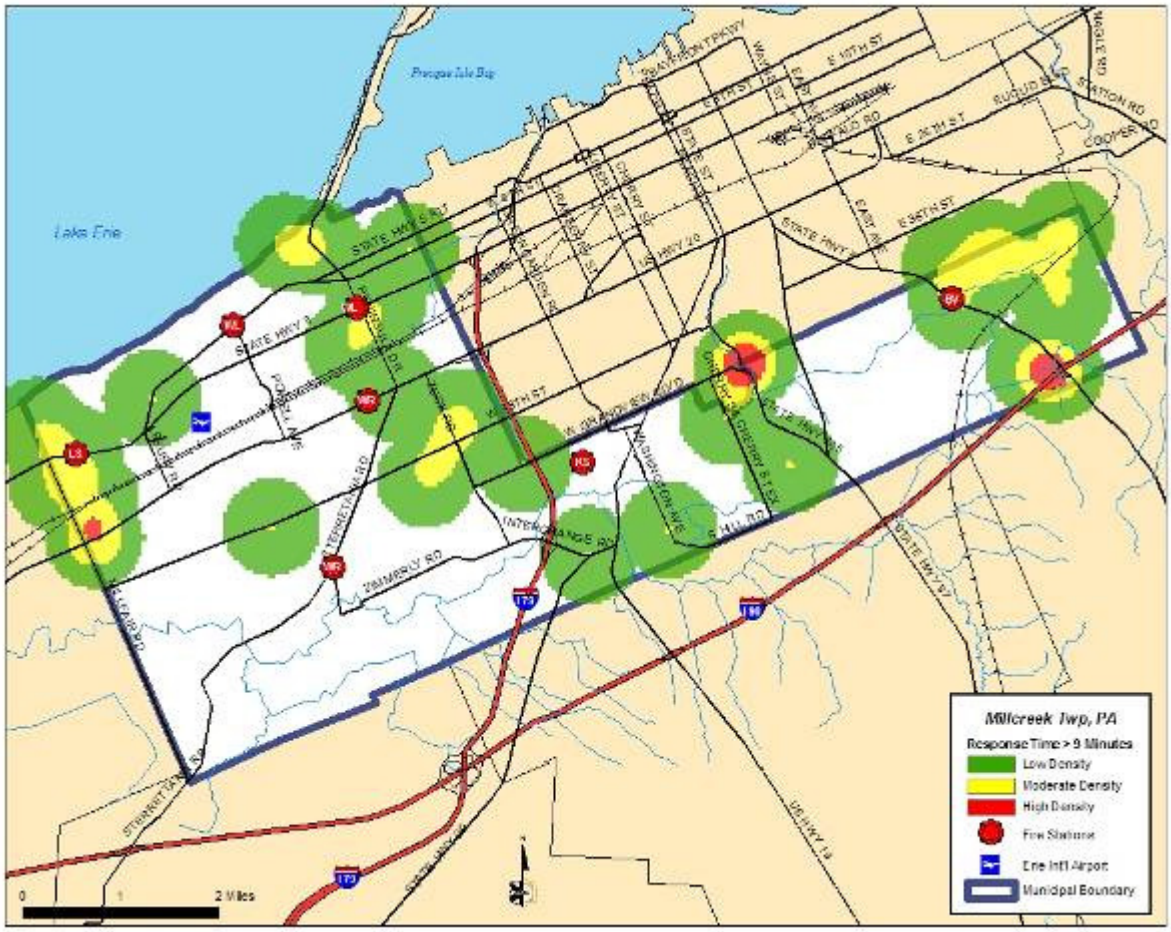
Figure 29: Fire Department Modeled Travel Time Capabilities



The map indicates that the majority of the Township's area is within five minutes of travel time from the current fire station locations. The greatest amount of resource concentration is in the west side of the Township, and that six of the seven fire stations reside within at least one five-minute travel time capability of an adjacent stations, creating an overlap of travel time capability. Additional discussion on this issue in relation to future strategies will appear in later sections of the report.

The following figure displays the density of incidents in which the response time recorded was in excess of nine minutes. This is useful to not only assess department performance, but in the evaluation of existing resources.

Figure 30: Density of Incidents With Response Time > Nine Minutes



Current Station Deployment

Maps are provided for each agency that display the specific geographic area served by that agency as primary responder and the location of the station within that area. In order to provide a basis for the reader to assess relative distribution, ESCi has plotted modeled travel time from each facility using color-coded shading. Each map is accompanied by an explanation of the shading and travel times used in that map. The travel time reflects driving time only and is not intended as a display of actual response time. The travel time is modeled using GIS and calculates the total time necessary to travel each individual street segment based on the average travel speed that is assigned to the segment. Travel speeds area assigned based on road type and condition. There are a total of 42 different road type classifications, from footpaths to limited-access freeways.

One-year worth of incident data was provided for each agency by the Emergency Communications Center. Data on chiefs' car responses were removed, and only the apparatus arriving first on scene was used in the response time analyses.

Belle Valley Fire Department

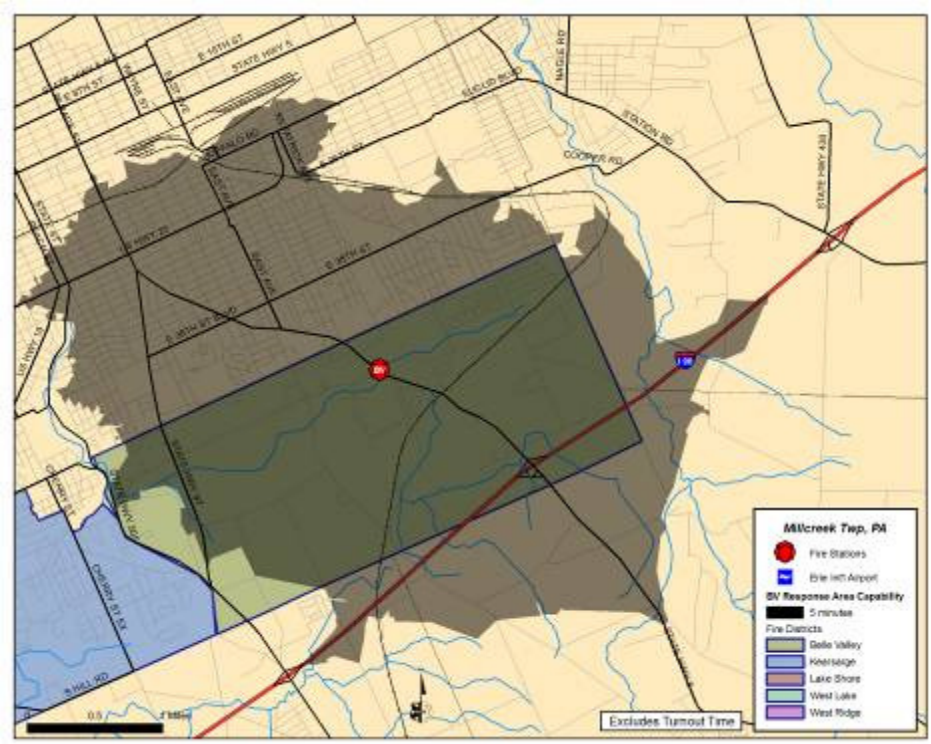
General Description

The Belle Valley Fire Department functions as a volunteer fire association and operates within Millcreek Township. The department's jurisdiction encompasses the eastern end of the panhandle of the Township. The response area includes small city development, suburban neighborhoods, and light industrial and rural property.

Deployment Strategy / Response Time Capabilities

BVFD maintains one fire station within its response area. The following map displays the total primary response area of the agency as well as the station location. In addition, the shaded polygon demonstrates the five-minute travel time from the station (does not include turnout time). Non-shaded areas are beyond a five-minute travel time.

Figure 31: Belle Valley FD Current Station Deployment

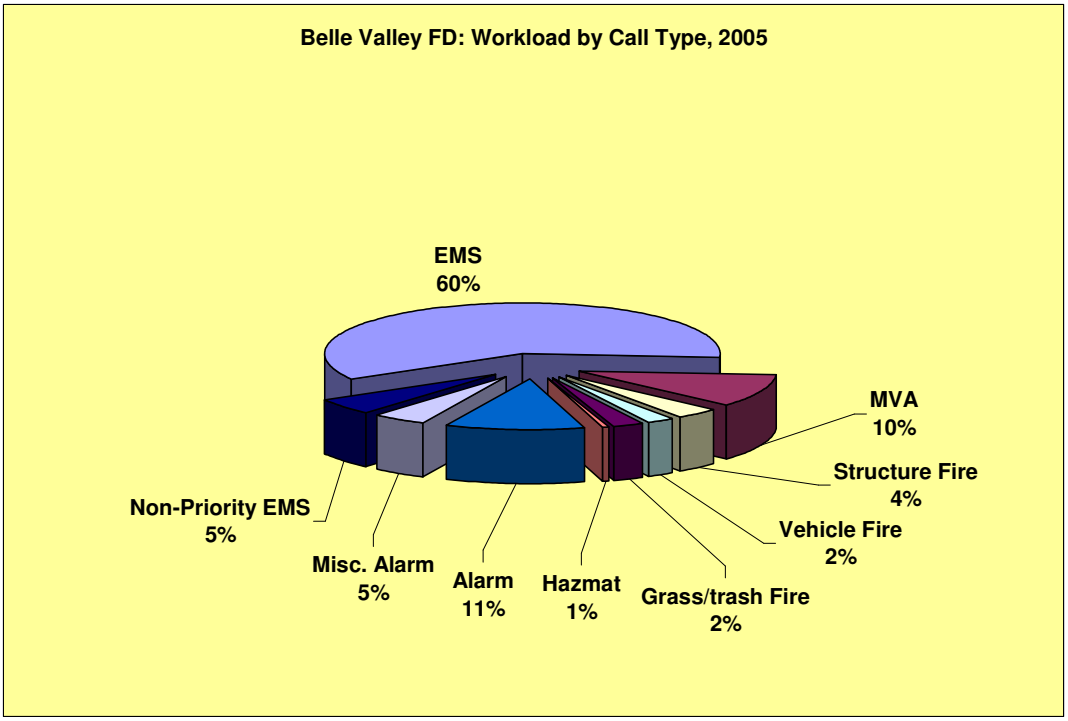


The southwestern edge of the BVFD service area is just outside the five-minute travel time capability according to the model. This area could be reached in another minute of emergency response mode travel.

Response Time Performance

The department provides a variety of services including fire suppression, victim rescue, basic life support (BLS) emergency medical response, first responder-level hazmat response, and limited public fire safety education. The department received an average of 578 calls for service in the last six years. In 2005, approximately 65 percent of the calls for service were medical in nature, while 35 percent were fire or service related.

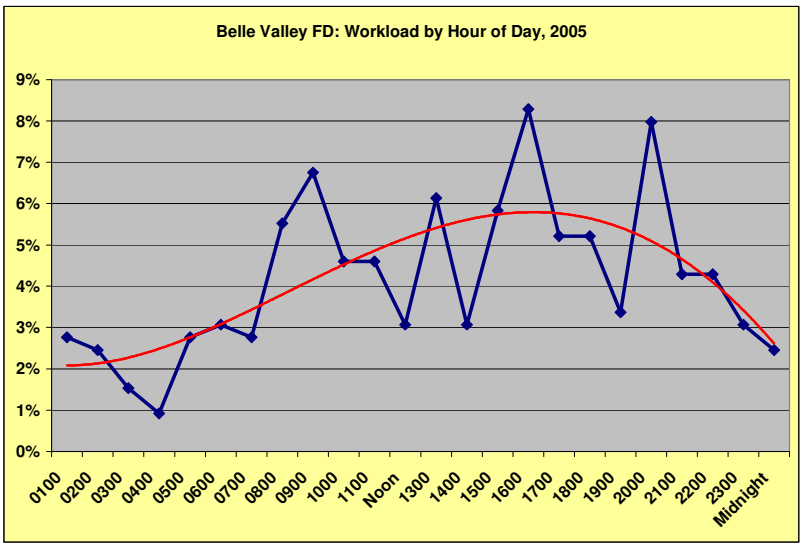
Figure 32: Belle Valley FD Workload by Call Type – 2005



The Belle Valley Fire Department does enter incident data into an electronic database from which analysis is possible. Incident volume in Belle Valley has remained stable over the last two years. The incident volume is expected to change as community growth occurs.

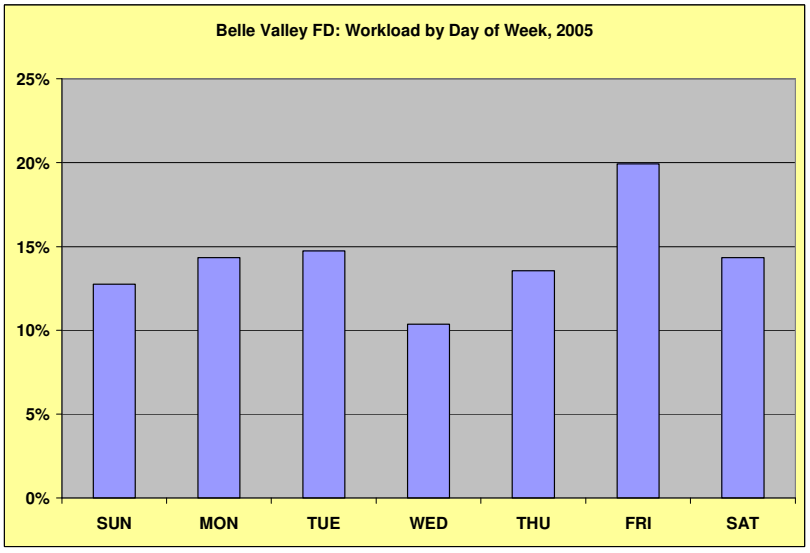
A review of incidents by time of occurrence reveals when the greatest response demand is occurring. The following charts show how activity and demand changes for BVFD based on time of day, day of week, and month of year.

Figure 33: Belle Valley FD Workload by Time of Day



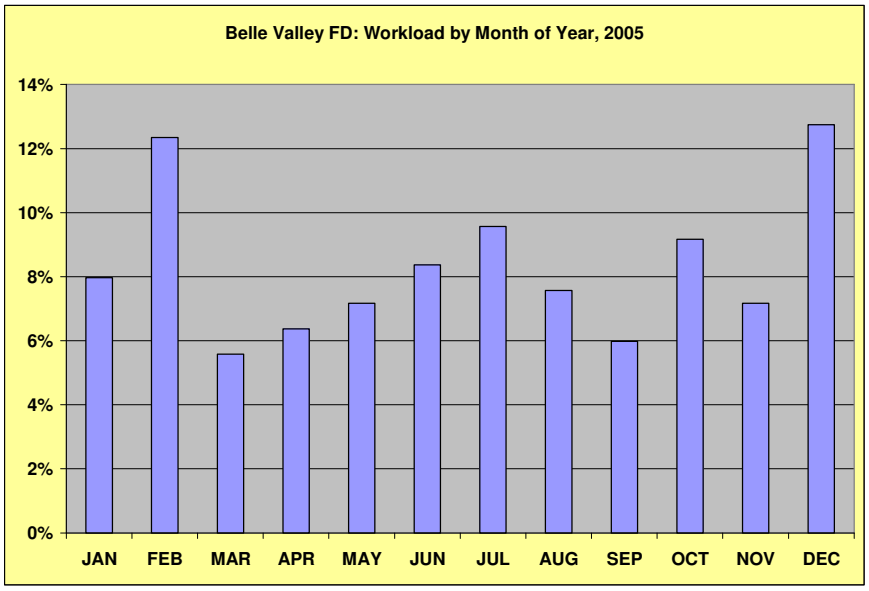
Requests for fire services are uneven throughout the day. but are generally higher in the afternoon and early evening hours. Incident volumes are slightly uneven throughout the days of the week, with a general decrease toward the middle of the week and rising towards the week's end.

Figure 34: Belle Valley Fire Workload by Day of Week



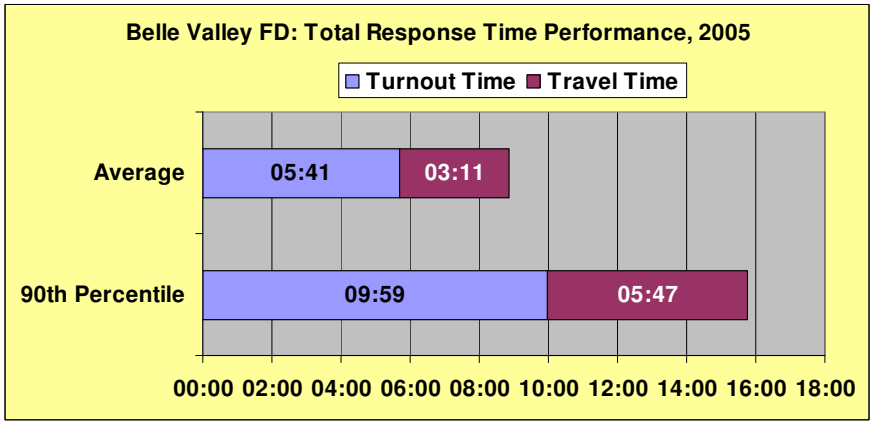
The chart below shows that incident volumes vary throughout the year with February and December having the greatest number of incidents.

Figure 35: Belle Valley Fire Workload by Month of Year



The following figure illustrates BVFD's response time performance. Response times have been divided into turnout and travel times. Turnout time is the time it takes volunteers to staff an apparatus and start travel to the incident scene. The total of both times is the overall response times for the department.

Figure 36: Belle Valley FD Response Time Performance



The data indicates that the department's overall response time average was eight minutes 52 seconds. Fractal analysis indicates a 90th percentile response time performance of 15 minutes 45 seconds.

ESCi examined response times of a specific period per day of the week. Volunteer fire departments typically have varying turnout times from weekends to weekdays, on drill nights, and by the time of day. Presumably, evenings and weekends are times when volunteer staff is most available and assembly of a fire crew can be made more rapidly than during other periods. Volunteer response is also dependent on volunteer demographic composition and work or school schedules.

Figure 37: Belle Valley FD: Average Turnout Times

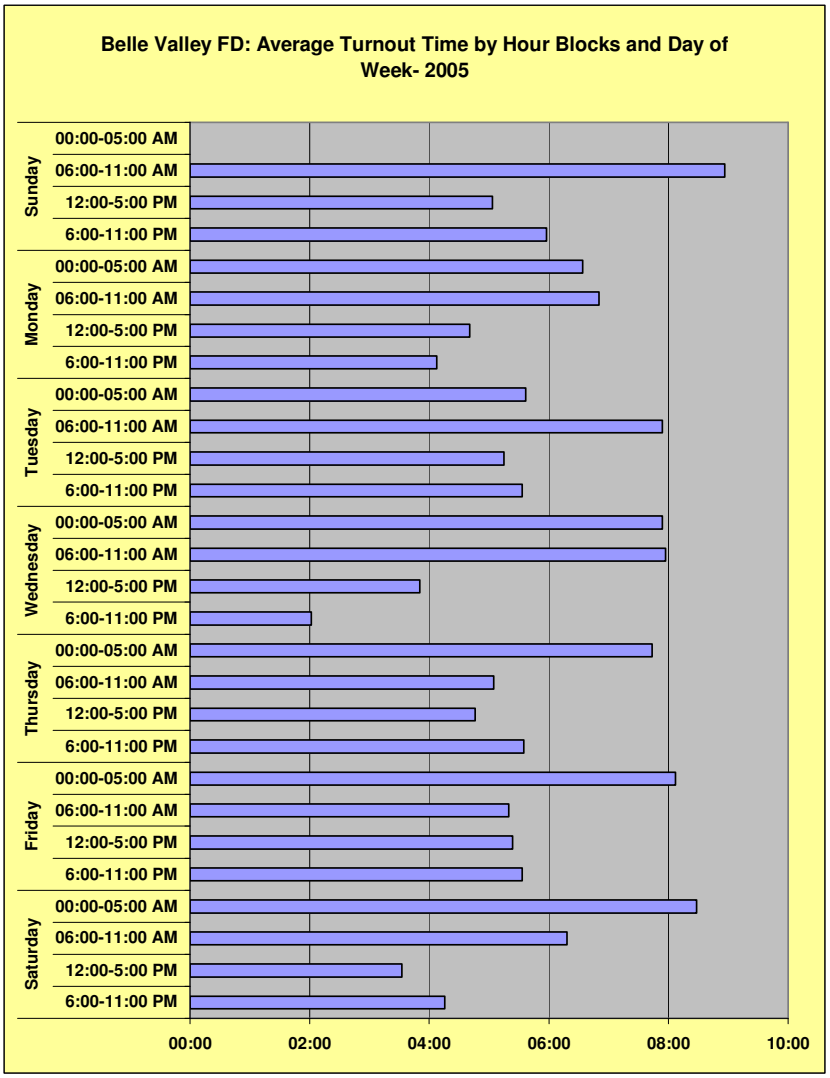
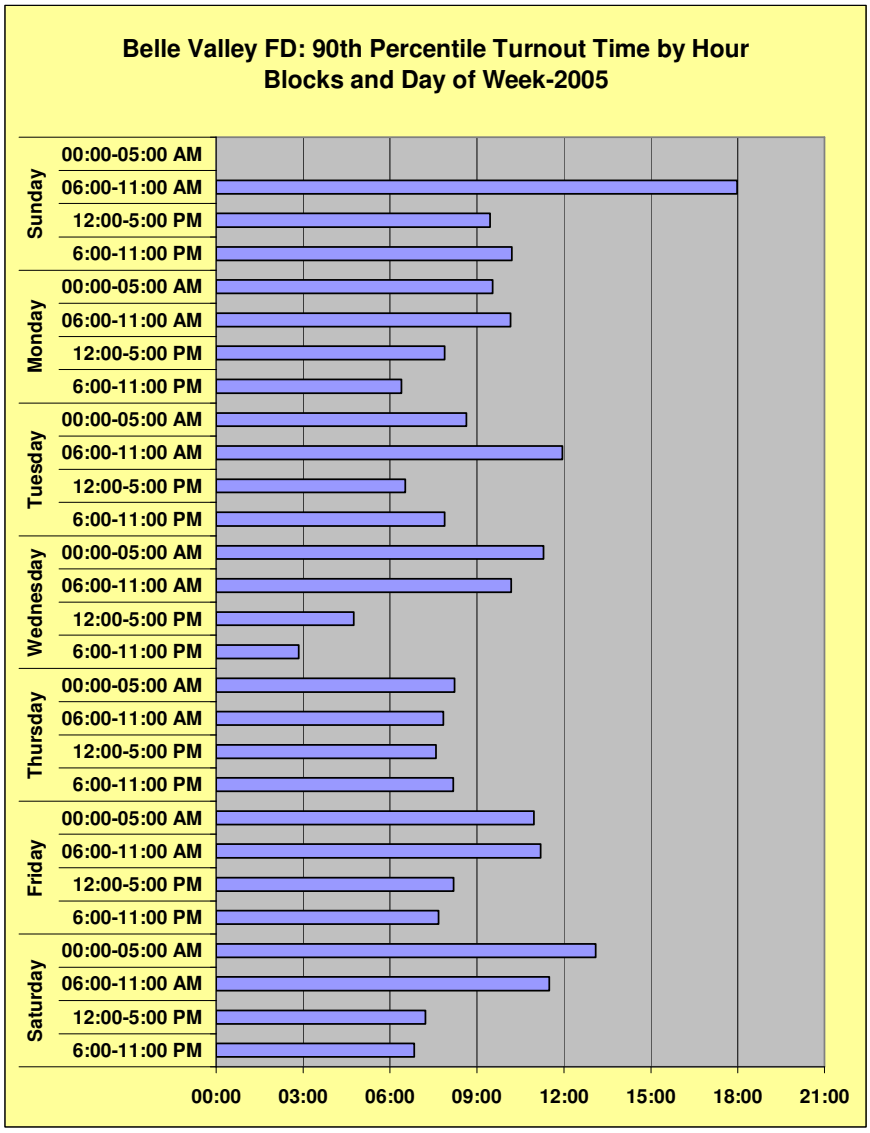
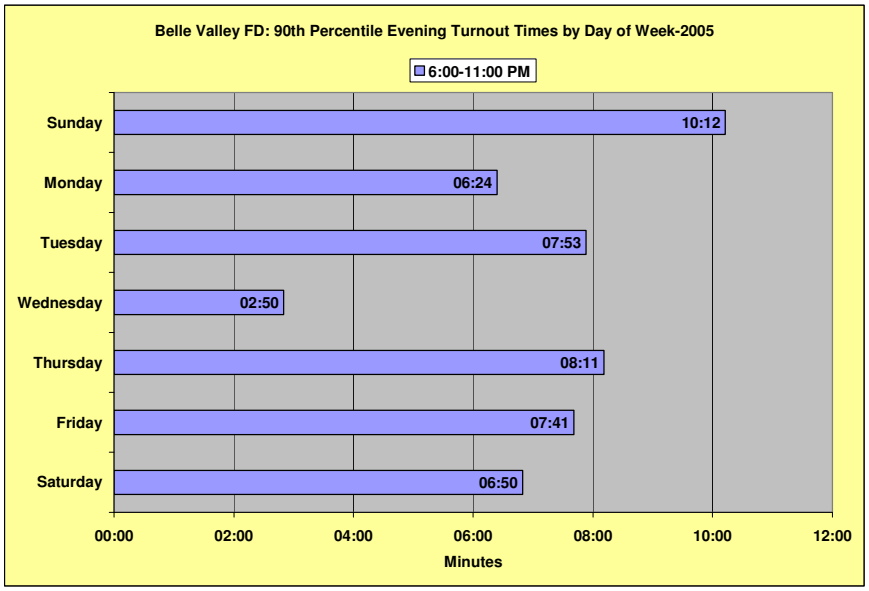


Figure 38: Belle Valley FD: 90th Percentile Turnout Times



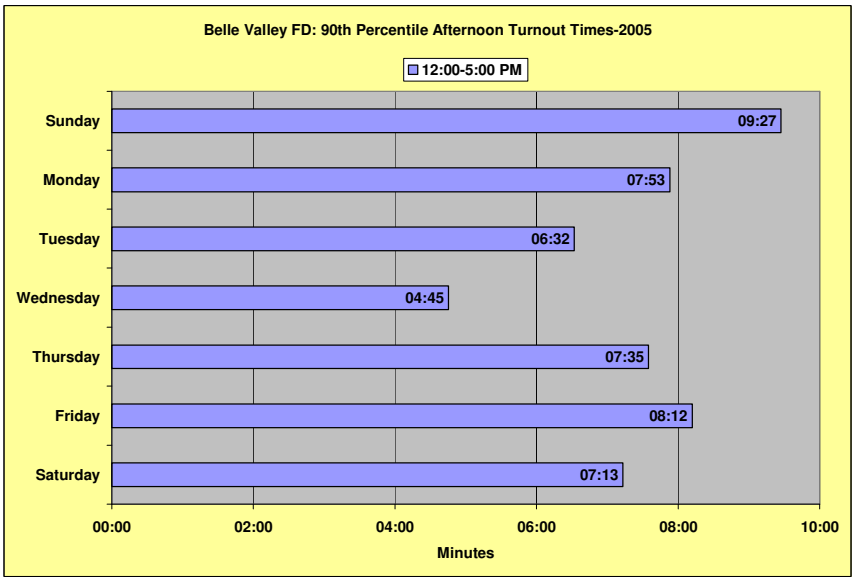
The overnight and morning hours appear to be the time of day when turnout times are the longest for BVFD. Wednesday afternoons and evenings are when the turnout times are the shortest. Further analysis of response during the selected periods is provided in the following figures.

Figure 39: Belle Valley FD: Evening Hours Turnout Times



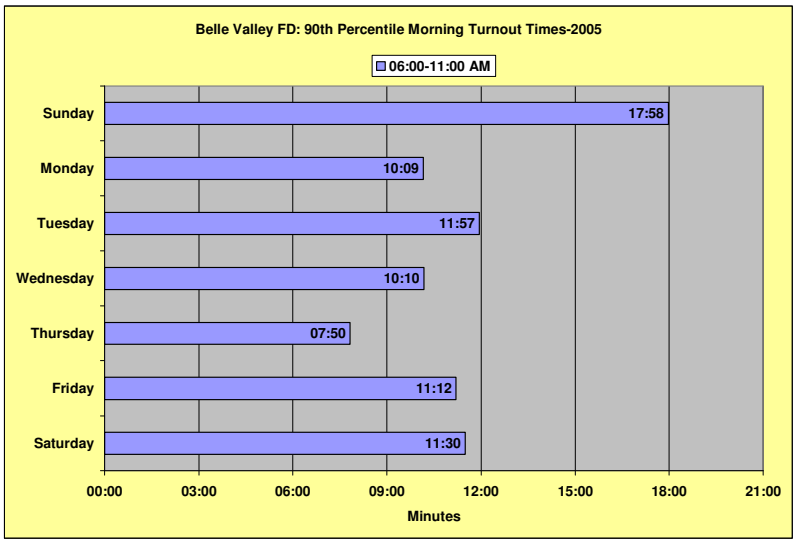
Isolated hourly periods indicate that evening turnout times are within the six to nine minute range, except on Sunday evenings. In the afternoons, turnout times improve as the week progresses into Wednesday. They steadily increase into the weekend with the longest times experienced on Sunday afternoons. The following figure displays this trend.

Figure 40: Belle Valley FD: Afternoon Turnout Times - 2005



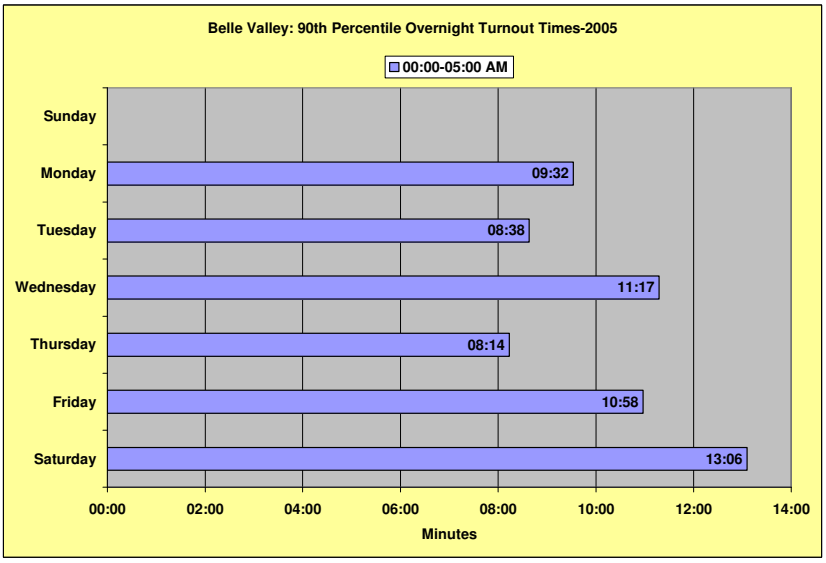
The turnout times in the morning hours are longer than other times of the day. During the week, they range from near eight minutes to 12 minutes. It should be noted that weekend mornings are as long or longer in time to assemble a crew.

Figure 41: Belle Valley FD Morning Turnout Times



Another period in which crew availability is higher for volunteer departments are the overnight hours. Overnight turnout times are longer due to the time it takes to awaken, dress, and report to the station. The following figure illustrates the overnight turnout times for the Belle Valley FD.

Figure 42: 90th Percentile Overnight Turnout Times – 2005



Data was not available for the call on Sunday during this period. The rest of the week displays turnout times in the range of eight to thirteen minutes. The longest turnout time during the overnight hours is Saturday night.

Kearsarge Fire Department

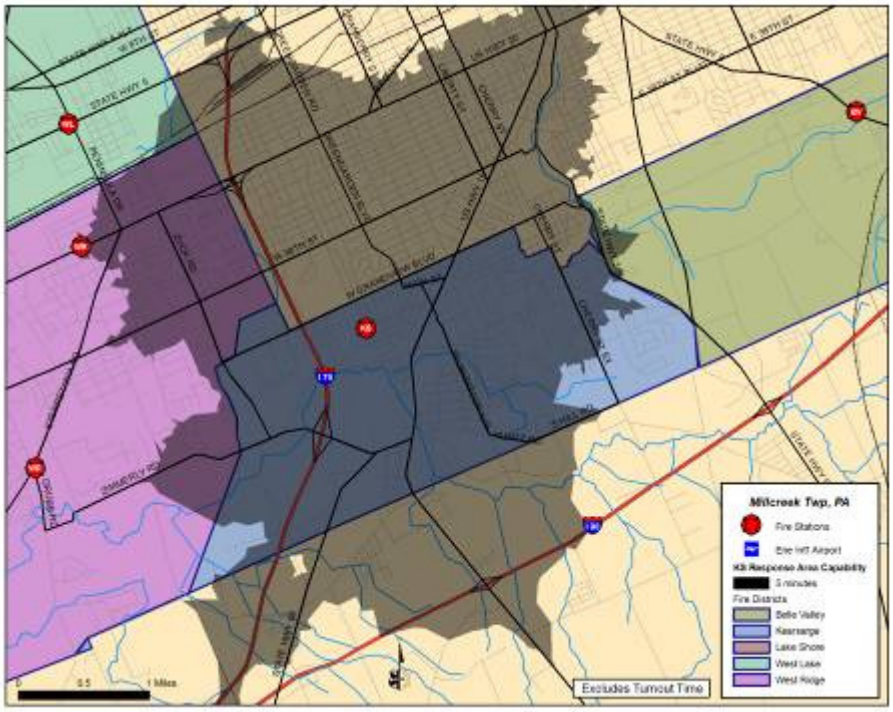
General Description

The Kearsarge Fire Department functions as a volunteer fire association operating within Millcreek Township. The department's jurisdiction includes an area in the middle of the panhandle of the Township and adjoins the main body of the west end of the township. The response area includes small city development, suburban neighborhoods, light industrial, and an interstate highway.

Deployment Strategy / Response Time Capabilities

The Kearsarge Fire Department maintains one fire station within its response area. The following map displays the total primary response area of the agency and the station location. In addition, the shaded polygon illustrates the five-minute travel time from the station (does not include turnout time). Non-shaded areas are beyond a five-minute travel time.

Figure 43: Kearsarge FD Current Station Deployment

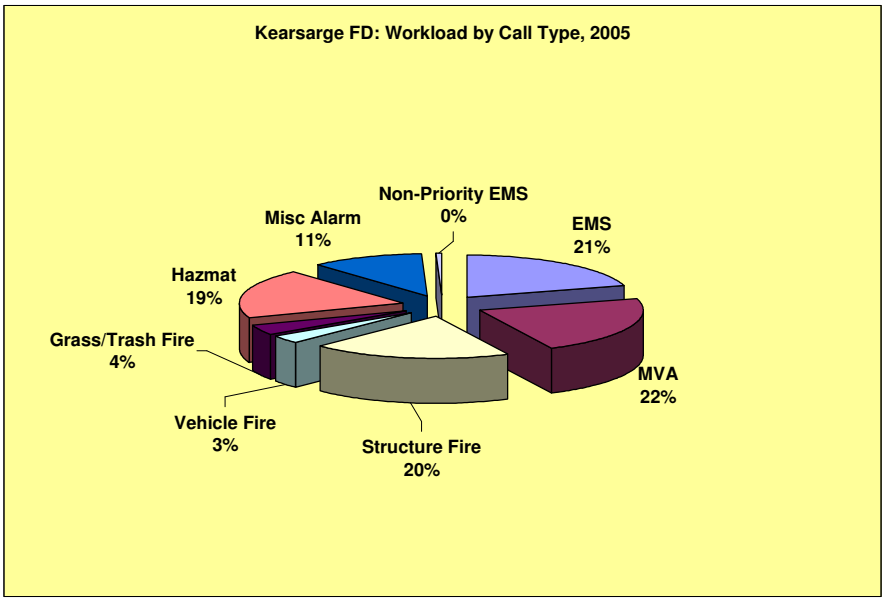


The far southwestern and eastern edges of their service area are outside the five-minute travel time capability according to the model. This area most likely could be reached in another two minutes of emergency response mode travel.

Response Time Performance

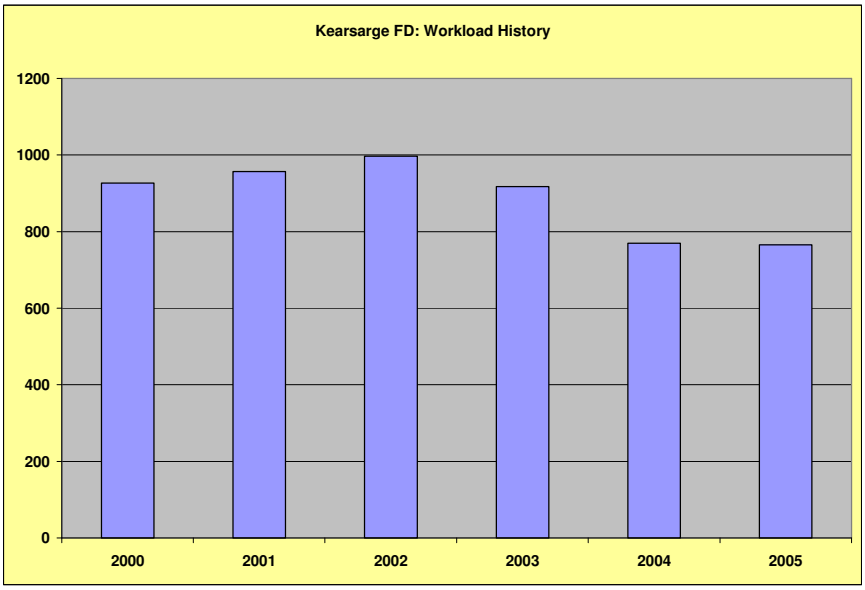
The department provides a variety of services including fire suppression, victim rescue, BLS emergency medical response, first responder hazmat response, and limited public fire safety education. The department received an average of 889 calls for service in the last six years. In 2005 approximately 21 percent of the calls for service were medical in nature, while 79 percent were fire or service related.

Figure 44: Kearsarge FD Workload by Call Type - 2005



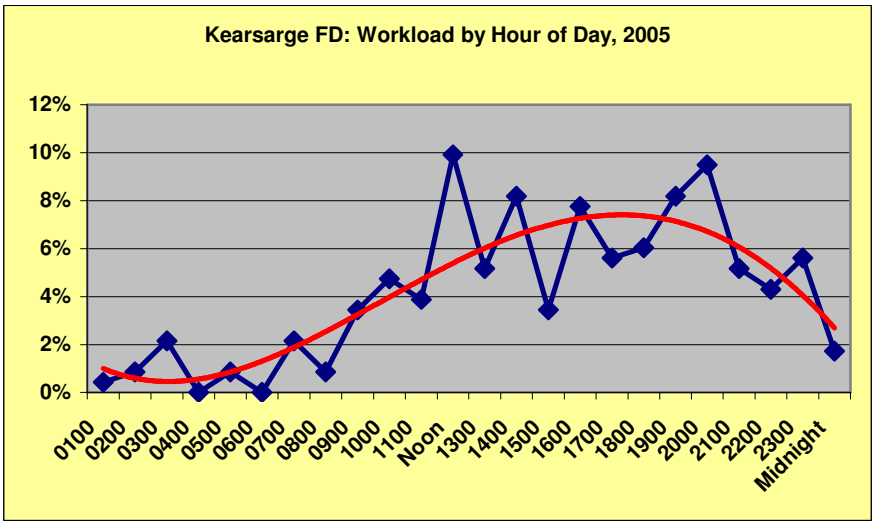
Incident data for KFD is entered into an electronic database in the Millcreek Emergency Communications Center from which analysis is possible. Incident volume in Kearsarge has remained stable over the last two years. The incident volume is expected to change as community growth occurs. The following figure details the overall workload for the past six years.

Figure 45: Kearsarge Workload History



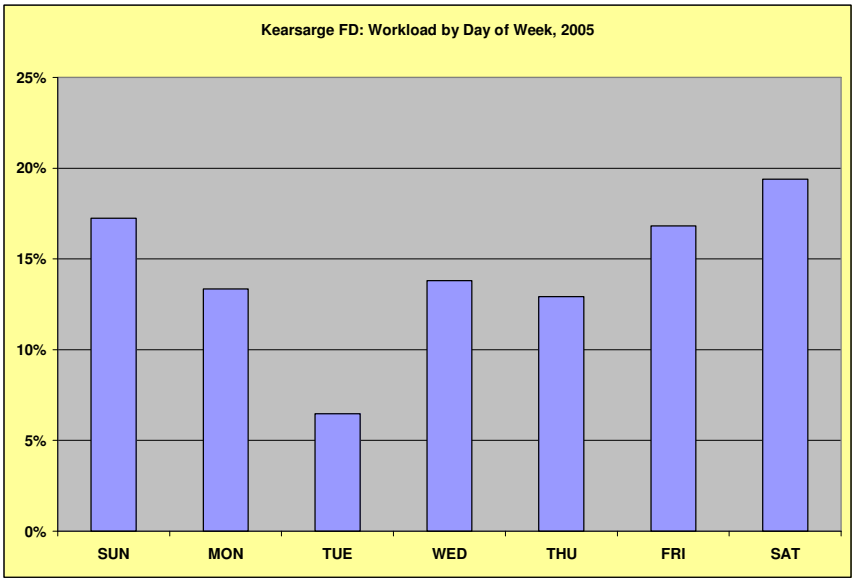
A review of incidents by time of occurrence reveals when the greatest response demand is occurring. The following charts show how activity and demand changes for KFD based on time of day, day of week, and month of year.

Figure 46: Kearsarge FD Workload by Time of Day



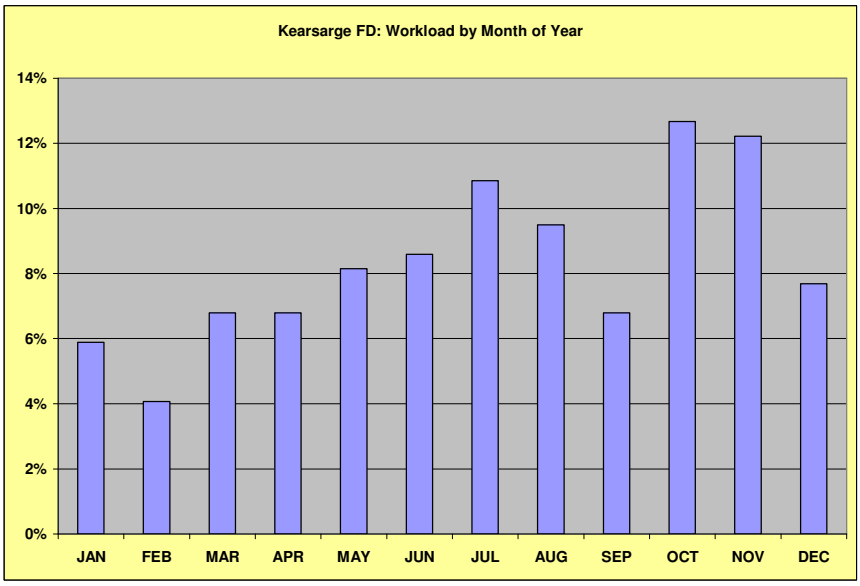
KFD incidents occur throughout the day, but are higher in the afternoon and early evening hours. Incident volumes are lower during the week and higher on the weekends.

Figure 47: Kearsarge Fire Workload by Day of Week



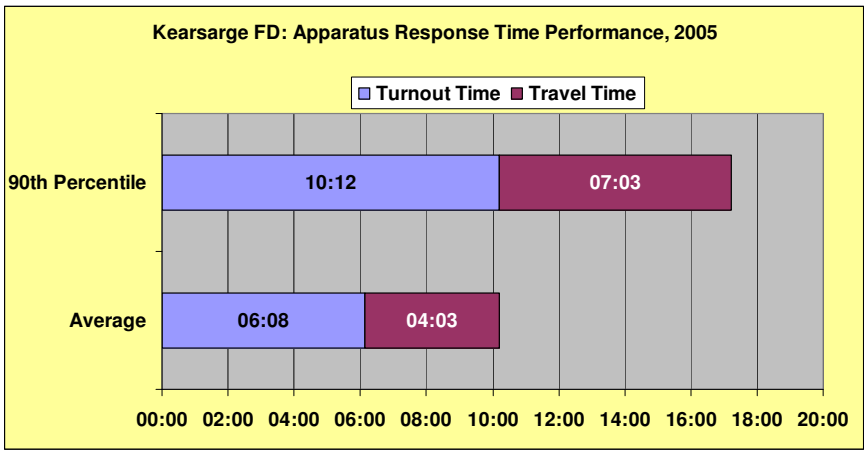
When incident volumes are examined by month, as shown in the following figure, incident volumes are uneven. Monthly incident volumes follow a pattern in which activity rises into the summer, drops through August and September, and rises again in October and November.

Figure 48: Kearsarge Fire Workload by Month of Year



The following figure illustrates KFD response time performance. The response times have been divided into turnout and travel times. The total of both times is the overall response times for the department.

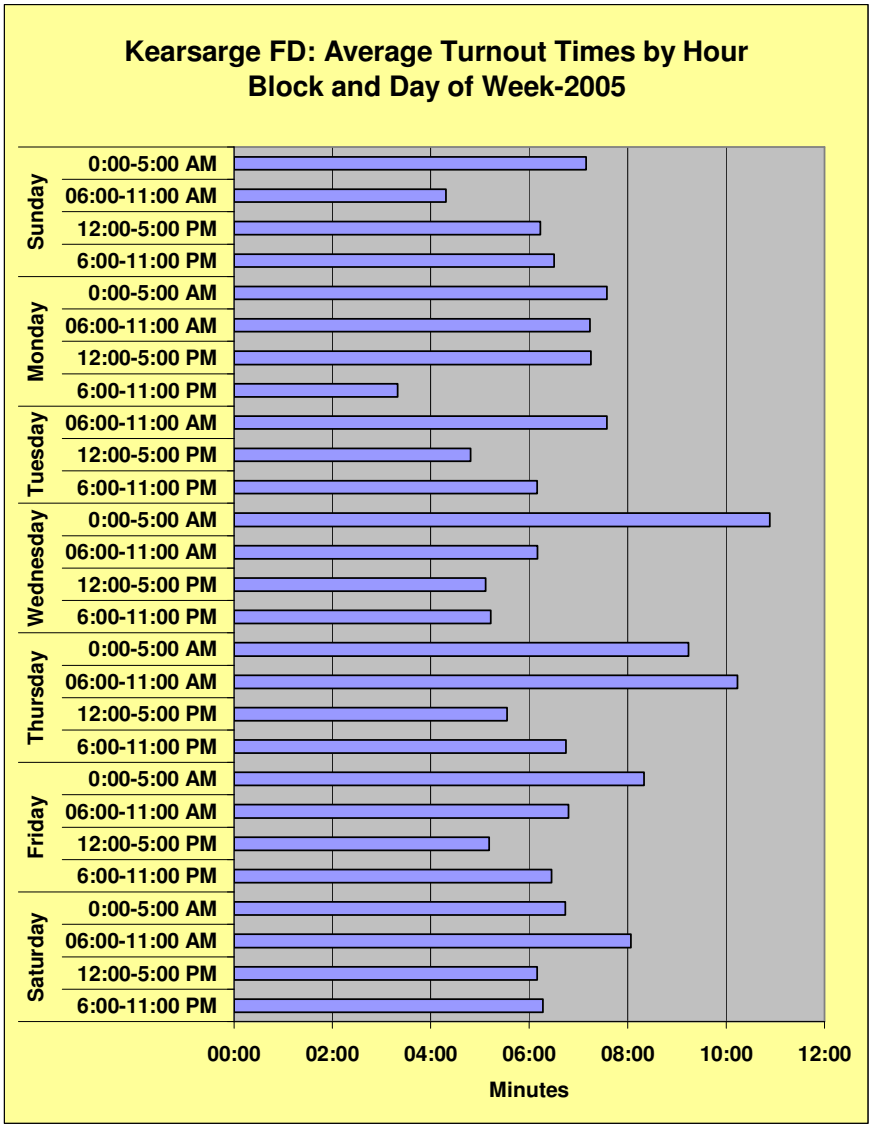
Figure 49: Kearsarge FD Response Time Performance



The data indicates that the department's overall response time average was ten minutes eleven seconds. Fractal analysis indicates a 90th percentile response time performance of 17 minutes 15 seconds.

ESCi examined response times of a specific period per day of the week. Volunteer fire departments typically have varying turnout times from weekends to weekdays, on drill nights, and by the time of day. Presumably, evenings and weekends are times when volunteer staff is most available and assembly of a fire crew can be made more rapidly than during other periods. Volunteer response is also dependent on volunteer demographic composition and work or school schedules.

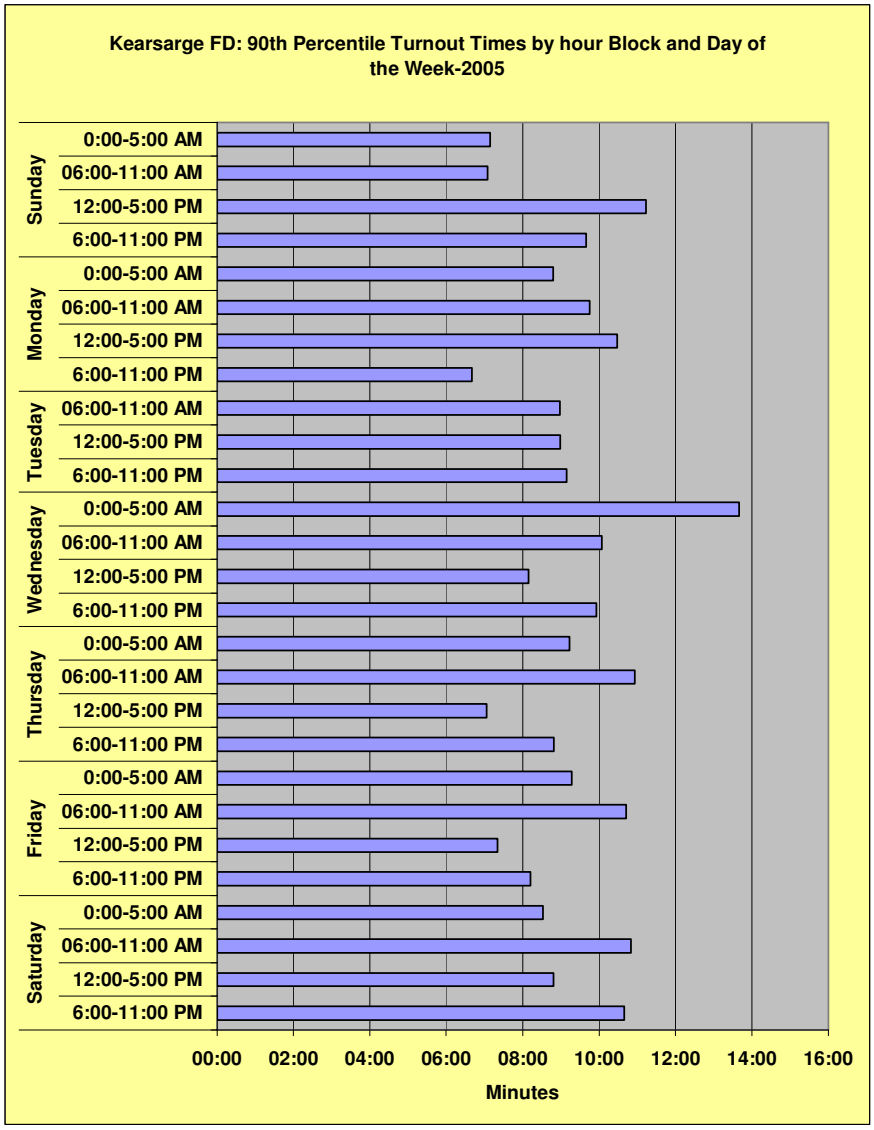
Figure 50: Kearsarge FD: Average Turnout Times



The average turnout times range from three minutes twenty seconds to over 10 minutes at certain hours of the day.

The following figure calculates this fractal measure for turnout times of the Kearsarge Fire Department.

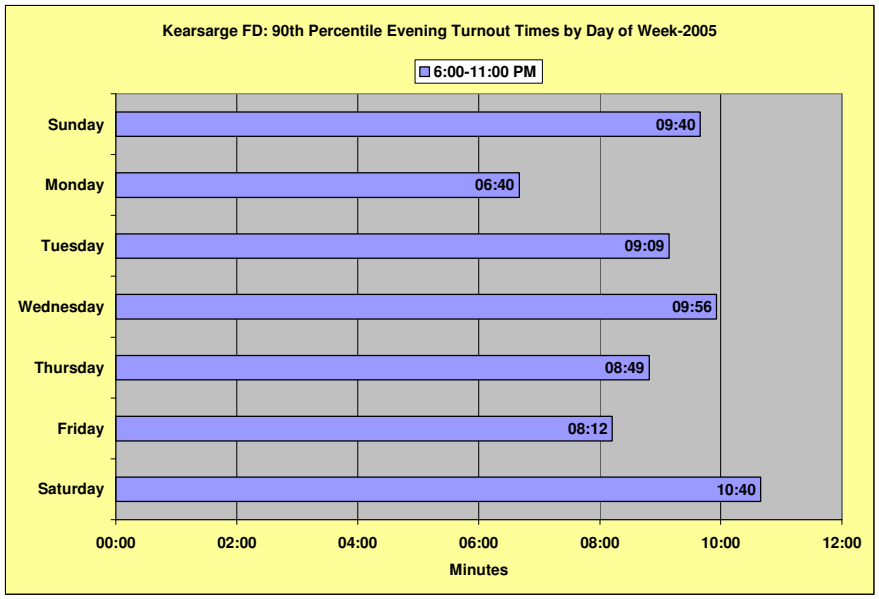
Figure 51: Kearsarge FD: 90th Percentile Turnout Times



The overnight and morning hours are the time of day when turnout times are the longest for KFD. Wednesday afternoons and evenings are when the turnout times are the shortest.

Further analysis was conducted by breaking turnout times into periods by day of the week. The following figure examines the evening hours.

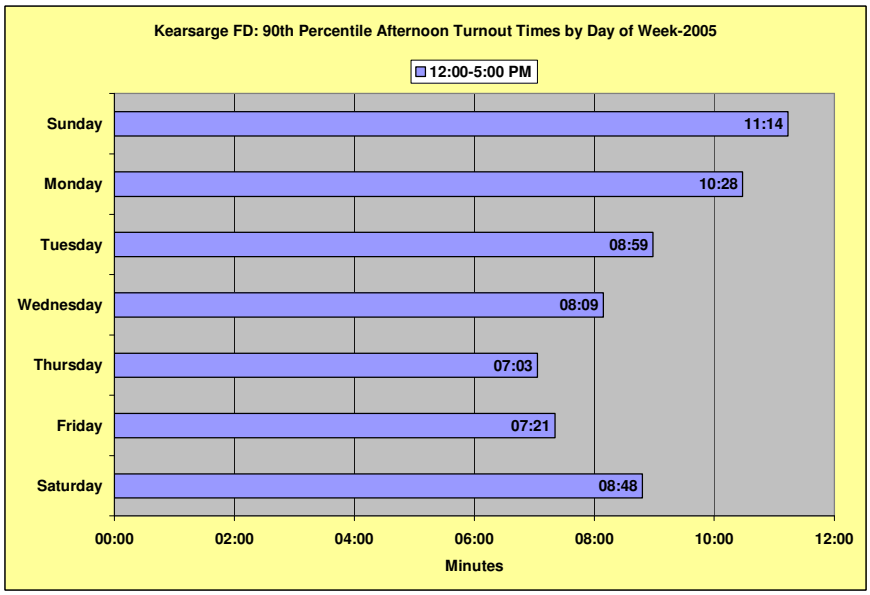
Figure 52: Kearsarge FD: Evening Hours Turnout Times



The evening turnout time periods are within the six to eleven minute range. However, Wednesday, Saturday, and Sunday have the highest turnout times. The longest times are experienced on Saturday

The following figure examines afternoon turnout times.

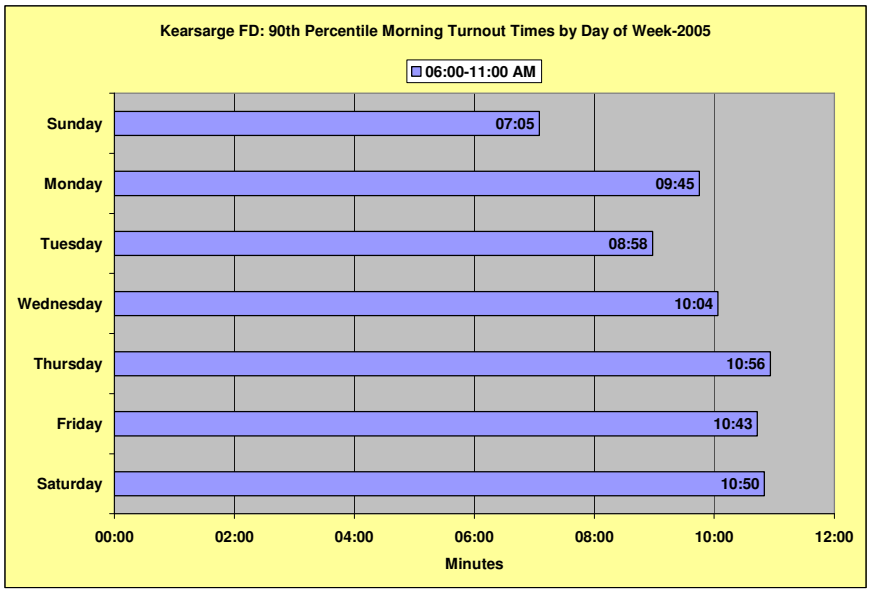
Figure 53: Kearsarge FD: Afternoon Turnout Times - 2005



Turnout times during the afternoon hours are fastest on Thursday, rise through the weekend to their slowest on Sunday.

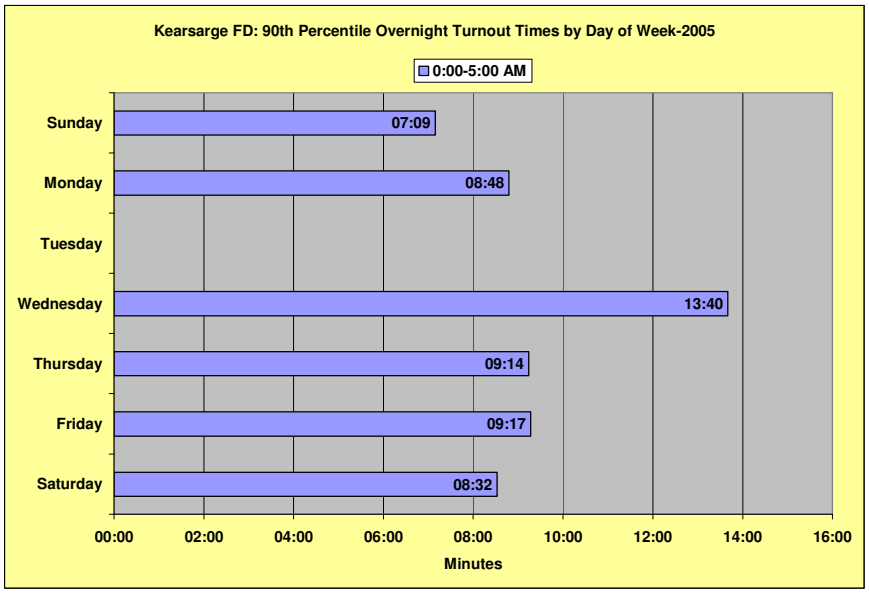
The turnout times during the morning hours are longer than other times of the day. During the week, they range from approximately nine minutes to nearly eleven minutes. Sundays have the longest turnout time, and Saturday has the fourth-longest morning turnout time. The morning periods are usually the time of the day that volunteer departments have higher crew availability.

Figure 54: Kearsarge FD Morning Turnout Times



Another period in which crew availability is usually high for volunteer departments are the overnight hours. However, typical overnight turnout times are longer due to the time it takes to awaken, get dressed, and report to the station. The following figure illustrates the overnight turnout times for KFD.

Figure 55: Kearsarge FD: Overnight Turnout Times



Data was not available for calls on Tuesday for this period. The rest of the week displays turnout times in the range of seven minutes to over thirteen minutes. The longest turnout time during the overnight hours is Wednesday night.

Lake Shore Fire Department

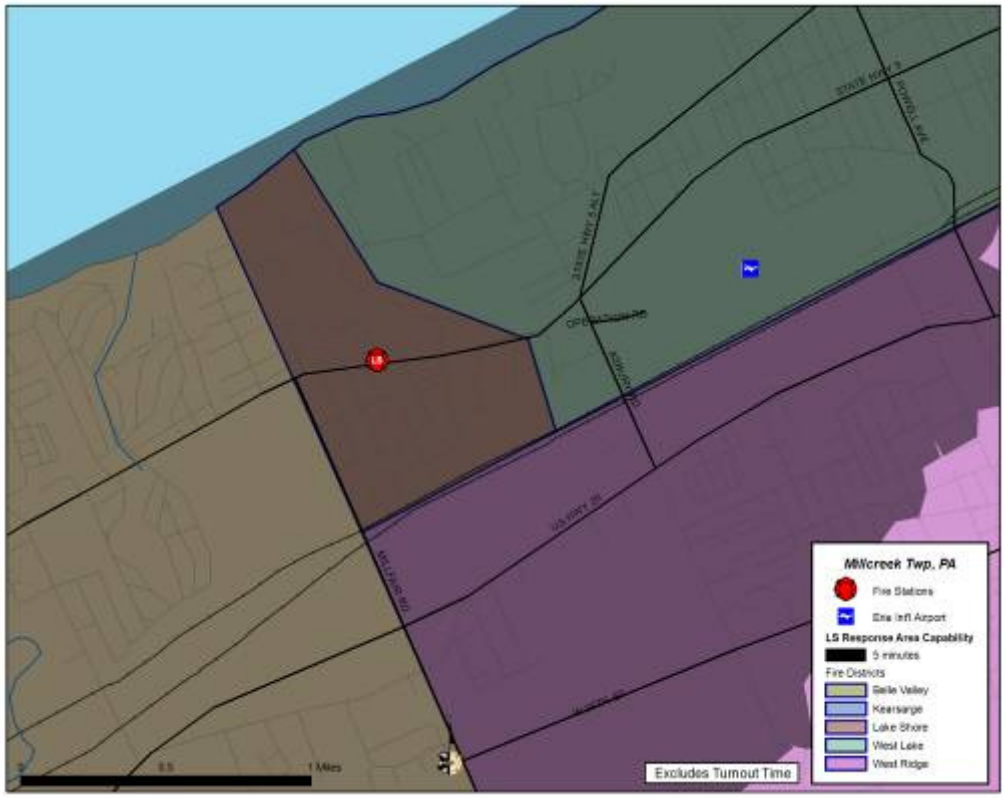
General Description

The Lake Shore Department functions as a volunteer fire association and operates within Millcreek and Fairview Townships. The department's jurisdiction encompasses the northwestern corner of Millcreek Township. The response area includes small city development, suburban neighborhoods, and light industrial property.

Deployment Strategy / Response Time Capabilities

Lake Shore Fire Department maintains one fire station within its response area. The following map displays the total primary response area of the agency as well as the station location. In addition, the shaded polygon demonstrates the five-minute travel time from the station (does not include turnout time). Non-shaded areas are beyond a five-minute travel time.

Figure 56: Lake Shore FD Current Station Deployment

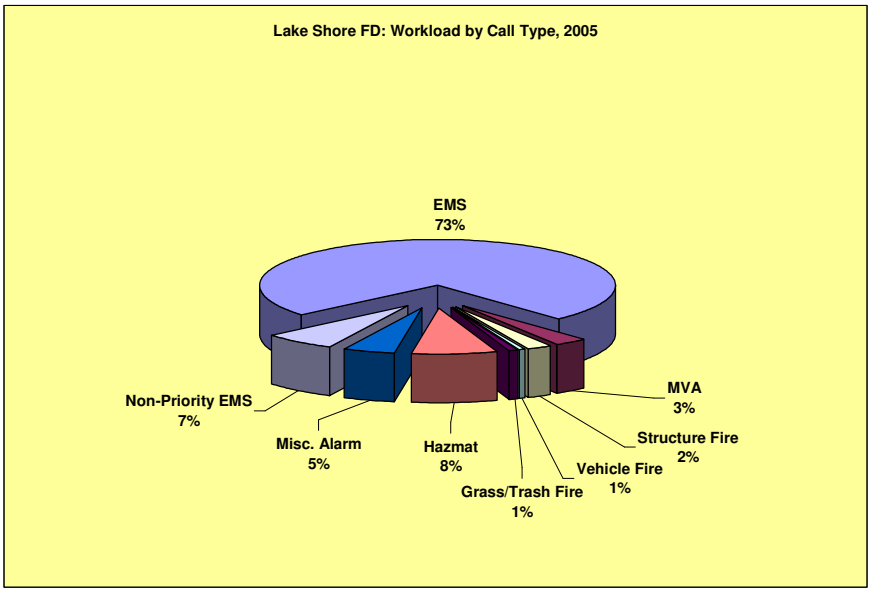


There are no areas within their service area that are outside the five-minute travel time capability according to the model. They have ample travel time ability to provide mutual aid to nearby departments.

Response Time Performance

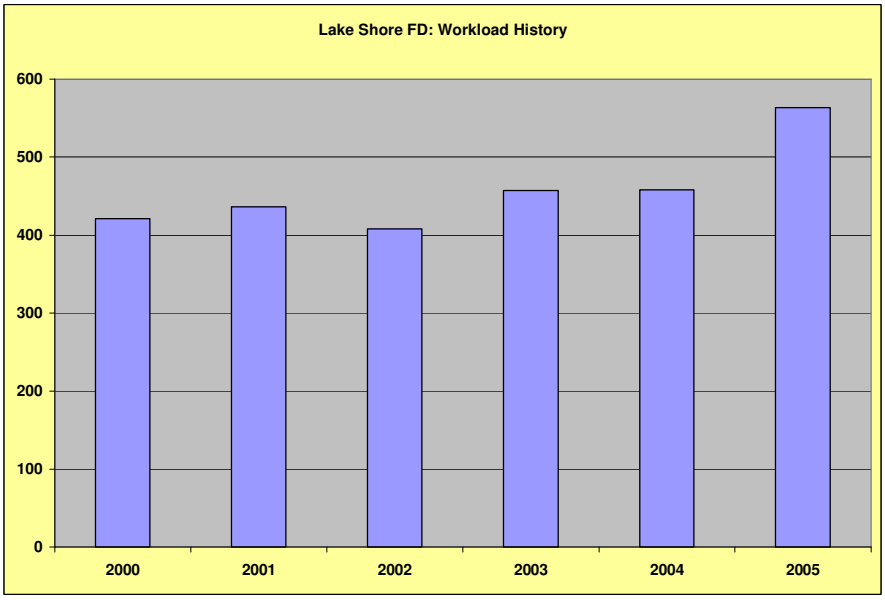
The department provides a variety of services including fire suppression, victim rescue, BLS emergency medical response, first responder hazmat response, and limited public fire safety education. The department received an average of 557 calls for service in the past six years. In 2005 approximately 80 percent of the departments incidents were medical in nature, while 20 percent were fire or service related incidents.

Figure 57: Lake Shore FD Workload by Call Type - 2005



The Millcreek Emergency Communications Center collects incident data for Lake Shore FD within an electronic database from which analysis is possible. Incident volume in Lake Shore has been increasing over the last several years.

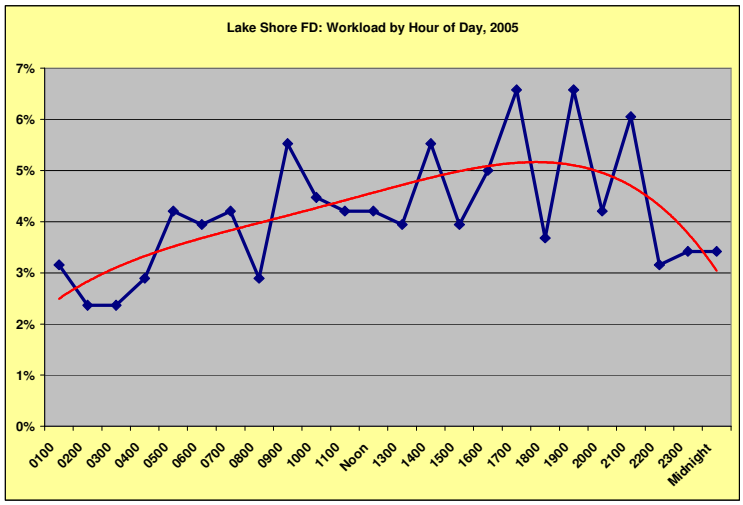
Figure 58: Lake Shore FD Workload History



In the following paragraphs, ESCi provides further analysis of the agency's workload by type of work, and factors of influence that generate service demand.

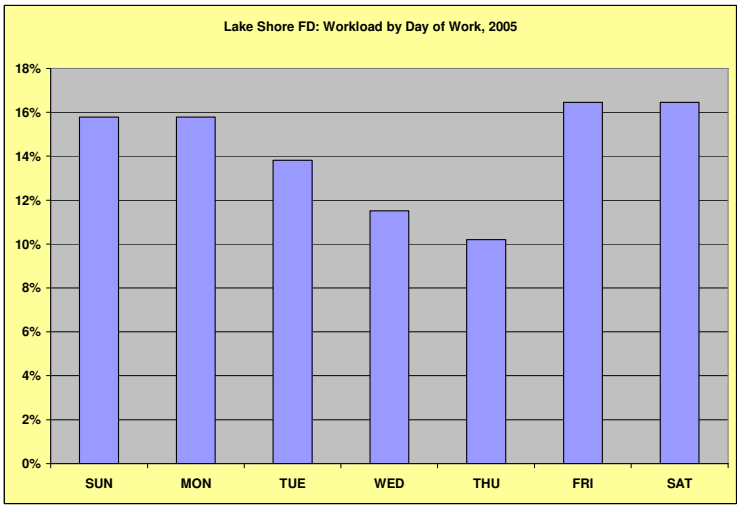
A review of incidents by time of occurrence reveals when the greatest response demand is occurring. The following charts show how activity and demand changes for Lake Shore Fire services based on time of day, day of week, and month of year.

Figure 59: Lake Shore FD Workload by Time of Day



Incident volume is uneven throughout the day, but is generally higher in the afternoon and early evening hours. This coincides with greater activity of business and the daily lives of most people.

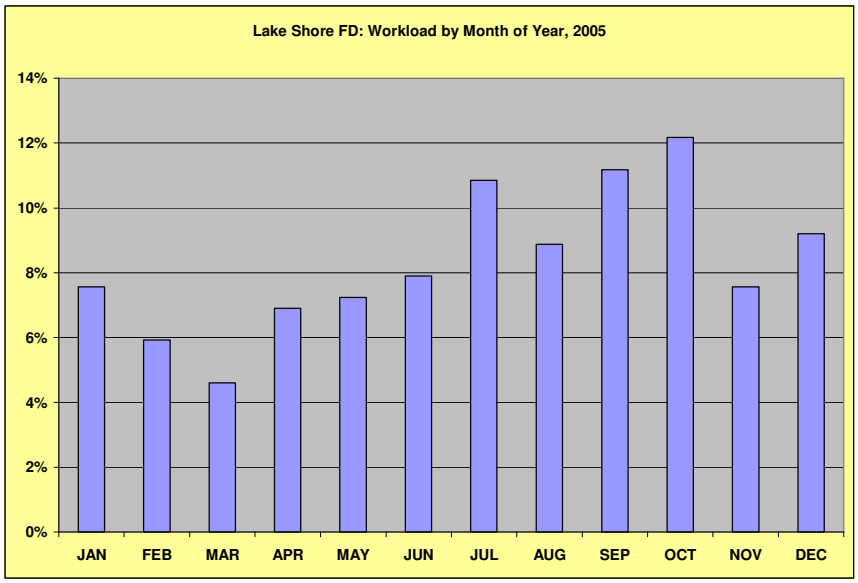
Figure 60: Lake Shore Fire Workload by Day of Week



LSFD's incident volumes are uneven throughout the days of the week, with a general decrease toward Thursday and rising towards the week's end.

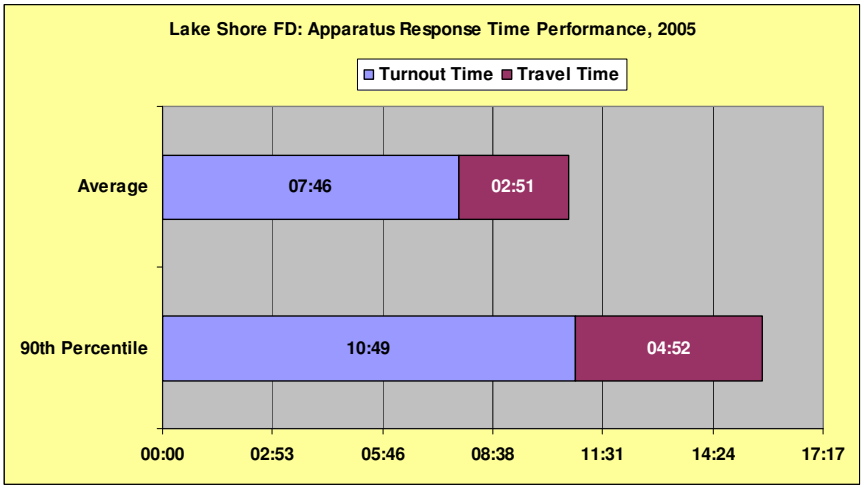
In the following figure, LSFD's incident volumes by month rise through the winter and peak in October, drop off, and increase until year end.

Figure 61: Lake Shore Fire Workload by Month of Year



The following figure illustrates LSFD's response time performance. The response times have been divided into turnout and travel times. Turnout time is the time it takes volunteers to staff an apparatus and start travel to the incident scene. The total of both times is the overall response times for the department.

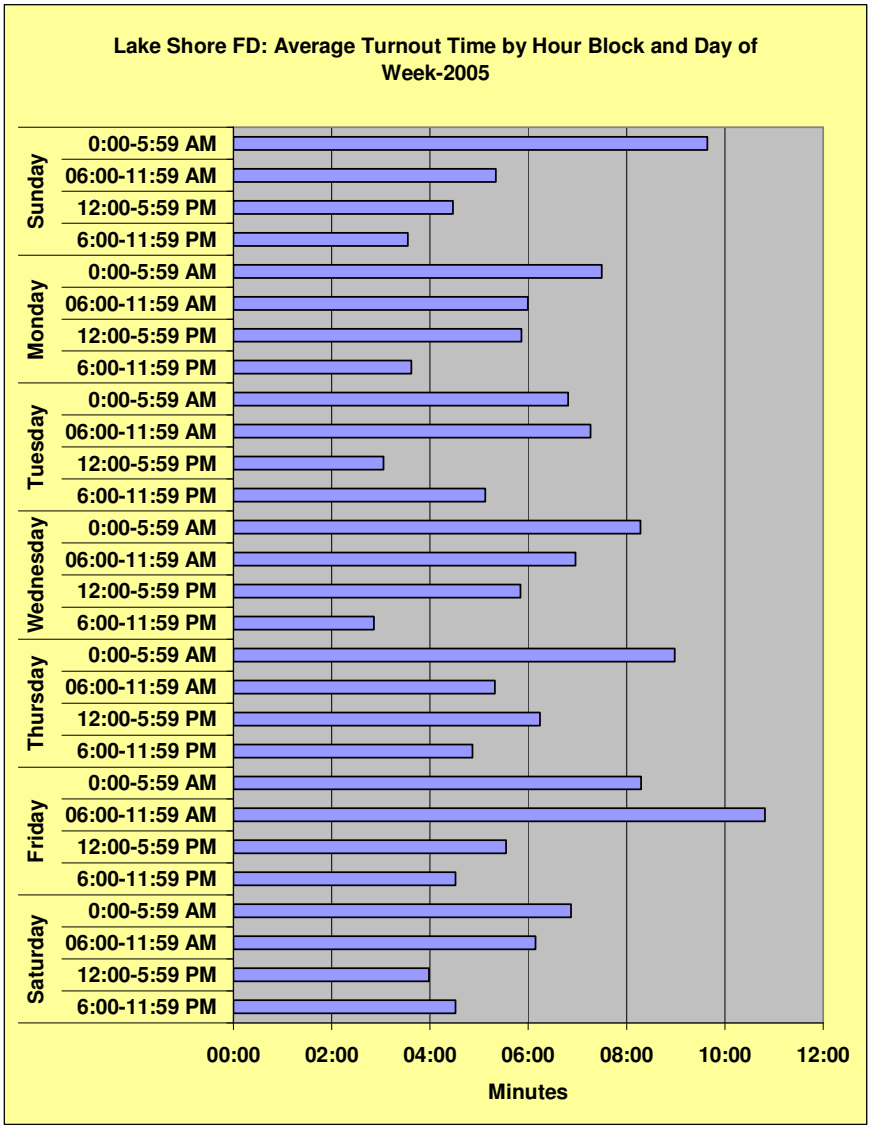
Figure 62: Lake Shore FD Response Time Performance



The data indicates that the department's overall response time average was ten minutes 36 seconds. Fractal analysis indicates a 90th percentile response time performance of 15 minutes 40 seconds.

ESCi examined response times of a specific period per day of the week. Volunteer fire departments typically have varying turnout times from weekends to weekdays, on drill nights, and by the time of day. Presumably, evenings and weekends are times when volunteer staff is most available and assembly of a fire crew can be made more rapidly than during other periods. Volunteer response is also dependent on volunteer demographic composition and work or school schedules.

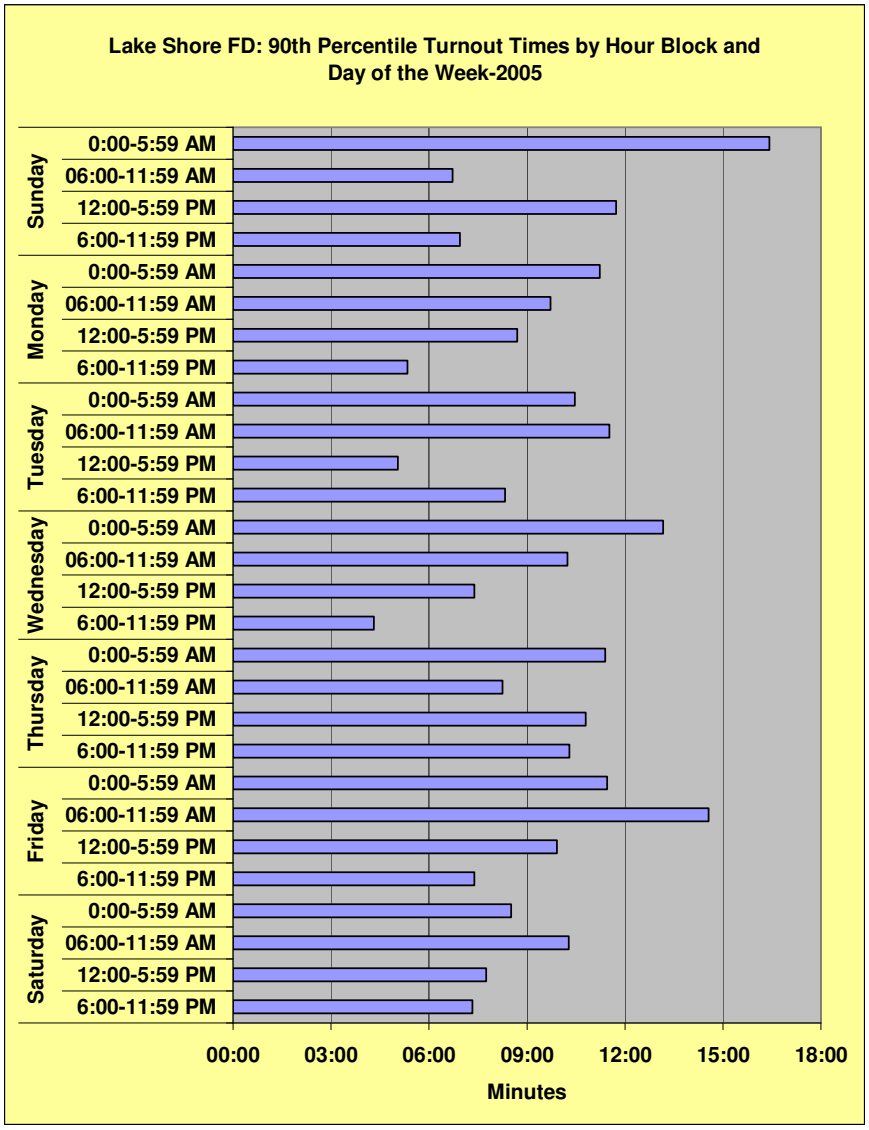
Figure 63: Lake Shore FD: Average Turnout Times



The average turnout times range from three minutes three seconds to over 10 minutes.

The following figure calculates the fractal measure for turnout times of the Lake Shore Fire Department.

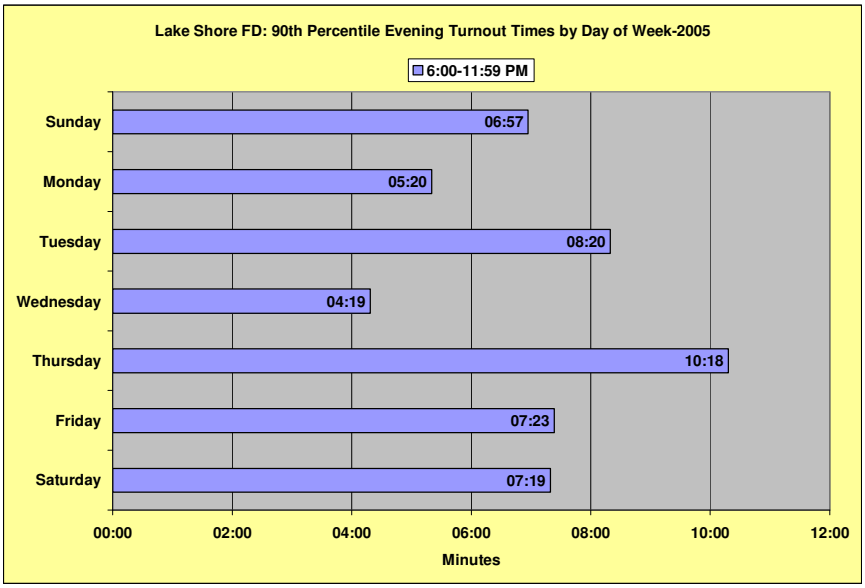
Figure 64: Lake Shore FD: 90th Percentile Turnout Times



The overnight and morning hours are the longest for Lake Shore FD. Tuesday afternoons and Wednesday evenings have the shortest turnout times.

ESCi conducted additional analysis of turnout times by period of the day.

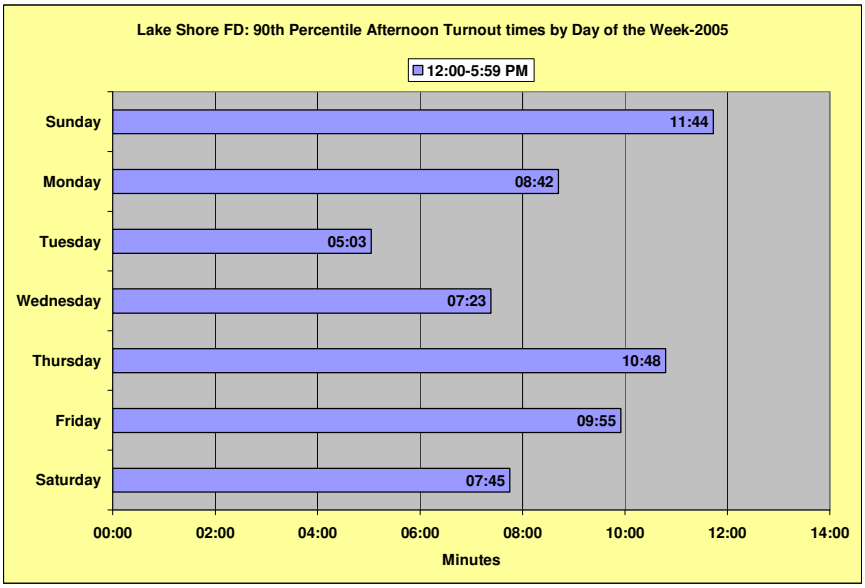
Figure 65: Lake Shore FD: Evening Hours Turnout Times



The illustration above indicates that evening turnout times are within the four to eleven minute range, longer on Thursday evenings, and shortest on Wednesday evenings.

The following figure illustrates the afternoon turnout time performance.

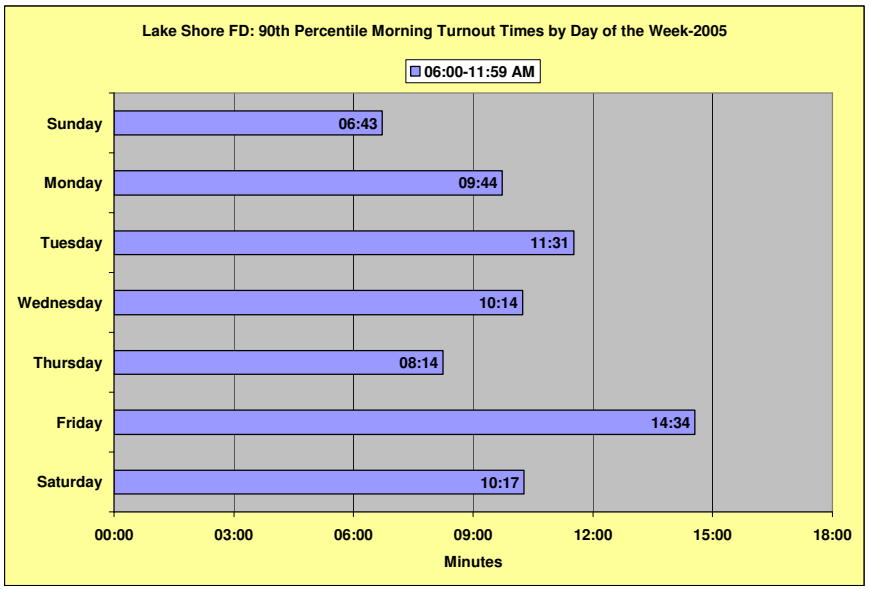
Figure 66: Lake Shore FD: Afternoon Turnout Times - 2005



As illustrated above, the afternoon hours with the longest time occur on Sunday. However, there is no consistent pattern to the afternoon turnout times.

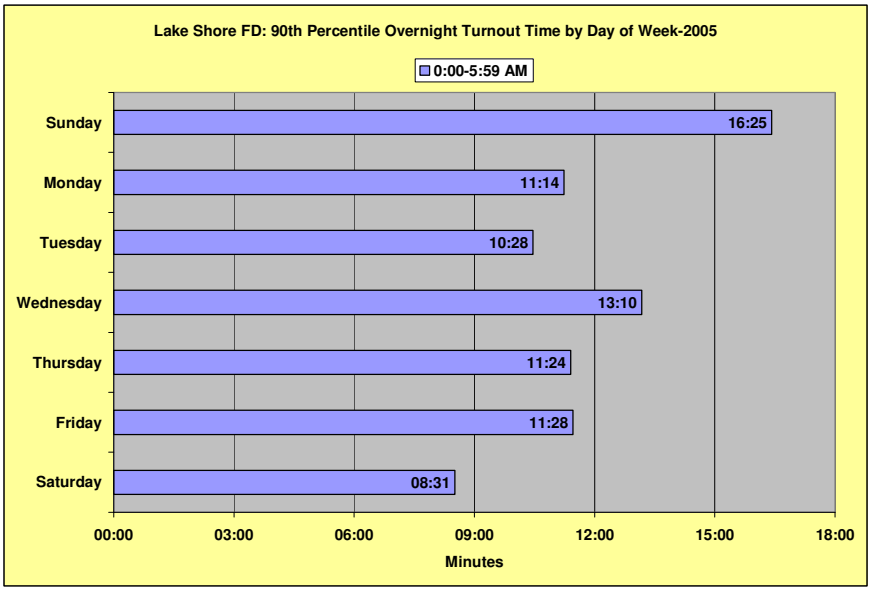
The following illustration shows the morning period of turnout time performance. During this period, turnout times are longer than other times of the day. The range is from a low of over six minutes on Sunday, to a high of over 14 minutes on Friday. Saturday mornings are over ten minutes.

Figure 67: Lake Shore FD Morning Turnout Times



Another period during which crew availability is likely to be higher for volunteer departments is the overnight hours. However, overnight turnout times are longer due to the time it takes to awaken, get dressed, and report to the station. The following figure illustrates the overnight turnout times for LSFD.

Figure 68: Lake Shore FD Overnight Turnout Times



Overnight turnout time displays in the range of eight to seventeen minutes. The longest turnout time during the overnight hours is Sunday night.

West Lake Fire Department

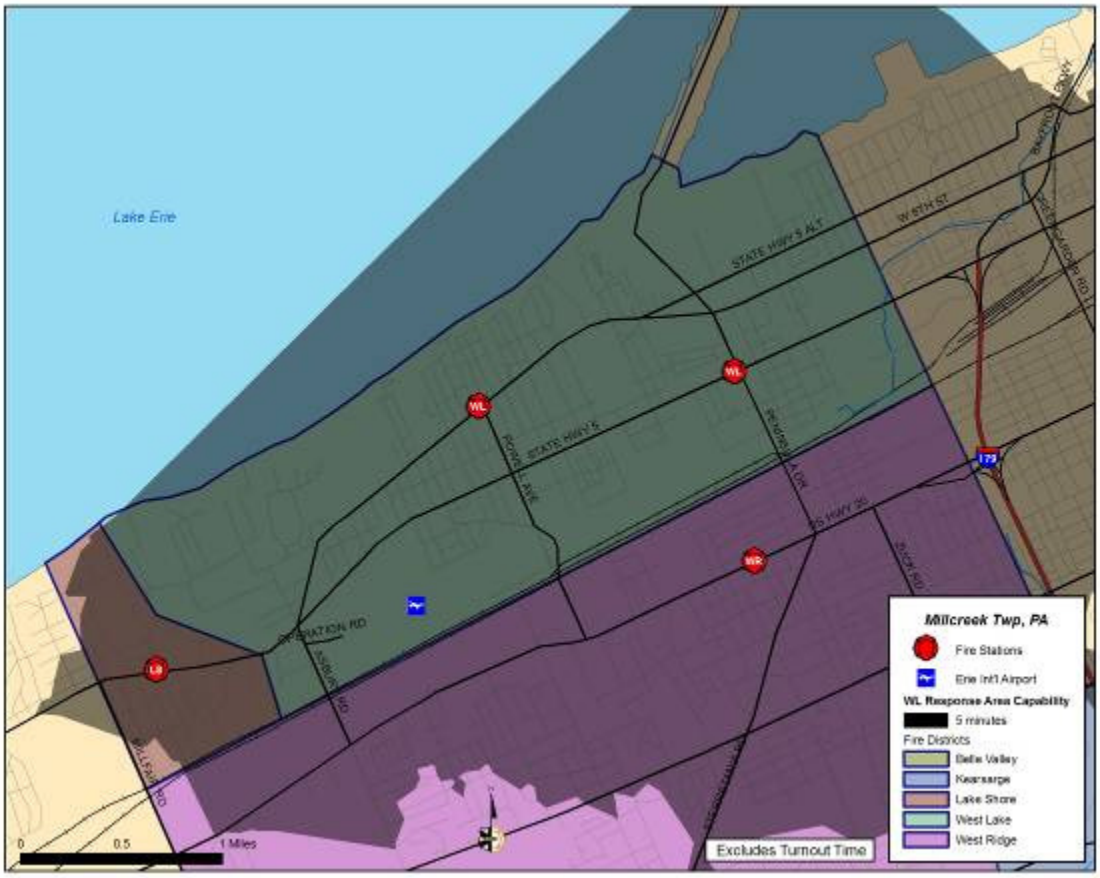
General Description

The West Lake Fire Department functions as a volunteer fire association and operates within Millcreek Township. The department's jurisdiction encompasses the northern lakeshore of the Township. The response area includes small city development, suburban neighborhoods, heavy industrial property, and the Erie International Airport.

Deployment Strategy / Response Time Capabilities

WLFD maintains two fire stations within its response area and the following map illustrates the primary response area of the agency as well as the station location. In addition, the shaded polygon demonstrates the five-minute travel time from the station (does not include turnout time). Non-shaded areas are beyond a five-minute travel time.

Figure 69: West Lake FD Current Station Deployment

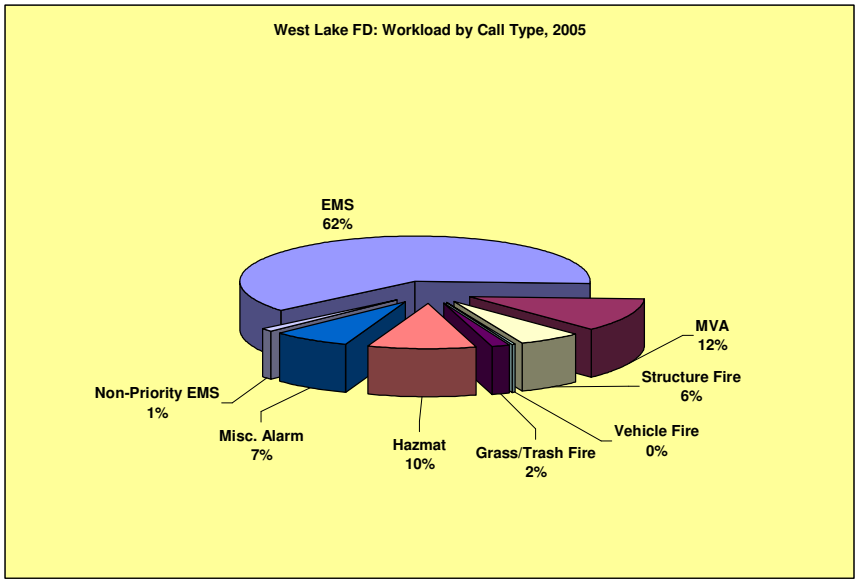


The WSFD service area is within the five minute travel time capability and there is ample travel time ability to provide mutual aid to nearby departments.

Response Time Performance

The department provides a variety of services including fire suppression, victim rescue, BLS emergency medical response, first responder hazmat response, and limited public fire safety education. The department received an average of 557 incidents in the last six years. In 2005, approximately 63 percent were medical in nature, and 27 percent were fire or service related.

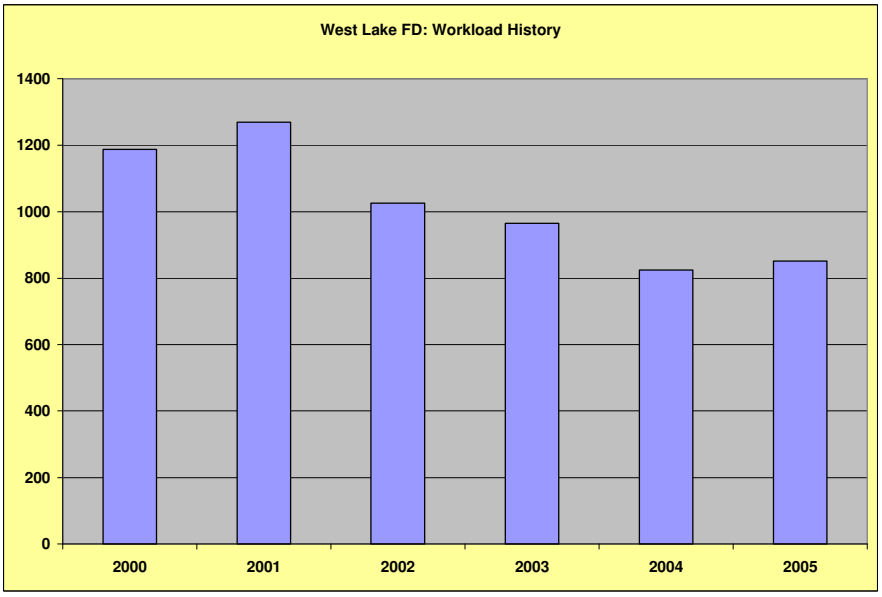
Figure 70: West Lake FD Workload by Call Type - 2005



The Millcreek Emergency Communications Center collects incident data for WLFD in an electronic database from which analysis is possible.

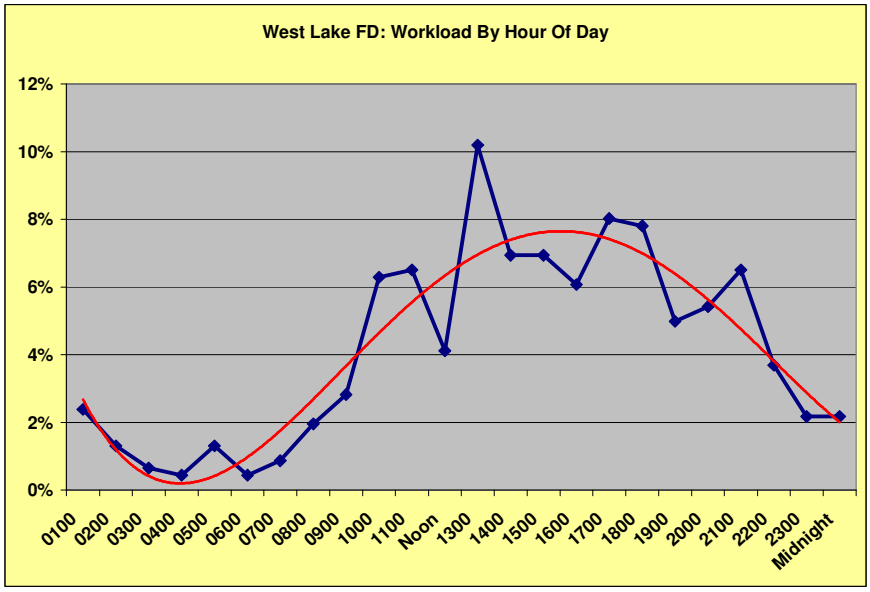
An analysis of incident volumes shows that the number of incidents has been decreasing over the past several years.

Figure 71: West Lake FD Workload History



A review of incidents by time of occurrence reveals when the greatest response demand is occurring. The following charts show how activity and demand changes for West Lake Fire services based on time of day, day of week, and month of year.

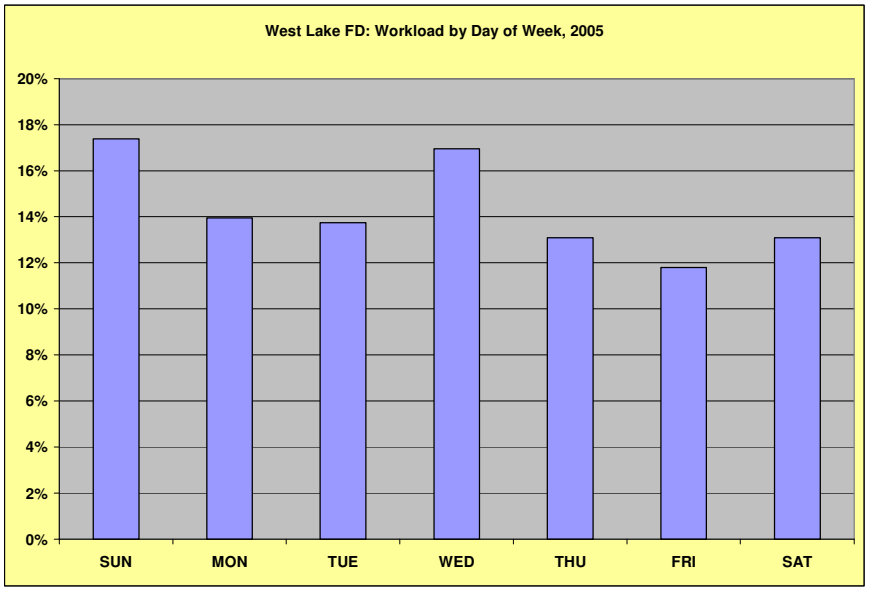
Figure 72: West Lake FD Workload by Time of Day



The number of incidents is uneven throughout the day but and higher in the afternoon and early evening hours. This coincides with greater activity of business and the daily lives of most people. Overnight calls are a very small percentage of West Lake's overall call volume.

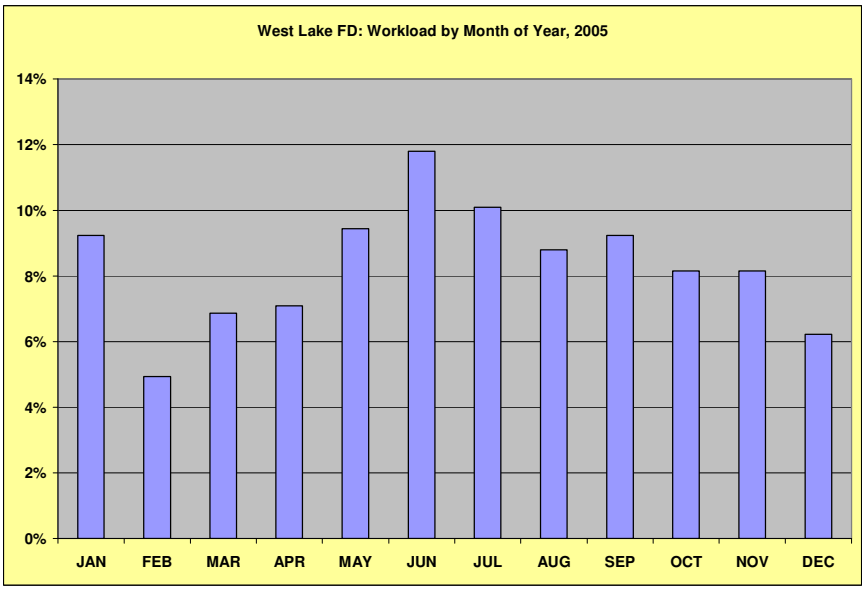
The following figure shows that incident volumes generally decrease throughout the days of the week, with a slight increase on Wednesday and rising again on the week's end.

Figure 73: West Lake Fire Workload by Day of Week



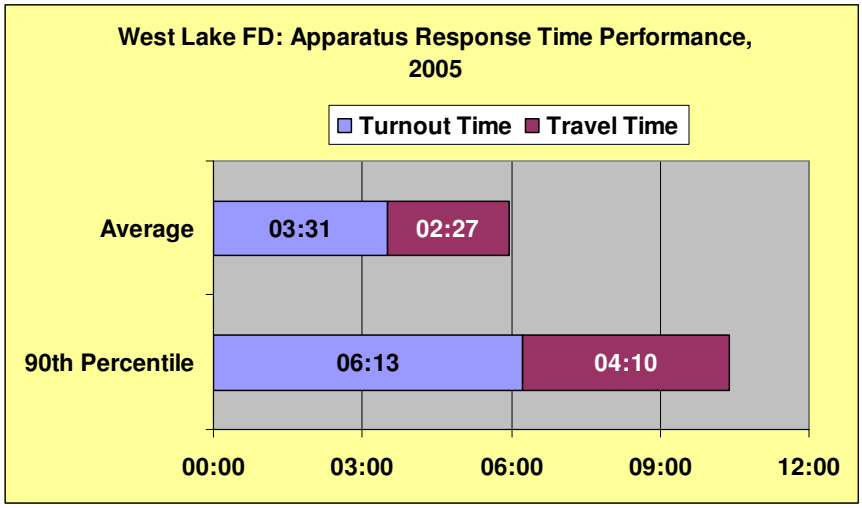
An analysis of incident volumes by month, as illustrated in the following figure, shows a unique pattern. Monthly incident volumes rise from February through June, with a general decline in volume until year end.

Figure 74: West Lake Fire Workload by Month of Year



The following figure illustrates WLFDs response time performance. The response times have been divided into turnout and travel times. Turnout time is the time it takes volunteers to staff an apparatus and start travel to the incident scene. The total of both times is the overall response times for the department.

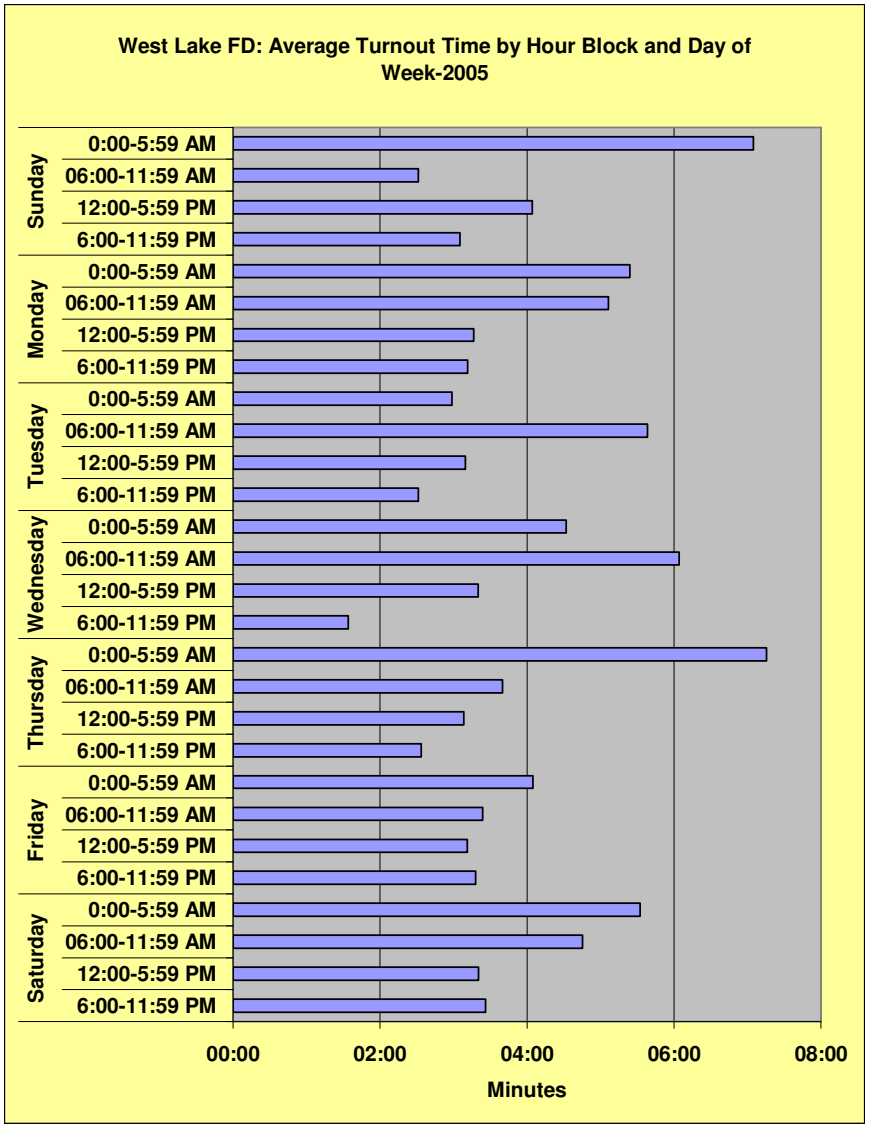
Figure 75: West Lake FD Response Time Performance



The data indicates that the department's overall response time average was five minutes 58 seconds. Fractal analysis indicates a 90th percentile response time performance of ten minutes 23 seconds.

ESCi examined response times of a specific period per day of the week. Volunteer fire departments typically have varying turnout times from weekends to weekdays, on drill nights, and by the time of day. Presumably, evenings and weekends are times when volunteer staff is most available and assembly of a fire crew can be made more rapidly than during other periods. Volunteer response is also dependent on volunteer demographic composition and work or school schedules.

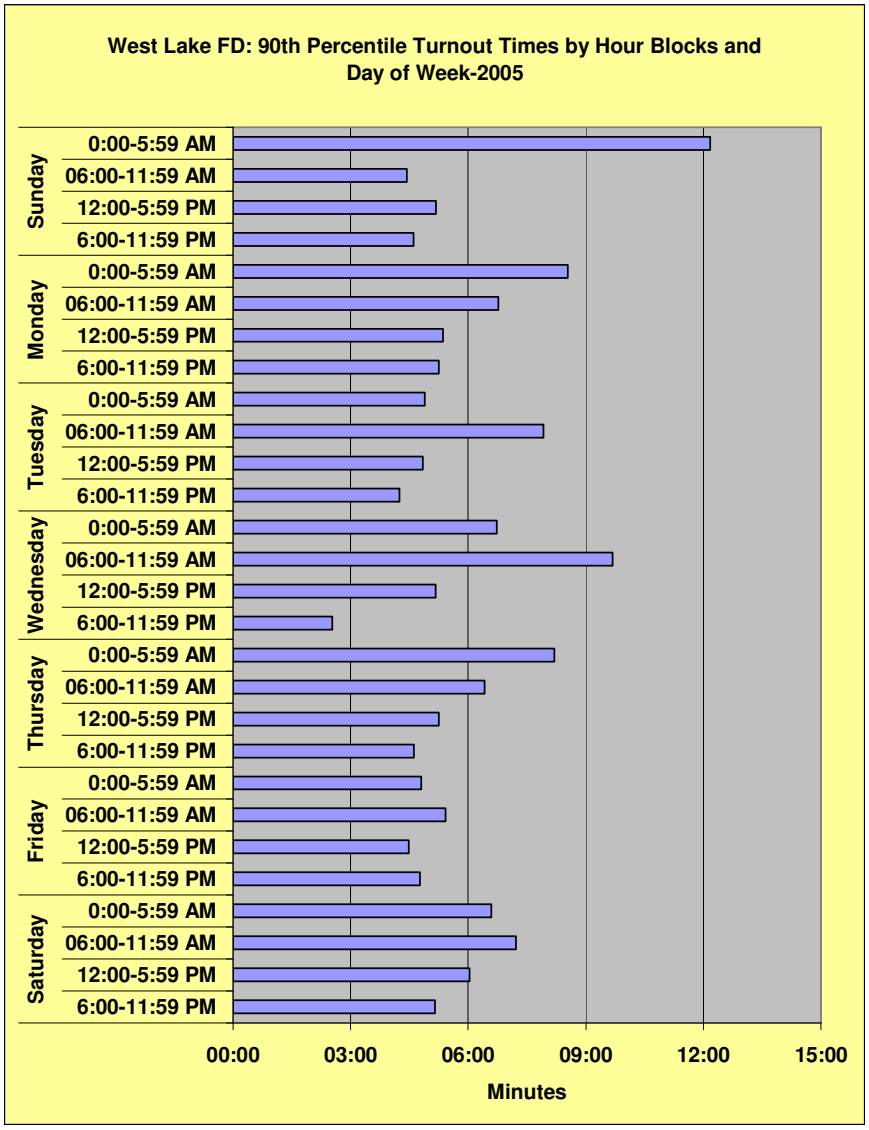
Figure 76: West Lake FD: Average Turnout Times



The average turnout times range from one minute and 34 seconds to over seven minutes.

The following figure calculates the fractal measure for WLFD turnout times.

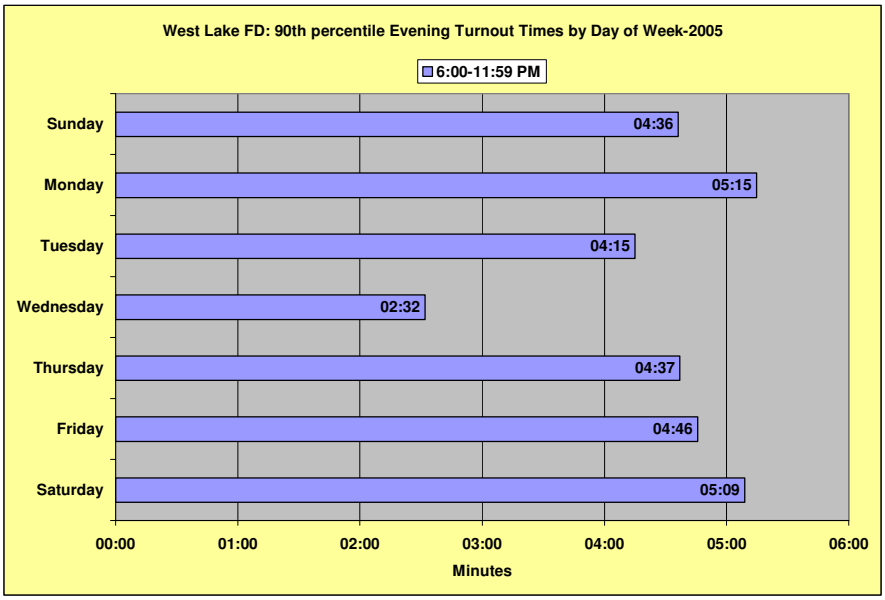
Figure 77: West Lake FD: 90th Percentile Turnout Times



The overnight and morning hours have the longest turnout times and Tuesday and Wednesday evenings are when the turnout times are the shortest.

ESCi conducted additional analysis of turnout times by period of the day.

Figure 78: West Lake FD: Evening Hours Turnout Times



The figure above indicates that evening turnout times are within a two minute 30 second and five minute 30 second range, with the longest time occurring on Monday and the shortest on Wednesday.

In the following illustration, afternoon turnout times range between four minutes 30 seconds and six minutes. The shortest turnout times are on Friday and the longest on Saturday, a day of the week when higher numbers are typically available.

Figure 79: West Lake FD: Afternoon Turnout Times - 2005

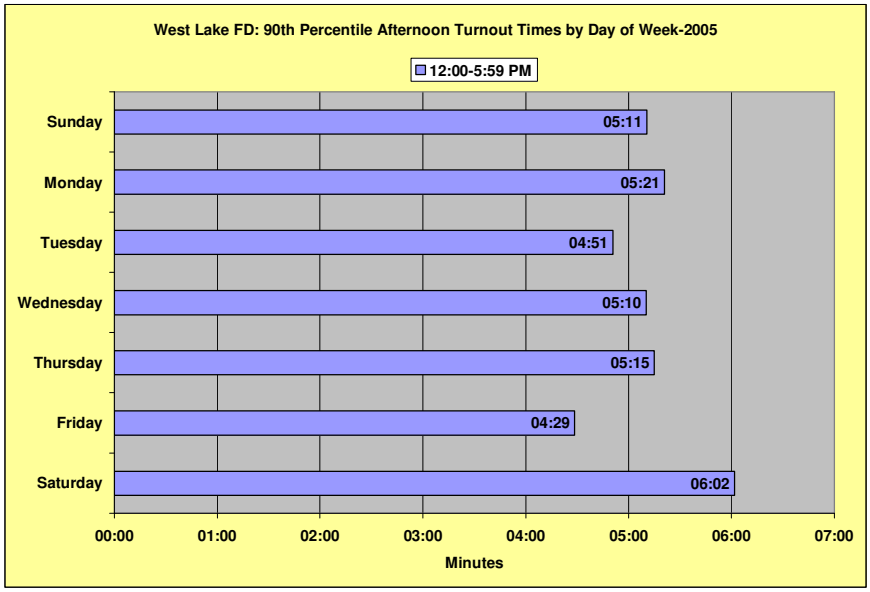
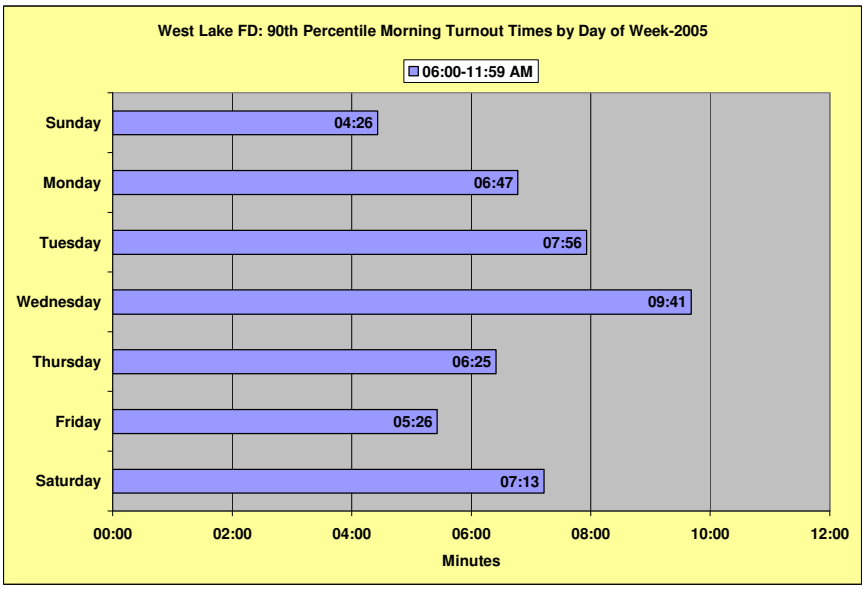


Figure 80: West Lake FD Morning Turnout Times

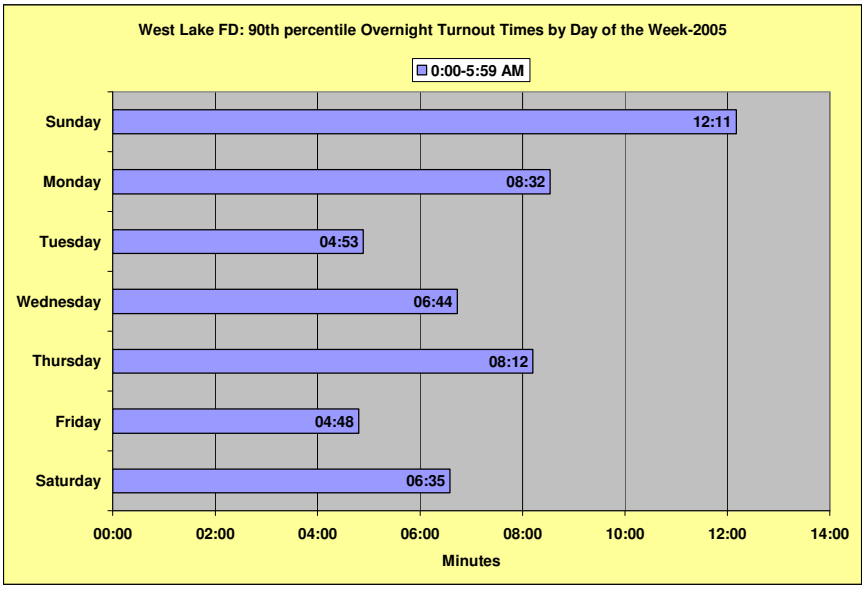


The figure above shows that turnout times during the morning hours are longer than other times of the day. During the week, times range from four minutes 26 seconds to over nine minutes.

A period during which crew availability is likely to be higher for volunteer departments is the overnight hours. Typically, overnight turnout times are longer due to the time it takes to awaken,

get dressed, and report to the station. The following figure illustrates the overnight turnout times for WLFD.

Figure 81: West Lake FD Overnight Turnout Times



Overnight turnout times range from four minutes 48 seconds to over twelve minutes. The longest turnout time occurs Sunday night.

West Ridge Fire Department

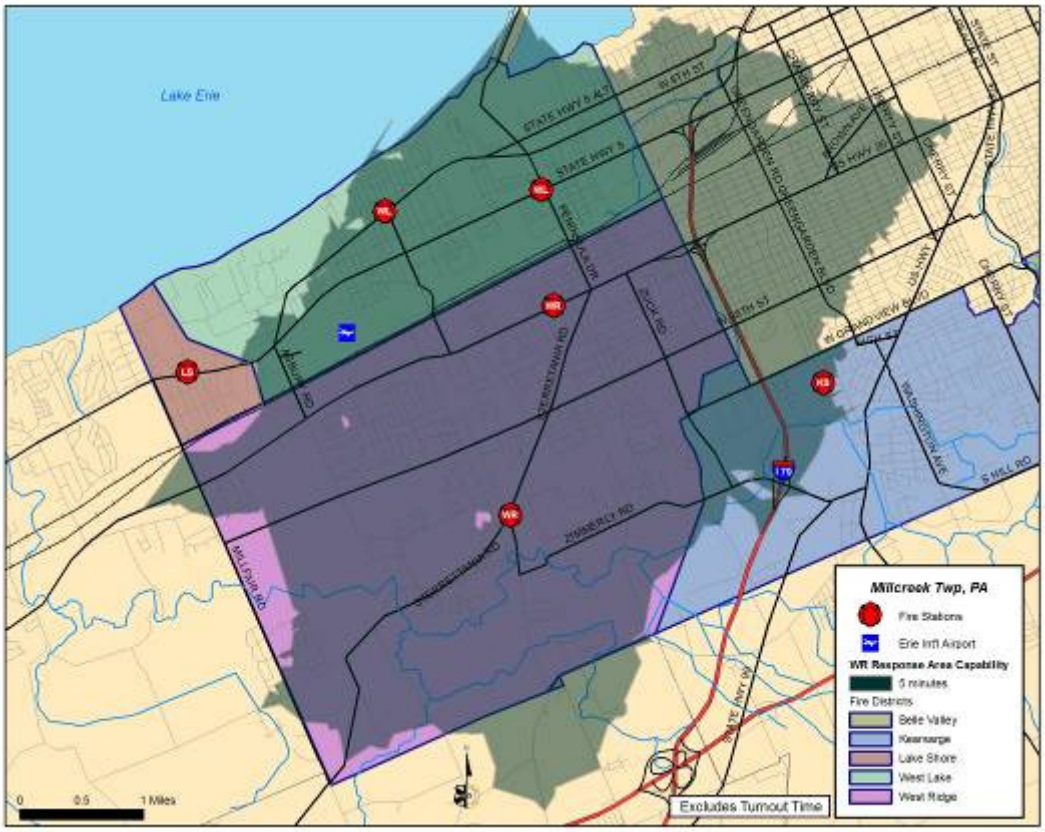
General Description

The West Ridge Department functions as a volunteer fire association and operates within Millcreek Township. The department's jurisdiction encompasses the largest area of the Township. The response area includes suburban neighborhoods, light commercial property, and rural areas.

Deployment Strategy / Response Time Capabilities

West Ridge Fire Department maintains two fire stations within its response area. The following map displays the total primary response area of the agency as well as the station location. In addition, the shaded polygon demonstrates the five-minute travel time from the station (does not include turnout time). Non-shaded areas are beyond a five-minute travel time.

Figure 82: West Ridge FD Current Station Deployment

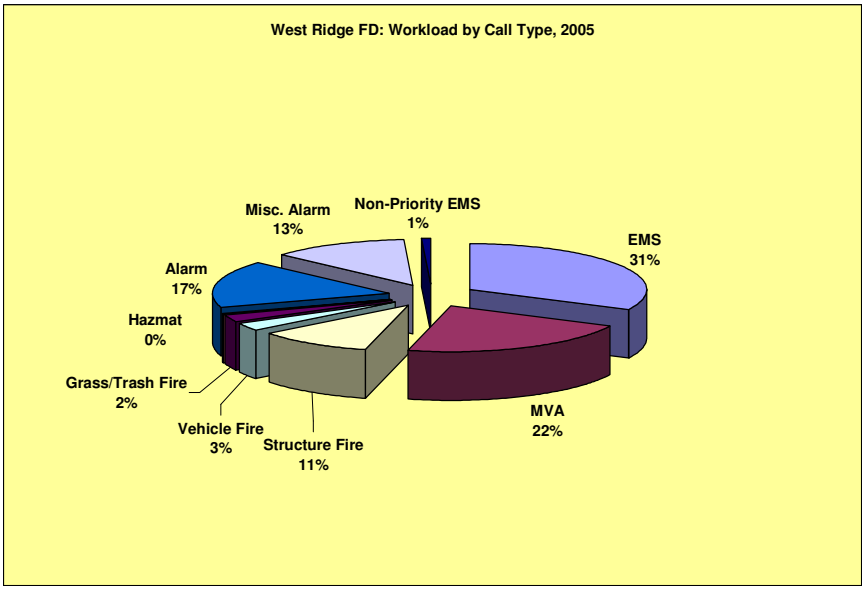


There are small areas within the WRFD service area that are outside the five-minute travel time capability according to the model. These areas are reachable within another minute of emergency mode travel time. WRFD has ample travel time capacity to provide mutual aid to West Lake and parts of Kearsarge.

Response Time Performance

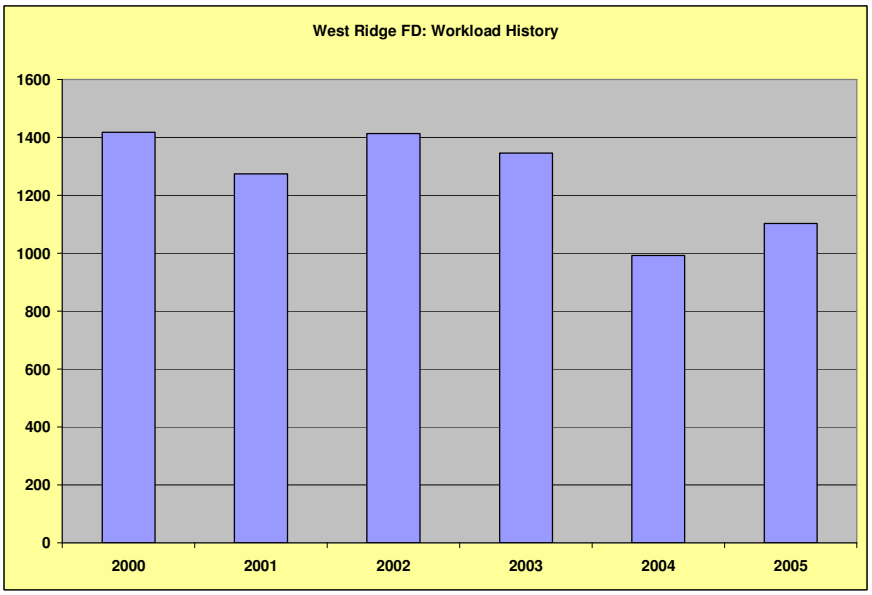
The department provides a variety of services including fire suppression, victim rescue, BLS emergency medical response, first responder-level hazmat response, and limited public fire safety education. The department responded to an average of 1,257 incidents in the past six years. In 2005, approximately 32 percent of the calls were medical in nature and 68 percent were fire or service related.

Figure 83: West Ridge FD Workload by Call Type - 2005



The Millcreek Emergency Communications Center collects incident data for West Ridge FD in an electronic database from which analysis is possible. Incident volume in West Ridge has been decreasing over the past several years.

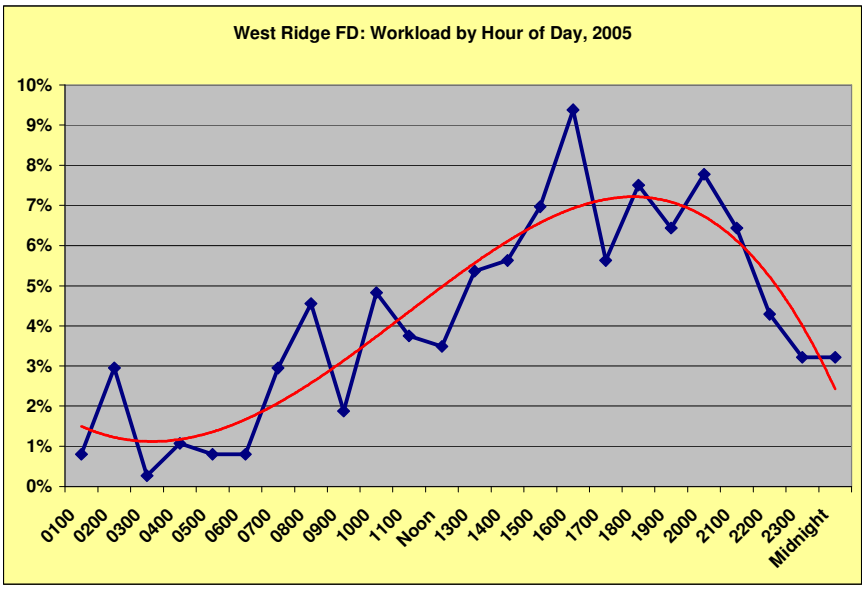
Figure 84: West Ridge FD Workload History



In the following paragraphs, ESCi provides further analysis of the agency's workload. The workloads, type of work, and factors of influence that generate service demand is examined in the subsequent pages.

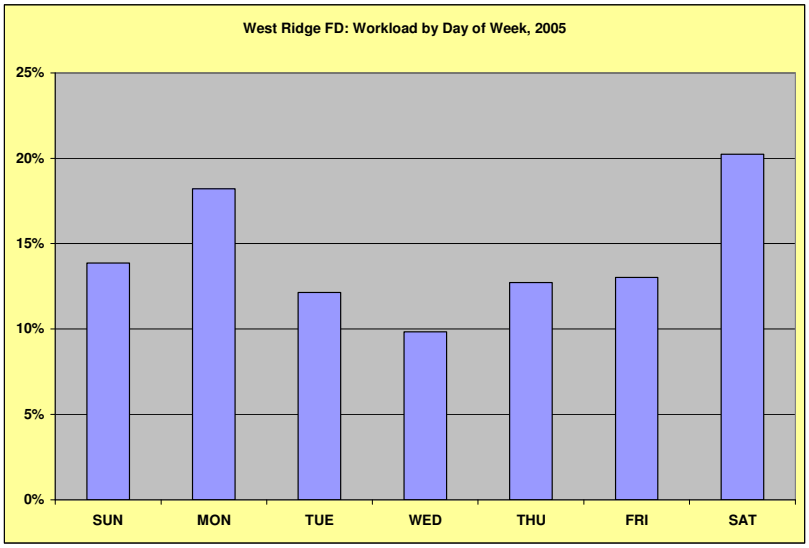
A review of incidents by time of occurrence reveals when the greatest response demand is occurring. The following charts show how activity and demand changes for WRFD based on time of day, day of week, and month of year.

Figure 85: West Ridge FD Workload by Time of Day



Incident volume is uneven throughout the day, but is generally higher in the afternoon and early evening hours. This coincides with greater activity of business and the daily lives of most people.

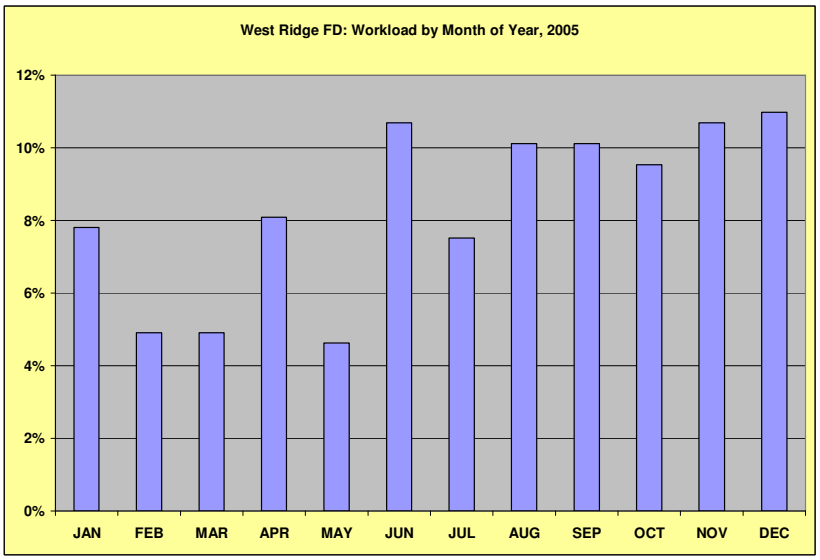
Figure 86: West Ridge Fire Workload by Day of Week



As illustrated in the figure above, WRFD experiences a decrease in incident volume from Monday through Wednesday, and a rise in volume through Saturday.

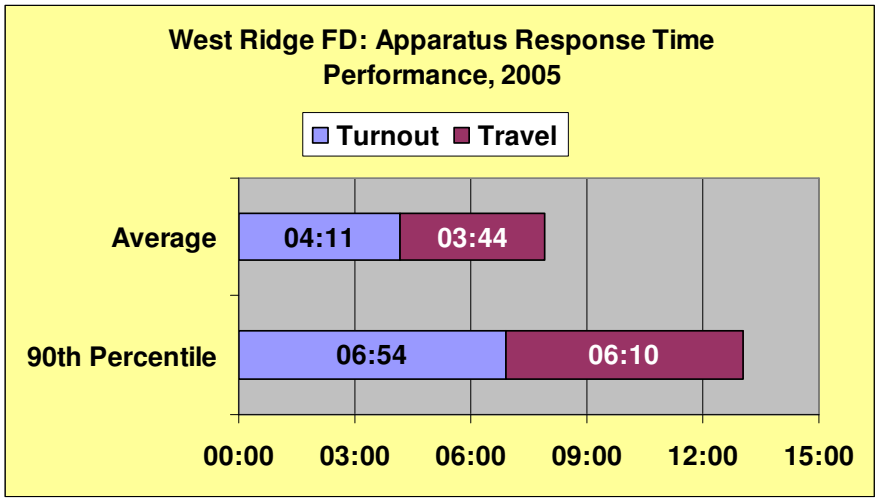
When incident volumes are analyzed by month, as shown in the following figure, the incident volume is different from the other departments in the study. Monthly incident volumes follow a pattern in which activity rises from summer months through the autumn, with lower volumes during the winter and spring months.

Figure 87: West Ridge Fire Workload by Month of Year



The following figure shows WRFD's response time performance. The response times have been divided into turnout and travel times. Turnout time is the time it takes volunteers to staff an apparatus and start travel to the incident scene. The total of both times is the overall response times for the department.

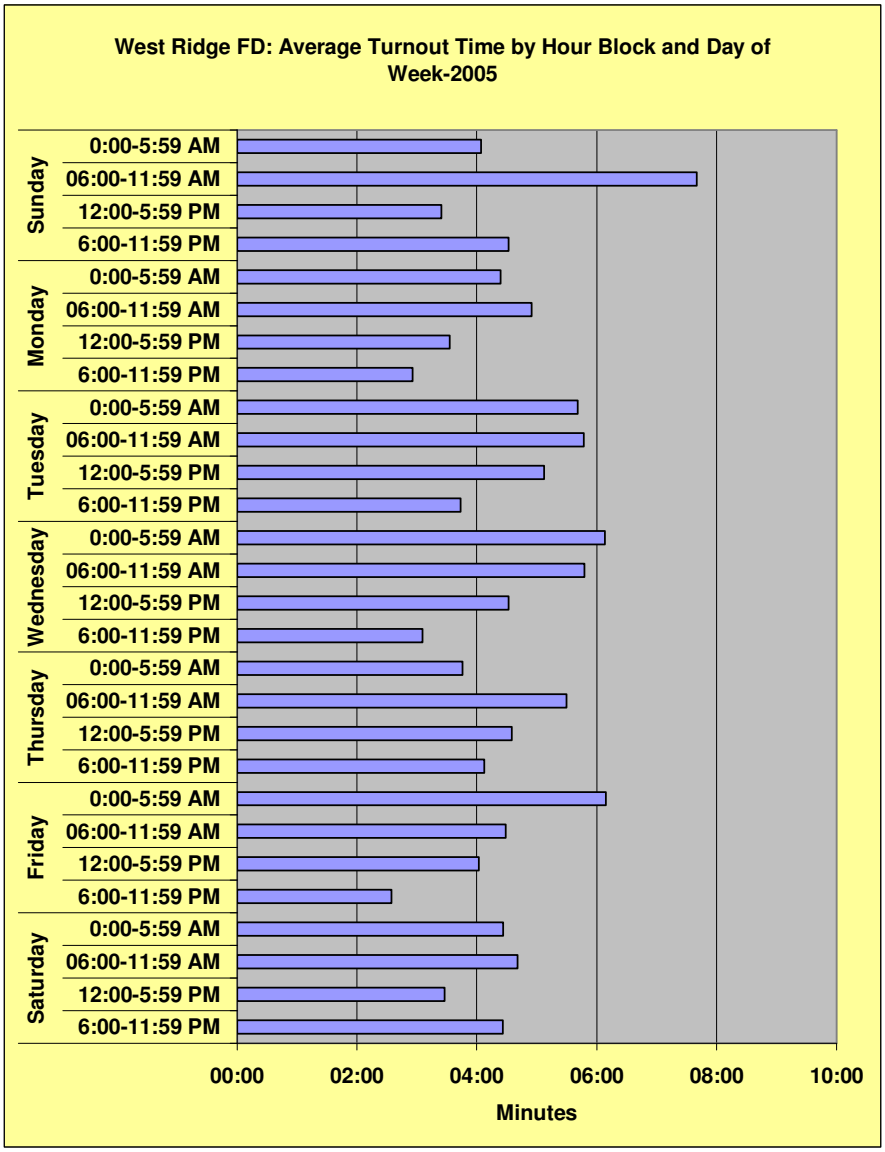
Figure 88: West Ridge FD Response Time Performance



The data indicates that the department's overall response time average was seven minutes 55 seconds. Fractal analysis indicates a 90th percentile response time performance of 13 minutes three seconds.

ESCi examined response times of a specific period per day of the week. Volunteer fire departments typically have varying turnout times from weekends to weekdays, on drill nights, and by the time of day. Presumably, evenings and weekends are times when volunteer staff are most available, and assembly of a fire crew can be made more rapidly than during other periods. Volunteer response is also dependent on volunteer demographic composition and work or school schedules.

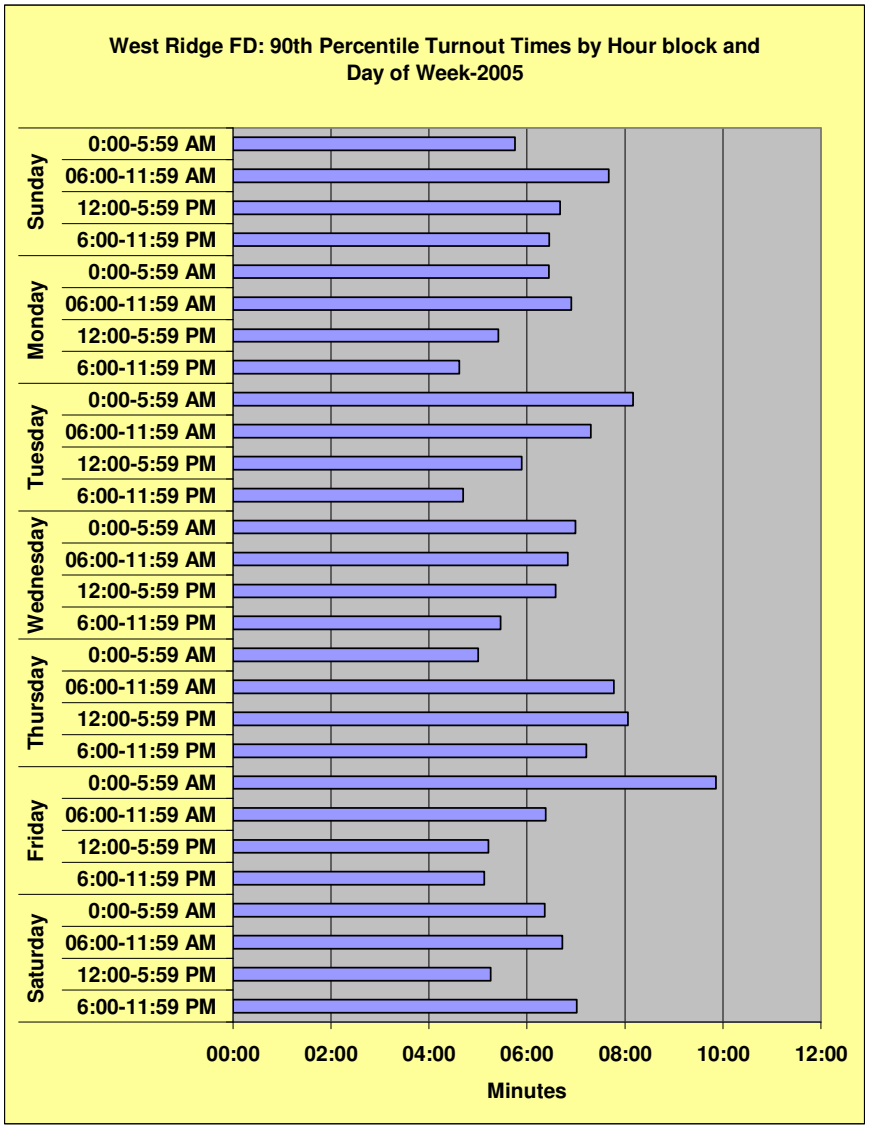
Figure 89: West Ridge FD: Average Turnout Times



The average turnout times range from just over two minutes 35 seconds to over seven minutes during certain hours of the day.

The following figure calculates the fractal measure for WRFD turnout times.

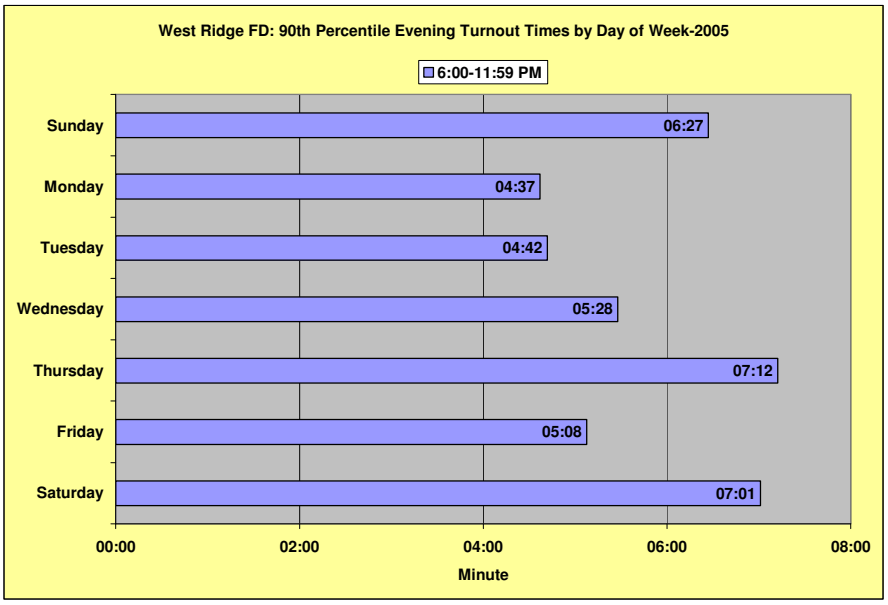
Figure 90: West Ridge FD: 90th Percentile Turnout Times



The previous figure shows that the morning hours have the longest turnout times, and Monday and Tuesday evenings have the shortest turnout times.

ESCi conducted additional analysis of turnout times by period of the day.

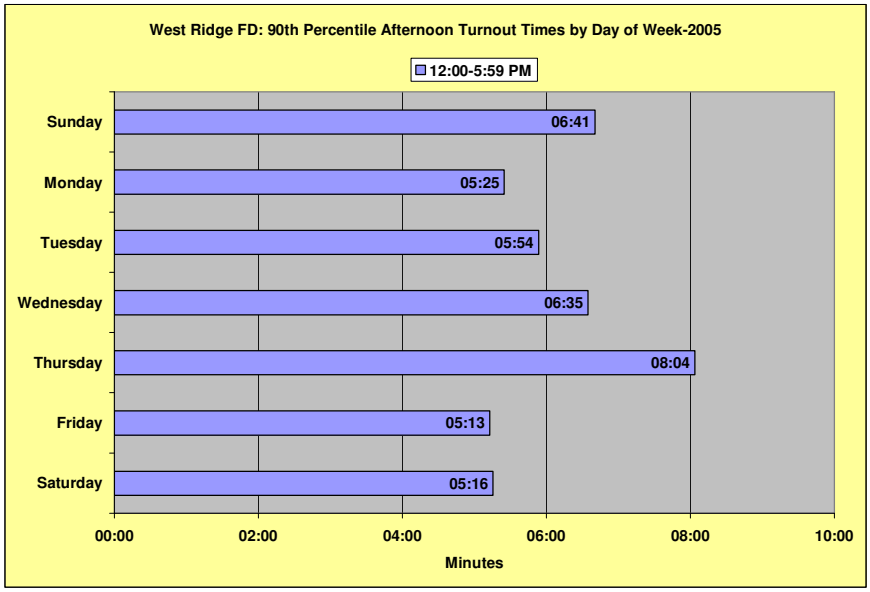
Figure 91: West Ridge FD: Evening Hours Turnout Times



The figure above indicates that evening turnout times are between the four minutes 37 seconds and seven minutes 12 seconds. The longest turnout times are on Saturday, Sunday, and Thursday evenings, and the shortest on Monday and Tuesday.

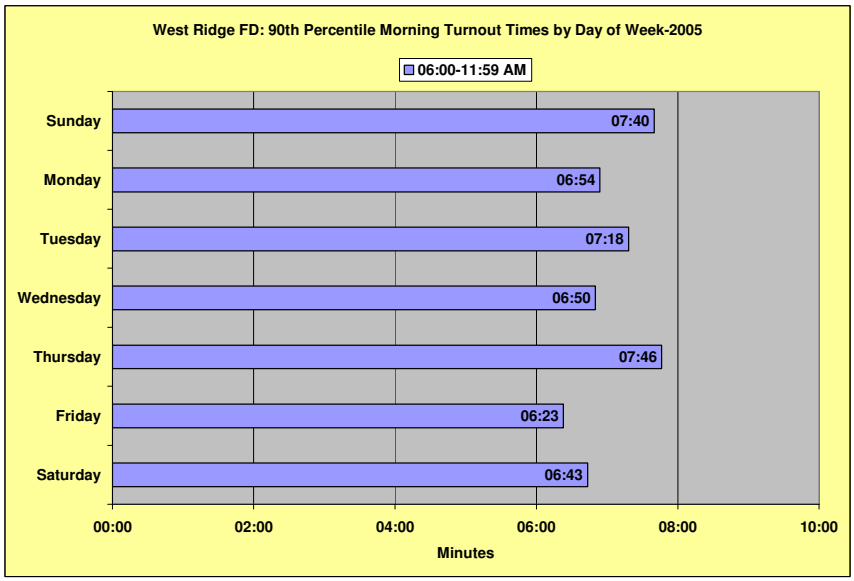
The following figure illustrates the afternoon turnout times. Turnout times during this period are between five minutes 13 seconds and eight minutes four seconds. The shortest turnout times occur on Friday, Saturday, and Monday. The afternoon hours with the longest times experienced are on Thursday afternoons.

Figure 92: West Ridge FD: Afternoon Turnout Times - 2005



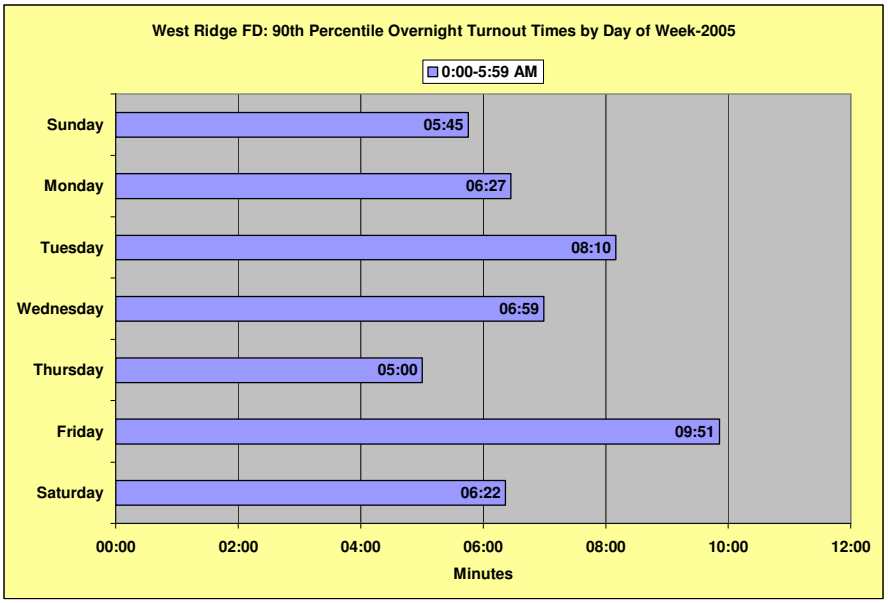
The morning period has the longest turnout times. The following figure shows turnout times ranging from six minutes 23 seconds to seven minutes 46 seconds.

Figure 93: West Ridge FD Morning Turnout Times



A period in which crew availability is higher for volunteer departments is the overnight hours. However, overnight turnout times are longer due to the time it takes to awaken, get dressed, and report to the station. The following figure illustrates the overnight turnout times.

Figure 94: West Ridge FD Overnight Turnout Times



The overnight turnout times range from five minutes to nine minutes 51 seconds with Thursday having the shortest turnout time and Friday the longest.

Millcreek Paramedic Service

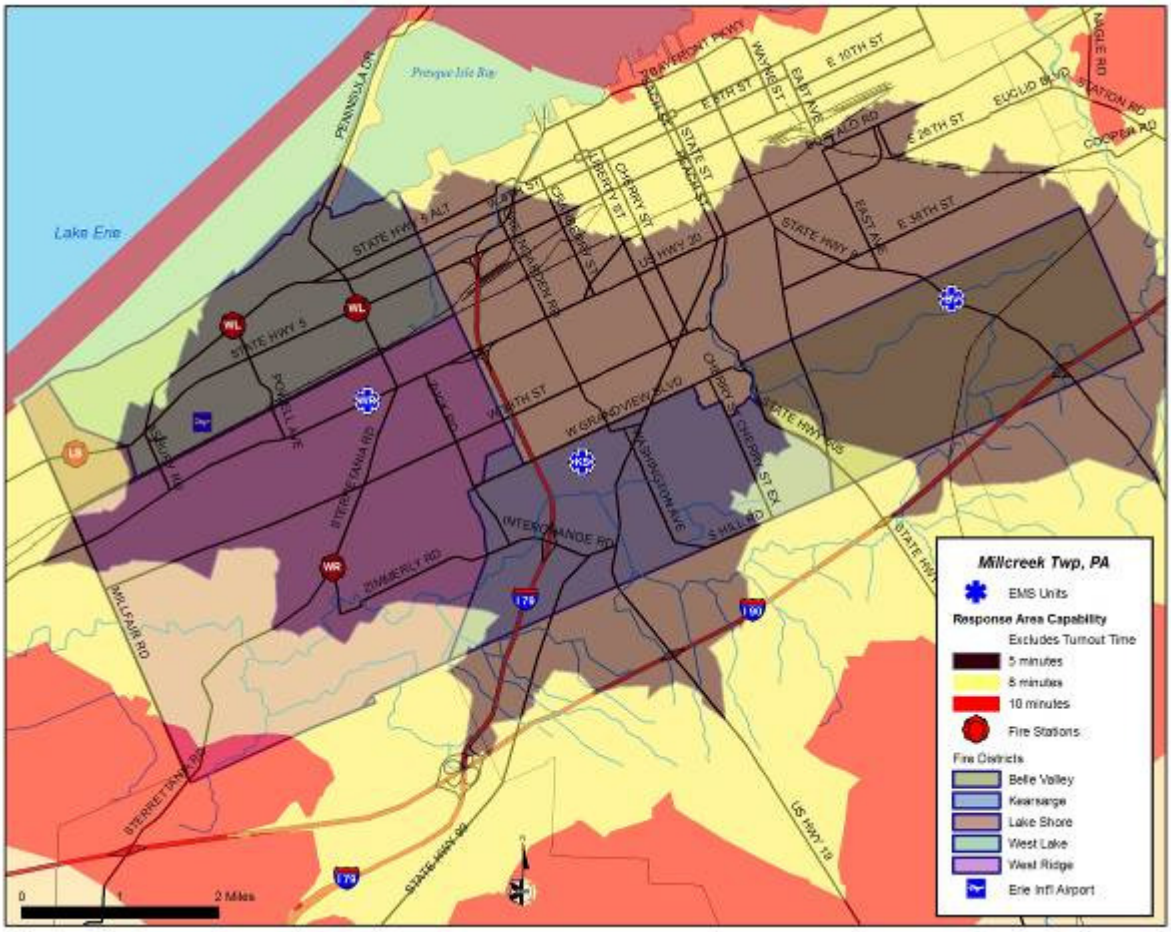
General Description

The Millcreek Paramedic Service is owned by the Township fire departments and functions as a for-profit association. MPS's jurisdiction encompasses all of Millcreek Township.

Deployment Strategy / Response Time Capabilities

MPS provides ambulance services utilizing three ambulances stationed at three fire stations within the Township. Two of the ambulances are staffed 24 hours and one peak activity unit is staffed 10 hours per day at the Belle Valley station. The following map displays the total primary response area of the agency as well as the stations where the EMS units are deployed. The black shaded polygons illustrate the five-minute travel time area from the station (does not include turnout time). Yellow shaded areas represent five to eight minute travel time, and the red shaded areas illustrate the eight to ten minute travel time.

Figure 95: Millcreek Paramedics Current Station Deployment

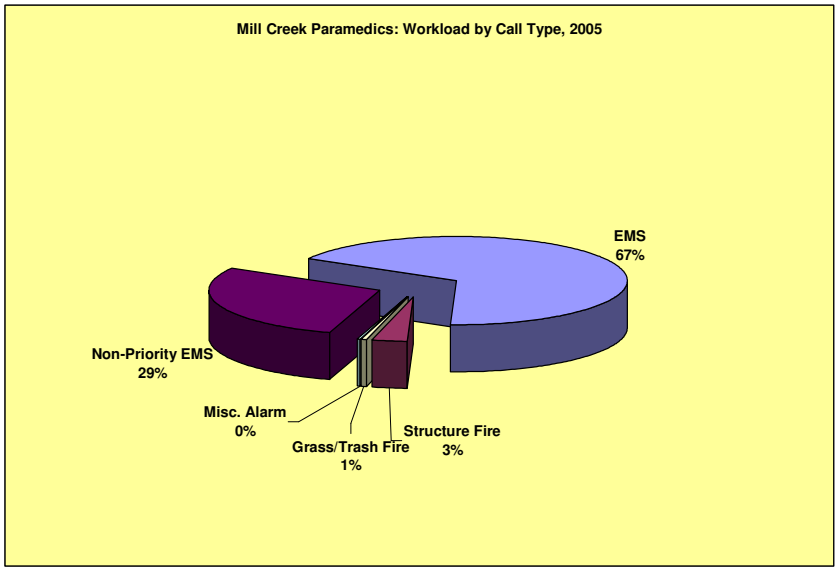


Based on the model illustrated above, there are areas within the Township that are outside the five minute travel time capability. Areas beyond the five minute travel time model are reachable within the eight minutes.

Response Time Performance

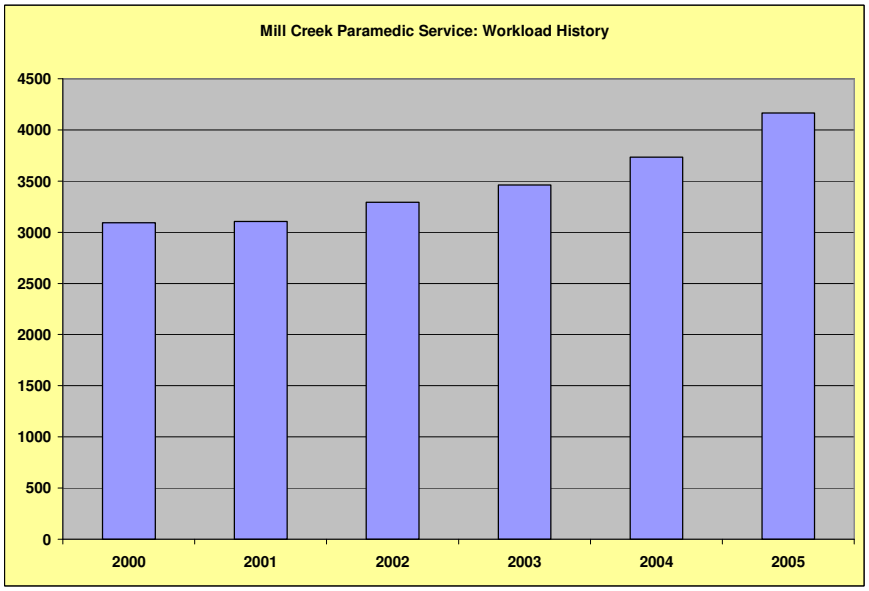
The MPS provides emergency medical response, transport, and limited public education, and received an average of 1,257 calls for service in the past six years. In 2005, approximately 96 percent of the calls for service were medical in nature, and four percent were fire or service related.

Figure 96: Millcreek Paramedics Workload by Call Type - 2005



The Millcreek Emergency Communications Center collects incident data for MPS within an electronic database from which analysis is possible. The following figure shows that incident volumes for MPS has been increasing over the past several years.

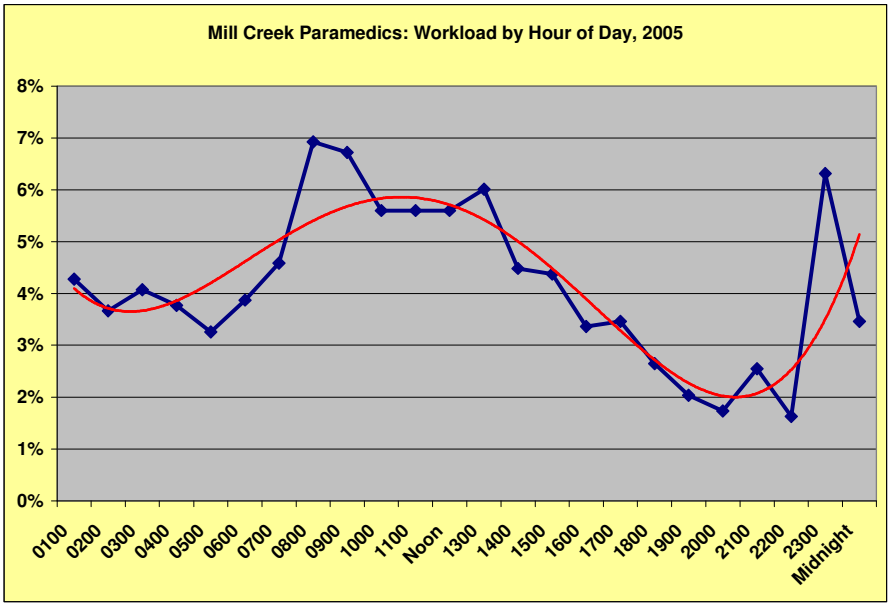
Figure 97: Millcreek Paramedics Workload History



In the following paragraphs, ESCi provides further analysis of the agency's workload. The workloads, type of work, and factors of influence that generate service demand is examined in the subsequent pages.

A review of incidents by time of occurrence reveals when the greatest response demand is occurring. The following charts show how activity and demand change for MPS based on time of day, day of week, and month of year.

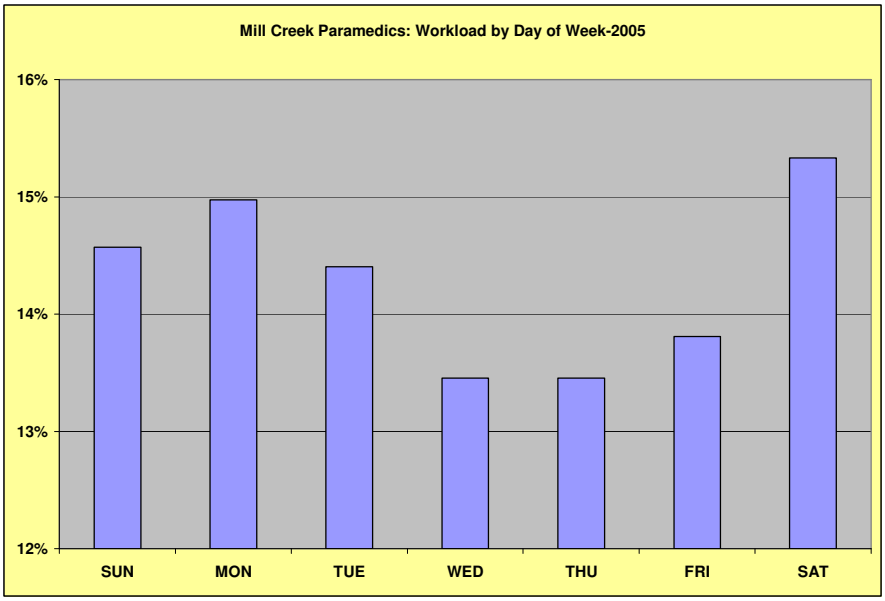
Figure 98: Millcreek Paramedics Workload by Time of Day



Requests for EMS services are higher in the morning and afternoon hours. This coincides with greater activity of business and the daily lives of most people. It should be noted that an unusual spike in call volume occurs around 11:00 PM.

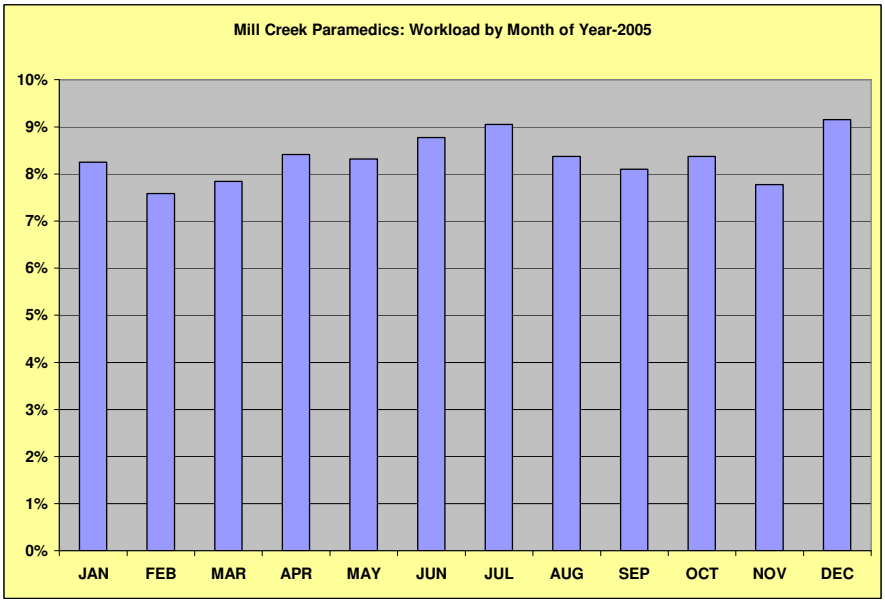
The following figure shows that incident volumes fluctuate during the week with the low period on Wednesday, Thursday, and Friday, and higher volumes through the rest of the week.

Figure 99: Millcreek Paramedics Workload by Day of Week



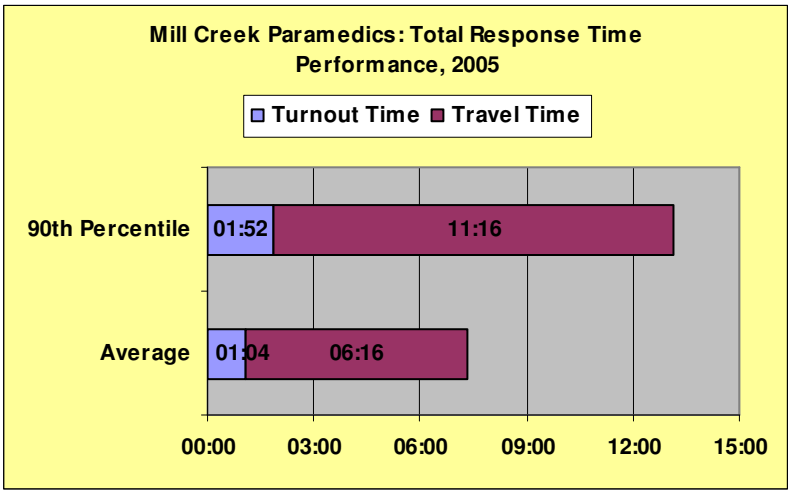
When incident volumes are analyzed by month, as shown in the following figure, calls for service fluctuate by approximately 1.5 percent throughout the year. Incident volumes follow a pattern in which activity peaks in the summer months, and again in December and January.

Figure 100: Millcreek Paramedics Workload by Month of Year



The following figure shows the MPS response time performance. The response times have been divided into turnout and travel times. Turnout time is the time it takes personnel to staff the ambulance and start travel to the incident scene. The total of both times is the overall response time for the agency.

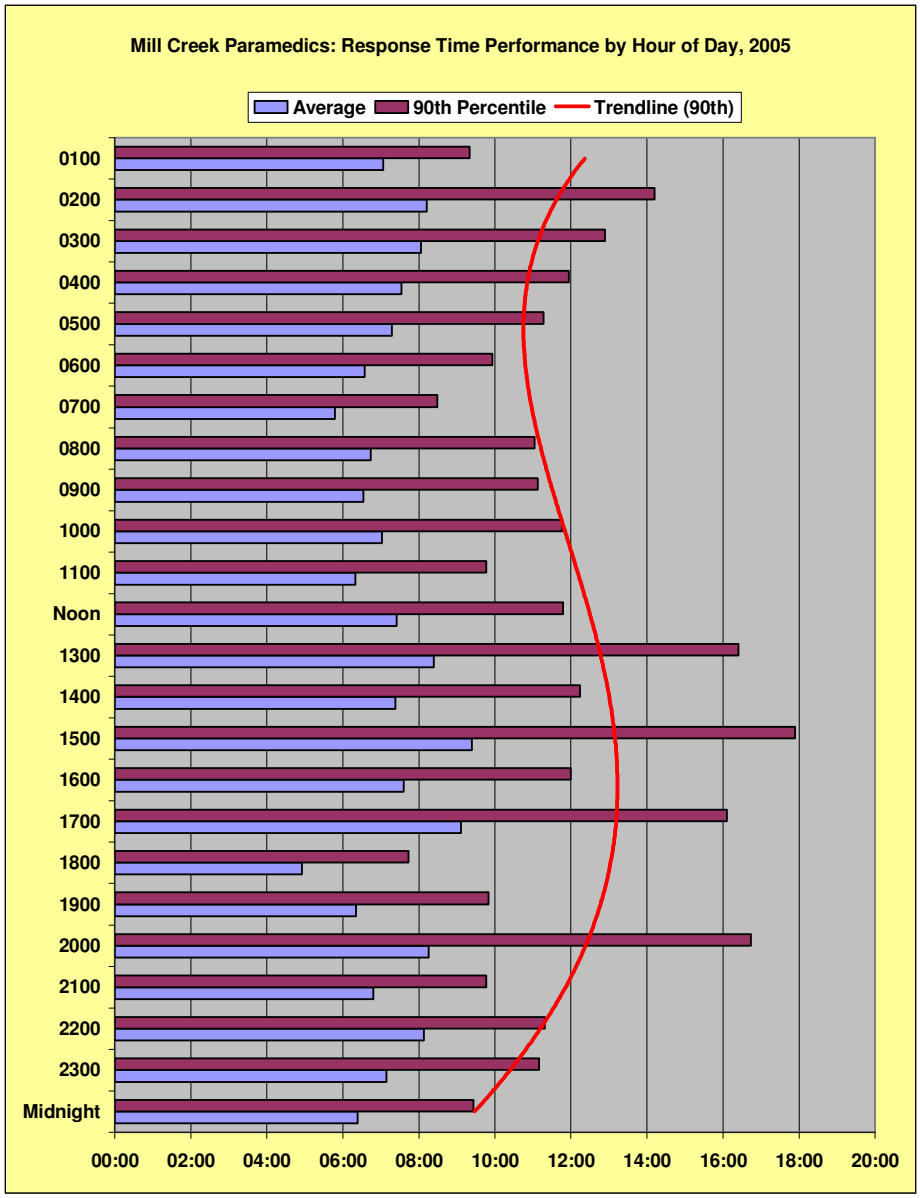
Figure 101: Millcreek Paramedics Response Time Performance



The data indicates that the MPS's overall response time average was seven minutes 12 seconds. Fractal analysis indicates a 90th percentile response time performance of 13 minutes nine seconds.

In the following figure, ESCi analyzed response times by hour of the day. The analysis reveals that response times are longer during periods of higher service demand.

Figure 102: Millcreek Paramedics Response Time Performance by Hour of Day



Mutual Aid

Mutual aid agreements vary by fire company, and are subject to control and turf issues.

Lake Shore

Mutual aid is based on informal agreements between organizations, which state they will help each other. For the most part, the agreements are not updated yearly, and are based on which fire chief is making the decision on who else he wants to respond. It is LSFD contention that dispatch can use discretion on whom to call in as the second unit; the closest unit is not always being dispatched.

West Ridge

Mutual aid is within all in the Township, with broader mutual aid available throughout the county. There are no written agreements in place; just past practice of the on-scene officer, calling if sees a need for additional units.

Belle Valley

It was reported that signed mutual aid agreements are in place, and protocol has been set with dispatch. However, no protocol is in place for automatic move up to cover multiple incidents.

West Lake

Mutual aid is by unwritten agreement among the agencies. It is up to the incoming WLFD fire chief to send to dispatch the list of fire departments he wants as back ups. This can change on a yearly basis. Turf wars have occurred in the past, which has cancelled out mutual aid. Move ups for incidents are determined by command.

Kearsarge

Mutual aid is provided by Belle Valley, Khul Hose Company, Summit Township (to the south), Perry Highway, and West Ridge to the Northeast. Written agreements are in place with Perry Highway Fire Department, but not with the City of Erie. No formal county mutual aid system is in place. Automatic aid is available with certain departments, but is probably unwritten except for certain pre-plans. There is no boundary drop or single engine response.

Inter-department Training

Joint training among the departments is not occurring. It was reported that at some point in the past, joint training opportunities were made available, but no one wanted to participate. Drill nights may or may not occur on the same evening.

Support Programs

ESCi reviewed and analyzed the training programs for the five fire departments, and the Townships fire prevention and emergency management programs.

Training

Providing for a safe and effective fire and emergency medical services delivery system requires a well-trained response force. The International Fire Service Training Association (IFSTA) states *that regardless of the* particular *system used, an effective training program will include: (1) the continuous training of all levels of personnel in the department; (2) a master outline or plan; (3) a system for evaluating the scope, depth, and effectiveness of the program: and (4) revising the program, as required, to include advances in equipment, products, and techniques.*

Without a high quality, comprehensive training program, emergency outcomes are compromised, departmental personnel are at risk, and the department and Township may be held liable for the actions of its employees. Training and education are critical functions for any fire department.

A comprehensive training plan includes:

- Identification of performance standards for all personnel
- Provisions for periodic review of individual and company level performance
- Competency-based training
- Scheduled training to prevent skills degradation
- Scheduled skills improvement training
- Comprehensive training objectives for each training session presented
- Process for evaluating the amount of learning that occurred
- Scheduling outside training opportunities
- Career development opportunities

General Training Components

A variety of training methods are used amongst the fire departments. West Ridge, Belle Valley, West Lake use IFSTA for the basis of their training. Lake Shore is using the Pennsylvania Essentials of Firefighting manuals. ESCi was unable to ascertain what Kearsarge is using for their training program.

Like any other activity, the training and education of personnel should be conducted under a comprehensive plan and the training program should be a direct reflection of the department's goals. Furthermore, training programs should internally goal driven and based on the organizations general competencies. The Township fire departments need to ensure that their individual training plans include clear goals and objectives, and that these goals and objectives are supportive of the department's overall goals. In addition, ESCi strongly recommends joint training efforts be established throughout the Township.

Recommendations:

- Standardize training manuals and methods across all fire departments
- Conduct a training needs analysis for each department and for the Township for the formulation of a comprehensive training program
- Establish consistent training goals and objectives for each fire department and across the Township
- Establish joint training schedules and conduct joint training exercises among all Township fire departments

The following chart provides a synopsis of the fire departments' training components.

Figure 103: Fire Department Training Programs

Emergency Services Training Programs					
Component	**Lake Shore**	**West Ridge**	**Belle Valley**	**West Lake**	**Kearsarge**
Incident Command System (ICS)	NIMS[22] 100 and 700, ICS not specified	Not NIMS compliant, use ICS	Not NIMS compliant, use ICS	NIMS 100, 700, & ICS	Not specified
Accountability Procedures	Yes	Yes	Yes	Yes	Yes
Policy & Procedures	Minimal training SOGs	No written training SOGs	Minimal training SOGs	No written training SOGs	Minimal training SOGs
Safety Procedures	Minimal SOGs	No SOG	Minimal SOGs	Minimal SOPs	Minimal SOGs
Defensive Driving	Yes	Yes	Yes	Yes	Yes
Training Calendar	Yes	No	Yes	No	Yes
Training Administration	Assistant Chief	Designated training officers	Training officer	Chiefs	Training committee
Training Facilities & Resources	In-house classroom & tower/props at county facility	In-house classroom & tower at south station	In-house classroom & use WRFD tower/props	In-house classroom & use WRFD tower/props	In-house classroom & use WRFD tower/props
Training Manual Adopted	PA Essentials of Firefighting	IFSTA	IFSTA – transitioning to Dumar	IFSTA FFI	Unknown
Training Methodology	Weekly drills, infrequent multi-agency drills	Weekly drills, infrequent multi-agency drills	Weekly drills, infrequent multi-agency drills	Weekly drills	Weekly drills
Disaster Drills	Airport every 2yrs	Airport every 2yrs	Airport, Pleasant Ridge Manor, juvenile center	Airport every 2yrs	Airport every 2yrs
Record Keeping	Firehouse	Firehouse	Firehouse	Firehouse	Firehouse

Recommendations:

- Each department should adopt an SOG that specifies training practices
- Each department should adopt an SOG that specifies training safety practices

[22] National Incident Management System.

Millcreek Paramedic Services

Training policies and procedures for MPS have been set by the medical director, and testing is required for all staff. A recruit academy process is in place, but has not been codified. All new employees participate in a ride-along program as the third person for an unspecified period. The medical director has chosen certain paramedics who can serve as recruit trainers; they are required to complete evaluation forms on all new recruits, which are subsequently reviewed by the director.

Certification in the emergency vehicle operators course (EVOC) is required as a condition of employment. If an employee is in an accident, they can be required to take the course again, depending on the circumstances of the accident.

Radio communications and etiquette are part of the training program, and are covered in the company's standard operating procedures. MPS participates in the disaster drills held at the airport and support the airport's crash crew.

Individual training records are kept as electronic and hard copies; each employee has access to their own electronic records.

Millcreek Paramedic Services has not integrated NIMS or the incident command system into their day-to-day operations. Depending on which fire department has the call, and depending on which members respond, will determine command at the scene. It is MPS' position that they are responsible for all medical aspects of the incident, however, it was reported that some firefighters question this and are not comfortable with MPS taking charge of the medical scene.

Recommendations:

- Adopt SOGs that specify training practices and safety.
- Include ICS and NIMS training in training schedule

Fire Prevention

An aggressive fire, medical, and accident risk management program, through active prevention efforts, is a fire department's best opportunity to minimize the loss and human trauma associated with fire and medical emergency events. The International Association of Fire Chiefs has defined proactive emergency services as:

> "…embracing new, proven, technology, and built-in protection, like automatic fire sprinkler and early detection systems, combined with an aggressive code enforcement and strong public education programs."

A fire department should actively promote fire resistive construction, built-in early warning and suppression systems, and an educated public that is trained to minimize their risk to fires, accidents, and medical emergencies.

A community's fire problem should be addressed in a continuous manner whereby each resource and function supports the reduction of the incidence of fires. This cycle includes the following:

- Public education: Awareness of hazards, prevention, and what to do if they occur.
- Engineering and code enforcement: To ensure that the community structures are appropriately constructed and maintained.
- Fire suppression: Fires are mitigated when there is a failure of education and code enforcement
- Fire investigation: To determine fire cause, and create a method or process for mitigating future incidents.

Millcreek Township is conducting its fire prevention program in a complete cycle; albeit on a limited basis. Fire prevention activities for Millcreek Township are handled internally through the Millcreek Township Bureau of Fire Prevention (Bureau).

Public Education

Fire and life safety education opportunities are limited throughout the Township. The Bureau director serves as the Township public information officer, and with support of one part-time inspector provides public education presentations on request. The fire departments provide limited public education at schools within their service areas. Education opportunities are noted in the chart below.

Figure 104: Public Education Opportunities

Fire Safety – Public Education Opportunities in Millcreek Township		
Component	**Fire Prevention Bureau**	**Fire Departments**
Calling 9-1-1	Yes	Yes
EDITH (exit drills in the home)	Yes	Intermittent
Smoke alarm program	Yes, if qualify	Yes – Safe Kids Program
Fire safety (heating equipment, chimney, electrical, etc.)	Yes – general message	No
Injury prevention (falls, burns, bike helmets, etc.)	No standard program	No
Fire extinguisher use	No	No
Fire brigade training	No	No
Elderly care and safety	No	No
Curriculum used in schools	No	No
Baby-sitting classes offered	No	No
CPR course, blood pressure checks	No	Yes - available through MPS
Publications available to public	Yes	Limited/intermittent
Bilingual information available	Limited	No
Annual report distributed to community on fire safety	Only to Township Board	No
Juvenile fire setter program	Yes	No
Wildland interface education	N/A	N/A

Code Enforcement

The Township has adopted the International Fire Code (2003) and the Commonwealth of Pennsylvania 2004 Building Codes. Fire service input was limited during the adoption process, and no additional local codes or addendums have been adopted. Except for specific sprinkler codes identified in the International Fire Code, no local sprinkler ordinance has been adopted.

New Construction

The Township has contracted with a third party, Building Inspections Underwriters (BIU), for all new and remodel, construction projects. The Township fire marshal does not review all building plans and has limited interaction with contractors. The adopted code requires consultation with the authority having jurisdiction (AHJ) on proposed commercial projects. However, the current contractor consults with the fire marshal on an infrequent basis. The fire marshal performs pre-occupancy inspections, and provides follow-up inspections as needed.

A key box program was implemented in 1995. However, the township fire departments have not established an SOG for the security and use of the key box key, creating security issues. Currently, a key box keys are kept on a key ring on the Township vehicles, and keys have been distributed to three of the five fire chiefs and medic units.

Fire flow data for new construction is maintained by the Township water department.

General Inspection Program

The Bureau is able to support a limited fire inspection program, with one full-time and one part-time inspector. The Township does not have a self-inspection program. The International Fire Code is used for all commercial inspections. High-risk occupancies, specifically hotels, are inspected annually. The remaining commercial occupancies are inspected as time allows.

The Township does not charge fees for any type of inspection or permit where an inspection is required. A formal citation process is in place that provides for written notice of the violation, time for abatement of the violation, and Bureau follow-up. Fines for non-compliance are not codified and are levied at the discretion of the Bureau director. Hard copies of inspection reports

are maintained and archived and computer records are not kept. It was reported that the software system is difficult to use and no clerical assistance is available.

Fire Investigations

Fire origin and cause determinations are initiated by the fire chief of the responding company, with follow up and completion by the Township police department. All criminal investigations are handled by a member of the criminal investigation division of the Township police department.

Data Collection and Analysis

Fire loss and incident data will be discussed in detail in the service delivery section.

Emergency Management

Millcreek Township participates in the Erie County Emergency Operations Plan. The assembly room located off the lobby of the Township municipal building is a back up emergency operations center (EOC) to the county's EOC. It was not known if the Township is a signer to the county's hazard mitigation plan as required by the Federal Emergency Management Agency (FEMA).

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Future System Demand

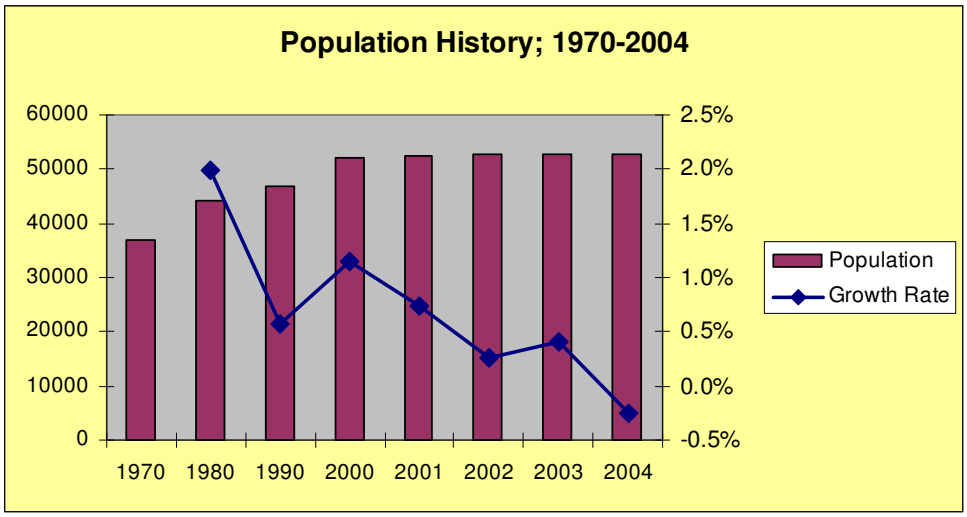
Population Growth Projections

Current Population Information

The population of Millcreek Township was 52,129 in the 2000 U.S. Census.[23] However, the Census Bureau has estimated some increase since the 2000 Census; the Township's population was estimated at 52,762 in 2004. For the Township, this population figure represents a modest 11 percent increase over the 1990 Census, when the population of the Millcreek Township was 46,820. A portion of growth has occurred through additional housing development; over 16 percent of the Township's total housing has been built since 1990.

The following chart provides historical population information for Millcreek Township.

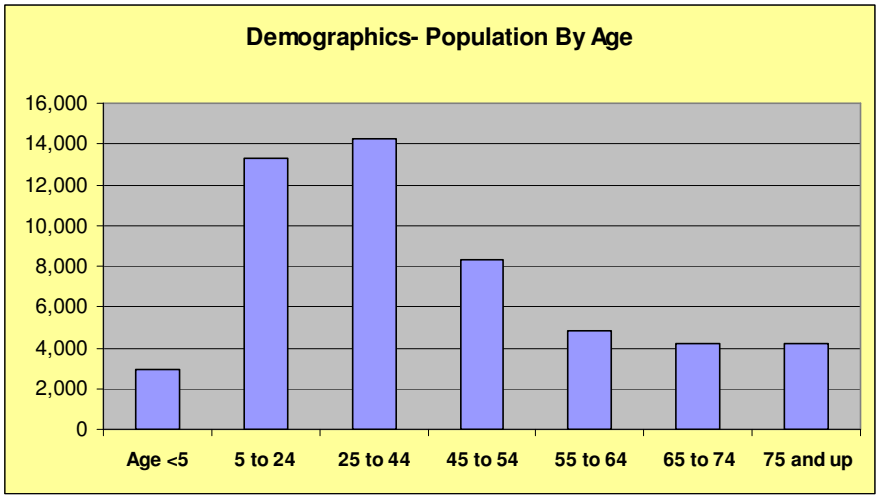
Figure 105: Millcreek Township Population Growth History



[23] 2000 U.S. Census Table SF-1 and SF-3.

The following figures provide some general demographic information on population and housing for Millcreek Township.

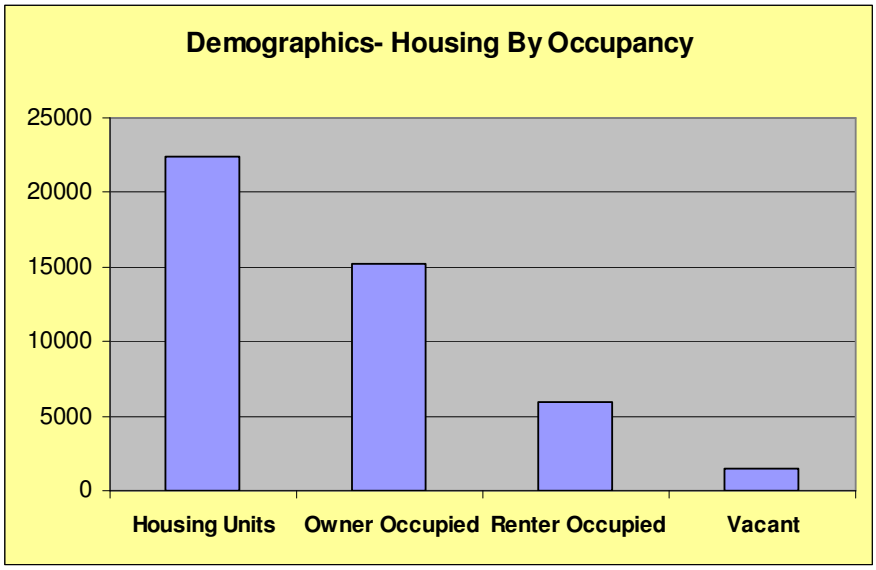
Figure 106: Millcreek Township Population by Age



Selected Demographic Information- 1990 to 2000								
	Total Pop	Age <5	5 to 24	25 to 44	45 to 54	55 to 64	65 to 74	75 and up
2000	52,129	2,951	13,325	14,295	8,312	4,833	4,214	4,199
1990	46,820	3,040	12,416	14,970	5,028	7,062	4,333	2,253
change	11%	-3%	7%	-5%	65%	-32%	-3%	86%

The information shows 16 percent of the population is 65 years of age or older and six percent is under five years of age, placing a total of 22 percent of the area's population within significant target age groups that pose the highest risk for fatalities in residential fire incidents. It is also worth noting that the number of residents over the age of 75 has increased by 86 percent since 1990, a change that can be expected to create a significant increase in service demand for emergency medical incidents.

Figure 107: Millcreek Township Housing by Occupancy



Selected Housing Information- 1990 to 2000				
	Housing Units	Owner Occupied	Renter Occupied	Vacant
2000	22369	15278	5939	1512
1990	19285	13536	4861	888
change	16%	13%	22%	70%

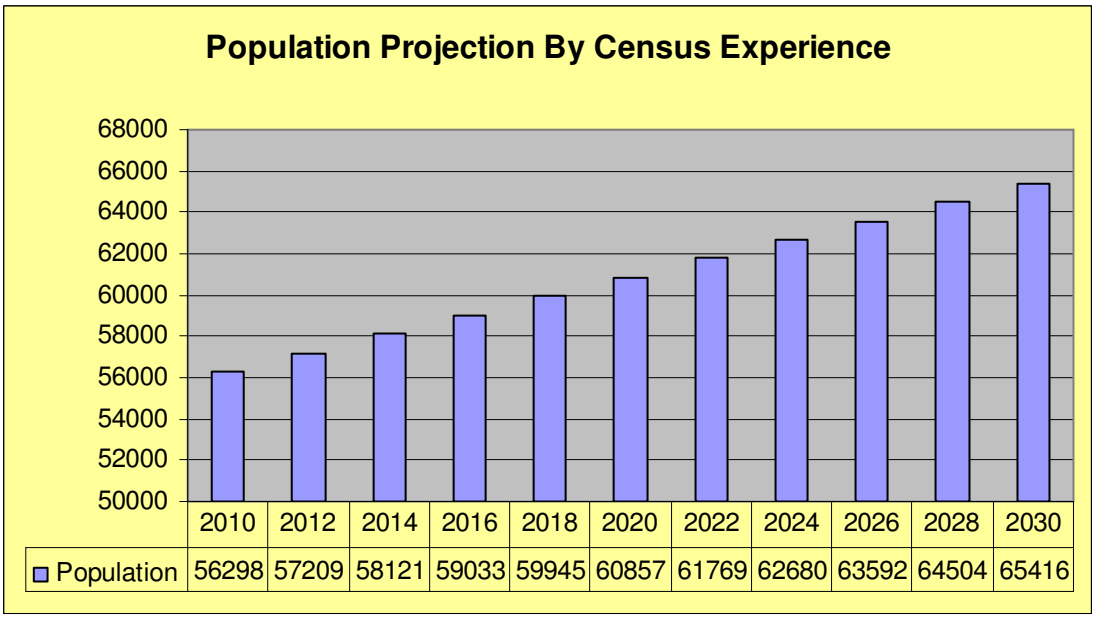
From the demographic information reviewed here, it is projected that Millcreek Township should experience a slightly higher demand for emergency services in comparison with other communities of its size.

Census-based Growth Projections

As indicated earlier, the population of Millcreek Township has increased modestly in the last decade. ESCi anticipates additional growth will continue into the future.

In developing forecasts for population growth, ESCi typically develops a forecast based on several decades of census experience. In the case of Millcreek Township, ESCi used decennial census figures from 1970 through 2000. A mathematical forecast is created through the year 2030. The resulting population forecast appears as follows.

Figure 108: Census-based Population Forecast



	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	2030
Population	56298	57209	58121	59033	59945	60857	61769	62680	63592	64504	65416

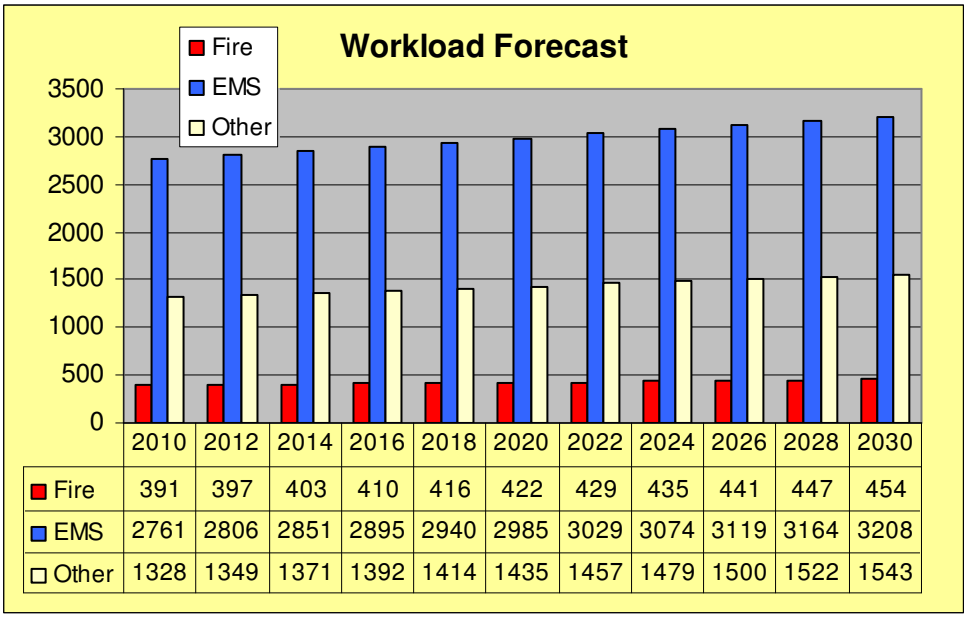
It is not the intent of this study to be a definitive authority for the projection of future population in the service area, but rather to base our recommendations for future fire protection needs on a reasonable association with projected service demand. With the demand for emergency services based almost entirely on human activity, it is important to have a population-based projection of the future size of the community. While variation in population projections is discussed here, one thing certain is that the Township fire departments will continue to be emergency service providers to a growing population, likely reaching over 65,000 by 2030. Planning should begin now to maintain the resources needed to meet the continuing demand for services.

Service Demand Projections

In evaluating deployment of facilities, resources, and staffing, it is imperative that consideration be given to potential changes in workload that could directly affect such deployment. Any changes in service demand can require changes and adjustments in the deployment of staff and resources in order to maintain acceptable levels of performance.

For purposes of this study, ESCi utilized population projections obtained through community development research and multiplied these by a forecasted incident rate derived from a five-year history of incident per capita rates to identify workload potential through the year 2024. The results of the analysis are shown, by year and type of call, in the following chart and table.

Figure 109: Workload Projection by Type and Year



	2010	2012	2014	2016	2018	2020	2022	2024	2026	2028	2030
Fire	391	397	403	410	416	422	429	435	441	447	454
EMS	2761	2806	2851	2895	2940	2985	3029	3074	3119	3164	3208
Other	1328	1349	1371	1392	1414	1435	1457	1479	1500	1522	1543

The increase in actual fire incidents is forecast to be relatively low during the study period, but this is a reflection of national trends for fire incident rates per capita and is believed to be the result of improvements made in building codes and public fire education during the past three decades. EMS and other emergency service calls not involving actual fires is expected to continue to rise moderately.

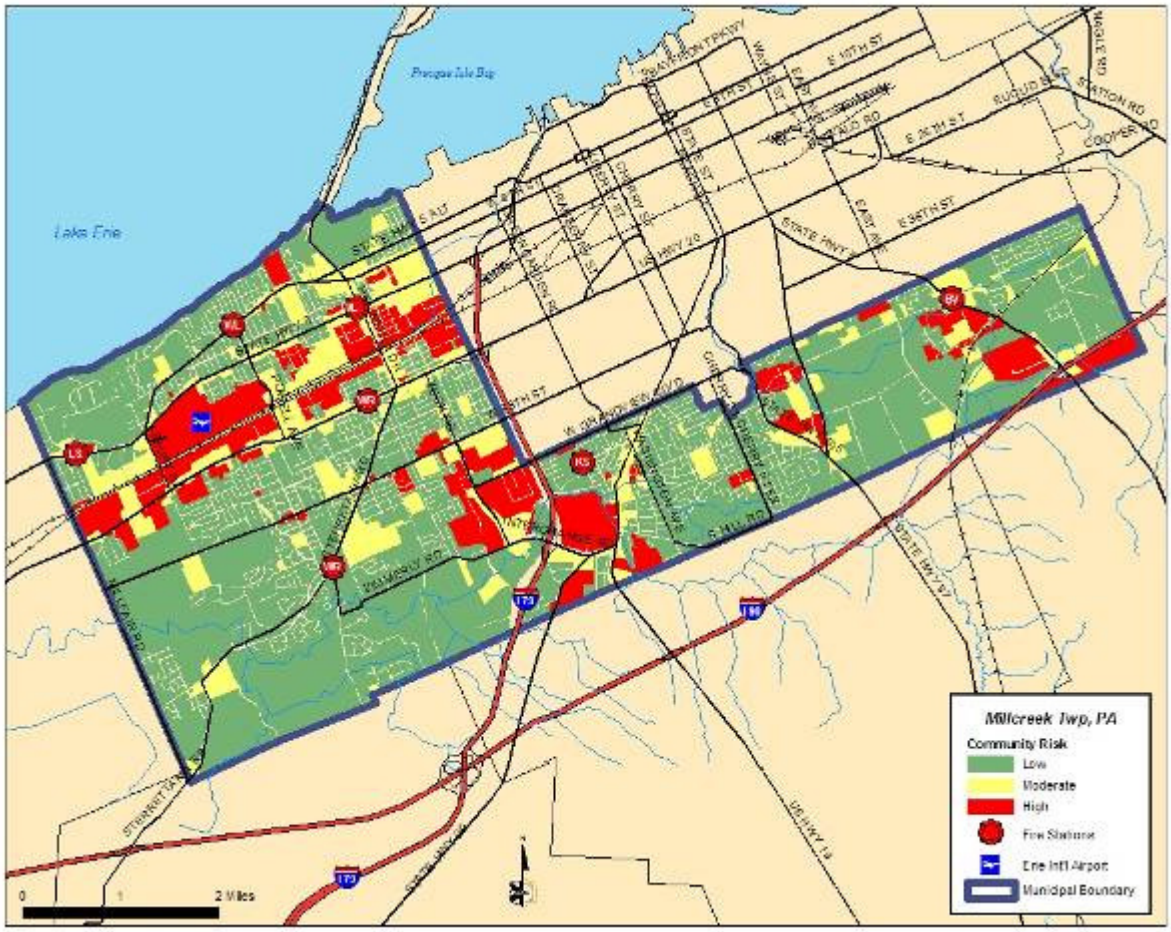
Community Risk Analysis

The fire service assesses the relative risk of properties based on a number of factors. Properties with high fire and life risk require greater numbers of personnel and apparatus to effectively mitigate a fire emergency. Staffing and deployment decisions should be made with consideration of the level of risk within geographic sub-areas of a community.

The community's risk assessment has been developed based on potential land use within its anticipated future boundaries. These potential uses are found in the Township's development plans and zoning designations. The following map translates land use (potential scale and type of development within geographic sub-areas) to fire and life risk categories.

- Low risk – Areas zoned and used for agricultural purposes, open space, low-density residential, and other low intensity uses.
- Moderate risk – Areas zoned for medium-density single family properties, small commercial and office uses, low-intensity retail sales, and equivalently sized business activities.
- High risk – Higher-intensity business districts, mixed use areas, high-density residential, industrial, warehousing, and large mercantile centers.

Figure 110: Community Risk Assessment



The Township contains predominantly low and moderate risk properties. The highest risk properties are located along the rail corridor on the north side of the Township, and in non-residential developments along the interstate highway. These properties include industrial, heavy commercial, mid-rise, mixed-use, institutional, and multi-family occupancies.

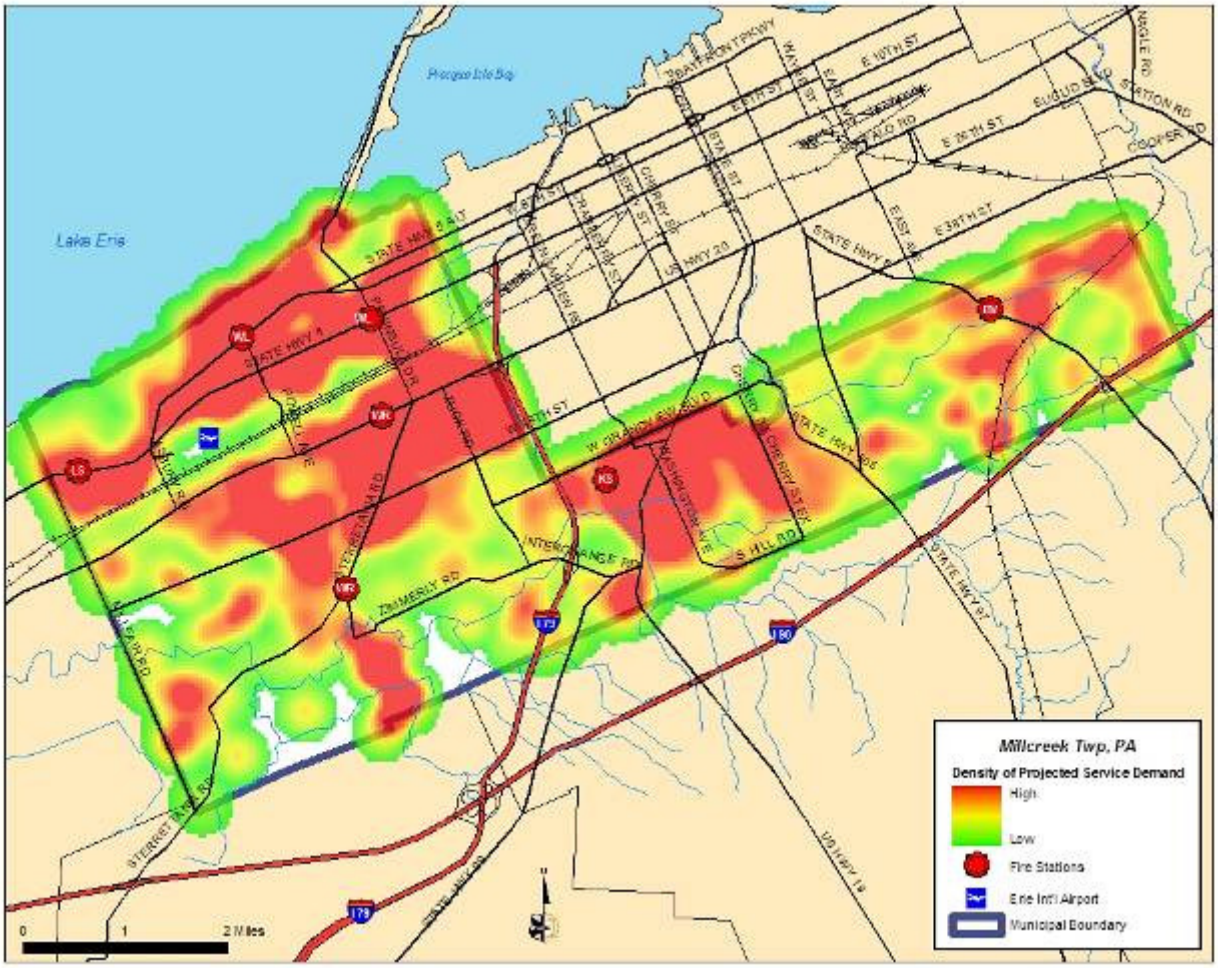
The Township's land use patterns contribute to development of an efficient fire resource deployment configuration, as most of the higher risk properties are along the interstate corridor with an even more concentrated amount of properties in the northeast part of the Township.

Future Service Demand

A projection of future service demand has been developed using information such as historic service demand, population density growth, traffic pattern changes, and future land use designations for the future service demand model. The extensive use of GIS allows for scientific modeling of apparatus response times against road networks using appropriate speed levels during straight-aways and turns. This process allows ESCi to evaluate current deployment and future strategies with accuracy and detail.

In the following figure, projected service demand is expected to remain high for the Lake Shore and West Lake fire department areas. Kearsarge and West Ridge (in the areas south of the railroad tracks) can expect an increase in service demand. Wooded or vacant areas planned for future development indicate an increase in service demand, especially on the southern border west of the interstate. It is not known if all the planned development will be realized, this *artist's rendition* view into the future community of Millcreek is useful in planning future resource deployment strategies for emergency services.

Figure 111: Projected Service Demand



Future Delivery System Models

Critical Issues

Based on the data and analysis discussed in the first two chapters, ESCi has found the following critical issues exist for the Township and its fire departments:

- The Township fire departments provide fire and rescue services independently, that is, without regard for a methodical distribution and concentration of resources and with an inconsistent mutual aid system.
- The Township fire departments have well maintained apparatus, but do not have an apparatus replacement plan for all of the apparatus.
- The Township fire departments are independent non-profit organizations that are dependent on contributions for their operating revenue from the public. Contributions, and thus, operating revenue, is declining.
- The Township government and fire departments, have not established a standard of coverage or performance objectives that measure the performance of the service delivery system.
- The Township government does not contribute public funds to the fire departments, and thus, the fire departments do not have a fiduciary responsibility to the citizens served.
- Joint training among the Township fire departments is inconsistent and sporadic.
- The Township fire departments are staffed totally by volunteer personnel; chief officers are elected by popular vote of the membership. Consequently, the administration and provision of support functions of the fire departments is fractured and inconsistent.
- The Township government, through its agreements with the fire departments has abrogated its responsibility for fire protection by not requiring or measuring specific levels of performance.
- The Township fire departments have reported to ESCi that they are having difficulty mustering a sufficient number of personnel for emergency response.
- The Township fire departments do not meet recognized response standards or their stated (anecdotal) turnout time targets.

90th Percentile Response Times			
Dept.	Turnout Time	Response Time	Total
BVFD	9:59	5:47	15:46
KFD	10:12	7:03	17:15
LSFD	10:49	4:52	15:41
WLFD	6:13	4:10	10:23
WRFD	12:57	6:10	19:07

General Partnering Strategies

Fire service partnering strategies span a broad range of activities that two or more entities can engage in to enhance their service delivery. ESCi has facilitated or observed hundreds of different types of combined services and Jack Snook, President of ESCi, literally wrote the book on cooperative services.[24] According to Snook, cooperative efforts fall under several major categories:

- Mutual Aid
  - Mutual aid – units respond by request only
  - Automatic mutual aid – units dispatched automatically for specific incident types or magnitude
  - Closest forces agreement (boundary drop) – the closest appropriate unit responds regardless of jurisdiction
- Consolidation of services
  - Partial – groups formed to handle specific functions or share workload
  - Operational or functional – separate organizations share administrative functions
- Contract services
  - One entity provides specific services to another, such as maintenance
  - Full or all services contract where one entity provides all services to another
- Mergers
  - Legal merger of entities into one organization
  - Annexation of one entity into another's territory

[24] Snook, J., *Making the Pieces Fit*, 1997, ESCi, Wilsonville, OR.

ESCi has identified the following partnering strategies as opportunities for sustaining or enhancing service delivery to the Township residents. This does not mean that other strategies would not be possible. On the contrary, the Township fire departments could identify additional strategies that would meet the needs of their citizens.

The following list outlines the strategies that ESCi has identified:

- Do nothing – Continue to deliver service in the manner it is currently delivered.
- Consolidate Department Functions – Functional consolidation options include the following:
  - Training – Establish a Township-wide training program and system
  - Administration – Consolidate administrative support functions such as:
    - Quartermaster/Purchasing functions
    - Business functions
    - Small equipment, SCBA, and turnout maintenance and repair
    - Fleet and facility maintenance
  - Joint Planning – Establish a joint strategic plan for immediate critical issues and a long-range plan for future facility and apparatus deployment
- Service Delivery Modifications – The existing fire departments make deployment changes that maintain or enhance service delivery.
  - Township-wide standard operating guidelines – Establish a set of SOGs that would be used consistently by all the fire departments
  - Elimination of response boundaries and enhancement of mutual aid
  - Facility deployment changes to address current and future service gaps
- Corporate merger – The existing fire departments merge into one or more private fire departments with a new structure.
  - Five fire departments are merged into two
  - All fire departments are merged into one
- Township provides fire protection – The Township funds and creates a fire and medical service department and negotiates the transfer of responsibilities from the existing fire departments to the Township.

Option Analysis

Option 1 – Do Nothing

In this scenario, the Township and its fire departments continue to deliver service in the manner it is currently being delivered, with no regard for the critical issues facing the departments.

Strengths of Option:

- No changes occur and change management is not required.
- Personnel are not asked to change what they are doing

Weaknesses of Option:

- The current fire service delivery system does not improve
- The fire service delivery system does not plan or prepare for future challenges
- Declining revenues will impact the ability of the fire departments to replace equipment and deliver service
- Minimal planning for apparatus and equipment replacement
- Training among the Township fire departments continues to ge inconsistent and sporadic
- Administrative and support functions are continue to be fractured and inconsistent

Financial Impact:

- Declining revenues will impact equipment replacement and operational requirements

Policy Action:

- None

Option 2 – Functional Consolidations

Functional consolidation or mergers occur when two or more fire departments agree to conduct business utilizing the same resources. The utilization of common resources is not unusual. ESCi has observed successful models of resource sharing throughout the United States that have ranged from joint purchasing to fully shared administrative, response, and training functions. The most successful examples of functional consolidations have detailed agreements that clearly identify each entities responsibilities and the functions or services being provided.

Option 2a – Consolidate Training Function

ESCi suggests that the fire departments establish a coordinated Township-wide training program. The outcome of a coordinated training program is a safer and more efficient and effective emergency response system. A side benefit is the opportunity to create new relationships between the departments and break down old perceptions and barriers to success.

Taking the concept one-step further, a shared training officer would lead to a safer and more efficient and effective emergency response system. A single individual focused on training enables the departments to deliver consistent, efficient, and high quality training programs to all personnel.

All of the Township fire departments have their own training program, annual training goals, classroom facilities, and a designated training officer. Training facilities and props are minimal. The fire departments conduct sporadic joint training, but there is no annual training calendar or common training goals among the departments.

Firefighter training could take a number of forms. Minimally, the departments could share their training calendars with each other and open their training to the other departments where appropriate. A greater benefit would be derived from creating a joint training taskforce. The purpose of the taskforce would be to set training goals for the entire Township, establish an annual training schedule, and coordinate the delivery of that training.

While each fire department recognizes the importance of firefighter training and supports the training function within their agency, none of the departments has a full-time training officer and little money is allocated in their budgets for the training function.

Based on the number of personnel that require training among all of the agencies (188), a career training officer is warranted. The funding of a Township training officer could be distributed by the agencies by utilizing a formula based on the number of personnel to be trained, their current level of training, and recertification requirements. The actual cost must be negotiated among the leadership of the departments. Furthermore, based on a cost per person, the annual cost for each department could fluctuate depending on the number of personnel in each department.

Strengths of Option:

- Higher level of training and training administration
- Training conducted by career staff member
- Training schedule based on training goals and adopted on an annual basis
- Consistent training for all Township fire departments
- Safer work environment for Township firefighters
- Closer relationships between the Township fire departments

Weaknesses of Option:

- The Township fire departments would have to make significant changes to their annual expenditure budgets in order to support this option
- Implementation requires negotiation of an agreement between the Township fire departments
- The Township fire departments must agree on training goals and objectives

Financial Impact:

- The approximate annual cost of this option is $93,062 based on the following:
  - Annual salary of $50,194 with $17,868 in benefits[25]
  - On-going office and training expenses of $25,000[26] per year
- If the cost of this option is distributed among the departments based on the number of personnel it will cost each department the following:

Figure 112: Estimated Cost Distribution of Training Officer Option

Estimated Cost Distribution of Training Officer Option				
Agency	Percent of Township Personnel	Cost Distribution	2005 Department Budgets	Percent of Each Dept's Budget
BVFD	20.74%	$19,305	$270,695	7.13%
KFD	13.83%	$12,870	$68,565	18.77%
LSFD	12.23%	$11,385	$253,856	4.48%
WLFD	28.19%	$26,236	$299,301	8.77%
WRFD	25.00%	$23,266	$181,089	12.85%
Totals	100.00%	$93,062	$1,073,506	

[25] Base salary calculated from a survey of twelve Pennsylvania fire departments. Benefits based on current Millcreek Township benefit costs.
[26] A conservative figure, funds used for the purchase of supplies, $1000 per month in office space rent, and external training opportunities.

This calculation is a representation and intended as an example of the potential cost. The actual cost should be determined after conducting a thorough study of each departments training requirements.

Policy Action:

- A contractual agreement should be established between participating departments that specifies:
  - How the costs are distributed
  - The establishment of a training steering committee consisting of representatives from each fire department that sets the annual strategic plan and training goals
  - The supervision and reporting structure
- No policy action required by the Township government

Option 2b – Consolidate Administrative Functions

The efficient delivery of public safety services is dependent on effective administrative functions. Those functions ensure that the personnel that are directly delivering service have the materials and support that is required to deliver the service. As the organization grows, the support functions become more complex and require a transition from volunteer to career assistance. Support functions include:

- Purchasing and distribution of materials and services
- Budget preparation and expenditure administration
- Documentation and archive maintenance
- Small equipment, SCBA, and turnout maintenance and repair
- Fleet and facility maintenance

The intended outcome of a joint administrative agreement is to monitor and conserve expenditures so that the savings from reduced expenses can be utilized to ensure an effective and efficient delivery of service. In order to establish an effective joint administrative program it is necessary to determine what functions must to be supported and which would provide a benefit to the departments.

Each of the Township fire departments relies on volunteer personnel to provide their administrative support, and two of the departments have utilized part-time administrative support.

Joint purchasing can produce a significant cost savings. Some minor joint purchasing has taken place between a couple of the Township departments and the amount of joint purchasing could certainly be enhanced. Many of items purchased by a fire department, both minor and capital purchases, could be purchased under a joint purchasing agreement.

Based on the analysis conducted in the Staffing section of the Agency Analysis, the fire departments should have 2.0 to 2.8 full-time equivalent (FTE) administrative staff. In this instance, the administrative functions would be lead by an executive director (one FTE) and supported by 1.5 FTE administrative assistants.

Under this option, the Township fire departments would enter into an agreement similar to the agreement that established the Millcreek Paramedic Service. However, in this scenario, the Township fire departments would be required to finance the continuing administrative functions. An executive director would serve as the business administrator for the Township fire departments and each department would maintain its current autonomy and separate set of officers.

Strengths of Option:

- Constant budget monitoring and administration
- Coordinated revenue efforts
- Business functions are documented and archived
- Cost savings from joint purchasing
- Consistent and monitored maintenance for all equipment
- Closer relationships between the Township fire departments

Weaknesses of Option:

- The Township fire departments would have to make significant changes to their annual expenditure budgets in order to support this option
- Implementation requires negotiation of an agreement between the Township fire departments

- The Township fire departments must agree on the functional responsibilities of the executive director and administrative assistant(s), and set the functions goals and objectives

Financial Impact:

- The cost of this option is $177,756 based on the following criteria:
  - Executive Director annual salary of $63,325 with $18,872 in benefits[27]
  - Administrative Assistant annual salary of $35,000 with $16,706 in benefits[28]
  - One-half time administrative assistant annual wages of $17,500 with $8,352 in benefits
  - Ongoing office expenses of $18,000[29] per year
- If the departments were to fund this option, the following formula distributes the cost based on the proportion of population served and the 2005 annual budget for each of the departments. The actual functional needs and requirements of each organization were not considered.

Figure 113: Estimated Cost Distribution of Administrative Function Option

Estimated Cost Distribution of Administrative Function Option						
Agency	Percent of Township Population	Percent of Personnel	Share of Admin Budget	Cost Distribution	2005 Department Budgets	Percent of Each Dept.'s Budget
BVFD	13.33%	20.74%	17.04%	$30,288	$270,695	11.19%
KFD	22.69%	13.83%	18.26%	$32,455	$68,565	47.33%
LSFD	2.96%	12.23%	7.60%	$13,502	$253,856	5.32%
WLFD	19.01%	28.19%	23.60%	$41,948	$299,301	14.02%
WRFD	42.02%	25.00%	33.51%	$59,563	$181,089	32.89%
Totals	100.00%	100.00%	100.00%	$177,756	$1,073,506	

This calculation is a representation and intended as an example of the potential cost. The actual cost should be determined by conducting an analysis of each department's administrative requirements.

[27] Base salary calculated from a survey of twelve Pennsylvania fire departments. Benefits based on current Millcreek Township benefit costs.
[28] Benefits based on current Millcreek Township benefit costs.
[29] A conservative figure, funds used for the purchase of supplies and $1000 per month in office space rent.

Policy Action:

- A contractual agreement should be established between participating departments that specifies:
  - How the costs are distributed
  - The establishment of a steering committee made up of representatives of each fire department that sets the annual strategic plan and administrative goals
  - The supervision and reporting structure
- No policy action required by the Township government

Option 2c – Joint Planning

Currently, neither the Township nor its fire departments participate in short or long-range fire service planning processes. Consequently, the distribution and concentration of resources have occurred without regard for the overall development of the Township. Each fire department has established its own revenue stream and resources as though it were expected to operate completely autonomously.

ESCi has found that the Township fire departments are all facing the same issues: Increasing workload, decreasing revenues, decreasing membership, and extended response times. Joint planning increases the opportunities for successful resolution issues by reducing the inevitable conflicts that arise from each organization attempting to resolve the issues on their own. Furthermore, the pooling of resources in the planning environment spreads the workload among a greater number of people, some with skills that can enhance the outcome. Another advantage of joint planning is the elimination of redundancies and duplication throughout the Township.

ESCi recommends that the joint planning process include strategic and long-range planning process that addresses the immediate critical and long-range issues facing the fire departments, as well as future facility and apparatus deployment.

Strengths of Option:

- Future facility and equipment redundancies are addressed, creating financial economies
- Service delivery is improved

- Resolution of issues is enhanced through cooperative efforts
- Improved relationships between Township fire departments
- Revenue stream could be improved through joint planning

Weaknesses of Option:

- The Township fire departments would have to relinquish some of their autonomy in order to support this option
- Implementation requires negotiation of an agreement between the Township fire departments
- The Township fire departments must agree on the type of planning to be conducted and the critical issues to be addressed

Financial Impact:

- No immediate financial impact
- Potential cost savings from long-range financial planning
- Potential increase in revenue from joint fundraising plans

Policy Action:

- A contractual agreement should be established between participating departments that specifies:
  - The type of planning that will be conducted
  - The responsibility of each fire department in the planning process
  - How planning costs are distributed
  - The establishment of a steering committee made up of representatives of each fire department
- No policy action required by the Township government

Option 3 – Service Delivery Modifications

ESCi has noted that the Township fire services delivery system has both redundancies and gaps, and the Township fire departments should be prepared to make deployment changes that maintain or enhance service delivery. These changes range from the development of Township-wide operational standard operating guidelines to the construction of additional facilities, to the addition of career or part time response personnel.

Option 3a – Township-wide standard operating guidelines (SOGs)

Firefighting is one of the most difficult and dangerous activities in the United States. The foundational procedures and guidelines of an emergency services agency set the behavioral expectations for a safe and efficient provision of service that, in turn, creates a safer environment for the citizens served.

The Township fire departments operate in a mutual aid environment and should consider developing joint SOGs to ensure that emergency operations are performed in a safe and consistent manner by all of the organizations engaged. The procedures and guidelines should address, at a minimum, the following topics:

- Emergency operations philosophy
- Incident safety and safety officer responsibilities
- Rapid Intervention Crew (RIC)
- Command and control
- Communication and terminology
- Firefighter emergency evacuation and rescue
- Emergency scene control
- Incident operational guidelines by incident type
- Responding to emergencies

Joint emergency operations' SOGs will lead to safer and more efficient mitigation of an emergency event. In addition, consistent emergency operations' SOGs provide incident commanders with the ability to make rapid adjustments to the emergency workforce, without the need to interpret or modify command behavior based on the procedure of another agency.

Strengths of Option:

- Improved efficiency and service delivery
- Improved citizen safety
- Improved firefighter safety

Weaknesses of Option:

- All of the Township fire departments need to agree to establish joint SOGs
- Current operational policies may be in conflict and therefore prohibit agreement on joint SOGs

Financial Impact:

- Minimal – volunteer staff time and publishing costs

Policy Action:

- A contractual agreement should be established between participating departments that specifies:
  - The responsibility of each fire department in the SOG writing process
  - How development costs are distributed
  - The establishment of a steering committee made up of representatives of each fire department
- No policy action required by the Township government

Option 3b – Enhance Mutual Aid

Mutual aid in its basic form is an agreement between agencies to assist one another when an agency does not have adequate resources to respond to or mitigate an incident. Automatic mutual aid agreements ensure that the appropriate number of resources is dispatched automatically to an incident. Taking that concept one step further, a boundary drop agreement would ensure that the closest appropriate resource is dispatched automatically to an incident regardless of the jurisdiction.

The Township fire departments have a variety of mutual aid agreements, written and verbal, that in practice provide an inconsistent response to the citizens of the Township. Relationships and turf wars have created an environment whereby the closest fire company is not always dispatched.

The current mutual aid system is dysfunctional and should be overhauled. While boundaries were supposed to have been dropped approximately five years ago, the Township fire departments should enter into an automatic mutual aid and boundary drop agreement that is executed by dispatch. Furthermore, the Township fire departments should be participants in a regional or countywide automatic mutual aid plan that is executed by dispatch SOG.

An expected outcome of enhanced mutual aid is that Township residents experience better service through greater depth of emergency resources. Emergency service will be faster and of a higher quality, even if the recipients do not outwardly notice a difference.

Based on anecdotal information and ESCi's analysis, the fire departments are having difficulty with turnout times and mustering a response crew during certain periods. Furthermore, several of the fire departments do not have sufficient membership to provide an effective and safe fire fighting force at moderate and higher risk occupancies (see Appendix). However, all of the fire departments, and their citizens, could benefit from a fully implemented boundary drop automatic aid agreement.

Strengths of Option:

- Boundary drop automatic mutual aid provides the most cost effective service possible to citizens
- Safety is increased for citizens and firefighters
- Emergency response personnel are afforded additional opportunities to respond to incidents in other jurisdictions

Weaknesses of Option:

- Organizational and personal attitudes between departments are barriers to success
- Potential imbalance in the number of responses given and received

Financial Impact:

- Minimal, limited to cost of fuel and maintenance if the number of responses increases significantly

Policy Action:

- New written mutual aid agreements must be established between the Township fire departments
- New written mutual aid agreements must be established between the Township fire departments and fire departments outside of the Township
- New dispatch policies must be established
- No policy action required by the Township government

Option 3c – Optimize Response Districts

ESCi conducted an analysis of the current service delivery system and has determined the following items should be addressed:

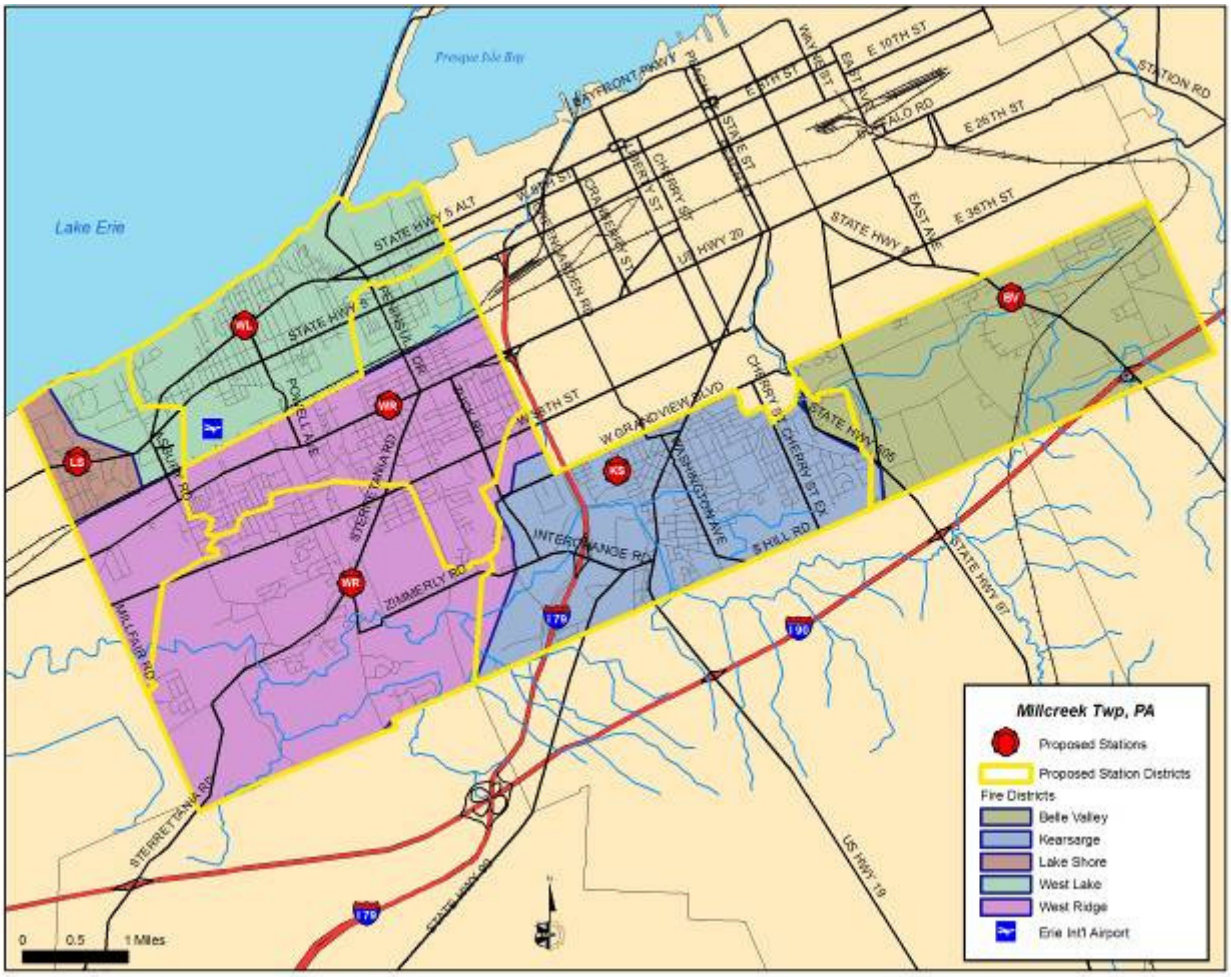
- The response boundaries between the Township fire departments are not drawn in an optimal manner
- West Lake Fire Department could discontinue the utilization of Fire Station No. 2 at 2942 West 12th

ESCi analyzed the travel time relationship of each Township fire station to its adjacent fire station(s). In doing so, it was discovered that area around WLFD Station 2 is within the five-minute travel time polygon of WLFD Station 1 and the WRFD Station 46. In addition, representatives of WLFD reported that Station 2 does not respond as frequently as it should. Thus, ESCi suggests that WLFD could discontinue the use of this facility and redirect the volunteer responders to the next closest station.

ESCi conducted a geographic travel time analysis of the remaining stations after removing WLFD Station 2 from the system. The following illustration shows the optimized response districts for each fire station. The yellow lines represent the travel time from each station and its adjacent stations within the Township, and the theoretical point at which a fire apparatus from one station will meet a fire apparatus from the next closest station.

It should be noted that the proposed response districts do not follow the district lines established by agreement between the Township and the fire departments. While the Township has established a district for each fire department, this district is not the optimal response area for each fire station. Utilizing a boundary-drop mutual aid system, the closest fire station would respond to an incident regardless of the district established by agreement with the Township. Consequently, ESCi recommends that the response districts identified by the yellow line be utilized to deliver the best possible service to Township residents.

Figure 114: Optimized Response Districts by Station



Strengths of Option:

- Optimizing response districts provides a more effective service to citizens
- Safety is increased for citizens and firefighters
- Emergency response personnel are afforded additional opportunities to respond to incidents in other jurisdictions

Weaknesses of Option:

- New response districts require a boundary drop mutual aid system
- Organizational and personal attitudes between departments are barriers to success
- Potential imbalance in the number of responses given and received

Financial Impact:

- Minimal, limited to cost of fuel and maintenance if the number of responses increases

- Department revenues (contributions) follow current boundaries, and a boundary change may have a negative impact on certain departments

Policy Action:

- New written mutual aid agreements must be established between the Township fire departments
- New dispatch policies must be established
- No policy action required by the Township government

Option 3d – Addressing Underserved Areas

ESCi conducted an analysis of the current service delivery system and has determined the following items should be addressed:

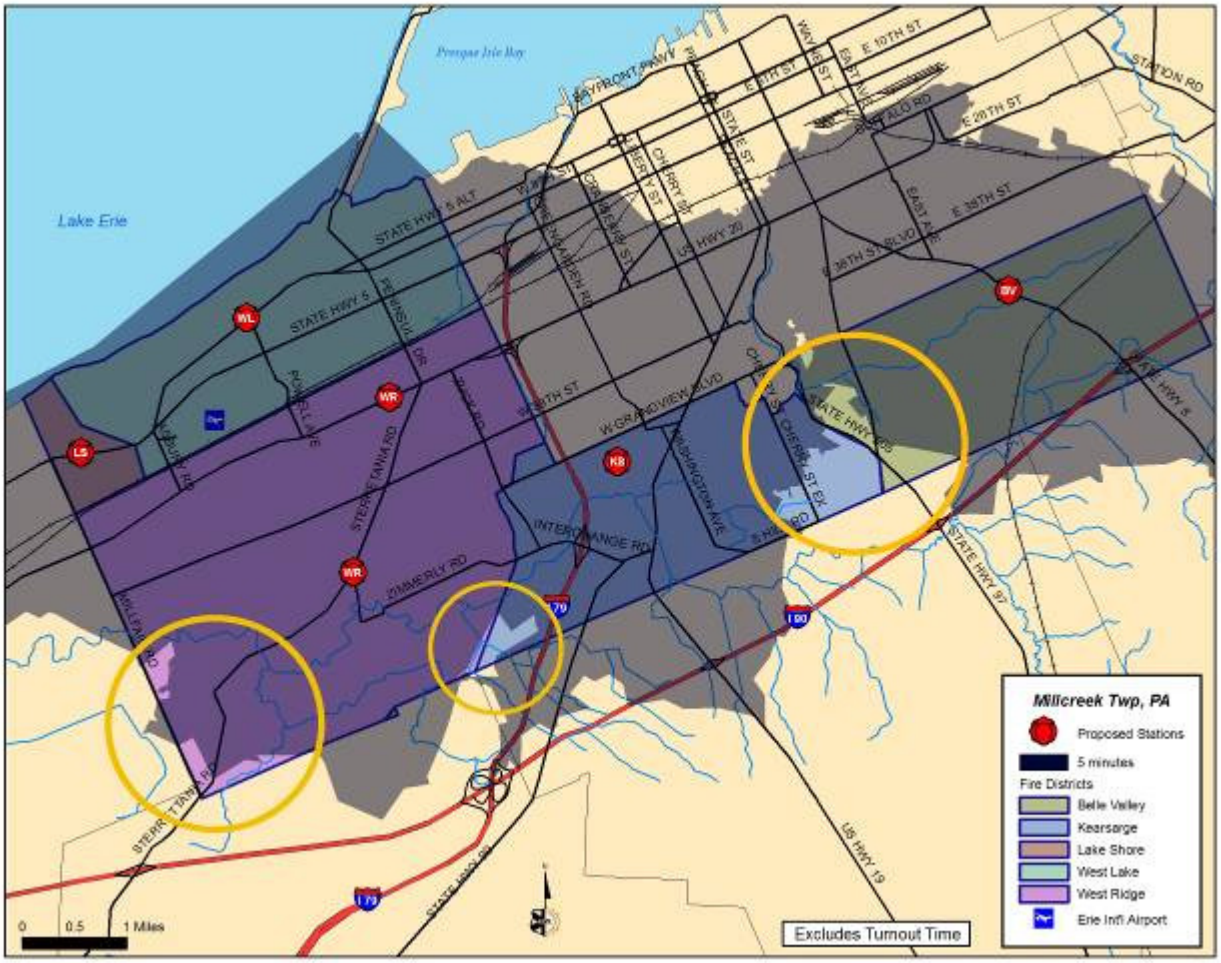
- The West Ridge, Kearsarge, and Belle Valley fire departments have areas within their area of responsibility with travel times in excess of five minutes
- Mutual aid with fire departments outside of the Township is not optimized

The following illustration shows underserved areas in the current five-minute travel time coverage, based on current fire station locations.

The areas of concern are situated in the southwest corner of the West Ridge district, on the southern edge of and between the West Ridge and Kearsarge districts, and on the southern edge of and between the Kearsarge and Belle Valley districts.

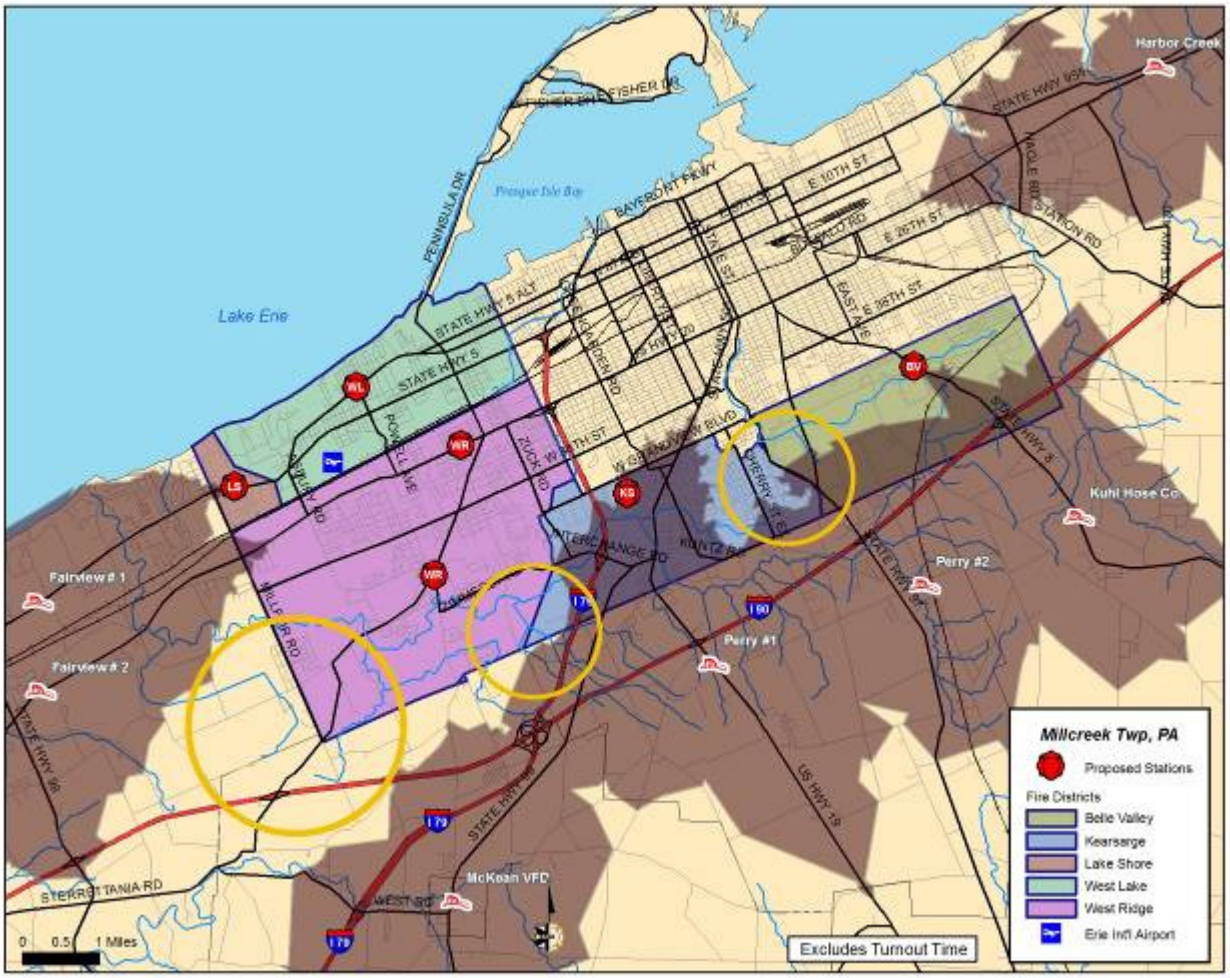
According to ESCi's analysis, the area of concern in the West Ridge district and between the West Ridge and Kearsarge districts have a low population and alarm density. This area will be subject to future growth and a commensurate growth in alarm activity. The area between Kearsarge and Belle Valley currently has a higher population and alarm density, and thus, is of an immediate concern.

Figure 115: Underserved Areas of Township



ESCi also analyzed the potential for mutual aid coverage of the underserved areas (see following illustration). Based on five-minute travel times, mutual aid fire departments can potentially cover the underserved area between Kearsarge and Belle Valley.

Figure 116: Potential Mutual Aid from Outside Millcreek Township



Based on GIS analysis, it is apparent that mutual aid is not an effective solution for the underserved areas in West Ridge and on the West Ridge/Kearsarge border.

In order to address the service issues at the southwest corner of its district, ESCi recommends that West Ridge either move its south station approximately one mile to the south, or build another station between the south station and Millfair road.

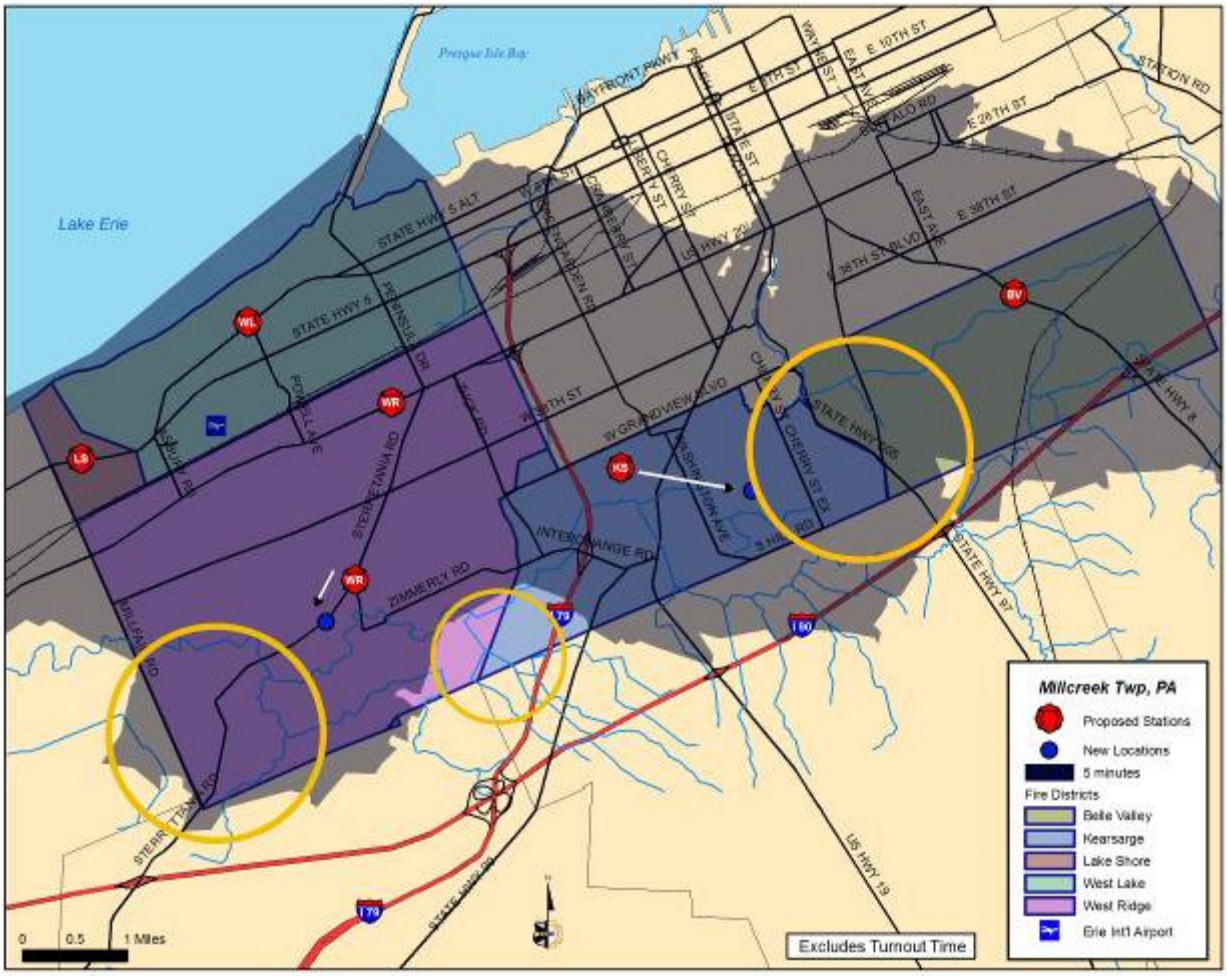
Moving the current station would exacerbate the service issues that exist on the border of West Ridge and Kearsarge. Therefore, if a third station is built, ESCi recommends that West Ridge

enter into a mutual aid agreement with the fire department to the southwest to provide coverage to a currently underserved area outside of the Township.

Kearsarge could move its station approximately two miles to the southeast to provide coverage to the underserved area between Kearsarge and Belle Valley. However, doing so would also exacerbate the underserved area on the West Ridge/Kearsarge border, and mutual aid could provide the coverage necessary to serve the area on the Kearsarge/Belle Valley border.

The following illustration shows the effect of moving West Ridge Station 2 approximately one mile to the southwest and the Kearsarge station approximately two miles to the southeast.

Figure 117: Proposed Station Relocations



Based on the analysis ESCi recommends the following:

- Kearsarge and Belle Valley enter into a mutual aid agreement with the Perry Fire Department for coverage to the underserved area along State Highway 505.
- West Ridge should engage in the planning process for the construction of a new station located to the southwest of Station 47.
  - West Ridge should consider entering into an agreement for a shared facility located on the border with the neighboring fire department.
- West Ridge and Kearsarge should engage in the planning process for the construction of a new station located in the underserved area on their district borders.

Strengths of Option:

- Optimizing mutual aid to the underserved areas provides a more effective service to citizens
- The construction of new stations provides service to underserved areas and a more effective service to citizens
- Safety is increased for citizens and firefighters

Weaknesses of Option:

- Construction costs, the fire departments are not financially prepared for a large capital expense
- Station 47 is less than ten years old. Moving it would be difficult to justify
- Optimized mutual aid requires a boundary drop mutual aid system
- Organizational and personal attitudes between departments are barriers to success

Financial Impact:

- The cost of a new single bay fire station with minimal facilities is between $350,000 and $500,000 depending on property cost

Policy Action:

- New written mutual aid agreements must be established between Kearsarge and Belle Valley, and Perry fire departments
- Written agreements must be established between the fire departments that share facilities
- New dispatch policies must be established
- No policy action required by the Township government

Option 3e – Improve Daytime Response

ESCi, through data analysis and anecdotal reports, has determined that the Township fire departments are having difficulty mustering an adequate number of volunteers during the daytime hours. In order to resolve this issue, the departments should consider two strategies to improve this situation. The first is to undertake a recruitment program that would improve volunteer response, and the second is to add career or part-time personnel to guarantee a daytime response.

Volunteer Response

Anecdotally, the members of the Millcreek fire departments expend a significant amount of effort on fundraising. It was reported to ESCi that the focus frequently shifts from training and response to fundraising. Consequently, the volunteers become engaged in activities that are not directly aligned with the mission of the fire service, which has led to dissatisfaction among the members.

The Township fire departments should consider establishing a joint formal volunteer recruitment and retention program. This program should also ensure that individuals are recruited that are available for daytime response.

The most successful volunteer programs focus on quality leadership, training, response, and hold volunteers accountable for their behavior, knowledge, skills, teamwork, and response capability. Successful volunteer programs do not depend on monetary rewards for the retention of their members. Instead, these programs reward their members by:

- Meeting individual needs
- Recognizing and rewarding individual and team achievement
- Challenging members to be innovative
- Asking individuals to take leadership roles in training, committees, and other activities
- Providing prepared and adequate supervision and leadership
- Not wasting the members time

The recruitment of volunteers should following a specific series of steps that fulfill the recruitment goal. Those steps include:

- Determine the type and number volunteers required for effective service delivery
- Develop an application and selection process
- Develop a recruitment slide program and handouts about being a volunteer
- Identify the target audience and venues for presentation
- Seek the assistance of the local media and/or place ads in various media outlets
- Place signs in strategic community locations
- Monitor and measure progress
- Select volunteers from applicants

For further information regarding the recruitment and retention of volunteers, ESCi suggests that the Township fire departments acquire ***Recruiting, Training, and Maintaining Volunteer Firefighters***, 1998, Third Edition, by Snook, Johnson, and Olsen.

In order for this option to succeed, several specific issues would need to be resolved:

- The amount of time spent on fundraising should be minimized
- New sources of revenue should be developed, or the Township government should provide financial support
- Training should take a priority over other department activities

Strengths of Option:

- Joint recruitment would eliminate competitive and redundant recruitments
- Closer working relationships
- Increased safety for firefighters and citizens

Weaknesses of Option:

- Organizational and personal attitudes between departments are barriers to success

Financial Impact:

- The reduction or elimination of fundraising activities would likely impact the departments' revenue stream

Policy Action:

- A contractual agreement should be established between the departments that specifies:

- The establishment of a recruitment committee made up of representatives of the fire departments
- The responsibilities of each fire department in the recruitment process
- How recruitment costs are distributed

Daytime Paid Response Personnel

In order to guarantee a specific level of daytime response, ESCi recommends the addition of part-time or career response personnel. The addition of paid (daytime) response personnel should be prioritized based on several considerations.

The first consideration is the geographic range of each station's travel model within the municipal limits of Millcreek Township. The second consideration is the population that each station can protect within the five-minute travel model. Higher populations, as demonstrated previously, generate greater service demand and account for the largest amount of residential property value. Third, the amount of projected service demand coverage is calculated for each station. This includes demand generated from residential, commercial, institutional, and transient sources (commuters, shoppers, visitors). Finally, an average of the community risk rating for future land use within each station's coverage area is calculated. The station areas that present a higher risk for the community are given more consideration for career staff deployment than other areas.

The following table shows each station's five minute travel time area within the municipal limits of Millcreek Township.

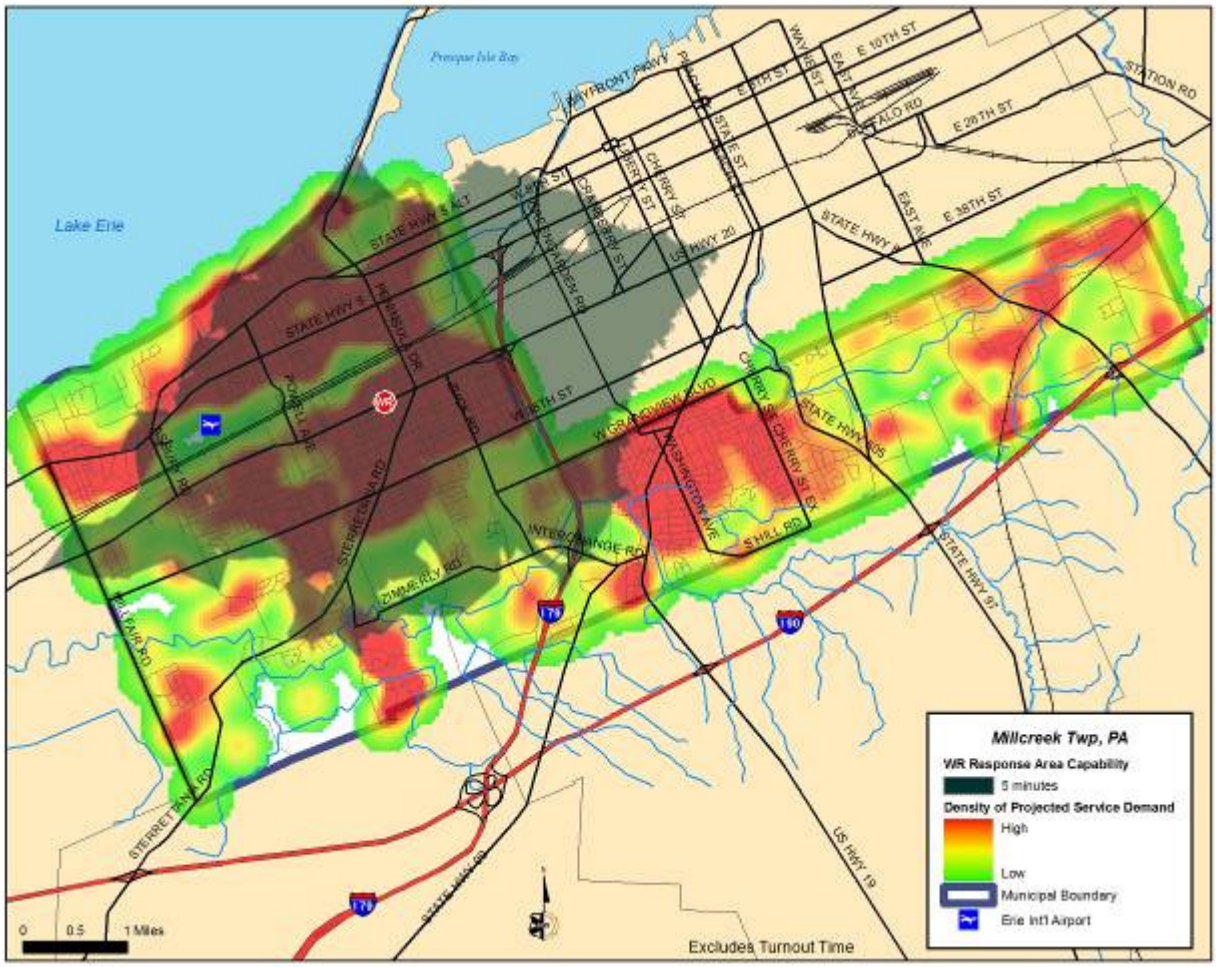
Figure 118: Five-Minute Travel Model Station Analysis

Five-Minute Travel Model Station Analysis				
Station	Area (Sq. Mi.)	Population	Service Demand	Average Risk Rating
Belle Valley	5.23	6,627	13%	1.188
Kearsarge	6.75	17,006	30%	1.215
Lake Shore	5.19	10,971	22%	1.358
West Lake	8.26	17,385	38%	1.396
West Ridge (N)	12.67	28,463	53%	1.341
West Ridge (S)	10.94	10,452	35%	1.275

Single Station Daytime Staff Deployment Strategy

The northern West Ridge Station clearly provides the greatest coverage in three of the four categories. While it ranks third in average community risk, it provides the most effective coverage to the other parameters measured. The following map illustrates the area of coverage for this station superimposed over the projected service demand.

Figure 119: One Station Daytime Staff Deployment Strategy



Two Station Daytime Staff Deployment Strategy

The next stations to be considered in a two station daytime staff deployment are the southern West Ridge station or the West Lake station. The factors considered in this deployment are the travel model station analysis and mutual aid response capability illustrated earlier in the report.

The addition of daytime staff in the southern West Ridge Station or the West Lake station to the northern West Ridge Station would result in a large area of coverage overlap. This would produce less effective results than deploying the daytime staff to the West Lake and southern West Ridge stations. The following table displays the results of a two-station daytime staff department under different configuration strategies.

Figure 120: Two Station Daytime Staff Station Analysis

Two Station Daytime Staff Station Analysis				
Station	Area (Sq. Mi.)	Population	Service Demand	Average Risk Rating
West Ridge (North & South)	16.9	31,687	61.11%	1.33
West Ridge (N) & West Lake	14.3	31,364	58.77%	1.32
West Ridge (S) & West Lake	17.2	31,952	61.42%	1.31

The following maps illustrate the daytime staff coverage area for the southern West Ridge Station and contrast that strategy with the coverage area for the two West Ridge stations. The coverage areas are superimposed over the projected service demand for Millcreek Township.

Figure 121: Southern West Ridge & West Lake Station Coverage Areas

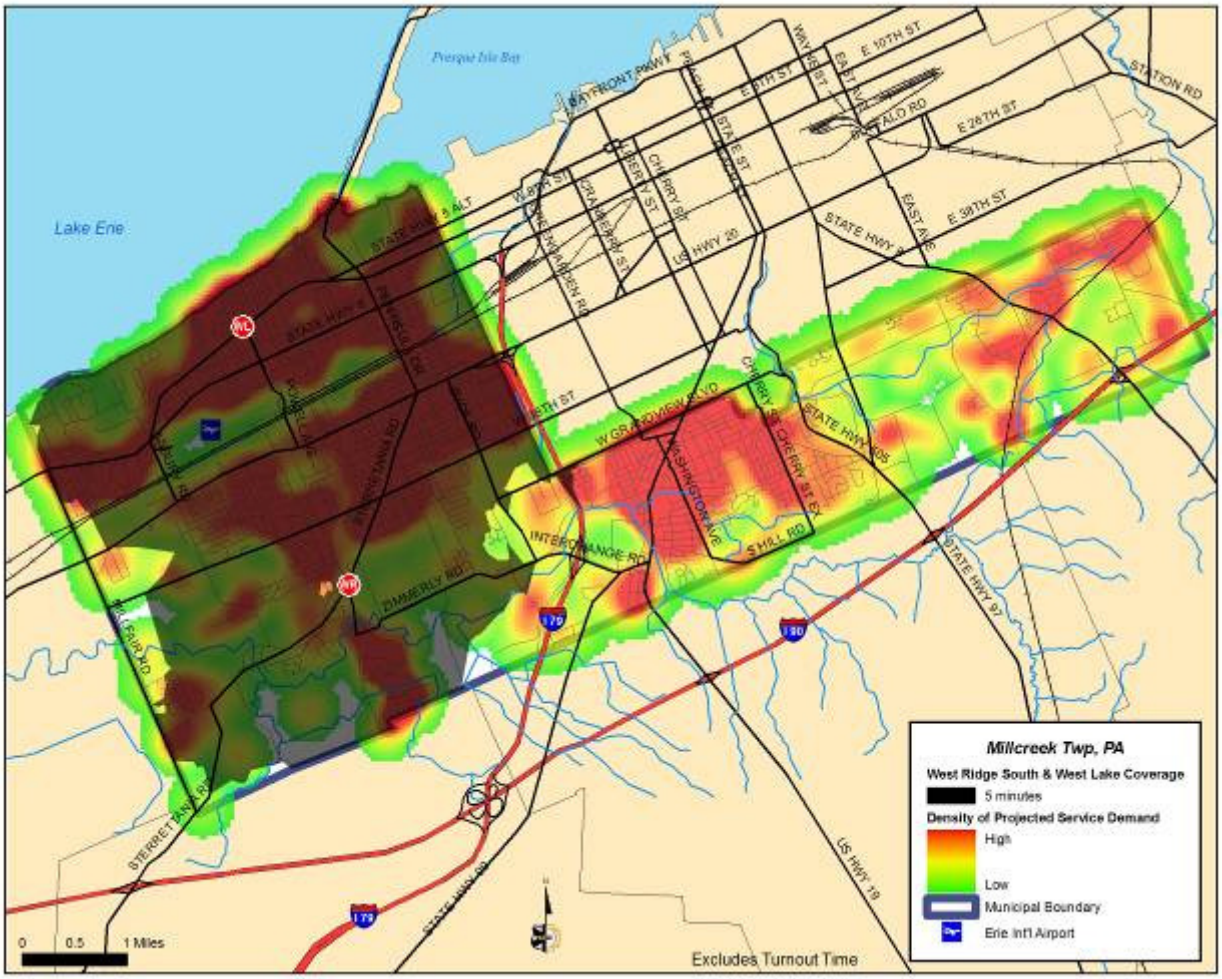
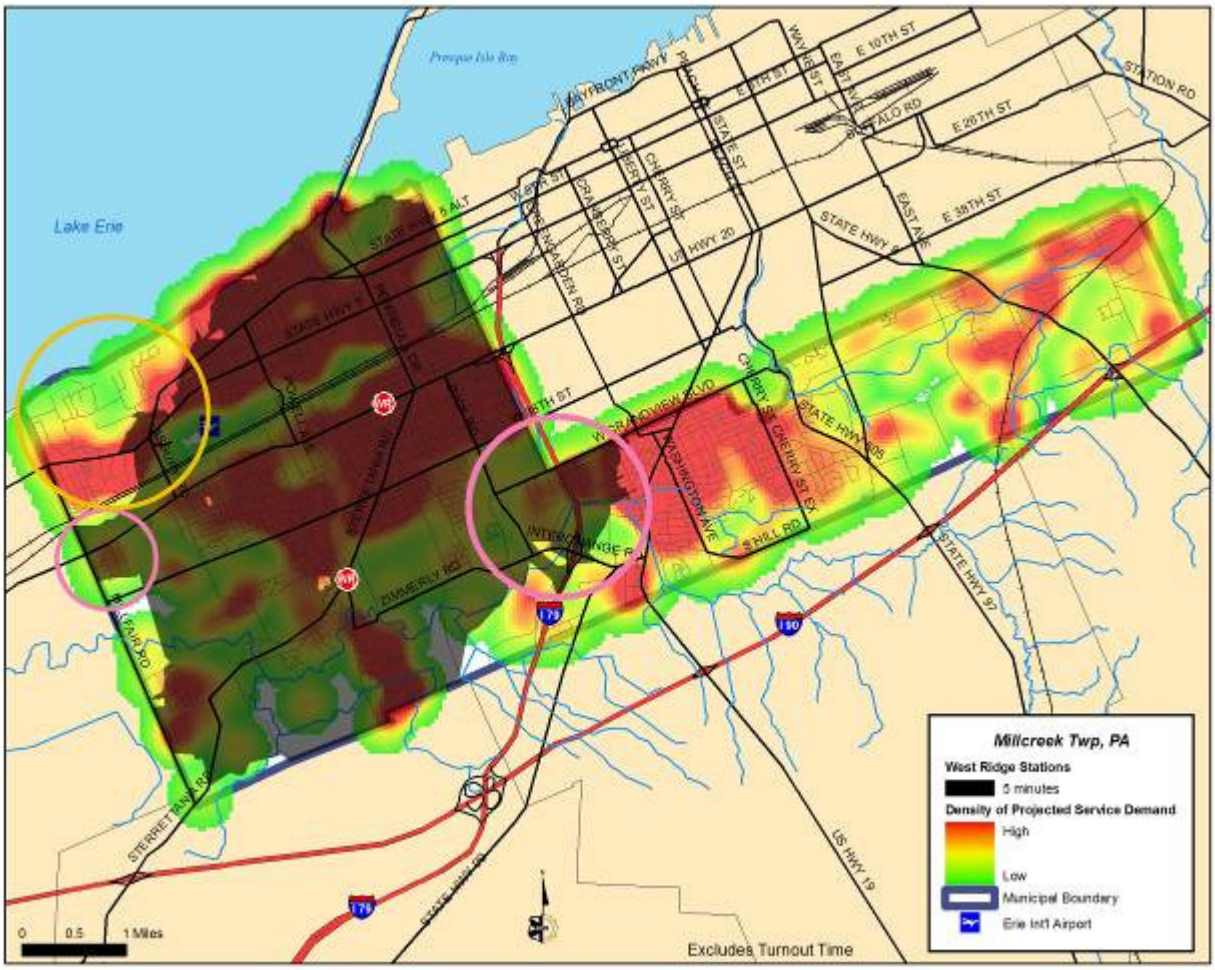


Figure 122: West Ridge Stations Coverage Area



The pink-colored circles in the second map identify areas where service is improved by this strategy. The orange-colored circle represents coverage area lost when compared to the previous strategy of the southern West Ridge station and the West Lake station.

The statistical differences in these two strategies are not significant, and therefore either may be acceptable as daytime staffing strategies utilizing two stations. The strategy of the southern West Ridge & West Lake stations is recommended due to the slight advantage in three of the four analyzed parameters.

Three Station Daytime Staff Deployment Strategy

The third station that should be considered for daytime staff is the Kearsarge Station, based upon the original travel time analysis. The staffing of the Lake Shore or Belle Valley stations is not indicated unless service demand greatly increases in their area. Their geographic location and travel time coverage area was not advantageous for consideration in the daytime staffing deployment strategies. The northern West Ridge Station was not considered as the third career-staffed station as it would provide redundant coverage to the two station career staff deployment strategy.

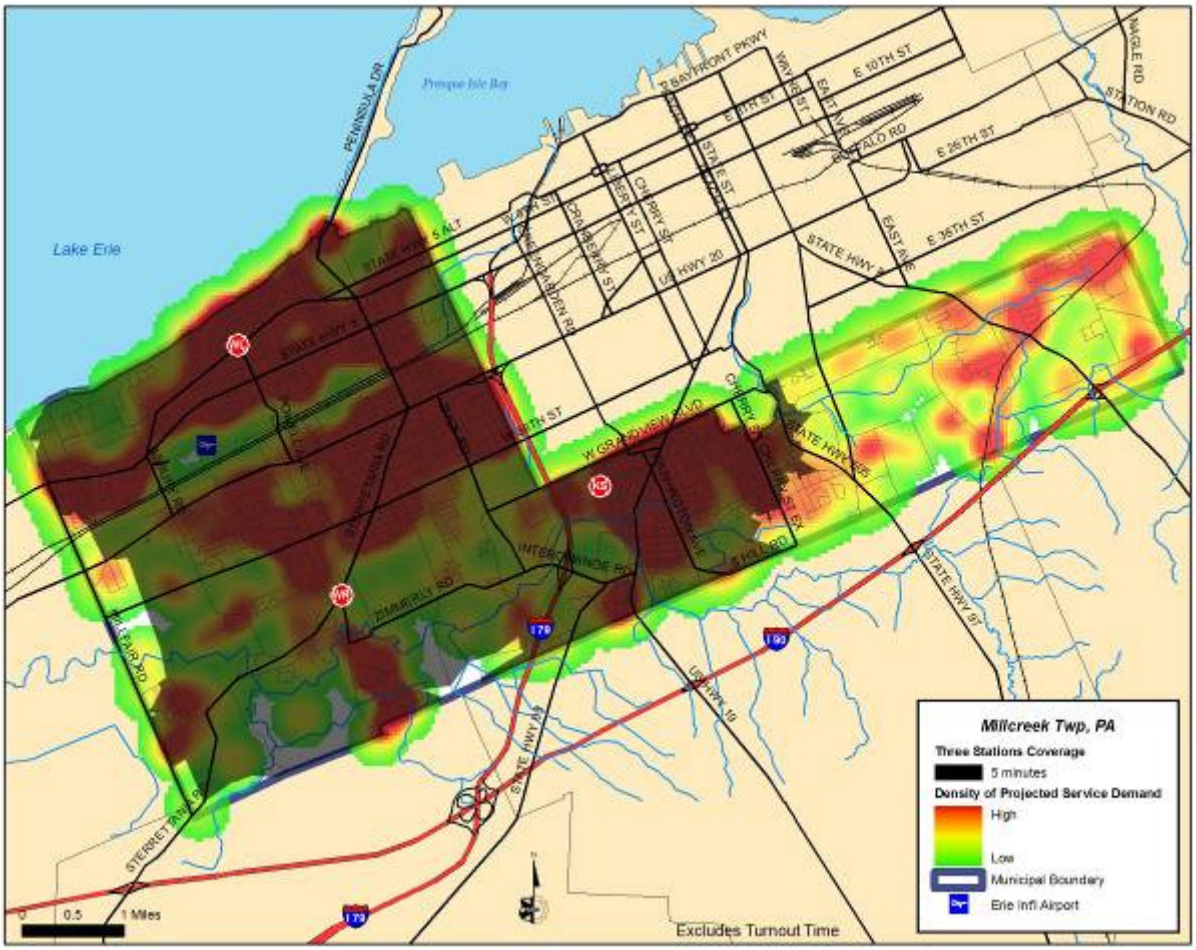
The following table details the results of the addition of a third daytime staff station within Millcreek Township.

Figure 123: Three Station Daytime Staff Analysis

Three Station Daytime Staff Station Analysis				
Station	Area (Sq. Mi.)	Population	Service Demand	Average Risk Rating
West Ridge (S), West Lake, & Kearsarge	22,02	43,824	83.37%	1.29

The average risk rating drops due to the inclusion of low risk properties. The projected service demand and population coverage now exceeds the eighty percent mark, while the area coverage is seventy-five percent of the total square miles of the Township. The following map illustrates the extent of this coverage.

Figure 124: Three Station Daytime Staff Deployment



This strategy provides coverage to the majority of the Township's population and higher community risk properties. However, to achieve results exceeding 90 percent, the Belle Valley Station would also need to be staffed.

Four Station Daytime Staff Deployment Strategy

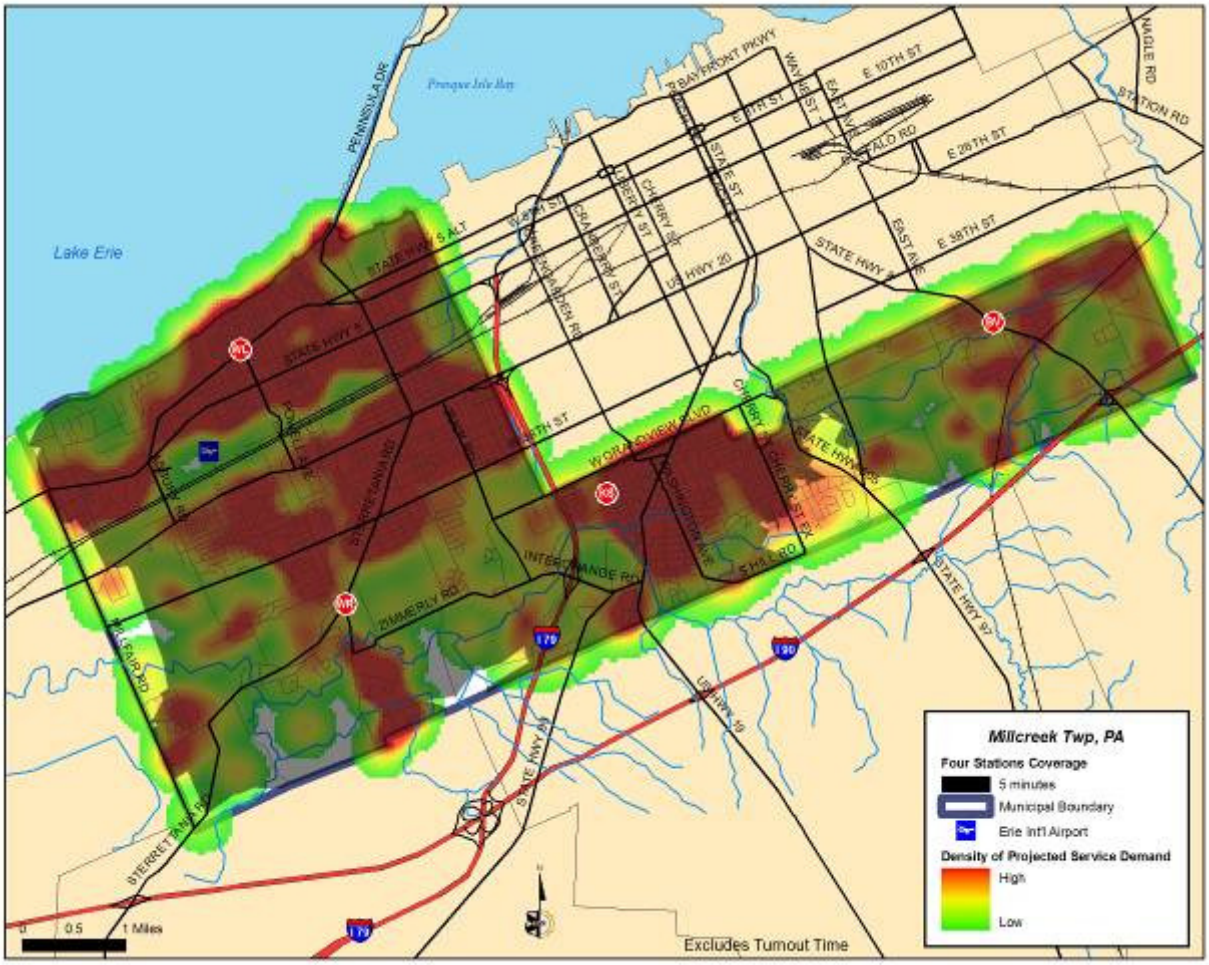
If the Belle Valley station were to be staffed in addition to the previously described strategy, daytime response coverage throughout the Township would exceed 90 percent. The following table details the results of the addition of a fourth daytime staff station within Millcreek Township.

Figure 125: Four Station Daytime Staff Analysis

Four Station Daytime Staff Station Analysis				
Station	Area (Sq. Mi.)	Population	Service Demand	Average Risk Rating
West Ridge (S), West Lake, Kearsarge & Belle Valley	27.31	50,515	96.35%	1.278

The following map illustrates the extent of coverage if four stations are staffed with daytime personnel. Except for an area between Kearsarge and Belle Valley Stations, the Township has full coverage. The analysis reveals that 93.26 percent of the Township's area is covered as well as 96.91 percent of the projected service demand. The level of response could improve if Kearsarge were to be repositioned to the location proposed earlier in the report.

Figure 126: Four Station Daytime Staff Deployment



Organization of Paid Daytime Staff

Based on ESCi's analysis, mid-week workload for the Township fire departments begins to rise around 7:00 AM and peaks around 5:00 PM. This is the same period when the fire departments have the greatest difficulty mustering volunteers for response.

There are a multitude of scenarios and schedules for the provision of daytime response. Three potential methods are described below. The establishment and maintenance of paid or career staff requires effective organization and management. ESCi recommends, at a minimum, that a fire chief and an administrative assistant be employed for this purpose. Administrative personnel require workspace and equipment as well as access to training and educational opportunities. The annual cost in material and services is approximately $18,000 per year. ESCi also recommends that these personnel be employed by either the Township or a merged Township fire department (see option 4b below).

Figure 127: Projected Personal Services Cost – Administrative

Projected Personal Service Cost – Administrative				
Position	**Annual Salary**	**Total FICA**	**Total Health**	**TOTAL**
Fire Chief	$74,500	$5,699	$14,028	$94,227
Administrative Assistant	$35,000	$2,678	$14,028	$51,706
Projected Personal Services Cost				**$145,933**

Staffing Strategy 1 - Part-time Personnel

Daytime response could be provided by part-time or career personnel, or a combination of each. In the following staffing strategy, all daytime shifts are covered by part-time personnel. Effective scheduling is paramount in this type of system to ensue that sufficient numbers of personnel are available. The total hours per week consist of multiple personnel filling various time slots. This schedule could be filled by as few as nine part-time personnel, and as many as 15 or more per station.

Figure 128: Staffing Strategy 1 - Part-time Personnel

Staffing Strategy 1 – Part-time Personnel			
Staff Per Station	**Schedule**	**Hours/week**	**Hours Annual**
Lieutenant (part-time)	7-7, M-F	60	3,120
Firefighter (part-time)	7-7, M-F	60	3,120
Firefighter (part-time)	7-7, M-F	60	3,120

The cost per station of this strategy is outlined in the following chart.

Figure 129: Projected Personal Services Cost Per Station – Staffing Strategy 1

Projected Personal Service Cost – Staffing Strategy 1						
Position	**Annual Salary**	**Hourly Rate**	**Total Hours**	**Total FICA**	**Total Health**	**TOTAL**
Firefighter (part-time)		$13.18	6,240	$6,291		$88,525
Lieutenant (part-time)		$15.16	3,120	$3,617		$50,902
					Projected Personal Services Cost	**$139,426**

Staffing Strategy 2 – Career Lieutenant, Part-time Firefighters

The following staffing strategy utilizes a combination of career officers and part-time firefighters. Again, effective scheduling is paramount in this type of system to ensue that sufficient numbers of personnel are available. The total hours per week consist of a single officer working a regular weekly work schedule and multiple personnel filling various firefighter time slots. This schedule could be filled by as few as three career lieutenants and 12 part-time firefighters. Lieutenant vacancies could be filled by part-time personnel. As many as 24 or more part-time firefighters could be utilized to fill vacancies.

Figure 130: Staffing Strategy 2 – Career Lieutenant, Part-time Firefighters

Staffing Strategy 2 – Career Lieutenant, Part-time Firefighters			
Staff Per Station	**Schedule**	**Hours/week**	**Annual Hours**
Lieutenant (career)	8-5, M-F	45	2,340
Firefighter (part-time)	8-5, M-F	45	2,340
Firefighter (part-time)	8-5, M-F	45	2,340

The cost of this strategy is outlined in the following chart.

Figure 131: Projected Personal Service Cost Per Station – Staffing Strategy 2

Projected Personal Service Cost – Staffing Strategy 2							
Position	**Annual Salary**	**Hourly Rate**	**Total Hours**	**Positions**	**Total FICA**	**Total Health**	**TOTAL**
Firefighter (part-time)		$13.18	4,680	2	$4,719		$66,401
Lieutenant	$43,647			1	$3,470	$14,028	$61,145
						Projected Personal Services Cost	**$127,546**

In addition to the cost projected above, the employer should be prepared to compensate the career lieutenants for hours worked in excess of 40 hours per week. The total cost would be approximately $3,789 per year.

Strategy 3 utilizes all career personnel. Scheduling is not as important as the previous systems unless part-time personnel are utilized to fill career vacancies. All shifts and hours are covered by career personnel working an 8:00 to 5:00 schedule, Monday through Friday. This schedule could be filled by as few as three career lieutenants and six career firefighters. Vacancies could be filled by part-time personnel.

Figure 132: Staffing Strategy 3 – Career Lieutenants and Firefighters

Staffing Strategy 3 – Career Lieutenants and Firefighters			
Staff Per Station	**Schedule**	**Hours/week**	**Hours Annual**
Lieutenant	8-5, M-F	45	2,340
Firefighter	8-5, M-F	45	2,340
Firefighter	8-5, M-F	45	2,340

The cost of this strategy is outlined in the following chart.

Figure 133: Projected Personal Service Cost Per Station – Staffing Strategy 3

Projected Personal Service Cost Per Station – Staffing Strategy 3					
Career Position	**Annual Salary**	**Positions**	**Total FICA**	**Total Health**	**TOTAL**
Firefighter	$37,954	2	$5,807	$28,056	$109,771
Lieutenant	$43,647	1	$3,339	$14,028	$61,014
Projected Personal Services Cost					**$170,785**

In addition to the cost projected above, the employer should be prepared to compensate career firefighting personnel for hours worked in excess of 40 hours per week. The total cost per station would be approximately $10,378 per year.

Strengths of Daytime Staffing Options:

- Township would receive consistent daytime response
- Fire chief position would provide greater coordination of Township firefighting efforts
- Mutual aid between departments could be eliminated or enhanced
- Closer working relationships
- Increased safety for firefighters and citizens
- Apparatus is available for daytime response

Weaknesses of Option:

- Organizational and personal attitudes between departments are barriers to success

- Change in organizational structure by adding administrative and part-time staff
- Apparatus for daytime response is owned by the independent fire companies
- Potentially poor relationships between career, part-time, and volunteer personnel

Financial Impact:

- Increased cost to Township – the fire departments do not have the financial capacity to fund the option

Policy Action:

- A contractual agreement should be established between the departments and the Township that specifies:
  - The establishment of a daytime response committee made up of representatives of the fire departments and the Township government
  - The responsibilities of each fire department and the Township in the process of establishing a daytime response capability
  - How the costs are distributed or borne
  - The organizational structure of the new response and administrative capability
  - Expectations of the current officers and members (operational and corporate) in the new response system
  - How each department's assets are to be utilized (stations and apparatus)
- New written mutual aid agreements must be established regarding the daytime capability
- Consideration must be given to how the daytime response capability will integrate with Millcreek Paramedic Service
- The Township government may be required to negotiate a new service agreement with the fire departments if the daytime response capability is not operated by the Township
- New dispatch policies must be established

Option 3f – Improve Nighttime Response

The Township fire departments are also interested in improving nighttime response. The addition of nighttime personnel to the daytime resources suggested above would provide Township residents with improved response times throughout a 24-hour period. In many volunteer fire departments, nighttime response has been enhanced by utilizing volunteer personnel that were offered a financial incentive for standing a shift at the fire station.

Nighttime and weekend stand-by programs have been met with mixed success across the nation, and cultural and workplace shifts have made it more difficult to sustain these programs. However, the Millcreek Township fire departments are encouraged to consider implementing such a program and then evaluating its success after a reasonable period of full operation. Several options exist that can help provide a higher level of response performance during certain periods of the day or week. They are:

- Volunteer personnel sign a roster that they are available during a particular period
- A specific number of volunteers are asked sign up (make a promise) to be available or within a certain distance of the fire station during specific periods
- A group of volunteers, usually the minimum number required to staff an engine or ladder, perform stand by duty at the fire station for a specific shift or period

If each of the township fire departments were to ask their members to staff one engine with three personnel from 5:30 PM to 7:00 AM five days a week, each member would be required to work a certain number of shifts in a one year period. However, the actual number of shifts that each person would work would be dependent on each member's availability. In addition, employment and personal issues may restrict a member's availability. The following chart shows the minimum number of shifts each member would have to work.

Figure 134: Number of Shifts Members Would be Required to Work

Number of Shifts Members Would be Required to Work					
	Lake Shore	**West Ridge**	**Belle Valley**	**West Lake**	**Kearsarge**
Operations personnel	41	56	37	35	20
Number of shifts	19	14	21	22	39

ESCi has found that these programs are met with enthusiasm in the beginning and there is little difficulty recruiting personnel for stand-by duty. Within one year, the department's personnel find that stand-by requirements are too restrictive for today's mobile society or too difficult to participate in when employed. A compensation program, in which members who sign up for night duty receive some compensation, can aid in sustaining a stand-by program, but the program may still be subject to the issues stated above.

Strengths of Nighttime Staffing Options:

- Township would receive consistent nighttime response
- Closer working relationships
- Increased safety for firefighters and citizens

Weaknesses of Option:

- Additional organizational burden
- Organizational and personal attitudes within departments may be barriers to success
- Initial success may be short lived
- Stand-by shifts will have an impact on the personal lives of volunteers
- Potential conflicts between career, part-time, and volunteer personnel

Financial Impact:

- None if stand-by shifts are not compensated
- Increased cost to Township if stand-by shifts are compensated

Policy Action:

- New written mutual aid agreements must be established regarding the nighttime capability
- Consideration must be given to how the nighttime response capability will integrate with Millcreek Paramedic Service
- New dispatch policies must be established

Option 4 – Corporate Merger

ESCi, during its fieldwork, found that the Township fire departments had some distinct similarities. Those similarities create a potential for the merger of the fire departments into one or two entities instead of five. The similarities are:

- All are not-for-profit organizations under the IRS code.
- All conduct fundraising activities for the major portion of their revenue
- The organizational structures are similar
- All of the fire departments have the same basic goal of delivering fire services
- All of the fire departments are co-owners of Millcreek Paramedic Service

Under this scenario, ESCi is suggesting the option of the existing fire departments merge into one or two private fire departments with a new structure.

Option 4a – Five Fire Departments Merged Into Two

Two factors exist that would make the merger of the five fire departments into two fire departments a feasible option: geography and culture. ESCi recommends the merger of Kearsarge and Belle Valley into one, and Lake Shore, West Lake, and West Ridge into one. In addition, ESCi recommends that the boundary between the two new organizations follow the recommended response boundary between West Ridge and Kearsarge outlined in green below.

Figure 135: Recommended Boundary between Two Merged Departments

Of the two mergers, the Kearsarge/Belle Valley merger has the greatest potential for success. Kearsarge and Belle Valley already have a working relationship and face similar challenges. In addition, some discussion has take place regarding a merger

A merger between Lake Shore, West Lake, and West Ridge would be more challenging. The organizational structures are slightly different and there are perceived turf issues between the organizations. However, the advantages of merging far outweigh the challenges.

Several questions would need to be answered if the departments to merge:

- Will an existing corporate entity be utilized or should a new one be formed?
- How would the new corporate entity be organized?
- Would the current officers and members (operational and corporate) continue in their roles?

- How would the current finances be transferred?
- How, and to whom, would the current assets be transferred?
- What would be the name of the new organization?

Strengths of Option:

- Elimination of redundant administrations
- Greater revenue potential
- Elimination of mutual aid within each merged organization and a new mutual aid relationship between the two merged entities
- Closer working relationships
- Increased safety for firefighters and citizens
- Emergency response personnel are afforded additional opportunities to respond to incidents
- Township would have two fire protection agreements instead of five
- Training would improve and provided on a more consistent basis

Weaknesses of Option:

- Organizational and personal attitudes between departments are barriers to success
- Financial issues – the distribution of current revenue, reserve funds, and the transfer of assets
- Change in organizational structure
- Change in leadership

Financial Impact:

- The disposition of reserve funds requires an agreement among the merging departments
- The transfer of assets to the new organization requires an agreement among the merging departments
- Financial economies gained by merging would be found in increased purchasing power and would be focused on facilities, vehicle, and equipment maintenance. Administrative economies will be minimal
- There will be some legal and accounting costs associated with the merger

Policy Action:

- A contractual agreement should be established between the merging departments that specifies:
  - The establishment of a merger committee made up of representatives of the merging fire departments
  - The responsibilities of each fire department in the merger process
  - The retention of lawyer and certified public accountant to assist with the specifics of the merger
  - How the cost of the merger are distributed
  - Whether or not a new corporate entity is formed, or an existing one is utilized
  - The organizational structure of the merged fire department
  - The disposition of the current officers and members (operational and corporate) in the merged fire department
  - How each department's current assets are transferred to the merged organization
  - The name of the merged organization
- New written mutual aid agreements must be established between the merged organization and mutual aid organizations
- New agreement must be established with Millcreek Paramedic Service, and the MPS by-laws must be rewritten to reflect the new relationship
- The Township government would be required to negotiate a new service agreement with the merged entities

Option 4b – Five Fire Departments Are Merged Into One

As in Option 4a, there are two factors that make the merger of the five fire departments into one fire department a feasible option: geography and culture. The single fire department scenario combines all of the advantages of the options that have been explored to this point. A single entity would have the best opportunity to:

- Eliminate boundary and turf issues
- Provide consistent leadership across the Township
- Deliver consistent service and eliminate service gaps
- Conduct planning for future service enhancements
- Distribute resources based on demand and geographic needs
- Enhance revenue streams

- Enhance mutual aid with departments outside of the Township

A merger of the five fire departments would be challenging. The organizational structures are slightly different and there are perceived turf issues between the organizations. However, the advantages listed above far outweigh the challenges.

Several questions would need to be answered if the departments were to merge:

- Will an existing corporate entity be utilized or should a new one be formed?
- How would the new corporate entity be organized?
- Would the current officers and members (operational and corporate) continue in their roles?
- How would the current finances be transferred?
- How, and to whom, would the current assets be transferred?
- What would be the name of the new organization?

Strengths of Option:

- Elimination of redundant administrations
- Financial resources could be pooled increasing the opportunity to acquire career staff
- Greater revenue potential
- Elimination of mutual aid problems within the Township, all departments are in the same department
- Closer working relationships
- Increased safety for firefighters and citizens
- Emergency response personnel are afforded additional opportunities to respond to incidents
- Planning for future service delivery and enhancements would be conducted on a Township-wide basis
- Township would have one fire protection agreement instead of five
- Training would be consistent and enhanced across the department

Weaknesses of Option:

- Organizational and personal attitudes between departments are barriers to success

- Financial issues – the distribution of current revenue, reserve funds, and the transfer of assets
- Change in organizational structure
- Change in leadership

Financial Impact:

- The disposition of reserve funds requires an agreement among the merging departments
- The transfer of assets to the new organization requires an agreement among the merging departments
- Financial economies gained by merging would be found in increased purchasing power and would be focused on facilities, vehicle, and equipment maintenance. Administrative economies will be minimal
- There will be some legal and accounting costs associated with the merger

Policy Action:

- A contractual agreement should be established between the merging departments that specifies:
  - The establishment of a merger committee made up of representatives of the merging fire departments
  - The responsibilities of each fire department in the merger process
  - The retention of lawyer and certified public accountant to assist with the specifics of the merger
  - How the cost of the merger are distributed
  - Whether or not a new corporate entity is formed, or an existing one is utilized
  - The organizational structure of the merged fire department
  - The disposition of the current officers and members (operational and corporate) in the merged fire department
  - How each department's current assets are transferred to the merged organization.
  - The name of the merged organization
- New written mutual aid agreements must be established between the merged organization and mutual aid organizations
- New agreement must be established with Millcreek Paramedic Service, and the MPS by-laws must be rewritten to reflect the new relationship

- The Township government would be required to negotiate a new service agreement with the merged fire department

Option 5 – Township Provides Financial Support for Fire Protection

The transfer of fire protection responsibilities to the Township is presented as an option that could take one of three forms.

- Option 5a – Fire protection is provided by an independent organization(s) to which the Township provides financial support.
- Option 5b – The Township provides administrative and operational oversight and the current fire departments own and maintain the assets.
- Option 5c – The Township acquires all of the facility and apparatus assets, and operates the fire department.

Option 5a – Fire protection is provided by a single independent fire department to which the Township provides financial support.

ESCi does not believe that Option 5 is a viable option unless the current five fire departments merge into a single department as described in Option 4b above. When considering the current financial status of the fire departments, substantial financial support is clearly needed. However, the gifting of public funds to five separate and private entities without public oversight is not good government. Conversely, financial support provided to a single fire department could be easily audited and controlled.

The fire departments spend considerable time and energy on fundraising. Approximately 1000 worker-hours (a rough estimate) are spent on fundraising to support the departments. Unfortunately, fundraising diverts the members of the departments from the fire service mission of protecting property and saving lives, and contributes to volunteer burn-out or dissatisfaction. In addition, fundraising efforts are subject to economic fluctuations and are not a reliable source of funding.

Consider that, based on records kept by the departments, only 40 percent or less of the community is donating to a service that is being delivered to everyone, regardless of who donates. The consequence is a financially imbalanced system where 60 percent of the Township's residents and businesses are receiving fire protection at no cost whatsoever, while

about 40% of the community (often the older, long-time established residents) bear the burden of funding. Municipal taxes or fees that are dedicated to fire protection are the most equitable and reliable method of funding this service.

ESCi believes that Option 5a is the most viable of the three presented in the Option 5 section. This option combines all of the advantages of the options that have been explored to this point with an additional advantage of financial stability.

A corporate merger poses several challenges, and the current fire departments have been doing business autonomously for a long time. However, the prospect of financial support, which could substantially replace the current fund raising burden in the current fire departments, is a significant incentive for change.

Strengths of Option:

- Elimination of redundant administrations, administration and oversight provided by a single fire department
- Financial stability – the delivery of fire protection would not be dependent on contributions and fundraising
- Time spent on fund raising by fire department personnel could be refocused on training and response
- Opportunity to provide career staff for administrative and response functions
- Elimination of mutual aid problems within the Township, all departments are in the same department
- Closer working relationships
- Increased safety for firefighters and citizens
- Emergency response personnel are afforded additional opportunities to respond to incidents
- Planning for future service delivery and enhancements would be conducted by the fire department administration on a Township-wide basis
- Township would have one fire protection agreement instead of five
- Training would be consistent and enhanced across the department
- The current physical assets could continue to serve the community

Weaknesses of Option:

- Organizational and personal attitudes between departments are barriers to success
- Township tax burden would increase
- Roles would change for the current officers (operational and corporate)
- Change in organizational structure may be difficult to accept
- Change in leadership

Financial Impact:

- ESCi estimates the on-going financial impact of providing support to a Township fire department that at an annual minimum of $875,430 for general operational expenses. This figure would cover expenses such as apparatus, equipment, and facilities maintenance, fuel, utilities, insurance, and miscellaneous expenses. The following criteria was used:
- Financial economies gained by merging would be found in increased purchasing power and would be focused on facilities, vehicle, and equipment maintenance
- There will be legal and accounting costs associated with the merger

Policy Action:

- A contractual agreement should be established between the Township and the fire departments that specifies:
  - The establishment of a Township fire protection taskforce made up of representatives of the fire departments and the Township
  - The responsibilities of each entity in the process
  - The retention of a lawyer and certified public accountant to assist the fire departments with the specifics of the merger
  - The disposition of the current officers and members (operational) in the new merged fire department
  - How each department's current physical assets are transferred to the new entity
- New written mutual aid agreements must be established between the new department and mutual aid organizations
- A new agreement must be established with Millcreek Paramedic Service, and the MPS by-laws must be rewritten to reflect the new relationship
- The Township government would be required to cancel the current service agreements with the fire departments, and develop a new service agreement with the merged department

Option 5b – Township provides administrative and operational oversight and the current fire departments own and maintain the assets.

Public-private partnerships are an essential function of modern government. However, ESCi believes that Option 5b has limited viability due to the differing roles and fiduciary responsibilities of government and private entities. The assets utilized to deliver fire services are highly visible and expensive and ESCi has identified areas of the Township that are underserved. In this option, planning and construction of new facilities is left to the fire departments, which do not have adequate funds for the construction of new facilities or the purchase of apparatus and equipment.

Option 5c – Township acquires all facility and apparatus assets, and operates the fire department.

Option 5c is the total transfer of fire protection responsibilities to the Township. In this scenario, the Township government becomes the service provider as well as the financial base for the service. The Township would need to be sensitive to the fire departments currently delivering service, and negotiate the transfer of responsibilities from the existing fire departments to the Township.

This option should be considered in the distant future if the fire departments cannot maintain or improve service delivery, or become financially insolvent. ESCi does not believe that the Township or the fire departments are interested in transferring responsibility for fire protection to the Township at this time and this scenario will become viable when there is a compelling reason to do so.

Recommended Long-Term Strategy

Based on the analysis and information provided, ESCi recommends that the Township and fire departments consider a combination of options that will stabilize funding and enhance future service delivery. The options recommended are:

Option 3e – Improve Daytime Response
Option 4b – Five Fire Departments Are Merged into One.
Option 5a – Fire protection is provided by an independent organization(s) to which the Township provides financial support.

The merger of all five fire departments creates an environment whereby most of the other options also succeed. Under the merger option, the consolidated organization has the strength to move forward with enhanced training, administrative, and planning functions as well as improving mutual aid and response districts. In addition, the Township government would be able to provide support to a single fire department that could be held to a high level of fiscal accountability.

Financial support provided by the Township should include funding for:

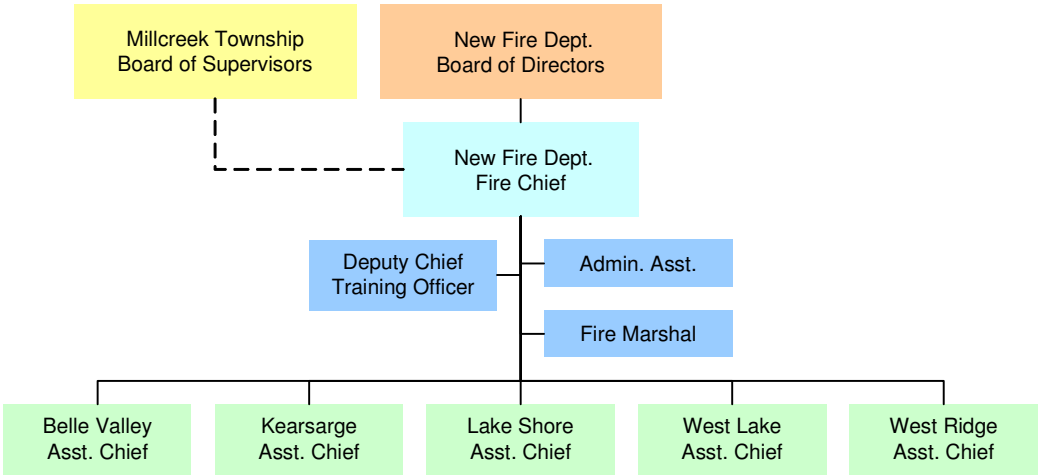
- Training & Safety (and potentially a career training officer)
- Maintenance
- General materials and services that support emergency operations
- Personnel for administrative support in the form of a fire chief and administrative assistant
- Daytime response

The Township and fire department should engage in a financial planning process to determine methods for funding future capital purchases to include facilities, apparatus, and large equipment purchases

The organizational structure of this new fire department should take into account the rank and operational structure of the current fire departments. The fire department corporate

organizations would merge into a single organization. All of the administrative, planning, training, and maintenance functions would be retained by the new organization.

Figure 136: Proposed Organization Chart



Under the corporate structure of the current fire departments, governance is vested in the membership. In this system, organizational stability is at risk if the membership decides to make an arbitrary change. In addition, operational or planning issues are subject to review by the membership, which slows the process of implementing needed changes (See short and mid-term strategies).

ESCi suggests that the new corporation be governed by a board of directors whose role is to set policy and provide direction to the fire chief for implementation of those policies. In the beginning, the board of directors should be made up of a representative from each of the existing fire departments and an equal number of positions appointed by the Township supervisors. The board would have ten seats.

The people appointed by the Township supervisors should represent a cross-section of the community to include a residents, businesses, industry, and medical representatives. A Township supervisor should not sit on the board in order to avoid the appearance of a conflict of interest because the Township is contracting with the department for service.

As the original board terms expire, the five fire department seats would be elected from the general membership of the new department. The general membership would elect the officers

of the corporation: president, vice president, secretary, and treasurer; from the ten board members. The president would not vote except to break a tie if board members were absent.

Currently, the Township fire chiefs are elected by the members of the department and can be removed by a vote of the members. Consequently, the fire chief is directly responsible to the membership. On the surface, responsibility to the organization's members appears appropriate and certainly meaningful to the members themselves. However, experience has shown that organizational planning and leadership continuity tend to suffer in this environment.

When fire services are supported by tax revenue, elected officials, and by extension, the board of directors and fire chief, become responsible to the public. Contemporary practice in this funding environment is for a governing board to select and appoint a fire chief that is responsible for implementing the policies of the governing board.

ESCi recommends the new fire chief be an employee of the Township and be appointed by the Township supervisors after conferring with the department board of directors. The current fire marshal would also be an employee of the Township, but the position would report to the fire chief.

While the fire chief would be an employee of the Township, the chief would report to the department board of directors. The contract for fire protection between the Township and the department would need to describe the relationship between the Township supervisors and the department board of directors, the responsibility and authority of the board of directors, and the authority of the fire chief. The remaining employees of the new department could be employees of the corporation.

Action Steps

The following action steps will be required to successfully merge the five fire departments into one, begin operating, and to receive financial support from the Township.

1. Form a fire protection task force consisting of representatives of each fire department and the Township.

2. The fire protection task force enters into a contractual agreement regarding the goals of the committee, communication methods, timelines, sharing of merger expenses, and member responsibilities and expectations.
3. Subcommittees are formed that focus on financial and operations issues and merger process issues.
4. Acquire the services of a certified public accountant and attorney.
5. Operations Committee:
    a. Conducts an audit of current fire department financial resources and determines the exact cost of providing fire protection.
    b. Develops an initial draft budget for the new entity that includes personal services and materials and services costs.
    c. The draft budget is presented to the Township supervisors for approval.
6. Merger Committee:
    a. Conducts an audit of current physical assets to determine values for use in the merger process.
    b. Conducts legal research regarding the most appropriate process for conducting a corporate merger.
    c. Determines which department is the surviving organization or if a new organization should be formed that the fire departments are merged into.
    d. Creates a merger proposal that Identifies:
        i. Timing of implementation
        ii. New corporate by-laws
        iii. Corporate leadership structure
            1. Ten seat board of directors, five elected by fire departments and fire appointed by Township supervisors
            2. President, vice president, secretary, and treasurer elected by fire department membership
        iv. The appointment of a career fire chief, staff, and their authority
        v. Disposition or transfer of assets
        vi. Impacts to current personnel
        vii. Organizational structure
        viii. The name of the new organization
        ix. The relationship with MPS

7. The merger proposal is reviewed and approved or modified for approval by the task force.
8. The merger proposal is presented to the members of each department by representatives of the task force and voted on by all department members.
    a. If the proposal passes – the merger moves forward and the merger committee prepares documents that meet the requirements of the merger proposal. Merger documents are presented to each department members for approval.
    b. If the proposal fails, a survey is conducted to determine the reason(s) for failure. The survey results are presented to the task force for consideration. The proposal is modified and returned to the members for approval.
9. The operations committee:
    a. Conducts research regarding financial controls, audits, and purchasing procedures.
    b. Drafts financial control procedures that will be included in the new fire protection agreement.
    c. Conducts research on administrative standard operating guidelines (SOGs).
    d. Drafts new administrative SOGs and submits to the taskforce for approval
    e. Submits draft financial control procedures to the Township supervisors for comment and pre-approval.
10. The merger committee:
    a. Develops criteria for a new fire protection agreement between the Township and fire department that identifies:
        i. Fire protection services and responsibilities
        ii. Relationship between Township supervisors and the board of directors
        iii. Authority of board of directors and fire chief
        iv. Relationship between board of directors, Township supervisors, and fire chief
        v. Number and types of employees
        vi. Performance criteria
            1. Response performance targets
            2. Financial control
        vii. Financial support
        viii. Mutual aid responsibilities

ix. EMS responsibilities

b. Presents the criteria to the Township supervisors and the task force for approval.

c. A new contract is developed from the approved criteria and the financial control procedures developed in step nine.

11. The merged fire department is formed and corporate officers are elected.
12. An interim fire chief is appointed by the Township supervisors on advice of board of directors.
13. The interim fire chief and/or the corporate leadership adopt the administrative SOGs developed by the taskforce, including financial controls.
14. The taskforce is disbanded.
15. The contract developed in step 10 is signed by the corporate officers and the Township supervisors.
16. The interim fire chief forms new taskforce(s) for the following purposes:
    a. Development of emergency operations SOG's
    b. Development of new dispatch protocols
    c. New mutual aid contracts with surrounding departments.
    d. New contract with MPS
    e. Development of a safety committee, safety manual, and safety officers
    f. Job descriptions
17. The corporate leadership:
    a. Develops the fire chief's job description
    b. Develops recruitment criteria and minimum qualifications
    c. Sets salary and benefit scale
    d. Initiates recruitment and selection process in cooperation with Township supervisors
    e. Recommends the selection of a permanent fire chief to the Township supervisors

A significant amount of work will need to be organized by the new fire chief. These activities will include:

1. Establishing and organizing office space
2. The organization and development of volunteer staff.
3. The development of staffing plans for daytime personnel.
4. The selection of an administrative assistant.

5. The organization of training resources.

Short and Mid-Term Strategies

The following strategies are offered as recommendations for improving the current system. Tomorrow's service delivery system will be very different from today. These recommendations, if followed, will help to set the stage for future success.

Foundational Policy

- The Township fire departments should develop a common set of standard operating guidelines using a cooperative committee or workgroup.

Organizational Structure

- The Lake Shore and West Lake fire departments should develop a formal organizational chart that divides responsibility among qualified officers. Unity of command and distribution of authority will achieve a more balanced span of control for the fire chief.
- The Township fire departments should develop formal position descriptions for all volunteer positions describing primary functions and critical tasks, levels of supervision and authority, and minimum qualifications.

Maintenance of History

- The Township fire departments should prepare and distribute an annual report of activities and accomplishments, and ensure adequate efforts are in place to maintain the ongoing history of their organizations.

Operating budget, funding, fees, taxation, and financial resources

- The Lake Shore, Belle Valley, West Lake, and Kearsarge fire departments should conduct an analysis of future capital requirements.

Emergency Services Staff

- The Township fire departments should develop a plan for establishing an on-call volunteer response force that will cover periods when volunteer response is insufficient.

Staff Allocation to Functional Responsibilities

- The Township fire departments should establish and codify a safety committee.
- Each Township fire department should develop job descriptions for each position in the organization.

Fire Stations

- Develop and adequately fund a long-range facilities management plan in accordance with recommendation for projected service delivery for all stations.
- Initiate efforts to correct existing deficiencies as indicated.

Fire Apparatus and Small Equipment

- Develop a cooperative purchase system between all five fire departments in the Township.
- Develop and fund a small equipment replacement program that anticipates replacement schedules and builds necessary funding in order to spread cost over multiple years.
- Review equipment to determine if duplicate equipment represents unnecessary redundancy and can be eliminated.
- Establish a record system for maintenance, usage, and repairs of small equipment.

Turnout Gear

- Develop a group purchase program to save with a volume purchase system for all five fire departments.
- Develop and fund a replacement program that anticipates replacement of turnout gear.
- Consider a group purchase of a commercial extractor and mobile turnout drying rack for all the Township fire departments.
- Establish a semi-annual inspection plan.
- Establish a record system for maintenance, use, and repairs of turnout gear.

Dispatch

- A functionally redundant dispatch site should be developed with computer aided dispatch access and encoded radio transmitter. Evacuation and transfer drills should be held at least annually.

Training

- Standardize training manuals and methods across all fire departments.
- Conduct a training needs analysis for each department, and for the Township overall, for the development of a comprehensive Township-wide training program.
- Establish consistent training goals and objectives for each fire department and across the Township.
- Establish joint training schedules and conduct joint training exercises among all Township departments.
- Each department should adopt an SOG that specifies training practices.
- Each department should adopt an SOG that specifies training safety practices.

MPS Training

- Adopt SOGs that specify training practices and safety.
- Include incident command system and National Incident Management System training in training schedule.

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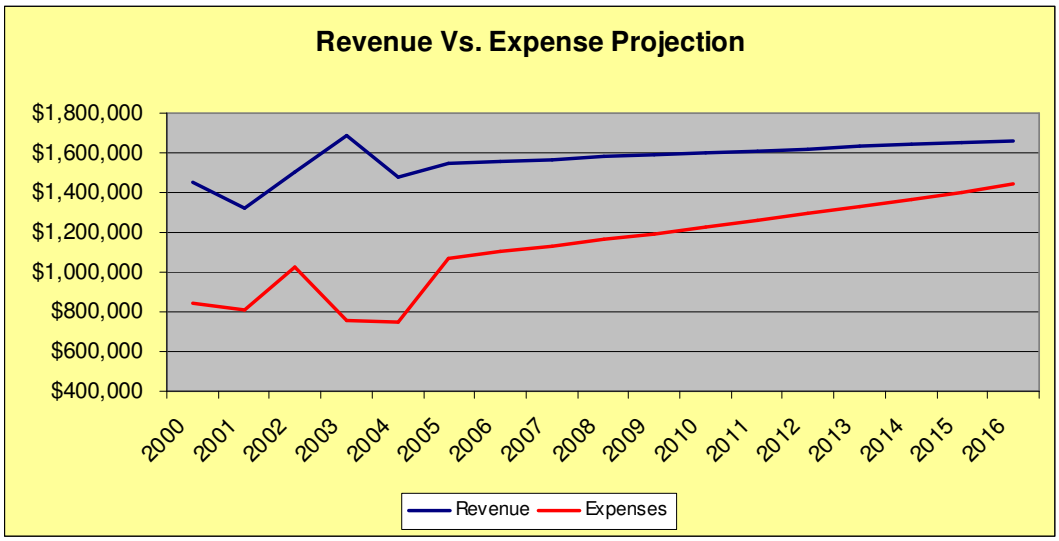
Fiscal Analysis

Fiscal analysis and planning is an important component of an emergency services planning process. Long-term survival of an emergency services system requires that the system be adequately funded. ESCi has analyzed the fiscal state of each department and has found that the departments are faced with declining revenues and increasing costs. Currently revenues exceed expenses but several of the departments are feeling the drop in revenues and Belle Valley has no cash reserves.

The following chart shows that the Township fire departments will continue to experience a narrowing of the gap between their revenues and expenditures into the foreseeable future. ESCi utilized a combination of the fire departments revenue experience and the U.S Department of Labor Northeast urban area Consumer Price Index - All Urban Consumers (CPI-U).[30] The decline in revenue was calculated at 0.65 percent based on the departments total revenue experience from 2000 through 2005. The median of the 1996 through 2006 CPI-U was used to calculate the expense projection. It was assumed that cash reserves, if any, would not be utilized.

Figure 137: Fire Department Revenue vs. Expense Projection



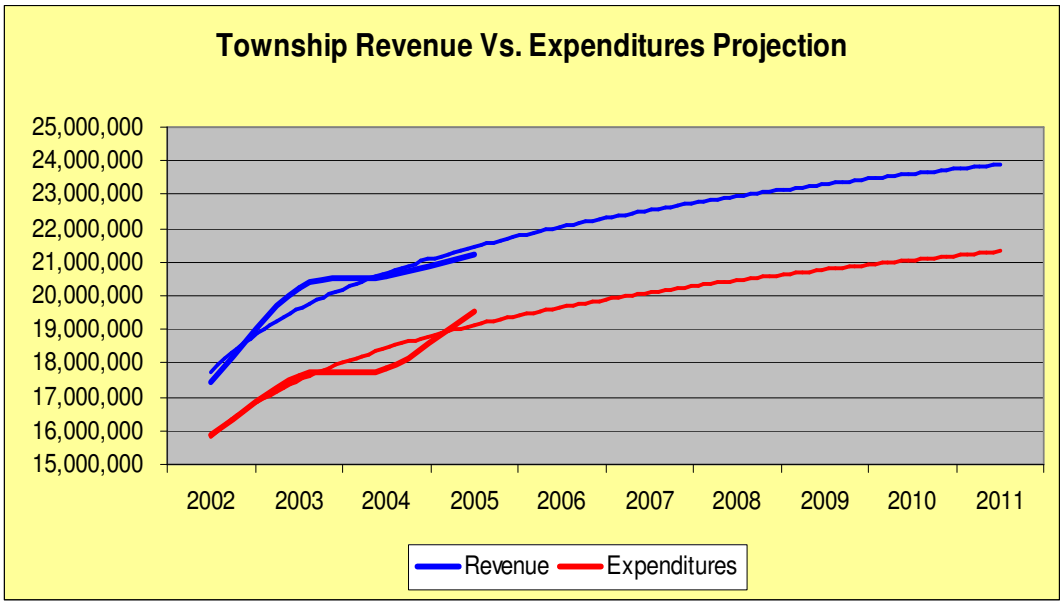
[30] http://data.bls.gov/cgi-bin/surveymost.

The cost of providing fire service to the residents of the Township is low when compared to departments serving a similarly sized jurisdiction. The current budgets for the Township fire departments are very small and there is limited spending flexibility. Consequently, each fire department will eventually be forced to utilize reserve funds, if available, to sustain the level of spending that is necessary for the effective delivery of fire protection.

In order to sustain fire protection into the future and to provide for a paid daytime response, the fire departments will have to increase revenue through fundraising or seek funding assistance from Township. The potential for increased revenue through fundraising was discussed earlier and is considered ineffectual.

The Township has the property tax capacity to fund fire protection if the supervisors were to choose to increase taxes for that purpose. In addition, the Township is currently not in danger of having its expenditures exceed its revenue.

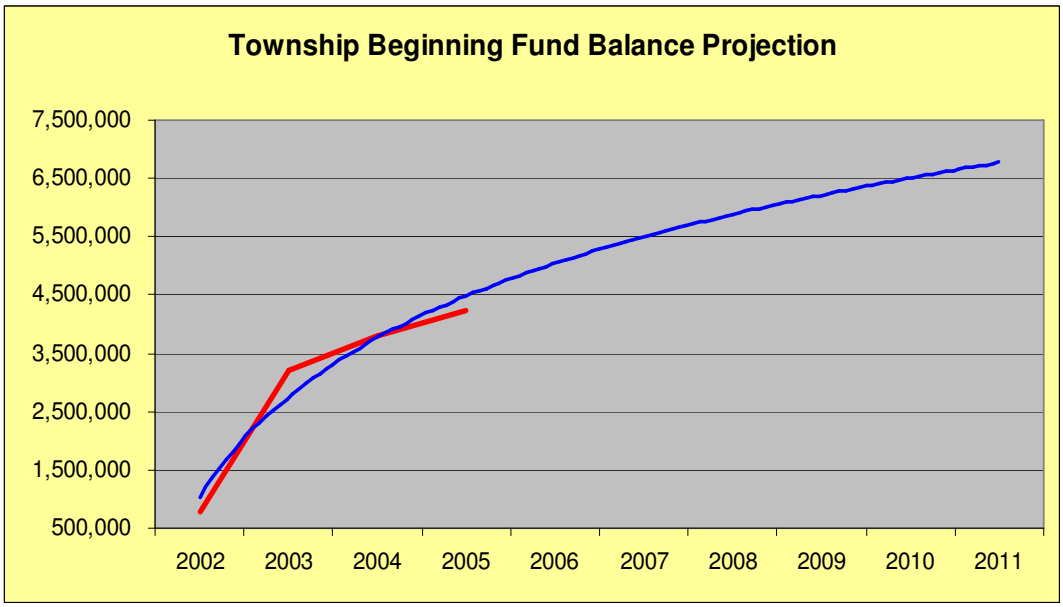
Figure 138: Township Revenue vs. Expenditure Projection



According to budget summary documents provided by the Township, the Townships general fund beginning balance that has grown an average of 12.92 percent over the past two years and at the current rate is projected to grow to over $6.5 million by 2011. The Township has reported

that a portion of the beginning/ending fund balance is appropriated and held in reserve, thus, the beginning fund balance may be somewhat skewed.

Figure 139: Millcreek Township Beginning Fund Balance Projection



ESCi is recommending that the Township stabilize financing for fire protection by providing support to a single Township fire department. ESCi also recommends that the Township provide support only if the five fire departments merge into one entity.

The current expense budgets for the five departments total $1,073,506. Included in that amount is the cost of fundraising and other non-service delivery expenses. If the non-service delivery expenses are removed, the adjusted budget is $875,430, which consists primarily of materials and services (operational) expenses.

The analysis in Option 3e – Improve Daytime Response shows that daytime response could be significantly improved with the addition of daytime personnel and ESCi developed several staffing scenarios within this option. Utilizing the materials and services budget estimated above, ESCi calculated the amount of support that the Township would have to provide, by option, and the estimated property tax rate required to fund the option.

Figure 140: Estimated Cost of Selected Options

Option 2 – Functional Consolidations	Personal Services	Materials & Services	Total Budget	Estimated Tax Rate
2a – Training Officer	$68,062	$25,000	$93,062	0.0327
2b – Admin Functions	$159,755	$18,000	$177,765	0.0592
Option 3e – Daytime Staff with Chief & Admin. Asst.	Personal Services	Materials & Services	Total Budget	Estimated Tax Rate
3 Staffed Stations Part-time	$564,211	$893,430	$1,457,641	0.4855
3 Staffed Stations Career & Part-time	$528,571	$893,430	$1,422,001	0.4736
3 Staffed Stations Career	$658,288	$893,430	$1,551,718	0.5168
4 Staffed Stations Part-time	$703,637	$893,430	$1,597,067	0.5319
4 Staffed Stations Career & Part-time	$656,117	$893,430	$1,549,547	0.5161
4 Staffed Stations Career	$829,073	$893,430	$1,722,503	0.5737
Option 3f – Nighttime Staff Incentive[31]	Personal Services			
3 Staffed Stations Volunteer	$70,200			
4 Staffed Stations Volunteer	$93,600			

The four station configuration provides that highest level of coverage for the Township at 96.35 percent, and the three station configuration also provides a high level of coverage at 83.37 percent. However, the three station coverage leaves the entire east end of the Township with longer response times during the day. From a cost standpoint, the four station coverage can be achieved at the same cost of the three station career option when utilizing a combination of career company officers with part-time personnel.

ESCi recommends that the Township support the fire department with an estimated budget of $1,550,000, which includes the cost of a career fire chief, administrative assistant, four career company officers, eight part-time firefighters, and materials and services.

In addition, ESCi recommends an incremental approach to the implementation of daytime responders. Utilizing the analysis in Option 3e, the Township could start with one station and add a station every four to six months using the following pattern:

1. West Ridge (North)
2. Move to the West Ridge (North) crew to West Ridge (South) and add West Lake
3. Add Kearsarge
4. Add Belle Valley

[31] $30 per shift incentive. Other personnel, and materials and services costs were not included.

There are several advantages to incremental implementation. Financially, the front-end cost is lower and some of the savings could be utilized to purchase turnout gear and provide training to new members. Training would be of a higher quality with smaller crews. Lastly, the implementation of career and part-time responders requires some administrative effort that would also be spread over a number of months.

ESCi was asked to provide the financial impact of an incentive for the nighttime volunteer stand-by shifts described in Option 3f. The provision of compensation to volunteer personnel is problematic. Volunteers that are compensated are generally considered employees if they receive more than 20 percent of the regular compensation of a career or part-time firefighter. If a volunteer meets or exceeds the 20 percent threshold, they are subject to federal wage and hour requirements, which raise the cost significantly.

For the purposes of this report, ESCi found that 20 percent of a full-time firefighter's salary is $3.24. A volunteer that works a 12-hour shift would be able to receive a maximum of $38.93. However, the actual compensation may be less, and thus, ESCi used $30.00 as a shift fee for the example in the previous figure.

Alternative Strategy

An alternative proposed by Township representatives would utilize an existing response force organized under the township fire marshal. The Township has organized a group of Township employees into a supplemental response force that is available for daytime response. Employees respond from their normal place of work within the Township government to assist in firefighting efforts. The Township municipal building is close to the West Lake station and the intent of this alternative is to reduce the cost of staffing the West Lake station with career daytime personnel by having this response force cover this area.

If this alternative were implemented, a cost savings, in direct support from the Township to the fire department, would be realized of between $139,426 and $170,785 per year. However, the cost of this alternative would be born indirectly by the Township in compensation for the responders, and lost productivity in their regular tasks and responsibilities.

This strategy has several positive aspects that support implementation. They are:

- The response group is already in place
- There is a minimal cost to the fire department and an overall cost savings
- The response group operates from a central location near the West Lake station

Alternatively, there are a number of issues that need to be overcome in order for the strategy to become viable. They are:

- There would be a workload impact on the responding Township employee's normal work assignment
- The absence of a key employee because of response would cause a workload shift for other employee's
- The turnout time required to muster responders would be longer than a dedicated career response force
- There would be ambiguity regarding to whom the responders were responsible to, the Township or the fire department
- Potential safety issues exist if training is not consistent with the fire department training program
- Salary issues are likely to surface regarding stand-by time or premium pay for participating as a responder
- A labor issue is likely to surface regarding salary equity if the responders job classifications and pay are different

Consequently, ESCi does not recommend this strategy as a long-term strategy.

Appendix

Fire and Emergency Medical Event Dynamics

Dynamics of Fire in Buildings

Most fires within buildings develop in a predictable manner, 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.

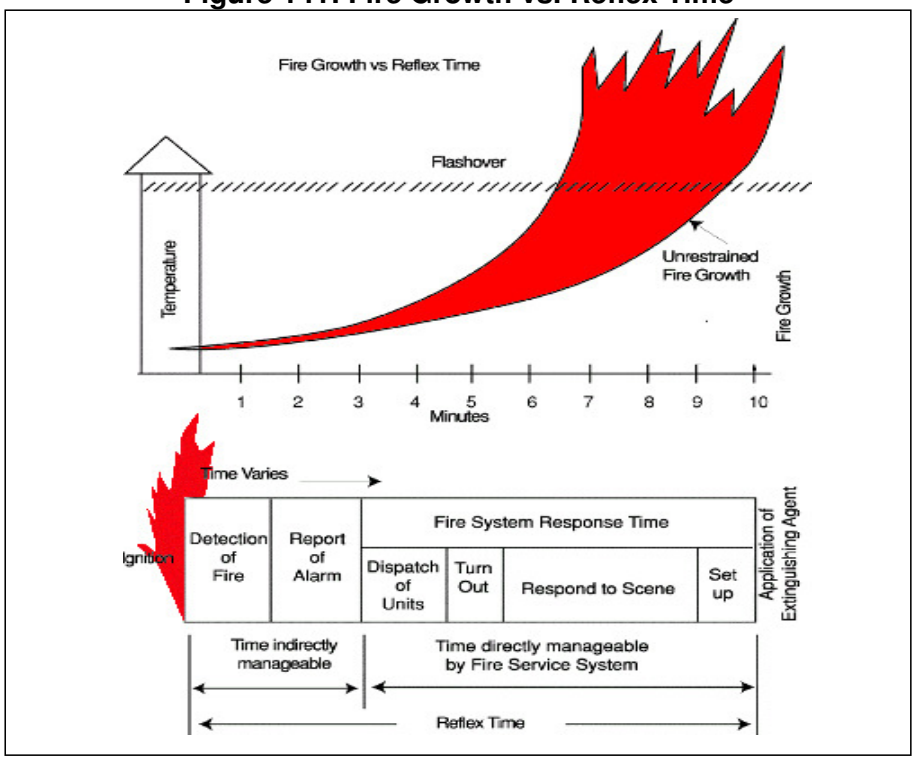
Perhaps as important as preventing flashover, is the need to control a fire before it does damage to the structural framing of a building. Materials used to construct buildings today are often less fire resistive than the heavy structural skeletons of older frame buildings. Roof trusses and floor joists 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 141: 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 a 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 sequence of event's description, 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 1994 and 1998 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 142: National Data - Fire Growth to Life and Property Loss

Fire Extension in Residential Structure Fires 1994 - 1998			
Extension	***Rates per 1,000 Fires***		
	Civilian Deaths	***Civilian Injuries***	***Dollar Loss Per Fire***
Confined to room of origin	2.32	35.19	$3,385
Beyond room of origin; confined to floor of origin	19.68	96.86	$22,720
Beyond floor of origin	26.54	63.48	$31,912

Emergency Medical Event Sequence

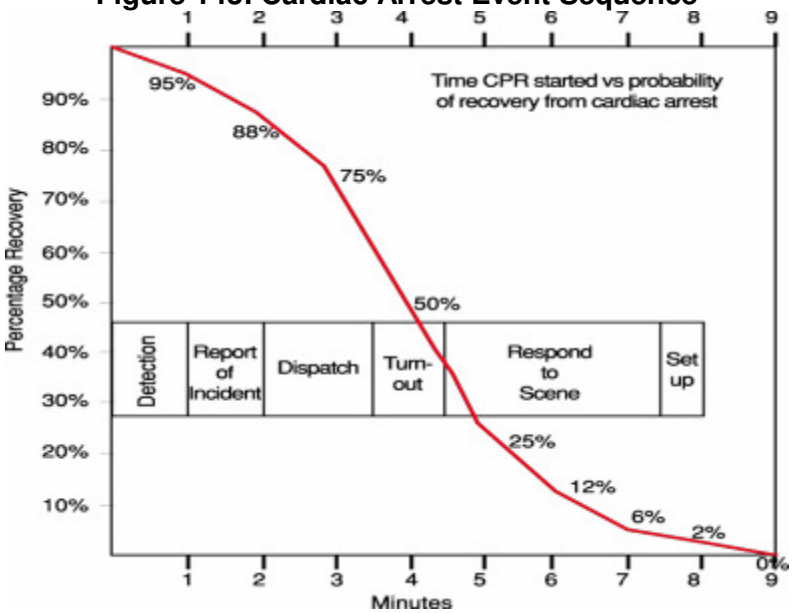
Cardiac arrest is the most significant life threatening medical event. A victim of cardiac arrest has mere minutes in which to receive definitive lifesaving care if there is to be any hope for resuscitation.

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 include 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 143: 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 degrade performance.

Apparatus Condition Definitions

Figure 144: Apparatus Condition Rating Definitions

Excellent:	Like new condition. No body or paint defects. Clean compartmentation. Interior cab complete and in full working order with no modifications. No significant defect history. Age is less than 25% 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% 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% 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% 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% of life expectancy. Vehicle exceeds its GVWR.