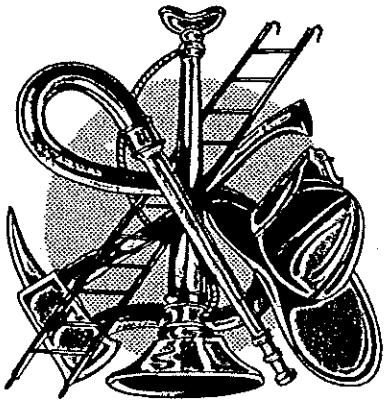
FIRE MANAGEMENT 2D

Master Planning
Student Manual



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STUDENT MANUAL

OFFICE OF STATE FIRE MARSHAL

COMMUNITY FIRE PROTECTION:

MASTER PLANNING

SUNVILLE

MANAGEMENT 2D - MASTER PLANNING

FORWARD

This course is designed for Chief Officers, Company Officers, Fire Service Mangers, City/County Administrative Officers and Planners.

This course provides participants with information and workshop exercises designed to develop skills in community-based master planning. This planning includes a definition of service demands and capabilities, forecasting, systems design, and systems analysis. Techniques for developing broad community understanding and support for fire protection, emergency medical and hazardous materials control programs are an integral part of the course. The process emphasizes the cooperative use of public and private resources.

The Master Planning process can increase the effectiveness of communities in managing risks by combining the use of technical analysis with community involvement in the decision making process. The Master Planning process provides a systematic approach to evaluating and selecting technical options that will best meet a community's risk management needs, given the available resources and the approval of community leaders in making risk management decisions.

When completed and implemented a community fire protection master plan should provide clearly defined and approved levels of service, risk and cost.

The **PREREQUISITES** for this course are: Management 1 and Management 2A (recommended).

This course applies to **CHIEF OFFICER** certification.

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UNIT 1: INTRODUCTION

OBJECTIVES

The participants will initiate communication with other class members which will facilitate workshop interaction.

INTRODUCTION

This course is intended to provide fire department officers with the capability to plan and manage the local fire protection system. Upon completion of this course, the student should be capable of organizing and coordinating the development and implementation of a community fire protection master plan for his/her community.

Lectures, audiovisual presentations, and group activities are used to provide a working knowledge of the master planning process. The course is designed to minimize lectures and maximize learning through exercises. The exercises enable the students to apply the master planning concepts to a sample community.

The student will receive instruction regarding standard planning and analysis techniques related to the ten-step planning process. Although understanding the technical process of planning is essential, an even greater effort must be devoted to the political aspects of planning and management. This course emphasizes the development of techniques for managing the political aspects of planning.

The ten steps of the planning process are:

Step 1: Decide to plan.

Step 2: Organize for planning.

Step 3: Collect and analyze data.

Step 4: Define goals and objectives.

Step 5: Define requirements, programs, and systems.

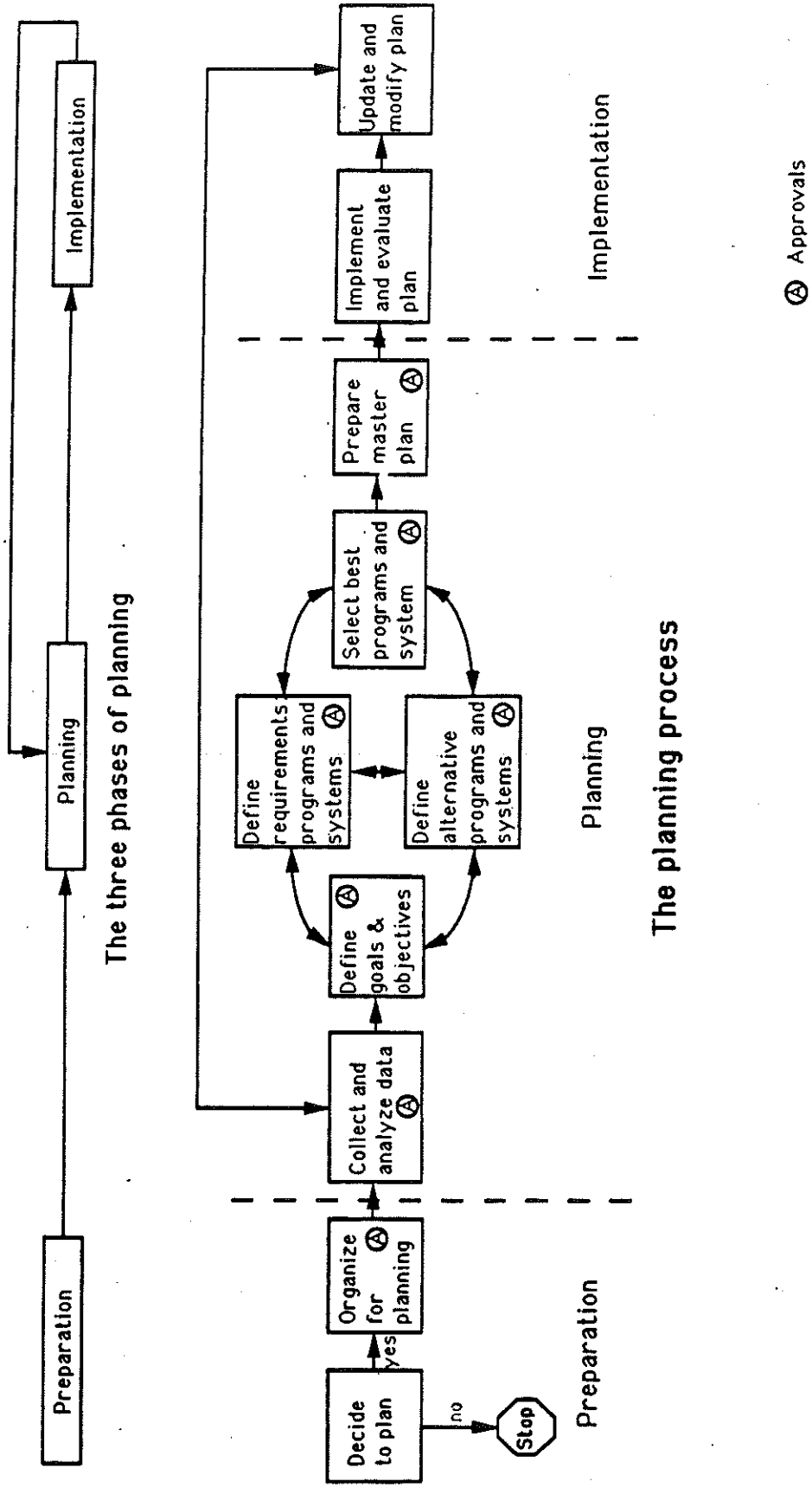
Step 6: Define alternative programs and systems.

Step 7: Select the best program and system.

Step 8: Prepare a master plan.

Step 9: Implement and evaluate the plan.

Step 10: Update and modify the plan.


Preparation
Planning
Implementation
The three phases of planning
Decide to plan
no
Stop
yes
Organize for planning
Collect and analyze data
Define goals & objectives
Define requirements programs and systems
Define alternative programs and systems
Select best programs and system
Prepare master plan
Implement and evaluate plan
Update and modify plan
Preparation
Planning
Implementation
The planning process
Approvals

PARTICIPANT AND INSTRUCTOR INTRODUCTIONS

Participants will be asked to introduce themselves to the group.

- *Name.*
- *Fire department.*
- *Position.*
- *Fire department special assignments/responsibilities.*
- *Planning experience.*
- *Hobbies/interests.*
- *Reason for attending.*

UNIT 2: MASTER PLANNING OVERVIEW

OBJECTIVES

The participants will:

1. *Identify the benefits of master planning.*
2. *Gain a general knowledge of the purpose and methodology of the ten-step planning process.*
3. *Define the concept of a "fire protection system" which consists of public and private agencies in which the fire department is one of the agencies.*

NOTE-TAKING GUIDE

NEED AND BENEFITS OF PLANNING

There is a need for each fire department to develop a master plan.

The process is 60% political and 40% technical.

Three levels of planning.

STRATEGIC PLANNING IN THE PRIVATE SECTOR

Purpose.

This video identifies the importance planning plays in business and how it is employed by some of the largest corporations in the world.

THE BUSINESS OF MANAGEMENT

PLANNING AND THE MANAGEMENT PROCESS

A. How does this video apply to the fire service?

B. How is the fire service different?

C. Planning is "Preparing for tomorrow, today."

D. Steps of the planning process are basically similar.

Methods and strategies can vary; there is no single method for every situation.

E. Strategic Planning

Tactical Planning

Operational Planning

F. No budgeting process makes sense without a road map of where you are going.

G. Strategic Planning

Considers a number of key parameters.

What are the needs criteria of the public?

H. AT&T

A monopolist which was required to change. How is the fire service like AT&T (past, present, and future)?

I. "All organizations share a common need, the need to plan."

J. Who are the stockholders?

K. Who are the stakeholders?

"You can't figure out where you want to go unless you know who you are today."

L. "Managers who rely on policies that have evolved as guidelines over the years, based on past historic approaches, can no longer cope or deal with future uncertainties."

M. Uncertainty is one of the greatest reasons to plan.

N. The need for flexibility is a reason to plan.

O. Organizations function best where there is a sense of direction that is well understood throughout the organization.

P. "Where there is no sense of long-term direction, I find that good people leave."

What is our market share?

If you asked your members to identify your plan, what would you hear?

INTRODUCTION TO THE PLANNING PROCESS

Preparation

Approval

Planning Team

Advisory Committee (Review Committee)

Management Team

Planning

Data

Problems/Concerns

Alternative Programs

Requirements

Selection

Writing the Document

Implementation

Action Plans

MASTER PLANNING OVERVIEW

ACTIVITY 2.1

PROBLEMS FACING THE FIRE SERVICE

DIRECTIONS:

DEVELOP A LIST OF THE TEN MOST SIGNIFICANT PROBLEMS THAT YOU THINK WILL FACE THE FIRE SERVICE OVER THE NEST 10 YEARS.

1. PRIORITIZE THE FIVE PROBLEMS.

2. LIST THE PROBLEMS ON FLIPCHART PAPER.

3. APPOINT A SPOKESPERSON TO PRESENT THE GROUP'S FINDINGS TO THE CLASS.

PRIORITY	PROBLEMS
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

AFTER THE PRESENTATIONS ARE COMPLETED, THE INSTRUCTOR WILL:

1. IDENTIFY AREAS OF AGREEMENT AMONG GROUPS.

2. HOLD A BRIEF DISCUSSION TO IDENTIFY REASONS FOR AREAS OF DISAGREEMENT AMONG GROUPS.

3. DISCUSS THOSE PROBLEMS WHICH HAVE A HIGH POTENTIAL FOR SOLUTION AS A RESULT OF MASTER PLANNING.

FIRE PROTECTION PLANNING--THE CONCEPT

If you ask most citizens in a community what they receive as fire protection from the fire department, they will tell you that it has primarily to do with the response to fire incidents after they occur. If you ask most fire departments what their role is, most firefighters will talk to you in terms of fire suppression. In fact, 80% to 90% of most fire department budgets go to fire suppression. It is viewed as an after-the-fact response to an emergency incident.

However, the role of fire departments has been expanding over the last few years to include transportation, emergency medical, and hazardous materials incidents and involvement in land development and building construction. There have been improvements in building construction such as increased use of sprinklers. There are also increased problems such as the use of prefabricated trusses in residential occupancies. Fire department functions have broadened beyond the historical role of fire suppression.

There is a misconception that the fire department can do it alone. A fire protection system exists in every community. It may or may not function as positively as it should. In order to provide effective and efficient fire protection, all of the elements such as building department, law enforcement, and water department must perform their proper function within the fire protection system. In fact, the fire department cannot provide fire protection without the full support of these agencies.

A fire protection system has required characteristics. Those agencies that make up the fire protection system must understand their role; they must commit themselves to certain fire protection results; they must have general community support, and all agencies within the fire protection system must be mutually supportive.

Residents can perform certain functions within the fire protection system if they are prepared and properly educated. They can learn to control a small kitchen fire by placing a lid on a pan on a kitchen stove. They can control car fires and smaller fires if they are knowledgeable and trained in the use of a fire extinguisher. However, fires can quickly exceed the capability of the homeowner and require the services of organized fire departments which are generally effective in controlling fires in small buildings. However, fires grow quite rapidly to the point where they exceed the capabilities of the first responding fire units and, frequently, it is necessary not only to use all the forces within the fire department, but also to use neighboring fire departments. However, there is a basic principle here that **all nonsprinklered buildings are at risk of total loss regardless of the amount of firefighting resources available**. There are some buildings that are clearly beyond the fire control capabilities of any fire department. The Sao Paulo, Brazil high-rise fire is one example. As he approached from about 2 blocks away, the first-arriving officer evaluated the conditions. He then stopped the engine, got off, and knelt down beside the engine for a few minutes; then got back on the engine and went on to the fire. This was probably the most effective thing he

did all day because he and the Sao Paulo Fire Department waited for the building to burn down to their firefighting capability which was relatively limited.

In fact, if a city's fire protection system is based upon the after-the-fact response, a horse-drawn fire engine may characterize its fire protection capability when faced with major fires such as high-rise. Use of the horse-drawn fire apparatus is just as effective on the Sao Paulo fire as modern firefighting resources.

Over the years the results of the nation's reactive fire protection system is that we have had major losses in this country because of the unrealistic expectation of the effectiveness of fire suppression. Most major cities in this country have burned down at least once. San Francisco, for example, has burned down five times. In the late 1800's the insurance industry became concerned about the conflagrations in our cities and started promoting built-in fire protection such as fire-resistant construction, building codes, more effective fire control by fire departments, and the installation of sprinkler systems. As a result, conflagrations have almost disappeared and the commercial and industrial losses have been greatly reduced. In fact, the records of the Factory Mutual Insurance Company show that in the 1860's, prior to the installation of the sprinkler systems, commercial and industrial losses averaged 30 dollars for every 100 dollars insured value. By the 1970's, as a result of the installation of sprinkler systems, their losses were 2 cents to 3 cents per 100 dollars of insured value. It should be noted that a constant rate has been maintained for residential losses primarily because neither insurance industries nor others in the fire protection system have shown an interest in these losses.

The United States has the worst fire record in the world when measured in terms of the number of building fires per thousand people and also the number of fire deaths per million population. Why should the United States have such high fire losses when so many resources are invested in fire protection? There are three primary factors. The public attitude in other countries, the legal responsibility of those who start fires in other countries, and the general approach to code enforcement. The city of Tokyo, which is four times the size of Los Angeles, has one quarter the number of fires as the city of Los Angeles. Although they operate under the same building codes, there is a different cultural attitude in Japan. Having a fire in Japan has a social stigma attached to it. People who have fires receive pressure from their neighbors and sometimes are required to move out of their homes. This attitude has a long history in the Japanese culture. If you have a fire in this country, people commiserate with you and bring you pies and cakes and help you recover from the fire. In Japan, you become a social outcast. Also, although Japan has volunteers in its rural areas to provide fire suppression, it also has a large number of volunteers both in metropolitan and rural areas to provide fire safety education. There are 8,000 fire safety groups in the city of Tokyo operated primarily by housewives and children.

In summary, foreign countries have a higher level of public fire safety education. There is greater cultural pressure regarding fires. There is a higher level of

code enforcement, and people are held legally responsible for the fires they start.

The history of hotel fires in this country paints a typical picture of our primarily reactive approach to fire protection. We have built our cities and the structures in them without a large degree of concern for fire protection. Then, after we have major incidents, we go back and try to fix the system. The Wyncoff hotel fire which occurred in Atlanta is typical of the hotel fire experience. This fire had a life loss of more than 200 people. The structure had open stairways, high flame spread in hallways, and transoms over doors of minimum fire resistance. There was no fire alarm system or sprinkler system and fire suppression was essentially ineffective.

In the 1980's there was a series of high-rise fires, including the Las Vegas Hilton, the Stouffer's Inn, and the West Chase Hilton--all of which had high life loss.

The MGM Grand fire in Las Vegas also occurred in this period. Something happened as a result of this fire. There was an increased public awareness that sprinklers were required in high-rise buildings. Like the Vietnam War, we saw the dramatic occurrence on television and public expectation changed as a result of viewing this disaster.

The MGM building was partially sprinklered. The casino area suffered almost total loss. It should be noted that the velour wall covering in the hallway leading to the convention center was intact because there was a sprinkler system in that hallway. This fire also reinforced the concept that fire-resistant construction was unable to control the rapid spread of fire without the assistance of an automatic sprinkler system.

The unrealistic expectation that fire-resistive construction prevents smoke spread was adequately demonstrated in this fire. The fatalities from the toxic by-products of the fire were found on the upper floors of the structure. In some cases there was heavy concentration of smoke; in other areas there was light concentration of smoke but fatal levels of CO.

In years past when smoke rose in buildings, people had some opportunity of going to windows to obtain fresh air. Modern building construction now encloses the building with windows that cannot be opened. Also, air-handling systems may spread the smoke throughout the building. There is an unrealistic expectation that the smoke-removal systems in high-rise buildings are effective. Fire incidents and fire tests have raised serious doubts about the effectiveness of smoke-removal systems. One series of tests on operation of smoke-removal systems in San Francisco evaluated these systems in high-rise hotel buildings and documented serious concerns about their effectiveness.

As a result of the MGM fire, major retrofits of high-rise hotels commenced in this country. The state of Nevada adopted a retrofit sprinkler ordinance. The city of Honolulu adopted retrofit sprinkler ordinances, and the Mariott Corporation

retrofitted all of the hotels in its system. The reason was public expectation that hotels should be sprinklered and the industry was responding to that expectation. New technology, e.g., the introduction of plastic pipe, in the sprinkler industry enabled sprinkler systems to be installed at relatively low cost and without damaging the aesthetics of hotels. Insurance reductions were significant. In Honolulu it was commonly found that a 75% reduction in insurance costs was obtained and up to a 35% reduction for contents for hotel structures. There was a business incentive as well as a popular demand to sprinkler these facilities. However, a large number of unsprinklered high-rise structures still remain. Fatal fires in high-rise occupancies continue to occur, such as the high-rise hotel in Puerto Rico, and the Cathedral Hill fire in San Francisco. Proposed ordinances have been unsuccessful. Although highly supported by the mayor of San Francisco, an ordinance was rejected in that city after the Cathedral Hill fire. It is significant to note that the owners retrofitted the hotel where it was reconstructed.

The fire loss prevention capability of suppression forces is limited. At best, firefighters can confine a fire to the building or area of involvement upon arrival. Life loss usually occurs prior to the arrival of the fire department. Effective life saving rescues by fire departments are rare. **Buildings, contents, and occupants of unsprinklered buildings are at risk of total loss to fire.**

This has been true since the time of Currier and Ives. Unrealistic expectations of fire suppression have a demonstrated history of unacceptable losses to property, and lives, including the lives of firefighters.

The typical reflex time chart is used to demonstrate the reactive capabilities of fire suppression in after-the-fact response to fires. If we take the typical reflex time and say that a fire will be detected within 1 minute after it starts, the detection process will be completed in 1 minute; it will take a minute-and-a-half to complete the alarm; that is, the receipt of the alarm by the dispatch center and notification of the fire stations; it takes 20 seconds for the fire apparatus to get out of the station; 2 minutes to respond; a minute-and-a-half to set up; and a minute to get water on the fire. Most firefighters would say that that is optimistic, although here we call it typical. What that response is intended to do is control fires prior to flashover. That is the point at which the interior contents of the building reach self-ignition at about 800°F. In order to prevent flashover the temperature must be controlled within a given period of time.

In this example, flashover occurs according to the standard time-temperature curve as the fire department is going out the door, which is approximately 4 minutes after ignition. This standard time-temperature curve is, however, a theoretical curve used in building materials testing. A more realistic curve was developed by the Los Angeles City Fire Department in its Operation School Burning tests after the Our Lady Of The Angel school fire in Chicago. This curve indicates that flashover occurs in approximately 7 to 8 minutes. This time-temperature curve has been validated by numerous lab tests. It appears to be a good average time to use for this analysis.

Other fires--flammable liquid fires, or fires in areas of highly combustible contents--have such a rapid rate of development they are detected at flashover. One of the answers to this flashover control problem is the use of automatic sprinkler systems. In the case of a sprinklered building, when the temperature rises to approximately 200°F, the sprinkler head activates. Time is no longer a factor and the temperature never reaches the flashover point. The generation of toxic gases is maintained at a safe level. Some of the concerns about sprinklers in the past have included excessive water damage, expensive installation, and damage to aesthetics. "It can't happen to me," and other resistance comes from those who just don't want any more governmental regulation. This is why we say that in planning, 40% of fire protection planning is technical to prove the technical aspects of the performance of such systems. But 60% of the master planning process is educational and political, in order to overcome myths about the capabilities of manual firefighting and myths that relate to the effectiveness and costs of built-in fire protection.

There are numerous other myths, such as the myth that aerial ladders provide a capability for life safety. It turns out that aerial ladders are effective in fire control by assisting the fire department to limit the spread of fires and enable occupants to escape by the normal paths in the building. But there is a myth held by many that large numbers of people can be evacuated by aerial ladders. There is significant evidence that this is not possible. There are other myths that aerial ladders are effective in high-rise firefighting. This is not always true.

The fire growth versus reflex time should be considered in the design of a fire protection system. There are manageable elements of the system which can be controlled. It is possible to control the time of detection of the fire. It is also possible to control the reporting of the alarm, either by educating the public or by installing automatic alarm systems. It is also possible to directly control the fire service response time by controlling the automated dispatch system. Response time can be reduced by adding fire stations. Setup time can be reduced by better training of the firefighting forces. The ability to control setup time is limited, tends to be expensive, and still must contend with the 7- to 8-minute flashover period. You may arrive at the base of a high-rise building within 4 minutes and have a possibility of controlling flashover. Yet it may take you 20 minutes to an hour to reach the fire floor. The results are obvious--flashover is going to occur.

Where is our firefighting problem generated? The building code establishes the fire control problem; it also provides unrealistic expectations. The features of the standard building code provide only a minimal level of fire protection. Building code provides allowable floor areas based upon the occupancy type and risk, fire resistant construction of the building, and the height of the structure. These requirements establish fire areas, fire flow, and resource requirements which we can calculate. It can also be stated that the areas within these fire walls are acceptable risks. The problem is that these factors are not considered in the development of allowable fire areas. People who write codes have never thought of these areas in terms of fire risk, allowable fire areas, or the fire flow and resource requirements of the fire department. The fallacy is

that the structural requirements will provide adequate protection for large or small cities despite their level of firefighting resources. In order to analyze these unrealistic expectations, we have calculated the personnel required to deliver the required fire flow to these areas. If you set a goal to control a fire within a building within 5 to 10 minutes after the arrival of the fire department, you need a certain fire flow capability which can be calculated using the ISO fire flow formula. In the case of a single-family dwelling which requires approximately 16 personnel, fire departments are typically effective in extinguishing fires within 5 to 10 minutes. However, in a fire-resistive public assembly building of 22,500 sq. ft., the fire department would have to arrive with 90 personnel in order to accomplish the same results. This is obviously unrealistic. No departments that we know of are capable of providing 90 personnel on the scene within 5 to 10 minutes. Therefore, the result is that the fire either spreads to other areas or the fire department waits for the fire to burn down to its firefighting capabilities.

Many features within the fire code provide unrealistic expectations. High-rise building construction allows smoke to spread and fire walls and fire doors may fail because of improper installation or maintenance.

Efforts by the insurance industry have eliminated the use of combustible roofs in industrial and commercial occupancies. The results of combustible roofs on single-family dwellings are dramatic. They have allowed the multiple destruction of single-family dwellings; this is increasingly evident in the wildland/urban interface fire problems that we are experiencing in all states in the nation.

There are alternatives to combustible roofing just as there are alternatives in other construction features. Fire-retardant roofing materials provide aesthetic, economic, and firesafe benefits.

We know that smoke detectors provide effective life safety service. Residential fire safety has been improved through the use of smoke detectors. Many building codes in this country now require smoke detectors in all structures. The report *America Burning* was the force behind this movement. The smoke detector industry initiated public education regarding the installation of smoke detectors. Fire departments supported it. However, now that the market has been saturated, the smoke detector industry has discontinued its public education programs and we now have major concerns regarding the effectiveness and maintenance of these smoke detectors, many of which are 8 to 10 years old. We are beginning to see failures. It is time for the fire service to conduct a major public education program which focuses on maintaining. and testing of smoke detectors.

So one of the things that we should consider in a fire protection master plan is the realistic capabilities of firefighting forces. It is very possible that by the time the apparatus is leaving the station, the fires have exceeded their capabilities and the fatalities they had hoped to prevent have already occurred.

If the fire department responded with a hand-drawn fire apparatus to a fire in a high-rise building it would probably be criticized by the citizens of the community, although the expectations of the modern fire department should not be more than the hand-drawn fire apparatus in relation to high-rise buildings and many other structures.

Unless adequate levels of building protection are provided, unrealistic expectations of the effectiveness of these firefighting capabilities will continue to produce unacceptable fire losses.

We must remember that the fire service is faced with more than firefighting activities. Emergency medical, hazardous materials, building construction, and code enforcement are growing functions in the fire service.

Fire departments started providing emergency medical services to care for their own personnel who were injured and to provide services at accidents, particularly transportation accidents. The level of expectation regarding emergency medical services increased with the television series "Emergency" and the installation of 911 systems.

Some fire departments have assumed a larger and larger role in the EMS system, some becoming involved in Advanced Life Support systems (paramedic systems). In most fire departments today, 60% to 80% of the fire department's activities relate to emergency medicine. It is significant that fire departments did not plan this, but merely reacted to demands for service. It is having a major impact on volunteer fire departments. Increased activities have resulted in employer resistance to the frequency of employees taking leave from work to provide emergency medical services. Increased training requirements make major demands on the time of volunteers. Exposure to contagious diseases is increasing. There are major family impacts when people are required to spend more and more of their time in training and responding to emergency medical incidents. In today's world when both spouses tend to be employed, time spent at home is becoming more and more precious. The ability to provide a 24-hour EMS with volunteers is becoming more difficult. The key factors here are that we did not anticipate the requirements of this service and we did not control the level of service that we are now providing. Many fire chiefs would prefer not to be as deeply involved in EMS as they now find themselves.

We also find that there is an EMS system within which the fire service participates. And if we look again at the reflex time we find that the fire departments by themselves may have a difficult time being effective in worst case conditions such as cardiac arrest. It is necessary to gain the support of others in this system. A trained citizenry can improve the effectiveness of fire departments by 20% in response to cardiac arrest as has been proven in the city of Seattle. There are also restrictions placed upon the fire departments by the medical profession both in terms of legal constraints and operational constraints.

The other major program in which the fire service is becoming involved is hazardous materials control. Incidents such as the Crescent City, Illinois, explosion demonstrate that firefighters are being drawn into a hazardous materials program in a manner similar to that of EMS. The fire service is being exposed as the first responder to spills and to new hazards. Increased training requirements are being legislated, including Title III SARA requirements and certain state requirements.

There is an increased exposure to all communities. No one today is immune to exposure to hazardous materials. Most communities have railroad systems which carry large volumes of hazardous materials and present significant risk.

Legislation is being adopted which places more and more responsibility and training requirements upon the fire department to protect its citizens and its firefighters. Managers must evaluate the extent to which they desire to be involved in hazardous materials. It is possible that others should perform the task that the fire service is assuming.

The fire service is being backed into a corner. More services are being demanded without corresponding increases in resources. Funding for the increased demands of services has not kept pace. There is voter resistance to increased expenditures at local government levels as demonstrated by Proposition 13 and other expenditure controls.

Other regulations are placing requirements on fire departments without consideration for funding. Local governments in general are being asked to increase services and cut costs. It is called *local government squeeze.*

Even when funds are available there are competing priorities. The local governing bodies perceive many problems that must be solved with the public safety dollar: crime, drugs, the AIDS epidemic--all issues that demand funding out of the public safety dollar. The fire problem may not be perceived as being as high a priority as these other issues since local government tends to respond to complaints. The fire department may receive a low priority because few complaints are received. The fire service may see the need for a fire station. The medical profession may see the need for a hospital or clinic; and, from what we hear about the impending costs of the AIDS epidemic, a higher and higher priority is going to be allocated to medical services. It should be remembered that the fire service receives few complaints about its service. In general, most politicians will consider fire protection services to be adequate for that reason.

It is necessary that in the process of planning, the fire administrator demonstrate the benefits of control versus reaction; that there is a need for a fire protection system; and that a cost/risk management system can be effective for a community.

In order to do this it is necessary to define the acceptable cost. What is the community willing to pay for fire protection? What risk is the community willing to accept? The community will probably accept more risks than the fire chief is

willing to accept. What is the proper balance? That must be determined through the process of negotiations and evaluations. The acceptable levels of cost and risk will establish the levels of service that the community and the fire service jointly accept as reasonable for that community. We believe the process to accomplish this is contained in the master planning process.

UNIT 3: SUNVILLE OVERVIEW

OBJECTIVES

The participants will:

1. *Identify data elements relevant to fire and EMS planning.*
2. *Use historical incident information to ascertain present concerns and project future fire service needs.*
3. *Identify reliable sources of relevant data.*
4. *Organize data so it can be analyzed to forecast future fire service needs.*
5. *Define fire demand zones.*
6. *Establish baseline data for future evaluation.*
7. *Identify the two evaluation methods of assessing fire station locations.*
8. *Identify the spheres of influence and the methods of their determination.*
9. *Identify a manner in which this information can be conveyed to a council or other decision-making group.*
10. *Define the purpose and process of determining the relative level of risk in the community based upon what there is to burn.*
11. *Identify a method of determining the level of service provided with the present service model.*

NOTE-TAKING GUIDE

DEVELOPMENT AND USE OF FIRE DEMAND ZONES

Data requirements.

Divide the data into smaller geographic areas to simplify the analysis.

The factors for FDZ development are:

A simple definition of an FDZ is a geographic area used to collect and maintain data for planning.

Potential additional uses may be:

Development of FDZ.

Fire management area (FMA).

FIRE STATION LOCATION ANALYSIS

Fire station location is important in that it usually represents the point from which most emergency services are initiated.

Fire station location is one of the main elements in every fire station plan.

Analysis of the location(s) of fire stations, actual or planned:

Two evaluations:

Approach determines the area served by each fire facility.

Average vehicle speed.

Fire station service area maps.

Response map analysis.

Coloring of maps.

ANALYZING THE PRESENT SITUATION--RISK ANALYSIS

Introduction.

Benefits of risk analysis:

Fire risks defined:

Categories of risk:

Factors to consider when determining risk:

Kinds of risk:

Risk may cause loss of:

Risk modifers:

Risk analysis application.

ACTIVITY 3.1

SUNVILLE DATA ANALYSIS

BACKGROUND

The objective of this activity is to provide you with an overview of the community of Sunville and with experience in working with data formatted in this manner.

The analysis process selected is based on the concept of questioning and comparing the various data elements prepared in order to determine the areas of concern (problems) associated with fire services in Sunville. Do not confuse this planning process with those that are solely confined to addressing problems. A concern (problem) may arise from an assessment of present response in capability in relation to stated goals and objectives.

DIRECTIONS

First select a recorder and a lead person. Then, working as a group, read each question carefully and formulate your responses. Some of the questions may be answered by a simple yes or no, while others may require more detailed analysis and comment. It is suggested that you view your group as the planning team of Sunville and approach this task accordingly. This analysis will form the basis for the remainder of the work you will be doing this week.

As groups work at different rates and to varying depths, the instructor will advise you as to your progress related to the time allotted for this exercise. It is suggested that you stay relatively general in your analysis approach at this time.

Record your answers in any manner that will document your findings. You will be asked to report to the remainder of the class.

Summary of Steps in Data Analysis Activities

Step 1	Select a recorder of information.
Step 2	Read the directions completely.
Step 3	Identify the lead person for this exercise.
Step 4	Start with Question Set 1.
Step 5	Complete through Question Set 6.

Break for Lecture.

Step 6	Continue with Question Set 7.
Step 7	Place the laundry list of problems on a flipchart. Question Set 12.

MAPS AND OVERLAYS

There are seven laminated colored maps with nine clear overlays available for the analysis of Sunville. The data comparisons suggested in this set of questions are not intended to represent a complete analysis, but are offered as a starting point, or examples of one way in which data may be analyzed.

There are seven laminated maps:

Map 1	Land Use
Map 2	Historical Development
Map 3	Population
Map 4	Assessed Valuation
Map 5	Transportation
Map 6	Future Land Use
Map 7	Water Distribution System

There are nine overlays placed on clear plastic:

OVL 1	Fire Demand Zones
OVL 2	Average Fire Flow Required and Available for the FDZ
OVL 3	Case Studies
OVL 4	Fire Incidents/Working Fires
OVL 5	EMS Incidents
OVL 6	Public Facilities
OVL 7	Five-Year Incident Forecast (Fire and EMS)
OVL 8	Target Hazards
OVL 9	Five-Minute Sphere of Influence

Familiarize your group with all of the maps and overlays prior to starting.

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #1 - Land Use Patterns

It is advantageous to know the relationship land use plays in the community when preparing a fire master plan. The following questions are designed to identify/clarify the role land use plays in Sunville.

A. Examine map #1 - Land Use.

1. Locate and identify the various land use categories of Sunville.

2. What is their relationship to the physical features of Sunville?

B. Place overlay #1 (FDZs) and overlay #4 (Fire Incidents) over map #1 (Land Use).

1. Describe the relationship between the demand for service (total alarms) and the different land uses.

2. What is the relationship between working fires and the various land uses?

C. Place overlay #3 over map #1. Note overlay #1 may be used with all other overlays to indicate which FDZ the data represents.

1. Compare the case studies provided to the various land use patterns.

2. What is the relationship of working fires, fire severity, and land use patterns?

D. Place overlay #5 (EMS incidents) over map #1 (Land Use).

1. Describe the relationship between the demand for EMS services and the different land uses.

2. Is there a relationship between the location of the hospital, the demand for service, and the fire station?

Note: Fire Station is located in SE 6.
Hospital is located in SE 9.

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #2 - Historical Development

As communities develop over time, a variety of influences affect their construction and use and, therefore, their fire potential. Differences in building codes, construction materials, construction techniques, levels of economy, and social values all play a role. The following set of questions is designed to clarify the role historical development plays in fire protection services.

A. Examine map #2 - Historical Development.

Locate and identify the various historical development trends of Sunville.

B. Place overlay #4 (fire incidents) over map #2 (historical development).

1. What is the relationship between the demand for service (total alarms) and the historical development of Sunville?

2. What is the relationship between working fires and historical development?

3. Compare the fire case studies to the historical development of Sunville. (Place overlay #3 over map 2.)

C. Place overlay #5 (EMS incidents) over map #2 (historical development).

What is the relationship between the demand for EMS service and historical development?

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #3 - Population

As the old saying goes, "There are three causes of fire...men, women, and children." Knowing the degree to which the inhabitants of a community affect its fire problem can be extremely helpful when developing a fire master plan. The following set of questions deals with the impact of population on the fire needs of Sunville.

A. Examine map #3 - Population.

1. Locate and identify the various population trends of Sunville.

2. Is there a relationship between population and the location of the fire station?

B. Place overlay #4 (fire incidents) over map #3 (population).

1. Is there a relationship between the demand for service (total alarms) and the population density of Sunville?

2. What is the relationship between working fires and population?

C. Place overlay #5 (EMS incidents) over map #3 (Population).

Describe the relationship between the demand for EMS services and population densities.

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #4 - Assessed Valuation (AV)

The role property values play in fire service operations spans from budget development to loss reporting. The importance of assuring that high value properties remain on the tax roles cannot be understated. While few communities consciously recognize the potential impact of losing a property, the consequences could be severe. Few properties are rebuilt in the same town and even fewer on the same location.

A. Examine map #4 - Assessed Valuation (AV)

Locate and identify the various assessed valuation districts within the community.

B. Place overlay #4 (fire incidents) over map #4 (AV).

1. Is there a relationship between the demand for service (total alarms) and the AV of Sunville?

2. What is the relationship between working fires and AV?

C. Place overlay #3 over map #4.

Compare the fire case studies of Sunville to the AV. Is there a relationship?

D. Place overlay #5 (EMS incidents) over map #4 (AV).

What is the relationship between the demand for EMS services and AV?

E. Does there appear to be any relationship among demand for service (both fire and EMS), services provided, and AV (taxes paid)?

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #5 - Transportation

The transportation map indicates the primary street network of Sunville and the general means of response to calls for assistance. It also denotes the freeways, railroad, and airport.

The transportation network in any community plays a major role in determining fire response effectiveness. If the necessary routes of travel are not in place, the response times will escalate and service levels will be reduced.

A. Examine map #5--transportation.

How does the overall shape of Sunville affect the ability of emergency vehicles to respond?

B. Examine the road network of Sunville.

1. What effect does the road network have on response in the City of Sunville?

2. What is the impact of freeways on emergency response in Sunville?

3. How does the rail line affect response in Sunville?

4. What effect does the river have on response?

5. Are there other barriers to response in Sunville?

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #6 - Future Land Use

The anticipated development of a community can offer valuable information when developing future service designs. The optimum configuration is one that meets current needs while serving as a strong base for future systems.

A. Examine map #6 - Future Land Use.

1. What impact could the anticipated land uses have on the demand for services in Sunville?

2. Identify the "shift" or movement in land uses with high service requirements.

B. Place overlay #2 (required and available fire flow) over map #6 (future land use).

1. What is your estimate of the impact the changes in land use will have on required fire flow?

2. How will these changes affect available fire flow?

C. Place overlay #7 (5-year forecast) and place overlay #4 over map #6.

1. What is the relationship of predicted demand for service (profiles) present demand for service, profile 4, and anticipated land use? (Fire and EMS)

2. Replace overlay #4 with overlay #7. What is the impact of future demands if land use remains constant?

D. Compare the present demand for service and the anticipated demand for service with the present fire station location. What is the impact?

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #7 - Fire Flow

One of the three primary components of fire suppression services is water. Its assessment is mandatory in the development of any complete fire master plan. There are two segments of fire flow that need to be developed--required fire flow and available fire flow--both measured in gallons per minute (GPM).

REQUIRED FIRE FLOW

Required fire flow is that amount of water necessary to extinguish a fire in the largest, single undivided area. The I.S.O. (Insurance Services Office) "Guide for the Determination of Required Fire Flow" can be used for determining the amount of water necessary for any given structure. This guide has been applied to the Sunville FDZs to develop a representative required flow for each zone. This flow represents a weighted average for the zone, not the highest or lowest, but the most representative.

AVAILABLE FIRE FLOW

The available fire flow is the average amount available from the water system with 20 pounds of residual pressure.

A. Place overlay #2 (required fire flow) over map #1 (land use).

1. What is the relationship between land use and required fire flow?

2. What is the relationship between required fire flow and available fire flow?

   a. Note the deficient zones, their location, and land use type.

   b. Identify areas of concern.

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #8 - Personnel/Time

The remaining two components of response are personnel and time. A community can have all the water in the world, but if there are no personnel to apply it or if the personnel arrive too late, then the resources are useless. The attached "Risk Analysis" was developed using the FDZs of Sunville, the estimated required fire flow, and Table 3-1 taken from the Urban Guide for Fire Prevention and Control, U.S. Fire Administration.

A. Refer to Sunville Response Assessment Model. Review the zones deficient at both 5- and 10-minute time increments. (Shortage/surplus column--darkest columns.)

1. Does there appear to be a relationship among the zones that are most deficient and land use?

2. Is there a relationship among the more deficient zones and location within the community or proximity to the fire station?

B. An environmental impact assessment has been requested and the developers have notified you of their desire to construct a shopping center with a 3,000 GPM requirement in one of the following zones: (What is your reply?)

1. SW3

2. SE1

3. SE4

Identify the personnel and time criteria for a 3,000 gpm flow. Then match against the available resources for the three FDZs.

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #9 - Station Location

Review the level of service provided from the present fire station location. (Use base map #1.)

A. Place overlay #9 over map #1.

1. What is the level of service provided within a 5-minute response time?

2. Note the occupancy types that fall beyond the 5-minute response.

B. Place overlay #9 over map #6.

How will this location serve future development?

C. Place overlay #7 over map #6.

What will be the impact of the 5-year-projected incident profile on this location?

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #10 - Other Analysis

A. It is now your turn to "free think" this analysis and make other comparisons you feel are appropriate in identifying the problems of Sunville.

1. Review other comparisons you feel may be of value.

2. Comment on your findings.

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #11 - Incident History

The review of historic fire loss will assist in developing an understanding of the present fire and EMS service demands and also may assist in developing future projections of service requirements.

A. Review - Sunville Fire Department (page 49) - 1988 Data Compilation Report.

1. Fixed Property Use, page 58.

   a. In which fixed property types are most alarms occurring in Sunville (by fixed property use)?

   b. In which fixed property types are the highest fire losses occurring in Sunville (by fixed property use)?

2. Incident frequency, pages 62 and 63. Review the incident frequency graphs (summary and time period breakdown).

   a. Is there a distinctive pattern developing?

   b. Overall, is there any day or time period with a marked level of service demand?

3. Situation found, page 71.

   Identify the 3 highest categories and their relationship.

4. Residential analysis, page 85.

   Review graphs provided. Does there appear to be a scenario most prevalent in residential alarms?

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #12 - A Current Assessment Of The Problem

At this point in the planning process it is necessary to structure definitive statements concerning the exact scope and nature of the current and projected problems for the City of Sunville. You may consider scanning your comments to date in this analysis section prior to the preparation of this question set. You may use any of the information you have learned about Sunville to date in preparing your response.

A. In your opinion:

1. Can the public and private features of Sunville adequately cope with the identified problems?

2. Develop a laundry list of approximately 10 problems in Sunville.

DEVELOPMENT AND USE OF FIRE DEMAND ZONES

In some departments, resources may be available for sophisticated data analysis projects or they may exist in another department within the city. However, in most smaller communities resources are limited. The key is to find the level that meets your analysis needs, yet is suitable for your department.

The data must be assembled in such a manner as to allow analysis in sufficient depth, yet simple enough not to be overwhelming. It needs to be well organized with enough utility to be applicable to future analysis. And, above all, it needs to portray a true picture of the fire protection and other service needs of the community.

When considering all of these data requirements, it also becomes apparent that analyzing data for an entire community at one time can be cumbersome at best. We, therefore, need to divide the data into smaller geographic areas to simplify the analysis.

The ideal situation is to take each occupancy within the city and assess its needs individually, developing a specific plan for each analysis. Obviously, that would be time-prohibitive. The next best approach, and the one we recommend, is to divide the area into similar segments and evaluate the needs of several occupancies simultaneously. The term most commonly used to identify these smaller geographic segments is fire demand zone (FDZ).

In developing FDZs it has become apparent that one of the drivers of fire service need is land use. Communities are experiencing consistent patterns of demand for service related to similar land uses. Other considerations such as age, location, service history, etc., will also play a role in zone determination.

The factors for FDZ development are:

1. General nature of occupancies (land use).
2. Required fire flow.
3. History of service need.
4. Population density.
5. Age (population and structures).
6. Distance from fire station(s) (barriers to response).

Other factors that allow the data to have greater utility are:

7. Other special considerations (airports, colleges, prisons, and any occupancies significant enough to merit individual attention).

A simple definition of FDZ is a geographic area used to collect and maintain data for planning.

Additionally, FDZ data must be used to implement and maintain the plan. By considering all of the potential uses prior to development, greater flexibility may be built into the zones.

Potential additional uses may be:

8. Incident management.
9. Hazard inspection management.
10. Hydrant servicing schedule.
11. Home inspection.
12. Other public information activities.

While several different approaches may be used, the following steps are offered as one example of zone development.

Step 1: Divide the community into 1-mile-square segments (township/range/section format). Contact your local planner or city engineer for a similar starting point.

Step 2: Use overlays to identify barriers to response, freeways, rivers, etc., and divide segments further.

Step 3: Secure a land use map (planning dept.) and review the general land uses. Divide the segments further to reflect general land uses. There usually will be a mixture of occupancies, with some residential within commercial lines, schools within residential lines, etc. Keep in mind that this analysis is developing a general overview of risk and that we cannot evaluate each occupancy individually.

Step 4: Further identify the locations of special occupancies that you may wish to evaluate individually, or to keep records on for future use; e.g., colleges, prisons, large businesses, etc.

FIRE STATION LOCATION ANALYSIS

In every fire service plan, one of the main elements is a determination of the facility needs of the community. Fire station location is important in that it usually represents the point from which most emergency services are initiated. Time is a key issue and the desire to provide services rapidly is self-evident.

This step analyzes the location(s) of fire stations, actual or planned, to determine the extent to which they meet community response objectives. The determination of personnel and apparatus needs is made separately from this analysis. The procedure listed is only one means of assessing the adequacy of stations. There are other manual approaches, either simple or more complex, and computer models that do more or less of the calculative effort.

The procedure suggested is a rather basic procedure; however, it can become complex if your community has chosen a complicated set of response objectives. Examples of complicated response time objectives are those which are different for different occupancies, population densities, etc.

The procedure described assumes that community-wide response time objectives have been established for the first-arriving unit and the response time for the total resources needed to provide required fire flow.

Two Evaluations

There are two principal areas of evaluation when considering an assessment of fire station locations:

1. The relationship between the hazard level of the community and the fire services provided; or, "once the fire has started, can we put it out?"

2. The ability of the fire agency to attack the fire before "flashover," or before the building is involved heavily in fire. "Can we get there prior to flashover?"

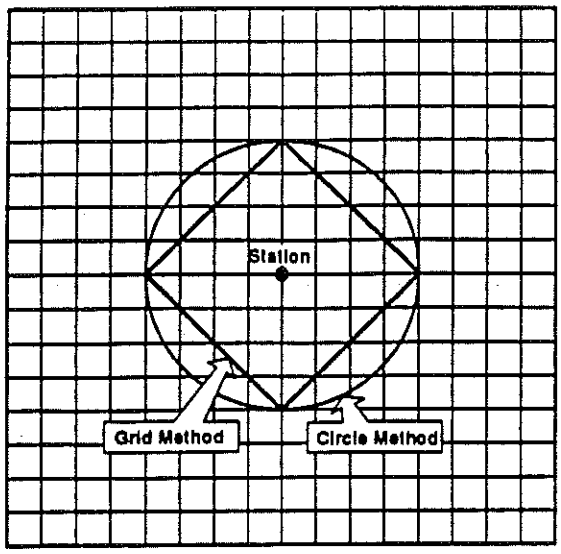
The Risk Analysis portion of the class addresses the concerns of item "1"; the relationship between the hazard level of the community and the fire forces available.

The second concern, "2," addresses the ability of the fire forces to attack the fire before the building becomes involved heavily in fire. This approach notes that when fire forces are deployed rapidly, there are far fewer resources needed and, therefore, more can be accomplished with less. To a large degree, success in this area somewhat negates the impacts of a greater deficiency that may be found in the risk analysis.

The single factor that most accurately represents this approach is response time recorded in minutes. Response time is that time from the fire apparatus leaving the fire station until it arrives at the scene. The target response time should be developed by the planning team and approved by the citizens' advisory committee. For purposes of this class, an acceptable response time of 5 minutes has been identified as the recommended time.

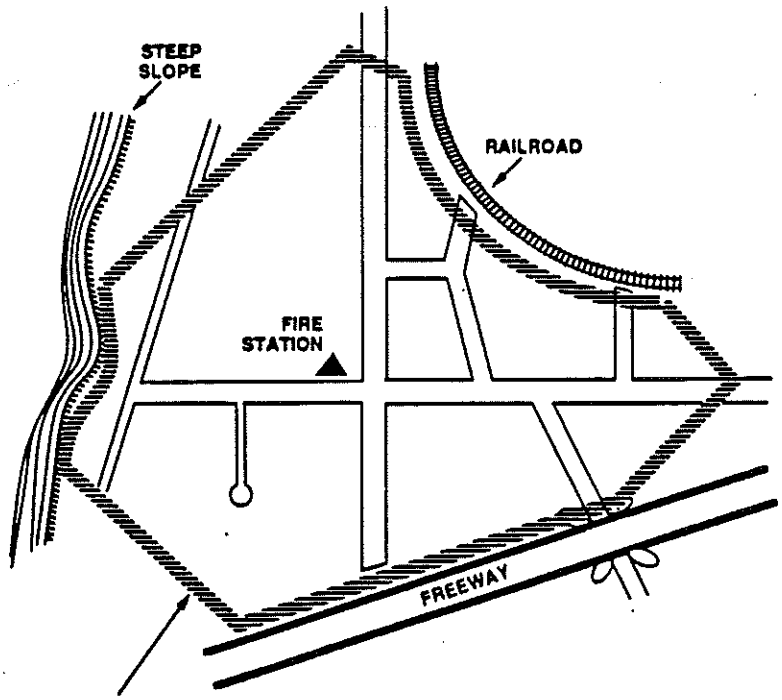
Approach

In order to evaluate and compare the present situation with each option, a determination of the area served by each fire facility needs to be developed. The service area or sphere of effective service is based on a response time from the station established by the average response speed and the distance traveled within the acceptable response time. As the effective area served is dependent upon the physical characteristics of the area (road conditions, etc.), the sphere of influence is not necessarily a perfect diamond or circular shape but sometimes assumes an odd configuration due to the limitations of existing road conditions. This approach is called the modified grid method.



Response Contour

There are other methods, such as drawing circles or diamonds, but the inaccuracy of these methods precludes their use. Neither of these methods takes into consideration the impact of freeways, rivers, canyons, or other physical barriers on response.



ACTUAL SERVICE AREA

There are several procedures which may be used to develop response boundaries. The most accurate and time-consuming is to actually drive the apparatus to several locations around the station. An alternate method, acceptable for planning, is to determine an average response speed in mph and multiply that speed by the identified response objective. For example, a 5-

minute response time objective and an average speed of 20 mph results in a 1.7-mile response distance. You then determine the 1.7-mile points in all directions and connect these points to give a picture of the area covered. The use of an engineer's wheel can aid greatly in determining these response boundaries. With the wheel set to the effective response distance, several different runs can be made on the map and the service area easily defined. It is important to follow the actual routes of travel that would be taken during an emergency response.

Average Vehicle Speed

The average vehicle speed should be determined based on response records from the fire department, indicating response time and distance traveled. After careful review of incidents, an average response speed can be selected. It is suggested that at least 50 incidents be selected with the best 10 and worst 10 eliminated to assure that an average is attained.

Fire Station Service Area

A set of maps should be prepared that indicates the area served within 5 minutes from each of the station(s) for both the present system and at least two options. The analysis of those maps can then be conducted in terms of population served, assessed valuation, historic response needs (number of incidents), etc.

Response Map Analysis

The viewing of the response maps will readily determine the areas in the community that are "covered" and those "uncovered." Being covered means that, in general, a response to that location can be made within the time objective. Being uncovered means that, in general, response to that area cannot be made within the desired time criteria. Uncovered does not mean that there is no fire protection.

For each uncovered area, the community must decide whether to add or reposition resources to meet the criteria or accept the risk associated with lack of coverage within the time criteria. In resolving the uncovered areas, remember the approximations made in developing the response maps and the uncertainties involved in actual response. These approximations and uncertainties will generally be such that the response time objective should be used as a guide and not an absolute requirement.

Coloring Of Maps

When the response maps are to be used for presentations, it becomes important to indicate the uncovered area instead of the area covered. One technique is to color the areas not covered within the response time frame in a red color using felt tip markers. This color can be seen readily from a distance and clearly indicates the areas in question.

ANALYZING THE PRESENT SITUATION--RISK ANALYSIS

In the process of master planning it is advantageous to identify and quantify the present level of hazard within the community in order to allow for the assessment of any modifications or changes. Performing an unemotional, nonthreatening risk assessment that is based on quantifiable data can be of immeasurable value to the study and the decisionmakers.

For years fire officials have been expounding to city councils the problems and potential of the large fire with the high fire loss and devastation to the community. Like the boy who cried "wolf," many city officials now feel the presentations are highly emotional and dismiss their content as something that can't happen in their community. This "holding up the burning babies" approach has caused the fire service in many instances to lose credibility and, along with that, the impact of their recommendations.

An alternative to this concern, and one that we highly recommend, is built in to this planning aproach; that is the sharing of the problem with the decision-makers prior to developing the solution. In this manner the decisionmakers are allowed to identify the concerns and assess the impact for themselves. This approach also stresses the use of averages or "real" potentials that have a higher probability of occurring than the disaster.

Toward this end, developing an understanding of the fire risks of the community, and performing a risk analysis can be highly beneficial.

Developing a risk analysis can be beneficial in acquiring an understanding of the fire problems of a community by:

1. Department members.
2. Council members.
3. Other city management.
4. The community.

The problem is quantified for all to criticize or accept.

Fire risks are the potential vulnerability to fire with the possibility of loss, injury, disadvantage, or destruction.

Categories of risk include:

1. Life.
2. Property.
3. Essential services risk.
4. Community impact.

There are six factors to consider when determining risk (the six questions to ask):

1. Who is endangered?
2. What is endangered?
3. Where will the incident and the degree of loss occur?
4. Why will the incident occur?
5. When will the incident occur?
6. What problems will the incident present to the fire department?

Risk may be defined as a potential vulnerability for the community that may result from:

1. Fire.
2. Explosion.
3. Hazardous materials incident.
4. Accident.
5. Natural disaster.
6. Sudden illness.

Risks may cause loss of life and property, jobs and tax base, essential community services, historic value, and/or community reputation.

We will be dealing with the modifiers resulting from fire in structures; however, these same concepts can be applied to any analysis.

When determining the type(s) of risk analysis you wish to evaluate, review each of these items and ascertain their degree of relativity to your community's planning needs.

For instance:

1. If your community happens to be atop a fault line, you certainly would want to consider impacts of earthquakes.

2. If your community receives 70% of its tax revenues from one business which also happens to employ 30% of the town's work force, then you would definitely want to perform a specific risk analysis on that occupancy.

3. If your community receives a substantial portion of its revenue from tourism based upon the large, well-kept Victorian mansions of historic significance located in the town, then you would want to pay specific attention to these structures.

Keep in mind that the formula for developing a risk analysis is:

REQUIRED - AVAILABLE = RISK

This says that any given structure has a resource requirement for extinguishment should a fire occur. The fire department also has a given response capacity. The difference between these two factors yields the quantification of the degree of risk for that structure.

This may be a good time to reaffirm that present risk and historical loss may be defined as acceptable risk and acceptable loss. Even though it may not be a conscious decision, by allowing them to continue over a period of time, these become acceptable community risks and losses.

The issue today, however, is whether the continuance of this "blind" approach to risk analysis is in the best interest of the community. It appears to be self-evident that to continue this approach is not sound management. Because a catastrophic incident has not occurred does not mean that it will not in the future if the risk exists.

The approach suggested here is to make the acceptance of the level of risk a conscious decision by the decisionmakers. The development of the understanding of that risk is your job; the establishment of the level of risk is their job. One is technical, the other is political.

It is important to establish the issues of evaluation in performing any risk analysis. These are the criteria that will be used to measure the level of need as well as the level of services provided.

1. Identifying criteria for assessment.

   a. Personnel.
   b. Time.
   c. Water.

Equipment and apparatus could be included along with training, etc., but the three noted above appear to be the main elements to consider.

2. Common thread.

Fire flow (GPM) is woven throughout the fabric of each of these elements (as the criteria for assessment) in the following manner:

- GPM is related to each structure through the generally accepted standard, "Guide for the Determination of Required Fire Flow," the amount of water necessary to extinguish a fire in the largest single undivided area.

- GPM is related to personnel. Several staffing studies have been conducted. Table 3-1 of the USFA Master Planning Urban Guide, which defines the number of firefighters needed to apply required fire flows, represents the most commonly accepted criterion.

- GPM is also related to time in table 3-1; i.e., how soon will the personnel need to arrive in order to be effective?

The premise is: to effectively fight a fire in a structure you need sufficient personnel, sufficient water, and you must arrive within a given time frame.

A benchmark is a point of reference from which measurements can be made.

In dealing with the time frames given in the fire service, there appear to be two points of time assessment or benchmarks.

These are:

1. Five minutes, the point prior to flashover, is the maximum response time applied to the company responding initially.

2. Ten minutes, the point of substantial involvement, is the maximum time for a full response.

Table 3-1, with slight modification, lends itself nicely to this process.

TABLE 3-1

PERSONNEL REQUIRED TO RESPOND WITHIN A TIME

Fire Flow Required	Total Suppression Personnel Required	Personnel Required to Respond Within a Time (min.)				
		5.0			10	
250	3		3		3	
500	6		3		6	
750	9		6		9	
1,000	12		6		12	
1,500	15		6		15	
2,000	18		12		18	
2,500	21		12		21	
3,000	24		12		24	
3,500	27		12		27	
4,000	30		12		30	
4,500	33		12		33	
5,000	36		18		36	
5,500	42		18		42	
6,000	48		18		48	
6,500	54		18		54	
7,000	60		18		60	
7,500	66		18		66	
8,000	72		18		72	

When conducting the risk analysis, determine resources required, plan for one fire at a time, and plan for the "average flow" in each FDZ.

The best approach to determining required fire flow appears to be to gather two or three persons of expertise in the department and identify representative flows for each FDZ. This is the procedure for the Sunville exercise. The flows can then be open to comment from the rest of the department and the community.

The determination of time, personnel, and water needs can be found in table 3-1.

In order to determine resources available, identify distance from each station to each FDZ, identify average staffing, identify the average staffing time, and the time from dispatch until apparatus is staffed. Mantime is the response time of volunteers to reach the fire station.

For the results, refer to the Sunville Response Assessment computer printout.

Source: Urban Guide for Fire Prevention Control, U.S. Fire Administration, Washington, D.C.

Sunville Response Assessment

A risk analysis was prepared for Sunville (SM p. 3-45) comparing the average level of service provided to a representative service level required for each Fire Demand Zone.

The assessment models, SM pp. 3-45 and 3-46, indicate the results of these analysis for the two general time periods, weekdays and night/weekends. These two periods represent the normal availability of volunteers who work during the week.

ASSESSMENT MODEL: DAYTIME

RESPONSE ASSESSMENT MODEL

Company	Avg # of Personnel	Location	Run Time (Minutes)
E1	4.0	123 SR101 1DZ 5L6	0
E2	8.5	123 SR101 1DZ 5L6	4

Avg. Vehicle Speed= 26 m.p.h.

Avg. Dispatch Time= 0 minutes

STATISTICS (Shortage/Surplus Column)

Response Evaluation

# OF ZONES THAT ARE:	@5	@10
A. >3 persons deficient	19	19
B. 0 to 3 persons deficient	12	6
C. meeting suggested requirements	11	17

SHORTAGE/SURPLUS COLUMN RESULTS

Avg. Personnel over/short @5 min. -4.1 persons

Avg. Personnel over/short @10 min. -3.7 persons

Avg. Fire Flow Required . 1464 Gallons

Avg. Fire Flow Available 1135 Gallons

ZONE INVENTORY

# OF ZONES:	
Rural/Residential	17
Residential	6
Light Commercial	8
Medium Commercial	7
Heavy Commercial	2
Total # of Zones	42

Sunville Fire Department

NO.	FIRE DEMAND ZONE	FIRE DEMAND ZONE DATA Est. Pop.	Fire Flow (GPM)	NEEDED RESOURCES Personnel @: (time in min) 5	10	Fire Flow (GPM)	SHORTAGE/SURPLUS Personnel @: (time in min) 5	10	Fire Flow (GPM)	AVAILABLE RESOURCES Personnel @ (time in min) 5	6.5	10	15	RESPONSE TIME FROM STATION Company # E1	E2	0	0	0	TRAVEL DISTANCE FROM STATION Company # E1	E2	0	0	0
1	SW1	42	2000	12	18	-1400	-8	-5.5	600	4	4	12.5	12.5	4.8	6.8	0.0	0.0	0.0	2.1	2.1			
2	SW2	22	3000	12	24	-2300	-8	-11	700	4	4	12.5	12.5	3.2	7.2	0.0	0.0	0.0	1.4	1.4			
3	SW3		3000	12	24	-1400	-8	-11	1600	4	12.5	12.5	12.5	1.8	5.8	0.0	0.0	0.0	0.8	0.8			
4	SW4	340	500	3	6	300	1	6.5	800	4	4	12.5	12.5	3.5	7.5	0.0	0.0	0.0	1.5	1.5			
5	SW5	16	2000	12	18	-800	-8	-5.5	1200	4	4	12.5	12.5	2.5	6.5	0.0	0.0	0.0	1.1	1.1			
6	SW6	820	1000	6	12	-350	-2	0.5	650	4	4	12.5	12.5	3.5	7.5	0.0	0.0	0.0	1.5	1.5			
7	SW7	804	1000	6	12	-600	-6	0.5	400	0	4	12.5	12.5	5.5	9.5	0.0	0.0	0.0	2.4	2.4			
8	SW8	204	500	3	6	300	-3	6.5	800	0	4	12.5	12.5	5.8	9.8	0.0	0.0	0.0	2.5	2.5			
9	SW9	21	2000	12	18	-1300	-8	-5.5	700	4	4	12.5	12.5	4.6	8.6	0.0	0.0	0.0	2.0	2.0			
10	SW10	16	500	3	6	100	-3	-2	600	0	0	4	12.5	7.4	11.4	0.0	0.0	0.0	3.2	3.2			
11	SW11	146	500	3	6	-300	-3	-2	200	0	0	4	12.5	9.2	13.2	0.0	0.0	0.0	4.0	4.0			
12	SE1	360	3000	12	24	-2550	-12	-20	450	0	0	4	12.5	7.4	11.4	0.0	0.0	0.0	3.2	3.2			
13	SE2	22	500	3	6	100	-3	-2	600	0	4	4	12.5	6.2	10.2	0.0	0.0	0.0	2.7	2.7			
14	SE3	14	500	3	6	-500	1	6.5	0	0	12.5	12.5	12.5	2.3	6.3	0.0	0.0	0.0	1.0	1.0			
15	SE4	63	3000	12	24	-1000	-8	-11	2000	4	12.5	12.5	12.5	1.2	5.2	0.0	0.0	0.0	0.5	0.5			
16	SE5	264	3000	12	24	-50	-8	-11	2950	4	4	12.5	12.5	3.5	7.5	0.0	0.0	0.0	1.5	1.5			
17	SE6		4000	12	30	-1400	0.5	-17	2600	12.5	12.5	12.5	12.5	0.5	4.5	0.0	0.0	0.0	0.2	0.2			
18	SE7	308	500	3	6	300	1	6.5	800	4	12.5	12.5	12.5	1.8	5.8	0.0	0.0	0.0	0.8	0.8			
19	SE8	196	1000	6	12	1100	6.5	0.5	2100	12.5	12.5	12.5	12.5	0.7	4.7	0.0	0.0	0.0	0.3	0.3			
20	SE9	8	2000	12	18	400	-8	-5.5	2400	4	12.5	12.5	12.5	1.8	5.8	0.0	0.0	0.0	0.8	0.8			
21	SE10	14	500	3	6	-500	1	6.5	0	4	4	12.5	12.5	3.2	7.2	0.0	0.0	0.0	1.4	1.4			
22	SE11		4000	12	30	-1200	-8	-17	2800	4	4	12.5	12.5	3.7	7.7	0.0	0.0	0.0	1.6	1.6			
23	SE12		1000	6	12	400	-2	0.5	1400	4	4	12.5	12.5	4.4	8.4	0.0	0.0	0.0	1.9	1.9			
24	SE13	464	1000	6	12	700	-2	0.5	1700	4	4	12.5	12.5	4.8	8.8	0.0	0.0	0.0	2.1	2.1			
25	NE1	94	1000	6	12	1100	-6	0.5	2100	4	4	12.5	12.5	5.3	9.3	0.0	0.0	0.0	2.3	2.3			
26	NE2	11	500	3	6	-500	-3	-2	0	0	4	4	12.5	6.2	10.2	0.0	0.0	0.0	2.7	2.7			
27	NE3	72	500	3	6	0	-3	-2	500	0	0	4	12.5	6.9	10.9	0.0	0.0	0.0	3.0	3.0			
28	NE4	21	2000	12	18	-50	-8	-5.5	1950	4	4	12.5	12.5	2.5	6.5	0.0	0.0	0.0	1.1	1.1			
29	NE5	17	500	3	6	-500	1	6.5	0	4	12.5	12.5	12.5	1.2	5.2	0.0	0.0	0.0	0.5	0.5			
30	NE6	264	500	3	6	1500	1	6.5	2000	4	12.5	12.5	12.5	2.3	6.3	0.0	0.0	0.0	1.0	1.0			
31	NE7	4	500	3	6	3100	1	6.5	3600	4	4	12.5	12.5	3.7	7.7	0.0	0.0	0.0	1.6	1.6			
32	NE8	12	500	3	6	-500	-3	-2	0	0	0	4	12.5	6.9	10.9	0.0	0.0	0.0	3.0	3.0			
33	NE9	760	1000	6	12	200	-6	-12	1200	0	0	0	0	15.7	19.7	0.0	0.0	0.0	6.8	6.8			
34	NE10	8	2000	12	18	900	-12	-18	2900	0	0	0	4	12.0	16.0	0.0	0.0	0.0	5.2	5.2			
35	NW1	6	3000	12	24	-600	-12	-24	2400	0	0	0	4	12.0	16.0	0.0	0.0	0.0	5.2	5.2			
36	NW2	10	500	3	6	-500	-3	-6	0	0	0	0	4	14.3	18.3	0.0	0.0	0.0	6.2	6.2			
37	NW3	11	500	3	6	-500	1	6.5	0	4	4	12.5	12.5	4.2	8.2	0.0	0.0	0.0	1.8	1.8			
38	NW4	206	500	3	6	250	1	6.5	750	4	4	12.5	12.5	4.2	8.2	0.0	0.0	0.0	1.8	1.8			
39	NW5		2000	12	18	-1400	-8	-5.5	600	4	12.5	12.5	12.5	2.1	6.1	0.0	0.0	0.0	0.9	0.9			
40	NW6	31	2000	12	18	-1300	-8	-5.5	700	4	4	12.5	12.5	3.5	7.5	0.0	0.0	0.0	1.5	1.5			
41	NW7	380	1000	6	12	600	-2	0.5	400	4	4	12.5	12.5	4.4	8.4	0.0	0.0	0.0	1.9	1.9			
42	NW8		3000	12	18	-2500	8	-11	500	4	4	12.5	12.5	4.8	8.8	0.0	0.0	0.0	2.1	2.1			

ASSESSMENT MODEL: NIGHTTIME/WEEKENDS

RESPONSE ASSESSMENT MODEL

Company	Avg # of Personnel	Location	Man Time (Minutes)
E1	3.0	123 SR101 FDZ SE6	3.5
E2	9.4	123 SR101 FDZ SE6	3.5

Avg. Vehicle Speed= 26 m.p.h.

Avg. Dispatch Time= 0 minutes

STATISTICS (Shortage/Surplus Column)

Response Evaluation	@5	@10
# OF ZONES THAT ARE:		
A. >3 persons deficient	22	23
B. 0 to 3 persons deficient	16	0
C. meeting suggested requirements	4	19

SHORTAGE/SURPLUS COLUMN RESULTS

Avg. Personnel over/short @ 5 min. -6 persons

Avg. Personnel over/short @10 min. -3.8 persons

Avg. Fire Flow Required 1464 Gallons

Avg. Fire Flow Available 1135 Gallons

ZONE INVENTORY

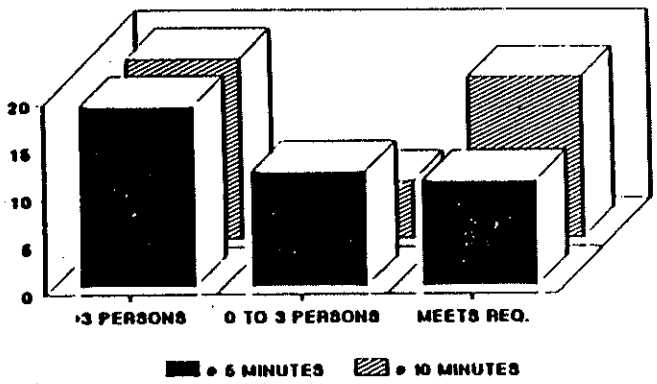
# OF ZONES:	
Rural/Residential	17
Residential	6
Light Commercial	8
Medium Commercial	7
Heavy Commercial	3
Total # of Zones	42

Sunville Fire Department

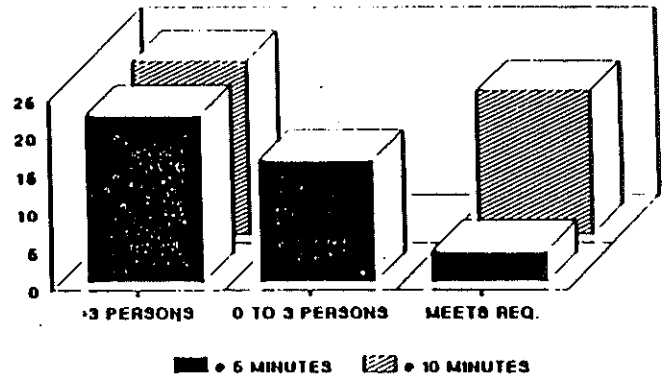
NO.	FIRE DEMAND ZONE	FIRE DEMAND ZONE DATA Est. Pop.	Fire Flow (GPM)	NEEDED RESOURCES Personnel @: (time in min) 5	NEEDED RESOURCES Personnel @: (time in min) 10	Fire Flow (GPM)	SHORTAGE/SURPLUS Personnel @: (time in min) 5	SHORTAGE/SURPLUS Personnel @: (time in min) 10	Fire Flow (GPM)	AVAILABLE RESOURCES Personnel @ (time in minutes) 5	6.5	10	15	RESPONSE TIME FROM STATION Company # E1	E2	0	0	0	TRAVEL DISTANCE FROM STATION Company # E1	E2	0	0	0
1	SW1	42	2000	12	18	-1400	-12	-5.6	600	0	0	12.4	12.4	8.3	8.3	0.0	0.0	0.0	2.1	2.1			
2	SW2	22	3000	12	24	-2300	-12	-11	700	0	0	12.4	12.4	6.7	6.7	0.0	0.0	0.0	1.4	1.4			
3	SW3		3000	12	24	-1400	-12	-11	1600	0	12.4	12.4	12.4	5.3	5.3	0.0	0.0	0.0	0.8	0.8			
4	SW4	340	500	3	6	300	-3	6.4	800	0	0	12.4	12.4	7.0	7.0	0.0	0.0	0.0	1.5	1.5			
5	SW5	16	2000	12	18	-800	-12	-5.6	1200	0	12.4	12.4	12.4	6.0	6.0	0.0	0.0	0.0	1.1	1.1			
6	SW6	820	1000	6	12	-350	-6	0.4	650	0	0	12.4	12.4	7.0	7.0	0.0	0.0	0.0	1.5	1.5			
7	SW7	804	1000	6	12	-600	-6	0.4	400	0	0	12.4	12.4	9.0	9.0	0.0	0.0	0.0	2.4	2.4			
8	SW8	204	500	3	6	300	-3	6.4	800	0	0	12.4	12.4	9.3	9.3	0.0	0.0	0.0	2.5	2.5			
9	SW9	21	2000	12	18	-1300	-12	-5.6	700	0	0	12.4	12.4	8.1	8.1	0.0	0.0	0.0	2.0	2.0			
10	SW10	16	500	3	6	100	-3	-6	600	0	0	0	12.4	10.9	10.9	0.0	0.0	0.0	3.2	3.2			
11	SW11	146	500	3	6	-300	-3	-6	200	0	0	0	12.4	12.7	12.7	0.0	0.0	0.0	4.0	4.0			
12	SE1	360	3000	12	24	-2550	-12	-24	450	0	0	0	12.4	10.9	10.9	0.0	0.0	0.0	3.2	3.2			
13	SE2	22	500	3	6	100	-3	6.4	600	0	0	12.4	12.4	9.7	9.7	0.0	0.0	0.0	2.7	2.7			
14	SE3	14	500	3	6	-500	-3	6.4	0	0	12.4	12.4	12.4	5.8	5.8	0.0	0.0	0.0	1.0	1.0			
15	SE4	63	3000	12	24	-1000	0.4	-11	2000	12.4	12.4	12.4	12.4	4.7	4.7	0.0	0.0	0.0	0.5	0.5			
16	SE5	264	3000	12	24	50	-12	-11	2950	0	0	12.4	12.4	7.0	7.0	0.0	0.0	0.0	1.5	1.5			
17	SE6		4000	12	30	-1400	0.4	-17	2600	12.4	12.4	12.4	12.4	4.0	4.0	0.0	0.0	0.0	0.2	0.2			
18	SE7	308	500	3	6	300	-3	6.4	800	0	12.4	12.4	12.4	5.3	5.3	0.0	0.0	0.0	0.8	0.8			
19	SE8	196	1000	6	12	1100	6.4	0.4	2100	12.4	12.4	12.4	12.4	4.2	4.2	0.0	0.0	0.0	0.3	0.3			
20	SE9	8	2000	12	18	400	-12	-5.6	2400	0	12.4	12.4	12.4	5.3	5.3	0.0	0.0	0.0	0.8	0.8			
21	SE10	14	500	3	6	-500	-3	6.4	0	0	0	12.4	12.4	6.7	6.7	0.0	0.0	0.0	1.4	1.4			
22	SE11		4000	12	30	-1200	-12	-17	2800	0	0	12.4	12.4	7.2	7.2	0.0	0.0	0.0	1.6	1.6			
23	SE12		1000	6	12	400	-6	0.4	1400	0	0	12.4	12.4	7.9	7.9	0.0	0.0	0.0	1.9	1.9			
24	SE13	464	1000	6	12	700	-6	0.4	1700	0	0	12.4	12.4	8.3	8.3	0.0	0.0	0.0	2.1	2.1			
25	NE1	94	1000	6	12	1100	-6	0.4	2100	0	0	12.4	12.4	8.8	8.8	0.0	0.0	0.0	2.3	2.3			
26	NE2	11	500	3	6	-500	-3	6.4	0	0	0	12.4	12.4	9.7	9.7	0.0	0.0	0.0	2.7	2.7			
27	NE3	72	500	3	6	0	-3	-6	500	0	0	0	12.4	10.4	10.4	0.0	0.0	0.0	3.0	3.0			
28	NE4	21	2000	12	18	-50	-12	-5.6	1950	0	12.4	12.4	12.4	6.0	6.0	0.0	0.0	0.0	1.1	1.1			
29	NE5	17	500	3	6	-500	9.4	6.4	0	12.4	12.4	12.4	12.4	4.7	4.7	0.0	0.0	0.0	0.5	0.5			
30	NE6	264	500	3	6	1500	-3	6.4	2000	0	12.4	12.4	12.4	5.8	5.8	0.0	0.0	0.0	1.0	1.0			
31	NE7	4	500	3	6	3100	-3	6.4	3600	0	0	12.4	12.4	7.2	7.2	0.0	0.0	0.0	1.6	1.6			
32	NE8	12	500	3	6	-500	-3	-6	0	0	0	0	12.4	10.4	10.4	0.0	0.0	0.0	3.0	3.0			
33	NE9	760	1000	6	12	200	-6	-12	1200	0	0	0	0	19.2	19.2	0.0	0.0	0.0	6.8	6.8			
34	NE10	8	2000	12	18	900	-12	-18	2900	0	0	0	0	15.5	15.5	0.0	0.0	0.0	5.2	5.2			
35	NW1	6	3000	12	24	-600	-12	-24	2400	0	0	0	0	15.5	15.5	0.0	0.0	0.0	5.2	5.2			
36	NW2	10	500	3	6	-500	-3	-6	0	0	0	0	0	17.8	17.8	0.0	0.0	0.0	6.2	6.2			
37	NW3	11	500	3	6	-500	-3	6.4	0	0	0	12.4	12.4	7.7	7.7	0.0	0.0	0.0	1.8	1.8			
38	NW4	206	500	3	6	250	-3	6.4	750	0	0	12.4	12.4	7.7	7.7	0.0	0.0	0.0	1.8	1.8			
39	NW5		2000	12	18	-1400	-12	-5.6	600	0	12.4	12.4	12.4	5.6	5.6	0.0	0.0	0.0	0.9	0.9			
40	NW6	31	2000	12	18	-1300	-12	-5.6	700	0	0	12.4	12.4	7.0	7.0	0.0	0.0	0.0	1.5	1.5			
41	NW7	380	1000	6	12	-600	-6	0.4	400	0	0	12.4	12.4	7.9	7.9	0.0	0.0	0.0	1.9	1.9			
42	NW8		3000	12	18	-2500	-12	-11	500	0	0	12.4	12.4	8.3	8.3	0.0	0.0	0.0	2.1	2.1			

SUNVILLE FIRE MASTER PLAN

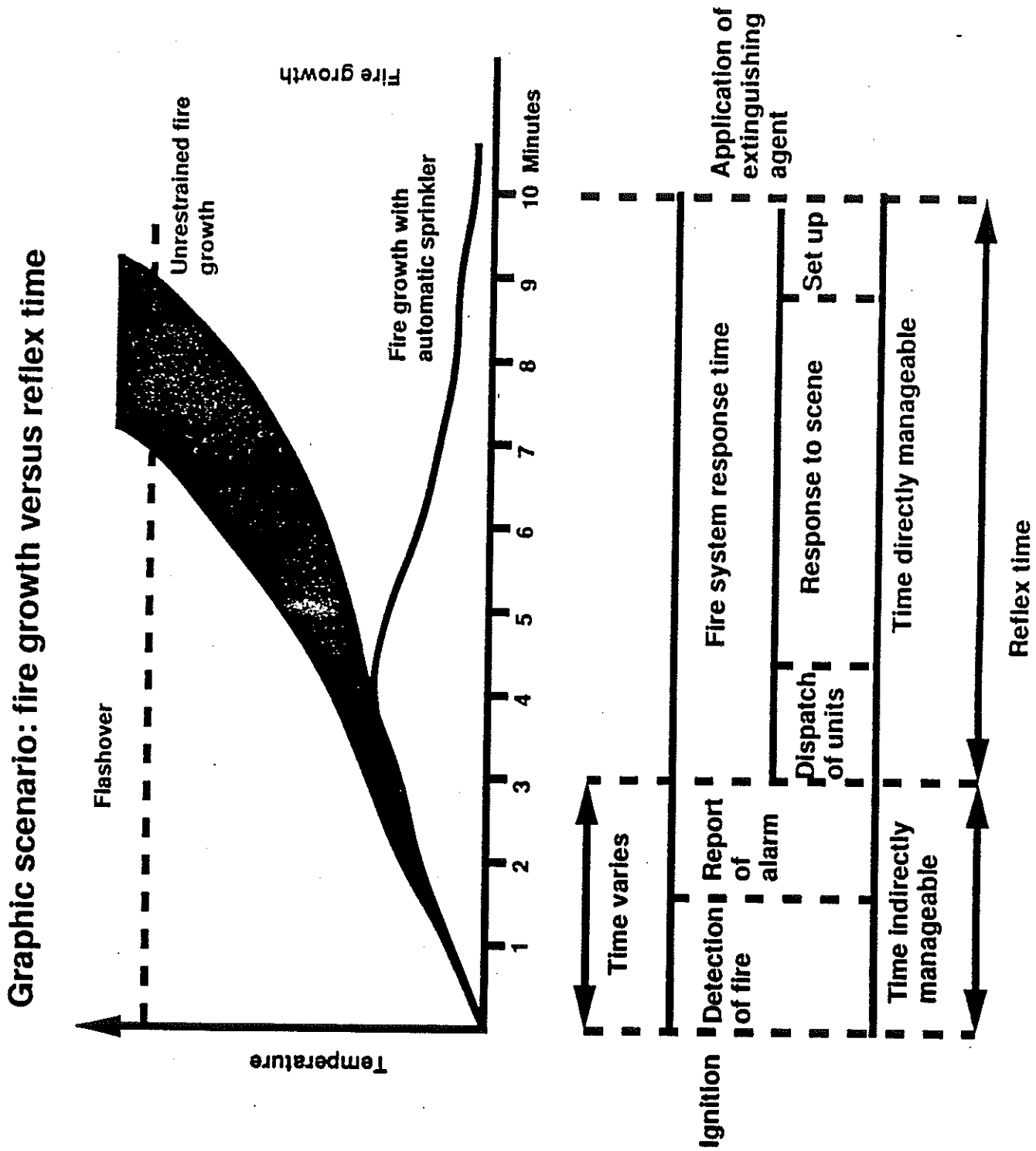
RISK ANALYSIS
DAYTIME



RISK ANALYSIS
NIGHT/WEEKENDS



GRAPHICS PRODUCED USING: IBM PC,
HARVARD GRAPHICS, AND LASERJET II PRINTER


Graphic scenario: fire growth versus reflex time
Flashover
Unrestrained fire growth
Fire growth
Fire growth with automatic sprinkler
Temperature
1
2
3
4
5
6
7
8
9
10 Minutes
Time varies
Ignition
Detection of fire
Report of alarm
Dispatch of units
Response to scene
Set up
Application of extinguishing agent
Fire system response time
Time indirectly manageable
Time directly manageable
Reflex time

TIME/TEMPERATURE CURVE

Flashover:

Simple definition - that point at which the building becomes untennable to life, and which substantial property damage occurs.

Flashover generally occurs - at between 7 and 9 1/2 minutes after ignition. (Normal Fire Progression) (Harvard University - Professor Emmons)

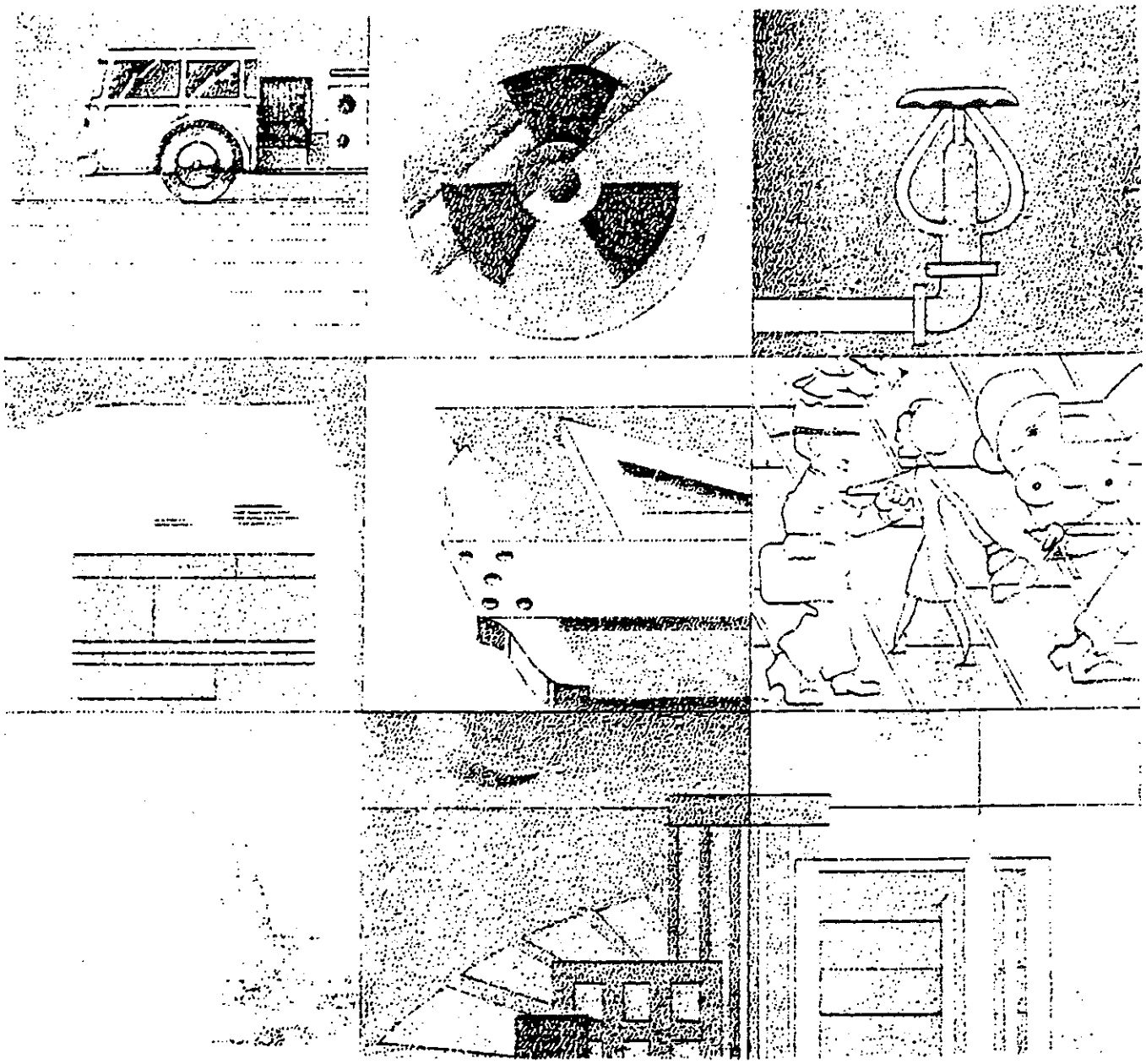
Fire services - can be more effective with less resources if they commence fire scene operations prior to flashover.

UNIT 3 APPENDIX

FIRE PREVENTION AND CONTROL MASTER PLANNING GUIDE

Prepared for:
U.S. DEPARTMENT OF COMMERCE
The National Fire Prevention and Control Administration
National Fire Safety and Research Office
NFPCA Grant No. 75006

Prepared by:
Mountain View Fire Department
Los Angeles City Fire Department
Mission Research Corporation



URBAN GUIDE FOR FIRE PREVENTION & CONTROL MASTER PLANNING

APPENDIX IV
ESTIMATING FIRE FLOW REQUIREMENTS

A form is included in this Appendix for those who wish to estimate fire flow based on ISO guidelines. The following notes are keyed to the corresponding parts of the form. For additional guidance, refer to ISO "Guidelines for Determination of Fire Flow," December, 1974.

1. **Risk Identification Information**

—Name and address: self explanatory

—Occupancy code: use local code.

—Jurisdiction: Identify the Fire Management Area at least. May also show first-in company or other jurisdictional information.

2. **Type of Construction**

Use the ISO guidelines.

—Fire-Resistive Construction—Any structure that is considered fire-resistive by any of the four model building codes.

—Noncombustible Construction—Any structure having all structural members including walls, columns, piers, beams, girders, trusses, floors, and roofs of noncombustible material and not qualifying as fire-resistive construction.

—Ordinary Construction—Any structure having exterior walls of masonry or other noncombustible material in which the other structural members, including but not limited to columns, floors, roofs, beams, girders, and joists, are wholly or partly of wood or other combustible material.

Heavy timber type buildings are required to satisfy a number of specific provisions (see any of the four model building codes).

—Wood Frame Construction—Any structure in which the structural members are wholly or partly of wood or other combustible material and the construction does not qualify as ordinary construction.

—Mixed—Combinations of the above within a single structure.

If mixed type of construction, see special instructions in a later section of this Appendix.

3. Area

—Ground Floor Area: self explanatory

—No. of Stories: total number of stories excluding basement, except:

If construction is fire-resistive with unprotected vertical openings, then consider only the six largest successive floor areas.

If construction is fire-resistive with protected vertical openings, then consider only the three largest successive stories.

—Area: If area per story varies or the number of stories varies throughout a building, sum the individual floor areas.

4. Structure Fire Flow

In Table IV-1, find the range within which the area (A) falls in the column corresponding to the Type of Construction. Read the corresponding "Structure Fire Flow" in the left-hand column. For example, in a 4,000 ft^2 building of ordinary construction, the area falls within the range 3,900 ft^2 to 5,800 ft^2. This corresponds to a Structure Fire Flow of 1,250 gpm. If the area is equal to a value which separates ranges, use the higher Structure Fire Flow (e.g., a 2,600 ft^2 wood frame building requires a Structure Fire Flow of 1,500 gpm).

The Structure Fire Flow shall not exceed:

—8,000 gpm for wood frame or ordinary construction

—6,000 gpm for noncombustible or fire-resistive construction

—6,000 gpm for single story building regardless of type of construction

5. Occupancy Factor Adjustment

The following occupancies are considered "low" or "high" risks:

Low Risk Occupancies:

Apartments
Asylums
Churches

Clubs
Colleges and Universities
Dormitories
Dwellings
Hospitals
Hotels
Institutions
Libraries, except Large Stack Room Areas
Museums
Nursing, Convalescent and Care Homes
Office Buildings
Prisons
Public Buildings
Rooming Houses
Schools
Tenements

High Risk Occupancies:

Aircraft Hangers
Cereal, Feed, Flour and Grist Mills
Chemical Works - High Hazard
Cotton Picker and Opening Operations
Explosives and Pyrotechnics Manufacturing
High Piled Combustible Storage in excess of 21 feet high
Linoleum and Oilcloth Manufacturing
Linseed Oil Mills
Match Manufacturing
Oil Refineries
Paint Shops
Pyroxylin Plastic Manufacturing and Processing
Shade Cloth Manufacturing
Solvent Extracting

Varnish and Paint Works

Woodworking with Flammable Finishing

Other occupancies involving processing, mixing, storage and dispensing flammable and/or combustible liquids.

While ± 25 percent adjustments may be made, the adjustment is to be based on judgment and in general is not expected to be at the limits permitted.

6. Compute Sub-Total

Self explanatory

7. Sprinkler Adjustment

Normally maximum adjustment would not be allowed without proper sprinkler system supervision including water flow and valves. Maximum adjustments are shown on the Fire Flow Estimate Form.

8. Exposure Adjustment

The percent actual adjustment for each "face" is based on judgment involving the following factors:

—the height, area, and construction of the building(s) being exposed

—the separation, openings in the exposed building(s)

—the length of exposure

—the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed

—the occupancy of the exposed building(s)

—the effect of hillside locations on the possible spread of fire

If a building is exposed within 150 ft., normally some percentage adjustment for exposure will be made (except where 4 hour walls are involved).

9. Roof Covering Adjustment

Self explanatory

10. Compute Estimated Fire Flow Required

Round off to the nearest 250 gpm if the computed value is less than 2,500 gpm and to the nearest 500 gpm if the value is greater than 2,500 gpm. The required fire flow should not be less than 500 gpm, nor more than 12,000 gpm.

Table IV-1.
FIRE FLOW vs. AREA

STRUCTURE FIRE FLOW (gpm)	TYPE OF CONSTRUCTION Wood Frame (area-sq.ft)	Ordinary (area-sq.ft)	Non-Combustible (area-sq.ft)	Fire Resistive (area-sq.ft)
500	500	1,200	1,900	3,300
750	1,100	2,400	3,700	6,600
1000	1,700	3,900	6,100	10,900
1250	2,600	5,800	9,100	16,200
1500	3,600	8,200	12,700	22,700
1750	4,800	10,900	17,000	30,200
2000	6,200	13,900	21,800	38,700
2250	7,700	17,400	27,200	48,300
2500	9,400	21,300	33,200	59,000
2750	11,300	25,500	39,700	70,900
3000	13,400	30,100	47,100	83,700
3250	15,600	35,200	54,900	97,700
3500	18,000	40,600	63,400	112,700
3750	20,600	46,400	72,400	128,700
4000	23,300	52,500	82,100	145,900
4250	26,300	59,100	92,400	164,200
4500	29,300	66,000	103,100	183,400
4750	32,600	73,300	114,600	203,700
5000	36,000	81,100	126,700	225,200
5250	39,600	89,200	139,400	247,700
5500				

Table IV-1.
FIRE FLOW vs. AREA

STRUCTURE FIRE FLOW (gpm)	TYPE OF CONSTRUCTION Wood Frame (area-sq.ft)	Ordinary (area-sq.ft)	Non-Combustible (area-sq.ft)	Fire Resistive (area-sq.ft)
	43,400	97,700	152,600	271,200
5750	47,400	106,500	166,500	295,900
6000	51,500	115,800	See Note 1	See Note 1
6250	55,700	125,500	"	"
6500	60,200	135,500	"	"
6750	64,800	145,800	"	"
7000	69,600	156,700	"	"
7250	74,600	167,900	"	"
7500	79,800	179,400	"	"
7750	85,100	191,400	"	"
8000				

Note 1*
The structure fire flow shall not exceed 6000 gpm for non-combustible or fire-resistive construction.

FIRE FLOW ESTIMATE FORM
(Based on ISO Publication "Guide for Determination of Fire Flow" December 1974)

1. Risk Identification Information

Name: _____ Occupancy Code: _____

Address: _____ Jurisdiction: _____

2. Determine Type of Construction

(Circle One) Fire-Resistive Non-Combustible Ordinary

Wood Frame Mixed

NOTE: If "mixed," see Special Instruction for Area and Basic Fire Flow

3. Determine Area

Ground Floor Area _____ ft^2

(times) No. of Stories x _____

Area _____ ft^2 (A)

4. Determine Structure Fire Flow from Table IV-1 Using Area (A): _____ gpm (B)

5. Determine Occupancy Factor Adjustment

If Low Risk — Subtract up to 25% of (B)

If High Risk — Add up to 25% of (B)

Adjustment _____ gpm (C)

6. Compute Sub-Total (B±C) _____ gpm (D)

(if B±C is less than 500 gpm, insert 500 gpm)

7. Determine Sprinkler Adjustment

If completely sprinklered — Subtract up to 50% of (D).

If light risk occupancy and fire-resistive or non-combustible construction — Subtract up to 75% of (D).

Adjustment (% Adjustment times (D)) _____ gpm (E)

8. Determine Exposure Adjustment

Using the table at left as a guide, enter the separation and adjustment for each of the "four faces" of the building in the table at right.

Separation (ft.)	Max. Adjust. Permitted	Exposure	Separation	Act. Adjust.
0-10	25% max.	North		add %
11-30	20% max.	East		add %
31-60	15% max.	South		add %
61-100	10% max.	West		add %
101-150	5% max.			
150 or 4 hr. wall	0%			
		Total % of Adjustment (not to exceed 75%)		%

Adjustment (Total % Adjustment times (D)) _____ gpm (F)

9. Determine Roof Covering Adjustment (if ordinary roof covering, add 500 gpm)

Adjustment _____ gpm (G)

10. Compute Estimated Fire Flow Required _____ gpm (H)

(D-E+F+G) Required Fire Flow
(If D-E+F+G is less than 500 gpm, insert 500 gpm)
(If D-E+F+G is greater than 12,000 gpm, insert 12,000 gpm)

SPECIAL INSTRUCTIONS FOR BUILDING WITH MIXED TYPE OF CONSTRUCTION

In buildings with mixed type of construction, the Structure Fire Flow is determined by prorating the percentages involved in the mix. The proration may be computed using the following table:

Type of Construction	(1) Ground Area	(2) No. Stories	(3) Area (1) x (2)	(4) % of Total Area 100x(3)/(7)	(5) Fire Flow Based on Total Area (7)	(6) Prorated Fire Flow (4)x(5)/100
Wood Frame						
Ordinary						
Non-combustible						
Fire Resistive						

(7) Total Area ft²	(8) Structure Fire Flow gpm

1. Enter the ground area and number of stories for each type of construction involved in the building [columns (1) and (2)].

2. Compute the area for each type of construction in the building. [Col. (3) = Col. (1) times Col. (2)]. Note that area for each type of construction should be computed separately and entered if the area per story varies from the ground area.

3. Using the area in Column (3) and the corresponding type of construction, enter Table IV-1 and determine the fire flow.

   —If this fire flow is greater than 8,000 gpm for the wood frame or ordinary construction parts of the building, enter 8,000 gpm as the Structure Fire Flow [Item (8)] and proceed directly to step 8.

   —If the building involves only noncombustible and fire-resistive construction and the fire flow for either part is greater than 6,000 gpm, enter 6,000 gpm as the Structure Fire Flow [Item (8)] and proceed directly to step 8.

   —If the building is single story throughout and any area in Column (3) results in a fire flow greater than 6,000 gpm, enter 6,000 gpm as the Structure Fire Flow [Item (8)]6038 and proceed directly to step 8.

4. Add the entries in Column (3) to obtain the Total Area of the building [Item (7)] and compute the respective percentages of total area by type of construction. The percentage computation is: Column 4 = 100 times Column (3) divided by Item (7).

5. Use the total area [Item (7)] to enter Table IV-1 and obtain a fire flow for each type of construction in the building assuming the entire building is of the type of construction being considered. Enter this value in Column (5). If the value so obtained is greater than 8,000 gpm for wood frame or ordinary construction or greater than 6,000 for noncombustible or fire-resistive construction, enter 8,000 or 6,000 respectively.

6. Compute each prorated fire flow as indicated. Column (6) = Column (4) times Column (5) divided by 100.

7. The Structure Fire Flow for the building [Item (8)] is the sum of the entries in Column (6).

8. Round off Item (8) to the nearest 250 gpm and enter the value in Item B of the Fire Flow Estimation Form.

UNIT 4: ORGANIZING FOR PLANNING

OBJECTIVES

The participants will:

1. *Identify the group dynamics associated with decisions and the impact of hidden agendas and prejudice.*
2. *Identify the key factors of a problem statement.*
3. *Prepare well-defined problem statements that reflect the real problems rather than symptoms.*
4. *Provide a recommended organizational structure for master planning.*
5. *Identify the roles of the management team, planning team, planning team leader, and citizens' advisory board.*
6. *Define in writing the need to develop a plan.*

NOTE-TAKING GUIDE

DECISIONMAKING

While this class does not allow time to pursue the decisionmaking process in depth, this manual contains four handouts for review at a later date. Reviewing these materials prior to commencing a planning project will assist you in your planning efforts.

PROBLEM STATEMENTS

Problem areas.

Writing problem statements.

ORGANIZING FOR PLANNING

Methods of documenting need for master plan.

Membership and purpose of the management team.

The role of the planning team leader.

Methods of identifying and appointing a planning team.

Purpose and organization of a citizens' advisory committee.

ACTIVITY 4.1

AN EXERCISE IN DECISIONMAKING

Directions

A. This is an exercise in decisionmaking. Each of you will be asked to review the shelter material and make your selection individually with no contact with anyone else. No talking during this part of the exercise is allowed.

B. Once everyone in your group has completed his or her selection, you are asked to arrive at a group decision that will be posted for class discussion.

C. Please keep the following points in mind during the exercise:

1. Accept the situation as fact.
2. Be honest. You must stay in the shelter.
3. Accept all facts as true.
4. Consider your own strengths and weaknesses.

D. Once your group has reached a decision, place it on a flipchart and post for discussion.

ACTIVITY 4.1, cont'd

AN EXERCISE IN DECISIONMAKING

One evening a year from now you invite nine of your friends to your home to talk with a psychology professor whom you know personally. In the midst of your discussion you hear a report over your scanner that there has been a meltdown at the nuclear power plant located 3 miles away across the river. The extent of the contamination is unknown at this time, but everyone is encouraged to seek shelter. Fortunately, you had anticipated such a potential and had constructed a shelter in your basement complete with air purification, water, food, etc. The problem is that your shelter will accommodate only 6 persons and you have 11 at your home, including yourself.

You monitor the scanner and things start to deteriorate. The group decides that for anyone to survive, the shelter must be activated and those remaining attempt to seek sanctuary elsewhere. The risks associated with outdoor travel are substantial, but it is agreed that this is the only viable alternative. To wait any longer would only make the decision riskier. Because it is your shelter, all agree that you must stay and choose the other five who will remain with you.

1. **Harriet**--is a psychology professor, and a few years older than the rest of the group. It has become evident already that the others respect her and recognize her grasp of the situation and ability to take control. Although she is rather cold and impersonal, she has helped to quiet the group's nervousness and settled an argument between Don and Gertrude. Even though no one seems close to her, you feel she would be valuable as an organizer and pacifier (settler of disagreements).

2. **Gertrude**--is studying home economics, nutrition, and dietetics. She is a very sexy, attractive girl. One of the first things she did was to appraise the food supply. You realize that her training has given her practical knowledge of how to ration food to avoid waste. She is also an imaginative cook who can fix even canned foods appealingly. She is efficient to the point of being domineering and bossy.

3. **Pansy**--is a brilliant girl who has done research on radiation. She has been pampered all her life and is horrified at wearing the same clothes for a month, being unable to take a bath or wash her hair, and sleeping in a room with 5 other people. Her scientific knowledge of the situation would be a definite asset; her whims and attitude would be trying.

4. **Lydia**--is a literature buff, has read extensively, and writes well herself. Already she has entertained and diverted the group with her reading experiences and retelling one of the books she perused recently.

5. **Sadie**--Joe's wife, generally has a pleasant personality. However, she has been the most nervous and upset of the group. Her temperamental, excitable mood is due partially to the fact that she is expecting a baby in 2 months.

6. **Joe**--Sadie's husband, is a medical student. He has had 2 years of medical study, three summers as medical director in a camp, and maintains a close relationship with his father, a doctor. You realize he would be a great asset; however, he refuses to stay unless Sadie also remains.

7. **Milton**--the mechanic who had been working upstairs, also has a great deal of practical know-how to recommend him. Although his formal education ended with high school, he has had experience with air filtration systems, air purifiers, and oxygen supply. He is a rather dull, chubby fellow who already has been reprimanded by Gertrude for snitching a candy bar from the limited food supply. Despite his understanding of the technical aspects, he fails to grasp the necessity of self-control as far as the food and water supply is concerned.

8. **Simon**--a young minister, is easygoing. His calmness, optimism, and faith are an inspiration to the group. In an intangible, yet perceptible way his presence is reassuring. He helped quiet Sadie's tearful outburst. At this time he revealed that he has learned to remain calm of necessity because he is diabetic. He requires a special diet and becomes tired easily. Overexcitement causes him to faint.

9. **Spike**--is a clean-cut, husky, black football player, the star center of the college's team. He is highly respected by everyone on campus. Spike was the only one able to lift the heavy metal plate that had to be placed over the shelter door. At one point, when Joe took it upon himself to set the oxygen tank valve, Milton flew at him, shoved him out of the way, and reset the valve properly. A fist fight might have started if Spike had not separated the two of them.

10. **Don**--is a romantic. His smile, lively guitar music, and scintillating sense of humor have helped improve everyone's mood. He gets along well with everyone--too well with some of the girls. He already has offended Gertrude by being fresh, and several of the girls have noticed his flirting eyes darting from face to face as he sings.

****

WHOM WILL YOU CHOOSE? In making your decisions, you must keep four things in mind:

1. Accept this situation as a fact. Concern yourself with choosing your companions, not with attacking the logic or probability of the situation.

2. Be honest. You must stay in the shelter. Your physical and mental well-being and survival will depend on your companions, their abilities, and personalities.

3. Accept all facts about the 10 people; overlook neither their assets nor weaknesses. You may assume nothing about the characters that would conflict with what you have been told.

4. Do not overlook your own strengths and weaknesses in making your choices. Remember, you are one of the 6 who will remain.

ACTIVITY 4.1 WORKSHEET

AN EXERCISE IN DECISIONMAKING

The purpose of this activity is to:

1. Identify the group dynamics associated with decisions and the impact of hidden agendas and prejudice of all nature.

2. Identify the features of, and potential barriers to, decisionmaking.

3. Discuss, decide, and be prepared to explain your reasons for having one person stay in preference to another. Defend your decisions. The right choice is one that reflects your values accurately.

Choose the 5 people you would pick to remain in the shelter with you and give the reasons why. . .

1.

2.

3.

4.

5.

ACTIVITY 4.2

SUNVILLE DATA ANALYSIS--PART 3

PROBLEM IDENTIFICATION

Directions:

From the laundry list of problems facing Sunville, select two problems and write complete problem statements.

Use the worksheets. Answer all questions.

Place statements on a flipchart to be used for reporting.

ACTIVITY 4.2, cont'd

SUNVILLE DATA ANALYSIS--PART 3

PROBLEM IDENTIFICATION

QUESTION SET #13

Problem #1_____

What?_____

Where?_____

When?_____

Why?_____

Who caused?_____

Impact?_____

Who affected?_____

Problem Statement:_____

Problem #2_____

What?_____

Where?_____

When?_____

Why?_____

Who caused?_____

Impact?_____

Who affected?_____

Problem Statement:_____

ACTIVITY 4.3

RECOMMENDATION TO SUNVILLE CITY MANAGER

Directions:

1. Each group will develop a one-page letter to the city manager using the sample memo.

2. Each group will appoint a person to report to the class.

3. Instructor will critique memos to ensure that each memo contains the following elements:

   A definition of the need to develop a plan. Students should use problem statements developed from the list of "problems facing Sunville."

   Estimated cost, personnel hours, and timeline for the project.

   A recommended management team and planning team members.

   A recommendation regarding the formation of a citizens' advisory board and recommended members.

ACTIVITY 4.3, cont'd

RECOMMENDATIONS TO SUNVILLE CITY MANAGER

SAMPLE MEMO

TO: (Name), City Manager

FROM: (Name), Fire Chief

DATE: (Month, Day, and Year)

RE: Fire Protection System: Master Planning

The future is inevitable! Whether or not it holds great promise for Sunville depends on our ability to direct its course. In this regard, I respectfully request your approval and support for the development of a five-year master plan for our fire protection system.

A master plan would provide us with the guiding framework needed for a strong sense of direction while at the same time serve as a resource management tool to effectively address the current and anticipated problems we now face. Problems such as (provide a couple of the most severe problems listed in the problem statements).

Realizing that Sunville's total fire protection needs involve more than just the fire department, we have developed a planning program that involves the formation of a management team, planning team, and citizens' advisory committee. The management team will consist of top management personnel who would review the work to ensure its consistency with the long-range goals of the city. The planning team will consist of representatives from all the elements of the fire protection system to ensure that the plan is comprehensive in scope. Finally, the citizens' advisory committee will consist of key people in the community to gain public involvement that will lead to their acceptance of the plan.

Obviously, such an endeavor will require the commitment of monetary and physical resources. I have estimated the cost of the project to be approximately ($) with an estimated staff time of (personnel hours). This places the project completion date around (month and year).

Time is of the essence in this project because failure to plan today will certainly lead to decline in the future. Therefore, your favorable response to my request would be well received and greatly appreciated, or I would welcome an opportunity to meet with you to discuss this project in more detail.

I anxiously await your reply.

SOME COMMON DECISIONMAKING METHODS

The quality of group decisions is highly dependent upon the interpersonal dynamics of those participating in the decisions.

The following are six decisionmaking methods commonly used by groups. Each has a place and time, and none is inherently good or bad. Each has consequences for future group operations, and these should be understood and accounted for by the decisionmaking unit.

DECISION BY LACK OF RESPONSE (PLOP)

The most common and perhaps least visible group decisionmaking method is that in which someone suggests an idea, and before anyone else has said anything about it, someone else suggests another idea until the group finds one on which it will act. All the ideas which have been bypassed have, in a sense, been decided upon by the group. But the decision simply has been a common decision not to support the idea, making the proposer feel that his suggestion has "plopped." Many group decisions are made by this method.

DECISION BY AUTHORITY RULE

Many groups set up a power structure or start with a power structure which makes it clear that the chairman or someone in authority will make the final decision. The group can generate ideas and hold free discussion, but, at any time, the chairman can say that having heard the discussion, he or she has decided to do thus and so. This method is highly efficient. Whether or not it is effective depends a great deal upon whether the chairman is a sufficiently good listener to have culled the right information on the basis of which to make his decision. Furthermore, if the group must move on to the next stage or implement the decision, the authority-rule method produces a minimum amount of involvement by the group. Thus, it undermines the potential quality of the implementation of the decision.

DECISION BY MINORITY

One of the most common complaints of group members is that they feel railroaded with respect to some decision. Usually this feeling results from one, two, or three people employing tactics which produce action, and therefore, must be considered decisions, but which are taken without the consent of the majority.

One individual can railroad a decision--particularly if he or she is in some kind of chairmanship role--thereby not allowing others to express opposition. A common form of minority rule is when two or more members come to quick and powerful agreement on a course of action, and challenge the group with a quick "Does anyone object?" and, if no one raises his or her voice in two seconds, the minority proceed with "Let's go ahead, then." The trap is the assumption that silence means consent.

A great many group decisions, particularly pertaining to the important issue of group procedures, rules of order, etc., are made in these rather rapid ways. For a group member to challenge such proceedings, and to say "I don't really agree," is often seen as blocking; hence, there are strong pressures on group members to remain silent and let things take their course, even though they are not in agreement.

DECISION BY MAJORITY RULE: VOTING AND/OR POLLING

Next are more familiar decisionmaking procedures, those which often are taken for granted as applying to any group situation because they reflect our political system. One simple version is to poll everyone's opinion following some period of discussion, and, if a majority feel the same way, to assume that decision has been reached. The other method is the more formal one of stating a clear alternative and asking for votes in favor of it, votes against it, and abstentions.

On the surface, this method seems completely sound, but, surprisingly, it often turns out that decisions made by this method are not well-implemented even by the group that made the decision. What is wrong? If the group is willing to discuss this process, it turns out that two kinds of psychological barriers exist:

- Minority members often feel that there was an insufficient period of discussion for them to really get their point of view across; hence, they feel misunderstood and sometimes resentful.

- Minority members often feel that the voting has created two camps within the group and that these camps are not in win-lose competition. Their camp lost the first round, but it is just a matter of time until it can regroup, pick up some support, and win the next time a vote comes up.

In other words, voting creates coalitions, and the preoccupation of the losing coalition is not how to implement what the majority wants, but how to win the next battle. If voting is to be used, the group must be sure that it has created a climate in which members feel they have had their day in court, and where members feel obligated to go along with the majority decision.

DECISION BY CONSENSUS

One of the most effective, but time-consuming, methods of group decisionmaking is to seek consensus. It is important to understand that consensus is not the same thing as unanimity. Rather, it is a state wherein communications have been sufficiently open and the group climate has been sufficiently supportive, causing everyone in the group to feel that he or she has had his or her fair chance to influence the decision. Someone then tests for the "sense of the meeting," carefully avoiding formal procedures like voting. If there is a clear alternative to which most members subscribe, and if those who oppose it feel they have had their chance to influence, then a consensus exists. Operationally, it would be defined as those members who would not take the majority alternative, nevertheless understanding it clearly and being prepared to support it. It is a psychological state which might be described as follows:

> "I understand what most of you would like to do. I personally would not do that, but I feel that you understand what my alternative would be. I have had sufficient opportunity to sway you to my point of view but clearly have not been able to do so. Therefore, I will gladly go along with what most of you wish to do."

In order to achieve such a condition, time must be allowed by the group for all members to state their opposition and to state it fully enough to get the feeling that others really do understand them. This condition is essential if they are later to free themselves of the preoccupation that they could have gotten their point across if others had only understood what they **really** had in mind. Only by listening carefully to the opposition can such feelings be forestalled and effective group decisions reached.

DECISIONS BY UNANIMOUS CONSENT

The logically perfect but least attainable kind of decision is one in which everyone truly agrees on the course of action to be taken. For certain key kinds of decisions it may be necessary to seek unanimity, but for most important ones consensus is enough, if it is real consensus. Unanimity is not always necessary, and may be a highly inefficient way to make decisions.

CHARACTERISTICS OF POSITIVE WORK TEAMS

1. There is smooth coordination and high cooperation among members of the work team.

2. There is a sense of positive group identity.

3. Each person feels that he/she is important to the achievement of the work unit's goals and carries his or her share of the load.

4. The work unit has specific, clear goals and time frames that are consistent with the organizational goals.

5. The team members support the goals of the work unit.

6. Team members are aware of each other's jobs and offer assistance when appropriate.

7. Team members meet frequently to share progress and solve problems.

8. Group norms for quality work are set and seen as standards for everyone in the group.

9. Team members feel free to communicate with each other and the team leader.

10. The team leader supports creative thinking and channels it to positive benefit.

11. Team members feel comfortable asking for help from other team members and the team leader.

THE DECISIONMAKING PROCESS

The decisionmaker, to the best of his/her ability and within his/her information-processing capabilities:

1. Thoroughly canvasses a wide range of alternative courses of action.

2. Surveys the full range of objectives to be fulfilled and the values implicated by the choice.

3. Carefully weighs whatever she/he knows about the costs and risks of negative consequences as well as positive consequences that could flow from each alternative.

4. Intensively searches for new information relevant to further evaluation of the alternatives.

5. Correctly assimilates and takes into account any new information or expert judgment to which she/he is exposed, even when the information or judgment does not support the course of action the decisionmaker prefers initially.

6. Reexamines the positive and negative consequences of all known alternatives, including those regarded originally as unacceptable, before making a final choice.

7. Makes detailed provisions for implementing or executing the chosen course of action, with special attention to contingency plans that might be required should various known risks materialize.

WORK TEAMS AND TEAM MEMBERS MUST RESOLVE THESE FOUR CONCERNS FOR MAXIMUM EFFECTIVENESS:

AREAS OF CONCERN	WHEN CONCERN UNRESOLVED, WE HAVE:	WHEN CONCERN RESOLVED, WE HAVE:
1. Am I an accepted member? Is there acceptance and trust among team members?	Fear Distrust Suspicion Conformity	Confidence Acceptance Trust Supportive communications climate
2. Are we getting the information we need to make good decisions?	Politeness Caution Strategy Downward communications Distortion of information	Spontaneity Leveling Feedback Meaningul communication Problem-solving behavior
3. Can we set goals or objectives and effectively work toward them?	Apathy Win-lose competition Manipulation Persuasion	Creativity Involvement Commitment Motivation
4. What control or organization is necessary to accomplish our work?	Dependency Hostility Bargaining Formalization of organization and rules	Interdependence Self-control Awareness of shared responsibility Informality Allocation of work by ability

PROBLEM STATEMENTS

Once accurate information is organized in such a way that it can be studied and compared, problem areas will emerge. Many of the findings will have been known before but possibly never quantified in this manner. Others will be entirely new and come as a surprise to all concerned. The key is that possibly for the first time, everyone is sharing the same set of problems, quantified in the same manner.

As an example, reflex times may be much longer than predicted, perhaps because of delayed alarms, perhaps because of slow staffing times of the apparatus. Or it may emerge that the town's only industrial complex may be at a high level of risk even though there has never been a fire there. However, if it should burn, the impact on the town's work force could be devastating. The fact that the issue is unemotionally identified and quantified allows everyone to be operating from the same decision foundation and therefore better able to agree if it is something we can live with or something we have to do something about.

Once this system is in place, different kinds of information can be logically and accurately reviewed and decisions more readily obtained.

WRITING PROBLEM STATEMENTS

Once a problem has been brought to light, it is essential that the problem be clearly defined so everyone has an accurate understanding of what needs to be resolved. The better a problem is defined, the easier it is to solve and the quicker the selected solution can be implemented.

The problem statement should state what the concern is in terms directly related to the fire/EMS problem, yet never contain the solution.

For example, "we don't have enough money" is not a good problem statement. "We don't have enough firefighters" is not acceptable either.

A clearer statement would be:

There is an insufficient personnel response necessary to provide the required fire flow to 80% of the working fires.

This is a clearer statement as it relates directly to the provision of service and everyone reading it knows that if we have a working fire it will probably burn down to our resource level 80% of the time.

It does relate directly to the need for greater personnel but is related to service needs and not just resource statements.

The problem statement should include answers to the following questions:

1. What is happening?
2. Where is it happening?
3. When is it happening?
4. Why is it happening?
5. Who is causing it to happen?
6. What is the impact?
7. Who is affected?

Example:

What: A large number of wood stove fires.

Where: Residential occupancies.

When: January and February, early morning.

Why: Creosote buildup, poor maintenance.

Who: Building owners/occupants.

Impact: Greater risk to life, higher property damage, extra burden on volunteers, higher service costs.

Another example: the number of wood stove fires in residential occupancies due to improper maintenance is twice the national average, resulting in higher property losses and increased exposure to the potential of life loss.

Once problems are clearly stated, solutions become more apparent and a greater number of minds can be focused on the issue(s). In the example given, several alternative solutions emerge. The department could work with the owners/occupants through educational programs; the community could adopt stricter codes and inspection procedures; or, the community could accept the problem as an acceptable risk. The solution selected is up to each individual community.

Keep in mind that once the problem has been identified and communicated, if the community decides to accept it then there is nothing more you can or should do. Your role is that of a technician and manager with no responsibility for imposing quality-of-life judgments. That is a political decision and the role of the elected official in our society.

ORGANIZING FOR PLANNING

In order to document the need for master plan, first identify deficiencies in the current system, then develop a projection of increasing or changing service demands; i.e., EMS, hazardous materials, etc. Define the benefits anticipated from an effective master plan and prepare a letter documenting the issues to the chief administrative officer.

Membership of the management team should include three or four key members of community government and the fire department. Purposes of this team include:

- Making the decision to develop a master plan.
- Appointing a project manager.
- Determining the need to use a citizens' advisory committee.
- Approving a program budget.
- Establishing program and operational policies.
- Establishing the process through which the interim products of the planning effort will be reviewed and approved; i.e., who will review, who will approve, and when reviews will be performed.
- Reviewing and approving interim products of the planning effort.
- Presenting final document to the governing body.

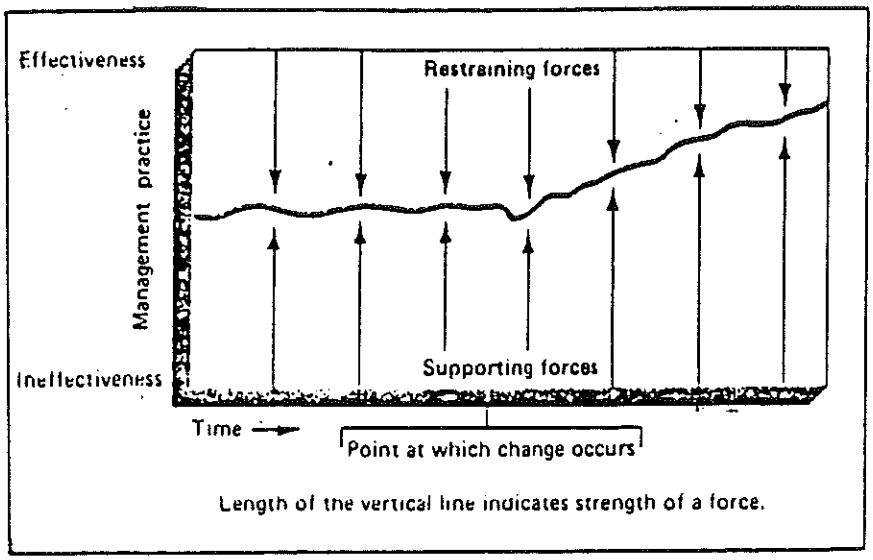
The project manager is a senior management person, preferably from the fire department, who will be required to spend 50% to 100% of available time managing the project and coordinating the activities of those preparing and reviewing the planning process.

In order to identify and appoint a planning team, you may choose to temporarily assign fire department personnel, with relief personnel available as needed or include non-fire-department personnel; i.e., building official, planner, law enforcement, etc. The team will have the responsibility of performing the tasks needed to develop an effective plan.

The purpose of a citizens' advisory committee is to provide a broad spectrum of support needed to implement the plan when it is completed The citizens' advisory committee also provides input from the major organizations or individuals within the community in order to meet community needs, reduce conflicts, and dilute the impact of special interests. The citizens' advisory committee will negotiate those compromises needed to obtain support of special interests, approval by the governing body, and effective implementation of the plan. Members of the citizens' advisory committee should be identified by the management team and appointed by the governing body. The citizens'

advisory committee should consist of influential members of the community who represent the major private sector interests which will be impacted by a master plan. These should include strong supporters and opponents of progressive fire protection and emergency services. Elected or career governmental officials should act as advisers to the committee but should not be members.

FORCE FIELD ANALYSIS



An equilibrium exists in all organizations

Change is typically viewed as requiring three steps:

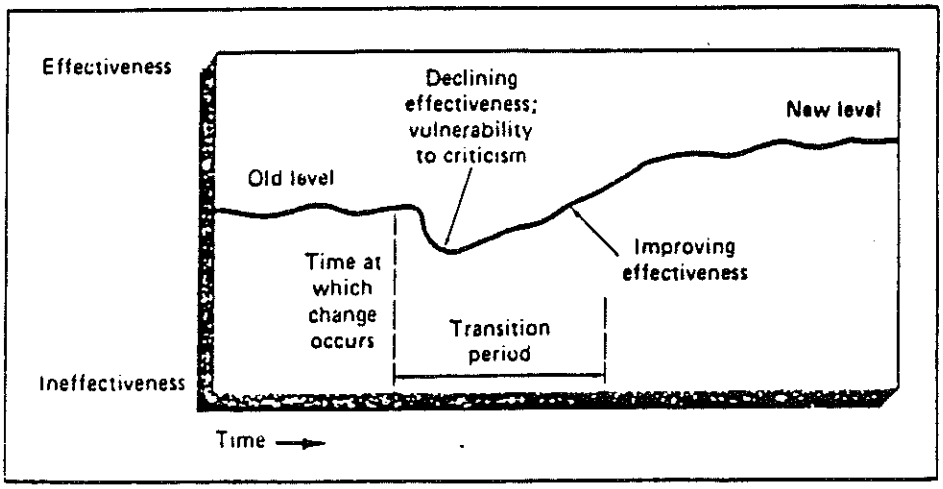
1. Unfreezing (Old ideas and practices need to be cast aside)
2. Changing (New ideas and practices are learned)
3. Refreezing (What has been learned is integrated into actual practice)

Employees need time to adapt to change

They are apt to become discouraged because of the problems that develop

At this time the change is especially subject to criticism, attack, and even failure, because it appears not to be working.

Forces of support need to be built before, during and after a change.



UNIT 5: DATA GATHERING

OBJECTIVES

The participants will:

1. *Identify the purposes of collecting data.*
2. *Define FDZ and FMA.*
3. *Identify data categories and how to use data from these categories.*
4. *Understand the importance of using graphics for displaying, analyzing, and communicating data.*
5. *Identify the methods for selecting and developing appropriate graphics to display data for planning team analysis, citizens' advisory committee review, and communicating to city council.*
6. *Learn how to use visual perception to think, review, and communicate graphically.*

NOTE-TAKING GUIDE

DATA GATHERING--HISTORICAL, PRESENT, AND FUTURE

Introduction.

Data collection process.

Data categories and usage.

Data sources.

Data time frames.

Historical data.

Current data.

Future data.

DATA GATHERING--HISTORICAL, PRESENT, AND FUTURE

The Sunville data which has just been reviewed represents a significant data-gathering effort. We will analyze some of the methods which can be used in data gathering. The necessary data frequently will not be readily available. Top management expects the fire chief to document needs and the anticipated results of programs and resource expenditures. Other agencies, such as the planning department and county assessor, possess data which can be used by the fire department for planning and management.

Data is needed to define the current and future problems, needs, and service demands.

Data is necessary in order to prepare goals which specify the conditions which should exist and to define and evaluate results. Measurable results which are needed for periodic reporting and program evaluations must be based upon accurate and complete data.

Without the required data it is not possible to develop alternative methods and programs; provide data needed to compare the cost and result differences of alternatives or identify program requirements, or provide the information needed to establish resources needed to accomplish goals and objectives such as personnel, equipment, legislation, costs, etc.

The following are steps in the data-collection process:

1. Review each step of the plan to identify data needed for each step in the process.

2. Establish a list of data which define the issues you believe the plan must confront.

3. Assign one person to coordinate data collection. This is necessary to maintain data consistency and accuracy.

4. Divide community into data-collection areas. Fire demand zones (FDZs) are used to collect and maintain data for planning and management. FDZs may be:

Geographical areas or homogeneous occupancy areas.

They must be small enough to accommodate aggregation in order to compare with other agency data-collection areas or to transfer workloads among fire management areas.

Fire management areas contain a number of FDZs and are used to implement and evaluate the provisions of the master plan. They also may be identified as: fire station response areas, battalions, inspection or public education districts, and wildland/urban interface or intermix areas.

The data required to develop and implement a master plan can be extensive and can present the primary workload in the project. It is essential that the data collected is required for the planning effort. Data that would be nice to have in the future should be collected in the future. It is necessary, therefore, to determine which data is needed early in the process.

The following are data sources: fire department records, state fire marshal or USFA, planning department, county assessor, building department, regional planning agencies; private sector--banks, McDonalds, Burger King, etc.; and public utilities--transit, telephone, etc.

Data to project the next 5 years will usually have reasonable accuracy. Beyond 5 years, accuracy is reduced and there is a need to provide for updating data as the plan is implemented.

If possible, use planning department data and time frames when developing future projections.

Historical data is used to identify past fire protection, and emergency medical and hazardous materials incident activity and trends.

Historical data documents community changes which have affected fire department operations such as: land development, population changes, water system, building code inspection and enforcement, legislation, and community policies, ordinances, etc. This data will also identify trends which can be useful in future projections.

Fire department history includes: staffing, facilities, equipment, and programs. Historical data which relates to occupancies or risks similar to those in the community should be collected from regional, state, and national fire protection agencies. Low activity rates in most small communities will not present a true picture of the potential risks of many occupancies or processes.

The current data should describe the conditions which exist within the community and provide a thorough description of the community, service demands, and the fire protection system, including the fire department.

A detailed description of the structures and occupancies within the community is needed to define the fire protection, EMS, and hazardous materials service demands accurately. This data is not always contained in fire department records but the records of the county assessor frequently will contain this information.

The community and the fire protection system are changing constantly. The community fire protection plan must be updated to cope with changes. Fire protection system planning should be based upon projections developed by local planning agencies. Future changes which can affect fire protection include land development, redevelopment projects, population changes, new

commercial/industrial structures and occupancies, legal constraints, financial changes, new service demands such as EMS and hazardous materials, and new water or sewer system improvements.

Sources of data to project future conditions include:

The local planning department (regarding annexations, new development, proposed redevelopment, land use and density changes, population changes, sphere of influence boundary changes, and prezoning of land to be annexed).

The local building department (regarding proposal changes to building codes).

The public works department (regarding proposed changes to water system, projected water system deficiencies, projected transportation needs and improvements).

The city/county legal office (regarding proposed legislation, tax and expenditure limits, and liability audit).

The finance department (regarding revenue projections and expenditure projections).

The state fire marshal (regarding proposed state legislation, future state fire protection programs, and statewide fire incident trends).

Local school boards (regarding student population projections).

Private institutions' (banks, fast food chains, local industries) business projections (regarding business and industrial developments, residential development, and population age changes), and public utilities.

FIGURE 5.1--DATA CATEGORIES

The information contained in this figure is most commonly used in fire protection for master planning. It should be emphasized that this data may not be applicable to all agencies. Other data may be needed to identify the unique character of each agency. If a specific use for the data cannot be identified, it should not be collected.

DATA CATEGORY AND DATA ELEMENTS	DATA USAGE
Population	
- Total population by year - Population by age/year - Population by FMA - Per capita service costs	- Per capita incident ratios - EMS service demands - Incendiary fire trends versus age
Land Use Data	
- Existing land area by zoning - Developed versus undeveloped land - Areas of potential annexation - Community future land use plan	- Potential development - Current and future work load estimates by type of land use - Potential changes in land use type
Physical Data	
- Topography - Freeways/Street patterns - Climatic and weather conditions - River, lakes - Relationship to other communities	- Access to incidents - Identification of growth areas - Disaster potential for tornadoes, earthquakes, floods, and other weather-related disasters - Response distance for mutual aid
Building/Occupancy Data	
- No. of occupancies by type - No. of occupancies with sprinklers - Occupancies by FMA - Fire flow requirements	- Fire prevention work load - Fire suppression resources - Water supply requirements
Safety Code Data	
- Current fire code - Current building code - Local amendments to codes - State codes - Hazardous materials regulations	- Built-in fire protection - Risk-reduction programs - Mandated enforcement and training.

Apparatus and Equipment

- Number by type
- Age of apparatus
- Maintenance costs
- Downtime
- Parts availability
- Standards/Specifications
- Preventive maintenance programs
- Scheduled replacement program
- Operating cost control

Financial Data

- Previous budgets
- Capital improvement plans
- Revenues (taxes, fees, donations)
- Revenue and tax limitations
- Insurance rating of community
- Future budgets
- New program funding
- New revenue sources
- ISO rate reduction

Water System

- Available fire flow by FDZ
- Size, age, and condition of water mains
- Storage capacities and reliability
- Hydrant system maintenance/tests
- Fire protection system design standards.
- Alternative fire flow supplies
- Fire flow capabilities
- Sprinkler system water supply
- System reliability and testing
- Disaster/Major incident planning
- Insurance rate reductions
- Mobile water supply program

Fire Department Data

- Personnel by rank
- Training activities
- Certification standards
- Fire station descriptions
- Fire station maintenance/repair
- Minimum staffing standards
- Allocation of personnel hours by type of activity
- Safety data
- Safety standards
- Workmen's Compensation claims
- Insurance claims
- Sick leave
- Injuries
- Accidents
- Operating costs
- Staffing standards
- Fire station type and location
- Training requirements
- Personnel required/available for program accomplishment
- Recruitment/retention of volunteers
- NFPA 1500 compliance
- OSHA compliance
- Justifying physical fitness program
- Identifying needs for safety equipment

Fire Prevention

- New construction plans review
- New construction inspections
- Periodic code enforcement inspections
- Special hazard abatement program description
- Hazards found versus corrected
- Permits enforcement
- Citation program
- Training and certification
- Fire code enforcement
- Resources allocated to code enforcement
- Liability for uncorrected hazards

Fire Investigation

- Fire cause determination
- Arson investigation
- Arson prosecution
- Training and certification
- Directed fire prevention
- Resources allocated to investigations
- Arson task force organization
- Law enforcement role
- District attorney role
- Cooperation of courts

Communications and Dispatching

- Available radios and frequencies
- Dispatching services
- Dispatching standards
- Radios and frequencies of mutual aid and auto aid agencies
- Radio maintenance/repairs
- Scheduled replacement of communications equipment
- Emergency support resources
- Adequate emergency/routine communications system
- Adequate communications for mutual/auto aid operations
- Adequate disaster operations
- Communications system costs
- Support preplanning; e.g., run maps, street addresses, etc.

Emergency Medical Services

- Total incident rates
- Resource commitment to EMS
- Activity rates related to demographics of FDZs
- Advanced life support needs
- Basic life support needs
- Resource requirements of EMS
- Desired levels of service
- Training/Certification levels for personnel
- Future service demands

Hazardous Materials

- Types of material
- Quantity of types
- Fixed storage
- Mobile transportation routes
- Times for materials movement
- Method of movement - rail/water/ air/highway/etc.
- Mitigation resources available
- Legal requirements
- Adopted plans in place
- History of incidents

UNIT 6: GOALS AND OBJECTIVES

OBJECTIVES

The participants will:

1. *Define goals, objectives, system objectives, and operational objectives.*
2. *Prepare appropriate goal statements, objectives, system objectives, and operational objectives.*

NOTE-TAKING GUIDE

FIRE PROTECTION SYSTEM GOALS

Definition of goals.

Purpose of goals.

FIRE PROTECTION SYSTEM OBJECTIVES

Purpose of objectives.

Characteristics of objectives.

Operational and system objectives.

ACTIVITY 6.1

WORKSHEET 6-1

Prepare one goal for each of the two problem statements written in Unit 4 (Activity 4.2). These should be statements of long-term conditions which provide a solution to each of the problem statements.

PROBLEM STATEMENT #1:

GOAL #1:

PROBLEM STATEMENT #2:

GOAL #2:

ACTIVITY 6.2

WORKSHEET 6-2

For each of the two problem statements and goals written in Activity 6.1, prepare two system objectives for that goal.

PROBLEM STATEMENT # _____

GOAL # _____

SYSTEM OBJECTIVE #1

SYSTEM OBJECTIVE #2

PROBLEM STATEMENT # _____

GOAL # _____

SYSTEM OBJECTIVE #1

SYSTEM OBJECTIVE #2

ACTIVITY 6.2 (cont'd)

WORKSHEET 6-2

Prepare two operational objectives for each system objective. **Reminder:** Objectives must be measurable and accomplished within a specific time frame.

PROBLEM STATEMENT:

GOAL #

SYSTEM OBJECTIVE #1

OPERATIONAL OBJECTIVE #1

OPERATIONAL OBJECTIVE #2

PROBLEM STATEMENT:

GOAL #

SYSTEM OBJECTIVE #1

OPERATIONAL OBJECTIVE #1

OPERATIONAL OBJECTIVE #2

FIRE PROTECTION SYSTEM GOALS

Fire protection system goals are the desired results which the community expects the fire protection system to produce. These goals define the levels of service and acceptable risks that meet the unique needs of a community. They form the basis for fire protection standards which are established as objectives.

Goals have many purposes, such as a general statement of purpose, establishing policy regarding service areas, defining direction of fire protection system, and providing policy to resolve present or anticipated problems.

Goals are not measurable or set in a time frame. They are the basis for objectives which are measurable standards.

If a goal is adopted by the governing body of a community, it establishes public policy and sets the direction of the fire protection system.

FIRE PROTECTION SYSTEM OBJECTIVES

At least one objective is established to attain each goal. Objectives are the fire protection standards for the community. They must be measurable and must be accomplished within a specific period of time.

Objectives are used to measure the results of implementing the master plan programs.

There are no general fire protection standards available for use by communities except those which each community develops. When adopted by the community governing body, objectives are the community standards for fire protection and other services for which goals and objectives are established. Objectives provide measurable levels of service and acceptable risk. The Insurance Services Office (ISO) grading schedule is designed to meet the needs of the insurance industry and does not meet the overall needs of the community. This is especially apparent with residential occupancies.

One guideline in planning is that **all** objectives must be met. Objectives must be met by the programs established as a result of the master plan. If it is apparent that the objectives will not be met, then the program must be upgraded or the objective must be changed. This will be discussed in detail as part of "Alternatives." At this point it is sufficient to state that all objectives **must** be accomplished.

System objectives are developed to meet the overall goals of the fire protection system.

For example, **fire protection system objective:**

All occupancies will be reinspected at least annually.

System objectives are developed by the community governing body.

Operational objectives are developed to accomplish the system objectives. Operational objectives are assigned to individuals or divisions.

For example, fire protection operational objectives:

Engine companies will inspect all commercial occupancies annually.

The fire inspector will inspect all high fire risk occupancies semi-annually.

The fire inspector will inspect all hospitals and rest homes quarterly.

All sprinkler systems will be inspected and tested annually by a certified private agency.

A home inspection program will be conducted annually by the public education division of volunteers.

Operational objectives will be developed to define the responsibilities of individuals or divisions in order to attain system objectives. More than one operational objective may be required to attain one system objective. Measurable operational objectives are essential to evaluate the results of programs implemented to accomplish system objectives.

UNIT 7: REQUIREMENTS AND ALTERNATIVES

OBJECTIVES

The participants will:

1. *Identify the programs and resource requirements needed to accomplish objectives.*
2. *Identify the cost of attaining goals and objectives.*
3. *Identify and evaluate alternatives.*

NOTE-TAKING GUIDE

REQUIREMENTS TO BE IDENTIFIED

Personnel hours needed to accomplish tasks.

Personnel costs: salaries and fringe benefits.

Facility costs: stations, training centers, maintenance facilities, etc.

Training equipment, instructors, and information.

Program costs related to:

New program development will include certain operational requirements which will be identified.

Requirements answer the questions:

Develop a consensus among key personnel when using estimates.

Compare the total costs of all programs with resources which are available.

ALTERNATIVES

Purpose of alternatives.

When an alternative does not meet the related objective:

Why develop alternatives?

Alternatives are identified as a result of:

ACTIVITY 7.1

SUNVILLE REQUIREMENTS

1. Each group will develop the requirements for one system objective previously identified, including the resource requirements of the operational objectives for that system objective. (Use worksheet 7-1.)

2. One spokesperson will be assigned to record the results on flipchart paper and report to the class.

3. The instructor will critique the results as they are presented. Each statement of requirements should answer the questions:

   How will it be done?

   Who will do it?

   How much will it cost?

   How will it be financed?

Be sure the following are identified, if applicable:

Personnel hours required, by position (rank).

New policies, regulations, or legislation.

Equipment or materials costs.

Training (hours, tuition, travel costs).

Approvals/Support of non-fire-department personnel or agencies.

WORKSHEET 7-1

SUNVILLE REQUIREMENTS

Problem Statement:

Goal:

Operational Objective:

Program Description:

Requirements:

Person Responsible:_____

Personnel Hours:_____hr./yr.

Materials:_____; Cost:_____

Equipment:_____; Cost:_____

Training:_____

Administrative Approvals:_____

Legislation:_____

Regulations/Policies:_____

Other:_____

ACTIVITY 7.2

SUNVILLE ALTERNATIVES

1. Each group will develop one alternative for one of the programs identified under resource requirements. (Use worksheet 7-2).

2. Each alternative should include:

   a. A brief description of the alternative.

   b. A description of how the goal and objective(s) will be met, within the specified time frame.

   c. A brief description of the program which will be used to accomplish the objective.

   d. The resources required to implement alternative program.

3. Each group will appoint a spokesperson who will record the results on flipchart paper and provide a report to the class.

4. The instructor will critique the results with the students and will place emphasis upon:

   a. Is the alternative clearly defined?

   b. Will the alternative meet the goal and objective?

   c. Is there a valid reason for developing an alternative?

   d. Can the alternative be compared with the original program?

WORKSHEET 7-2

SUNVILLE ALTERNATIVES

Problem Statement:

Goal:

Operational Objective:

"Alternative" Program Description:

Requirements:

Person Responsible:_____

Personnel Hours:_____hr./yr.

Materials:_____; Cost:_____

Equipment:_____; Cost:_____

Training:_____

Administrative Approvals:_____

Legislation:_____

Regulations/Policies:_____

Other:_____

REQUIREMENTS TO BE IDENTIFIED

In this phase, the resource requirements of programs are identified. The total costs of all programs must be identified and compared with resources (personnel hours, equipment budget, etc.) which are available.

Frequently, the programs proposed will require levels of resources which exceed the available resources. It is important that the programs which are recommended as a result of this master planning process are realistic. After the initial cost analysis is performed, it may be necessary to cycle back into the planning process and modify the goals and objectives to establish realistic programs which are within the resource constraints of the organization. That is the message that is conveyed by the circular lines on the planning process chart.

Some examples:

1. Personnel hours needed to accomplish tasks.

2. Personnel costs: salaries and fringe benefits.

3. Facility costs: stations, training centers, maintenance facilities, etc.

4. Apparatus, vehicles, and support equipment periodic replacement programs.

5. Training equipment, instructors, and information.

6. Program costs related to training, fire prevention, apparatus and facility purchase and maintenance, fire prevention programs, and public fire safety education.

7. New program development will include certain operational requirements which are: preparing a detailed description and analysis of new programs; identifying funding sources; obtaining input from department membership and approval of top management; and developing new ordinances, regulations, or procedures.

SUNVILLE REQUIREMENTS

Identify resources needed for each objective. Prepare a total resource cost for all objectives. Requirements should answer the questions: What must be done? How will it be done? Who will do it?

Develop a consensus among key personnel when using estimates. This is one of the purposes of the review/approval procedure at the end of each step in the planning process.

Compare required resources with available resources. Identify discrepancies.

ALTERNATIVES

One of the primary purposes of developing a master plan is to identify and evaluate alternative methods of providing the most efficient and effective levels of services. **Remember:** an alternative must fully meet the related objective in order to be considered. When it does not, then either the alternative must be changed or you must cycle back in the process and change the objective.

Alternatives are identified as a result of:

1. New or improved methods discovered as a result of data gathering and analysis of existing programs.

2. The need to reduce resource requirements of programs which meet goals and objectives.

3. City managers, city councilpersons, residents, or other administrative personnel may request that certain alternatives be investigated such as: the consolidation of departments, contractual fire protection, providing additional stations, etc.

4. Programs which may need to be modified to meet political or legal requirements.

Alternatives should be developed to answer specific questions or issues. It is not necessary to develop an alternative for each program. Although textbook theory would recommend that alternatives be provided for all programs to assure objectivity, in reality such a process would prevent the successful completion of a fire protection master plan.

The purpose of alternatives is to identify programs which have higher efficiency and effectiveness and evaluate options to assure that they meet goals and objectives.

(SAMPLE)

REQUIREMENTS OF FIRE PROTECTION MASTER PLAN

SECTION: IV-TRAINING AND PERSONNEL DEVELOPMENT

GOAL:

To recruit, develop, and maintain personnel with the knowledge and skills to attain the goals and objectives of the fire protection system and to assist fire department personnel in attaining their career goals.

OBJECTIVE: TRAINING AND PERSONNEL DEVELOPMENT #8:

A record and evaluation system will be developed to record training and education activities and to evaluate the effectiveness of training with 6 months.

PROGRAMS/TASKS:

1. Provide an IBM compatible computer system and printer at the training center.

2. Establish a program of periodic reviews and evaluations of data.

PERSON(S) RESPONSIBLE FOR PROGRAMS/TASKS: Training Coordinator

RESOURCES:

	Required:		Source:
1.	Administrative Officer:	8 hrs.	
	Training Coordinator:	8 hrs.	
	Computer and printer:	$5,500	1989/90 budget
2.	Battalion Chief:	48 hrs/yr.	
	Training Coordinator:	48 hrs/yr.	
	Clerical:	96 hrs/yr.	

PROGRAM TIME FRAMES:

Start Date:	Completion Date:
3 mo. after plan adoption	6 mo. after plan adoption

SECTION XI - SUMMARY OF REQUIREMENTS FOR THE FIRE PROTECTION AND EMERGENCY MEDICAL MASTER PLAN FISCAL YEAR 1989/90

TASK	PERSONNEL HOURS																			
	Chief	Batt Chief	Admin. Officer	Admin. Assi.	Capt.	Engr.	Fire Fighter	Apprntc. FF	Trng. Coord.	CLRCL	Fire Marshal	Fire Prev. Spl	Fire Insp.	Haz Mat Spec.	Plans Examr.	Pub. Ed. Officer	Hazard Abte/Off.	Mech	Comm Tech.	Equip and Materials Costs
	(1)	(3)	(1)	(1)	(22)	(22)	(27)	(13)	(1)	(4)	(1)	(1)	(5)	(2)	(2)	(1)	(1)	(2)	(4)	
SECTION I																				
FIRE PROTECTION MANAGEMENT	2034	4381	1698	2216	5361	88	54	66	158	2145	857	6	30	12	12	6	6	12	24	59500
FIRE PREVENTION	71	96	150		6531	6539	6531	4716	24	1643	2181	1853	8805		3600		1763			1500
FIRE SAFETY EDUCATION	12									72	64					1888				5180
FIRE SUPPRESSION	50	256	240		740	740	740	446		7										
FIRE INVESTIGATION		303			1182	420	266			121	32		420							4000
AIRPORT CRASH FIRE RESCUE		48			32				56	10	16		16					64		66000
SECTION II																				
EMERGENCY MEDICAL SERVICES	38	412	28	24	1476	1476	1536	1524	28	140	24	24	120	48	48	24	24	48	96	2000
SECTION III																				
HAZARDOUS MATERIALS CNTRL	13	32	916		2544	2400	2400		48	48	32			3056						7000
SECTION IV																				
TRAINING & PRSNL DVLPMT	110	725	130	98	10277	8924	9377	7176	1417	402	110	48	392	334	80	40	40	80	120	148640
SECTION V																				
APPARATUS MAINT & RPLCMT		102	27		110	3875	3110	2088		67								3530		1495500
SECTION VI																				
COMMUNICATION & DISPATCH	24	60	256		20				60	19										
SECTION VII																				
COMM. EQUP. MAINTENANCE	4	24	680							73									7100	
SECTION VIII																				
FACILITIES MAINTENANCE		90	12	40	1600	2500	3500	2500		10										
SECTION IX																				
DISASTER PLANNING	6	24	6	6					40	22	6									
SECTION X																				
SYSTEM SUPPORT		12	136		88					1	12		48							
TOTAL REQUIRED	2362	6585	3579	2384	29941	26962	27514	18496	1831	4778	3334	1931	9831	3449	3740	1958	1833	3734	7340	1789320
TOTAL AVAILABLE	1883	2920	1883	1883	21355	21355	25720	12620	1883	3766	1883	1883	9415	3766	3766	1883	1780	3766	7520	
SURPLUS OR DEFICIENCY	-479	-3645	-1696	-501	-8586	-5607	-1794	-5876	52	-1012	-1451	-48	-416	317	26	-75	-53	32	180	

3 ADDITIONAL FIREFIGHTERS FOR 9 MONTHS, AND 3 ADDITIONAL FIREFIGHTERS FOR 6 MONTHS

*AVAILABLE HOURS BASED UPON 8 HOURS PER DAY FOR SHIFT PERSONNEL

UNIT 8: PREPARING PRESENTATIONS

OBJECTIVES

The participants will:

1. *Identify the role of the presentation to council or other decision-making body.*
2. *Identify the manner of preparation for a presentation.*
3. *Identify techniques to avoid and techniques to include in effective presentations.*
4. *Understand the importance of using graphics for displaying, analyzing, and communicating data.*
5. *Identify the methods for selecting and developing appropriate graphics to display data for planning team analysis, citizens' advisory committee review, and communicating to city council.*
6. *Learn how to use visual perception to think, review, and communicate effectively.*

MASTER PLANNING PRESENTATIONS

KNOW THE AUDIENCE

Objectives: _____

_____

Background: _____

_____

Knowledge: _____

_____

Composition: _____

_____

Attitude: _____

_____

TARGET THE PRESENTATION

Set Objectives: _____

_____

Outline the Presentation: _____

_____

Give Audience Data: _____

_____

Show and Tell: _____

_____

GENERAL COMMENTS:

_____

_____

_____

_____

_____

_____

NOTE-TAKING GUIDE

MASTER PLANNING PRESENTATIONS

Knowing the audience.

Targeting the presentation.

Other points to consider.

Summary.

POSTVIDEO DISCUSSION

Knowing the audience will help you target your presentation and avoid pitfalls (pet irritations or projects of each of the politicians). Attend council sessions prior to your presentation to gain insight or view videos if previous sessions were broadcast over cable TV to the community.

Target the presentation to the audience by setting objectives and outlining the presentation. Do not get too technical. Be prepared. At the start of your presentation, tell the council members what you expect of them following the presentation. Use the citizens' advisory committee appropriately.

GRAPHICS SELECTION AND DEVELOPMENT TECHNIQUES

If a single message underlies this section, it is that data does not speak for itself. Planning information is produced through a process that includes a clear statement of the problem, careful efforts to uncover existing data from a variety of sources, systematic collection of original data, and careful translation of data into easily understood written and graphic displays. Not only must the planning team members understand the data they produce, they must also be able to communicate the information precisely and concisely to policymakers and the public.

GRAPHICS SELECTION

Graphics selection criteria for planning team use should stimulate analytical thinking with emphasis on spatial relationships, trends, patterns, and cycles. This is best accomplished through the use of geographic units shown on maps representing data groupings. Using transparent overlays showing conditions or impact by area with a base map is an excellent aid to analytical thinking by steering a thought-provoking discussion in a specific direction.

Graphics selection criteria for citizens' advisory committee review should focus on the need to communicate the findings of the data collection and generate input from the community as an aid to putting theory into practice. The planning team maps and overlays are helpful in accomplishing this objective. They should be supplemented with flipcharts that summarize the findings and recommendations of the planning team. The flipchart should be structured in outline form with space to write in citizens' advisory committee comments.

Graphics selection criteria for city council presentation is not designed to encourage input, but rather to encourage communication of the final fixed product and gain members' approval. It should be used with caution, and then only to display data that communciates key information to the approval process; e.g., maps. Flipcharts are also useful, but, unlike the citizens' advisory committee flipcharts, they should be structured to draw attention only to the "bottom line" of the findings and recommendations. A more effective approach is the use of a 10- to 15-minute slide tape presentation giving a brief historical

account of how the proposed plan was developed. Then, supplement this presentation with graphs, charts, or overhead transparencies, illustrating the elements of the plan.

GRAPHICS DEVELOPMENT

Most graphics require advance preparation, and some are time-consuming and costly to produce. However, failure to invest the necessary time and money to produce effective graphics can have more costly effects on the success or failure of the plan.

Rules of thumb for preparing graphics displays:

All graphics should be properly documented, self-contained, and self-explanatory.

Titles should provide a clear and complete statement of what the graphic shows. The title should be kept short to catch attention, with a subtitle to complete the thought.

Labels, sources, explanatory notes, keys, and the date of preparation should be documented on the graphic display to help users answer questions for themselves.

Colors are useful in drawing attention to key information, but the number of colors should not exceed the quantity necessary to convey the message. Using too many colors often draws attention to the graphics, rather than the message or data being displayed.

Be sure lines, letters, numbers, rows, and columns are straight, properly spaced, and large enough to read.

Do not clutter graphics with extraneous information that is hard to understand. It is better to use two uncluttered graphic pieces than one that is overloaded.

Reproduce all graphics in an 8 1/2" x 11" format to encourage participants to take copies for further study.

Do not use humorous graphics unless they are likely to have universal appeal; stale humor detracts from the presentation.

Slides that are on hand should not govern the content of the message. First write the script and then assemble the slides. Show each slide at least 5 and no more than 15 seconds. The total program should not exceed 15 minutes.

Rules that govern the development of maps are comparable to those that apply to slides.

UNIT 9: PRESENTATIONS TO COUNCIL

OBJECTIVES

The participants will:

1. *Assign program elements to specific objectives.*
2. *Prepare plan to accomplish the stated goals and objectives of Sunville using an assigned alternative.*
3. *Participate in the presentation of plan to council.*

ACTIVITY 9.1

DEVELOPING A PLAN

DIRECTIONS

Your planning team has been asked to develop a plan that addresses the adopted goals and objectives using the assigned approach in a 20-minute presentation to the council. The occupational/social makeup of your presentation team will be determined by you. Groups are free to use as many members as desired in making the presentation (two or more is suggested).

The master plan advisory committee has met with the council in the past and has secured approval for the following goals and objectives for the Sunville fire master plan. When these goals and objectives were approved, the city council requested the three alternative fire protection plans be submitted to meet these goals and objectives. They are:

- Financial status quo (pg. (9-7).
- Adaptive response (pg. 9-8).
- Public/Private (pg. 9-9).

The council will select one of the alternative fire protection plans using these as guidelines for its selection.

Goals

1. To provide adequate fire protection at a reasonable cost.

2. To reduce the risk of injury and death from fire.

3. To improve fire protection through code enforcement.

4. To provide adequate emergency medical care.

Objectives

1. To provide the required fire attack capacity to 80% of the commercial occupancies within the next 3 years.

2. To provide the required fire attack capacity to 80% of the residential occupancies within the next 3 years.

3. To adopt a new fire code within 1 year.

4. To implement a code enforcement program within 18 months.

5. To provide BLS coverage to 90% of the community within 1 year.

Instructions

Prepare your presentation carefully, following the instructions provided. Read your assignment carefully, keeping in mind the goals and objectives listed.

The council will meet at 10 a.m. Thursday to hear presentations for implementation in Sunville.

Minor variations and additions are allowed to improve the assigned option as long as they are in keeping with the philosophy of your assignment; i.e., if you are assigned the *Status Quo* option, you cannot adopt a retrofit sprinkler ordinance, etc.

Your presentation may be structured to allow appropriate political and community influence as desired. Keep in mind that the council will be selecting one of the presentations at this meeting.

Remember that the audience for your presentation is the city council of Sunville. Tailor your presentation to its needs in order to make the decision.

There is no penalty for additional improvements based upon what you have learned of Sunville to date, as long as you stay within your assigned philosophy. Feel free to innovate.

You are encouraged to take advantage of the Learning Resource Center located in Building N. The hours of operation are 8:30 a.m. to 9:00 p.m.

Visual Aids

You are free to use all visual materials and techniques available to you. Certain personnel on campus are prepared to assist you with your project. Your instructor will introduce you to someone who will provide assistance in computer-generated graphics. Turn your typing in to your instructor by 8:00 if you want to have the presentation typed before 10 a.m.

Please secure permission prior to using or acquiring any materials or supplies.

The Sunville council members will be selected, one per table, by the table they represent. The mayor of Sunville will be selected from those elected by the instructors.

The council member from your table is to work on the development of the presentation, but will be unable to participate as a member of the presentation team for obvious reasons.

The instructors will provide a biographical outline of each council member that will serve as their individual point of reference during the council session.

The city administrator and city attorney will be provided. Complete the assignment worksheet and give it to the city administrator prior to the council meeting to assure that your group will be introduced properly and that you will receive participation credit toward your certificate/graduation.

Time Schedule

11:00 a.m.	Wed.	Receive assignment
1:00 p.m.	Wed.	Elect council members (one per group, elected by group)
9:00 a.m.	Thurs.	Council study session (for council members only)
11:00 a.m.	Thurs.	Council meeting

Points to Consider

Consider the following points for the fire protection alternative you are preparing.

1. Approximate cost of implementing your alternative.
2. The percentage or degree to which your proposal meets the objective(s).
3. List the legislation required to implement your alternative; e.g., a sprinkler ordinance or smoke detector requirements would require legislation.
4. What political ramifications does your alternative hold?
5. Have you considered all of the positives and negatives of your alternative?
6. Do your analysis and presentation assess and present the alternative's ability to meet the fire protection needs of Sunville?
7. Does your presentation answer the obvious questions?
8. Assure that your presentation meets the information needs of the council and remains close to the allotted time.
9. Prepare an outline of your presentation prior to making assignments to individual members.

CITY OF SUNVILLE

Council Session

AGENDA

I. Pledge of Allegiance

Introduction of Councilpersons; each reads own profile

II. Minutes of Last Meeting

Mayor to request dispensing with the reading of the minutes

III. Old Business

No old business

IV. New Business

1. Fire Master Plan

Review goals and objectives; ask city administration

a. Call for first presenter

City administration to introduce

b. Discussion/scoring following each presentation

c. Public input to be held until after all presentations have been given

First

Second

Third

Fourth

Fifth

Sixth

2. Public Input

3. Council Decision

4. Adjournment

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are the owner of a warehouse and are supported by business. You are not up for reelection for two more years. You are the president of a family-owned sprinkler company and do almost all of the sprinkler installations in town.

At your own expense, you have traveled to several recent high-rise fires and understand the value of sprinkler systems in life safety.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are the owner of a number of small buildings as well as a chain of early american furniture stores.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are a regional administrator for a large petroleum firm and recently have learned that you will be relocated in a semi-hostile South American country. Should you survive, you can expect to be there for at least three years. If and when you return to the U.S., you will be assigned to corporate headquarters in Houston, Texas. While you care about Sunville very much, you will be resigning your council seat in two to three months. This news has not been released to the public at this time; however, the other council members have been informed.

P.S. The recent awards to city employees in the form of salary and associated benefits have caused you to question the benefits of local government. You have openly questioned the Park Department as to whether an outside contractor could not perform grounds maintenance at a lower cost and higher quality.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are up for reelection in four months and are being sponsored by the business people in the community. One of your campaign promises over the years has been to always watch out for the rights of the business person.

You are the owner of a very successful lounge/restaurant in town and recently have decided to expand and build a motel adjacent to your present business.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are up for reelection in four months and are being sponsored by the community clubs. Your campaign has been based on the pledge that you will not let the citizens absorb any more of the city costs that are created by the business community.

You have a degree in physical education and direct the very successful Sunville Boys Club.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are up for reelection in four months and are a labor leader in a local factory. Your support has come primarily from the low-income and working class. You are very appreciative and represent those interests well on the council.

Lately, you have tended to give long orations regarding the plight of the poor and less fortunate, causing many to think you are campaigning for a state or federal position. The mayor has requested you make your comments brief and to the point in future sessions.

FIRE SERVICE MASTER PLANNING

MAYOR: _____

You have been the mayor of Sunville for the past six years and like the position. You are an ecology activist in the community, a former professor of business ethics at the local college, and a currently registered state lobbyist. You receive your support from both the business and neighborhood communities.

You will be in charge of the council meeting and are requested to keep the presentations to the 20 minutes allotted (30 minutes at the outside, if the flow of material is appropriate). At the end of each presentation, allow five minutes of question-and-answer time from other members of the council only; none form the audience until all presentations are completed. The flow of the meeting is:

A. Introductions (each member to give name and background information)

B. Conduct a review of the goals, objectives, and selection criteria

C. Ask for the first presentation (20-30 minutes)

D. Questions from the council to presenters (15 minutes)

E. Have the council complete the selection criteria

F. Have the council complete the critique sheets

G. Next presentation

H. Etc.

Remember, you are the mayor and are expected to conduct the meeting as close as possible to a real council session.

No decision will be made until all presentations are completed.

Do not look to the instructor to control this session. You are the mayor, so take charge.

SUNVILLE PRESENTATION EVALUATION FORM

GROUP # _____ ASSIGNMENT _____

MEMBERS

_____ _____

_____ _____

_____ _____

COMMENTS:

Start Time: _____ Stop Time: _____

Target Audience

_____

_____

Use of Visuals

_____

_____

Presentation Technique/Flow

_____

_____

Did Well With:

_____

_____

Should Consider:

_____

_____

Sunville
Jan. 6, 1990

SUNVILLE FIRE DEPARTMENT

DATA COMPILATION REPORT

SUNVILLE FIRE DEPT.

DATA COMPILATION REPORT

The Sunville Fire Department Data Compilation Report was prepared by an independent consulting firm with funds provided by "Twentieth Century Sunville". The report was prepared using actual fire response records (incident reports) provided by the department.

You will note that a few of the incident totals do not match exactly with one another. This is due to inaccuracies in a few of the reports; a factor often found with data compilation both in automated tally and hand counting. There is also a difference found between number of incidents (calls, 454 for last year) and fires (incidents plus exposures, 467 for last year). The data report provided is felt to be an accurate representation of the community, however.

Also note that the alarm/fire incident information covers a one-year period while the specific EMS data (EMS section) is for three plus years.

The records were entered, by the consulting firm, using the NFPA 901 codes in the National Fire Incident Reporting System (NFIRS IV) format. The fire service software used by the consulting firm is from Sunpro with the graphs developed using Harvard Graphics.

Using data gathered over a single year does not constitute a reliable trend. Care should be taken when interpreting all data collected in the planning process. For the purposes of this exercise, this data should be interpreted as "representative" of the nature of Sunville.

Format

The graphs are followed by the actual printouts prepared by the fire service software. All materials have been prepared using a microcomputer. Users should be careful to read the "conditions" section, located at the top of each printout, to assure proper interpretation and comparison.

INDEX

ALARM/FIRE INCIDENT DATA

Fire-Year Recap **Page 57**

Three graphs that illustrate the number of incidents, property and life loss for the last five years.

Fixed Property Use **Page 58**

Four graphs that depict the alarms experience in relation to Fixed Property Use.

Incident Frequency **Page 62**

Four graphs that illustrate the frequency of alarms by the four clock periods.

Incidents by Day **Page 63**

A single graph that shows the number of alarms by day of week.

Response Times (Travel Time) **Page 65**

Four graphs that depict the response time to alarms, within a response time range, within four clock periods.

Losses Over $1,000 **Page 67**

A printout that shows the day and time of alarms with a loss in excess of $1,000. (When the working fires occur).

Losses Over $5,000 **Page 68**

A printout that shows the day and time of alarms with a loss in excess of $5,000. (When the more severe working fires occur).

Action Taken/How Reported **Page 69**

Two graphs that illustrate the method of receipt of alarm and the action that was taken by the department.

Situation Found **Page 71**

Three graphs that illustrate the number of alarms by situation found, the dollar loss, and the loss to value at risk relationship.

Mutual Aid (Given/Received) **Page 74**

Two printouts that show mutual aid given and received. One small pie chart that depicts this relationship

Origin & Ignition **Page 76**

Two graphs that depict the area of origin and the ignition factors (both by %).

Ignition Factors **Page 80**

Three graphs that show the relationship of ignition factors by heat of ignition, type of material ignited, and form of material ignited.

Residential Analysis **Page 85**

Four graphs that illustrate the area of origin, ignition factor, heat of ignition, and material ignited in residential occupancies.

EMS INCIDENT DATA

Patient Recap of Cause **Page 93**

A printout indicating the number of EMS calls by the cause of the injury or need for assistance.

Unit/First Response Recap **Page 94**

Two printouts showing the response times in relation to the four clock periods of the day and the number of responses per unit and the time of response.

Patient Age **Page 95**

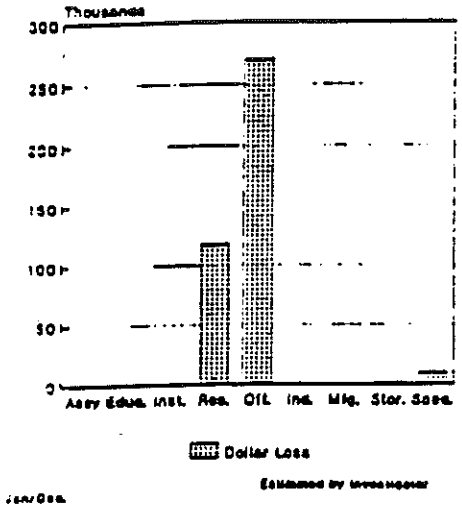
A graph illustrating the age of patients, in 10-year increments, for the past three plus years.

ALARM/FIRE INCIDENT DATA

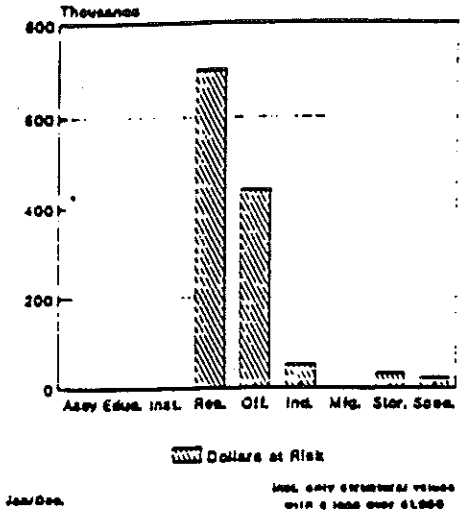
SUNVILLE FIRE DEPT.

FIXED PROPERTY USE

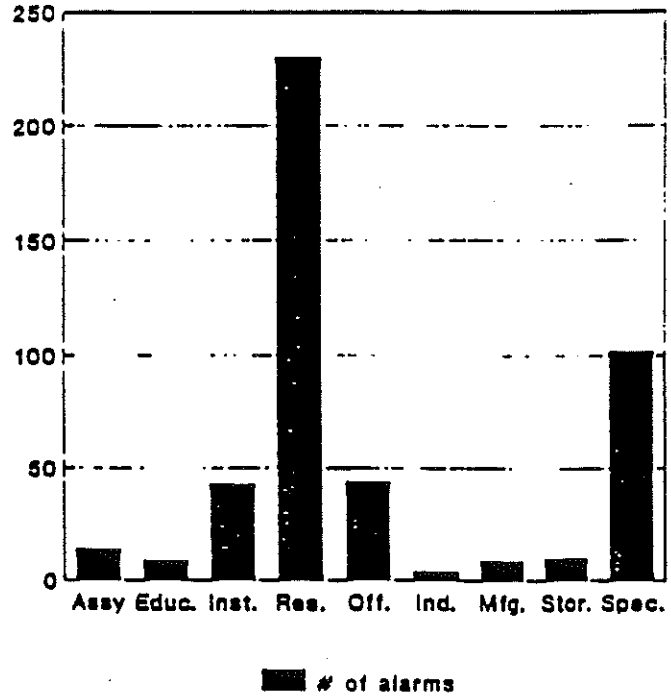
Fire Loss
By Fixed Prop. Use



$ at Risk
By Fixed Prop. Use



of Alarms
By Fixed Prop. Use



Jan/Dec.

Sunville Fire Department

FIRE RECAP BY FIXED PROPERTY USE
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
000	1	0.21	0	0	0.00	UNDETERMINED OR NOT REPORTED
008	1	0.21	0	0	0.00	NOT APPLICABLE
** Subtotal **	2	0.42	0	0		
** 1						
124	2	0.43	0	0	0.00	PLAYGROUND
134	3	0.64	0	0	0.00	FUNERAL PARLOR, CHAPEL
161	6	1.28	0	0	0.00	RESTAURANT
162	2	0.43	0	0	0.00	NIGHTCLUB
164	1	0.21	0	0	0.00	LUNCHROOM, DRIVE-IN
** Subtotal **	14	2.99	0	0		
** 2						
213	1	0.21	0	0	0.00	ELEMENTARY SCHOOL
214	4	0.86	0	0	0.00	JUNIOR HIGH SCHOOL
215	4	0.86	0	30000	0.00	HIGH SCHOOL
** Subtotal **	9	1.93	0	30000		
** 3						
311	2	0.43	0	0	0.00	CARE OF THE AGED WITH NURSING STAFF
312	5	1.07	0	0	0.00	CARE OF THE AGED WITHOUT NURSING STAFF
331	3	0.64	0	0	0.00	HOSPITAL, HOSPITAL-TYPE INFIRMARY
341	5	1.07	0	0	0.00	PRISON CELL, CELL BLOCK FOR MEN
345	15	3.21	0	0	0.00	POLICE STATION
346	4	0.86	0	0	0.00	VOCATIONAL REHABILITATION CENTER
360	1	0.21	0	0	0.00	UNABLE TO CLASSIFY FURTHER
361	3	0.64	0	0	0.00	MENTAL INSTITUTION
362	4	0.86	0	0	0.00	INSTITUTION FOR THE MENTALLY RETARDED
369	1	0.21	0	0	0.00	NOT CLASSIFIED
** Subtotal **	43	9.20	0	0		
** 4						
411	174	37.26	117815	639425	18.43	ONE FAMILY DWELLING, YEAR ROUND USE
414	2	0.43	0	0	0.00	TWO FAMILY DWELLING, YEAR ROUND USE
415	1	0.21	0	0	0.00	TWO FAMILY DWELLING, SEASONAL USE
421	1	0.21	0	0	0.00	1 OR 2 LIVING UNITS WITH BUSINESS
422	15	3.21	300	2500	12.00	3 THROUGH 6 UNITS
423	17	3.64	0	0	0.00	7 THROUGH 20 UNITS
424	18	3.85	0	0	0.00	OVER 20 UNITS
443	1	0.21	0	0	0.00	20-99 UNITS YEAR ROUND USE
481	1	0.21	0	60000	0.00	LESS THAN 20 UNITS YEAR-ROUND

FIRE RECAP BY FIXED PROPERTY USE
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** Subtotal **	230	49.23	118115	701925		
** 5						
511	5	1.07	0	0	0.00	SUPERMARKET
512	6	1.28	50	50	100.00	MARKET, GROCERY STORE
515	2	0.43	0	0	0.00	CREAMERY, DAIRY STORE
516	1	0.21	0	0	0.00	DELICATESSEN
521	1	0.21	0	0	0.00	CLOTHING STORE
522	2	0.43	96000	96000	100.00	CLOTHING ACCESSORIES, SHOE STORE
532	1	0.21	174000	184000	94.57	APPLIANCE STORE
533	1	0.21	0	0	0.00	HARDWARE STORE
544	1	0.21	0	0	0.00	JEWELRY STORE
549	1	0.21	0	0	0.00	NOT CLASSIFIED
562	1	0.21	0	0	0.00	TRADE SUPPLY SALES
571	2	0.43	0	0	0.00	PUBLIC SERVICE STATION
575	1	0.21	0	0	0.00	MOTOR VEHICLE ACCESSORY SALES
578	1	0.21	0	0	0.00	CAR WASHING FACILITY
581	1	0.21	0	0	0.00	DEPARTMENT STORE
583	1	0.21	0	0	0.00	LARGE VARIETY STORE
591	10	2.14	0	0	0.00	GENERAL BUSINESS OFFICE
592	1	0.21	0	0	0.00	BANK, WITH FIRST STORY BANKING FACILITIES
593	5	1.07	0	160000	0.00	MEDICAL, RESEARCH, SCIENTIFIC OFFICE
** Subtotal **	44	9.37	270050	440050		
** 6						
652	1	0.21	50	50000	0.10	COW, CATTLE PRODUCTION
655	1	0.21	0	0	0.00	CROPS, ORCHARDS
657	2	0.43	0	0	0.00	FRUIT, VEGETABLE PACKING
** Subtotal **	4	0.85	50	50000		
** 7						
710	3	0.64	0	0	0.00	UNABLE TO CLASSIFY FURTHER
713	4	0.86	0	0	0.00	CANNING, PRESERVING OF FRUITS, VEGETABLES
719	1	0.21	0	0	0.00	NOT CLASSIFIED
756	1	0.21	0	0	0.00	PAPER, PULP, PAPERBOARD PRODUCTS MANUFACTURE
** Subtotal **	9	1.92	0	0		
** 8						
812	3	0.64	0	0	0.00	BOXED, CRATED, PACKAGED AGRICULTURAL PRODS STORAGE
817	1	0.21	0	0	0.00	LIVESTOCK STORAGE
818	2	0.43	0	0	0.00	AGRICULTURAL SUPPLY STORAGE
881	2	0.43	1000	2500	40.00	RESIDENTIAL PARKING GARAGE
882	1	0.21	500	30000	1.67	GENERAL VEHICLE PARKING GARAGE

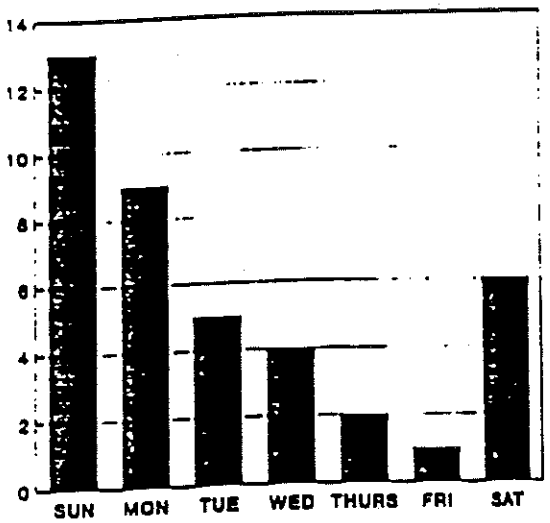
FIRE RECAP BY FIXED PROPERTY USE
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
883	1	0.21	0	0	0.00	BUS, TRUCK, AUTO FLEET, AUTOMOBILE DEALER STORAGE
** Subtotal **	10	2.13	1500	32500		
** 9						
909	1	0.21	0	0	0.00	NOT CLASSIFIED
915	1	0.21	0	0	0.00	VACANT PROPERTY
926	1	0.21	100	500	20.00	OUTBUILDING EXCLUDING GARAGE
931	16	3.43	200	500	40.00	OPEN LAND, FIELD
935	1	0.21	0	0	0.00	CAMPSITE WITH UTILITIES
936	5	1.07	0	0	0.00	VACANT LOT
939	1	0.21	0	0	0.00	NOT CLASSIFIED
946	1	0.21	0	0	0.00	INLAND WATER AREA
951	3	0.64	0	0	0.00	RAILROAD RIGHT OF WAY
961	5	1.07	0	0	0.00	LIMITED ACCESS HIGHWAY, DIVIDED HIGHWAY
962	40	8.57	3550	7250	48.97	PAVED PUBLIC STREET
963	2	0.43	1200	2600	46.15	PAVED PRIVATE STREET, WAY
964	6	1.28	1470	2450	60.00	UNPAVED STREET, ROAD, PATH
965	18	3.85	3200	9450	33.86	UNCOVERED PARKING AREA
973	1	0.21	0	0	0.00	AIRCRAFT ON TAXIWAY, UNCOVERED PARKING, MAINT AREA
** Subtotal **	102	21.81	9720	22750		
*** Total ***	467	99.85	399435	1277225		

SUNVILLE FIRE DEPT.

INCIDENT FREQUENCY

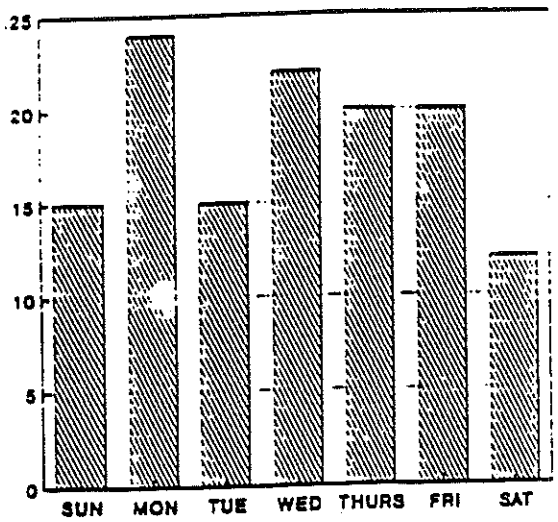
Incident Frequency
Alarms 0001-0600



BASED ON 40 RESPONSES

Jan/Dec.

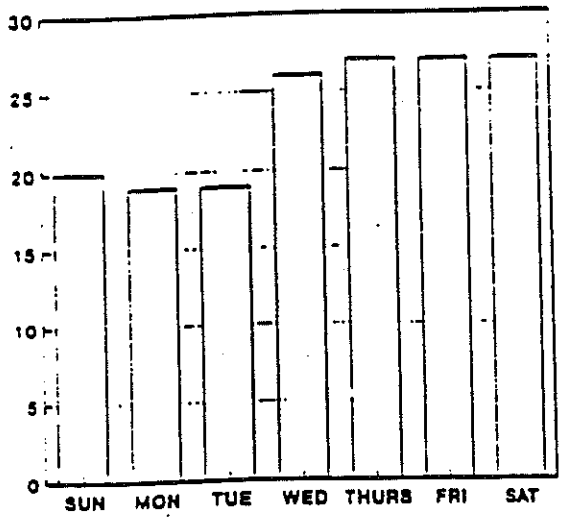
Incident Frequency
Alarms 0601-1200



BASED ON 128 CALLS

Jan/Dec.

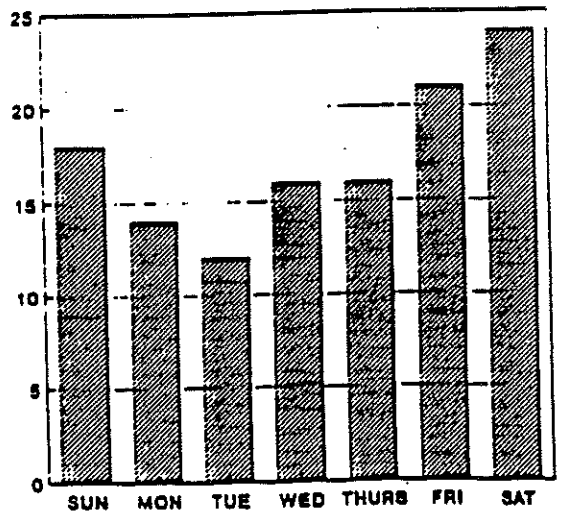
Incident Frequency
Alarms 1201-1800



BASED ON 166 CALLS

Jan/Dec.

Incident Frequency
Alarms 1801-2400

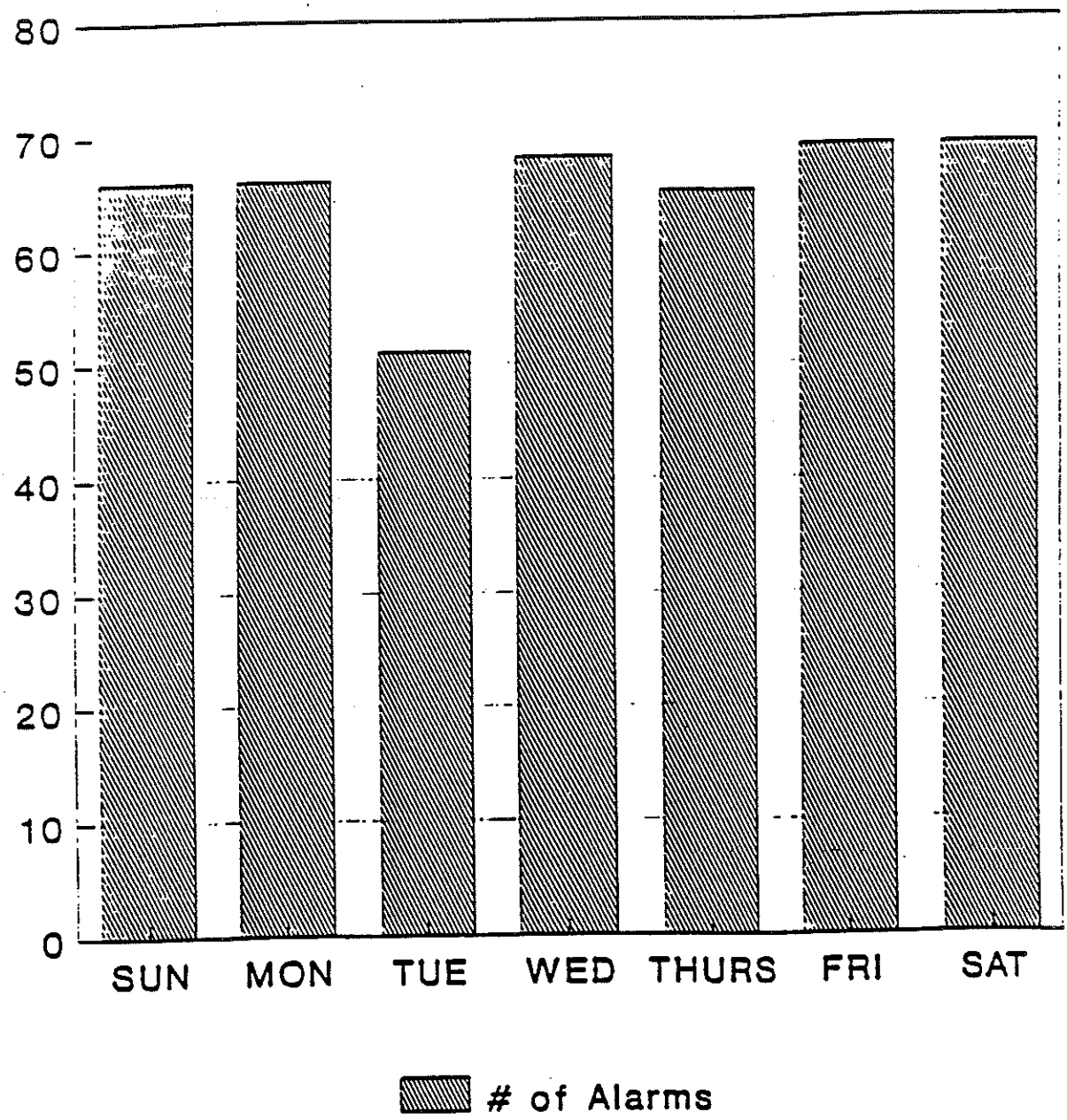


BASED ON 121 CALLS

Jan/Dec.

of incidents
by Day

SUMMARY



BASED ON 454 CALLS

Jan/Dec.

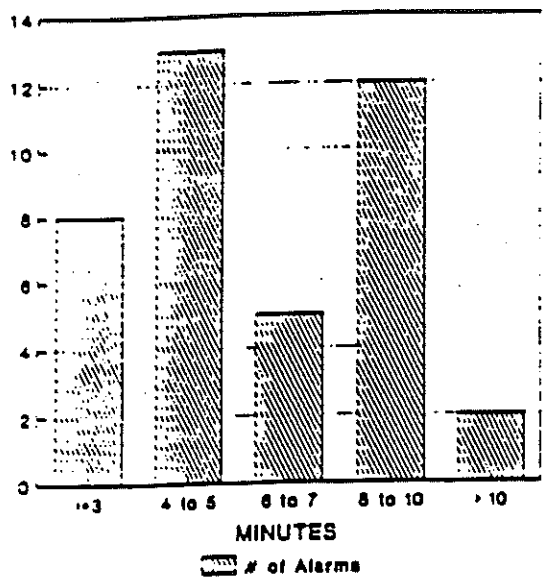
INCIDENT RECAP BY DAY/ALARM TIME
AS OF /88 FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
SUNDAY	13	15	20	18	66
MONDAY	9	24	19	14	66
TUESDAY	5	15	19	12	51
WEDNESDAY	4	22	26	16	68
THURSDAY	2	20	27	16	65
FRIDAY	1	20	27	21	69
SATURDAY	6	12	27	24	69
	40	128	165	121	454

SUNVILLE FIRE DEPT.

RESPONSE TIMES

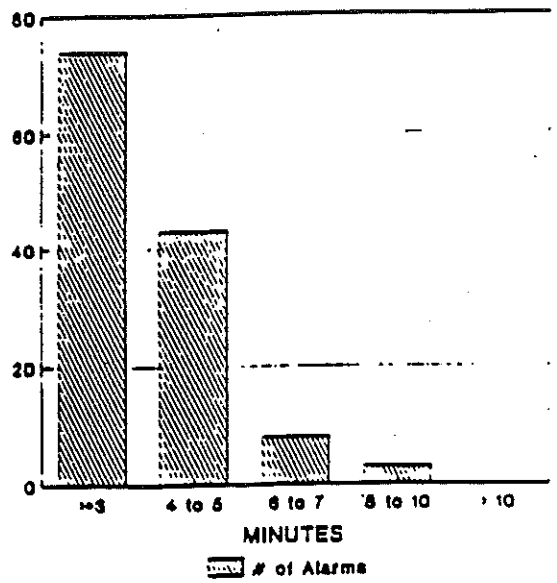
Response times
Responses 0001-0600



Jan/Dec.

BASED ON 40 RESPONSES

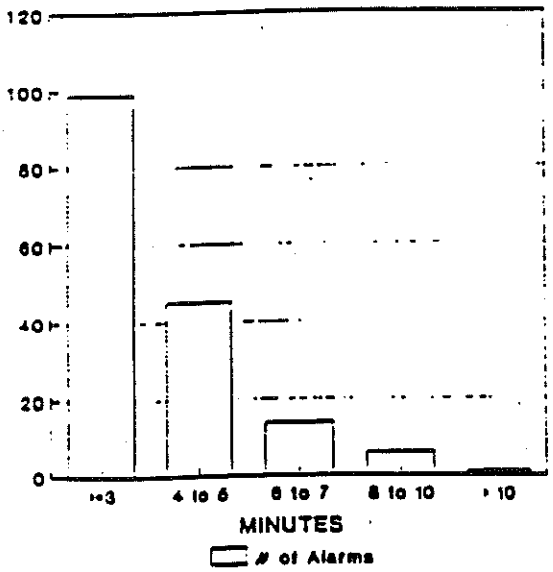
Response times
Responses 0601-1200



Jan/Dec.

BASED ON 128 RESPONSES

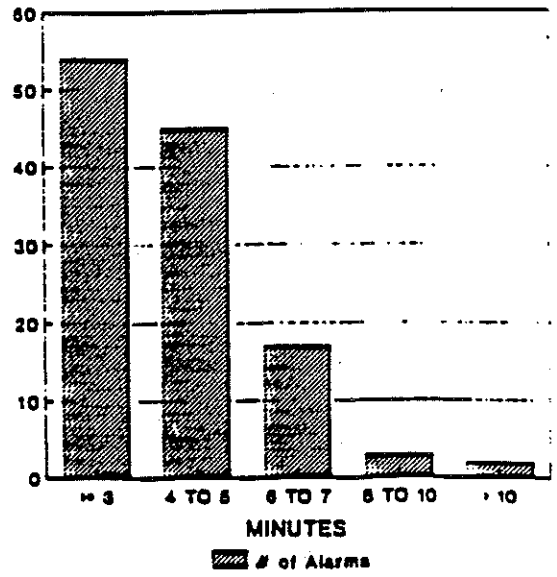
RESPONSE TIMES
RESPONSES 1201-1800



Jan/Dec.

BASED ON 165 RESPONSES

RESPONSE TIMES
RESPONSES 1801-2400



JAN/DEC.

BASED ON 121 RESPONSES

INCIDENT RECAP BY FIRST RESPONSE/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
3 Minutes & Under	8	74	99	54	235
4 To 5 Minutes	13	43	45	45	146
6 To 7 Minutes	5	8	14	17	44
8 To 10 Minutes	12	3	6	3	24
Over 10 Minutes	2	0	1	2	5
	40	128	165	121	454

Average First Response Time (Zero Response Times Excluded) 4.58

LOSSES OVER $1,000

BY DAY

INCIDENT RECAP BY DAY/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
LOSSES OVER: $1000; EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
SUNDAY	0	1	0	0	1
MONDAY	0	0	1	0	1
TUESDAY	0	1	0	0	1
WEDNESDAY	0	0	0	4	4
THURSDAY	0	1	0	0	1
FRIDAY	0	0	0	0	0
SATURDAY	0	0	1	0	1
	0	3	2	4	9

BY RESPONSE TIME

INCIDENT RECAP BY FIRST RESPONSE/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
LOSSES OVER: $1000; EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
3 Minutes & Under	0	2	1	4	7
4 To 5 Minutes	0	1	0	0	1
6 To 7 Minutes	0	0	1	0	1
8 To 10 Minutes	0	0	0	0	0
Over 10 Minutes	0	0	0	0	0
	0	3	2	4	9

Average First Response Time 3.33

LOSSES OVER $5,000

BY DAY

INCIDENT RECAP BY DAY/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
LOSSES OVER: $5000; EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
SUNDAY	0	0	0	0	0
MONDAY	0	0	0	0	0
TUESDAY	0	0	0	0	0
WEDNESDAY	0	0	0	4	4
THURSDAY	0	0	0	0	0
FRIDAY	0	0	0	0	0
SATURDAY	0	0	0	0	0
	0	0	0	4	4

BY RESPONSE TIME

INCIDENT RECAP BY FIRST RESPONSE/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
LOSSES OVER: $5000; EXCLUDES MUTUAL AID GIVEN

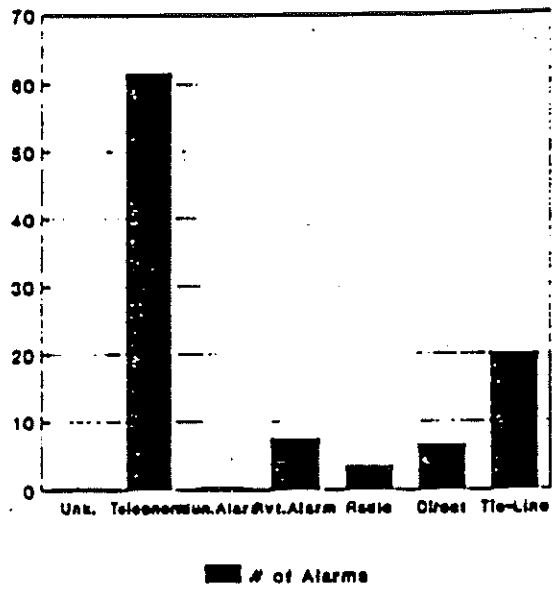
	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
3 Minutes & Under	0	0	0	4	4
4 To 5 Minutes	0	0	0	0	0
6 To 7 Minutes	0	0	0	0	0
8 To 10 Minutes	0	0	0	0	0
Over 10 Minutes	0	0	0	0	0
	0	0	0	4	4

Average First Response Time 3.00

SUNVILLE FIRE DEPT.

ACTION TAKEN/HOW REPORTED

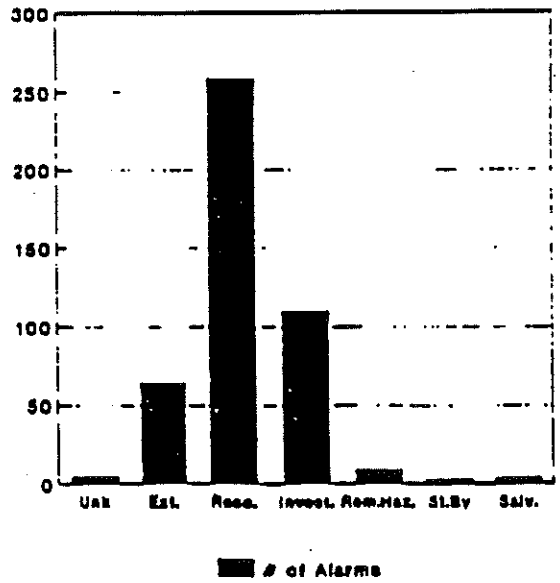
Method of Alarm
How Reported



Jan/Dec.

By Percentage

of Incidents
by Action Taken



Jan/Dec.

BASED ON 464 CALLS

Sunville Fire Department

INCIDENT RECAP BY ACTION TAKEN
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Description
0	2	0.44	UNDETERMINED OR NOT REPORTED
1	64	14.10	EXTINGUISHMENT
2	258	56.83	RESCUE ONLY
3	110	24.23	INVESTIGATION ONLY
4	9	1.98	REMOVE HAZARD
5	3	0.66	STAND BY
6	4	0.88	SALVAGE
7	1	0.22	AMBULANCE SERVICE
9	3	0.66	NOT CLASSIFIED
*** Total ***	454	100.00	

Sunville Fire Department
Page No. 1

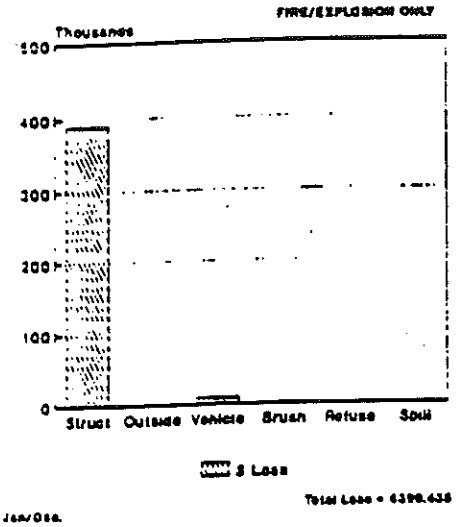
INCIDENT RECAP BY METHOD OF ALARM
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Description
0	1	0.22	UNDETERMINED OR NOT REPORTED
1	280	61.67	TELEPHONE DIRECT TO FIRE DEPARTMENT
2	2	0.44	CODED SIGNAL MUNICIPAL FIRE ALARM SYSTEM
3	34	7.49	PRIVATE FIRE ALARM SYSTEM
4	16	3.52	RADIO
5	30	6.61	DIRECT REPORT TO A FIRE STATION
7	91	20.04	TELEPHONE TIE-LINE TO FIRE DEPARTMENT
*** Total ***	454	99.99	

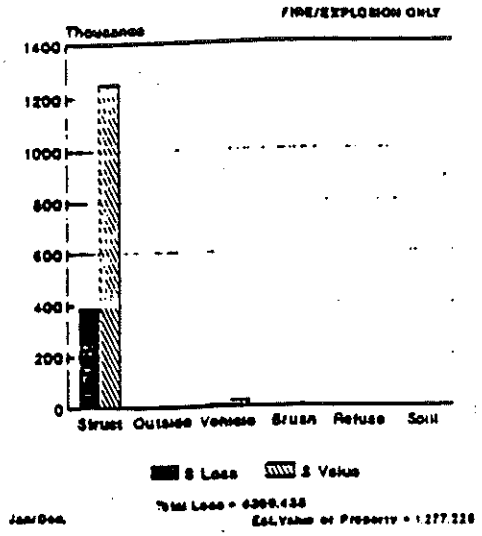
SUNVILLE FIRE DEPT.

SITUATION FOUND

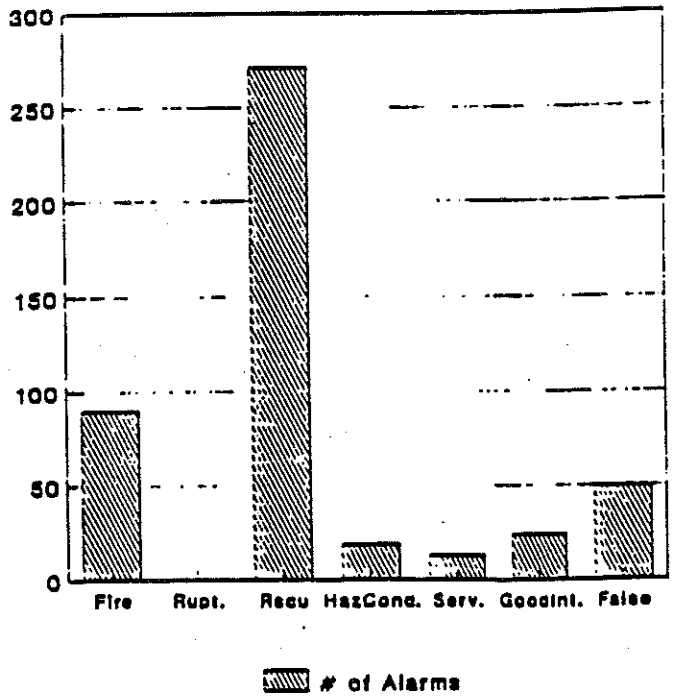
$ Loss
Situation Found



$ Loss/Value
Situation Found



of Alarms
by Situation Found



...ville Fire Department

FIRE RECAP BY SITUATION
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
11	31	6.64	389300	1252050	31.09	STRUCTURE FIRE
12	5	1.07	200	600	33.33	OUTSIDE STRUCTURE FIRE
13	18	3.85	9620	23100	41.65	VEHICLE FIRE
14	27	5.78	300	1000	30.00	TREES, BRUSH, GRASS FIRE
15	3	1.71	0	450	0.00	REFUSE FIRE
17	1	0.21	15	25	60.00	OUTSIDE SPILL, LEAK WITH ENSUING FIRE
** Subtotal **	90	19.26	399435	1277225		
** 3						
31	2	0.43	0	0	0.00	INHALATOR CALL
32	268	57.39	0	0	0.00	EMERGENCY MEDICAL CALL
39	1	0.21	0	0	0.00	NOT CLASSIFIED
** Subtotal **	271	58.03	0	0		
** 4						
41	9	1.93	0	0	0.00	SPILL, LEAK WITH NO IGNITION
44	1	0.21	0	0	0.00	POWER LINE DOWN
45	6	1.28	0	0	0.00	ARCING, SHORTED ELECTRICAL EQUIPMENT
46	1	0.21	0	0	0.00	AIRCRAFT STANDBY
47	1	0.21	0	0	0.00	CHEMICAL EMERGENCY
49	1	0.21	0	0	0.00	NOT CLASSIFIED
** Subtotal **	19	4.05	0	0		
** 5						
50	1	0.21	0	0	0.00	UNABLE TO CLASSIFY FURTHER
52	2	0.43	0	0	0.00	WATER EVACUATION
53	4	0.86	0	0	0.00	SMOKE, ODOR REMOVAL
55	1	0.21	0	0	0.00	ASSIST POLICE
56	1	0.21	0	0	0.00	UNAUTHORIZED BURNING
59	4	0.86	0	0	0.00	NOT CLASSIFIED
** Subtotal **	13	2.78	0	0		
** 6						
60	1	0.21	0	0	0.00	UNABLE TO CLASSIFY FURTHER
61	18	3.85	0	0	0.00	SMOKE SCARE
62	1	0.21	0	0	0.00	WRONG LOCATION
63	1	0.21	0	0	0.00	CONTROLLED BURNING
65	1	0.21	0	0	0.00	STEAM, OTHER GAS MISTAKEN FOR SMOKE
69	2	0.43	0	0	0.00	NOT CLASSIFIED
** Subtotal **	24	5.12	0	0		

FIRE RECAP BY SITUATION
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

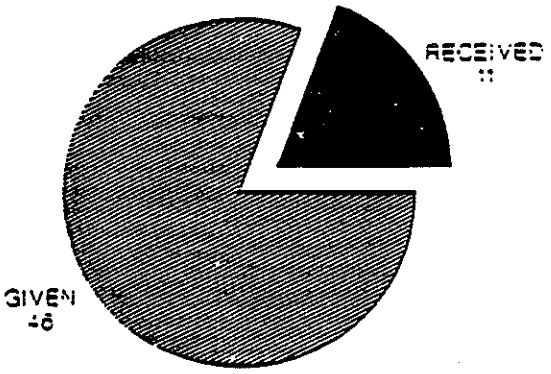
Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 7						
71	4	0.86	0	0	0.00	MALICIOUS, MISCHIEVOUS FALSE CALL
73	19	4.07	0	0	0.00	SYSTEM MALFUNCTION
74	22	4.71	0	0	0.00	UNINTENTIONAL
79	5	1.07	0	0	0.00	NOT CLASSIFIED
** Subtotal **	50	10.71	0	0		
*** Total ***	467	99.95	399435	1277225		

Sunville Fire Department

MUTUAL AID RECEIVED
Dates: 01/01/88 to 12/31/88
Numbers: All, Situations: All

Incident Exposure Number	Date	Alarm Time	Address	Zone & Station	Situation Found & Action Taken
880105-00	03/02/88	1221	MABTON/ALLEN RDS	000000/114	12/1
880235-00	05/10/88	1550	I-82/MIDVALE	000000/613	14/1
880255-01	05/19/88	1513	1RST & Y.V.H.	000000/613	14/1
880345-00	07/03/88	0040	129 W. LINCOLN	000000/116	14/1
880345-01	07/03/88	0040	129 W. LINCOLN	000000/116	11/1
880345-02	07/03/88	0040	128 W. MADISON	000000/116	11/1
880387-00	07/17/88	1530	1320 SO 13TH STREET	000000/116	14/1
880403-01	07/24/88	1322	710 SCOON RD	000000/116	14/1
880423-00	08/02/88	1145	409 W. EDISON AVE.	000000/116	15/1
880474-00	08/23/88	2254	804 GRANDVIEW AVE.	000000/116	14/1
880511-00	09/05/88	1504	711 WOODS RD.	000000/116	14/1

MUTUAL AID
RECAP



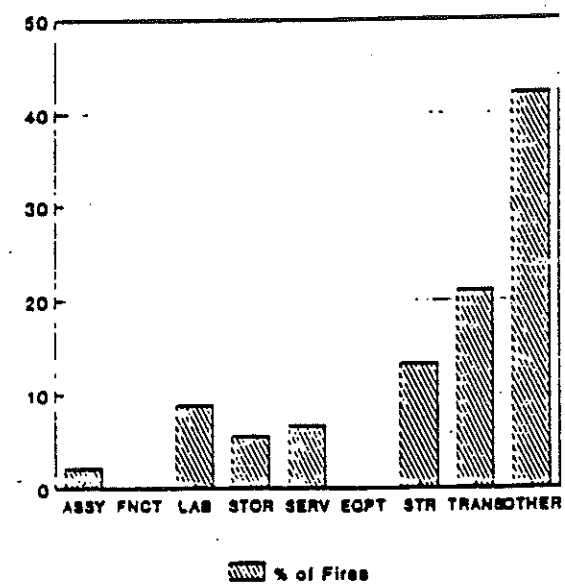
MUTUAL AID GIVEN
Dates: 01/01/88 to 12/31/88
Numbers: All, Situations: All

Incident Exposure Number	Date	Alarm Time	Address	Zone & Station	Situation Found & Action Taken
880254-00	05/18/88	0009	S.S.MABTON & ALEX.	000000/118	32/2
880258-00	05/20/88	2236	840 SO. HILL RD.	000000/118	32/2
880262-00	05/23/88	1727	231 SWAN RD.	000000/118	32/2
880264-00	05/24/88	0851	WANETA RD./ Y.V.H.	000000/118	32/2
880267-00	05/25/88	1131	271 MORSE RD.	000000/118	32/2
880269-00	05/26/88	1020	RT.2 BOX 2474 S'SIDE	000000/115	32/2
880272-00	05/26/88	1801	1420 SOUTH HILL RD.	000000/118	32/2
880273-00	05/26/88	2133	1420 SOUTH HILL RD.	000000/118	32/2
880276-00	05/27/88	1713	VANBELLE & RAY RDS.	000000/118	32/2
880281-00	05/30/88	1759	GAP/PRICE RDS.	000000/118	32/2
880290-00	06/05/88	0216	4071 VAN BELLE RD.	000000/117	11/1
880305-00	06/12/88	1441	EMERALD/MIDVALE	000000/118	32/2
880308-00	06/13/88	2345	SR 241-MILE POST #7	000000/118	32/2
880309-00	06/13/88	2345	SR 241-MILE POST #7	000000/O/J	41/5
880315-00	06/18/88	1227	OUTLOOK/AUCTION YARD	000000/118	32/2
880318-00	06/18/88	1602	RT. 1 BOX 1270	000000/118	32/2
880325-00	06/20/88	1519	I-82, MILE POST 65	000000/118	32/2
880331-00	06/27/88	0151	SS/MABTON-PENN AVE.	000000/118	32/2
880337-00	06/30/88	0959	I-82 MILE POST 63	000000/118	32/2
880340-00	06/30/88	2118	GAP/LESTER RD.	000000/117	14/1
880346-00	07/03/88	1301	4082 WASHOUT RD	000000/118	32/2
880347-00	07/03/88	1445	I-82 MILE POST #69	000000/118	32/2
880356-00	07/05/88	2250	SO. HILL/S.W.CRESCENT	000000/118	32/2
880360-00	07/07/88	1925	2131 FORDYCE RD	000000/118	32/2
880366-00	07/09/88	0826	410 FACTORY RD	000000/118	32/3
880368-00	07/10/88	0952	3790 OUTLOOK RD	000000/118	32/2
880376-00	07/12/88	2040	SR 241 / E. EDISON	000000/118	32/2
880381-00	07/15/88	0834	500 ALBRO RD	000000/118	32/2
880384-00	07/16/88	1654	S.S.MABTON/ALEXANDER	000000/118	32/3
880385-00	07/16/88	1847	VAN BELLE/DEKKER RDS	000000/118	32/2
880388-00	07/18/88	0650	2470 SCOON RD	000000/118	32/2
880394-00	07/20/88	1756	71 MURRAY RD	000000/118	32/2
880399-00	07/23/88	1500	SCOON/WOODIN RDS	000000/118	32/2
880405-00	07/25/88	1712	DEKKER/VAN BELLE RDS	000000/118	32/2
880408-00	07/26/88	1321	RT 2, BOX 2438,G'VIEW	000000/115	32/2
880409-00	07/26/88	1625	781 PIPELINE RD	000000/118	32/2
880410-00	07/26/88	1810	CEMETERY/VAN BELLERDS	000000/118	32/3
880412-00	07/28/88	0738	1ST ST / "D", OUTLOOK	000000/118	32/2
880430-00	08/04/88	2028	281 SWAN RD.	000000/118	32/2
880432-00	08/05/88	1500	Y.V.H./MONSON ENT.	000000/118	32/2
880434-00	08/05/88	2251	1014 SCOON RD.	000000/118	32/2
880435-00	08/06/88	0025	1420 SO. HILL RD.	000000/118	32/2
880436-00	08/06/88	0320	530 MIDVALE RD.	000000/118	32/2
880442-00	08/07/88	1806	1420 SO. HILL	000000/118	32/2
880444-00	08/08/88	0459	I-82/MABTON OVERPASS	000000/118	32/3
880458-00	08/17/88	1652	EUCLID & Y.V.H.	000000/118	32/2

SUNVILLE FIRE DEPT.

ORIGIN & IGNITION

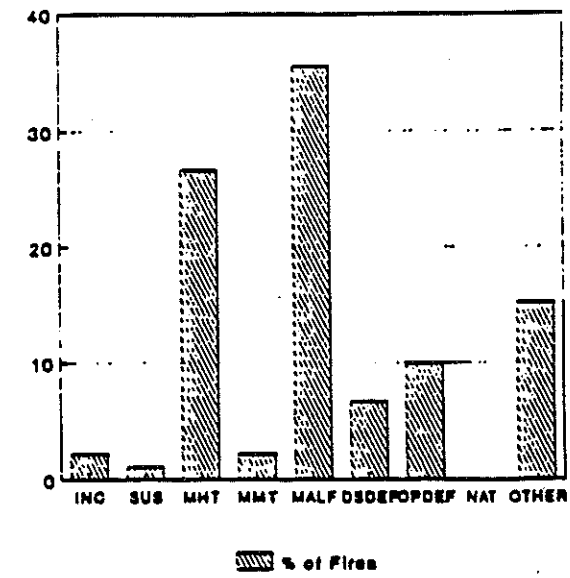
Area of Origin
% of Fires



Jan/Dec.

BASED ON 60 ALARMS

Ignition Factor
% of Fires



Jan/Dec.

BASED ON 90 CALLS

Sunville Fire Department

FIRE RECAP BY AREA OF FIRE ORIGIN
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
14	2	2.22	400	1250	32.00	LOUNGE AREA
** Subtotal **	2	2.22	400	1250		
** 2						
21	2	2.22	23900	64000	37.34	SLEEPING ROOM FOR UNDER 5 PERSONS
24	4	4.44	2100	90000	2.33	KITCHEN, COOKING AREA
25	1	1.11	0	30000	0.00	LAVATORY, LOCKER ROOM, CLOAKROOM
26	1	1.11	8000	22000	36.36	LAUNDRY ROOM, AREA
** Subtotal **	8	8.88	34000	206000		
** 4						
45	1	1.11	96000	96000	100.00	SHIPPING, RECEIVING, LOADING AREA
46	4	4.44	0	450	0.00	TRASH OR RUBBISH AREAS, CONTAINER
** Subtotal **	5	5.55	96000	96450		
** 5						
57	6	6.67	0	315000	0.00	CHIMNEY
** Subtotal **	6	6.67	0	315000		
** 7						
74	4	4.44	215100	330500	65.08	CEILING AND ROOF ASSEMBLY, CONCEALED FLOOR/CEILING
75	1	1.11	2000	40000	5.00	WALL ASSEMBLY, CONCEALED WALL SPACE
76	4	4.44	1600	33000	4.85	EXTERIOR WALL SURFACE
77	3	3.33	40050	230000	17.41	EXTERIOR ROOF SURFACE
** Subtotal **	12	13.32	258750	633500		
** 8						
81	4	4.44	2700	3700	72.97	PASSENGER AREA OF TRANSPORTATION EQUIPMENT
83	12	13.33	5900	15900	37.11	ENGINE AREA, RUNNING GEAR, WHEEL AREA
84	1	1.11	20	1000	2.00	FUEL TANK, FUEL LINE AREA OF TRANSPORTATION EQUPT
85	1	1.11	1000	1000	100.00	OPERATING, CONTROL AREA
86	1	1.11	200	2000	10.00	EXTERIOR EXPOSED SURFACE OF TRANSPORTATION EQUPMNT
** Subtotal **	19	21.10	9820	23600		
** 9						
91	1	1.11	0	0	0.00	ON OR NEAR RAILROAD RIGHT OF WAY, EMBANKMENT
92	4	4.44	0	0	0.00	ON OR NEAR HIGHWAY, PUBLIC WAY, STREET
94	30	33.33	415	1375	30.18	LAWN, FIELD, OPEN AREA
98	1	1.11	0	0	0.00	NOT APPLICABLE
99	2	2.22	50	50	100.00	NOT CLASSIFIED
** Subtotal **	38	42.21	465	1425		
*** Total ***	90	99.95	399435	1277225		

Sunville Fire Department

FIRE RECAP BY IGNITION FACTOR
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	12	13.33	1000	2050	48.78	UNDETERMINED OR NOT REPORTED
** Subtotal **	12	13.33	1000	2050		
** 1						
11	2	2.22	800	30800	2.60	NOT DURING CIVIL DISTURBANCE
** Subtotal **	2	2.22	800	30800		
** 2						
21	1	1.11	23000	40000	57.50	NOT DURING CIVIL DISTURBANCE
** Subtotal **	1	1.11	23000	40000		
** 3						
31	1	1.11	0	0	0.00	ABANDONED, DISCARDED MATERIAL
34	9	10.00	100	500	20.00	INADEQUATE CONTROL OF OPEN FIRE
36	13	14.44	41700	24500	170.20	CHILDREN WITH, CHILD PLAYING
37	1	1.11	0	250	0.00	UNCONSCIOUS - MENTAL, PHYSICAL IMPAIRMENT - DRUGS
** Subtotal **	24	26.66	41800	25250		
** 4						
41	1	1.11	15	25	60.00	FUEL SPILLED, RELEASED ACCIDENTALLY
48	1	1.11	0	0	0.00	CHILDREN WITH, CHILD PLAYING
** Subtotal **	2	2.22	15	25		
** 5						
50	1	1.11	700	700	100.00	UNABLE TO CLASSIFY FURTHER
51	8	8.89	4400	9100	48.35	PART FAILURE, LEAK, BREAK
52	1	1.11	300	0	0.00	AUTOMATIC CONTROL FAILURE
54	11	12.22	109400	238050	45.96	SHORT CIRCUIT, GROUND FAULT
56	7	7.78	40000	384000	10.42	LACK OF MAINTENANCE, WORN OUT
57	3	3.33	800	7000	11.43	BACKFIRE
59	1	1.11	20	1000	2.00	NOT CLASSIFIED
** Subtotal **	32	35.55	155620	639850		
** 6						
62	1	1.11	1800	30000	6.00	CONSTRUCTION DEFICIENCY
63	1	1.11	0	160000	0.00	INSTALLED TOO CLOSE TO COMBUSTIBLES
65	4	4.44	174500	214000	81.54	PROPERTY TOO CLOSE TO (EXPOSURE FIRES)
** Subtotal **	6	6.66	176300	404000		

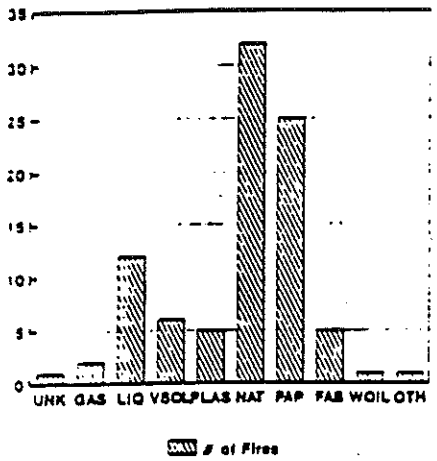
FIRE RECAP BY IGNITION FACTOR
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 7						
73	9	10.00	100	60250	0.17	UNATTENDED
** Subtotal **	9	10.00	100	60250		
** 9						
99	2	2.22	800	75000	1.07	OTHER IGNITION FACTOR NOT CLASSIFIED ABOVE
** Subtotal **	2	2.22	800	75000		
*** Total ***	90	99.97	399435	1277225		

SUNVILLE FIRE DEPT.

IGNITION FACTORS

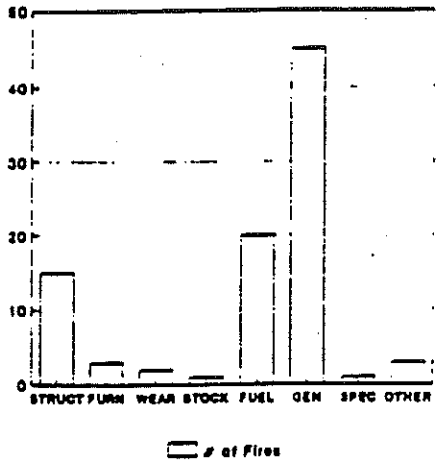
Type of Material
of incidents



Jan/Dec.

BASED ON 90 INCIDENTS

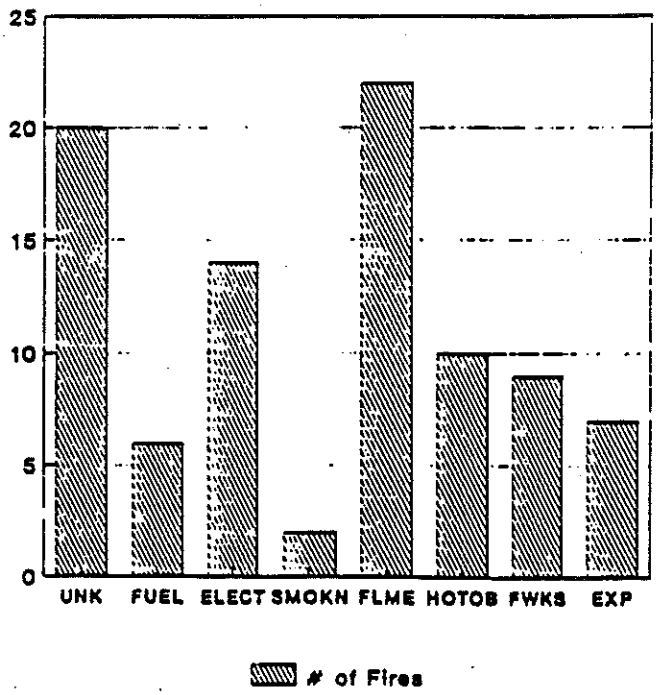
Form Material Ignited
of Incidents



Jan/Dec.

BASED ON 90 INCIDENTS

Heat of Ignition
of Incidents



Jan/Dec.

BASED ON 90 RESPONSES

Sunville Fire Department

FIRE RECAP BY TYPE OF MATERIAL IGNITED
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	1	1.11	750	750	100.00	UNDETERMINED OR NOT REPORTED
** Subtotal **	1	1.11	750	750		
** 1						
12	2	2.22	715	725	98.62	LP-CITY GAS (LP AND AIR MIX)
** Subtotal **	2	2.22	715	725		
** 2						
23	12	13.33	5220	17100	30.53	GASOLINE
** Subtotal **	12	13.33	5220	17100		
** 3						
34	6	6.67	0	315000	0.00	ADHESIVE, RESIN, TAR
** Subtotal **	6	6.67	0	315000		
** 4						
40	3	3.33	1300	61000	2.13	UNABLE TO CLASSIFY FURTHER
45	1	1.11	400	1000	40.00	POLYESTER
49	1	1.11	50	50	100.00	NOT CLASSIFIED
** Subtotal **	5	5.55	1750	62050		
** 5						
51	1	1.11	200	1100	18.18	RUBBER
54	30	33.33	300	1000	30.00	GRASS, LEAVES, HAY, STRAW
57	1	1.11	0	0	0.00	FOOD, STARCH
** Subtotal **	32	35.55	500	2100		
** 6						
60	1	1.11	0	0	0.00	UNABLE TO CLASSIFY FURTHER
61	1	1.11	0	0	0.00	GROWING WOOD
63	18	20.00	261550	527850	49.55	SAWN WOOD
67	4	4.44	96000	126000	76.19	PAPER, UNTREATED, UNCOATED
68	1	1.11	0	450	0.00	CARDBOARD
** Subtotal **	25	27.77	357550	654300		
** 7						
70	2	2.22	150	900	16.67	UNABLE TO CLASSIFY FURTHER
72	2	2.22	1800	2300	78.26	COTTON, RAYON, COTTON FABRIC, FINISHED GOODS
79	1	1.11	8000	22000	36.36	NOT CLASSIFIED

FIRE RECAP BY TYPE OF MATERIAL IGNITED
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** Subtotal **						
	5	5.55	9950	25200		
** 8						
86	1	1.11	0	160000	0.00	ASPHALT TREATED MATERIAL
** Subtotal **						
	1	1.11	0	160000		
** 9						
97	1	1.11	23000	40000	57.50	MULTIPLE TYPES OF MATERIALS FIRST IGNITED
** Subtotal **						
	1	1.11	23000	40000		
*** Total ***						
	90	99.97	399435	1277225		

Sunville Fire Department

FIRE RECAP BY FORM OF MATERIAL IGNITED
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
11	4	4.44	40850	305000	13.39	EXTERIOR ROOF COVERING,SURFACE,FINISH
12	5	5.56	1700	33250	5.11	EXTERIOR SIDEWALL COVERING, SURFACE, FINISH
17	6	6.67	219000	349500	62.66	STRUCTURAL MEMBER,FRAMING
** Subtotal **	15	16.67	261550	687750		
** 2						
21	3	3.33	1550	3150	49.21	UPHOLSTERED SOFA, CHAIR, VEHICLE SEATS
** Subtotal **	3	3.33	1550	3150		
** 3						
32	1	1.11	0	250	0.00	BEDDING, BLANKET, SHEET, COMFORTER
34	1	1.11	800	800	100.00	WEARING APPAREL NOT ON A PERSON
** Subtotal **	2	2.22	800	1050		
** 5						
51	1	1.11	96000	96000	100.00	BOX, CARTON, BAG
** Subtotal **	1	1.11	96000	96000		
** 6						
61	4	4.44	2100	1800	116.67	ELECTRICAL WIRE, CABLE INSULATION
65	16	17.78	5935	17925	33.11	FUEL
** Subtotal **	20	22.22	8035	19725		
** 7						
72	1	1.11	0	0	0.00	FENCE, POLE
74	29	32.22	300	1000	30.00	GROWING, LIVING FORM
75	13	14.44	0	315450	0.00	RUBBISH, TRASH, WASTE
76	2	2.22	0	60000	0.00	COOKING MATERIALS
** Subtotal **	45	49.99	300	376450		
** 8						
81	1	1.11	8000	22000	36.36	DUST, FIBER, LINT
** Subtotal **	1	1.11	8000	22000		
** 9						
97	1	1.11	23000	40000	57.50	MULTIPLE FORM OF MATERIAL IGNITED
99	2	2.22	200	31100	0.64	FORM OF MATERIAL NOT CLASSIFIED ABOVE
** Subtotal **	3	3.33	23200	71100		
*** Total ***	90	99.98	399435	1277225		

Sunville Fire Department

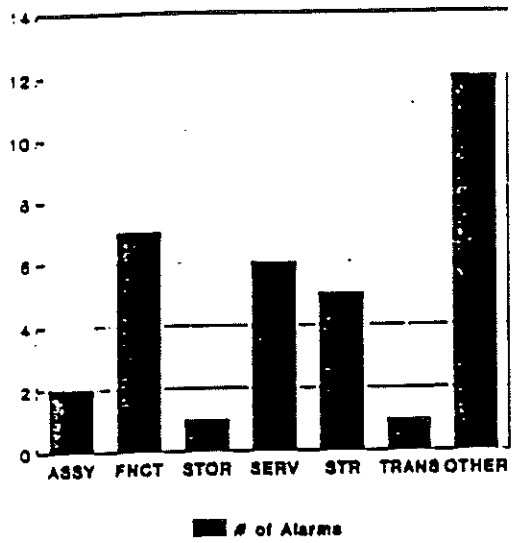
FIRE RECAP BY FORM OF HEAT IGNITION
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	20	22.22	27300	45250	60.33	UNDETERMINED OR NOT REPORTED
** Subtotal **	20	22.22	27300	45250		
** 1						
12	1	1.11	15	25	60.00	HEAT FROM GAS FUELED EQUIPMENT
14	2	2.22	700	3300	21.21	HEAT FROM LIQUID FUELED EQUIPMENT
15	2	2.22	40000	69000	57.97	SPARK ESCAPING FROM SOLID FUELED EQUIPMENT
16	1	1.11	0	60000	0.00	HEAT FROM SOLID FUELED EQUIPMENT
** Subtotal **	6	6.66	40715	132325		
** 2						
23	5	5.56	8700	76250	11.41	SHORT CIRCUIT ARC FROM DEFECTIVE, WORN INSULATION
24	5	5.56	98570	99550	99.02	UNSPECIFIED SHORT CIRCUIT ARC
26	1	1.11	300	0	0.00	ARC FROM OPERATING EQUIPMENT OR SWITCH
27	3	3.33	2950	64050	4.61	HEAT FROM OVERLOADED ELECTRICAL EQUIPMENT
** Subtotal **	14	15.56	110520	239850		
** 3						
31	2	2.22	0	250	0.00	CIGARETTE
** Subtotal **	2	2.22	0	250		
** 4						
45	7	7.78	400	1000	40.00	MATCH
46	3	3.33	800	30800	2.60	LIGHTER (FLAME TYPE)
47	8	8.89	200	750	26.67	OPEN FIRE
48	4	4.44	900	7500	12.00	BACKFIRE FROM INTERNAL COMBUSTION ENGINE
** Subtotal **	22	24.44	2300	40050		
** 5						
51	1	1.11	0	0	0.00	HEAT, SPARK FROM FRICTION
53	5	5.56	800	330000	0.24	HOT EMBER, ASH
54	1	1.11	0	160000	0.00	ELECTRIC LAMP
56	2	2.22	200	62000	0.32	HEAT FROM PROPERLY OPERATING ELECTRICAL EQUIPMENT
59	1	1.11	0	0	0.00	NOT CLASSIFIED
** Subtotal **	10	11.11	1000	552000		
** 6						
63	9	10.00	800	1500	53.33	FIREWORKS
** Subtotal **	9	10.00	800	1500		
** 8						
81	7	7.78	216800	266000	81.50	HEAT FROM DIRECT FLAME, CONVECTION CURRENTS
** Subtotal **	7	7.78	216800	266000		
*** Total ***						

SUNVILLE FIRE DEPT.

RESIDENTIAL ANALYSIS

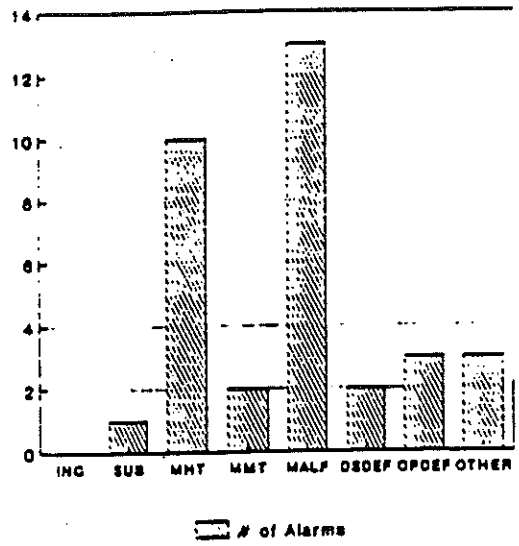
Area of Origin
Residential Fires



BASED ON 34 RESIDENTIAL RESPONSES

Jan/Dec.

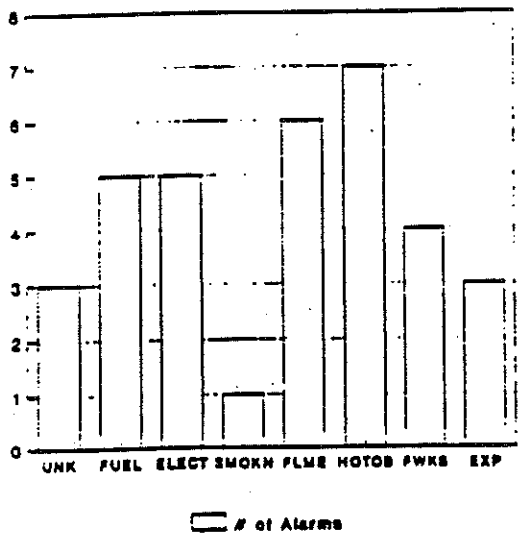
Ignition Factor
Residential Fires



BASED ON 34 RESIDENTIAL INCIDENTS

Jan/Dec.

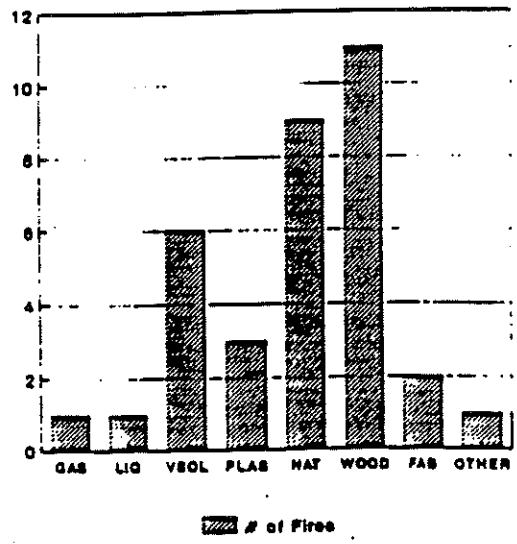
Heat of Ignition
Residential Fires



BASED ON 34 RESIDENTIAL INCIDENTS

Jan/Dec.

Material Ignited
Residential Fires



BASED ON 34 RESIDENTIAL INCIDENTS

Jan/Dec.

Sunville Fire Department

FIRE RECAP BY AREA OF FIRE ORIGIN
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: 400 TO 499

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
14	2	5.88	400	1250	32.00	LOUNGE AREA
** Subtotal **						
	2	5.88	400	1250		
** 2						
21	2	5.88	23900	64000	37.34	SLEEPING ROOM FOR UNDER 5 PERSONS
24	4	11.76	2100	90000	2.33	KITCHEN, COOKING AREA
26	1	2.94	8000	22000	36.36	LAUNDRY ROOM, AREA
** Subtotal **						
	7	20.58	34000	176000		
** 4						
46	1	2.94	0	0	0.00	TRASH OR RUBBISH AREAS, CONTAINER
** Subtotal **						
	1	2.94	0	0		
** 5						
57	6	17.65	0	315000	0.00	CHIMNEY
** Subtotal **						
	6	17.65	0	315000		
** 7						
74	3	8.82	41100	146500	28.05	CEILING AND ROOF ASSEMBLY, CONCEALED FLOOR/CEILING
75	1	2.94	2000	40000	5.00	WALL ASSEMBLY, CONCEALED WALL SPACE
77	1	2.94	40000	20000	200.00	EXTERIOR ROOF SURFACE
** Subtotal **						
	5	14.70	83100	206500		
** 8						
83	1	2.94	200	1800	11.11	ENGINE AREA, RUNNING GEAR, WHEEL AREA
** Subtotal **						
	1	2.94	200	1800		
** 9						
94	11	32.35	415	1375	30.18	LAWN, FIELD, OPEN AREA
98	1	2.94	0	0	0.00	NOT APPLICABLE
** Subtotal **						
	12	35.29	415	1375		
*** Total ***						
	34	99.98	118115	701925		

Sylville Fire Department

FIRE RECAP BY IGNITION FACTOR
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: 400 TO 499

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	2	5.88	0	100	0.00	UNDETERMINED OR NOT REPORTED
** Subtotal **	2	5.88	0	100		
** 2						
21	1	2.94	23000	40000	57.50	NOT DURING CIVIL DISTURBANCE
** Subtotal **	1	2.94	23000	40000		
** 3						
34	2	5.88	0	0	0.00	INADEQUATE CONTROL OF OPEN FIRE
36	7	20.59	40700	22000	185.00	CHILDREN WITH, CHILD PLAYING
37	1	2.94	0	250	0.00	UNCONSCIOUS - MENTAL, PHYSICAL IMPAIRMENT - DRUGS
** Subtotal **	10	29.41	40700	22250		
** 4						
41	1	2.94	15	25	60.00	FUEL SPILLED, RELEASED ACCIDENTALLY
48	1	2.94	0	0	0.00	CHILDREN WITH, CHILD PLAYING
** Subtotal **	2	5.88	15	25		
** 5						
51	1	2.94	200	1800	11.11	PART FAILURE, LEAK, BREAK
52	1	2.94	300	0	0.00	AUTOMATIC CONTROL FAILURE
54	4	11.76	11200	88500	12.66	SHORT CIRCUIT, GROUND FAULT
56	7	20.59	40000	384000	10.42	LACK OF MAINTENANCE, WORN OUT
** Subtotal **	13	38.23	51700	474300		
** 6						
62	1	2.94	1800	30000	6.00	CONSTRUCTION DEFICIENCY
65	1	2.94	0	0	0.00	PROPERTY TOO CLOSE TO (EXPOSURE FIRES)
** Subtotal **	2	5.88	1800	30000		
** 7						
73	3	8.82	100	60250	0.17	UNATTENDED
** Subtotal **	3	8.82	100	60250		
** 9						
99	1	2.94	800	75000	1.07	OTHER IGNITION FACTOR NOT CLASSIFIED ABOVE
** Subtotal **	1	2.94	800	75000		
*** Total ***	34	99.98	118115	701925		

Sunville Fire Department

FIRE RECAP BY FORM OF HEAT IGNITION
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: 400 TO 499

12/06/88

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	3	8.82	23000	40100	57.36	UNDETERMINED OR NOT REPORTED
** Subtotal **	3	8.82	23000	40100		
** 1						
12	1	2.94	15	25	60.00	HEAT FROM GAS FUELED EQUIPMENT
14	1	2.94	200	1800	11.11	HEAT FROM LIQUID FUELED EQUIPMENT
15	2	5.88	40000	69000	57.97	SPARK ESCAPING FROM SOLID FUELED EQUIPMENT
16	1	2.94	0	60000	0.00	HEAT FROM SOLID FUELED EQUIPMENT
** Subtotal **	5	14.70	40215	130825		
** 2						
23	2	5.88	8300	24500	33.88	SHORT CIRCUIT ARC FROM DEFECTIVE, WORN INSULATION
26	1	2.94	300	0	0.00	ARC FROM OPERATING EQUIPMENT OR SWITCH
27	2	5.88	2900	64000	4.53	HEAT FROM OVERLOADED ELECTRICAL EQUIPMENT
** Subtotal **	5	14.70	11500	88500		
** 3						
31	1	2.94	0	250	0.00	CIGARETTE
** Subtotal **	1	2.94	0	250		
** 4						
45	2	5.88	400	1000	40.00	MATCH
46	1	2.94	0	0	0.00	LIGHTER (FLAME TYPE)
47	3	8.82	100	250	40.00	OPEN FIRE
** Subtotal **	6	17.64	500	1250		
** 5						
53	5	14.71	800	330000	0.24	HOT EMBER, ASH
56	1	2.94	0	60000	0.00	HEAT FROM PROPERLY OPERATING ELECTRICAL EQUIPMENT
59	1	2.94	0	0	0.00	NOT CLASSIFIED
** Subtotal **	7	20.59	800	390000		
** 6						
63	4	11.76	300	1000	30.00	FIREWORKS
** Subtotal **	4	11.76	300	1000		
** 8						
81	3	8.82	41800	50000	83.60	HEAT FROM DIRECT FLAME, CONVECTION CURRENTS
** Subtotal **	3	8.82	41800	50000		
*** Total ***	34	99.97	118115	701925		

Sunville Fire Department

FIRE RECAP BY TYPE OF MATERIAL IGNITED
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: 400 TO 499

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
12	1	2.94	15	25	60.00	LP-CITY GAS (LP AND AIR MIX)
** Subtotal **	1	2.94	15	25		
** 2						
23	1	2.94	200	1800	11.11	GASOLINE
** Subtotal **	1	2.94	200	1800		
** 3						
34	6	17.65	0	315000	0.00	ADHESIVE, RESIN, TAR
** Subtotal **	6	17.65	0	315000		
** 4						
40	2	5.88	300	60000	0.50	UNABLE TO CLASSIFY FURTHER
45	1	2.94	400	1000	40.00	POLYESTER
** Subtotal **	3	8.82	700	61000		
** 5						
54	8	23.53	300	1000	30.00	GRASS, LEAVES, HAY, STRAW
57	1	2.94	0	0	0.00	FOOD, STARCH
** Subtotal **	9	26.47	300	1000		
** 6						
61	1	2.94	0	0	0.00	GROWING WOOD
63	10	29.41	85900	260850	32.93	SAWN WOOD
** Subtotal **	11	32.35	85900	260850		
** 7						
70	1	2.94	0	250	0.00	UNABLE TO CLASSIFY FURTHER
79	1	2.94	8000	22000	36.36	NOT CLASSIFIED
** Subtotal **	2	5.88	8000	22250		
** 9						
97	1	2.94	23000	40000	57.50	MULTIPLE TYPES OF MATERIALS FIRST IGNITED
** Subtotal **	1	2.94	23000	40000		
*** Total ***	34	99.99	118115	701925		

EMS INCIDENT DATA

NOTE: DATA COMPILED FOR
A 3+ YEAR PERIOD

Sunville Fire Department

EMS PATIENT RECAP OF CAUSE CODES
Numbers: All
EXCLUDED: 34 Patient Zero Records & 4 Invalid Records

EMS Code	Number	Percent	Severity 0	Severity 1	Severity 2	Severity 3	Severity 4	Description
MV	151	19.61	0	10	33	68	34	Motor Vehicle
PV	9	1.17	0	0	3	4	2	Pedestrian/Vehicle
MC	14	1.82	0	0	5	6	3	Motorcycle (incl. motorcycle/car)
BI	6	0.78	0	0	2	4	0	Bicycle (incl. bicycle/car)
ME	9	1.17	0	1	5	2	1	Machinery/Equipment
GS	1	0.13	0	0	1	0	0	Firearms
BU	5	0.65	0	2	2	0	1	Burns
BL	3	0.39	0	0	0	2	1	Blunt Instrument
KN	5	0.65	0	0	0	4	1	Sharp Instrument
AS	26	3.38	0	0	4	14	8	Beating/Fight/Assault (w/o weapon)
FA	87	11.30	0	0	28	39	19	Fall
SP	12	1.56	0	0	6	6	0	Sports or Play Injury
AN	3	0.39	0	0	1	2	0	Animal-Caused Injury
AC	3	0.39	0	0	1	1	1	Other Accident/Injury
DR	2	0.26	0	0	1	1	0	Drowning
ST	2	0.26	0	1	0	1	0	Strangulation or Suffocation
AL	11	1.43	0	0	0	5	6	Alcohol Intoxication
CO	16	2.08	0	1	8	7	0	Drug (incl. combined drug-alcohol)
DT	2	0.26	0	0	0	1	1	Drug-alcohol withdrawal
AX	1	0.13	0	0	1	0	0	Accidental overdose/poison
AD	2	0.26	0	0	2	0	0	Adverse drug reaction
MO	324	42.08	0	42	143	112	26	Medical (illness)
OB	3	0.39	0	0	1	2	0	Obstetric
PS	8	1.04	0	0	0	6	2	Psychiatric
XX	65	8.44	0	0	1	7	53	Other Alarm
*** Total ***	770	100.02	0	57	253	294	159	

EMS CODE — Explained under description

SEVERITY
1 Immediate life threatening
2 Urgent
3 Non-urgent
4 Not Applicable

Sunville Fire Department

EMS UNIT RECAP
Numbers: All
Unit Codes: All
EXCLUDED: 2 Invalid Records

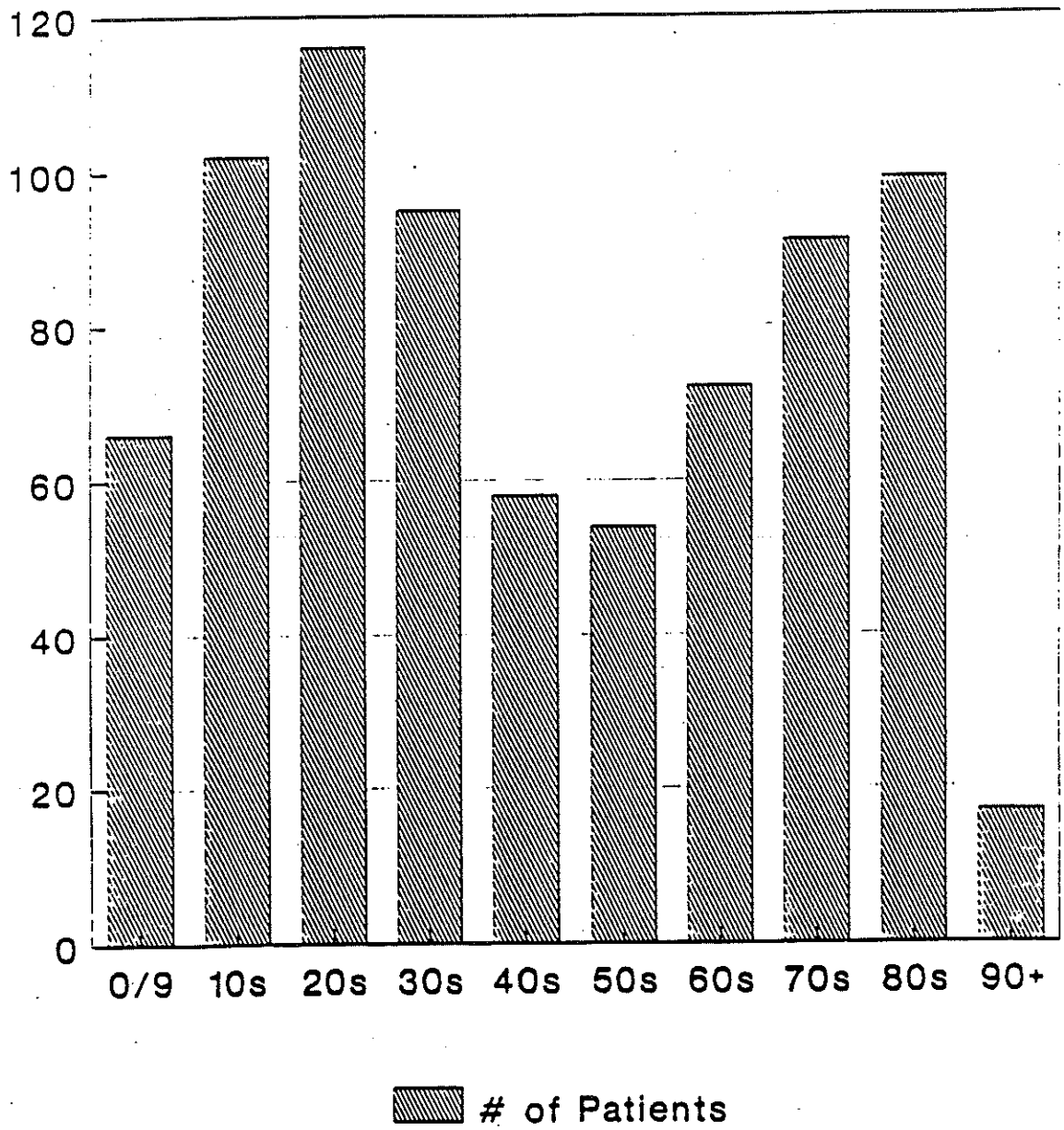
Unit Code	Runs	Percent	Miles	Time	0 to 3 Minutes	4 to 5 Minutes	6 to 7 Minutes	8 to 10 Minutes	Over 10 Minutes	Nonemergency Runs Or No Patient Supported	Description
15	42	5.45	170	1763	11	7	8	7	3	6	Northview Ambulance Comp.
19	726	94.29	2074	****	314	174	79	64	29	66	Sunville Fire Department
112	1	0.13	4	49	0	0	0	0	1	0	Sunville Police
113	1	0.13	0	0	0	0	0	0	0	1	Ridgeview Fire Departmen
*** Total ***	770	100.00	2248	****	325	181	87	71	33	73	

EMS FIRST RESPONSE RECAP - BLS
As Of 02/20/89 For Sunville Fire Department
Dates: to 12/31/88; Numbers: All

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
3 Minutes & Under	7	95	149	79	330
4 To 5 Minutes	13	49	57	52	171
6 To 7 Minutes	14	27	17	26	84
8 To 10 Minutes	24	15	17	6	62
Over 10 Minutes	14	4	4	8	30
	72	190	244	171	677

Average First Response Time (Zero Response Times Excluded) 4.45

PATIENT AGE
EMS Incidents



3 YEAR PERIOD

Sunville Fire Department

EMS PATIENT RECAP OF AGE/SEX
Numbers: 870000 to 889999
EXCLUDED: 34 Patient Zero Records & 4 Invalid Records

	Age	Number	Percent	Males	Females
** 0					
	0	22	2.86	13	4
	1	9	1.17	5	4
	2	4	0.52	2	2
	3	3	0.39	2	1
	4	2	0.26	1	1
	5	5	0.65	1	4
	6	3	0.39	1	2
	7	5	0.65	4	1
	8	6	0.78	3	3
	9	7	0.91	3	4
** Subtotal **		66	8.58	35	26
** 1					
	10	1	0.13	1	0
	11	10	1.30	7	3
	12	3	0.39	1	2
	13	7	0.91	4	3
	14	11	1.43	6	5
	15	8	1.04	4	4
	16	17	2.21	4	13
	17	21	2.73	9	12
	18	14	1.82	10	4
	19	10	1.30	6	4
** Subtotal **		102	13.26	52	50
** 2					
	20	15	1.95	9	6
	21	11	1.43	6	5
	22	14	1.82	7	7
	23	9	1.17	4	5
	24	15	1.95	11	4
	25	11	1.43	5	6
	26	13	1.69	7	6
	27	11	1.43	7	4
	28	7	0.91	6	1
	29	10	1.30	5	5
** Subtotal **		116	15.08	67	49
** 3					
	30	16	2.08	9	7
	31	8	1.04	5	3
	32	13	1.69	9	4
	33	11	1.43	6	5
	34	11	1.43	8	3

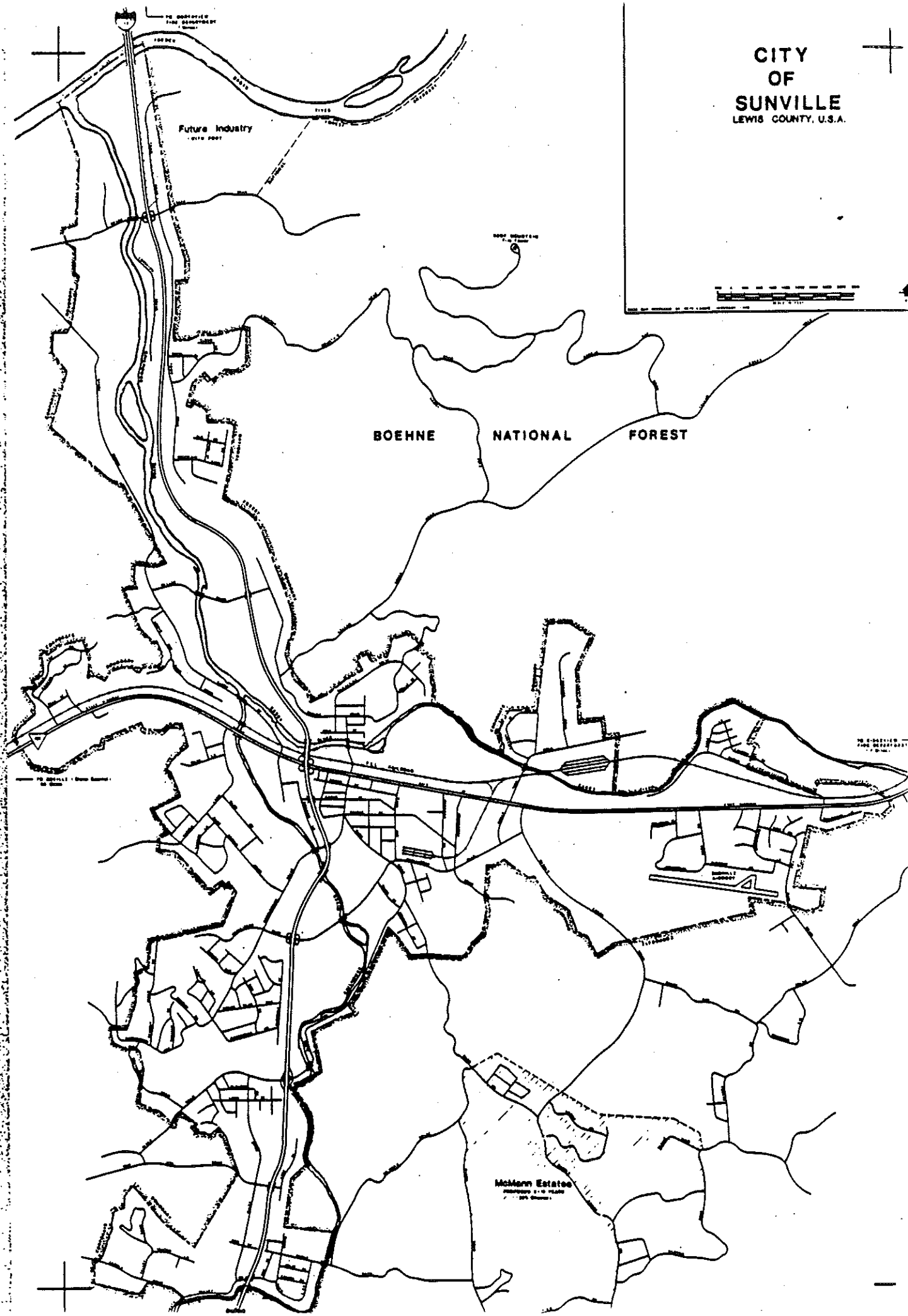
EMS PATIENT RECAP OF AGE/SEX
Numbers: 870000 to 889999
EXCLUDED: 34 Patient Zero Records & 4 Invalid Records

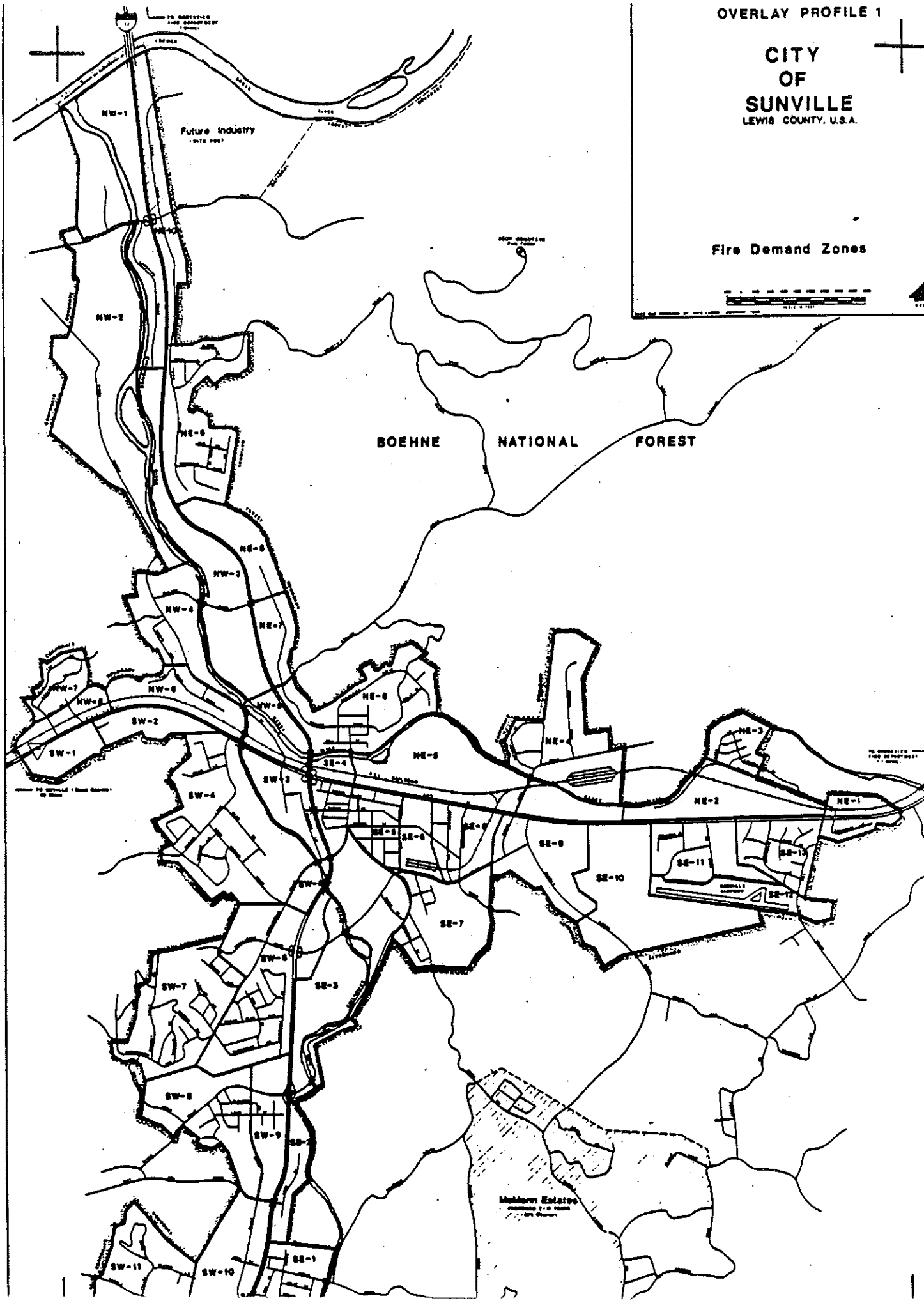
	Age	Number	Percent	Males	Females
	35	7	0.91	3	4
	36	5	0.65	3	2
	37	7	0.91	4	3
	38	6	0.78	2	4
	39	11	1.43	7	4
** Subtotal **		95	12.35	56	39
** 4					
	40	8	1.04	4	4
	41	5	0.65	1	4
	42	8	1.04	4	4
	43	6	0.78	3	3
	44	3	0.39	2	1
	45	9	1.17	2	7
	46	2	0.26	0	2
	47	3	0.39	1	2
	48	4	0.52	1	3
	49	10	1.30	4	6
** Subtotal **		58	7.54	22	36
** 5					
	50	6	0.78	4	2
	51	4	0.52	4	0
	52	5	0.65	4	1
	53	4	0.52	2	2
	54	4	0.52	2	2
	55	6	0.78	0	6
	56	4	0.52	4	0
	57	6	0.78	4	2
	58	12	1.56	7	5
	59	3	0.39	1	2
** Subtotal **		54	7.02	32	22
** 6					
	60	7	0.91	7	0
	61	6	0.78	3	3
	62	6	0.78	3	3
	63	6	0.78	2	4
	64	6	0.78	3	3
	65	10	1.30	7	3
	66	6	0.78	5	1
	67	9	1.17	2	7
	68	8	1.04	3	5
	69	8	1.04	7	1

EMS PATIENT RECAP OF AGE/SEX
Numbers: 870000 to 889999
EXCLUDED: 34 Patient Zero Records & 4 Invalid Records

	Age	Number	Percent	Males	Females
** Subtotal **		72	9.36	42	30
** 7					
	70	9	1.17	5	4
	71	7	0.91	4	3
	72	7	0.91	6	1
	73	6	0.78	3	3
	74	7	0.91	2	5
	75	11	1.43	7	4
	76	12	1.56	4	8
	77	16	2.08	6	10
	78	9	1.17	5	4
	79	7	0.91	3	4
** Subtotal **		91	11.83	45	46
** 8					
	80	3	0.39	2	1
	81	5	0.65	2	3
	82	10	1.30	3	7
	83	9	1.17	4	5
	84	8	1.04	2	6
	85	7	0.91	1	6
	86	7	0.91	1	6
	87	16	2.08	9	7
	88	13	1.69	11	2
	89	21	2.73	16	5
** Subtotal **		99	12.87	51	48
** 9					
	90	4	0.52	2	2
	91	3	0.39	1	2
	92	1	0.13	0	1
	93	2	0.26	1	1
	94	2	0.26	0	2
	95	1	0.13	1	0
	96	1	0.13	1	0
	97	1	0.13	0	1
	98	1	0.13	1	0
** Subtotal **		16	2.08	7	9
** 0					
	102	1	0.13	0	1
** Subtotal **		1	0.13	0	1
*** Total ***		770	100.10	409	356

MAPS AND OVERLAYS


CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates


OVERLAY PROFILE 1
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Fire Demand Zones
Future Industry
BOEHNE NATIONAL FOREST
NW-1
NW-2
NW-3
NW-4
NW-5
NW-6
NW-7
NW-8
NW-9
NE-1
NE-2
NE-3
NE-4
NE-5
NE-6
NE-7
NE-8
NE-9
SW-1
SW-2
SW-3
SW-4
SW-5
SW-6
SW-7
SW-8
SW-9
SW-10
SW-11
SE-1
SE-2
SE-3
SE-4
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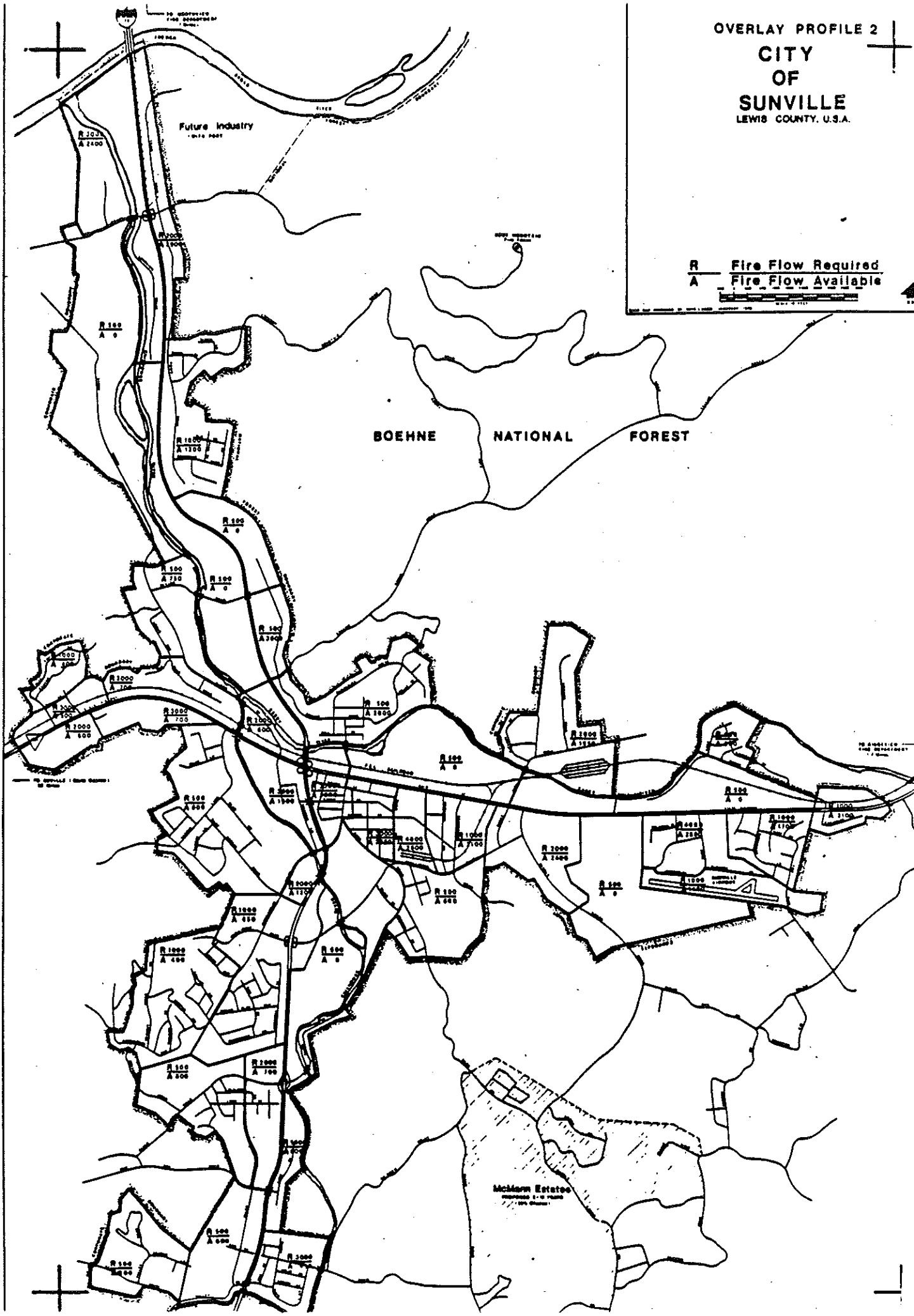
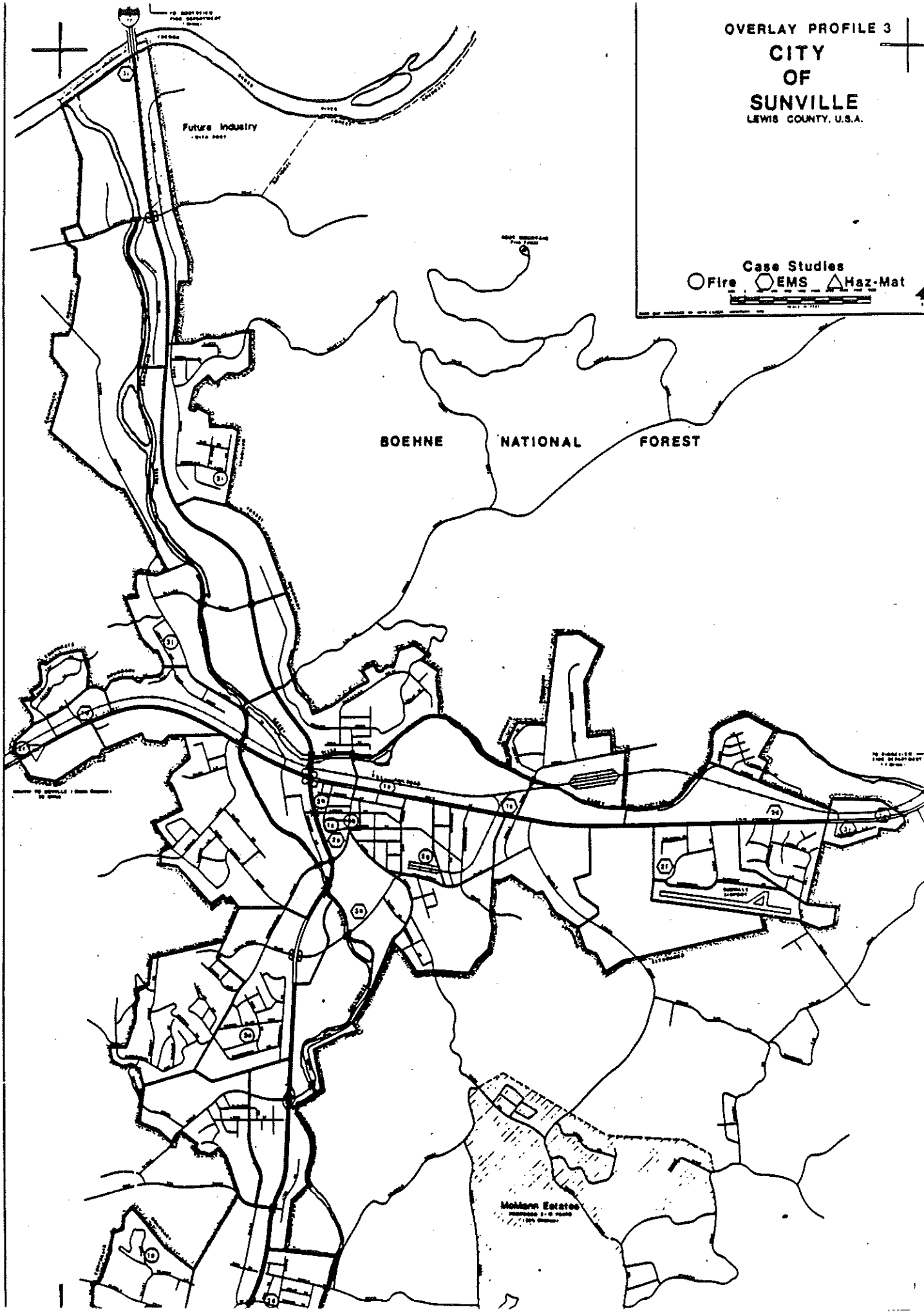
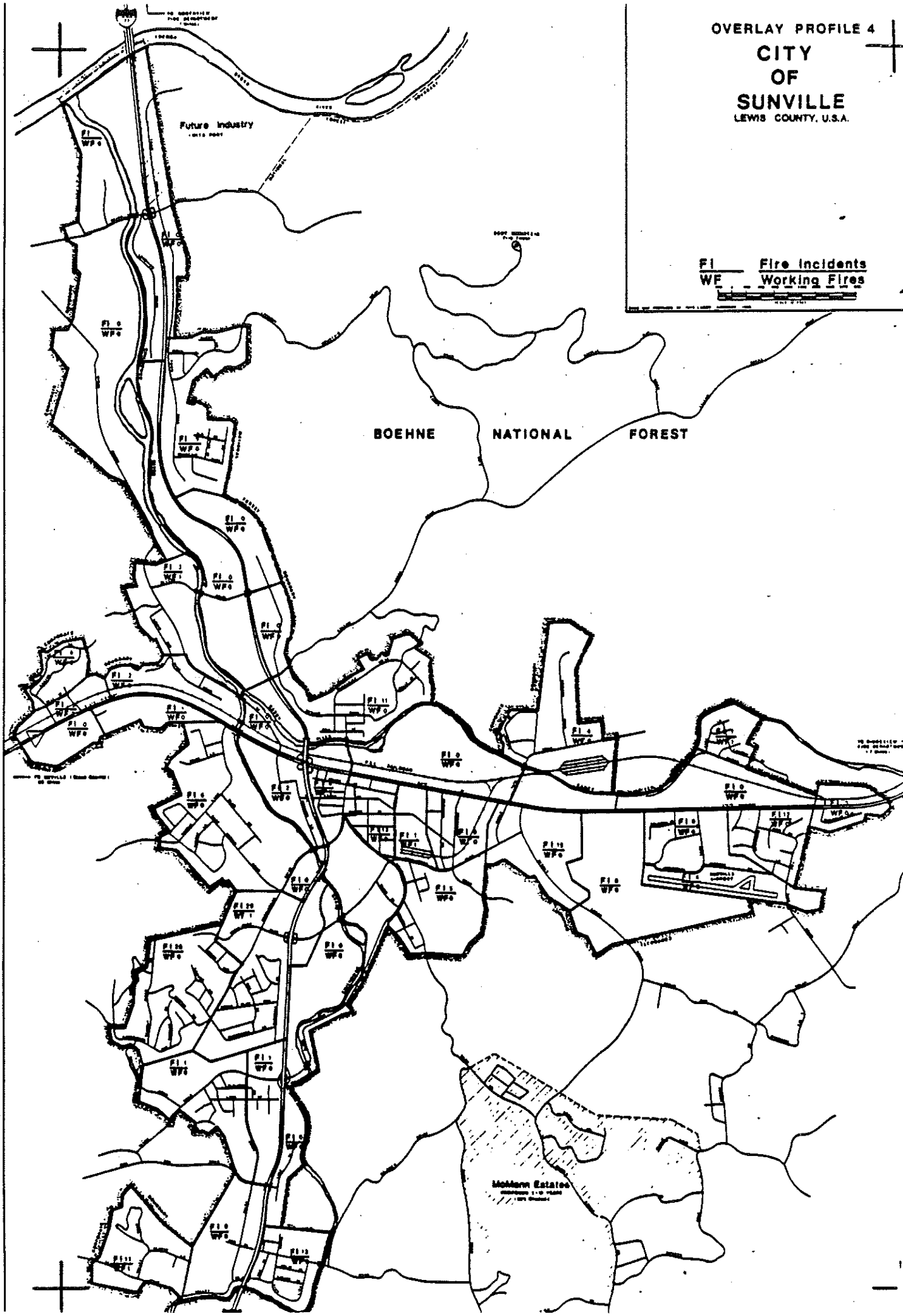
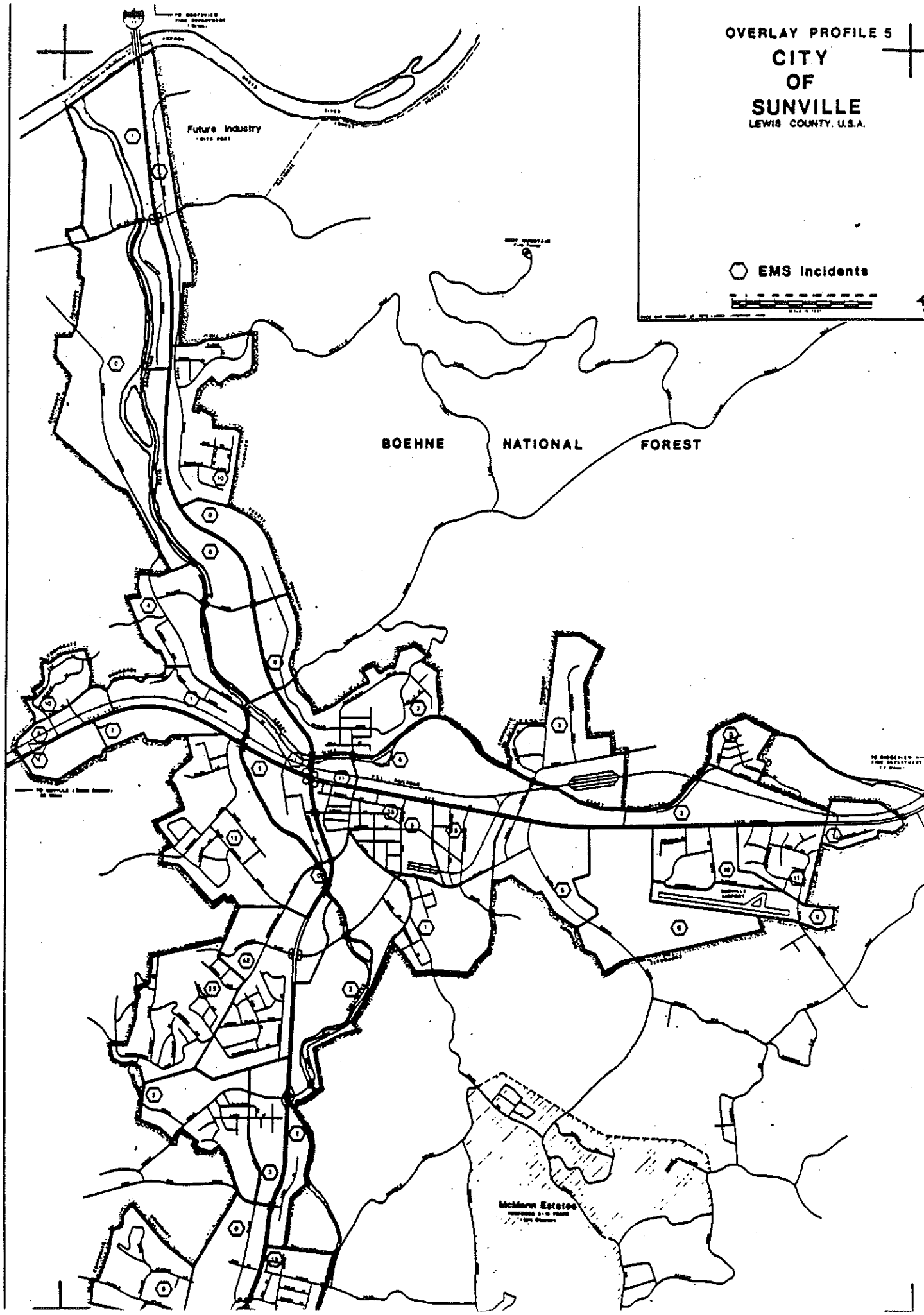
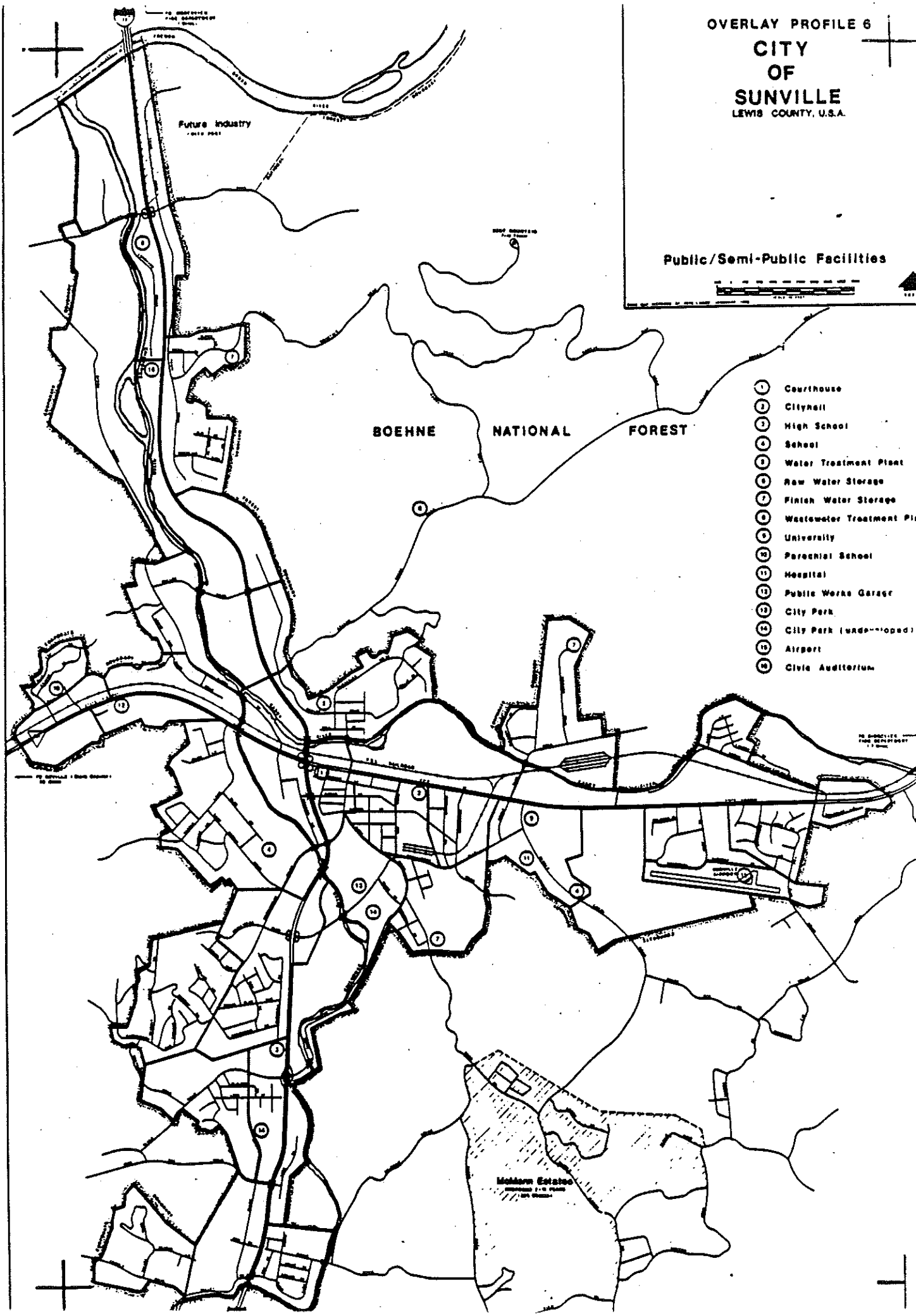
SE-6
SE-7
SE-8
SE-9
SE-10
SE-11
SE-12
SE-13
Meldorn Estates

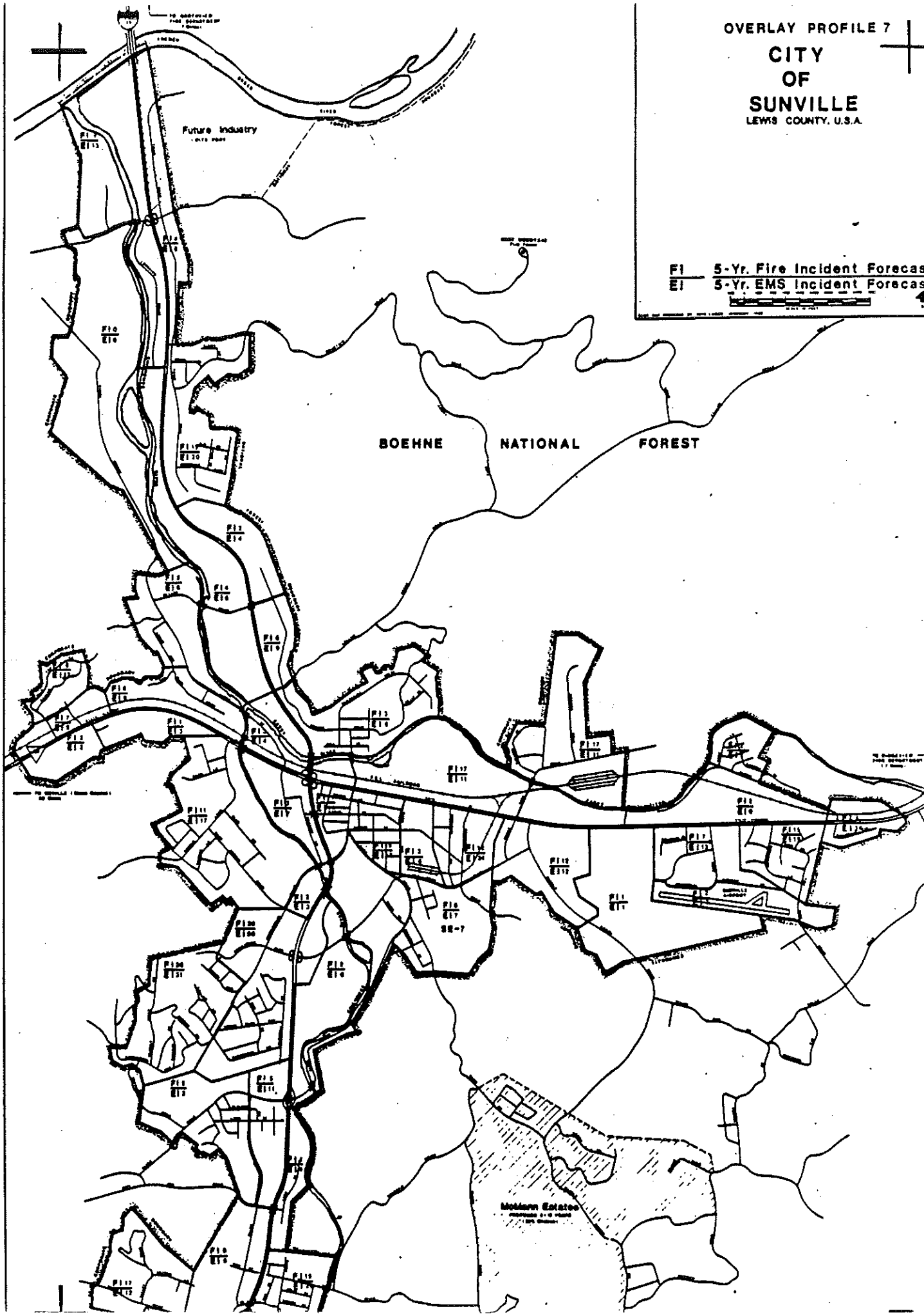

OVERLAY PROFILE 2
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
R Fire Flow Required
A Fire Flow Available
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates

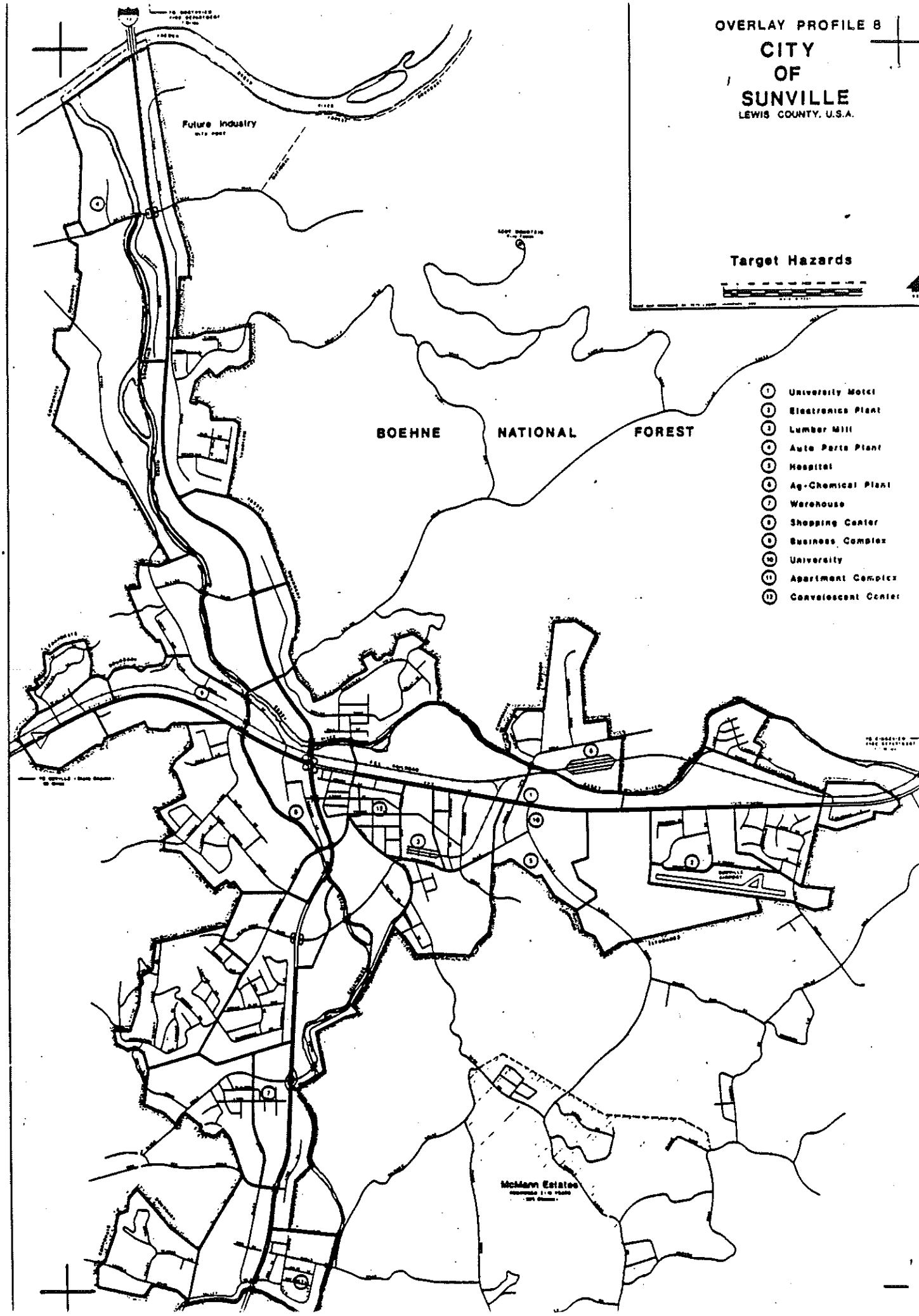

OVERLAY PROFILE 3
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Case Studies
Fire
EMS
Haz-Mat
Future Industry
BOEHNE NATIONAL FOREST
Mohlmann Estates

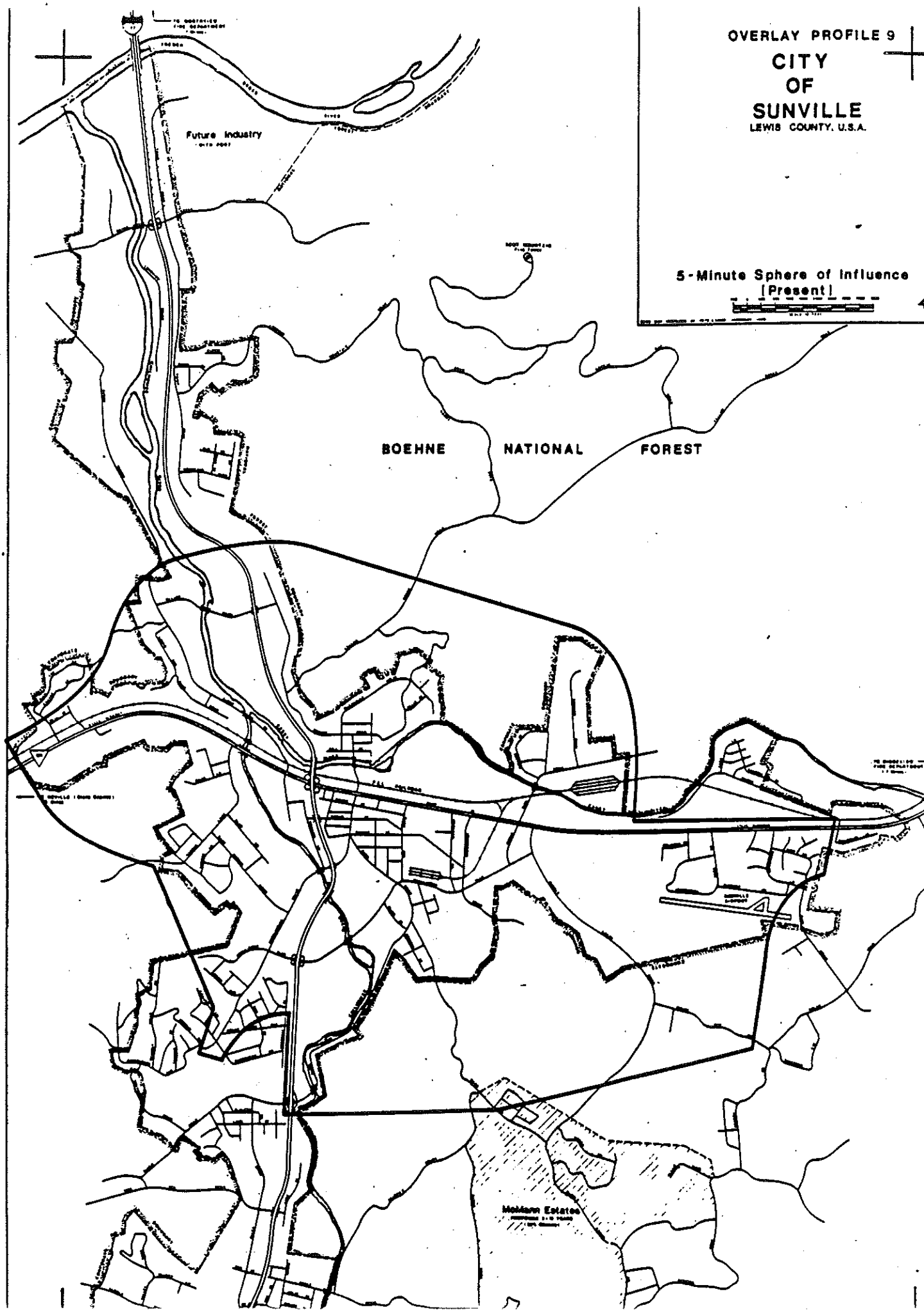

OVERLAY PROFILE 4
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
FI Fire Incidents
WF Working Fires
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates


OVERLAY PROFILE 5
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
EMS Incidents
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates


OVERLAY PROFILE 6
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Public/Semi-Public Facilities
Future Industry
BOEHNE NATIONAL FOREST
1 Courthouse
2 Cityhall
3 High School
4 School
5 Water Treatment Plant
6 Raw Water Storage
7 Finish Water Storage
8 Wastewater Treatment Pl
9 University
10 Parochial School
11 Hospital
12 Public Works Garage
13 City Park
14 City Park (undeveloped)
15 Airport
16 Civic Auditorium
Mobbern Estates


OVERLAY PROFILE 7
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
FI 5-Yr. Fire Incident Forecas
EI 5-Yr. EMS Incident Forecas
Future Industry
BOEHNE NATIONAL FOREST
Mobleen Estates


OVERLAY PROFILE 8
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Target Hazards
Future Industry
BOEHNE NATIONAL FOREST
1 University Motel
2 Electronics Plant
3 Lumber Mill
4 Auto Parts Plant
5 Hospital
6 Ag-Chemical Plant
7 Warehouse
8 Shopping Center
9 Business Complex
10 University
11 Apartment Complex
12 Convalescent Center
McMann Estates


OVERLAY PROFILE 9
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
5-Minute Sphere of Influence
[Present]
Future Industry
BOEHNE NATIONAL FOREST
Holdann Estates

UNIT 10: IMPLEMENTATION TECHNIQUES

OBJECTIVES

The participants will:

1. *Describe what they can do to implement the skills covered in this course.*
2. *Evaluate the course.*

ACTIVITY 10.1

RETURNING HOME

It is recommended that each student develop a plan of action to apply the information which has been gained during this course. The action plan should include the actions which will be completed the first day you return to work, by the end of the first week, and by the end of the first month.

Actions--First day:

Actions--By the end of the first week:

Actions--By the end of the first month:

Planning for community fire protection

Planning is a basic step in fire protection management. Texts on the subject universally list planning as one of the major management functions, usually the first.[1] Timely and dynamic fire protection planning provides the basis for systematic control of current and future fire risks and efficient and effective use of fire protection resources, thereby limiting fire losses and fire protection costs.

Most fire protection agencies are experiencing escalating demands for fire suppression and fire prevention services, fire safety education, emergency medical services, and hazardous materials control. However, the resources required to provide these services are limited or diminishing. To adequately meet these demands, a community—with the guidance of the fire department—must take the following steps:

1. Identify the nature and extent of the risks it faces
2. Establish the levels of service desired
3. Identify the most efficient and effective use of public and private resources to provide the established service levels
4. Implement a management and evaluation system that ensures the attainment and timely revision of service-level standards.

This chapter describes the planning process that encompasses all these steps as it applies to the community fire protection system. The fire protection system (its components are described in detail in Chapter 2) includes all public and private services that are available to protect people and property from fire. The following components should be included in the planning process:

1. The fire department. It enforces fire safety codes, provides fire safety education, provides rescue and emergency medical services, controls or suppresses fires, provides hazardous materials controls, determines the cause of fires, investigates arson, and supports arson prosecution.
2. The building department. It maintains and enforces building codes, a major factor in the establishment and control of fire risks and fire protection costs.
3. The planning or community development department. It regulates the use of land within a community through land use controls, such as zoning limitations, development density controls, height limitations, open space requirements, transportation systems, and utility system requirements. These factors influence the fire protection risks and the fire protection system requirements of a community. Community general plans, developed and maintained by planning departments, are the primary long-range planning documents for communities.

Burns, Robert B., Managing Fire Services, Second Edition, 1988.
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4. The water system. This component is essential to firefighting operations and to automatic sprinkler system design and performance. Fire protection requirements should be a key element in the design and construction of community water systems.

5. The public works or engineering department. This department is responsible for engineering and design related to utility systems, public roads, and traffic signal systems. Traffic circulation patterns, including road width, cul-de-sac length, maximum load capacity of road structures, and other factors affect the fire department's ability to respond to requests for service.

6. The police department. It investigates and assists in prosecution of arson, controls crowds at emergency incidents, reports hazardous conditions, and evacuates persons exposed to fire or hazardous materials risks.

7. The educational system. It plays a role in providing fire safety education. However, only a few schools have adopted a curriculum that requires fire prevention education.

8. Private-sector fire protection, including water companies, fire protection engineering firms, industrial or commercial emergency response teams (fire brigades), fire protection system manufacturers, contractors, and service companies.

9. Regional, state, and national organizations. Community fire protection efforts are frequently supported by regional, state, and national fire protection agencies, such as county fire departments, military fire departments, and state and federal emergency services offices. At the same time, state and federal legislation may place constraints on planning and managing local fire protection via preemption of authority in building code modifications, labor laws (e.g., Fair Labor Standards Act), safety practices, and hazardous materials reporting and control requirements.

An effective community fire protection plan cannot be developed without input from each of these components of the system. All organizations that have a major impact on the fire protection system should be involved so that their appropriate roles can be established and mutually agreed on.

The tangible end result of this planning process is a document, often called a community fire protection master plan. An even more important outcome of this effort should be a dynamic long-term planning process that can adjust to community demographics, land development patterns, and technological changes. This planning process should be integrated into the community management process. It is essential that the fire protection goals and standards that are developed within this plan be integrated into the community general plan.

The ability to project or predict future conditions that will affect the fire protection system is quite limited. Communities are dynamic. Changes with impacts on the fire protection system will occur. Therefore, the plan must be periodically revised and updated through an ongoing planning process that is coordinated with other community planning efforts such as general plan revisions, annual budget preparations, capital improvements programs, and utility system projections. As Peter Drucker has written: "Decisions exist only in the present. The question that faces the long-range planner is not what we should do tomorrow. It is: what do we have to do today to be ready for an uncertain tomorrow?"[2]

The rest of this chapter looks at the plans and planning processes used in the fire service, reviews the reasons for planning, and examines the systems concept in planning. It then presents a detailed examination of the planning process from the initial decision to plan through the process for updating a plan. The

central theme is that good management is an essential part of planning. Although elected representatives often are the ones who decide how safe our communities will be by the enactment of the budget, sound policy decisions regarding priorities in expenditure cannot be made without objective and thorough planning, and decisions cannot be carried out as intended without effective, ongoing, professional management. This connection between policy-level decision making and planning and management cannot be emphasized enough.

A basic premise in fire protection planning is that no federal, state, or regional body or private-sector organization has yet developed fire protection standards that a community can adopt to meet its needs. What does exist is a series of laws, fire code standards, empirical data, and nationally recognized good practices that a community can use to determine its own levels of adequate service and acceptable risk. These are the major policy decisions which form the basis of fire protection planning. These actions are taken through the development and adoption of fire protection goals and objectives.

Types of plans

Planning—the creation of plans—is carried out on several levels. For fire protection, three levels might be identified: (1) long-range or master planning, (2) operational planning, and (3) tactical planning.

Long-range planning

Long-range or master planning is concerned with evaluating and changing the fire protection system to meet the needs of a changing environment. It is by nature policy-oriented, long range in time frame, and wide in scope, and it provides the major focus for this chapter. It strives to confront the technical, financial, operational, legal, legislative, and political aspects of fire protection.

Long-range planning is not a new concept. Industry has used it for many years (sometimes under the name of *strategic planning*) in developing and marketing products. Government, particularly the federal government, uses long-range planning, especially in technology-intensive areas such as space exploration. Long-range planning has also been used by the military, especially since World War II, to define the military threat and to define, develop, and acquire systems to protect against that threat. Long-range planning emphasizes anticipating conditions rather than merely reacting to them. In the past, long-range planning was not generally applied to service-oriented organizations, perhaps because the end product is not as visible as, say, a water system or a transit system.

To be useful to the decision maker, long-range planning must perform the following key functions: define the problem(s), identify the solution(s), and provide a scheme or plan by which to implement the solution(s). Since fire protection is a system of independent interacting elements, effective long-range planning has a high potential for improving efficiency and effectiveness.

In the 1970s, the National Fire Prevention and Control Administration (NFPCA; now the U.S. Fire Administration) embarked on a project designed to help local communities prepare fire protection master plans. NFPCA tested master planning procedures in numerous communities and produced several publications on the subject.[3] Subsequently, the master planning process has been used in other communities to develop effective long-range plans.[4]

Operational planning

Operational planning is done to make a system work on a day-to-day basis. It is primarily administrative in nature. It is exemplified by organizational plan-

ning, response planning, regional incident command and mutual aid planning, capital improvements planning, and so on. During the 1980s, for example, a great deal of emphasis has been put on general emergency planning for the community, as detailed in Chapter 13. Each of the four phases of emergency planning—mitigation, preparation, response, and recovery—requires continuous operational-level planning.

Tactical planning

Finally, tactical planning is detailed planning that focuses on achieving specific objectives. An example is pre-fire planning. Because of its technical nature, tactical planning is not discussed in detail in this chapter.

The need for planning

Why should a fire department or community expend the resources required to develop a long-range fire protection plan? In many communities, fire protection services are considered adequate by top management and elected officials. They receive fewer complaints about fire protection than any other service, and major fire losses are infrequent. Fire department budget requests often exceed the community's ability or willingness to expend funds, raising the question of whether the department is seeking to provide a level of service greater than that desired by the community. In addition, the community frequently is unaware of the direct and indirect impacts of fire losses.

The planning process can help confront such issues by

1. Establishing levels of service and risk that meet the needs and expectations of the community and fire department
2. Identifying the options and opportunities for controlling fire loss and cost within the public and private sectors
3. Defining fire protection standards that can serve as management criteria.

Public fire protection systems in the United States and Canada have developed in reaction to major fire incidents, with an emphasis on fire suppression. Typically, about 95 percent of paid fire department budgets are devoted to staffing for fire suppression activities. Few general plans contain community fire protection goals that establish acceptable levels of risk and cost for fire services in coordination with other development interests. Communities are frequently planned and constructed with little or no concern for the control of fire losses and fire protection costs, and many structures are built with minimal fire protection features.

For example, building codes are a primary factor in the establishment of fire risks and fire department operating costs. They establish allowable limits for building construction type, occupancy class, area, height, and building separation. Minimal automatic fire suppression systems are required for some construction types and occupancy classes. However, a growing number of cities and counties are enacting regulations that exceed these "minimal" requirements. The characteristics of buildings affect the work load of fire departments during fire fighting operations and prevention activities and consequently play a major role in determining resource requirements and expenditures. However, these fire protection impacts are rarely considered in the planning and development of building codes.

The fire protection elements of building and fire codes are primarily reactions to major fire disasters. For example, panic hardware requirements for public assembly occupancies were adopted only after the 1903 Iroquois Theatre fire in Chicago, Illinois, which resulted in 602 deaths. Flame spread requirements

for public assemblages resulted from the Cocoanut Grove nightclub fire in 1942, which caused 492 deaths. Similar examples can be found throughout the codes.

Fire departments have little influence on the adoption and enforcement of "standard" building codes and frequently cope with codes and enforcement procedures that are counterproductive to efficient and effective fire protection. If a community desires to control fire losses and fire protection costs, it must limit the fire risks at the time buildings are constructed by incorporating building code provisions into its planning. Long-range planning emphasizes such prevention and control measures.

The lack of adequate planning and control with respect to new or increased service demands can be seen in the manner in which emergency medical services (EMS) and hazardous materials programs have evolved. These services are usually provided by fire departments, but not without significant organizational and economic impacts. For example, EMS demands can overtax volunteer fire departments owing to the volume of calls. Before such programs are initiated or expanded, a thorough evaluation needs to be performed to define work load and resource requirements and also to consider other methods that may be more efficient and/or effective. An established plan provides a method of conducting such analysis.

Fire protection planning also provides a means of evaluating the potential impacts of increased fire safety education, which is a major untapped resource of fire risk reduction. While some communities have developed effective communitywide fire safety education programs, most have not. A comparison of U.S. fire protection with that of other countries demonstrates the United States has consistently had the worst fire loss record in the world.[5] Although there are many contributing factors, the absence of comprehensive fire safety education stands out as a deficiency of U.S. fire protection in comparison with other industrialized nations.

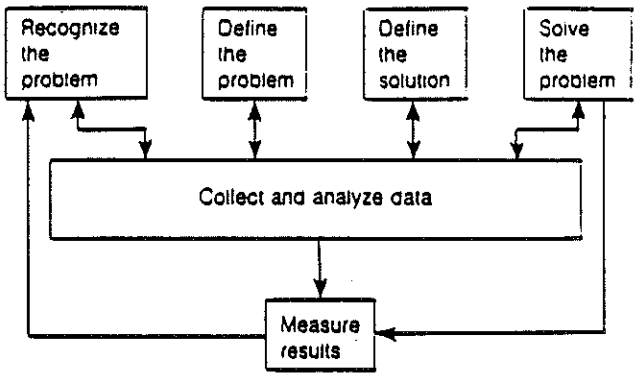
The systems concept in planning

Systems analysis is a much used, much abused, and often misunderstood term. It has its genesis in the notion that large systems must be viewed as a whole, rather than as a number of integrated components, because these parts interact with a resultant effect on each other and on the system, and also because the system has an effect on the outside world (vice versa).

Systems analysis, in a general form, can be thought of as a closed loop feedback process, as illustrated in Figure 4–1.

The process begins with someone recognizing that a problem exists. This finding is usually expressed in a vague statement such as "We have a problem."

Figure 4–1
Systems analysis.



The first thing to do is to define the problem precisely. This may mean collecting and analyzing some pertinent data. Once the problem has been defined, an appropriate solution can be formulated. The next step is to choose an appropriate method of implementing the solution, consistent with the available resources. The preferred solution is then implemented and the results are measured by analyzing data. If the problem is not solved satisfactorily, the process is repeated, with changes in the level and or method of solution until the desired result is obtained. Fire protection master planning, or long-range planning, uses the techniques of systems analysis to determine the existing levels of service and risk provided by the community fire protection system and the concept of goal setting to establish the levels of service and risk desired in the future. (Again, note that there are no absolute requirements, in the legal sense, or in the form of national or regional standards that determine or establish the level of fire protection to be provided by a community.) The techniques of systems analysis are then used to formulate various ways and means of identifying, adopting, and providing the desired level of fire protection. These programs are analyzed and compared, and the best programs are selected. These programs—including an implementation program that defines authority, responsibility, and time frames—are consolidated into a fire protection plan.

The planning process

Long-range planning is a systematic process that has been used successfully in industry, in the military, and in the federal government. It is used in many communities throughout the country, not only for fire protection, but also for law enforcement, utility systems, parks and recreation, and other community services. It is applicable to any type of community—rural, suburban, urban—a county, a region (council of governments), or a state.

Cooperation and commitment

One of the most important ingredients of long-range planning is commitment. Long-range planning by its very nature requires commitment over a long period of time. Commitment is obtained through the cooperative involvement of the many community agencies that participate directly or indirectly in fire protection. The review and approval of interim planning products at various stages in the planning process enhances understanding and commitment. Cooperation is the key to commitment. To be successful, a plan must be understood and accepted by all who are to participate—in fire prevention and control, that is more or less everybody in the community. A plan frequently fails because some person or group was not committed to it, perhaps because of a misunderstanding. This process encourages negotiation and compromise among competing interests and produces a plan that obtains broad support throughout the community. When people are involved in a plan, they will identify with it, support it, and make it work.

It follows that commitment can best be achieved through the cooperation of all community organizations involved in fire protection. These would include the planning, building, and police departments; and in the private sector, merchants' associations, builders' associations, homeowners' groups, and industry representatives. The successful implementation of a plan depends directly on the extent to which the community is involved in developing the plan. The use of a planning team and advisory committee is intended to enhance cooperation and commitment.

Phases and activities

Planning is carried out in three phases or stages: preparation, planning, and implementation (Figure 4–2). Planning and implementation are iterative or repetitive, reflecting the fact that planning never stops, that implementation involves planning, and that planning is part of implementation.

A more detailed picture of the planning process is shown in Figure 4–3, which clarifies the major activities and their relations to each other. Here the iterative nature of the process is more apparent. Briefly, the primary planning activities are the following:

1. Deciding whether to undertake long-range planning
2. If a planning effort is to be undertaken, getting organized for it
3. Collecting and analyzing data to find out what the problems are
4. Defining goals and objectives (i.e., setting standards for service and risks)
5. Defining the programs and resources required to attain goals and objectives
6. Defining alternative programs, where appropriate
7. Comparing alternatives and selecting the best programs
8. Preparing a documented plan to implement and maintain the selected programs
9. Implementing and evaluating the plan (organizing, directing, and controlling)
10. Updating and modifying the plan.

At several points in the process, approvals are needed (see Figure 4–3). Approvals at interim stages of planning are necessary to maintain community awareness and participation and to obtain the commitments necessary to proceed to the next step in the planning process. Approvals of plan elements during the planning process are provided by management personnel, the planning team, or the citizens' advisory committee, as specified in the planning proposal. Final approvals are provided by elected officials.

Deciding whether to plan

The fire protection leadership in the community must make a conscious decision to embark on long-range planning. This is not to be made lightly: To be successful, planning efforts require a great deal of time and resources. In communities of 100,000 or less, one person should spend at least half of his or her time on managing the planning effort. Communities with populations of 100,000 or more should assign at least one person full time if possible.

Personnel time and some resources from other existing programs will be required to successfully complete this project. Furthermore, the climate has to be right before planning can exist in the community, since long-range planning is not necessarily acceptable to everyone. The decision to plan or not to plan should be made after stating and examining the reasons for and against it. Some reasons for planning might be an unacceptable level of fire deaths or property loss, the desire to stabilize or reduce public fire protection costs, the need to reduce duplicated or overlapping fire protection services, a desire to improve joint use of regional resources, or the need to increase fire protection as a result of the community's growth. Some reasons for not planning might be the existence of a satisfactory plan, or satisfaction with the status quo.

The decision to develop a fire protection plan should be outlined in a written proposal and presented to top management within the community (city manager,

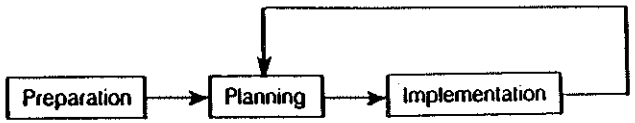


Figure 4-2 The three phases of planning

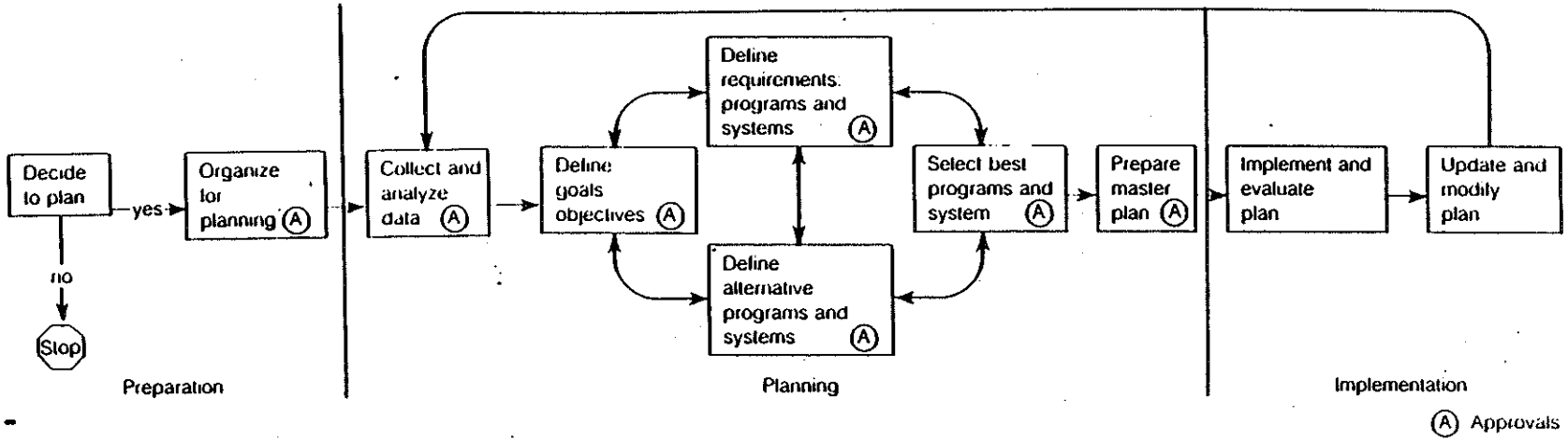


Figure 4-3 The planning process

county executive officer, etc.). Since there will be substantial economic, political, and policy impacts from this decision, a formal written proposal should be developed for adoption by the elected governing body after it has been approved by top management.

The proposal might contain the following items:

1. A discussion of the need for a fire protection plan, such as high fire loss or anticipated rapid growth
2. The benefits potentially available from a plan, such as increased citizen awareness of fire risks and fire protection, control of fire protection costs and losses, increased private sector participation with resulting reduced public sector costs, improved fire department efficiency and effectiveness, and improved coordination between public agencies
3. Identification of the planning organization, including planning team leadership, membership and functions, advisory committee membership and functions, and the responsibilities of these groups
4. The budget and schedule, with milestones, for the planning work.

Organizing for planning

Once the decision to go ahead with planning has been made, the next step is to get organized. There are many things to do: select a planning leader and team, form an advisory group, and fund and schedule the planning as specified in the planning proposal.

Planning team The planning team does the planning work. It is composed of a permanent cadre of a few planning and management-oriented professionals, augmented by resource persons as needed. Typical membership includes persons from the fire department, the planning department, the finance department, the building department, and the water department. The team is headed by a planning team leader whose functions are to assign tasks, provide guidance to the team members, coordinate the work, and report progress.

The planning team leader should also serve as the staff liaison with the advisory committee, if one is formed. The team members should be able to make decisions—to commit the group they represent—without having to obtain authorization. In other words, they have responsibility backed up by the requisite authority; this is very important—if it can be obtained. The planning team leader must be given the time and resources to manage this project.

Advisory committee The advisory committee is an ad hoc group convened especially for the planning effort. It comprises community leaders who collectively provide guidance to the planning team so that the community is represented in the process. Typical membership includes representatives of the following bodies: major industries, the chamber of commerce, local financial institutions, major land developers, private water utilities, civic groups, educational institutions, labor organizations, news media, and similar groups.

Advisory committee members should represent the significant and influential community interests that will be affected by the plan and, like the planning team members, should be persons who are accepted as spokespersons for the groups they represent. Names of committee members should be proposed by the management or leadership of their respective organizations and submitted to the governing body of the community for official appointment to the advisory committee.

The role of the committee should be clearly identified. It should review the findings and proposals of the planning team and then make recommendations to the elected body. The primary function of the advisory committee is to ensure

that the needs of a broad spectrum of the community are met by the plan. The advisory committee is intended to provide a forum for the resolution of conflicting interests. The result should be a compromise fire protection plan that has broad community support. The committee should be activated upon completion of the data gathering phase, as that part of the planning effort has proven to be time-consuming. It is important to maintain consistent progress in the planning process, with review and approval conducted in a timely fashion in order to maintain the interest and participation of the advisory committee.

The primary drawback to the use of a citizens advisory committee is the time and resources required to organize, coordinate, and support the deliberations of a committee. Successful master plans have been developed without an advisory committee. In general, however, plans developed with such committees have greater success in dealing with controversial issues and have a high rate of implementation of plan recommendations.

Using consultants Although fire protection planning must be done by those persons and organizations that constitute the fire protection system, fire protection consultants who are experienced in this process can provide technical assistance and serve as a catalyst in this process. If a community is unwilling to relieve a fire officer of a substantial number of his/her duties in order to manage this planning project, it may consider employing a consultant to perform some of the planning organization and coordination tasks.

Collecting and analyzing data

As soon as the proposal has been approved and the team has been authorized to proceed (in the form of a resolution by the governing body), the team starts the actual planning phase. The initial step is to collect and analyze data to determine the risks and problems. (For a detailed discussion of data collection and analysis, see Chapters 5 and 6.)

Data should be developed that identify the current and future fire protection risks, service demands (including EMS and hazmat) fire protection capabilities, financial requirements and revenues, and legal constraints. There is a tendency in this process to collect too much data or data that are "nice to know" but are not useful to planning. A good procedure to follow is to identify how each piece of information is used and what decisions will be made. If those questions cannot be clearly answered—don't collect the data.

The accuracy and thoroughness of the plan to be developed will depend on the quality of the data collected. This will be most evident later, when the time comes to measure progress toward the objectives that have been established for the implementation of the plan. In order to evaluate the results, it is important that the data be accurate and quantifiable. Most communities, however, discover that the available data are not adequate to support the planning process at the depth of analysis desired. The available information is frequently found to be incomplete, inaccurate, or in a form that is not readily usable in the planning process. Communities are therefore frequently forced to conduct the planning effort with incomplete data or stop the planning process while all efforts are put into data gathering.

If management decides to proceed with incomplete data, the planning team and advisory committee should review and approve this decision. It is acceptable to conduct planning with some incomplete data if the limitations are understood. However, this should be accompanied by a recommendation that an improved management information system be implemented as part of the plan.

If management decides to delay planning until *all* data are collected in the desired format, the planning process may be permanently postponed. Also if a major data-gathering effort is conducted without providing for the maintenance of the data (usually a computerized management information system) the same

data-gathering effort may have to be carried out every year to measure the results of the implementation of the plan.

Experience has shown that it is more effective to proceed with some incomplete data than to delay the planning until *all* needed data are available. Again, this recommendation is based on the assumption that an improved management information system will be one of the outcomes of the plan.

Categories of data The data required will probably fall into six general categories: demographic, geographic and physical, building and occupancy, organizational and functional (including fire incidence and loss, and EMS and other non–fire incident activities), financial, and legislative and legal. Specific data items can be identified within each of these categories. The subsequent analysis and planning cannot proceed without data on what has happened, what is happening, and what will probably happen. Insights into the future can be obtained from the historical and current data.

Demographic data Demographic data can be related to fire incidence and emergency medical services. For example, U.S. Fire Administration studies indicate that age, sex, income level, ethnic background, educational level, and neighborhood can be correlated to fire incidence and loss.[6]

Geographic and physical data The geography and physical characteristics of a community identify its existing and projected boundaries. These have a bearing on fire station locations, response times, and service demands, as do transportation networks, water systems, terrain and weather. Where brush or timber fires are a factor, the risk of the vegetation and climatic conditions should be identified. Natural disasters such as earthquakes, tornados, and floods influence emergency and rescue services and fireground operations.

Building and occupancy data For most communities, the major fire risks result from and occur in the "built" environment (that is, in existing structures and occupancies). For this reason it is important to collect building and occupancy data that include the classification and location of occupancies, number of occupancies protected by alarm systems and sprinklers, age of buildings, and heights and areas of buildings. The relative fire risk of structures is frequently stated in terms of fire flow requirements, which identify a firefighting work load based upon building size, construction type, occupancy classification, height, fire resistance of roofing, building separation, and credits for automatic sprinkler systems. Corresponding fire department resources required to deliver this fire flow can be quantified.[7]

The types and densities of structures and occupancies that are allowed in the community's zoning ordinances also determine the current and future fire protection needs of the community.

Organizational and functional data Data must be obtained on work loads in order to assess the allocation of current and future resources. These should cover fire prevention, pre-fire planning, and suppression activities; non–fire incident services; training activities; facilities and equipment maintenance; and public education. Where possible, work loads should be identified by personnel hours devoted to programs. The personnel hours should indicate the title of personnel assigned.

Fire prevention program data should identify the number and types of occupancies inspected, hazards found and corrected, fire safety education programs conducted and persons contacted, numbers and types of fire investigations, personnel time requirements by type of activity, suppression division resource allocations and activities in fire prevention, the measure of successful performance related to fire prevention programs (i.e., standard inspection frequencies.

plan check "turnaround time," maximum allowable time for hazard correction), and citation program description.

Fire suppression data should include the numbers and types of incidents that occur by occupancy type and area of the community (these are most useful when expressed as rates); injuries and fatalities to citizens and firefighters; response times and distances (for first-due apparatus and full assignments); resource commitment to incidents (personnel hours and apparatus); mutual and automatic aid agreements, mutual aid resources available and frequency of mutual aid activity; communications system capabilities and equipment; and incident command system description.

The planning team also needs data on non–fire incident services such as emergency medical services and hazardous materials control. In many jurisdictions, emergency medical service responses account for the greatest proportion of the emergency service activities of the fire department. The extent to which a fire department is involved in these activities has major economic, political, and organizational implications. Data that accurately define these factors are essential to long-range community fire protection planning.

Training program data should include training and certification requirements for employment and promotion, records of skill maintenance training by task and personnel hours, career development training; and a physical fitness program description.

A facilities inventory should include the location, size, and age of fire stations and other facilities. A description of the adequacy of the facilities and projected relocations should be included.

Data related to fire apparatus and equipment should include an inventory of the number of vehicles by type, capacity, age, and general operating condition. Schedule replacement and maintenance programs should be defined. Records of maintenance costs and downtime should be provided.

The planning effort should also include data on fire protection functions that are or should be performed by other agencies, public and private.

Financial data Among the financial data required to conduct long-range planning are current and projected costs, current and projected revenues, limitations on revenues and expenditures, and optional revenue sources.

Operating and capital expenditures for the fire department for the past five years should be provided to assess current expenditure levels and to project future cost trends. In addition, in order to determine the *total cost* of providing fire protection services, expenditures incurred by other departments must also be considered. For example, certain expenditures by the water department (such as expenditures for water storage tank capacity and water pumps) directly or indirectly support fire protection, and certain expenditures by the police department (such as expenditures for traffic control and riot control) also support fire protection. The following are some other examples of cost data:

1. Operating budgets of community departments with expenditures related to fire protection (i.e., fire hydrant testing, maintenance, and repair by the water department)
2. Capital improvement budgets of other departments for items related to fire protection (water mains and fire hydrants, for example)
3. Private expenditures for fire protection (i.e., general costs of sprinkler installation and maintenance, alarm systems installation, maintenance, and operation, industrial fire brigades, rescue and ambulance services, and hospital emergency care and burn centers).

Data on current and projected revenues come from the operating budget, public revenues available by category (i.e., taxes, fees, grants, bond issues, and revenue projections related to future growth and/or redevelopment). Optional revenue sources, both actual and potential, also should be identified.

These include fees for service, augmented fire service availability fees, permit fees, fines related to citations, environmental impact report fire protection mitigation requirements, special district assessment revenue, and property tax increases for fire protection. Limitations on revenues include state-mandated tax or expenditure limitations, legal restrictions on use of funds, legal restrictions on collection of fees, and limits on bond indebtedness.

Legislative and legal data Many legislative acts and legal decisions affect the provision of fire protection, and an informed planner needs to keep in touch with these developments at the local, state, and federal levels. The data should include current legal decisions and legislation, and projected future actions. Examples of such data are Fair Labor Standards Act provisions and enforcement, hazardous materials transportation regulations, affirmative action plans, state fire marshal regulations, OSHA safety regulations for personnel, state emergency medical and rescue service regulations, and building or fire code provisions. Preemption of local authority to adopt and enforce safety requirements should be noted.

Sources of data When the required data are identified, the possible sources should be identified as well. Data will be obtained from sources both within and outside the community. Local sources include city departments (fire, planning, building, water, finance, public works, the administrative office, school administration, the attorney's office, the clerk's office), commercial businesses and organizations (insurance companies, merchants' associations), and industry. Other sources include county agencies, regional agencies (such as councils of governments and regional planning organizations), state agencies, and federal agencies.[3] A matrix of data required together with potential sources can be constructed. Figure 4–4 shows a simple example of this, and Chapters 5 and 6 outline further sources of data.

In addition to obtaining data from traditional sources, planners may need to collect some original data. For example, fire loss and incidence data may be obtained from fire department reports and insurance records—but these traditional sources will not indicate unreported fires or losses not covered by in-

	Data required					
Data source	Demographic	Geographic	Building and occupancy	Organizational and functional	Financial	Legislative
Fire department			X	X	X	X
Planning department	X	X	X	X	X	X
Building department			X	X	X	X
Water department			X	X	X	X
Finance department				X	X	X
Public works department		X		X	X	X
Administrative office	X	X		X	X	X
School administration	X			X	X	X
Attorney's office				X	X	X
Clerk's office	X	X		X	X	X
Commerce				X	X	
Industry				X	X	
County agencies	X		X	X	X	X
Regional agencies	X			X	X	X
State agencies	X			X	X	X
Federal agencies	X				X	X

Figure 4–4 Data required and sources of data.

surance. To complete the loss/incidence data, a survey of homeowners and businesses might be conducted. The survey could be carried out by mail (in water bills, for example), by telephone, or in person. Such a survey could be instituted on an annual basis and would ask respondents to evaluate community service expectations and the extent to which those expectations are being met.

Collection methods When the data required and data sources are known, the data collection assignments should be made. Data collection will be performed primarily by the members of the planning team. As good a match as possible should be made between the collector and the source: For example, someone who is credible and known to the insurance industry will have a much better chance of obtaining insurance premium data than someone who is not. One person should be assigned to coordinate data gathering to ensure that information is complete, appropriate, and accurate.

Some persons or businesses may be reluctant to supply the data. In those cases, extra time will have to be spent on explaining the purpose of the project and use of the data, particularly to the private sector, as it is more likely to be reticent about supplying data. Confidentiality of data is all-important. Each data collector should be prepared to explain the data needed and how the data will and will not be used; the desired format should also be explained, and assurance given that confidentiality will be maintained.

There are many means of collecting the data: those employed will depend on the particular data desired. Building and occupancy data, for example, can be collected from building department records, fire inspection records, planning department zoning maps, county assessors' data, utility company records, and special surveys of the pre-fire plans of the fire department.

Previous planning reports conducted by local or regional agencies can provide valuable data. These include transportation system studies, utility system studies, and regional population and economic growth studies. Projections of future growth and development are particularly difficult. The local planning director can identify the best source of development projections. Fire departments should not attempt to develop such projections but should rely on the projections being used by other governmental agencies, especially the local planning departments.[9]

The data should be assembled as a report and displayed in graphic and tabular forms, where possible. Examples of the graphic display of information are shown in Chapter 6.

Analyzing data When sufficient data are available, the next step is to organize and analyze the data to define the current status of the fire protection system—risk conditions and performance—and to identify existing or future problems.

Criteria for useful data The analysis should be both quantitative and qualitative. Some questions that should be answered are

1. Do the data clearly and accurately specify conditions and problems?
2. Will the data selected enable managers to measure results (i.e., to determine when desired conditions or problem resolutions are attained)?
3. Do management personnel within the fire protection system and the advisory committee agree that the data are acceptable measures of results?
4. Can the data be readily maintained and updated to meet planning and management needs throughout the anticipated life of the plan?

After this analysis it may be necessary to conduct additional data gathering or to delete certain data. Two key points regarding the data gathering and analysis should be kept in mind:

1. These data will be the criteria used to choose the "best" programs.
2. These data will form the basis for measuring performance and the subsequent results.

Defining the situation Fire risk and protection can be analyzed in several ways. One is to make a statistical summary of the structures and other risks in the planning area, including, for example, the distribution of building construction (type, area, and height), occupancy classification, and fire flow required. Such a summary will give a picture of what there is to burn and how it will change with time in the future (i.e., the fire risk).

A second method of analysis would be to summarize the fire and emergency medical response history within the community. For fire, such a summary might include, for each year, total responses, actual fires per 1,000 population, fires by type, fires by time of day, fires by occupancy, fires by source, fires by type and form of material, fires by ignition factor, civilian deaths by age and by cause, firefighter deaths by cause, civilian and firefighter injuries by type. Other information that might be included is property loss by occupancy and total property loss as well as the rate or percentage of incidents by type. For emergency medical services, useful data would be the number of responses by area of community, type of EMS calls, response times, types of service provided (basic life support or advanced life support). These fire and EMS histories can be extrapolated to the end of the planning period to obtain a projection of the fire and EMS experience for the near future.

A third means of analysis employs scenarios. A fire scenario is a sequential listing of the events and circumstances resulting in a loss, injury, or fatality. It can be used to link the type of loss with the events of a fire and to provide a description of the many elements of the fire problem in a concise form that is easy to comprehend.

Losses from fire are a direct result of a sequence of events embedded in a set of circumstances. If the chain of events should be broken or the circumstances altered, the end result—a loss—could be averted. Greater knowledge of the events and circumstances and of their causal relationships could help to prevent loss by indicating where to intervene in the chain of events or how to modify the circumstances.

The losses, events, and circumstances can be grouped into six categories: type of loss, type of occupancy, time of day, ignition source, item ignited, and direct cause of loss. Major constituent elements of each category can then be defined. (Figure 4–5 is an example of such a grouping.) A scenario can then

Type of loss	Type of occupancy	Time of day	Ignition source	Item ignited	Direct cause of loss
1. Death 2. Injury 3. Property	1. Industrial 2. Commercial 3. Public assembly 4. Institutional 5. Transportation 6. Residential 7. Independent of occupancy	1. Day 2. Night	1. Friction 2. Flame 3. Matches/lighters 4. Smoking material 5. Electrical equipment 6. Electrical wiring 7. Heating/cooking surface 8. Spontaneous 9. Arson 10. Other	1. Flammable fluids/gases 2. Furnishings 3. Structure 4. Interior finish 5. Apparel 6. Other	1. Smoke/gas 2. Heat/flame

Figure 4–5 Fire scenario elements.

be formed by linking the elements, using one from each category (for example, death–residential–night–smoking–furnishings–smoke and gas.)

This scenario indicates that death occurs directly from smoke and gas emitted from burning furnishings, such as a mattress or a blanket, which were ignited by smoking materials, perhaps a cigarette that was carelessly handled, at night in a residence. It might be pointed out that this sequence of events, or scenario, represents perhaps the most common cause of fire-related death.

In general, the data needed to perform fire scenario analysis are obtained from fire incidence reports, which should contain the following information for each fire incident:

1. The occupancy identification
2. The time of day of the fire occurrence
3. The source of ignition
4. The spreading agent (item ignited)
5. The direct cause of loss
6. The loss(es).

Scenarios are by no means arbitrarily generated. They are derived by ranking fire incident data as follows:

1. Losses ranked in order of frequency
2. Occupancies ranked in order of frequency of each of the losses (death, injury, property)
3. Time of day ranked in order of frequency for each occupancy
4. Ignition source ranked in order of frequency for each time of day
5. Item ignited ranked in order of frequency for each ignition source
6. Direct cause of loss ranked in order of frequency for each item ignited.

Scenarios give a good idea of the causes of fire losses and the relative importance of these causes. This information can be used to devise intervention strategies such as educational programs, automatic suppression devices, and early warning devices, which would break the scenario chain of events and would thus prevent or reduce the loss. These events can be the subjects requiring action that have been identified as goals and objectives.

In order to use the scenario process effectively, a department needs an accurate data base containing a significant number of incidents. Fire departments that experience a low volume of incidents can use regional or statewide fire incident data where available. If data are unavailable, a department can develop a generalized scenario and identify effective intervention actions. Figure 4–6, for example, is a generalized scenario that indicates fire growth to flashover as compared with fire suppression response elements. The significant intervention is the activation of an automatic sprinkler system. These generalized scenarios are best displayed graphically rather than statistically. The result of this analysis should be a comparison of the fire control resources and fire risks as compared with current and projected fire protection resource capabilities.

Other methods of analysis that can contribute to planning are described in Chapter 6. They include detailed evaluations of comparative service levels and fire attack capabilities.

Defining goals and objectives

The next major step is to define goals and objectives that identify the purposes and results desired of the fire protection system. Together, goals and objectives establish the level of service to be provided in the community. The goals are policy statements of organizational purpose or intent. They describe ends toward which the department is working. Objectives, on the other hand, are specific interim results that are expected within a given time; in this sense they are

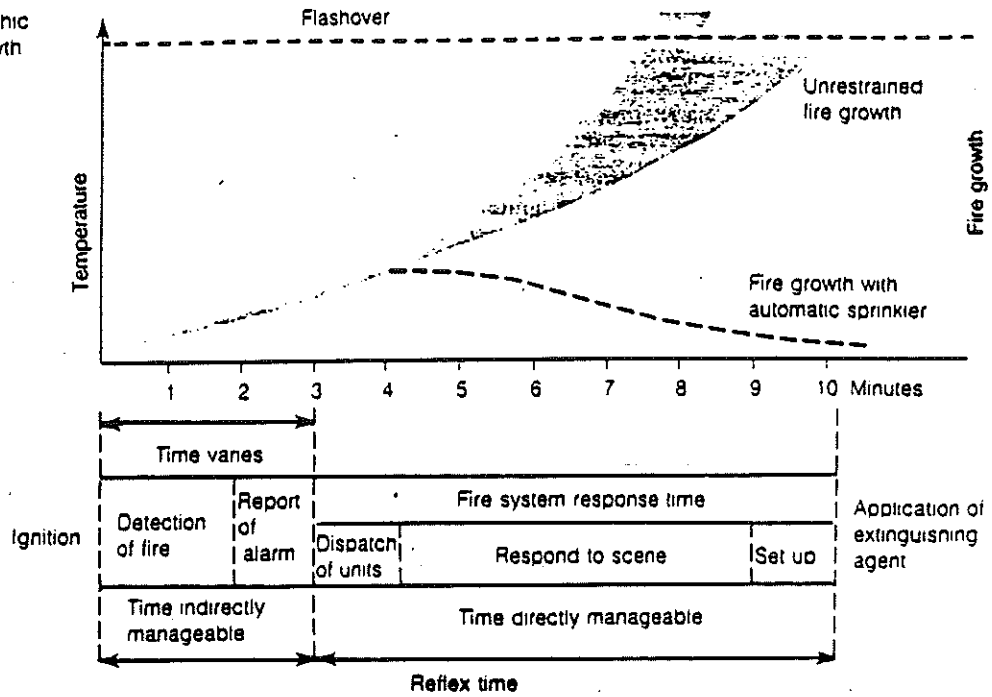


Figure 4–6 Graphic scenario: fire growth versus reflex time.

milestones. Goals and objectives should address the current status of fire and emergency medical services and outline measurable increments of change toward the desired status. Each time an objective is achieved, the level of service moves closer to a given goal. Goals and objectives should be as independent of the means of accomplishment as possible; they should state what to do, not how to do it. The "how" is addressed later in programs.

Mission statement The goals and objectives that come out of the planning process need to relate directly to the mission of the organization. If the department does not have a formal mission statement, the planning process is a good time to formulate one. The mission statement can be compared to the top of a pyramid—it is the capstone of the organization (see Figure 4–7). It states why the fire service delivery system exists and provides a structure for all of

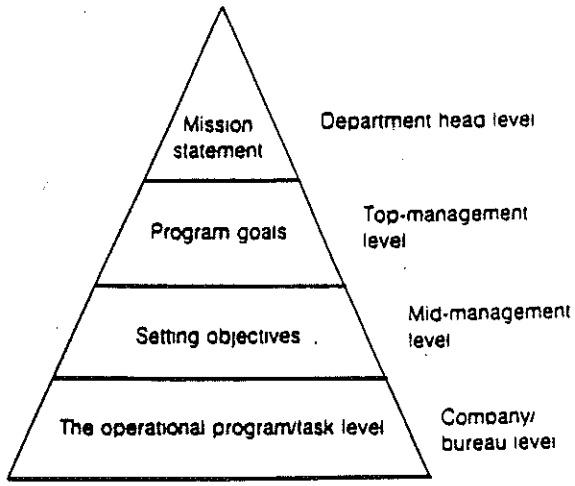


Figure 4–7 Mission statement as the capstone of the organization, with supporting goals and objectives, carried out by operational-level tasks.

the department's goals and objectives. It should look at the needs of the community as well. An example of a mission statement appears in Figure 10–2. Note that a mission statement should be closely linked with the enabling legislation that forms the overall organization.

Goals Fire protection goals define the levels of service and acceptable risks that meet the unique needs of a community. They form the basis for fire protection "standards," which are established as objectives. Here are some sample goals:

1. Provide adequate fire protection at acceptable cost
2. Reduce fire risks
3. Control fire losses
4. Achieve fire safety awareness at all levels of the community
5. Provide emergency medical life support services
6. Provide hazardous materials control services
7. Reduce overlapping services.

The fire protection system consists of subsystems, the goals of which may be in conflict. For example, the building department may prefer to modify building codes by submitting proposed changes to national building code organizations, whereas the fire department may consider local modifications to be more timely and effective. Resolving such conflicts is one of the primary purposes of the planning team and advisory committee reviews, deliberations, and recommendations.

Public fire protection policy is established when the elected body approves and adopts the goals. Although details of a plan are not normally reviewed with the elected officials during the development phase, a study session to review proposed goals would be an appropriate method of providing guidance to the planning team, since future steps in the planning will be based on the basic policies defined by these goals.

Objectives After goals have been tentatively adopted, the next step is to develop the objectives, which are then reviewed and approved by the advisory committee. Objectives define the standards for community fire protection (i.e., the levels of service) and are used to measure progress toward the attainment of goals. Objectives are used to develop specific fire protection system programs and resource requirements, to evaluate alternative programs and ultimately select the "best," and to evaluate the efficiency and effectiveness of programs that have been implemented. Guidelines for setting objectives appear in Figure 4–8. At least one objective should be developed for each goal. Here are some sample objectives:

1. The first-due engine will arrive within five minutes at 95 percent of the fire incidents.
2. All firefighters will attain and maintain Emergency Medical Technician certification with eighteen months.

Figure 4–8 Guidelines for setting objectives.

1. An objective should be consistent with authoritative goals (local government and fire department policy, charter provisions, and so on).
2. An objective should be stated in behavioral terms, as a guide to action. That is, it should clearly describe desired, observable results.
3. An objective should have intermediate targets and a specific completion date—in terms of the budget year or other time schedule.
4. An objective should include specific performance criteria, such as how many, what percent, which site, personnel levels, and costs.
5. An objective should be both challenging and attainable.

3. All hospitals and rest homes will be inspected semiannually by the fire prevention bureau.
4. A fire safety education program will be provided to all school-age children annually.
5. All apparatus shall receive a six-month preventive maintenance inspection, and no apparatus failures will result from a lack of preventive maintenance.

The accompanying sidebar gives examples of goals and corresponding objectives for the EMS component of a fire department plan.

Defining programs and resources required

After goals and objectives are set, planners need to determine what programs and resources are required to attain them. They need to answer the following questions:

1. What must be done to attain the objectives?
2. How will it be done?
3. When will it be done?
4. Who will do it (identified authority and responsibility)?
5. What resources (personnel, apparatus, materials, legislation, codes, etc.) are needed?

The programs proposed must meet the requirements of each objective. One program may provide the requirements for more than one objective.

Defining alternative programs

Often it is desirable to propose several possible ways to achieve a given objective. Each set of alternatives will be analyzed and the "best" program selected. A word of caution is in order here, however. While classical planning doctrine requires that two or more alternative programs be developed for each objective, attempts to do this can overwhelm and stall the planning effort. Develop alternative programs only when there are viable alternatives.

For example, here are alternatives to accomplish two objectives:

1. *Objective:* Inspect all commercial occupancies annually.
   a) Alternative 1: All inspections will be performed by fire prevention personnel.
   b) Alternative 2: Thirty percent of inspections will be performed by fire prevention personnel and 70 percent by suppression division personnel.
2. *Objective:* All fire apparatus shall recieve preventive maintenance inspections every six months.
   a) Alternative 1: Preventive maintenance will be performed by city shops.
   b) Alternative 2: Preventive maintenance will be performed by a qualified apparatus manufacturer.

The planning team then discusses alternatives to determine which ones are viable and deserve further analysis. The results should be reviewed with the advisory committee.

The planning team may be directed to evaluate major system alternatives as options (e.g., police-fire consolidation, contract fire protection, civilianization of certain divisions or positions, joint service agreements, volunteer/career staffing, and so on). These alternatives, which are discussed in detail in Chapter 17, can be evaluated effectively and unemotionally if the goals and objectives

accurately and specifically define service level standards. It is recommended that a guideline be established that requires a proposed alternative system to meet *all* goals and objectives. It has frequently been found that some of the most controversial systems are able to meet documented goals and objectives only after major revisions to the basic concept.

EMS goals and objectives For the fire department planning the development of an EMS component the following goals and objectives might be typical:

Goal I: Provide first-response and basic life support services in cases of medical emergency

Objectives:

1. Develop operational policies in coordination with hospital, medical director, police agencies, and ambulance services, by (*date*)
2. Design, purchase, and install radio and telephone communications equipment to permit public access to emergency medical services and to permit coordination between EMTs, public safety agencies, ambulance services and hospitals, by (*date*)
3. Equip designated apparatus and rescue vehicles with basic life support equipment and supplies, by (*date*)
4. Modify department training programs to provide continuing education of EMTs and maintenance of basic life support skills, by (*date*)
5. Train [*number to be inserted*] firefighters to level of EMT, by (*date*)
6. Initiate service, by (*date*).

Goal II: Provide advanced life support services and emergency ambulance transportation in cases of life-threatening medical emergency

Objectives:

1. Establish contractual relationship with medical control hospital for training of [*number to be inserted*] personnel as mobile intensive care paramedics and for continuing education, skill maintenance, and medical control functions, by (*date*)
2. Establish selection criteria and solicit paramedic training applications from among personnel previously trained to EMT level, by (*date*)
3. In coordination with medical control hospital, establish commencement date for paramedic training and arrange for appropriate staffing to replace personnel assigned to training program, by (*date*)
4. Establish specifications for mobile intensive care vehicles, equipment, and communications hardware and commence purchasing procedures, by (*date*)
5. Initiate paramedic training program, by (*date*)
6. Develop operational policies in coordination with medical control hospital, medical director, police agencies, and ambulance services, by (*date*)
7. Conduct community public education/orientation program in preparation for initiation of mobile intensive care service, by (*date*)
8. Take delivery of vehicles, equipment, and communications hardware and prepare for service, by (*date*)
9. In coordination with medical control hospital, medical director, and appropriate health-related agencies, prepare reporting instruments and procedures to facilitate ongoing evaluation of mobile intensive care program, by (*date*)
10. Conduct paramedic graduation exercises and initiate service, by (*date*).

The foregoing goals and objectives are not intended as a complete list of planning considerations for the respective programs; they merely illustrate the distinction between generalized goals and specific objectives.

At this point the viability of those alternatives would be identified and documented for analysis in the next task. Programs and program alternatives are reviewed and approved by the advisory committee.

Comparing alternatives and selecting the best programs

The planning team then analyzes the alternatives that have been identified and selects the ones that members believe will work best as components of the community's fire protection system. Alternatives should be judged against the quantifiable elements of the objectives as the selection criteria if at all possible. In some instances, however, qualitative analysis will be required. The results of this analysis also should be reviewed and approved by the advisory committee.

Preparing a documented plan

The planning document is prepared using the programs and/or systems selected in the previous step. The document should contain the following:

1. An executive summary, giving the highlights of the plan
2. A description of the reasons for conducting the plan, including a summary of the data analysis (a complete listing of data collected may be provided in an accompanying document)
3. A description of the planning organization, including acknowledgment of contributions to the planning effort, especially those of citizens, public agencies, and private sector organizations
4. Goals and objectives for the fire protection system
5. Requirements for achieving the goals and objectives
6. A summary of the alternatives and a description of the programs and systems selected
7. An implementation plan that specifically identifies the time schedule and management responsibility for the implementation of the programs
8. A budget for the forthcoming fiscal year
9. A long-range capital improvements plan
10. A community general plan element that incorporates the appropriate goals and objectives of the fire protection plan into the community general plan
11. Ordinances for adoption or modification of building/fire codes, zoning changes, fee schedules, and so on
12. A schedule for the periodic evaluation and revision of the plan and programs.

Implementing and evaluating the plan

The first step in the implementation phase is to have the plan approved by the governing body. The governing body should schedule study sessions and/or public hearings at which the community management personnel, the planning team leader and the advisory committee present the completed plan. The governing body will generally take the following actions:

1. Approve and adopt the plan in concept (this document is too large and dynamic to be formally approved and codified)
2. Approve annual budget
3. Approve capital improvements schedule
4. Approve revision of community general plan
5. Approve revised codes and ordinances.

After approval, the managers of the various departments and community agencies implement the plan as they assign program responsibility, establish resource allocation plans, and monitor the progress of programs that are part of the plan. Specific day-to-day management techniques are covered in other chapters.

An integral part of implementation is evaluating the results. Reporting and evaluation procedures should be established to ensure that the intended results of the plan are achieved. These evaluations should be conducted on a schedule to coincide with other reporting—for example, monthly activity reports, annual reports, and scheduled expenditure analysis. Again, it should be noted that most fire departments need to upgrade their management information systems to effectively monitor and evaluate the implementation of a long-range plan.

Updating and modifying the plan

The plan should be designed to respond to changing conditions in the community. It should be modified if projected or unexpected changes occur that affect the fire protection system or if the programs that have been selected as part of the plan are not producing the desired results (goals and objectives). These plan updates should become a part of ongoing management activities (i.e., annual budget preparations, capital improvements plan revisions, general plan amendments, and building/fire code revisions).

Some communities retain the advisory committee or planning team to review progress toward goals and to recommend plan modifications, but most find it preferable to integrate this process into the normal management functions of the organization.

The outlook

What trends in fire protection will affect the planning efforts of local communities? Perhaps the forecast might be:

1. Fire protection will focus less on suppression as a result of increased fire prevention activities.
2. Increased installation of automatic fire detection and suppression systems will continue to reduce fire losses.
3. Fire protection responsibility will continue to shift to the private sector.
4. The emergency, medical service demands will continue to be a significant part of the fire protection system.
5. Fire departments will be expected to provide increased services in hazardous materials incident prevention and control.
6. Planning—along with organizing, implementing, and measuring—will continue to change the technician role of the fire service manager. He or she will increasingly need to assess future possibilities and plan to meet them rather than react to changes as they occur. An important criterion in assessing the effectiveness of the fire department will be the ability to manage change and innovation (see Chapter 16).
7. Funding for fire protection will continue to be limited. Reductions in available "public safety" funding will result from limited public financing and increased competition for the public safety dollar.

The need for long-range planning is evident and the methodology is available. Whether it can help solve some of the problems of providing fire protection will undoubtedly depend on how public-sector managers perceive the benefits and costs of initiating and implementing planning. There are definite costs or disincentives to planning. Foremost is the consideration that the planning should be participatory—that is, that planning is best done by the community, not by

a small group in the fire department or by an outside consultant. Only through community participation, however, will the commitment and cooperation be forthcoming to support the programs in the plan. Many of the cities that have performed fire protection planning have discovered that the *process* of planning was as important as the end product. In many instances the planning project provided a unique opportunity for an interdisciplinary effort toward a common goal. The experience of working with members of other departments and with citizens gave fire department members a new perspective, which was just as important as the plan.

Another disincentive is a lack of planning expertise and experience. Many communities, especially small ones, feel that they have no personnel with sufficient planning and management abilities to lead or participate in a major planning project. A number of options are available to communities to meet this need:

1. Master planning guides developed by the U.S. Fire Administration contain procedures that may be used by any fire department or government official. These guides went out of print but are still valid if they can be obtained from a library or another source.
2. Training courses in planning procedures are available through some state fire academies.
3. A member of a local or regional planning agency may be recruited to serve on the planning team to provide expertise in planning methods.
4. Consultants with fire protection planning experience are available to provide assistance.

1 For example, Michael J. Jucius and William E. Schlender, *Elements of Managerial Action* (Homewood, Ill: Richard D. Irwin, 1965), 4–5. Peter F. Drucker, *Management: Tasks, Responsibilities, Practices* (New York: Harper & Row, 1974), 121–22; and Robert C. Ford and Cherrill Heaton, *Principles of Management* (Reston, Va.: Reston Publishing Company, 1980), 19.

2 Peter F. Drucker, *Technology, Management & Society* (New York: Harper & Row, 1970), 131.

3 National Fire Prevention and Control Administration, National Fire Safety and Research Office, *Urban Guide for Fire Prevention and Control Master Planning* (Washington, D.C.: Government Printing Office, 1977 and *A Basic Guide for Fire Prevention and Control Master Planning* (Washington, D.C.: Government Printing Office, 1977).

4 The U.S. Fire Administration lists 91 communities that contacted the administration for technical support and developed master planning documents. In addition, the following agencies are known to the author to have developed community fire protection master plans using the process developed in this chapter: Auburn, Washington, 1982; California State Fire Marshal, 1986; Clark County No. 5, Washington, 1985; Contra Costa County, California, 1981; Cowlitz County No. 2, Washington, 1983; El Segundo, California, 1983; Fresno County, California, 1981; Gig Harbor, Washington, 1984; Hanford, California, 1985; King County Fire District No. 20, 1979; Lake Tapps, Washington, 1985; Livermore, California, 1984; Morgan Hill, California, 1986; Palm Coast, Florida, 1985; Pleasanton, California, 1982; Sierra Vista, Arizona, 1985; and Vancouver, Washington, 1985.

5 See, for example, Philip S. Schaenman and Edward F. Seits, *International Concepts in Fire Protection: Practices from Japan, Hong Kong, Australia, and New Zealand* (Arlington, Va.: TriData, 1985); and Philip S. Schaenman, *International Concepts in Fire Protection: Ideas from Europe That Could Improve U.S. Fire Safety* (Arlington, Va.: TriData, 1982).

6 See, for example: National Fire Prevention and Control Administration, *The Human Factor in High Fire Risk Urban Neighborhoods: A Pilot Study in New Orleans, Louisiana* (Washington, D.C., 1976); *Highlights of the National Household Fire Survey* (Washington, D.C., n.d.); and *Fire Education Planning* (Washington, D.C., 1977).

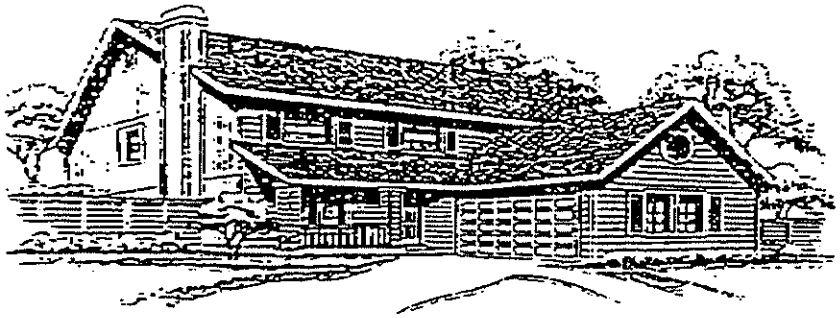
7 National Fire Prevention and Control Administration, *Urban Guide for Fire Prevention and Control Master Planning*, appendices V and VI.

8 See, for example, National Fire Incident Reporting System (NFIRS), developed by the National Fire Prevention and Control Administration; the Uniform Fire Incident Reporting System (UFIRS), developed by the National Fire Protection Association; the California Fire Incident Reporting System (CFIRS); the Fire Incident Reporting and Evaluation System (FIRES), developed and used by the California cities of Huntington Beach, Seal Beach, Fountain Valley, and Westminster; and the Field Incident Reporting System (FIRS), developed by the Los Angeles Fire Department in the early 1960s.

9 A good reference on techniques of data gathering is: Carl V. Patton, "Information for Planning," in *The Practice of Local Government Planning*, ed. Frank S. So and Judith Getzels, 2d ed. (Washington, D.C.: International City Management Association, 1988).

WHY JOHNNY CAN'T AFFORD

A HOUSE



LUXURY HOME

3,064 SQ. FT.

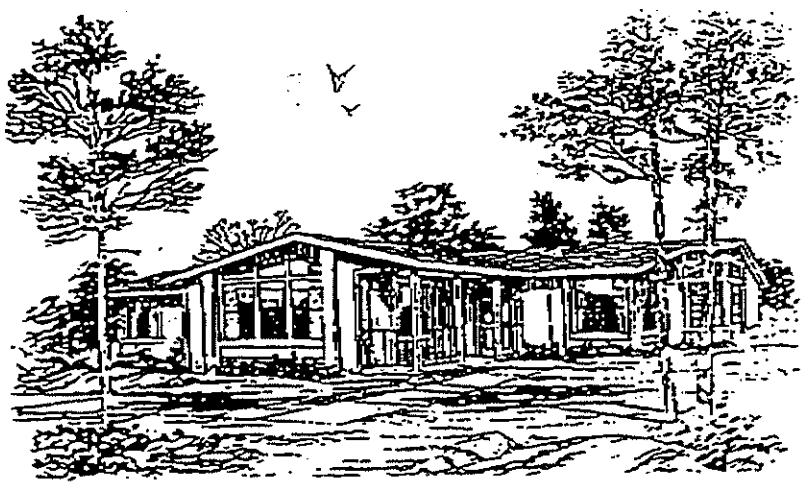
COST

CONSTRUCTION ($50.00 sq. ft.)		$153,200	38%
DEVELOPER PROFIT		$107,924	27%
LOT		$ 80,000	20%
REALTOR FEE		$ 24,000	6%
FINANCIAL LOAN POINTS/INTEREST/TAXES		$ 20,000	5%
PERMIT FEES			
HUNI	$ 4,766		
SCHOOL	$ 4,596		
SANITATION	$ 1,900		
		$ 11,262	3%
FIRE PROTECTION			
RESIDENTIAL FIRE SPRINKLERS	$ 3,524		
SMOKE DETECTORS	$ 90		
		$ 3,614	1%

SALES PRICE= $ 400,000

WHY JOHNNY CAN'T AFFORD

A HOUSE



MODULAR/MANUFACTURED HOME

1,152 SQ. FT.

COST

CONSTRUCTION ($37.00 sq. ft)		$ 42,600	28%
DEVELOPER PROFIT		$ 47,173	32%
LOT		$ 35,000	23%
REALTOR FEE		$ 9,000	6%
FINANCIAL LOAN POINTS/INTEREST/TAXES		$ 7,000	5%
PERMIT FEES			
HUNE	$ 3,917		
SCHOOL	$ 1,720		
SANITATION	$ 1,900		
		$ 7,537	5%
FIRE PROTECTION			
RESIDENCIAL FIRE SPRINKLERS	$ 1,600		
SMOKE DETECTORS	$ 90		
		$ 1,690	1%

SALES PRICE= $ 150,000

WHY JOHNNY CAN'T AFFORD A HOUSE

This analysis is the result of a frustration with myths concerning the alleged relationship between the cost of residential fire protection and the cost of affordable housing. As John Kennedy once said, "The great enemy of the truth is very often not the lie, deliberate, contrived and dishonest; but the myth, persistent, persuasive and unrealistic."

The accompanying figures are based on actual homes constructed in the City of Napa. As shown on the accompanying diagrams, costs have been listed in descending order and are believed to reflect statewide patterns.

Local governments are constantly under criticism regarding building requirements, permit fees and environmental impact mitigation measures, and their effect on affordable housing. However, reducing these costs will not substantially alter the cost of housing. Several other conclusions may be drawn from these simple diagrams, and several myths may be dispelled:

1. Actual material and construction costs may be assumed to be fairly constant throughout the state, therefore costs per square foot as shown reflect a statewide average.

2. Lot costs do fluctuate widely throughout the state and may differ from the lot cost represented on the diagram. Lower land costs can result in lower selling prices or increased developer profits. Without local or state government intervention, any savings probably will be reflected in increased developer profits.

3. Real estate fees are also a large cost factor n the diagram. Commissions, while officially negotiable, tend to average around 6% in the California residential sales market. The total commission has been escalating sharply in the past several years along with the substantial price increase in housing. Real estate fees will only continue to increase, to the detriment of the possibility of affordable housing, until there is a consistent voluntary effort, or legislation, to control them.

4. Financing costs for the land and construction of houses vary with the market. Reducing the cost of financing can provide some assistance to those seeking affordable housing. However, as shown on the diagram, the amount that can be saved as a percentage of the total cost of a house is minimal. A minor reduction in financing rates will have little effect on the sales price of the house.

5. Permit fees do vary by locale, but once again represent a minor portion of the sales price of a house. Reducing permit fees will not substantially alter the production of affordable housing in a

community and may result in developers not paying their fair share for municipal services.

6. The cost of fire protection is the issue that is, as John Kennedy stated, "the myth, persistent, persuasive and unrealistic." The accompanying figures show that life safety fire protection being provided at the local level is the least costly factor in the affordable housing budget. In fact, the application of fire retardant roofing, residential fire sprinklers, smoke detectors and other fire and life safety systems will permit increased densities, decreasing land costs per house.

7. A very substantial factor in the affordability dilemma is the amount and percentage of profit realized by developers. This factor does fluctuate throughout the state as costs fluctuate and the supply and demand equation comes into play. Without governmental intervention to address developer profits as it affects affordable housing we will continue to see an escalation of profit as any of the other cost factors decrease.

It is hoped that this document and the accompanying diagrams will dispel some of the myths regarding fire and life safety protection and its relationship to affordable housing. It is further hoped that the real obstacles to affordable housing - escalating land costs, real estate fees and developer profits - will be highlighted.

The California Fire Service will work with any group to provide fire safe affordable housing. However, we believe that all income groups are entitled to equal protection from the ravages of fire.

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UNIT 1: INTRODUCTION

OBJECTIVES

The participants will initiate communication with other class members which will facilitate workshop interaction.

INTRODUCTION

This course is intended to provide fire department officers with the capability to plan and manage the local fire protection system. Upon completion of this course, the student should be capable of organizing and coordinating the development and implementation of a community fire protection master plan for his/her community.

Lectures, audiovisual presentations, and group activities are used to provide a working knowledge of the master planning process. The course is designed to minimize lectures and maximize learning through exercises. The exercises enable the students to apply the master planning concepts to a sample community.

The student will receive instruction regarding standard planning and analysis techniques related to the ten-step planning process. Although understanding the technical process of planning is essential, an even greater effort must be devoted to the political aspects of planning and management. This course emphasizes the development of techniques for managing the political aspects of planning.

The ten steps of the planning process are:

Step 1: Decide to plan.

Step 2: Organize for planning.

Step 3: Collect and analyze data.

Step 4: Define goals and objectives.

Step 5: Define requirements, programs, and systems.

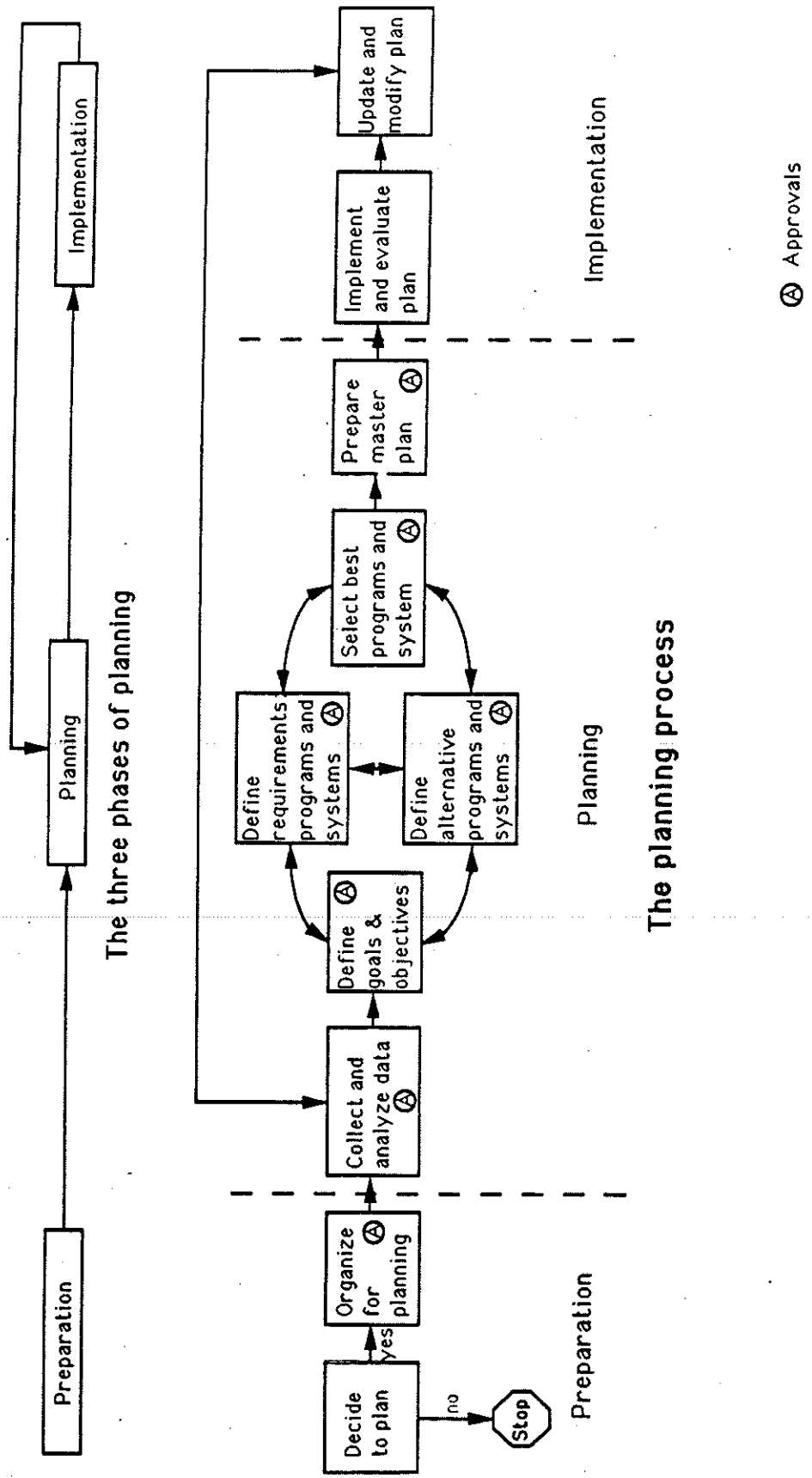
Step 6: Define alternative programs and systems.

Step 7: Select the best program and system.

Step 8: Prepare a master plan.

Step 9: Implement and evaluate the plan.

Step 10: Update and modify the plan.


Preparation
Planning
Implementation
The three phases of planning
Decide to plan
yes
no
Stop
Organize for planning
Collect and analyze data
Define goals & objectives
Define requirements programs and systems
Define alternative programs and systems
Select best programs and system
Prepare master plan
Implement and evaluate plan
Update and modify plan
Preparation
Planning
Implementation
The planning process
Approvals

PARTICIPANT AND INSTRUCTOR INTRODUCTIONS

Participants will be asked to introduce themselves to the group.

- *Name.*
- *Fire department.*
- *Position.*
- *Fire department special assignments/responsibilities.*
- *Planning experience.*
- *Hobbies/interests.*
- *Reason for attending.*

UNIT 2: MASTER PLANNING OVERVIEW

OBJECTIVES

The participants will:

1. *Identify the benefits of master planning.*
2. *Gain a general knowledge of the purpose and methodology of the ten-step planning process.*
3. *Define the concept of a "fire protection system" which consists of public and private agencies in which the fire department is one of the agencies.*

NOTE-TAKING GUIDE

NEED AND BENEFITS OF PLANNING

There is a need for each fire department to develop a master plan.

The process is 60% political and 40% technical.

Three levels of planning.

STRATEGIC PLANNING IN THE PRIVATE SECTOR

Purpose.

This video identifies the importance planning plays in business and how it is employed by some of the largest corporations in the world.

THE BUSINESS OF MANAGEMENT

PLANNING AND THE MANAGEMENT PROCESS

A. How does this video apply to the fire service?

B. How is the fire service different?

C. Planning is "Preparing for tomorrow, today."

D. Steps of the planning process are basically similar.

Methods and strategies can vary; there is no single method for every situation.

E. Strategic Planning

Tactical Planning

Operational Planning

F. No budgeting process makes sense without a road map of where you are going.

G. Strategic Planning

Considers a number of key parameters.

What are the needs criteria of the public?

H. AT&T

A monopolist which was required to change. How is the fire service like AT&T (past, present, and future)?

I. "All organizations share a common need, the need to plan."

J. Who are the stockholders?

K. Who are the stakeholders?

"You can't figure out where you want to go unless you know who you are today."

L. "Managers who rely on policies that have evolved as guidelines over the years, based on past historic approaches, can no longer cope or deal with future uncertainties."

M. Uncertainty is one of the greatest reasons to plan.

N. The need for flexibility is a reason to plan.

O. Organizations function best where there is a sense of direction that is well understood throughout the organization.

P. "Where there is no sense of long-term direction, I find that good people leave."

What is our market share?

If you asked your members to identify your plan, what would you hear?

INTRODUCTION TO THE PLANNING PROCESS

Preparation

Approval

Planning Team

Advisory Committee (Review Committee)

Management Team

Planning

Data

Problems/Concerns

Alternative Programs

Requirements

Selection

Writing the Document

Implementation

Action Plans

MASTER PLANNING OVERVIEW

ACTIVITY 2.1

PROBLEMS FACING THE FIRE SERVICE

DIRECTIONS:

DEVELOP A LIST OF THE TEN MOST SIGNIFICANT PROBLEMS THAT YOU THINK WILL FACE THE FIRE SERVICE OVER THE NEST 10 YEARS.

1. PRIORITIZE THE FIVE PROBLEMS.

2. LIST THE PROBLEMS ON FLIPCHART PAPER.

3. APPOINT A SPOKESPERSON TO PRESENT THE GROUP'S FINDINGS TO THE CLASS.

PRIORITY	PROBLEMS
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

AFTER THE PRESENTATIONS ARE COMPLETED, THE INSTRUCTOR WILL:

1. IDENTIFY AREAS OF AGREEMENT AMONG GROUPS.

2. HOLD A BRIEF DISCUSSION TO IDENTIFY REASONS FOR AREAS OF DISAGREEMENT AMONG GROUPS.

3. DISCUSS THOSE PROBLEMS WHICH HAVE A HIGH POTENTIAL FOR SOLUTION AS A RESULT OF MASTER PLANNING.

FIRE PROTECTION PLANNING--THE CONCEPT

If you ask most citizens in a community what they receive as fire protection from the fire department, they will tell you that it has primarily to do with the response to fire incidents after they occur. If you ask most fire departments what their role is, most firefighters will talk to you in terms of fire suppression. In fact, 80% to 90% of most fire department budgets go to fire suppression. It is viewed as an after-the-fact response to an emergency incident.

However, the role of fire departments has been expanding over the last few years to include transportation, emergency medical, and hazardous materials incidents and involvement in land development and building construction. There have been improvements in building construction such as increased use of sprinklers. There are also increased problems such as the use of prefabricated trusses in residential occupancies. Fire department functions have broadened beyond the historical role of fire suppression.

There is a misconception that the fire department can do it alone. A fire protection system exists in every community. It may or may not function as positively as it should. In order to provide effective and efficient fire protection, all of the elements such as building department, law enforcement, and water department must perform their proper function within the fire protection system. In fact, the fire department cannot provide fire protection without the full support of these agencies.

A fire protection system has required characteristics. Those agencies that make up the fire protection system must understand their role; they must commit themselves to certain fire protection results; they must have general community support, and all agencies within the fire protection system must be mutually supportive.

Residents can perform certain functions within the fire protection system if they are prepared and properly educated. They can learn to control a small kitchen fire by placing a lid on a pan on a kitchen stove. They can control car fires and smaller fires if they are knowledgeable and trained in the use of a fire extinguisher. However, fires can quickly exceed the capability of the homeowner and require the services of organized fire departments which are generally effective in controlling fires in small buildings. However, fires grow quite rapidly to the point where they exceed the capabilities of the first responding fire units and, frequently, it is necessary not only to use all the forces within the fire department, but also to use neighboring fire departments. However, there is a basic principle here that **all nonsprinklered buildings are at risk of total loss regardless of the amount of firefighting resources available**. There are some buildings that are clearly beyond the fire control capabilities of any fire department. The Sao Paulo, Brazil high-rise fire is one example. As he approached from about 2 blocks away, the first-arriving officer evaluated the conditions. He then stopped the engine, got off, and knelt down beside the engine for a few minutes; then got back on the engine and went on to the fire. This was probably the most effective thing he

did all day because he and the Sao Paulo Fire Department waited for the building to burn down to their firefighting capability which was relatively limited.

In fact, if a city's fire protection system is based upon the after-the-fact response, a horse-drawn fire engine may characterize its fire protection capability when faced with major fires such as high-rise. Use of the horse-drawn fire apparatus is just as effective on the Sao Paulo fire as modern firefighting resources.

Over the years the results of the nation's reactive fire protection system is that we have had major losses in this country because of the unrealistic expectation of the effectiveness of fire suppression. Most major cities in this country have burned down at least once. San Francisco, for example, has burned down five times. In the late 1800's the insurance industry became concerned about the conflagrations in our cities and started promoting built-in fire protection such as fire-resistant construction, building codes, more effective fire control by fire departments, and the installation of sprinkler systems. As a result, conflagrations have almost disappeared and the commercial and industrial losses have been greatly reduced. In fact, the records of the Factory Mutual Insurance Company show that in the 1860's, prior to the installation of the sprinkler systems, commercial and industrial losses averaged 30 dollars for every 100 dollars insured value. By the 1970's, as a result of the installation of sprinkler systems, their losses were 2 cents to 3 cents per 100 dollars of insured value. It should be noted that a constant rate has been maintained for residential losses primarily because neither insurance industries nor others in the fire protection system have shown an interest in these losses.

The United States has the worst fire record in the world when measured in terms of the number of building fires per thousand people and also the number of fire deaths per million population. Why should the United States have such high fire losses when so many resources are invested in fire protection? There are three primary factors. The public attitude in other countries, the legal responsibility of those who start fires in other countries, and the general approach to code enforcement. The city of Tokyo, which is four times the size of Los Angeles, has one quarter the number of fires as the city of Los Angeles. Although they operate under the same building codes, there is a different cultural attitude in Japan. Having a fire in Japan has a social stigma attached to it. People who have fires receive pressure from their neighbors and sometimes are required to move out of their homes. This attitude has a long history in the Japanese culture. If you have a fire in this country, people commiserate with you and bring you pies and cakes and help you recover from the fire. In Japan, you become a social outcast. Also, although Japan has volunteers in its rural areas to provide fire suppression, it also has a large number of volunteers both in metropolitan and rural areas to provide fire safety education. There are 8,000 fire safety groups in the city of Tokyo operated primarily by housewives and children.

In summary, foreign countries have a higher level of public fire safety education. There is greater cultural pressure regarding fires. There is a higher level of

code enforcement, and people are held legally responsible for the fires they start.

The history of hotel fires in this country paints a typical picture of our primarily reactive approach to fire protection. We have built our cities and the structures in them without a large degree of concern for fire protection. Then, after we have major incidents, we go back and try to fix the system. The Wyncoff hotel fire which occurred in Atlanta is typical of the hotel fire experience. This fire had a life loss of more than 200 people. The structure had open stairways, high flame spread in hallways, and transoms over doors of minimum fire resistance. There was no fire alarm system or sprinkler system and fire suppression was essentially ineffective.

In the 1980's there was a series of high-rise fires, including the Las Vegas Hilton, the Stouffer's Inn, and the West Chase Hilton--all of which had high life loss.

The MGM Grand fire in Las Vegas also occurred in this period. Something happened as a result of this fire. There was an increased public awareness that sprinklers were required in high-rise buildings. Like the Vietnam War, we saw the dramatic occurrence on television and public expectation changed as a result of viewing this disaster.

The MGM building was partially sprinklered. The casino area suffered almost total loss. It should be noted that the velour wall covering in the hallway leading to the convention center was intact because there was a sprinkler system in that hallway. This fire also reinforced the concept that fire-resistant construction was unable to control the rapid spread of fire without the assistance of an automatic sprinkler system.

The unrealistic expectation that fire-resistive construction prevents smoke spread was adequately demonstrated in this fire. The fatalities from the toxic by-products of the fire were found on the upper floors of the structure. In some cases there was heavy concentration of smoke; in other areas there was light concentration of smoke but fatal levels of CO.

In years past when smoke rose in buildings, people had some opportunity of going to windows to obtain fresh air. Modern building construction now encloses the building with windows that cannot be opened. Also, air-handling systems may spread the smoke throughout the building. There is an unrealistic expectation that the smoke-removal systems in high-rise buildings are effective. Fire incidents and fire tests have raised serious doubts about the effectiveness of smoke-removal systems. One series of tests on operation of smoke-removal systems in San Francisco evaluated these systems in high-rise hotel buildings and documented serious concerns about their effectiveness.

As a result of the MGM fire, major retrofits of high-rise hotels commenced in this country. The state of Nevada adopted a retrofit sprinkler ordinance. The city of Honolulu adopted retrofit sprinkler ordinances, and the Mariott Corporation

retrofitted all of the hotels in its system. The reason was public expectation that hotels should be sprinklered and the industry was responding to that expectation. New technology, e.g., the introduction of plastic pipe, in the sprinkler industry enabled sprinkler systems to be installed at relatively low cost and without damaging the aesthetics of hotels. Insurance reductions were significant. In Honolulu it was commonly found that a 75% reduction in insurance costs was obtained and up to a 35% reduction for contents for hotel structures. There was a business incentive as well as a popular demand to sprinkler these facilities. However, a large number of unsprinklered high-rise structures still remain. Fatal fires in high-rise occupancies continue to occur, such as the high-rise hotel in Puerto Rico, and the Cathedral Hill fire in San Francisco. Proposed ordinances have been unsuccessful. Although highly supported by the mayor of San Francisco, an ordinance was rejected in that city after the Cathedral Hill fire. It is significant to note that the owners retrofitted the hotel where it was reconstructed.

The fire loss prevention capability of suppression forces is limited. At best, firefighters can confine a fire to the building or area of involvement upon arrival. Life loss usually occurs prior to the arrival of the fire department. Effective life saving rescues by fire departments are rare. **Buildings, contents, and occupants of unsprinklered buildings are at risk of total loss to fire.**

This has been true since the time of Currier and Ives. Unrealistic expectations of fire suppression have a demonstrated history of unacceptable losses to property, and lives, including the lives of firefighters.

The typical reflex time chart is used to demonstrate the reactive capabilities of fire suppression in after-the-fact response to fires. If we take the typical reflex time and say that a fire will be detected within 1 minute after it starts, the detection process will be completed in 1 minute; it will take a minute-and-a-half to complete the alarm; that is, the receipt of the alarm by the dispatch center and notification of the fire stations; it takes 20 seconds for the fire apparatus to get out of the station; 2 minutes to respond; a minute-and-a-half to set up; and a minute to get water on the fire. Most firefighters would say that that is optimistic, although here we call it typical. What that response is intended to do is control fires prior to flashover. That is the point at which the interior contents of the building reach self-ignition at about 800°F. In order to prevent flashover the temperature must be controlled within a given period of time.

In this example, flashover occurs according to the standard time-temperature curve as the fire department is going out the door, which is approximately 4 minutes after ignition. This standard time-temperature curve is, however, a theoretical curve used in building materials testing. A more realistic curve was developed by the Los Angeles City Fire Department in its Operation School Burning tests after the Our Lady Of The Angel school fire in Chicago. This curve indicates that flashover occurs in approximately 7 to 8 minutes. This time-temperature curve has been validated by numerous lab tests. It appears to be a good average time to use for this analysis.

Other fires--flammable liquid fires, or fires in areas of highly combustible contents--have such a rapid rate of development they are detected at flashover. One of the answers to this flashover control problem is the use of automatic sprinkler systems. In the case of a sprinklered building, when the temperature rises to approximately 200°F, the sprinkler head activates. Time is no longer a factor and the temperature never reaches the flashover point. The generation of toxic gases is maintained at a safe level. Some of the concerns about sprinklers in the past have included excessive water damage, expensive installation, and damage to aesthetics. "It can't happen to me," and other resistance comes from those who just don't want any more governmental regulation. This is why we say that in planning, 40% of fire protection planning is technical to prove the technical aspects of the performance of such systems. But 60% of the master planning process is educational and political, in order to overcome myths about the capabilities of manual firefighting and myths that relate to the effectiveness and costs of built-in fire protection.

There are numerous other myths, such as the myth that aerial ladders provide a capability for life safety. It turns out that aerial ladders are effective in fire control by assisting the fire department to limit the spread of fires and enable occupants to escape by the normal paths in the building. But there is a myth held by many that large numbers of people can be evacuated by aerial ladders. There is significant evidence that this is not possible. There are other myths that aerial ladders are effective in high-rise firefighting. This is not always true.

The fire growth versus reflex time should be considered in the design of a fire protection system. There are manageable elements of the system which can be controlled. It is possible to control the time of detection of the fire. It is also possible to control the reporting of the alarm, either by educating the public or by installing automatic alarm systems. It is also possible to directly control the fire service response time by controlling the automated dispatch system. Response time can be reduced by adding fire stations. Setup time can be reduced by better training of the firefighting forces. The ability to control setup time is limited, tends to be expensive, and still must contend with the 7- to 8-minute flashover period. You may arrive at the base of a high-rise building within 4 minutes and have a possibility of controlling flashover. Yet it may take you 20 minutes to an hour to reach the fire floor. The results are obvious--flashover is going to occur.

Where is our firefighting problem generated? The building code establishes the fire control problem; it also provides unrealistic expectations. The features of the standard building code provide only a minimal level of fire protection. Building code provides allowable floor areas based upon the occupancy type and risk, fire resistant construction of the building, and the height of the structure. These requirements establish fire areas, fire flow, and resource requirements which we can calculate. It can also be stated that the areas within these fire walls are acceptable risks. The problem is that these factors are not considered in the development of allowable fire areas. People who write codes have never thought of these areas in terms of fire risk, allowable fire areas, or the fire flow and resource requirements of the fire department. The fallacy is

that the structural requirements will provide adequate protection for large or small cities despite their level of firefighting resources. In order to analyze these unrealistic expectations, we have calculated the personnel required to deliver the required fire flow to these areas. If you set a goal to control a fire within a building within 5 to 10 minutes after the arrival of the fire department, you need a certain fire flow capability which can be calculated using the ISO fire flow formula. In the case of a single-family dwelling which requires approximately 16 personnel, fire departments are typically effective in extinguishing fires within 5 to 10 minutes. However, in a fire-resistive public assembly building of 22,500 sq. ft., the fire department would have to arrive with 90 personnel in order to accomplish the same results. This is obviously unrealistic. No departments that we know of are capable of providing 90 personnel on the scene within 5 to 10 minutes. Therefore, the result is that the fire either spreads to other areas or the fire department waits for the fire to burn down to its firefighting capabilities.

Many features within the fire code provide unrealistic expectations. High-rise building construction allows smoke to spread and fire walls and fire doors may fail because of improper installation or maintenance.

Efforts by the insurance industry have eliminated the use of combustible roofs in industrial and commercial occupancies. The results of combustible roofs on single-family dwellings are dramatic. They have allowed the multiple destruction of single-family dwellings; this is increasingly evident in the wildland/urban interface fire problems that we are experiencing in all states in the nation.

There are alternatives to combustible roofing just as there are alternatives in other construction features. Fire-retardant roofing materials provide aesthetic, economic, and firesafe benefits.

We know that smoke detectors provide effective life safety service. Residential fire safety has been improved through the use of smoke detectors. Many building codes in this country now require smoke detectors in all structures. The report *America Burning* was the force behind this movement. The smoke detector industry initiated public education regarding the installation of smoke detectors. Fire departments supported it. However, now that the market has been saturated, the smoke detector industry has discontinued its public education programs and we now have major concerns regarding the effectiveness and maintenance of these smoke detectors, many of which are 8 to 10 years old. We are beginning to see failures. It is time for the fire service to conduct a major public education program which focuses on maintaining. and testing of smoke detectors.

So one of the things that we should consider in a fire protection master plan is the realistic capabilities of firefighting forces. It is very possible that by the time the apparatus is leaving the station, the fires have exceeded their capabilities and the fatalities they had hoped to prevent have already occurred.

If the fire department responded with a hand-drawn fire apparatus to a fire in a high-rise building it would probably be criticized by the citizens of the community, although the expectations of the modern fire department should not be more than the hand-drawn fire apparatus in relation to high-rise buildings and many other structures.

Unless adequate levels of building protection are provided, unrealistic expectations of the effectiveness of these firefighting capabilities will continue to produce unacceptable fire losses.

We must remember that the fire service is faced with more than firefighting activities. Emergency medical, hazardous materials, building construction, and code enforcement are growing functions in the fire service.

Fire departments started providing emergency medical services to care for their own personnel who were injured and to provide services at accidents, particularly transportation accidents. The level of expectation regarding emergency medical services increased with the television series "Emergency" and the installation of 911 systems.

Some fire departments have assumed a larger and larger role in the EMS system, some becoming involved in Advanced Life Support systems (paramedic systems). In most fire departments today, 60% to 80% of the fire department's activities relate to emergency medicine. It is significant that fire departments did not plan this, but merely reacted to demands for service. It is having a major impact on volunteer fire departments. Increased activities have resulted in employer resistance to the frequency of employees taking leave from work to provide emergency medical services. Increased training requirements make major demands on the time of volunteers. Exposure to contagious diseases is increasing. There are major family impacts when people are required to spend more and more of their time in training and responding to emergency medical incidents. In today's world when both spouses tend to be employed, time spent at home is becoming more and more precious. The ability to provide a 24-hour EMS with volunteers is becoming more difficult. The key factors here are that we did not anticipate the requirements of this service and we did not control the level of service that we are now providing. Many fire chiefs would prefer not to be as deeply involved in EMS as they now find themselves.

We also find that there is an EMS system within which the fire service participates. And if we look again at the reflex time we find that the fire departments by themselves may have a difficult time being effective in worst case conditions such as cardiac arrest. It is necessary to gain the support of others in this system. A trained citizenry can improve the effectiveness of fire departments by 20% in response to cardiac arrest as has been proven in the city of Seattle. There are also restrictions placed upon the fire departments by the medical profession both in terms of legal constraints and operational constraints.

The other major program in which the fire service is becoming involved is hazardous materials control. Incidents such as the Crescent City, Illinois, explosion demonstrate that firefighters are being drawn into a hazardous materials program in a manner similar to that of EMS. The fire service is being exposed as the first responder to spills and to new hazards. Increased training requirements are being legislated, including Title III SARA requirements and certain state requirements.

There is an increased exposure to all communities. No one today is immune to exposure to hazardous materials. Most communities have railroad systems which carry large volumes of hazardous materials and present significant risk.

Legislation is being adopted which places more and more responsibility and training requirements upon the fire department to protect its citizens and its firefighters. Managers must evaluate the extent to which they desire to be involved in hazardous materials. It is possible that others should perform the task that the fire service is assuming.

The fire service is being backed into a corner. More services are being demanded without corresponding increases in resources. Funding for the increased demands of services has not kept pace. There is voter resistance to increased expenditures at local government levels as demonstrated by Proposition 13 and other expenditure controls.

Other regulations are placing requirements on fire departments without consideration for funding. Local governments in general are being asked to increase services and cut costs. It is called *local government squeeze.*

Even when funds are available there are competing priorities. The local governing bodies perceive many problems that must be solved with the public safety dollar: crime, drugs, the AIDS epidemic--all issues that demand funding out of the public safety dollar. The fire problem may not be perceived as being as high a priority as these other issues since local government tends to respond to complaints. The fire department may receive a low priority because few complaints are received. The fire service may see the need for a fire station. The medical profession may see the need for a hospital or clinic; and, from what we hear about the impending costs of the AIDS epidemic, a higher and higher priority is going to be allocated to medical services. It should be remembered that the fire service receives few complaints about its service. In general, most politicians will consider fire protection services to be adequate for that reason.

It is necessary that in the process of planning, the fire administrator demonstrate the benefits of control versus reaction; that there is a need for a fire protection system; and that a cost/risk management system can be effective for a community.

In order to do this it is necessary to define the acceptable cost. What is the community willing to pay for fire protection? What risk is the community willing to accept? The community will probably accept more risks than the fire chief is

willing to accept. What is the proper balance? That must be determined through the process of negotiations and evaluations. The acceptable levels of cost and risk will establish the levels of service that the community and the fire service jointly accept as reasonable for that community. We believe the process to accomplish this is contained in the master planning process.

UNIT 3: SUNVILLE OVERVIEW

OBJECTIVES

The participants will:

1. *Identify data elements relevant to fire and EMS planning.*
2. *Use historical incident information to ascertain present concerns and project future fire service needs.*
3. *Identify reliable sources of relevant data.*
4. *Organize data so it can be analyzed to forecast future fire service needs.*
5. *Define fire demand zones.*
6. *Establish baseline data for future evaluation.*
7. *Identify the two evaluation methods of assessing fire station locations.*
8. *Identify the spheres of influence and the methods of their determination.*
9. *Identify a manner in which this information can be conveyed to a council or other decision-making group.*
10. *Define the purpose and process of determining the relative level of risk in the community based upon what there is to burn.*
11. *Identify a method of determining the level of service provided with the present service model.*

NOTE-TAKING GUIDE

DEVELOPMENT AND USE OF FIRE DEMAND ZONES

Data requirements.

Divide the data into smaller geographic areas to simplify the analysis.

The factors for FDZ development are:

A simple definition of an FDZ is a geographic area used to collect and maintain data for planning.

Potential additional uses may be:

Development of FDZ.

Fire management area (FMA).

FIRE STATION LOCATION ANALYSIS

Fire station location is important in that it usually represents the point from which most emergency services are initiated.

Fire station location is one of the main elements in every fire station plan.

Analysis of the location(s) of fire stations, actual or planned:

Two evaluations:

Approach determines the area served by each fire facility.

Average vehicle speed.

Fire station service area maps.

Response map analysis.

Coloring of maps.

ANALYZING THE PRESENT SITUATION--RISK ANALYSIS

Introduction.

Benefits of risk analysis:

Fire risks defined:

Categories of risk:

Factors to consider when determining risk:

Kinds of risk:

Risk may cause loss of:

Risk modifers:

Risk analysis application.

ACTIVITY 3.1

SUNVILLE DATA ANALYSIS

BACKGROUND

The objective of this activity is to provide you with an overview of the community of Sunville and with experience in working with data formatted in this manner.

The analysis process selected is based on the concept of questioning and comparing the various data elements prepared in order to determine the areas of concern (problems) associated with fire services in Sunville. Do not confuse this planning process with those that are solely confined to addressing problems. A concern (problem) may arise from an assessment of present response in capability in relation to stated goals and objectives.

DIRECTIONS

First select a recorder and a lead person. Then, working as a group, read each question carefully and formulate your responses. Some of the questions may be answered by a simple yes or no, while others may require more detailed analysis and comment. It is suggested that you view your group as the planning team of Sunville and approach this task accordingly. This analysis will form the basis for the remainder of the work you will be doing this week.

As groups work at different rates and to varying depths, the instructor will advise you as to your progress related to the time allotted for this exercise. It is suggested that you stay relatively general in your analysis approach at this time.

Record your answers in any manner that will document your findings. You will be asked to report to the remainder of the class.

Summary of Steps in Data Analysis Activities

Step 1	Select a recorder of information.
Step 2	Read the directions completely.
Step 3	Identify the lead person for this exercise.
Step 4	Start with Question Set 1.
Step 5	Complete through Question Set 6.

Break for Lecture.

Step 6	Continue with Question Set 7.
Step 7	Place the laundry list of problems on a flipchart. Question Set 12.

MAPS AND OVERLAYS

There are seven laminated colored maps with nine clear overlays available for the analysis of Sunville. The data comparisons suggested in this set of questions are not intended to represent a complete analysis, but are offered as a starting point, or examples of one way in which data may be analyzed.

There are seven laminated maps:

Map 1	Land Use
Map 2	Historical Development
Map 3	Population
Map 4	Assessed Valuation
Map 5	Transportation
Map 6	Future Land Use
Map 7	Water Distribution System

There are nine overlays placed on clear plastic:

OVL 1	Fire Demand Zones
OVL 2	Average Fire Flow Required and Available for the FDZ
OVL 3	Case Studies
OVL 4	Fire Incidents/Working Fires
OVL 5	EMS Incidents
OVL 6	Public Facilities
OVL 7	Five-Year Incident Forecast (Fire and EMS)
OVL 8	Target Hazards
OVL 9	Five-Minute Sphere of Influence

Familiarize your group with all of the maps and overlays prior to starting.

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #1 - Land Use Patterns

It is advantageous to know the relationship land use plays in the community when preparing a fire master plan. The following questions are designed to identify/clarify the role land use plays in Sunville.

A. Examine map #1 - Land Use.

1. Locate and identify the various land use categories of Sunville.

2. What is their relationship to the physical features of Sunville?

B. Place overlay #1 (FDZs) and overlay #4 (Fire Incidents) over map #1 (Land Use).

1. Describe the relationship between the demand for service (total alarms) and the different land uses.

2. What is the relationship between working fires and the various land uses?

C. Place overlay #3 over map #1. Note overlay #1 may be used with all other overlays to indicate which FDZ the data represents.

1. Compare the case studies provided to the various land use patterns.

2. What is the relationship of working fires, fire severity, and land use patterns?

D. Place overlay #5 (EMS incidents) over map #1 (Land Use).

1. Describe the relationship between the demand for EMS services and the different land uses.

2. Is there a relationship between the location of the hospital, the demand for service, and the fire station?

Note: Fire Station is located in SE 6.
Hospital is located in SE 9.

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #2 - Historical Development

As communities develop over time, a variety of influences affect their construction and use and, therefore, their fire potential. Differences in building codes, construction materials, construction techniques, levels of economy, and social values all play a role. The following set of questions is designed to clarify the role historical development plays in fire protection services.

A. Examine map #2 - Historical Development.

Locate and identify the various historical development trends of Sunville.

B. Place overlay #4 (fire incidents) over map #2 (historical development).

1. What is the relationship between the demand for service (total alarms) and the historical development of Sunville?

2. What is the relationship between working fires and historical development?

3. Compare the fire case studies to the historical development of Sunville. (Place overlay #3 over map 2.)

C. Place overlay #5 (EMS incidents) over map #2 (historical development).

What is the relationship between the demand for EMS service and historical development?

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #3 - Population

As the old saying goes, "There are three causes of fire...men, women, and children." Knowing the degree to which the inhabitants of a community affect its fire problem can be extremely helpful when developing a fire master plan. The following set of questions deals with the impact of population on the fire needs of Sunville.

A. Examine map #3 - Population.

1. Locate and identify the various population trends of Sunville.

2. Is there a relationship between population and the location of the fire station?

B. Place overlay #4 (fire incidents) over map #3 (population).

1. Is there a relationship between the demand for service (total alarms) and the population density of Sunville?

2. What is the relationship between working fires and population?

C. Place overlay #5 (EMS incidents) over map #3 (Population).

Describe the relationship between the demand for EMS services and population densities.

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #4 - Assessed Valuation (AV)

The role property values play in fire service operations spans from budget development to loss reporting. The importance of assuring that high value properties remain on the tax roles cannot be understated. While few communities consciously recognize the potential impact of losing a property, the consequences could be severe. Few properties are rebuilt in the same town and even fewer on the same location.

A. Examine map #4 - Assessed Valuation (AV)

Locate and identify the various assessed valuation districts within the community.

B. Place overlay #4 (fire incidents) over map #4 (AV).

1. Is there a relationship between the demand for service (total alarms) and the AV of Sunville?

2. What is the relationship between working fires and AV?

C. Place overlay #3 over map #4.

Compare the fire case studies of Sunville to the AV. Is there a relationship?

D. Place overlay #5 (EMS incidents) over map #4 (AV).

What is the relationship between the demand for EMS services and AV?

E. Does there appear to be any relationship among demand for service (both fire and EMS), services provided, and AV (taxes paid)?

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #5 - Transportation

The transportation map indicates the primary street network of Sunville and the general means of response to calls for assistance. It also denotes the freeways, railroad, and airport.

The transportation network in any community plays a major role in determining fire response effectiveness. If the necessary routes of travel are not in place, the response times will escalate and service levels will be reduced.

A. Examine map #5--transportation.

How does the overall shape of Sunville affect the ability of emergency vehicles to respond?

B. Examine the road network of Sunville.

1. What effect does the road network have on response in the City of Sunville?

2. What is the impact of freeways on emergency response in Sunville?

3. How does the rail line affect response in Sunville?

4. What effect does the river have on response?

5. Are there other barriers to response in Sunville?

ACTIVITY 3.1 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 1

Question Set #6 - Future Land Use

The anticipated development of a community can offer valuable information when developing future service designs. The optimum configuration is one that meets current needs while serving as a strong base for future systems.

A. Examine map #6 - Future Land Use.

1. What impact could the anticipated land uses have on the demand for services in Sunville?

2. Identify the "shift" or movement in land uses with high service requirements.

B. Place overlay #2 (required and available fire flow) over map #6 (future land use).

1. What is your estimate of the impact the changes in land use will have on required fire flow?

2. How will these changes affect available fire flow?

C. Place overlay #7 (5-year forecast) and place overlay #4 over map #6.

1. What is the relationship of predicted demand for service (profiles) present demand for service, profile 4, and anticipated land use? (Fire and EMS)

2. Replace overlay #4 with overlay #7. What is the impact of future demands if land use remains constant?

D. Compare the present demand for service and the anticipated demand for service with the present fire station location. What is the impact?

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #7 - Fire Flow

One of the three primary components of fire suppression services is water. Its assessment is mandatory in the development of any complete fire master plan. There are two segments of fire flow that need to be developed--required fire flow and available fire flow--both measured in gallons per minute (GPM).

REQUIRED FIRE FLOW

Required fire flow is that amount of water necessary to extinguish a fire in the largest, single undivided area. The I.S.O. (Insurance Services Office) "Guide for the Determination of Required Fire Flow" can be used for determining the amount of water necessary for any given structure. This guide has been applied to the Sunville FDZs to develop a representative required flow for each zone. This flow represents a weighted average for the zone, not the highest or lowest, but the most representative.

AVAILABLE FIRE FLOW

The available fire flow is the average amount available from the water system with 20 pounds of residual pressure.

A. Place overlay #2 (required fire flow) over map #1 (land use).

1. What is the relationship between land use and required fire flow?

2. What is the relationship between required fire flow and available fire flow?

   a. Note the deficient zones, their location, and land use type.

   b. Identify areas of concern.

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #8 - Personnel/Time

The remaining two components of response are personnel and time. A community can have all the water in the world, but if there are no personnel to apply it or if the personnel arrive too late, then the resources are useless. The attached "Risk Analysis" was developed using the FDZs of Sunville, the estimated required fire flow, and Table 3-1 taken from the Urban Guide for Fire Prevention and Control, U.S. Fire Administration.

A. Refer to Sunville Response Assessment Model. Review the zones deficient at both 5- and 10-minute time increments. (Shortage/surplus column--darkest columns.)

1. Does there appear to be a relationship among the zones that are most deficient and land use?

2. Is there a relationship among the more deficient zones and location within the community or proximity to the fire station?

B. An environmental impact assessment has been requested and the developers have notified you of their desire to construct a shopping center with a 3,000 GPM requirement in one of the following zones: (What is your reply?)

1. SW3

2. SE1

3. SE4

Identify the personnel and time criteria for a 3,000 gpm flow. Then match against the available resources for the three FDZs.

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #9 - Station Location

Review the level of service provided from the present fire station location. (Use base map #1.)

A. Place overlay #9 over map #1.

1. What is the level of service provided within a 5-minute response time?

2. Note the occupancy types that fall beyond the 5-minute response.

B. Place overlay #9 over map #6.

How will this location serve future development?

C. Place overlay #7 over map #6.

What will be the impact of the 5-year-projected incident profile on this location?

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #10 - Other Analysis

A. It is now your turn to "free think" this analysis and make other comparisons you feel are appropriate in identifying the problems of Sunville.

1. Review other comparisons you feel may be of value.

2. Comment on your findings.

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #11 - Incident History

The review of historic fire loss will assist in developing an understanding of the present fire and EMS service demands and also may assist in developing future projections of service requirements.

A. Review - Sunville Fire Department (page 49) - 1988 Data Compilation Report.

1. Fixed Property Use, page 58.

   a. In which fixed property types are most alarms occurring in Sunville (by fixed property use)?

   b. In which fixed property types are the highest fire losses occurring in Sunville (by fixed property use)?

2. Incident frequency, pages 62 and 63. Review the incident frequency graphs (summary and time period breakdown).

   a. Is there a distinctive pattern developing?

   b. Overall, is there any day or time period with a marked level of service demand?

3. Situation found, page 71.

   Identify the 3 highest categories and their relationship.

4. Residential analysis, page 85.

   Review graphs provided. Does there appear to be a scenario most prevalent in residential alarms?

ACTIVITY 3.2 WORKSHEET

SUNVILLE DATA ANALYSIS--PART 2

Question Set #12 - A Current Assessment Of The Problem

At this point in the planning process it is necessary to structure definitive statements concerning the exact scope and nature of the current and projected problems for the City of Sunville. You may consider scanning your comments to date in this analysis section prior to the preparation of this question set. You may use any of the information you have learned about Sunville to date in preparing your response.

A. In your opinion:

1. Can the public and private features of Sunville adequately cope with the identified problems?

2. Develop a laundry list of approximately 10 problems in Sunville.

DEVELOPMENT AND USE OF FIRE DEMAND ZONES

In some departments, resources may be available for sophisticated data analysis projects or they may exist in another department within the city. However, in most smaller communities resources are limited. The key is to find the level that meets your analysis needs, yet is suitable for your department.

The data must be assembled in such a manner as to allow analysis in sufficient depth, yet simple enough not to be overwhelming. It needs to be well organized with enough utility to be applicable to future analysis. And, above all, it needs to portray a true picture of the fire protection and other service needs of the community.

When considering all of these data requirements, it also becomes apparent that analyzing data for an entire community at one time can be cumbersome at best. We, therefore, need to divide the data into smaller geographic areas to simplify the analysis.

The ideal situation is to take each occupancy within the city and assess its needs individually, developing a specific plan for each analysis. Obviously, that would be time-prohibitive. The next best approach, and the one we recommend, is to divide the area into similar segments and evaluate the needs of several occupancies simultaneously. The term most commonly used to identify these smaller geographic segments is fire demand zone (FDZ).

In developing FDZs it has become apparent that one of the drivers of fire service need is land use. Communities are experiencing consistent patterns of demand for service related to similar land uses. Other considerations such as age, location, service history, etc., will also play a role in zone determination.

The factors for FDZ development are:

1. General nature of occupancies (land use).
2. Required fire flow.
3. History of service need.
4. Population density.
5. Age (population and structures).
6. Distance from fire station(s) (barriers to response).

Other factors that allow the data to have greater utility are:

7. Other special considerations (airports, colleges, prisons, and any occupancies significant enough to merit individual attention).

A simple definition of FDZ is a geographic area used to collect and maintain data for planning.

Additionally, FDZ data must be used to implement and maintain the plan. By considering all of the potential uses prior to development, greater flexibility may be built into the zones.

Potential additional uses may be:

8. Incident management.
9. Hazard inspection management.
10. Hydrant servicing schedule.
11. Home inspection.
12. Other public information activities.

While several different approaches may be used, the following steps are offered as one example of zone development.

Step 1: Divide the community into 1-mile-square segments (township/range/section format). Contact your local planner or city engineer for a similar starting point.

Step 2: Use overlays to identify barriers to response, freeways, rivers, etc., and divide segments further.

Step 3: Secure a land use map (planning dept.) and review the general land uses. Divide the segments further to reflect general land uses. There usually will be a mixture of occupancies, with some residential within commercial lines, schools within residential lines, etc. Keep in mind that this analysis is developing a general overview of risk and that we cannot evaluate each occupancy individually.

Step 4: Further identify the locations of special occupancies that you may wish to evaluate individually, or to keep records on for future use; e.g., colleges, prisons, large businesses, etc.

FIRE STATION LOCATION ANALYSIS

In every fire service plan, one of the main elements is a determination of the facility needs of the community. Fire station location is important in that it usually represents the point from which most emergency services are initiated. Time is a key issue and the desire to provide services rapidly is self-evident.

This step analyzes the location(s) of fire stations, actual or planned, to determine the extent to which they meet community response objectives. The determination of personnel and apparatus needs is made separately from this analysis. The procedure listed is only one means of assessing the adequacy of stations. There are other manual approaches, either simple or more complex, and computer models that do more or less of the calculative effort.

The procedure suggested is a rather basic procedure; however, it can become complex if your community has chosen a complicated set of response objectives. Examples of complicated response time objectives are those which are different for different occupancies, population densities, etc.

The procedure described assumes that community-wide response time objectives have been established for the first-arriving unit and the response time for the total resources needed to provide required fire flow.

Two Evaluations

There are two principal areas of evaluation when considering an assessment of fire station locations:

1. The relationship between the hazard level of the community and the fire services provided; or, "once the fire has started, can we put it out?"

2. The ability of the fire agency to attack the fire before "flashover," or before the building is involved heavily in fire. "Can we get there prior to flashover?"

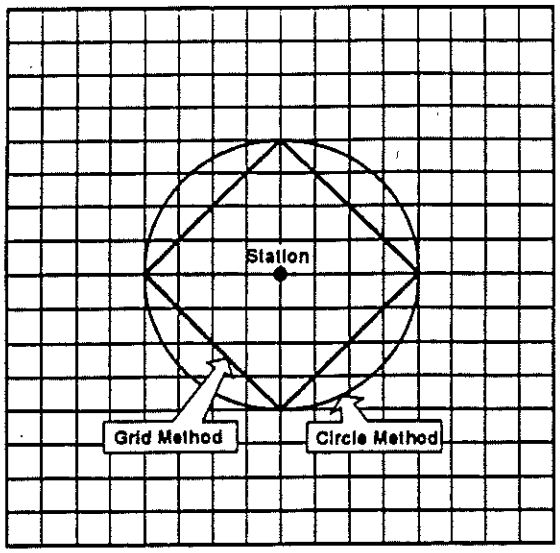
The Risk Analysis portion of the class addresses the concerns of item "1"; the relationship between the hazard level of the community and the fire forces available.

The second concern, "2," addresses the ability of the fire forces to attack the fire before the building becomes involved heavily in fire. This approach notes that when fire forces are deployed rapidly, there are far fewer resources needed and, therefore, more can be accomplished with less. To a large degree, success in this area somewhat negates the impacts of a greater deficiency that may be found in the risk analysis.

The single factor that most accurately represents this approach is response time recorded in minutes. Response time is that time from the fire apparatus leaving the fire station until it arrives at the scene. The target response time should be developed by the planning team and approved by the citizens' advisory committee. For purposes of this class, an acceptable response time of 5 minutes has been identified as the recommended time.

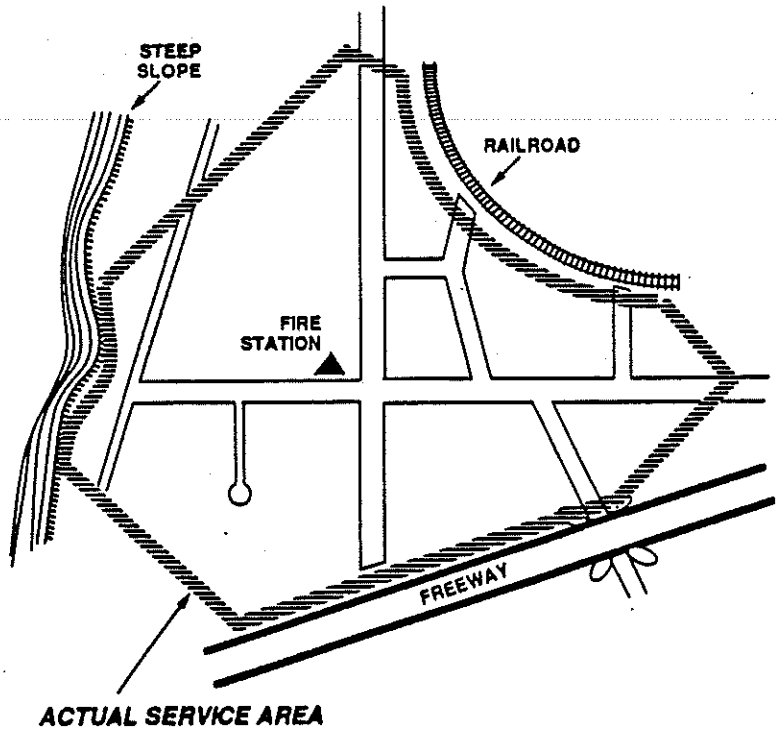
Approach

In order to evaluate and compare the present situation with each option, a determination of the area served by each fire facility needs to be developed. The service area or sphere of effective service is based on a response time from the station established by the average response speed and the distance traveled within the acceptable response time. As the effective area served is dependent upon the physical characteristics of the area (road conditions, etc.), the sphere of influence is not necessarily a perfect diamond or circular shape but sometimes assumes an odd configuration due to the limitations of existing road conditions. This approach is called the modified grid method.



Response Contour

There are other methods, such as drawing circles or diamonds, but the inaccuracy of these methods precludes their use. Neither of these methods takes into consideration the impact of freeways, rivers, canyons, or other physical barriers on response.



There are several procedures which may be used to develop response boundaries. The most accurate and time-consuming is to actually drive the apparatus to several locations around the station. An alternate method, acceptable for planning, is to determine an average response speed in mph and multiply that speed by the identified response objective. For example, a 5-

minute response time objective and an average speed of 20 mph results in a 1.7-mile response distance. You then determine the 1.7-mile points in all directions and connect these points to give a picture of the area covered. The use of an engineer's wheel can aid greatly in determining these response boundaries. With the wheel set to the effective response distance, several different runs can be made on the map and the service area easily defined. It is important to follow the actual routes of travel that would be taken during an emergency response.

Average Vehicle Speed

The average vehicle speed should be determined based on response records from the fire department, indicating response time and distance traveled. After careful review of incidents, an average response speed can be selected. It is suggested that at least 50 incidents be selected with the best 10 and worst 10 eliminated to assure that an average is attained.

Fire Station Service Area

A set of maps should be prepared that indicates the area served within 5 minutes from each of the station(s) for both the present system and at least two options. The analysis of those maps can then be conducted in terms of population served, assessed valuation, historic response needs (number of incidents), etc.

Response Map Analysis

The viewing of the response maps will readily determine the areas in the community that are "covered" and those "uncovered." Being covered means that, in general, a response to that location can be made within the time objective. Being uncovered means that, in general, response to that area cannot be made within the desired time criteria. Uncovered does not mean that there is no fire protection.

For each uncovered area, the community must decide whether to add or reposition resources to meet the criteria or accept the risk associated with lack of coverage within the time criteria. In resolving the uncovered areas, remember the approximations made in developing the response maps and the uncertainties involved in actual response. These approximations and uncertainties will generally be such that the response time objective should be used as a guide and not an absolute requirement.

Coloring Of Maps

When the response maps are to be used for presentations, it becomes important to indicate the uncovered area instead of the area covered. One technique is to color the areas not covered within the response time frame in a red color using felt tip markers. This color can be seen readily from a distance and clearly indicates the areas in question.

ANALYZING THE PRESENT SITUATION--RISK ANALYSIS

In the process of master planning it is advantageous to identify and quantify the present level of hazard within the community in order to allow for the assessment of any modifications or changes. Performing an unemotional, nonthreatening risk assessment that is based on quantifiable data can be of immeasurable value to the study and the decisionmakers.

For years fire officials have been expounding to city councils the problems and potential of the large fire with the high fire loss and devastation to the community. Like the boy who cried "wolf," many city officials now feel the presentations are highly emotional and dismiss their content as something that can't happen in their community. This "holding up the burning babies" approach has caused the fire service in many instances to lose credibility and, along with that, the impact of their recommendations.

An alternative to this concern, and one that we highly recommend, is built in to this planning aproach; that is the sharing of the problem with the decision-makers prior to developing the solution. In this manner the decisionmakers are allowed to identify the concerns and assess the impact for themselves. This approach also stresses the use of averages or "real" potentials that have a higher probability of occurring than the disaster.

Toward this end, developing an understanding of the fire risks of the community, and performing a risk analysis can be highly beneficial.

Developing a risk analysis can be beneficial in acquiring an understanding of the fire problems of a community by:

1. Department members.
2. Council members.
3. Other city management.
4. The community.

The problem is quantified for all to criticize or accept.

Fire risks are the potential vulnerability to fire with the possibility of loss, injury, disadvantage, or destruction.

Categories of risk include:

1. Life.
2. Property.
3. Essential services risk.
4. Community impact.

There are six factors to consider when determining risk (the six questions to ask):

1. Who is endangered?
2. What is endangered?
3. Where will the incident and the degree of loss occur?
4. Why will the incident occur?
5. When will the incident occur?
6. What problems will the incident present to the fire department?

Risk may be defined as a potential vulnerability for the community that may result from:

1. Fire.
2. Explosion.
3. Hazardous materials incident.
4. Accident.
5. Natural disaster.
6. Sudden illness.

Risks may cause loss of life and property, jobs and tax base, essential community services, historic value, and/or community reputation.

We will be dealing with the modifiers resulting from fire in structures; however, these same concepts can be applied to any analysis.

When determining the type(s) of risk analysis you wish to evaluate, review each of these items and ascertain their degree of relativity to your community's planning needs.

For instance:

1. If your community happens to be atop a fault line, you certainly would want to consider impacts of earthquakes.

2. If your community receives 70% of its tax revenues from one business which also happens to employ 30% of the town's work force, then you would definitely want to perform a specific risk analysis on that occupancy.

3. If your community receives a substantial portion of its revenue from tourism based upon the large, well-kept Victorian mansions of historic significance located in the town, then you would want to pay specific attention to these structures.

Keep in mind that the formula for developing a risk analysis is:

REQUIRED - AVAILABLE = RISK

This says that any given structure has a resource requirement for extinguishment should a fire occur. The fire department also has a given response capacity. The difference between these two factors yields the quantification of the degree of risk for that structure.

This may be a good time to reaffirm that present risk and historical loss may be defined as acceptable risk and acceptable loss. Even though it may not be a conscious decision, by allowing them to continue over a period of time, these become acceptable community risks and losses.

The issue today, however, is whether the continuance of this "blind" approach to risk analysis is in the best interest of the community. It appears to be self-evident that to continue this approach is not sound management. Because a catastrophic incident has not occurred does not mean that it will not in the future if the risk exists.

The approach suggested here is to make the acceptance of the level of risk a conscious decision by the decisionmakers. The development of the understanding of that risk is your job; the establishment of the level of risk is their job. One is technical, the other is political.

It is important to establish the issues of evaluation in performing any risk analysis. These are the criteria that will be used to measure the level of need as well as the level of services provided.

1. Identifying criteria for assessment.

   a. Personnel.
   b. Time.
   c. Water.

Equipment and apparatus could be included along with training, etc., but the three noted above appear to be the main elements to consider.

2. Common thread.

Fire flow (GPM) is woven throughout the fabric of each of these elements (as the criteria for assessment) in the following manner:

- GPM is related to each structure through the generally accepted standard, "Guide for the Determination of Required Fire Flow," the amount of water necessary to extinguish a fire in the largest single undivided area.

- GPM is related to personnel. Several staffing studies have been conducted. Table 3-1 of the USFA Master Planning Urban Guide, which defines the number of firefighters needed to apply required fire flows, represents the most commonly accepted criterion.

- GPM is also related to time in table 3-1; i.e., how soon will the personnel need to arrive in order to be effective?

The premise is: to effectively fight a fire in a structure you need sufficient personnel, sufficient water, and you must arrive within a given time frame.

A benchmark is a point of reference from which measurements can be made.

In dealing with the time frames given in the fire service, there appear to be two points of time assessment or benchmarks.

These are:

1. Five minutes, the point prior to flashover, is the maximum response time applied to the company responding initially.

2. Ten minutes, the point of substartial involvement, is the maximum time for a full response.

Table 3-1, with slight modification, lends itself nicely to this process.

TABLE 3-1

PERSONNEL REQUIRED TO RESPOND WITHIN A TIME

Fire Flow Required	Total Suppression Personnel Required	Personnel Required to Respond Within a Time (min.)				
		5.0			10	
250	3		3		3	
500	6		3		6	
750	9		6		9	
1,000	12		6		12	
1,500	15		6		15	
2,000	18		12		18	
2,500	21		12		21	
3,000	24		12		24	
3,500	27		12		27	
4,000	30		12		30	
4,500	33		12		33	
5,000	36		18		36	
5,500	42		18		42	
6,000	48		18		48	
6,500	54		18		54	
7,000	60		18		60	
7,500	66		18		66	
8,000	72		18		72	

When conducting the risk analysis, determine resources required, plan for one fire at a time, and plan for the "average flow" in each FDZ.

The best approach to determining required fire flow appears to be to gather two or three persons of expertise in the department and identify representative flows for each FDZ. This is the procedure for the Sunville exercise. The flows can then be open to comment from the rest of the department and the community.

The determination of time, personnel, and water needs can be found in table 3-1.

In order to determine resources available, identify distance from each station to each FDZ, identify average staffing, identify the average staffing time, and the time from dispatch until apparatus is staffed. Mantime is the response time of volunteers to reach the fire station.

For the results, refer to the Sunville Response Assessment computer printout.

Source: Urban Guide for Fire Prevention Control, U.S. Fire Administration, Washington, D.C.

Sunville Response Assessment

A risk analysis was prepared for Sunville (SM p. 3-45) comparing the average level of service provided to a representative service level required for each Fire Demand Zone.

The assessment models, SM pp. 3-45 and 3-46, indicate the results of these analysis for the two general time periods, weekdays and night/weekends. These two periods represent the normal availability of volunteers who work during the week.

ASSESSMENT MODEL: DAYTIME

RESPONSE ASSESSMENT MODEL

Company	Avg # of Personnel	Location	Plan Time (Minutes)
E1	4.0	123 SR101 FDZ SL6	0
E2	8.5	123 SR101 FDZ SL6	4

Avg. Vehicle Speed= 26 m.p.h.

Avg. Dispatch Time= 0 minutes

STATISTICS (Shortage/Surplus Column)

Response Evaluation	@5	@10
# OF ZONES THAT ARE:		
A. >3 persons deficient	19	19
B. 0 to 3 persons deficient	12	6
C. meeting suggested requirements	11	17

SHORTAGE/SURPLUS COLUMN RESULTS

Avg. Personnel over/short @ 5 min. -4.1 persons

Avg. Personnel over/short @10 min. -3.7 persons

Avg. Fire Flow Required 1464 Gallons

Avg. Fire Flow Available 1135 Gallons

ZONE INVENTORY

# OF ZONES:	
Rural/Residential	17
Residential	8
Light Commercial	8
Medium Commercial	7
Heavy Commercial	2
Total # of Zones	42

Sunville Fire Department

NO.	FIRE DEMAND ZONE	FIRE DEMAND ZONE DATA Est. Pop.	Fire Flow (GPM)	NEEDED RESOURCES Personnel @: (time in min) 5	10	Fire Flow (GPM)	SHORTAGE/SURPLUS Personnel @: (time in min) 5	10	Fire Flow (GPM)	AVAILABLE RESOURCES Personnel @ (time in min) 5	6.5	10	15	RESPONSE TIME FROM STATION Company # E1	E2	0	0	0	TRAVEL DISTANCE FROM STATION Company # E1	E2	0	0	0
1	SW1	42	2000	12	18	-1400	-8	-5.5	600	4	4	12.5	12.5	4.8	8.8	0.0	0.0	0.0	2.1	2.1			
2	SW2	22	3000	12	24	-2300	-8	-11	700	4	4	12.5	12.5	3.2	7.2	0.0	0.0	0.0	1.4	1.4			
3	SW3		3000	12	24	-1400	-8	-11	1600	4	12.5	12.5	12.5	1.8	5.8	0.0	0.0	0.0	0.8	0.8			
4	SW4	340	500	3	6	300	1	6.5	800	4	4	12.5	12.5	3.5	7.5	0.0	0.0	0.0	1.5	1.5			
5	SW5	16	2000	12	18	-800	-8	-5.5	1200	4	4	12.5	12.5	2.5	6.5	0.0	0.0	0.0	1.1	1.1			
6	SW6	820	1000	6	12	-350	-2	0.5	650	4	4	12.5	12.5	3.5	7.5	0.0	0.0	0.0	1.5	1.5			
7	SW7	804	1000	6	12	-600	-6	0.5	400	0	4	12.5	12.5	5.5	9.5	0.0	0.0	0.0	2.4	2.4			
8	SW8	204	500	3	6	300	-3	6.5	800	0	4	12.5	12.5	5.8	9.8	0.0	0.0	0.0	2.5	2.5			
9	SW9	21	2000	12	18	-1300	-8	-5.5	700	4	4	12.5	12.5	4.6	8.6	0.0	0.0	0.0	2.0	2.0			
10	SW10	16	500	3	6	100	-3	-2	600	0	0	4	12.5	7.4	11.4	0.0	0.0	0.0	3.2	3.2			
11	SW11	146	500	3	6	-300	-3	-2	200	0	0	4	12.5	9.2	13.2	0.0	0.0	0.0	4.0	4.0			
12	SE1	360	3000	12	24	-2550	-12	-20	450	0	0	4	12.5	7.4	11.4	0.0	0.0	0.0	3.2	3.2			
13	SE2	22	500	3	6	100	-3	-2	600	0	4	4	12.5	6.2	10.2	0.0	0.0	0.0	2.7	2.7			
14	SE3	14	500	3	6	-500	1	6.5	0	0	12.5	12.5	12.5	2.3	6.3	0.0	0.0	0.0	1.0	1.0			
15	SE4	63	3000	12	24	-1000	-8	-11	2000	4	12.5	12.5	12.5	1.2	5.2	0.0	0.0	0.0	0.5	0.5			
16	SE5	264	3000	12	24	-50	-8	-11	2950	4	4	12.5	12.5	3.5	7.5	0.0	0.0	0.0	1.5	1.5			
17	SE6		4000	12	30	-1400	0.5	-17	2600	12.5	12.5	12.5	12.5	0.5	4.5	0.0	0.0	0.0	0.2	0.2			
18	SE7	308	500	3	6	300	1	6.5	800	4	12.5	12.5	12.5	1.8	5.8	0.0	0.0	0.0	0.8	0.8			
19	SE8	196	1000	6	12	1100	6.5	0.5	2100	12.5	12.5	12.5	12.5	0.7	4.7	0.0	0.0	0.0	0.3	0.3			
20	SE9	8	2000	12	18	400	-8	-5.5	2400	4	12.5	12.5	12.5	1.8	5.8	0.0	0.0	0.0	0.8	0.8			
21	SE10	14	500	3	6	-500	1	6.5	0	4	4	12.5	12.5	3.2	7.2	0.0	0.0	0.0	1.4	1.4			
22	SE11		4000	12	30	-1200	-8	-17	2800	4	4	12.5	12.5	3.7	7.7	0.0	0.0	0.0	1.6	1.6			
23	SE12		1000	6	12	400	-2	0.5	1400	4	4	12.5	12.5	4.4	8.4	0.0	0.0	0.0	1.9	1.9			
24	SE13	464	1000	6	12	700	-2	0.5	1700	4	4	12.5	12.5	4.8	8.8	0.0	0.0	0.0	2.1	2.1			
25	NE1	94	1000	6	12	1100	-6	0.5	2100	4	4	12.5	12.5	5.3	9.3	0.0	0.0	0.0	2.3	2.3			
26	NE2	11	500	3	6	-500	-3	-2	0	0	4	4	12.5	6.2	10.2	0.0	0.0	0.0	2.7	2.7			
27	NE3	72	500	3	6	0	-3	-2	500	0	0	4	12.5	6.9	10.9	0.0	0.0	0.0	3.0	3.0			
28	NE4	21	2000	12	18	-50	-8	-5.5	1950	4	4	12.5	12.5	2.5	6.5	0.0	0.0	0.0	1.1	1.1			
29	NE5	17	500	3	6	-500	1	6.5	0	4	12.5	12.5	12.5	1.2	5.2	0.0	0.0	0.0	0.5	0.5			
30	NE6	264	500	3	6	1500	1	6.5	2000	4	12.5	12.5	12.5	2.3	6.3	0.0	0.0	0.0	1.0	1.0			
31	NE7	4	500	3	6	3100	1	6.5	3600	4	4	12.5	12.5	3.7	7.7	0.0	0.0	0.0	1.6	1.6			
32	NE8	12	500	3	6	-500	-3	-2	0	0	0	4	12.5	6.9	10.9	0.0	0.0	0.0	3.0	3.0			
33	NE9	760	1000	6	12	200	-6	-12	1200	0	0	0	0	15.7	19.7	0.0	0.0	0.0	6.8	6.8			
34	NE10	8	2000	12	18	900	-12	-18	2900	0	0	0	4	12.0	16.0	0.0	0.0	0.0	5.2	5.2			
35	NW1	6	3000	12	24	-600	-12	-24	2400	0	0	0	4	12.0	16.0	0.0	0.0	0.0	5.2	5.2			
36	NW2	10	500	3	6	-500	-3	-6	0	0	0	0	4	14.3	18.3	0.0	0.0	0.0	6.2	6.2			
37	NW3	11	500	3	6	-500	1	6.5	0	4	4	12.5	12.5	4.2	8.2	0.0	0.0	0.0	1.8	1.8			
38	NW4	206	500	3	6	250	1	6.5	750	4	4	12.5	12.5	4.2	8.2	0.0	0.0	0.0	1.8	1.8			
39	NW5		2000	12	18	-1400	-8	-5.5	600	4	12.5	12.5	12.5	2.1	6.1	0.0	0.0	0.0	0.9	0.9			
40	NW6	31	2000	12	18	-1300	-8	-5.5	700	4	4	12.5	12.5	3.5	7.5	0.0	0.0	0.0	1.5	1.5			
41	NW7	380	1000	6	12	600	-2	0.5	400	4	4	12.5	12.5	4.4	8.4	0.0	0.0	0.0	1.9	1.9			
42	NW8		3000	12	18	-2500	-8	-11	500	4	4	12.5	12.5	4.8	8.8	0.0	0.0	0.0	2.1	2.1			

ASSESSMENT MODEL: NIGHTTIME/WEEKENDS

RESPONSE ASSESSMENT MODEL

Company	Avg # of Personnel	Location	Man Time (Minutes)
E1	3.0	123 SR101 FDZ SE6	3.5
E2	9.4	123 SR101 FDZ SE6	3.5

Avg. Vehicle Speed= 26 m.p.h.

Avg. Dispatch Time= 0 minutes

STATISTICS (Shortage/Surplus Column)

Response Evaluation		
# OF ZONES THAT ARE:	●5	●10
A. >3 persons deficient	22	23
B. 0 to 3 persons deficient	16	0
C. meeting suggested requirements	4	19

SHORTAGE/SURPLUS COLUMN RESULTS

Avg. Personnel over/short ● 5 min. -6 persons

Avg. Personnel over/short ●10 min. -3.8 persons

Avg. Fire Flow Required 1464 Gallons

Avg. Fire Flow Available 1135 Gallons

ZONE INVENTORY

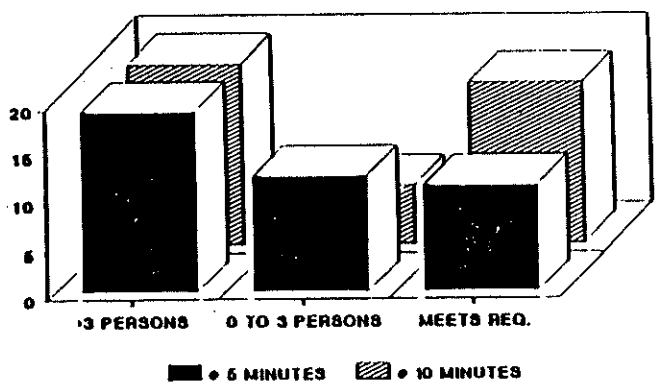
# OF ZONES:	
Rural/Residential	17
Residential	6
Light Commercial	8
Medium Commercial	7
Heavy Commercial	3
Total # of Zones	42

Sunville Fire Department

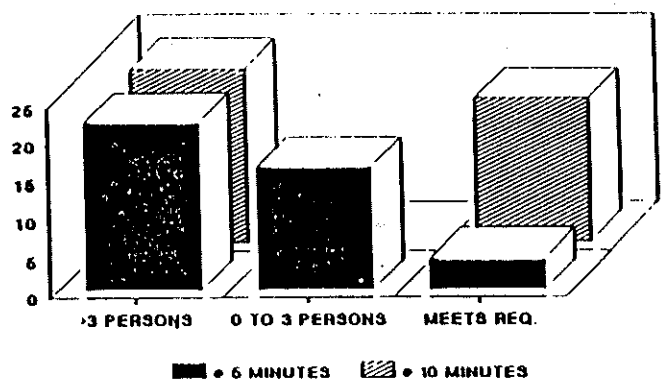
NO.	FIRE DEMAND ZONE	FIRE DEMAND ZONE DATA Est. Pop.	Fire Flow (GPM)	NEEDED RESOURCES Personnel ●: (time in min) 5	10	Fire Flow (GPM)	SHORTAGE/SURPLUS Personnel ●: (time in min) 5	10	Fire Flow (GPM)	AVAILABLE RESOURCES Personnel ● (time in minutes) 5	6.5	10	15	RESPONSE TIME FROM STATION Company # E1	E2	0	0	0	TRAVEL DISTANCE FROM STATION Company # E1	E2	0	0	0
1	SW1	42	2000	12	18	-1400	-12	-5.6	600	0	0	12.4	12.4	8.3	8.3	0.0	0.0	0.0	2.1	2.1			
2	SW2	22	3000	12	24	-2300	-12	-11	700	0	0	12.4	12.4	6.7	6.7	0.0	0.0	0.0	1.4	1.4			
3	SW3		3000	12	24	-1400	-12	-11	1600	0	12.4	12.4	12.4	5.3	5.3	0.0	0.0	0.0	0.8	0.8			
4	SW4	340	500	3	6	300	-3	6.4	800	0	0	12.4	12.4	7.0	7.0	0.0	0.0	0.0	1.5	1.5			
5	SW5	16	2000	12	18	-800	-12	-5.6	1200	0	12.4	12.4	12.4	6.0	6.0	0.0	0.0	0.0	1.1	1.1			
6	SW6	820	1000	6	12	-350	-6	0.4	650	0	0	12.4	12.4	7.0	7.0	0.0	0.0	0.0	1.5	1.5			
7	SW7	804	1000	6	12	-600	-6	0.4	400	0	0	12.4	12.4	9.0	9.0	0.0	0.0	0.0	2.4	2.4			
8	SW8	204	500	3	6	300	-3	6.4	800	0	0	12.4	12.4	9.3	9.3	0.0	0.0	0.0	2.5	2.5			
9	SW9	21	2000	12	18	-1300	-12	-5.6	700	0	0	12.4	12.4	8.1	8.1	0.0	0.0	0.0	2.0	2.0			
10	SW10	16	500	3	6	100	-3	-6	600	0	0	0	12.4	10.9	10.9	0.0	0.0	0.0	3.2	3.2			
11	SW11	146	500	3	6	-300	-3	-6	200	0	0	0	12.4	12.7	12.7	0.0	0.0	0.0	4.0	4.0			
12	SE1	360	3000	12	24	-2550	-12	-24	450	0	0	0	12.4	10.9	10.9	0.0	0.0	0.0	3.2	3.2			
13	SE2	22	500	3	6	100	-3	6.4	600	0	0	12.4	12.4	9.7	9.7	0.0	0.0	0.0	2.7	2.7			
14	SE3	14	500	3	6	-500	-3	6.4	0	0	12.4	12.4	12.4	5.8	5.8	0.0	0.0	0.0	1.0	1.0			
15	SE4	63	3000	12	24	-1000	0.4	-11	2000	12.4	12.4	12.4	12.4	4.7	4.7	0.0	0.0	0.0	0.5	0.5			
16	SE5	264	3000	12	24	50	-12	-11	2950	0	0	12.4	12.4	7.0	7.0	0.0	0.0	0.0	1.5	1.5			
17	SE6		4000	12	30	-1400	0.4	-17	2600	12.4	12.4	12.4	12.4	4.0	4.0	0.0	0.0	0.0	0.2	0.2			
18	SE7	308	500	3	6	300	-3	6.4	800	0	12.4	12.4	12.4	5.3	5.3	0.0	0.0	0.0	0.8	0.8			
19	SE8	196	1000	6	12	1100	6.4	0.4	2100	12.4	12.4	12.4	12.4	4.2	4.2	0.0	0.0	0.0	0.3	0.3			
20	SE9	8	2000	12	18	400	-12	-5.6	2400	0	12.4	12.4	12.4	5.3	5.3	0.0	0.0	0.0	0.8	0.8			
21	SE10	14	500	3	6	-500	-3	6.4	0	0	0	12.4	12.4	6.7	6.7	0.0	0.0	0.0	1.4	1.4			
22	SE11		4000	12	30	-1200	-12	-17	2800	0	0	12.4	12.4	7.2	7.2	0.0	0.0	0.0	1.6	1.6			
23	SE12		1000	6	12	400	-6	0.4	1400	0	0	12.4	12.4	7.9	7.9	0.0	0.0	0.0	1.9	1.9			
24	SE13	464	1000	6	12	700	-6	0.4	1700	0	0	12.4	12.4	8.3	8.3	0.0	0.0	0.0	2.1	2.1			
25	NE1	94	1000	6	12	1100	-6	0.4	2100	0	0	12.4	12.4	8.8	8.8	0.0	0.0	0.0	2.3	2.3			
26	NE2	11	500	3	6	-500	-3	6.4	0	0	0	12.4	12.4	9.7	9.7	0.0	0.0	0.0	2.7	2.7			
27	NE3	72	500	3	6	0	-3	-6	500	0	0	0	12.4	10.4	10.4	0.0	0.0	0.0	3.0	3.0			
28	NE4	21	2000	12	18	-50	-12	-5.6	1950	0	12.4	12.4	12.4	6.0	6.0	0.0	0.0	0.0	1.1	1.1			
29	NE5	17	500	3	6	-500	9.4	6.4	0	12.4	12.4	12.4	12.4	4.7	4.7	0.0	0.0	0.0	0.5	0.5			
30	NE6	264	500	3	6	1500	-3	6.4	2000	0	12.4	12.4	12.4	5.8	5.8	0.0	0.0	0.0	1.0	1.0			
31	NE7	4	500	3	6	3100	-3	6.4	3600	0	0	12.4	12.4	7.2	7.2	0.0	0.0	0.0	1.6	1.6			
32	NE8	12	500	3	6	-500	-3	-6	0	0	0	0	12.4	10.4	10.4	0.0	0.0	0.0	3.0	3.0			
33	NE9	760	1000	6	12	200	-6	-12	1200	0	0	0	0	19.2	19.2	0.0	0.0	0.0	6.8	6.8			
34	NE10	8	2000	12	18	900	-12	-18	2900	0	0	0	0	15.5	15.5	0.0	0.0	0.0	5.2	5.2			
35	NW1	6	3000	12	24	-600	-12	-24	2400	0	0	0	0	15.5	15.5	0.0	0.0	0.0	5.2	5.2			
36	NW2	10	500	3	6	-500	-3	-6	0	0	0	0	0	17.8	17.8	0.0	0.0	0.0	6.2	6.2			
37	NW3	11	500	3	6	-500	-3	6.4	0	0	0	12.4	12.4	7.7	7.7	0.0	0.0	0.0	1.8	1.8			
38	NW4	206	500	3	6	250	-3	6.4	750	0	0	12.4	12.4	7.7	7.7	0.0	0.0	0.0	1.8	1.8			
39	NW5		2000	12	18	-1400	-12	-5.6	600	0	12.4	12.4	12.4	5.6	5.6	0.0	0.0	0.0	0.9	0.9			
40	NW6	31	2000	12	18	-1300	-12	-5.6	700	0	0	12.4	12.4	7.0	7.0	0.0	0.0	0.0	1.5	1.5			
41	NW7	380	1000	6	12	-600	-6	0.4	400	0	0	12.4	12.4	7.9	7.9	0.0	0.0	0.0	1.9	1.9			
42	NW8		3000	12	18	-2500	-12	-11	500	0	0	12.4	12.4	8.3	8.3	0.0	0.0	0.0	2.1	2.1			

SUNVILLE FIRE MASTER PLAN

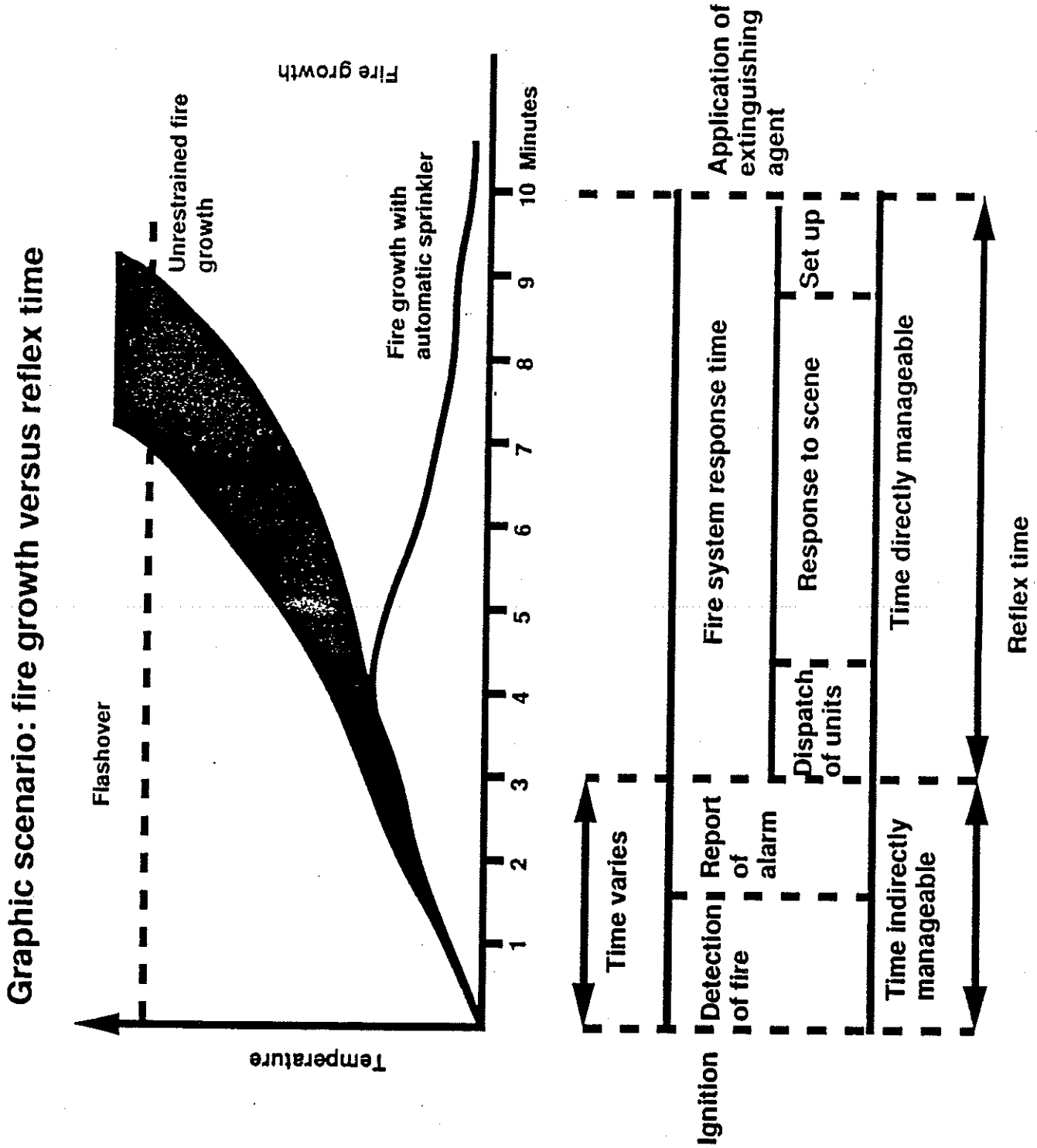
RISK ANALYSIS
DAYTIME



RISK ANALYSIS
NIGHT/WEEKENDS



GRAPHICS PRODUCED USING: IBM PC,
HARVARD GRAPHICS, AND LASERJET II PRINTER


Graphic scenario: fire growth versus reflex time
Flashover
Unrestrained fire growth
Fire growth
Fire growth with automatic sprinkler
Temperature
1
2
3
4
5
6
7
8
9
10 Minutes
Time varies
Ignition
Detection of fire
Report of alarm
Dispatch of units
Response to scene
Set up
Application of extinguishing agent
Fire system response time
Time indirectly manageable
Time directly manageable
Reflex time

TIME/TEMPERATURE CURVE

Flashover:

Simple definition - that point at which the building becomes untennable to life, and which substantial property damage occurs.

Flashover generally occurs - at between 7 and 9 1/2 minutes after ignition. (Normal Fire Progression) (Harvard University - Professor Emmons)

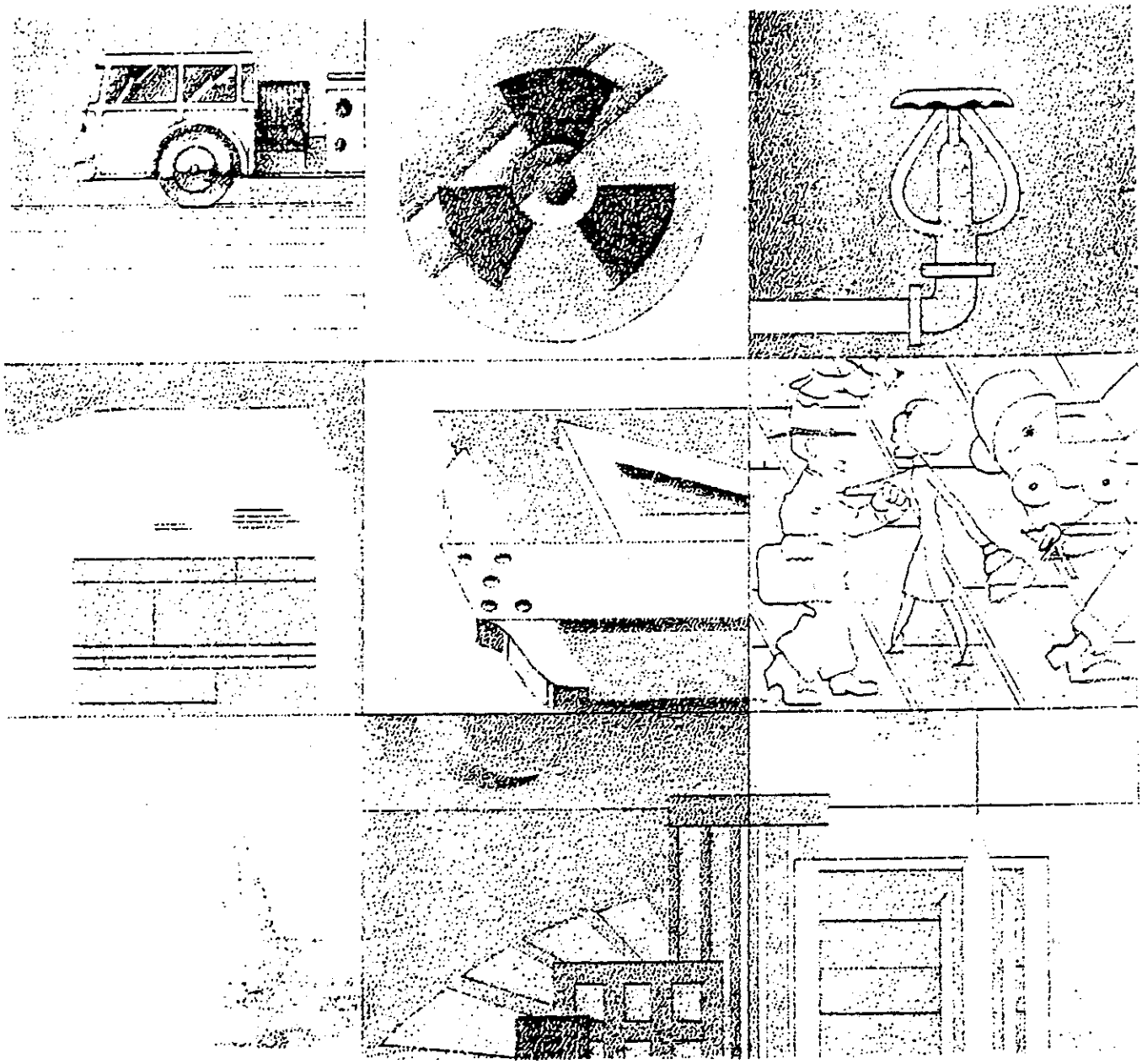
Fire services - can be more effective with less resources if they commence fire scene operations prior to flashover.

UNIT 3 APPENDIX

FIRE PREVENTION AND CONTROL MASTER PLANNING GUIDE

Prepared for:
U.S. DEPARTMENT OF COMMERCE
The National Fire Prevention and Control Administration
National Fire Safety and Research Office
NFPCA Grant No. 75006

Prepared by:
Mountain View Fire Department
Los Angeles City Fire Department
Mission Research Corporation



URBAN GUIDE FOR FIRE PREVENTION & CONTROL MASTER PLANNING

APPENDIX IV
ESTIMATING FIRE FLOW REQUIREMENTS

A form is included in this Appendix for those who wish to estimate fire flow based on ISO guidelines. The following notes are keyed to the corresponding parts of the form. For additional guidance, refer to ISO "Guidelines for Determination of Fire Flow," December, 1974.

1. **Risk Identification Information**

—Name and address: self explanatory

—Occupancy code: use local code.

—Jurisdiction: Identify the Fire Management Area at least. May also show first-in company or other jurisdictional information.

2. **Type of Construction**

Use the ISO guidelines.

—Fire-Resistive Construction—Any structure that is considered fire-resistive by any of the four model building codes.

—Noncombustible Construction—Any structure having all structural members including walls, columns, piers, beams, girders, trusses, floors, and roofs of noncombustible material and not qualifying as fire-resistive construction.

—Ordinary Construction—Any structure having exterior walls of masonry or other noncombustible material in which the other structural members, including but not limited to columns, floors, roofs, beams, girders, and joists, are wholly or partly of wood or other combustible material.

Heavy timber type buildings are required to satisfy a number of specific provisions (see any of the four model building codes).

—Wood Frame Construction—Any structure in which the structural members are wholly or partly of wood or other combustible material and the construction does not qualify as ordinary construction.

—Mixed—Combinations of the above within a single structure.

If mixed type of construction, see special instructions in a later section of this Appendix.

3. Area

—Ground Floor Area: self explanatory

—No. of Stories: total number of stories excluding basement, except:

If construction is fire-resistive with unprotected vertical openings, then consider only the six largest successive floor areas.

If construction is fire-resistive with protected vertical openings, then consider only the three largest successive stories.

—Area: If area per story varies or the number of stories varies throughout a building, sum the individual floor areas.

4. Structure Fire Flow

In Table IV-1, find the range within which the area (A) falls in the column corresponding to the Type of Construction. Read the corresponding "Structure Fire Flow" in the left-hand column. For example, in a 4,000 ft^2 building of ordinary construction, the area falls within the range 3,900 ft^2 to 5,800 ft^2. This corresponds to a Structure Fire Flow of 1,250 gpm. If the area is equal to a value which separates ranges, use the higher Structure Fire Flow (e.g., a 2,600 ft^2 wood frame building requires a Structure Fire Flow of 1,500 gpm).

The Structure Fire Flow shall not exceed:

—8,000 gpm for wood frame or ordinary construction

—6,000 gpm for noncombustible or fire-resistive construction

—6,000 gpm for single story building regardless of type of construction

5. Occupancy Factor Adjustment

The following occupancies are considered "low" or "high" risks:

Low Risk Occupancies:

Apartments
Asylums
Churches

Clubs
Colleges and Universities
Dormitories
Dwellings
Hospitals
Hotels
Institutions
Libraries, except Large Stack Room Areas
Museums
Nursing, Convalescent and Care Homes
Office Buildings
Prisons
Public Buildings
Rooming Houses
Schools
Tenements

High Risk Occupancies:

Aircraft Hangers
Cereal, Feed, Flour and Grist Mills
Chemical Works - High Hazard
Cotton Picker and Opening Operations
Explosives and Pyrotechnics Manufacturing
High Piled Combustible Storage in excess of 21 feet high
Linoleum and Oilcloth Manufacturing
Linseed Oil Mills
Match Manufacturing
Oil Refineries
Paint Shops
Pyroxylin Plastic Manufacturing and Processing
Shade Cloth Manufacturing
Solvent Extracting

Varnish and Paint Works

Woodworking with Flammable Finishing

Other occupancies involving processing, mixing, storage and dispensing flammable and/or combustible liquids.

While ± 25 percent adjustments may be made, the adjustment is to be based on judgment and in general is not expected to be at the limits permitted.

6. Compute Sub-Total

Self explanatory

7. Sprinkler Adjustment

Normally maximum adjustment would not be allowed without proper sprinkler system supervision including water flow and valves. Maximum adjustments are shown on the Fire Flow Estimate Form.

8. Exposure Adjustment

The percent actual adjustment for each "face" is based on judgment involving the following factors:

—the height, area, and construction of the building(s) being exposed

—the separation, openings in the exposed building(s)

—the length of exposure

—the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed

—the occupancy of the exposed building(s)

—the effect of hillside locations on the possible spread of fire

If a building is exposed within 150 ft., normally some percentage adjustment for exposure will be made (except where 4 hour walls are involved).

9. Roof Covering Adjustment

Self explanatory

10. Compute Estimated Fire Flow Required

Round off to the nearest 250 gpm if the computed value is less than 2,500 gpm and to the nearest 500 gpm if the value is greater than 2,500 gpm. The required fire flow should not be less than 500 gpm, nor more than 12,000 gpm.

Table IV-1.
FIRE FLOW vs. AREA

STRUCTURE FIRE FLOW (gpm)	TYPE OF CONSTRUCTION Wood Frame (area-sq.ft)	Ordinary (area-sq.ft)	Non-Combustible (area-sq.ft)	Fire Resistive (area-sq.ft)
	43,400	97,700	152,600	271,200
5750	47,400	106,500	166,500	295,900
6000	51,500	115,800	See Note 1	See Note 1
6250	55,700	125,500	"	"
6500	60,200	135,500	"	"
6750	64,800	145,800	"	"
7000	69,600	156,700	"	"
7250	74,600	167,900	"	"
7500	79,800	179,400	"	"
7750	85,100	191,400	"	"
8000				

Note 1*
The structure fire flow shall not exceed 6000 gpm for non-combustible or fire-resistive construction.

Table IV-1.
FIRE FLOW vs. AREA

STRUCTURE FIRE FLOW (gpm)	TYPE OF CONSTRUCTION Wood Frame (area-sq.ft)	Ordinary (area-sq.ft)	Non-Combustible (area-sq.ft)	Fire Resistive (area-sq.ft)
500	500	1,200	1,900	3,300
750	1,100	2,400	3,700	6,600
1000	1,700	3,900	6,100	10,900
1250	2,600	5,800	9,100	16,200
1500	3,600	8,200	12,700	22,700
1750	4,800	10,900	17,000	30,200
2000	6,200	13,900	21,800	38,700
2250	7,700	17,400	27,200	48,300
2500	9,400	21,300	33,200	59,000
2750	11,300	25,500	39,700	70,900
3000	13,400	30,100	47,100	83,700
3250	15,600	35,200	54,900	97,700
3500	18,000	40,600	63,400	112,700
3750	20,600	46,400	72,400	128,700
4000	23,300	52,500	82,100	145,900
4250	26,300	59,100	92,400	164,200
4500	29,300	66,000	103,100	183,400
4750	32,600	73,300	114,600	203,700
5000	36,000	81,100	126,700	225,200
5250	39,600	89,200	139,400	247,700
5500				

FIRE FLOW ESTIMATE FORM
(Based on ISO Publication "Guide for Determination of Fire Flow" December 1974)

1. Risk Identification Information

   Name: _____ Occupancy Code: _____

   Address: _____ Jurisdiction: _____

2. Determine Type of Construction

   (Circle One) Fire-Resistive Non-Combustible Ordinary

   Wood Frame Mixed

   NOTE: If "mixed," see Special Instruction for Area and Basic Fire Flow

3. Determine Area
   Ground Floor Area _____ ft^2
   (times) No. of Stories _____ x
   Area _____ ft^2 (A)

4. Determine Structure Fire Flow from Table IV-1 Using Area (A): _____ gpm (B)

5. Determine Occupancy Factor Adjustment
   If Low Risk — Subtract up to 25% of (B)
   If High Risk — Add up to 25% of (B)
   Adjustment _____ gpm (C)

6. Compute Sub-Total (B±C) _____ gpm (D)
   (if B±C is less than 500 gpm, insert 500 gpm)

7. Determine Sprinkler Adjustment

If completely sprinklered — Subtract up to 50% of (D).

If light risk occupancy and fire-resistive or non-combustible construction — Subtract up to 75% of (D).

Adjustment (% Adjustment times (D)) _____ gpm (E)

8. Determine Exposure Adjustment

Using the table at left as a guide, enter the separation and adjustment for each of the "four faces" of the building in the table at right.

Separation (ft.)	Max. Adjust. Permitted
0-10	25% max.
11-30	20% max.
31-60	15% max.
61-100	10% max.
101-150	5% max.
150 or 4 hr. wall	0%

Exposure	Separation	Act. Adjust.
North		add %
East		add %
South		add %
West		add %
Total % of Adjustment (not to exceed 75%)		%

Adjustment (Total % Adjustment times (D)) _____ gpm (F)

9. Determine Roof Covering Adjustment (if ordinary roof covering, add 500 gpm)

Adjustment _____ gpm (G)

10. Compute Estimated Fire Flow Required _____ gpm (H)

(D-E+F+G) Required Fire Flow
(If D-E+F+G is less than 500 gpm, insert 500 gpm)
(If D-E+F+G is greater than 12,000 gpm, insert 12,000 gpm)

SPECIAL INSTRUCTIONS FOR BUILDING WITH MIXED TYPE OF CONSTRUCTION

In buildings with mixed type of construction, the Structure Fire Flow is determined by prorating the percentages involved in the mix. The proration may be computed using the following table:

Type of Construction	(1) Ground Area	(2) No. Stories	(3) Area (1) x (2)	(4) % of Total Area 100x(3)/(7)	(5) Fire Flow Based on Total Area (7)	(6) Prorated Fire Flow (4)x(5)/100
Wood Frame						
Ordinary						
Non-combustible						
Fire Resistive						

(7) Total Area ft²	(8) Structure Fire Flow gpm

1. Enter the ground area and number of stories for each type of construction involved in the building [columns (1) and (2)].

2. Compute the area for each type of construction in the building. [Col. (3) = Col. (1) times Col. (2)]. Note that area for each type of construction should be computed separately and entered if the area per story varies from the ground area.

3. Using the area in Column (3) and the corresponding type of construction, enter Table IV-1 and determine the fire flow.

   —If this fire flow is greater than 8,000 gpm for the wood frame or ordinary construction parts of the building, enter 8,000 gpm as the Structure Fire Flow [Item (8)] and proceed directly to step 8.

   —If the building involves only noncombustible and fire-resistive construction and the fire flow for either part is greater than 6,000 gpm, enter 6,000 gpm as the Structure Fire Flow [Item (8)] and proceed directly to step 8.

   —If the building is single story throughout and any area in Column (3) results in a fire flow greater than 6,000 gpm, enter 6,000 gpm as the Structure Fire Flow [Item (8)]6038 and proceed directly to step 8.

4. Add the entries in Column (3) to obtain the Total Area of the building [Item (7)] and compute the respective percentages of total area by type of construction. The percentage computation is: Column 4 = 100 times Column (3) divided by Item (7).

5. Use the total area [Item (7)] to enter Table IV-1 and obtain a fire flow for each type of construction in the building assuming the entire building is of the type of construction being considered. Enter this value in Column (5). If the value so obtained is greater than 8,000 gpm for wood frame or ordinary construction or greater than 6,000 for noncombustible or fire-resistive construction, enter 8,000 or 6,000 respectively.

6. Compute each prorated fire flow as indicated. Column (6) = Column (4) times Column (5) divided by 100.

7. The Structure Fire Flow for the building [Item (8)] is the sum of the entries in Column (6).

8. Round off Item (8) to the nearest 250 gpm and enter the value in Item B of the Fire Flow Estimation Form.

UNIT 4: ORGANIZING FOR PLANNING

OBJECTIVES

The participants will:

1. *Identify the group dynamics associated with decisions and the impact of hidden agendas and prejudice.*
2. *Identify the key factors of a problem statement.*
3. *Prepare well-defined problem statements that reflect the real problems rather than symptoms.*
4. *Provide a recommended organizational structure for master planning.*
5. *Identify the roles of the management team, planning team, planning team leader, and citizens' advisory board.*
6. *Define in writing the need to develop a plan.*

NOTE-TAKING GUIDE

DECISIONMAKING

While this class does not allow time to pursue the decisionmaking process in depth, this manual contains four handouts for review at a later date. Reviewing these materials prior to commencing a planning project will assist you in your planning efforts.

PROBLEM STATEMENTS

Problem areas.

Writing problem statements.

ORGANIZING FOR PLANNING

Methods of documenting need for master plan.

Membership and purpose of the management team.

The role of the planning team leader.

Methods of identifying and appointing a planning team.

Purpose and organization of a citizens' advisory committee.

ACTIVITY 4.1

AN EXERCISE IN DECISIONMAKING

Directions

A. This is an exercise in decisionmaking. Each of you will be asked to review the shelter material and make your selection individually with no contact with anyone else. No talking during this part of the exercise is allowed.

B. Once everyone in your group has completed his or her selection, you are asked to arrive at a group decision that will be posted for class discussion.

C. Please keep the following points in mind during the exercise:

1. Accept the situation as fact.
2. Be honest. You must stay in the shelter.
3. Accept all facts as true.
4. Consider your own strengths and weaknesses.

D. Once your group has reached a decision, place it on a flipchart and post for discussion.

ACTIVITY 4.1, cont'd

AN EXERCISE IN DECISIONMAKING

One evening a year from now you invite nine of your friends to your home to talk with a psychology professor whom you know personally. In the midst of your discussion you hear a report over your scanner that there has been a meltdown at the nuclear power plant located 3 miles away across the river. The extent of the contamination is unknown at this time, but everyone is encouraged to seek shelter. Fortunately, you had anticipated such a potential and had constructed a shelter in your basement complete with air purification, water, food, etc. The problem is that your shelter will accommodate only 6 persons and you have 11 at your home, including yourself.

You monitor the scanner and things start to deteriorate. The group decides that for anyone to survive, the shelter must be activated and those remaining attempt to seek sanctuary elsewhere. The risks associated with outdoor travel are substantial, but it is agreed that this is the only viable alternative. To wait any longer would only make the decision riskier. Because it is your shelter, all agree that you must stay and choose the other five who will remain with you.

1. **Harriet**--is a psychology professor, and a few years older than the rest of the group. It has become evident already that the others respect her and recognize her grasp of the situation and ability to take control. Although she is rather cold and impersonal, she has helped to quiet the group's nervousness and settled an argument between Don and Gertrude. Even though no one seems close to her, you feel she would be valuable as an organizer and pacifier (settler of disagreements).

2. **Gertrude**--is studying home economics, nutrition, and dietetics. She is a very sexy, attractive girl. One of the first things she did was to appraise the food supply. You realize that her training has given her practical knowledge of how to ration food to avoid waste. She is also an imaginative cook who can fix even canned foods appealingly. She is efficient to the point of being domineering and bossy.

3. **Pansy**--is a brilliant girl who has done research on radiation. She has been pampered all her life and is horrified at wearing the same clothes for a month, being unable to take a bath or wash her hair, and sleeping in a room with 5 other people. Her scientific knowledge of the situation would be a definite asset; her whims and attitude would be trying.

4. **Lydia**--is a literature buff, has read extensively, and writes well herself. Already she has entertained and diverted the group with her reading experiences and retelling one of the books she perused recently.

5. **Sadie**--Joe's wife, generally has a pleasant personality. However, she has been the most nervous and upset of the group. Her temperamental, excitable mood is due partially to the fact that she is expecting a baby in 2 months.

6. **Joe**--Sadie's husband, is a medical student. He has had 2 years of medical study, three summers as medical director in a camp, and maintains a close relationship with his father, a doctor. You realize he would be a great asset; however, he refuses to stay unless Sadie also remains.

7. **Milton**--the mechanic who had been working upstairs, also has a great deal of practical know-how to recommend him. Although his formal education ended with high school, he has had experience with air filtration systems, air purifiers, and oxygen supply. He is a rather dull, chubby fellow who already has been reprimanded by Gertrude for snitching a candy bar from the limited food supply. Despite his understanding of the technical aspects, he fails to grasp the necessity of self-control as far as the food and water supply is concerned.

8. **Simon**--a young minister, is easygoing. His calmness, optimism, and faith are an inspiration to the group. In an intangible, yet perceptible way his presence is reassuring. He helped quiet Sadie's tearful outburst. At this time he revealed that he has learned to remain calm of necessity because he is diabetic. He requires a special diet and becomes tired easily. Overexcitement causes him to faint.

9. **Spike**--is a clean-cut, husky, black football player, the star center of the college's team. He is highly respected by everyone on campus. Spike was the only one able to lift the heavy metal plate that had to be placed over the shelter door. At one point, when Joe took it upon himself to set the oxygen tank valve, Milton flew at him, shoved him out of the way, and reset the valve properly. A fist fight might have started if Spike had not separated the two of them.

10. **Don**--is a romantic. His smile, lively guitar music, and scintillating sense of humor have helped improve everyone's mood. He gets along well with everyone--too well with some of the girls. He already has offended Gertrude by being fresh, and several of the girls have noticed his flirting eyes darting from face to face as he sings.

****

WHOM WILL YOU CHOOSE? In making your decisions, you must keep four things in mind:

1. Accept this situation as a fact. Concern yourself with choosing your companions, not with attacking the logic or probability of the situation.

2. Be honest. You must stay in the shelter. Your physical and mental well-being and survival will depend on your companions, their abilities, and personalities.

3. Accept all facts about the 10 people; overlook neither their assets nor weaknesses. You may assume nothing about the characters that would conflict with what you have been told.

4. Do not overlook your own strengths and weaknesses in making your choices. Remember, you are one of the 6 who will remain.

ACTIVITY 4.1 WORKSHEET

AN EXERCISE IN DECISIONMAKING

The purpose of this activity is to:

1. Identify the group dynamics associated with decisions and the impact of hidden agendas and prejudice of all nature.

2. Identify the features of, and potential barriers to, decisionmaking.

3. Discuss, decide, and be prepared to explain your reasons for having one person stay in preference to another. Defend your decisions. The right choice is one that reflects your values accurately.

Choose the 5 people you would pick to remain in the shelter with you and give the reasons why. . .

1.

2.

3.

4.

5.

ACTIVITY 4.2

SUNVILLE DATA ANALYSIS--PART 3

PROBLEM IDENTIFICATION

Directions:

From the laundry list of problems facing Sunville, select two problems and write complete problem statements.

Use the worksheets. Answer all questions.

Place statements on a flipchart to be used for reporting.

ACTIVITY 4.2, cont'd

SUNVILLE DATA ANALYSIS--PART 3

PROBLEM IDENTIFICATION

QUESTION SET #13

Problem #1 _____

What? _____

_____

Where? _____

_____

When? _____

_____

Why? _____

_____

Who caused? _____

_____

Impact? _____

_____

Who affected? _____

_____

Problem Statement: _____

_____

_____

_____

_____

Problem #2_____

What?_____

Where?_____

When?_____

Why?_____

Who caused?_____

Impact?_____

Who affected?_____

Problem Statement:_____

ACTIVITY 4.3

RECOMMENDATION TO SUNVILLE CITY MANAGER

Directions:

1. Each group will develop a one-page letter to the city manager using the sample memo.

2. Each group will appoint a person to report to the class.

3. Instructor will critique memos to ensure that each memo contains the following elements:

   A definition of the need to develop a plan. Students should use problem statements developed from the list of "problems facing Sunville."

   Estimated cost, personnel hours, and timeline for the project.

   A recommended management team and planning team members.

   A recommendation regarding the formation of a citizens' advisory board and recommended members.

ACTIVITY 4.3, cont'd

RECOMMENDATIONS TO SUNVILLE CITY MANAGER

SAMPLE MEMO

TO: (Name), City Manager

FROM: (Name), Fire Chief

DATE: (Month, Day, and Year)

RE: Fire Protection System: Master Planning

The future is inevitable! Whether or not it holds great promise for Sunville depends on our ability to direct its course. In this regard, I respectfully request your approval and support for the development of a five-year master plan for our fire protection system.

A master plan would provide us with the guiding framework needed for a strong sense of direction while at the same time serve as a resource management tool to effectively address the current and anticipated problems we now face. Problems such as (provide a couple of the most severe problems listed in the problem statements).

Realizing that Sunville's total fire protection needs involve more than just the fire department, we have developed a planning program that involves the formation of a management team, planning team, and citizens' advisory committee. The management team will consist of top management personnel who would review the work to ensure its consistency with the long-range goals of the city. The planning team will consist of representatives from all the elements of the fire protection system to ensure that the plan is comprehensive in scope. Finally, the citizens' advisory committee will consist of key people in the community to gain public involvement that will lead to their acceptance of the plan.

Obviously, such an endeavor will require the commitment of monetary and physical resources. I have estimated the cost of the project to be approximately ($) with an estimated staff time of (personnel hours). This places the project completion date around (month and year).

Time is of the essence in this project because failure to plan today will certainly lead to decline in the future. Therefore, your favorable response to my request would be well received and greatly appreciated, or I would welcome an opportunity to meet with you to discuss this project in more detail.

I anxiously await your reply.

SOME COMMON DECISIONMAKING METHODS

The quality of group decisions is highly dependent upon the interpersonal dynamics of those participating in the decisions.

The following are six decisionmaking methods commonly used by groups. Each has a place and time, and none is inherently good or bad. Each has consequences for future group operations, and these should be understood and accounted for by the decisionmaking unit.

DECISION BY LACK OF RESPONSE (PLOP)

The most common and perhaps least visible group decisionmaking method is that in which someone suggests an idea, and before anyone else has said anything about it, someone else suggests another idea until the group finds one on which it will act. All the ideas which have been bypassed have, in a sense, been decided upon by the group. But the decision simply has been a common decision not to support the idea, making the proposer feel that his suggestion has "plopped." Many group decisions are made by this method.

DECISION BY AUTHORITY RULE

Many groups set up a power structure or start with a power structure which makes it clear that the chairman or someone in authority will make the final decision. The group can generate ideas and hold free discussion, but, at any time, the chairman can say that having heard the discussion, he or she has decided to do thus and so. This method is highly efficient. Whether or not it is effective depends a great deal upon whether the chairman is a sufficiently good listener to have culled the right information on the basis of which to make his decision. Furthermore, if the group must move on to the next stage or implement the decision, the authority-rule method produces a minimum amount of involvement by the group. Thus, it undermines the potential quality of the implementation of the decision.

DECISION BY MINORITY

One of the most common complaints of group members is that they feel railroaded with respect to some decision. Usually this feeling results from one, two, or three people employing tactics which produce action, and therefore, must be considered decisions, but which are taken without the consent of the majority.

One individual can railroad a decision--particularly if he or she is in some kind of chairmanship role--thereby not allowing others to express opposition. A common form of minority rule is when two or more members come to quick and powerful agreement on a course of action, and challenge the group with a quick "Does anyone object?" and, if no one raises his or her voice in two seconds, the minority proceed with "Let's go ahead, then." The trap is the assumption that silence means consent.

A great many group decisions, particularly pertaining to the important issue of group procedures, rules of order, etc., are made in these rather rapid ways. For a group member to challenge such proceedings, and to say "I don't really agree," is often seen as blocking; hence, there are strong pressures on group members to remain silent and let things take their course, even though they are not in agreement.

DECISION BY MAJORITY RULE: VOTING AND/OR POLLING

Next are more familiar decisionmaking procedures, those which often are taken for granted as applying to any group situation because they reflect our political system. One simple version is to poll everyone's opinion following some period of discussion, and, if a majority feel the same way, to assume that decision has been reached. The other method is the more formal one of stating a clear alternative and asking for votes in favor of it, votes against it, and abstentions.

On the surface, this method seems completely sound, but, surprisingly, it often turns out that decisions made by this method are not well-implemented even by the group that made the decision. What is wrong? If the group is willing to discuss this process, it turns out that two kinds of psychological barriers exist:

- Minority members often feel that there was an insufficient period of discussion for them to really get their point of view across; hence, they feel misunderstood and sometimes resentful.

- Minority members often feel that the voting has created two camps within the group and that these camps are not in win-lose competition. Their camp lost the first round, but it is just a matter of time until it can regroup, pick up some support, and win the next time a vote comes up.

In other words, voting creates coalitions, and the preoccupation of the losing coalition is not how to implement what the majority wants, but how to win the next battle. If voting is to be used, the group must be sure that it has created a climate in which members feel they have had their day in court, and where members feel obligated to go along with the majority decision.

DECISION BY CONSENSUS

One of the most effective, but time-consuming, methods of group decisionmaking is to seek consensus. It is important to understand that consensus is not the same thing as unanimity. Rather, it is a state wherein communications have been sufficiently open and the group climate has been sufficiently supportive, causing everyone in the group to feel that he or she has had his or her fair chance to influence the decision. Someone then tests for the "sense of the meeting," carefully avoiding formal procedures like voting. If there is a clear alternative to which most members subscribe, and if those who oppose it feel they have had their chance to influence, then a consensus exists. Operationally, it would be defined as those members who would not take the majority alternative, nevertheless understanding it clearly and being prepared to support it. It is a psychological state which might be described as follows:

> "I understand what most of you would like to do. I personally would not do that, but I feel that you understand what my alternative would be. I have had sufficient opportunity to sway you to my point of view but clearly have not been able to do so. Therefore, I will gladly go along with what most of you wish to do."

In order to achieve such a condition, time must be allowed by the group for all members to state their opposition and to state it fully enough to get the feeling that others really do understand them. This condition is essential if they are later to free themselves of the preoccupation that they could have gotten their point across if others had only understood what they **really** had in mind. Only by listening carefully to the opposition can such feelings be forestalled and effective group decisions reached.

DECISIONS BY UNANIMOUS CONSENT

The logically perfect but least attainable kind of decision is one in which everyone truly agrees on the course of action to be taken. For certain key kinds of decisions it may be necessary to seek unanimity, but for most important ones consensus is enough, if it is real consensus. Unanimity is not always necessary, and may be a highly inefficient way to make decisions.

CHARACTERISTICS OF POSITIVE WORK TEAMS

1. There is smooth coordination and high cooperation among members of the work team.

2. There is a sense of positive group identity.

3. Each person feels that he/she is important to the achievement of the work unit's goals and carries his or her share of the load.

4. The work unit has specific, clear goals and time frames that are consistent with the organizational goals.

5. The team members support the goals of the work unit.

6. Team members are aware of each other's jobs and offer assistance when appropriate.

7. Team members meet frequently to share progress and solve problems.

8. Group norms for quality work are set and seen as standards for everyone in the group.

9. Team members feel free to communicate with each other and the team leader.

10. The team leader supports creative thinking and channels it to positive benefit.

11. Team members feel comfortable asking for help from other team members and the team leader.

THE DECISIONMAKING PROCESS

The decisionmaker, to the best of his/her ability and within his/her information-processing capabilities:

1. Thoroughly canvasses a wide range of alternative courses of action.

2. Surveys the full range of objectives to be fulfilled and the values implicated by the choice.

3. Carefully weighs whatever she/he knows about the costs and risks of negative consequences as well as positive consequences that could flow from each alternative.

4. Intensively searches for new information relevant to further evaluation of the alternatives.

5. Correctly assimilates and takes into account any new information or expert judgment to which she/he is exposed, even when the information or judgment does not support the course of action the decisionmaker prefers initially.

6. Reexamines the positive and negative consequences of all known alternatives, including those regarded originally as unacceptable, before making a final choice.

7. Makes detailed provisions for implementing or executing the chosen course of action, with special attention to contingency plans that might be required should various known risks materialize.

WORK TEAMS AND TEAM MEMBERS MUST RESOLVE THESE FOUR CONCERNS FOR MAXIMUM EFFECTIVENESS:

AREAS OF CONCERN	WHEN CONCERN UNRESOLVED, WE HAVE:	WHEN CONCERN RESOLVED, WE HAVE:
1. Am I an accepted member? Is there acceptance and trust among team members?	Fear Distrust Suspicion Conformity	Confidence Acceptance Trust Supportive communications climate
2. Are we getting the information we need to make good decisions?	Politeness Caution Strategy Downward communications Distortion of information	Spontaneity Leveling Feedback Meaningul communication Problem-solving behavior
3. Can we set goals or objectives and effectively work toward them?	Apathy Win-lose competition Manipulation Persuasion	Creativity Involvement Commitment Motivation
4. What control or organization is necessary to accomplish our work?	Dependency Hostility Bargaining Formalization of organization and rules	Interdependence Self-control Awareness of shared responsibility Informality Allocation of work by ability

PROBLEM STATEMENTS

Once accurate information is organized in such a way that it can be studied and compared, problem areas will emerge. Many of the findings will have been known before but possibly never quantified in this manner. Others will be entirely new and come as a surprise to all concerned. The key is that possibly for the first time, everyone is sharing the same set of problems, quantified in the same manner.

As an example, reflex times may be much longer than predicted, perhaps because of delayed alarms, perhaps because of slow staffing times of the apparatus. Or it may emerge that the town's only industrial complex may be at a high level of risk even though there has never been a fire there. However, if it should burn, the impact on the town's work force could be devastating. The fact that the issue is unemotionally identified and quantified allows everyone to be operating from the same decision foundation and therefore better able to agree if it is something we can live with or something we have to do something about.

Once this system is in place, different kinds of information can be logically and accurately reviewed and decisions more readily obtained.

WRITING PROBLEM STATEMENTS

Once a problem has been brought to light, it is essential that the problem be clearly defined so everyone has an accurate understanding of what needs to be resolved. The better a problem is defined, the easier it is to solve and the quicker the selected solution can be implemented.

The problem statement should state what the concern is in terms directly related to the fire/EMS problem, yet never contain the solution.

For example, "we don't have enough money" is not a good problem statement. "We don't have enough firefighters" is not acceptable either.

A clearer statement would be:

There is an insufficient personnel response necessary to provide the required fire flow to 80% of the working fires.

This is a clearer statement as it relates directly to the provision of service and everyone reading it knows that if we have a working fire it will probably burn down to our resource level 80% of the time.

It does relate directly to the need for greater personnel but is related to service needs and not just resource statements.

The problem statement should include answers to the following questions:

1. What is happening?
2. Where is it happening?
3. When is it happening?
4. Why is it happening?
5. Who is causing it to happen?
6. What is the impact?
7. Who is affected?

Example:

What: A large number of wood stove fires.

Where: Residential occupancies.

When: January and February, early morning.

Why: Creosote buildup, poor maintenance.

Who: Building owners/occupants.

Impact: Greater risk to life, higher property damage, extra burden on volunteers, higher service costs.

Another example: the number of wood stove fires in residential occupancies due to improper maintenance is twice the national average, resulting in higher property losses and increased exposure to the potential of life loss.

Once problems are clearly stated, solutions become more apparent and a greater number of minds can be focused on the issue(s). In the example given, several alternative solutions emerge. The department could work with the owners/occupants through educational programs; the community could adopt stricter codes and inspection procedures; or, the community could accept the problem as an acceptable risk. The solution selected is up to each individual community.

Keep in mind that once the problem has been identified and communicated, if the community decides to accept it then there is nothing more you can or should do. Your role is that of a technician and manager with no responsibility for imposing quality-of-life judgments. That is a political decision and the role of the elected official in our society.

ORGANIZING FOR PLANNING

In order to document the need for master plan, first identify deficiencies in the current system, then develop a projection of increasing or changing service demands; i.e., EMS, hazardous materials, etc. Define the benefits anticipated from an effective master plan and prepare a letter documenting the issues to the chief administrative officer.

Membership of the management team should include three or four key members of community government and the fire department. Purposes of this team include:

- Making the decision to develop a master plan.
- Appointing a project manager.
- Determining the need to use a citizens' advisory committee.
- Approving a program budget.
- Establishing program and operational policies.
- Establishing the process through which the interim products of the planning effort will be reviewed and approved; i.e., who will review, who will approve, and when reviews will be performed.
- Reviewing and approving interim products of the planning effort.
- Presenting final document to the governing body.

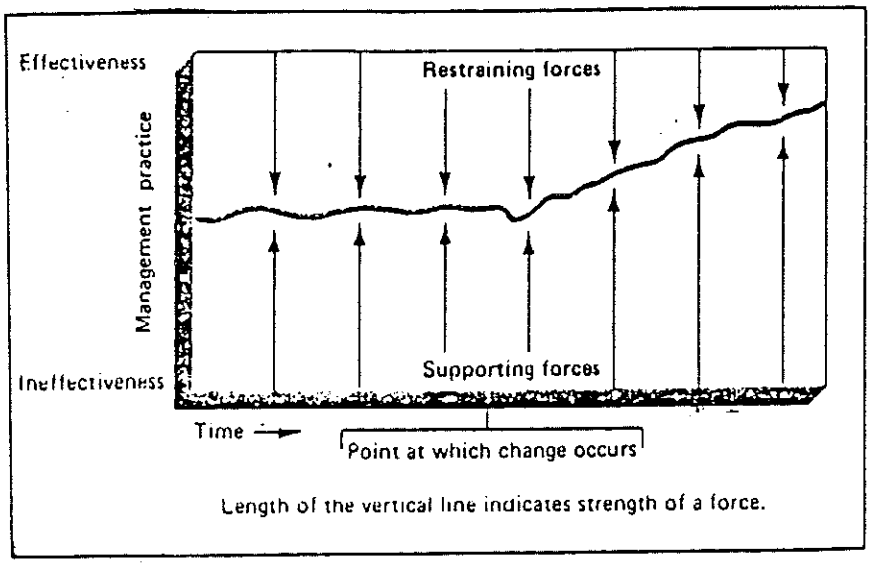
The project manager is a senior management person, preferably from the fire department, who will be required to spend 50% to 100% of available time managing the project and coordinating the activities of those preparing and reviewing the planning process.

In order to identify and appoint a planning team, you may choose to temporarily assign fire department personnel, with relief personnel available as needed or include non-fire-department personnel; i.e., building official, planner, law enforcement, etc. The team will have the responsibility of performing the tasks needed to develop an effective plan.

The purpose of a citizens' advisory committee is to provide a broad spectrum of support needed to implement the plan when it is completed The citizens' advisory committee also provides input from the major organizations or individuals within the community in order to meet community needs, reduce conflicts, and dilute the impact of special interests. The citizens' advisory committee will negotiate those compromises needed to obtain support of special interests, approval by the governing body, and effective implementation of the plan. Members of the citizens' advisory committee should be identified by the management team and appointed by the governing body. The citizens'

advisory committee should consist of influential members of the community who represent the major private sector interests which will be impacted by a master plan. These should include strong supporters and opponents of progressive fire protection and emergency services. Elected or career governmental officials should act as advisers to the committee but should not be members.

FORCE FIELD ANALYSIS



An equilibrium exists in all organizations

Change is typically viewed as requiring three steps:

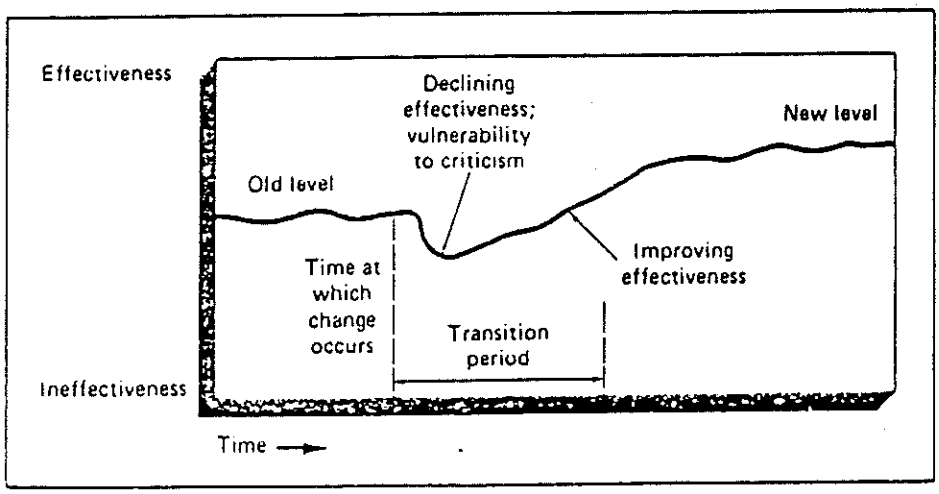
1. Unfreezing (Old ideas and practices need to be cast aside)
2. Changing (New ideas and practices are learned)
3. Refreezing (What has been learned is integrated into actual practice)

Employees need time to adapt to change

They are apt to become discouraged because of the problems that develop

At this time the change is especially subject to criticism, attack, and even failure, because it appears not to be working.

Forces of support need to be built before, during and after a change.



UNIT 5: DATA GATHERING

OBJECTIVES

The participants will:

1. *Identify the purposes of collecting data.*
2. *Define FDZ and FMA.*
3. *Identify data categories and how to use data from these categories.*
4. *Understand the importance of using graphics for displaying, analyzing, and communicating data.*
5. *Identify the methods for selecting and developing appropriate graphics to display data for planning team analysis, citizens' advisory committee review, and communicating to city council.*
6. *Learn how to use visual perception to think, review, and communicate graphically.*

NOTE-TAKING GUIDE

DATA GATHERING--HISTORICAL, PRESENT, AND FUTURE

Introduction.

Data collection process.

Data categories and usage.

Data sources.

Data time frames.

Historical data.

Current data.

Future data.

DATA GATHERING--HISTORICAL, PRESENT, AND FUTURE

The Sunville data which has just been reviewed represents a significant data-gathering effort. We will analyze some of the methods which can be used in data gathering. The necessary data frequently will not be readily available. Top management expects the fire chief to document needs and the anticipated results of programs and resource expenditures. Other agencies, such as the planning department and county assessor, possess data which can be used by the fire department for planning and management.

Data is needed to define the current and future problems, needs, and service demands.

Data is necessary in order to prepare goals which specify the conditions which should exist and to define and evaluate results. Measurable results which are needed for periodic reporting and program evaluations must be based upon accurate and complete data.

Without the required data it is not possible to develop alternative methods and programs; provide data needed to compare the cost and result differences of alternatives or identify program requirements, or provide the information needed to establish resources needed to accomplish goals and objectives such as personnel, equipment, legislation, costs, etc.

The following are steps in the data-collection process:

1. Review each step of the plan to identify data needed for each step in the process.

2. Establish a list of data which define the issues you believe the plan must confront.

3. Assign one person to coordinate data collection. This is necessary to maintain data consistency and accuracy.

4. Divide community into data-collection areas. Fire demand zones (FDZs) are used to collect and maintain data for planning and management. FDZs may be:

Geographical areas or homogeneous occupancy areas.

They must be small enough to accommodate aggregation in order to compare with other agency data-collection areas or to transfer workloads among fire management areas.

Fire management areas contain a number of FDZs and are used to implement and evaluate the provisions of the master plan. They also may be identified as: fire station response areas, battalions, inspection or public education districts, and wildland/urban interface or intermix areas.

The data required to develop and implement a master plan can be extensive and can present the primary workload in the project. It is essential that the data collected is required for the planning effort. Data that would be nice to have in the future should be collected in the future. It is necessary, therefore, to determine which data is needed early in the process.

The following are data sources: fire department records, state fire marshal or USFA, planning department, county assessor, building department, regional planning agencies; private sector--banks, McDonalds, Burger King, etc.; and public utilities--transit, telephone, etc.

Data to project the next 5 years will usually have reasonable accuracy. Beyond 5 years, accuracy is reduced and there is a need to provide for updating data as the plan is implemented.

If possible, use planning department data and time frames when developing future projections.

Historical data is used to identify past fire protection, and emergency medical and hazardous materials incident activity and trends.

Historical data documents community changes which have affected fire department operations such as: land development, population changes, water system, building code inspection and enforcement, legislation, and community policies, ordinances, etc. This data will also identify trends which can be useful in future projections.

Fire department history includes: staffing, facilities, equipment, and programs. Historical data which relates to occupancies or risks similar to those in the community should be collected from regional, state, and national fire protection agencies. Low activity rates in most small communities will not present a true picture of the potential risks of many occupancies or processes.

The current data should describe the conditions which exist within the community and provide a thorough description of the community, service demands, and the fire protection system, including the fire department.

A detailed description of the structures and occupancies within the community is needed to define the fire protection, EMS, and hazardous materials service demands accurately. This data is not always contained in fire department records but the records of the county assessor frequently will contain this information.

The community and the fire protection system are changing constantly. The community fire protection plan must be updated to cope with changes. Fire protection system planning should be based upon projections developed by local planning agencies. Future changes which can affect fire protection include land development, redevelopment projects, population changes, new

commercial/industrial structures and occupancies, legal constraints, financial changes, new service demands such as EMS and hazardous materials, and new water or sewer system improvements.

Sources of data to project future conditions include:

The local planning department (regarding annexations, new development, proposed redevelopment, land use and density changes, population changes, sphere of influence boundary changes, and prezoning of land to be annexed).

The local building department (regarding proposal changes to building codes).

The public works department (regarding proposed changes to water system, projected water system deficiencies, projected transportation needs and improvements).

The city/county legal office (regarding proposed legislation, tax and expenditure limits, and liability audit).

The finance department (regarding revenue projections and expenditure projections).

The state fire marshal (regarding proposed state legislation, future state fire protection programs, and statewide fire incident trends).

Local school boards (regarding student population projections).

Private institutions' (banks, fast food chains, local industries) business projections (regarding business and industrial developments, residential development, and population age changes), and public utilities.

FIGURE 5.1--DATA CATEGORIES

The information contained in this figure is most commonly used in fire protection for master planning. It should be emphasized that this data may not be applicable to all agencies. Other data may be needed to identify the unique character of each agency. If a specific use for the data cannot be identified, it should not be collected.

DATA CATEGORY AND DATA ELEMENTS	DATA USAGE
Population	
- Total population by year - Population by age/year - Population by FMA - Per capita service costs	- Per capita incident ratios - EMS service demands - Incendiary fire trends versus age
Land Use Data	
- Existing land area by zoning - Developed versus undeveloped land - Areas of potential annexation - Community future land use plan	- Potential development - Current and future work load estimates by type of land use - Potential changes in land use type
Physical Data	
- Topography - Freeways/Street patterns - Climatic and weather conditions - River, lakes - Relationship to other communities	- Access to incidents - Identification of growth areas - Disaster potential for tornadoes, earthquakes, floods, and other weather-related disasters - Response distance for mutual aid
Building/Occupancy Data	
- No. of occupancies by type - No. of occupancies with sprinklers - Occupancies by FMA - Fire flow requirements	- Fire prevention work load - Fire suppression resources - Water supply requirements
Safety Code Data	
- Current fire code - Current building code - Local amendments to codes - State codes - Hazardous materials regulations	- Built-in fire protection - Risk-reduction programs - Mandated enforcement and training.

Apparatus and Equipment

- Number by type
- Age of apparatus
- Maintenance costs
- Downtime
- Parts availability
- Standards/Specifications
- Preventive maintenance programs
- Scheduled replacement program
- Operating cost control

Financial Data

- Previous budgets
- Capital improvement plans
- Revenues (taxes, fees, donations)
- Revenue and tax limitations
- Insurance rating of community
- Future budgets
- New program funding
- New revenue sources
- ISO rate reduction

Water System

- Available fire flow by FDZ
- Size, age, and condition of water mains
- Storage capacities and reliability
- Hydrant system maintenance/tests
- Fire protection system design standards.
- Alternative fire flow supplies
- Fire flow capabilities
- Sprinkler system water supply
- System reliability and testing
- Disaster/Major incident planning
- Insurance rate reductions
- Mobile water supply program

Fire Department Data

- Personnel by rank
- Training activities
- Certification standards
- Fire station descriptions
- Fire station maintenance/repair
- Minimum staffing standards
- Allocation of personnel hours by type of activity
- Safety data
- Safety standards
- Workmen's Compensation claims
- Insurance claims
- Sick leave
- Injuries
- Accidents
- Operating costs
- Staffing standards
- Fire station type and location
- Training requirements
- Personnel required/available for program accomplishment
- Recruitment/retention of volunteers
- NFPA 1500 compliance
- OSHA compliance
- Justifying physical fitness program
- Identifying needs for safety equipment

Fire Prevention

- New construction plans review
- New construction inspections
- Periodic code enforcement inspections
- Special hazard abatement program description
- Hazards found versus corrected
- Permits enforcement
- Citation program
- Training and certification
- Fire code enforcement
- Resources allocated to code enforcement
- Liability for uncorrected hazards

Fire Investigation

- Fire cause determination
- Arson investigation
- Arson prosecution
- Training and certification
- Directed fire prevention
- Resources allocated to investigations
- Arson task force organization
- Law enforcement role
- District attorney role
- Cooperation of courts

Communications and Dispatching

- Available radios and frequencies
- Dispatching services
- Dispatching standards
- Radios and frequencies of mutual aid and auto aid agencies
- Radio maintenance/repairs
- Scheduled replacement of communications equipment
- Emergency support resources
- Adequate emergency/routine communications system
- Adequate communications for mutual/auto aid operations
- Adequate disaster operations
- Communications system costs
- Support preplanning; e.g., run maps, street addresses, etc.

Emergency Medical Services

- Total incident rates
- Resource commitment to EMS
- Activity rates related to demographics of FDZs
- Advanced life support needs
- Basic life support needs
- Resource requirements of EMS
- Desired levels of service
- Training/Certification levels for personnel
- Future service demands

Hazardous Materials

- Types of material
- Quantity of types
- Fixed storage
- Mobile transportation routes
- Times for materials movement
- Method of movement - rail/water/ air/highway/etc.
- Mitigation resources available
- Legal requirements
- Adopted plans in place
- History of incidents

UNIT 6: GOALS AND OBJECTIVES

OBJECTIVES

The participants will:

1. *Define goals, objectives, system objectives, and operational objectives.*
2. *Prepare appropriate goal statements, objectives, system objectives, and operational objectives.*

NOTE-TAKING GUIDE

FIRE PROTECTION SYSTEM GOALS

Definition of goals.

Purpose of goals.

FIRE PROTECTION SYSTEM OBJECTIVES

Purpose of objectives.

Characteristics of objectives.

Operational and system objectives.

ACTIVITY 6.1

WORKSHEET 6-1

Prepare one goal for each of the two problem statements written in Unit 4 (Activity 4.2). These should be statements of long-term conditions which provide a solution to each of the problem statements.

PROBLEM STATEMENT #1:

GOAL #1:

PROBLEM STATEMENT #2:

GOAL #2:

ACTIVITY 6.2

WORKSHEET 6-2

For each of the two problem statements and goals written in Activity 6.1, prepare two system objectives for that goal.

PROBLEM STATEMENT # _____

GOAL # _____

SYSTEM OBJECTIVE #1

SYSTEM OBJECTIVE #2

PROBLEM STATEMENT # _____

GOAL # _____

SYSTEM OBJECTIVE #1

SYSTEM OBJECTIVE #2

ACTIVITY 6.2 (cont'd)

WORKSHEET 6-2

Prepare two operational objectives for each system objective. **Reminder:** Objectives must be measurable and accomplished within a specific time frame.

PROBLEM STATEMENT:

GOAL #

SYSTEM OBJECTIVE #1

OPERATIONAL OBJECTIVE #1

OPERATIONAL OBJECTIVE #2

PROBLEM STATEMENT:

GOAL #

SYSTEM OBJECTIVE #1

OPERATIONAL OBJECTIVE #1

OPERATIONAL OBJECTIVE #2

FIRE PROTECTION SYSTEM GOALS

Fire protection system goals are the desired results which the community expects the fire protection system to produce. These goals define the levels of service and acceptable risks that meet the unique needs of a community. They form the basis for fire protection standards which are established as objectives.

Goals have many purposes, such as a general statement of purpose, establishing policy regarding service areas, defining direction of fire protection system, and providing policy to resolve present or anticipated problems.

Goals are not measurable or set in a time frame. They are the basis for objectives which are measurable standards.

If a goal is adopted by the governing body of a community, it establishes public policy and sets the direction of the fire protection system.

FIRE PROTECTION SYSTEM OBJECTIVES

At least one objective is established to attain each goal. Objectives are the fire protection standards for the community. They must be measurable and must be accomplished within a specific period of time.

Objectives are used to measure the results of implementing the master plan programs.

There are no general fire protection standards available for use by communities except those which each community develops. When adopted by the community governing body, objectives are the community standards for fire protection and other services for which goals and objectives are established. Objectives provide measurable levels of service and acceptable risk. The Insurance Services Office (ISO) grading schedule is designed to meet the needs of the insurance industry and does not meet the overall needs of the community. This is especially apparent with residential occupancies.

One guideline in planning is that **all** objectives must be met. Objectives must be met by the programs established as a result of the master plan. If it is apparent that the objectives will not be met, then the program must be upgraded or the objective must be changed. This will be discussed in detail as part of "Alternatives." At this point it is sufficient to state that all objectives **must** be accomplished.

System objectives are developed to meet the overall goals of the fire protection system.

For example, **fire protection system objective:**

All occupancies will be reinspected at least annually.

System objectives are developed by the community governing body.

Operational objectives are developed to accomplish the system objectives. Operational objectives are assigned to individuals or divisions.

For example, fire protection operational objectives:

Engine companies will inspect all commercial occupancies annually.

The fire inspector will inspect all high fire risk occupancies semi-annually.

The fire inspector will inspect all hospitals and rest homes quarterly.

All sprinkler systems will be inspected and tested annually by a certified private agency.

A home inspection program will be conducted annually by the public education division of volunteers.

Operational objectives will be developed to define the responsibilities of individuals or divisions in order to attain system objectives. More than one operational objective may be required to attain one system objective. Measurable operational objectives are essential to evaluate the results of programs implemented to accomplish system objectives.

UNIT 7: REQUIREMENTS AND ALTERNATIVES

OBJECTIVES

The participants will:

1. *Identify the programs and resource requirements needed to accomplish objectives.*
2. *Identify the cost of attaining goals and objectives.*
3. *Identify and evaluate alternatives.*

NOTE-TAKING GUIDE

REQUIREMENTS TO BE IDENTIFIED

Personnel hours needed to accomplish tasks.

Personnel costs: salaries and fringe benefits.

Facility costs: stations, training centers, maintenance facilities, etc.

Training equipment, instructors, and information.

Program costs related to:

New program development will include certain operational requirements which will be identified.

Requirements answer the questions:

Develop a consensus among key personnel when using estimates.

Compare the total costs of all programs with resources which are available.

ALTERNATIVES

Purpose of alternatives.

When an alternative does not meet the related objective:

Why develop alternatives?

Alternatives are identified as a result of:

ACTIVITY 7.1

SUNVILLE REQUIREMENTS

1. Each group will develop the requirements for one system objective previously identified, including the resource requirements of the operational objectives for that system objective. (Use worksheet 7-1.)

2. One spokesperson will be assigned to record the results on flipchart paper and report to the class.

3. The instructor will critique the results as they are presented. Each statement of requirements should answer the questions:

   How will it be done?

   Who will do it?

   How much will it cost?

   How will it be financed?

Be sure the following are identified, if applicable:

Personnel hours required, by position (rank).

New policies, regulations, or legislation.

Equipment or materials costs.

Training (hours, tuition, travel costs).

Approvals/Support of non-fire-department personnel or agencies.

WORKSHEET 7-1

SUNVILLE REQUIREMENTS

Problem Statement:

Goal:

Operational Objective:

Program Description:

Requirements:

Person Responsible:_____

Personnel Hours:_____hr./yr.

Materials:_____; Cost:_____

Equipment:_____; Cost:_____

Training:_____

Administrative Approvals:_____

Legislation:_____

Regulations/Policies:_____

Other:_____

ACTIVITY 7.2

SUNVILLE ALTERNATIVES

1. Each group will develop one alternative for one of the programs identified under resource requirements. (Use worksheet 7-2).

2. Each alternative should include:

   a. A brief description of the alternative.

   b. A description of how the goal and objective(s) will be met, within the specified time frame.

   c. A brief description of the program which will be used to accomplish the objective.

   d. The resources required to implement alternative program.

3. Each group will appoint a spokesperson who will record the results on flipchart paper and provide a report to the class.

4. The instructor will critique the results with the students and will place emphasis upon:

   a. Is the alternative clearly defined?

   b. Will the alternative meet the goal and objective?

   c. Is there a valid reason for developing an alternative?

   d. Can the alternative be compared with the original program?

WORKSHEET 7-2

SUNVILLE ALTERNATIVES

Problem Statement:

Goal:

Operational Objective:

"Alternative" Program Description:

Requirements:

Person Responsible:_____

Personnel Hours:_____hr./yr.

Materials:_____; Cost:_____

Equipment:_____; Cost:_____

Training:_____

Administrative Approvals:_____

Legislation:_____

Regulations/Policies:_____

Other:_____

REQUIREMENTS TO BE IDENTIFIED

In this phase, the resource requirements of programs are identified. The total costs of all programs must be identified and compared with resources (personnel hours, equipment budget, etc.) which are available.

Frequently, the programs proposed will require levels of resources which exceed the available resources. It is important that the programs which are recommended as a result of this master planning process are realistic. After the initial cost analysis is performed, it may be necessary to cycle back into the planning process and modify the goals and objectives to establish realistic programs which are within the resource constraints of the organization. That is the message that is conveyed by the circular lines on the planning process chart.

Some examples:

1. Personnel hours needed to accomplish tasks.

2. Personnel costs: salaries and fringe benefits.

3. Facility costs: stations, training centers, maintenance facilities, etc.

4. Apparatus, vehicles, and support equipment periodic replacement programs.

5. Training equipment, instructors, and information.

6. Program costs related to training, fire prevention, apparatus and facility purchase and maintenance, fire prevention programs, and public fire safety education.

7. New program development will include certain operational requirements which are: preparing a detailed description and analysis of new programs; identifying funding sources; obtaining input from department membership and approval of top management; and developing new ordinances, regulations, or procedures.

SUNVILLE REQUIREMENTS

Identify resources needed for each objective. Prepare a total resource cost for all objectives. Requirements should answer the questions: What must be done? How will it be done? Who will do it?

Develop a consensus among key personnel when using estimates. This is one of the purposes of the review/approval procedure at the end of each step in the planning process.

Compare required resources with available resources. Identify discrepancies.

ALTERNATIVES

One of the primary purposes of developing a master plan is to identify and evaluate alternative methods of providing the most efficient and effective levels of services. **Remember:** an alternative must fully meet the related objective in order to be considered. When it does not, then either the alternative must be changed or you must cycle back in the process and change the objective.

Alternatives are identified as a result of:

1. New or improved methods discovered as a result of data gathering and analysis of existing programs.

2. The need to reduce resource requirements of programs which meet goals and objectives.

3. City managers, city councilpersons, residents, or other administrative personnel may request that certain alternatives be investigated such as: the consolidation of departments, contractual fire protection, providing additional stations, etc.

4. Programs which may need to be modified to meet political or legal requirements.

Alternatives should be developed to answer specific questions or issues. It is not necessary to develop an alternative for each program. Although textbook theory would recommend that alternatives be provided for all programs to assure objectivity, in reality such a process would prevent the successful completion of a fire protection master plan.

The purpose of alternatives is to identify programs which have higher efficiency and effectiveness and evaluate options to assure that they meet goals and objectives.

(SAMPLE)

REQUIREMENTS OF FIRE PROTECTION MASTER PLAN

SECTION: IV-TRAINING AND PERSONNEL DEVELOPMENT

GOAL:

To recruit, develop, and maintain personnel with the knowledge and skills to attain the goals and objectives of the fire protection system and to assist fire department personnel in attaining their career goals.

OBJECTIVE: TRAINING AND PERSONNEL DEVELOPMENT #8:

A record and evaluation system will be developed to record training and education activities and to evaluate the effectiveness of training with 6 months.

PROGRAMS/TASKS:

1. Provide an IBM compatible computer system and printer at the training center.

2. Establish a program of periodic reviews and evaluations of data.

PERSON(S) RESPONSIBLE FOR PROGRAMS/TASKS: Training Coordinator

RESOURCES:

	Required:		Source:
1.	Administrative Officer:	8 hrs.	
	Training Coordinator:	8 hrs.	
	Computer and printer:	$5,500	1989/90 budget
2.	Battalion Chief:	48 hrs/yr.	
	Training Coordinator:	48 hrs/yr.	
	Clerical:	96 hrs/yr.	

PROGRAM TIME FRAMES:

Start Date:	Completion Date:
3 mo. after plan adoption	6 mo. after plan adoption

SECTION XI - SUMMARY OF REQUIREMENTS FOR THE FIRE PROTECTION AND EMERGENCY MEDICAL MASTER PLAN FISCAL YEAR 1989/90

TASK	PERSONNEL HOURS																			
	Chief	Batt Chief	Admin. Officer	Admin. Asst.	Capt.	Engr.	Fire Fighter	Apprntc. FF	Trng. Coord.	CLRCL	Fire Marshal	Fire Prev. Spl	Fire Insp.	Haz Mat Spec.	Plans Examr.	Pub. Ed. Officer	Hazard Abte/Off.	Mech	Comm Tech.	Equip and Materials Costs
	(1)	(3)	(1)	(1)	(22)	(22)	(27)	(13)	(1)	(4)	(1)	(1)	(5)	(2)	(2)	(1)	(1)	(2)	(4)	
SECTION I																				
FIRE PROTECTION MANAGEMENT	2034	4381	1698	2216	5361	88	54	66	158	2145	857	6	30	12	12	6	6	12	24	59500
FIRE PREVENTION	71	96	150		6531	6539	8531	4716	24	1643	2181	1853	8805		3600		1763			1500
FIRE SAFETY EDUCATION	12									72	64					1888				5180
FIRE SUPPRESSION	50	258	240		740	740	740	446		7										
FIRE INVESTIGATION		303			1182	420	266			121	32		420							4000
AIRPORT CRASH FIRE RESCUE		48			32				56	10	16		16					64		66000
SECTION II																				
EMERGENCY MEDICAL SERVICES	38	412	28	24	1476	1476	1536	1524	28	140	24	24	120	48	48	24	24	48	96	2000
SECTION III																				
HAZARDOUS MATERIALS CNTRL	13	32	216		2544	2400	2400		48	48	32			3065						7000
SECTION IV																				
TRAINING & PRSNL. DVLPMT	110	725	130	98	10277	8924	9377	7176	1417	402	110	48	392	334	80	40	40	80	120	148640
SECTION V																				
APPARATUS MAINT & RPLCMT		102	27		110	3875	3110	2068		67								3530		1495500
SECTION VI																				
COMMUNICATION & DISPATCH	24	60	256		20				60	19										
SECTION VII																				
COMM. EQUP. MAINTENANCE	4	24	680							73									7100	
SECTION VIII																				
FACILITIES MAINTENANCE		90	12	40	1600	2500	3500	2500		10										
SECTION IX																				
DISASTER PLANNING	6	24	6	6					40	22	6									
SECTION X																				
SYSTEM SUPPORT		12	136		68					1	12		48							
TOTAL REQUIRED	2362	6585	3579	2384	29941	26962	27514	18496	1831	4778	3334	1931	9831	3449	3740	1958	1833	3734	7340	1789320
TOTAL AVAILABLE	1883	2920	1883	1883	21355	21355	25720	12620	1883	3766	1883	1883	9415	3766	3766	1883	1780	3766	7520	
SURPLUS OR DEFICIENCY	-479	-3645	-1696	-501	-8586	-5607	-1794	-5876	52	-1012	-1451	-48	-416	317	26	-75	-53	32	180	

3 ADDITIONAL FIREFIGHTERS FOR 9 MONTHS, AND 3 ADDITIONAL FIREFIGHTERS FOR 6 MONTHS

**AVAILABLE HOURS BASED UPON 81 HOURS PER DAY FOR SHIFT PERSONNEL

UNIT 8: PREPARING PRESENTATIONS

OBJECTIVES

The participants will:

1. *Identify the role of the presentation to council or other decision-making body.*
2. *Identify the manner of preparation for a presentation.*
3. *Identify techniques to avoid and techniques to include in effective presentations.*
4. *Understand the importance of using graphics for displaying, analyzing, and communicating data.*
5. *Identify the methods for selecting and developing appropriate graphics to display data for planning team analysis, citizens' advisory committee review, and communicating to city council.*
6. *Learn how to use visual perception to think, review, and communicate effectively.*

MASTER PLANNING PRESENTATIONS

KNOW THE AUDIENCE

Objectives: _____

_____

Background: _____

_____

Knowledge: _____

_____

Composition: _____

_____

Attitude: _____

_____

TARGET THE PRESENTATION

Set Objectives: _____

_____

Outline the Presentation: _____

_____

Give Audience Data: _____

_____

Show and Tell: _____

_____

GENERAL COMMENTS:

_____

_____

_____

_____

_____

_____

NOTE-TAKING GUIDE

MASTER PLANNING PRESENTATIONS

Knowing the audience.

Targeting the presentation.

Other points to consider.

Summary.

POSTVIDEO DISCUSSION

Knowing the audience will help you target your presentation and avoid pitfalls (pet irritations or projects of each of the politicians). Attend council sessions prior to your presentation to gain insight or view videos if previous sessions were broadcast over cable TV to the community.

Target the presentation to the audience by setting objectives and outlining the presentation. Do not get too technical. Be prepared. At the start of your presentation, tell the council members what you expect of them following the presentation. Use the citizens' advisory committee appropriately.

GRAPHICS SELECTION AND DEVELOPMENT TECHNIQUES

If a single message underlies this section, it is that data does not speak for itself. Planning information is produced through a process that includes a clear statement of the problem, careful efforts to uncover existing data from a variety of sources, systematic collection of original data, and careful translation of data into easily understood written and graphic displays. Not only must the planning team members understand the data they produce, they must also be able to communicate the information precisely and concisely to policymakers and the public.

GRAPHICS SELECTION

Graphics selection criteria for planning team use should stimulate analytical thinking with emphasis on spatial relationships, trends, patterns, and cycles. This is best accomplished through the use of geographic units shown on maps representing data groupings. Using transparent overlays showing conditions or impact by area with a base map is an excellent aid to analytical thinking by steering a thought-provoking discussion in a specific direction.

Graphics selection criteria for citizens' advisory committee review should focus on the need to communicate the findings of the data collection and generate input from the community as an aid to putting theory into practice. The planning team maps and overlays are helpful in accomplishing this objective. They should be supplemented with flipcharts that summarize the findings and recommendations of the planning team. The flipchart should be structured in outline form with space to write in citizens' advisory committee comments.

Graphics selection criteria for city council presentation is not designed to encourage input, but rather to encourage communication of the final fixed product and gain members' approval. It should be used with caution, and then only to display data that communciates key information to the approval process; e.g., maps. Flipcharts are also useful, but, unlike the citizens' advisory committee flipcharts, they should be structured to draw attention only to the "bottom line" of the findings and recommendations. A more effective approach is the use of a 10- to 15-minute slide tape presentation giving a brief historical

account of how the proposed plan was developed. Then, supplement this presentation with graphs, charts, or overhead transparencies, illustrating the elements of the plan.

GRAPHICS DEVELOPMENT

Most graphics require advance preparation, and some are time-consuming and costly to produce. However, failure to invest the necessary time and money to produce effective graphics can have more costly effects on the success or failure of the plan.

Rules of thumb for preparing graphics displays:

All graphics should be properly documented, self-contained, and self-explanatory.

Titles should provide a clear and complete statement of what the graphic shows. The title should be kept short to catch attention, with a subtitle to complete the thought.

Labels, sources, explanatory notes, keys, and the date of preparation should be documented on the graphic display to help users answer questions for themselves.

Colors are useful in drawing attention to key information, but the number of colors should not exceed the quantity necessary to convey the message. Using too many colors often draws attention to the graphics, rather than the message or data being displayed.

Be sure lines, letters, numbers, rows, and columns are straight, properly spaced, and large enough to read.

Do not clutter graphics with extraneous information that is hard to understand. It is better to use two uncluttered graphic pieces than one that is overloaded.

Reproduce all graphics in an 8 1/2" x 11" format to encourage participants to take copies for further study.

Do not use humorous graphics unless they are likely to have universal appeal; stale humor detracts from the presentation.

Slides that are on hand should not govern the content of the message. First write the script and then assemble the slides. Show each slide at least 5 and no more than 15 seconds. The total program should not exceed 15 minutes.

Rules that govern the development of maps are comparable to those that apply to slides.

UNIT 9: PRESENTATIONS TO COUNCIL

OBJECTIVES

The participants will:

1. *Assign program elements to specific objectives.*
2. *Prepare plan to accomplish the stated goals and objectives of Sunville using an assigned alternative.*
3. *Participate in the presentation of plan to council.*

ACTIVITY 9.1

DEVELOPING A PLAN

DIRECTIONS

Your planning team has been asked to develop a plan that addresses the adopted goals and objectives using the assigned approach in a 20-minute presentation to the council. The occupational/social makeup of your presentation team will be determined by you. Groups are free to use as many members as desired in making the presentation (two or more is suggested).

The master plan advisory committee has met with the council in the past and has secured approval for the following goals and objectives for the Sunville fire master plan. When these goals and objectives were approved, the city council requested the three alternative fire protection plans be submitted to meet these goals and objectives. They are:

- Financial status quo (pg. (9-7).
- Adaptive response (pg. 9-8).
- Public/Private (pg. 9-9).

The council will select one of the alternative fire protection plans using these as guidelines for its selection.

Goals

1. To provide adequate fire protection at a reasonable cost.

2. To reduce the risk of injury and death from fire.

3. To improve fire protection through code enforcement.

4. To provide adequate emergency medical care.

Objectives

1. To provide the required fire attack capacity to 80% of the commercial occupancies within the next 3 years.

2. To provide the required fire attack capacity to 80% of the residential occupancies within the next 3 years.

3. To adopt a new fire code within 1 year.

4. To implement a code enforcement program within 18 months.

5. To provide BLS coverage to 90% of the community within 1 year.

Instructions

Prepare your presentation carefully, following the instructions provided. Read your assignment carefully, keeping in mind the goals and objectives listed.

The council will meet at 10 a.m. Thursday to hear presentations for implementation in Sunville.

Minor variations and additions are allowed to improve the assigned option as long as they are in keeping with the philosophy of your assignment; i.e., if you are assigned the *Status Quo* option, you cannot adopt a retrofit sprinkler ordinance, etc.

Your presentation may be structured to allow appropriate political and community influence as desired. Keep in mind that the council will be selecting one of the presentations at this meeting.

Remember that the audience for your presentation is the city council of Sunville. Tailor your presentation to its needs in order to make the decision.

There is no penalty for additional improvements based upon what you have learned of Sunville to date, as long as you stay within your assigned philosophy. Feel free to innovate.

You are encouraged to take advantage of the Learning Resource Center located in Building N. The hours of operation are 8:30 a.m. to 9:00 p.m.

Visual Aids

You are free to use all visual materials and techniques available to you. Certain personnel on campus are prepared to assist you with your project. Your instructor will introduce you to someone who will provide assistance in computer-generated graphics. Turn your typing in to your instructor by 8:00 if you want to have the presentation typed before 10 a.m.

Please secure permission prior to using or acquiring any materials or supplies.

The Sunville council members will be selected, one per table, by the table they represent. The mayor of Sunville will be selected from those elected by the instructors.

The council member from your table is to work on the development of the presentation, but will be unable to participate as a member of the presentation team for obvious reasons.

The instructors will provide a biographical outline of each council member that will serve as their individual point of reference during the council session.

The city administrator and city attorney will be provided. Complete the assignment worksheet and give it to the city administrator prior to the council meeting to assure that your group will be introduced properly and that you will receive participation credit toward your certificate/graduation.

Time Schedule

11:00 a.m.	Wed.	Receive assignment
1:00 p.m.	Wed.	Elect council members (one per group, elected by group)
9:00 a.m.	Thurs.	Council study session (for council members only)
11:00 a.m.	Thurs.	Council meeting

Points to Consider

Consider the following points for the fire protection alternative you are preparing.

1. Approximate cost of implementing your alternative.
2. The percentage or degree to which your proposal meets the objective(s).
3. List the legislation required to implement your alternative; e.g., a sprinkler ordinance or smoke detector requirements would require legislation.
4. What political ramifications does your alternative hold?
5. Have you considered all of the positives and negatives of your alternative?
6. Do your analysis and presentation assess and present the alternative's ability to meet the fire protection needs of Sunville?
7. Does your presentation answer the obvious questions?
8. Assure that your presentation meets the information needs of the council and remains close to the allotted time.
9. Prepare an outline of your presentation prior to making assignments to individual members.

CITY OF SUNVILLE Council Session

AGENDA

I. Pledge of Allegiance

Introduction of Councilpersons; each reads own profile

II. Minutes of Last Meeting

Mayor to request dispensing with the reading of the minutes

III. Old Business

No old business

IV. New Business

1. Fire Master Plan

Review goals and objectives; ask city administration

a. Call for first presenter

City administration to introduce

b. Discussion/scoring following each presentation

c. Public input to be held until after all presentations have been given

First

Second

Third

Fourth

Fifth

Sixth

2. Public Input

3. Council Decision

4. Adjournment

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are the owner of a warehouse and are supported by business. You are not up for reelection for two more years. You are the president of a family-owned sprinkler company and do almost all of the sprinkler installations in town.

At your own expense, you have traveled to several recent high-rise fires and understand the value of sprinkler systems in life safety.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are the owner of a number of small buildings as well as a chain of early american furniture stores.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are a regional administrator for a large petroleum firm and recently have learned that you will be relocated in a semi-hostile South American country. Should you survive, you can expect to be there for at least three years. If and when you return to the U.S., you will be assigned to corporate headquarters in Houston, Texas. While you care about Sunville very much, you will be resigning your council seat in two to three months. This news has not been released to the public at this time; however, the other council members have been informed.

P.S. The recent awards to city employees in the form of salary and associated benefits have caused you to question the benefits of local government. You have openly questioned the Park Department as to whether an outside contractor could not perform grounds maintenance at a lower cost and higher quality.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are up for reelection in four months and are being sponsored by the business people in the community. One of your campaign promises over the years has been to always watch out for the rights of the business person.

You are the owner of a very successful lounge/restaurant in town and recently have decided to expand and build a motel adjacent to your present business.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are up for reelection in four months and are being sponsored by the community clubs. Your campaign has been based on the pledge that you will not let the citizens absorb any more of the city costs that are created by the business community.

You have a degree in physical education and direct the very successful Sunville Boys Club.

FIRE SERVICE MASTER PLANNING

COUNCILPERSON: _____

You are up for reelection in four months and are a labor leader in a local factory. Your support has come primarily from the low-income and working class. You are very appreciative and represent those interests well on the council.

Lately, you have tended to give long orations regarding the plight of the poor and less fortunate, causing many to think you are campaigning for a state or federal position. The mayor has requested you make your comments brief and to the point in future sessions.

FIRE SERVICE MASTER PLANNING

MAYOR: _____

You have been the mayor of Sunville for the past six years and like the position. You are an ecology activist in the community, a former professor of business ethics at the local college, and a currently registered state lobbyist. You receive your support from both the business and neighborhood communities.

You will be in charge of the council meeting and are requested to keep the presentations to the 20 minutes allotted (30 minutes at the outside, if the flow of material is appropriate). At the end of each presentation, allow five minutes of question-and-answer time from other members of the council only; none form the audience until all presentations are completed. The flow of the meeting is:

A. Introductions (each member to give name and background information)

B. Conduct a review of the goals, objectives, and selection criteria

C. Ask for the first presentation (20-30 minutes)

D. Questions from the council to presenters (15 minutes)

E. Have the council complete the selection criteria

F. Have the council complete the critique sheets

G. Next presentation

H. Etc.

Remember, you are the mayor and are expected to conduct the meeting as close as possible to a real council session.

No decision will be made until all presentations are completed.

Do not look to the instructor to control this session. You are the mayor, so take charge.

SUNVILLE PRESENTATION EVALUATION FORM

GROUP # _____ ASSIGNMENT _____

MEMBERS

_____ _____

_____ _____

_____ _____

COMMENTS:

Start Time: _____ Stop Time: _____

Target Audience

_____

_____

Use of Visuals

_____

_____

Presentation Technique/Flow

_____

_____

Did Well With:

_____

_____

Should Consider:

_____

_____

Sunville
Jan. 6, 1990

SUNVILLE FIRE DEPARTMENT

DATA COMPILATION REPORT

SUNVILLE FIRE DEPT.

DATA COMPILATION REPORT

The Sunville Fire Department Data Compilation Report was prepared by an independent consulting firm with funds provided by "Twentieth Century Sunville". The report was prepared using actual fire response records (incident reports) provided by the department.

You will note that a few of the incident totals do not match exactly with one another. This is due to inaccuracies in a few of the reports; a factor often found with data compilation both in automated tally and hand counting. There is also a difference found between number of incidents (calls, 454 for last year) and fires (incidents plus exposures, 467 for last year). The data report provided is felt to be an accurate representation of the community, however.

Also note that the alarm/fire incident information covers a one-year period while the specific EMS data (EMS section) is for three plus years.

The records were entered, by the consulting firm, using the NFPA 901 codes in the National Fire Incident Reporting System (NFIRS IV) format. The fire service software used by the consulting firm is from Sunpro with the graphs developed using Harvard Graphics.

Using data gathered over a single year does not constitute a reliable trend. Care should be taken when interpreting all data collected in the planning process. For the purposes of this exercise, this data should be interpreted as "representative" of the nature of Sunville.

Format

The graphs are followed by the actual printouts prepared by the fire service software. All materials have been prepared using a microcomputer. Users should be careful to read the "conditions" section, located at the top of each printout, to assure proper interpretation and comparison.

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Three graphs that illustrate the number of incidents, property and life loss for the last five years.

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Four graphs that depict the alarms experience in relation to Fixed Property Use.

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Four graphs that illustrate the frequency of alarms by the four clock periods.

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A single graph that shows the number of alarms by day of week.

Response Times (Travel Time) Page 65

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Two printouts that show mutual aid given and received. One small pie chart that depicts this relationship

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EMS INCIDENT DATA

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A printout indicating the number of EMS calls by the cause of the injury or need for assistance.

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Two printouts showing the response times in relation to the four clock periods of the day and the number of responses per unit and the time of response.

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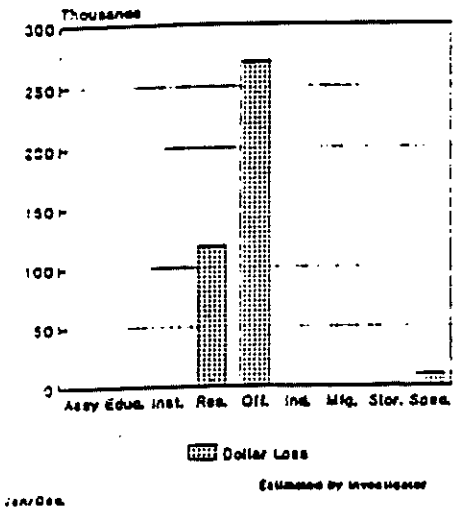
A graph illustrating the age of patients, in 10-year increments, for the past three plus years.

ALARM/FIRE INCIDENT DATA

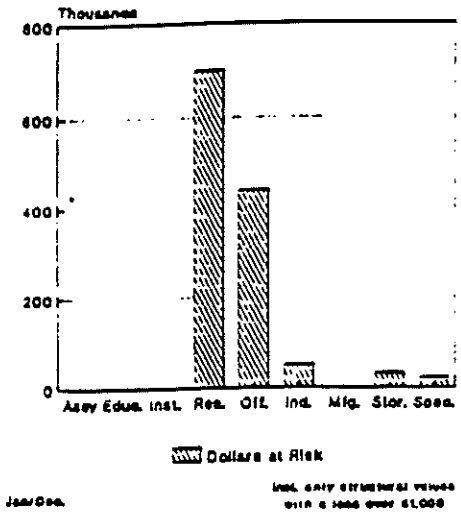
SUNVILLE FIRE DEPT.

FIXED PROPERTY USE

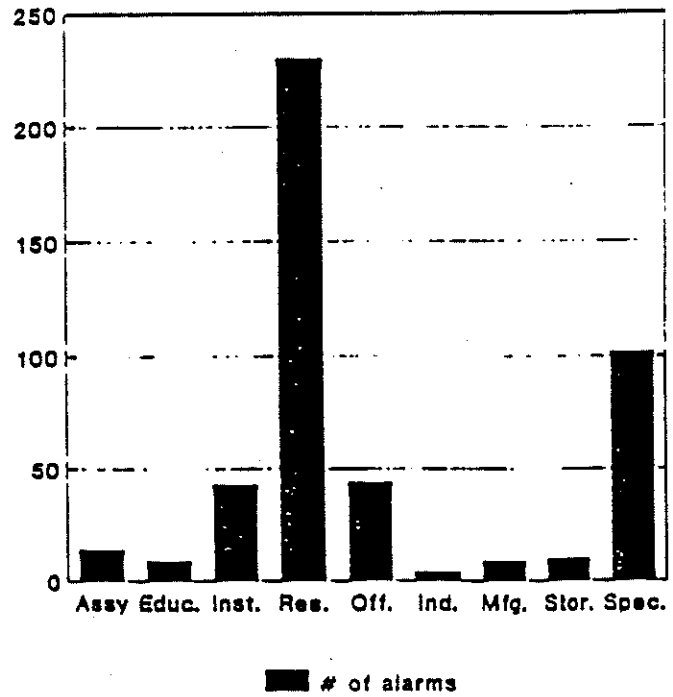
Fire Loss
By Fixed Prop. Use



$ at Risk
By Fixed Prop. Use



of Alarms
By Fixed Prop. Use



Jan/Dec.

Sunville Fire Department

FIRE RECAP BY FIXED PROPERTY USE
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
000	1	0.21	0	0	0.00	UNDETERMINED OR NOT REPORTED
008	1	0.21	0	0	0.00	NOT APPLICABLE
** Subtotal **	2	0.42	0	0		
** 1						
124	2	0.43	0	0	0.00	PLAYGROUND
134	3	0.64	0	0	0.00	FUNERAL PARLOR, CHAPEL
161	6	1.28	0	0	0.00	RESTAURANT
162	2	0.43	0	0	0.00	NIGHTCLUB
164	1	0.21	0	0	0.00	LUNCHROOM, DRIVE-IN
** Subtotal **	14	2.99	0	0		
** 2						
213	1	0.21	0	0	0.00	ELEMENTARY SCHOOL
214	4	0.86	0	0	0.00	JUNIOR HIGH SCHOOL
215	4	0.86	0	30000	0.00	HIGH SCHOOL
** Subtotal **	9	1.93	0	30000		
** 3						
311	2	0.43	0	0	0.00	CARE OF THE AGED WITH NURSING STAFF
312	5	1.07	0	0	0.00	CARE OF THE AGED WITHOUT NURSING STAFF
331	3	0.64	0	0	0.00	HOSPITAL, HOSPITAL-TYPE INFIRMARY
341	5	1.07	0	0	0.00	PRISON CELL, CELL BLOCK FOR MEN
345	15	3.21	0	0	0.00	POLICE STATION
346	4	0.86	0	0	0.00	VOCATIONAL REHABILITATION CENTER
360	1	0.21	0	0	0.00	UNABLE TO CLASSIFY FURTHER
361	3	0.64	0	0	0.00	MENTAL INSTITUTION
362	4	0.86	0	0	0.00	INSTITUTION FOR THE MENTALLY RETARDED
369	1	0.21	0	0	0.00	NOT CLASSIFIED
** Subtotal **	43	9.20	0	0		
** 4						
411	174	37.26	117815	639425	18.43	ONE FAMILY DWELLING, YEAR ROUND USE
414	2	0.43	0	0	0.00	TWO FAMILY DWELLING, YEAR ROUND USE
415	1	0.21	0	0	0.00	TWO FAMILY DWELLING, SEASONAL USE
421	1	0.21	0	0	0.00	1 OR 2 LIVING UNITS WITH BUSINESS
422	15	3.21	300	2500	12.00	3 THROUGH 6 UNITS
423	17	3.64	0	0	0.00	7 THROUGH 20 UNITS
424	18	3.85	0	0	0.00	OVER 20 UNITS
443	1	0.21	0	0	0.00	20-99 UNITS YEAR ROUND USE
481	1	0.21	0	60000	0.00	LESS THAN 20 UNITS YEAR-ROUND

FIRE RECAP BY FIXED PROPERTY USE
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** Subtotal **	230	49.23	118115	701925		
** 5						
511	5	1.07	0	0	0.00	SUPERMARKET
512	6	1.28	50	50	100.00	MARKET, GROCERY STORE
515	2	0.43	0	0	0.00	CREAMERY, DAIRY STORE
516	1	0.21	0	0	0.00	DELICATESSEN
521	1	0.21	0	0	0.00	CLOTHING STORE
522	2	0.43	96000	96000	100.00	CLOTHING ACCESSORIES, SHOE STORE
532	1	0.21	174000	184000	94.57	APPLIANCE STORE
533	1	0.21	0	0	0.00	HARDWARE STORE
544	1	0.21	0	0	0.00	JEWELRY STORE
549	1	0.21	0	0	0.00	NOT CLASSIFIED
562	1	0.21	0	0	0.00	TRADE SUPPLY SALES
571	2	0.43	0	0	0.00	PUBLIC SERVICE STATION
575	1	0.21	0	0	0.00	MOTOR VEHICLE ACCESSORY SALES
578	1	0.21	0	0	0.00	CAR WASHING FACILITY
581	1	0.21	0	0	0.00	DEPARTMENT STORE
583	1	0.21	0	0	0.00	LARGE VARIETY STORE
591	10	2.14	0	0	0.00	GENERAL BUSINESS OFFICE
592	1	0.21	0	0	0.00	BANK, WITH FIRST STORY BANKING FACILITIES
593	5	1.07	0	160000	0.00	MEDICAL, RESEARCH, SCIENTIFIC OFFICE
** Subtotal **	44	9.37	270050	440050		
** 6						
652	1	0.21	50	50000	0.10	COW, CATTLE PRODUCTION
655	1	0.21	0	0	0.00	CROPS, ORCHARDS
657	2	0.43	0	0	0.00	FRUIT, VEGETABLE PACKING
** Subtotal **	4	0.85	50	50000		
** 7						
710	3	0.64	0	0	0.00	UNABLE TO CLASSIFY FURTHER
713	4	0.86	0	0	0.00	CANNING, PRESERVING OF FRUITS, VEGETABLES
719	1	0.21	0	0	0.00	NOT CLASSIFIED
756	1	0.21	0	0	0.00	PAPER, PULP, PAPERBOARD PRODUCTS MANUFACTURE
** Subtotal **	9	1.92	0	0		
** 8						
812	3	0.64	0	0	0.00	BOXED, CRATED, PACKAGED AGRICULTURAL PRODS STORAGE
817	1	0.21	0	0	0.00	LIVESTOCK STORAGE
818	2	0.43	0	0	0.00	AGRICULTURAL SUPPLY STORAGE
881	2	0.43	1000	2500	40.00	RESIDENTIAL PARKING GARAGE
882	1	0.21	500	30000	1.67	GENERAL VEHICLE PARKING GARAGE

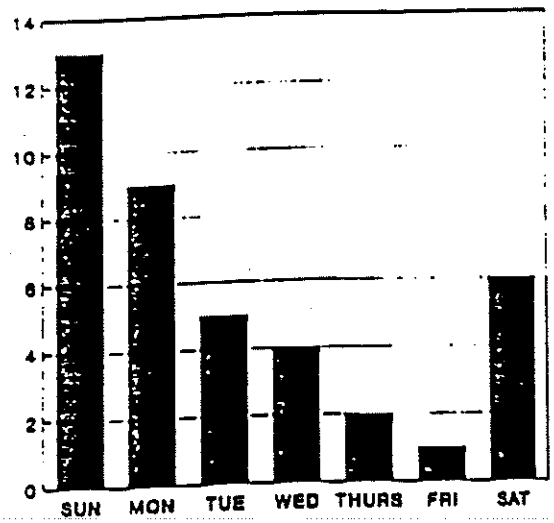
FIRE RECAP BY FIXED PROPERTY USE
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
883	1	0.21	0	0	0.00	BUS, TRUCK, AUTO FLEET, AUTOMOBILE DEALER STORAGE
** Subtotal **	10	2.13	1500	32500		
** 9						
909	1	0.21	0	0	0.00	NOT CLASSIFIED
915	1	0.21	0	0	0.00	VACANT PROPERTY
926	1	0.21	100	500	20.00	OUTBUILDING EXCLUDING GARAGE
931	16	3.43	200	500	40.00	OPEN LAND, FIELD
935	1	0.21	0	0	0.00	CAMPSITE WITH UTILITIES
936	5	1.07	0	0	0.00	VACANT LOT
939	1	0.21	0	0	0.00	NOT CLASSIFIED
946	1	0.21	0	0	0.00	INLAND WATER AREA
951	3	0.64	0	0	0.00	RAILROAD RIGHT OF WAY
961	5	1.07	0	0	0.00	LIMITED ACCESS HIGHWAY, DIVIDED HIGHWAY
962	40	8.57	3550	7250	48.97	PAVED PUBLIC STREET
963	2	0.43	1200	2600	46.15	PAVED PRIVATE STREET, WAY
964	6	1.28	1470	2450	60.00	UNPAVED STREET, ROAD, PATH
965	18	3.85	3200	9450	33.86	UNCOVERED PARKING AREA
973	1	0.21	0	0	0.00	AIRCRAFT ON TAXIWAY, UNCOVERED PARKING, MAINT AREA
** Subtotal **	102	21.81	9720	22750		
*** Total ***	467	99.85	399435	1277225		

SUNVILLE FIRE DEPT.

INCIDENT FREQUENCY

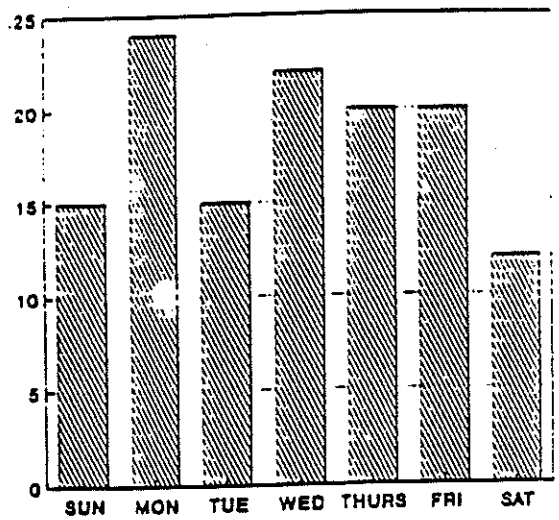
Incident Frequency
Alarms 0001-0600



Jan/Dec.

BASED ON 40 RESPONSES

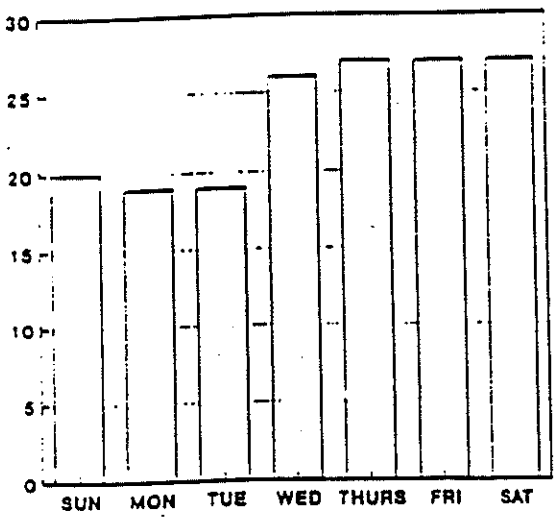
Incident Frequency
Alarms 0601-1200



Jan/Dec.

BASED ON 128 CALLS

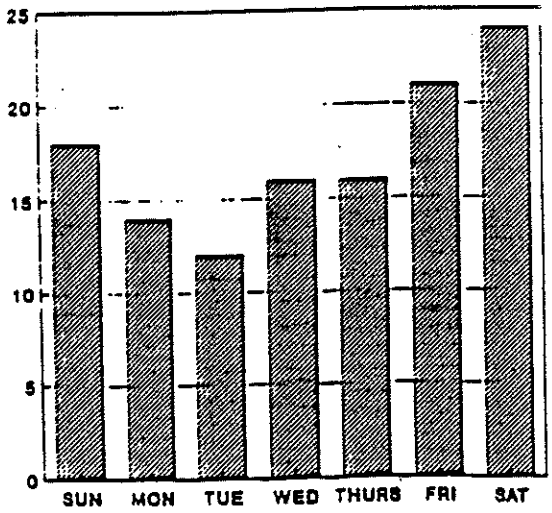
Incident Frequency
Alarms 1201-1800



Jan/Dec.

BASED ON 166 CALLS

Incident Frequency
Alarms 1801-2400

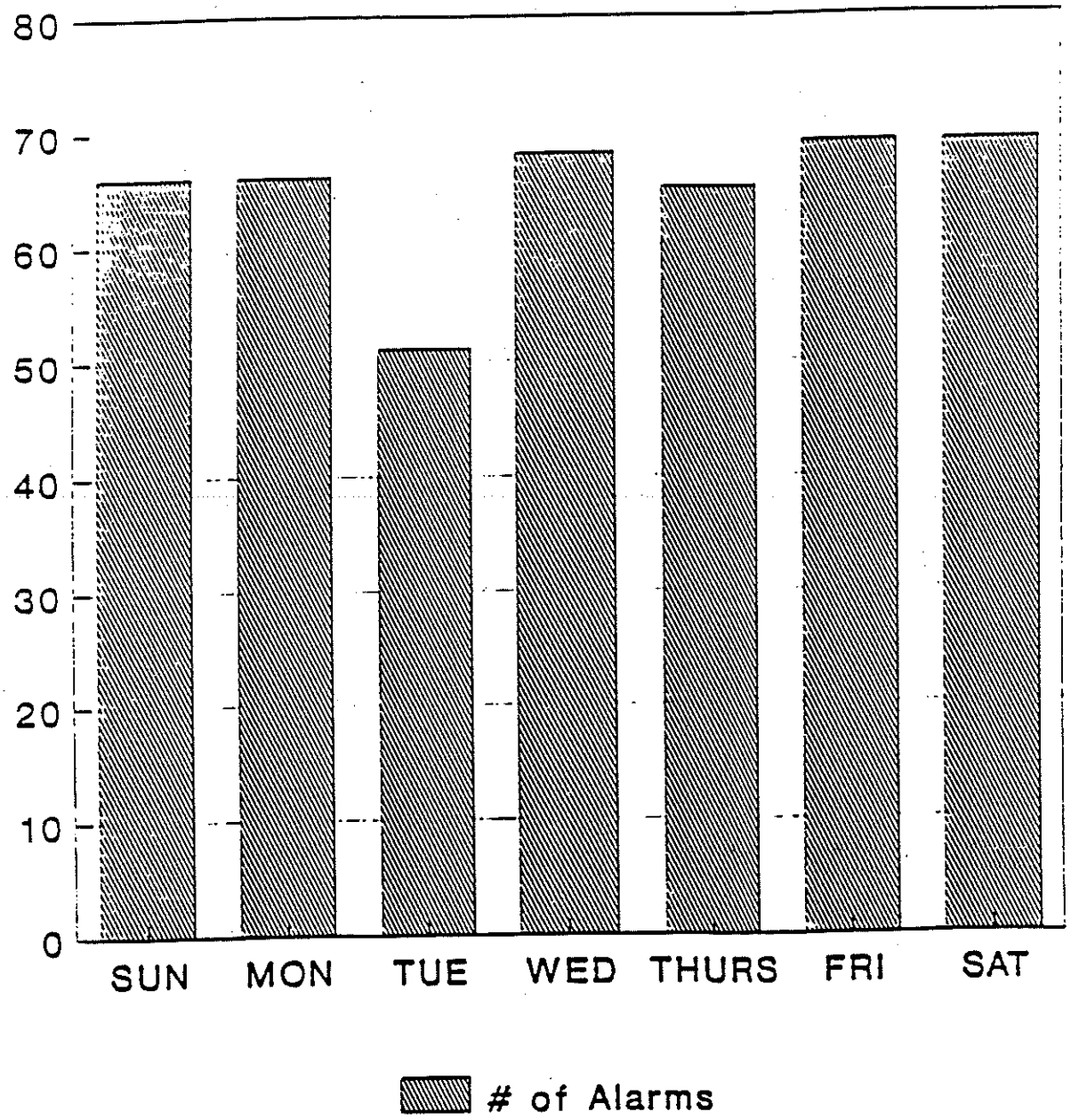


Jan/Dec.

BASED ON 121 CALLS

of incidents
by Day

SUMMARY



BASED ON 454 CALLS

Jan/Dec.

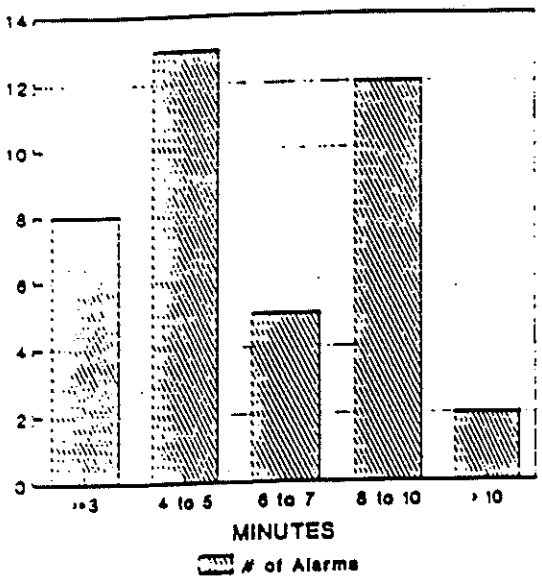
INCIDENT RECAP BY DAY/ALARM TIME
AS OF /88 FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
SUNDAY	13	15	20	18	66
MONDAY	9	24	19	14	66
TUESDAY	5	15	19	12	51
WEDNESDAY	4	22	26	16	68
THURSDAY	2	20	27	16	65
FRIDAY	1	20	27	21	69
SATURDAY	6	12	27	24	69
	40	128	165	121	454

SUNVILLE FIRE DEPT.

RESPONSE TIMES

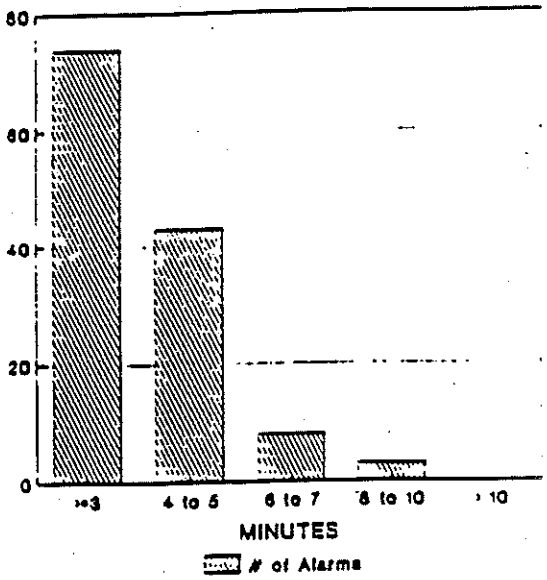
Response times
Responses 0001-0600



BASED ON 40 RESPONSES

Jan/Dec.

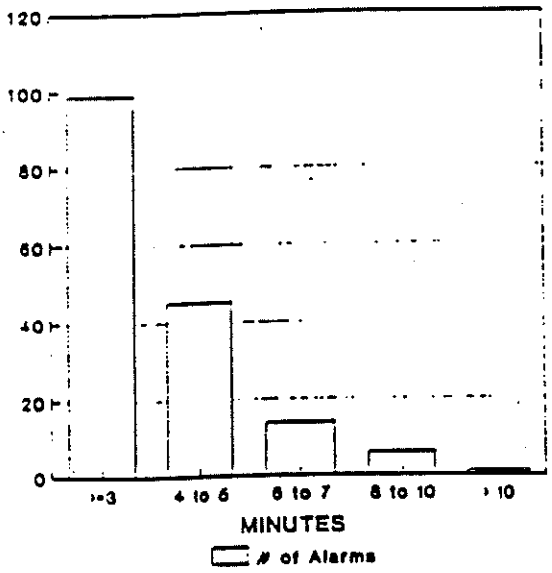
Response times
Responses 0601-1200



BASED ON 128 RESPONSES

Jan/Dec.

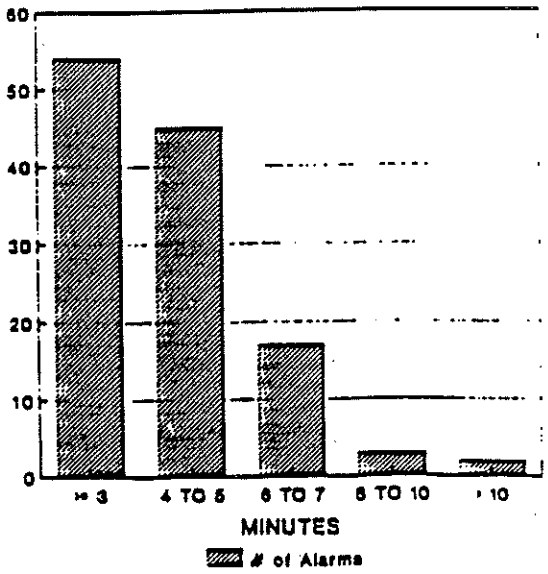
RESPONSE TIMES
RESPONSES 1201-1800



BASED ON 186 RESPONSES

Jan/Dec.

RESPONSE TIMES
RESPONSES 1801-2400



BASED ON 121 RESPONSES

JAN/DEC.

INCIDENT RECAP BY FIRST RESPONSE/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
3 Minutes & Under	8	74	99	54	235
4 To 5 Minutes	13	43	45	45	146
6 To 7 Minutes	5	8	14	17	44
8 To 10 Minutes	12	3	6	3	24
Over 10 Minutes	2	0	1	2	5
	40	128	165	121	454

Average First Response Time (Zero Response Times Excluded) 4.58

LOSSES OVER $1,000

BY DAY

INCIDENT RECAP BY DAY/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
LOSSES OVER: $1000; EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
SUNDAY	0	1	0	0	1
MONDAY	0	0	1	0	1
TUESDAY	0	1	0	0	1
WEDNESDAY	0	0	0	4	4
THURSDAY	0	1	0	0	1
FRIDAY	0	0	0	0	0
SATURDAY	0	0	1	0	1
	0	3	2	4	9

BY RESPONSE TIME

INCIDENT RECAP BY FIRST RESPONSE/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
LOSSES OVER: $1000; EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
3 Minutes & Under	0	2	1	4	7
4 To 5 Minutes	0	1	0	0	1
6 To 7 Minutes	0	0	1	0	1
8 To 10 Minutes	0	0	0	0	0
Over 10 Minutes	0	0	0	0	0
	0	3	2	4	9

Average First Response Time 3.33

LOSSES OVER $5,000

BY DAY

INCIDENT RECAP BY DAY/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
LOSSES OVER: $5000; EXCLUDES MUTUAL AID GIVEN

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
SUNDAY	0	0	0	0	0
MONDAY	0	0	0	0	0
TUESDAY	0	0	0	0	0
WEDNESDAY	0	0	0	4	4
THURSDAY	0	0	0	0	0
FRIDAY	0	0	0	0	0
SATURDAY	0	0	0	0	0
	0	0	0	4	4

BY RESPONSE TIME

INCIDENT RECAP BY FIRST RESPONSE/ALARM TIME
AS OF FOR Sunville Fire Department
DATES: 01/01/88 TO 12/31/88; NUMBERS: ALL, SITUATIONS: ALL
LOSSES OVER: $5000; EXCLUDES MUTUAL AID GIVEN

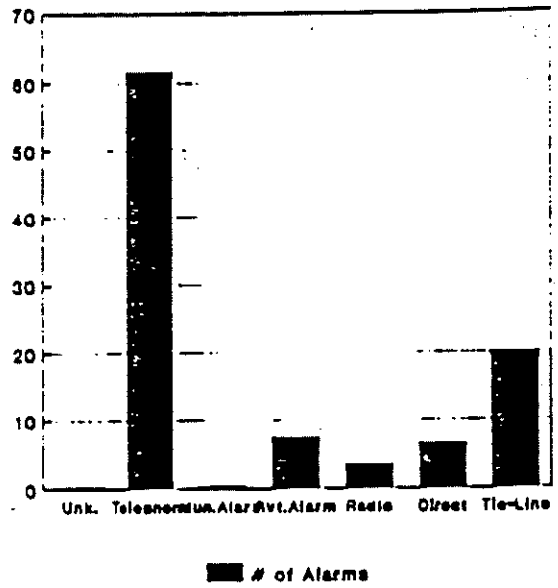
	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
3 Minutes & Under	0	0	0	4	4
4 To 5 Minutes	0	0	0	0	0
6 To 7 Minutes	0	0	0	0	0
8 To 10 Minutes	0	0	0	0	0
Over 10 Minutes	0	0	0	0	0
	0	0	0	4	4

Average First Response Time 3.00

SUNVILLE FIRE DEPT.

ACTION TAKEN/HOW REPORTED

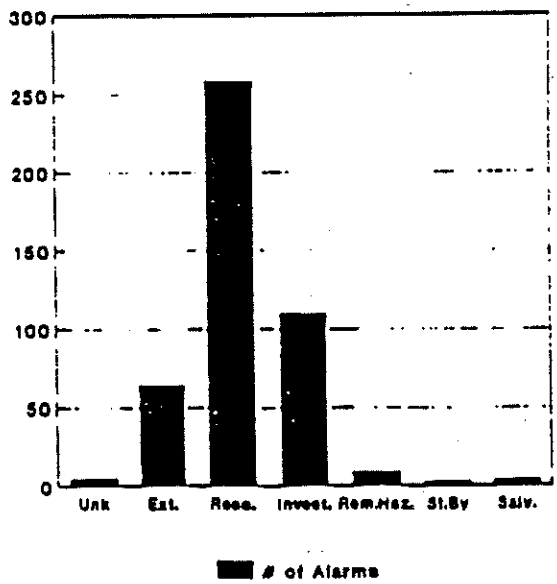
Method of Alarm
How Reported



Jan/Dec.

By Percentage

of Incidents
by Action Taken



Jan/Dec.

BASED ON 464 CALLS

Sunville Fire Department

INCIDENT RECAP BY ACTION TAKEN
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Description
0	2	0.44	UNDETERMINED OR NOT REPORTED
1	64	14.10	EXTINGUISHMENT
2	258	56.83	RESCUE ONLY
3	110	24.23	INVESTIGATION ONLY
4	9	1.98	REMOVE HAZARD
5	3	0.66	STAND BY
6	4	0.88	SALVAGE
7	1	0.22	AMBULANCE SERVICE
9	3	0.66	NOT CLASSIFIED
*** Total ***	454	100.00	

Sunville Fire Department
Page No. 1

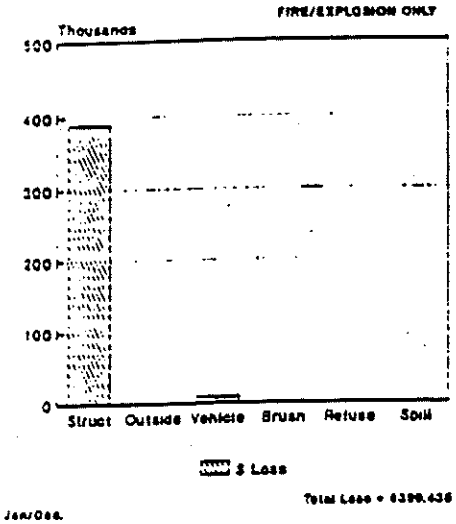
INCIDENT RECAP BY METHOD OF ALARM
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Description
0	1	0.22	UNDETERMINED OR NOT REPORTED
1	280	61.67	TELEPHONE DIRECT TO FIRE DEPARTMENT
2	2	0.44	CODED SIGNAL MUNICIPAL FIRE ALARM SYSTEM
3	34	7.49	PRIVATE FIRE ALARM SYSTEM
4	16	3.52	RADIO
5	30	6.61	DIRECT REPORT TO A FIRE STATION
7	91	20.04	TELEPHONE TIE-LINE TO FIRE DEPARTMENT
*** Total ***	454	99.99	

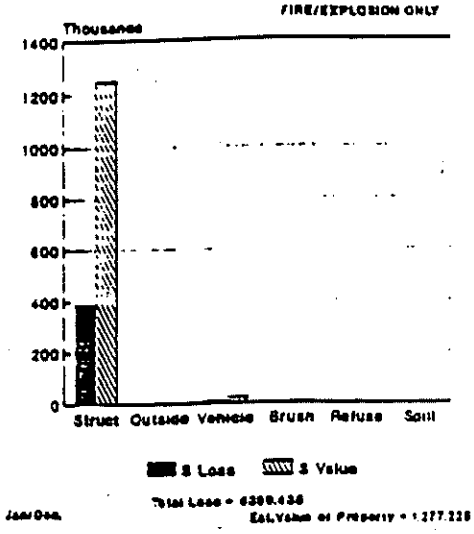
SUNVILLE FIRE DEPT.

SITUATION FOUND

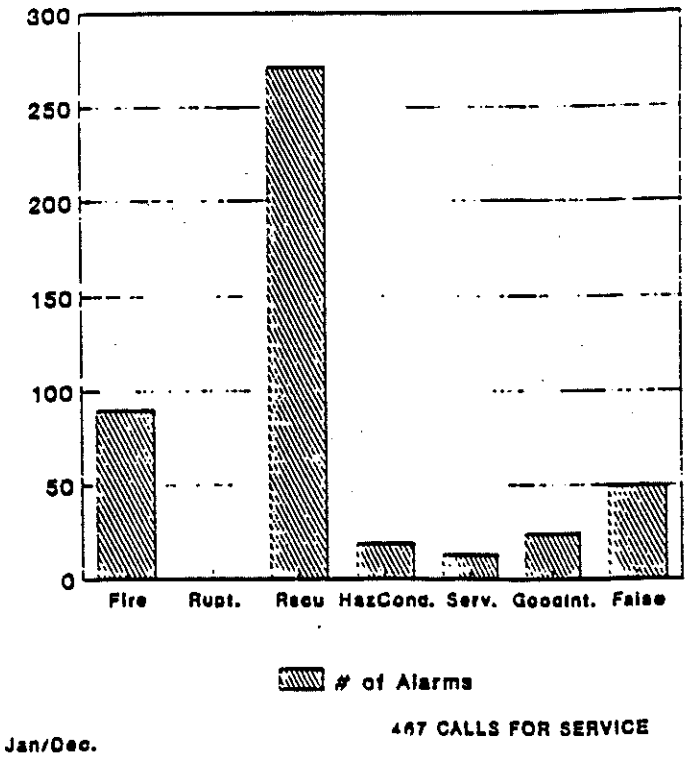
$ Loss
Situation Found



$ Loss/Value
Situation Found



of Alarms
by Situation Found



...nville Fire Department

FIRE RECAP BY SITUATION
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
11	31	6.64	389300	1252050	31.09	STRUCTURE FIRE
12	5	1.07	200	600	33.33	OUTSIDE STRUCTURE FIRE
13	18	3.85	9620	23100	41.65	VEHICLE FIRE
14	27	5.78	300	1000	30.00	TREES, BRUSH, GRASS FIRE
15	8	1.71	0	450	0.00	REFUSE FIRE
17	1	0.21	15	25	60.00	OUTSIDE SPILL, LEAK WITH ENSUING FIRE
** Subtotal **	90	19.26	399435	1277225		
** 3						
31	2	0.43	0	0	0.00	INHALATOR CALL
32	268	57.39	0	0	0.00	EMERGENCY MEDICAL CALL
39	1	0.21	0	0	0.00	NOT CLASSIFIED
** Subtotal **	271	58.03	0	0		
** 4						
41	9	1.93	0	0	0.00	SPILL, LEAK WITH NO IGNITION
44	1	0.21	0	0	0.00	POWER LINE DOWN
45	6	1.28	0	0	0.00	ARCING, SHORTED ELECTRICAL EQUIPMENT
46	1	0.21	0	0	0.00	AIRCRAFT STANDBY
47	1	0.21	0	0	0.00	CHEMICAL EMERGENCY
49	1	0.21	0	0	0.00	NOT CLASSIFIED
** Subtotal **	19	4.05	0	0		
** 5						
50	1	0.21	0	0	0.00	UNABLE TO CLASSIFY FURTHER
52	2	0.43	0	0	0.00	WATER EVACUATION
53	4	0.86	0	0	0.00	SMOKE, ODOR REMOVAL
55	1	0.21	0	0	0.00	ASSIST POLICE
56	1	0.21	0	0	0.00	UNAUTHORIZED BURNING
59	4	0.86	0	0	0.00	NOT CLASSIFIED
** Subtotal **	13	2.75	0	0		
** 6						
60	1	0.21	0	0	0.00	UNABLE TO CLASSIFY FURTHER
61	18	3.85	0	0	0.00	SMOKE SCARE
62	1	0.21	0	0	0.00	WRONG LOCATION
63	1	0.21	0	0	0.00	CONTROLLED BURNING
65	1	0.21	0	0	0.00	STEAM, OTHER GAS MISTAKEN FOR SMOKE
69	2	0.43	0	0	0.00	NOT CLASSIFIED
** Subtotal **	24	5.12	0	0		

FIRE RECAP BY SITUATION
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL
EXCLUDES MUTUAL AID GIVEN

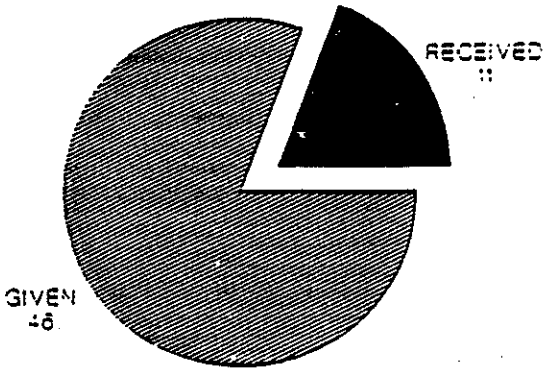
Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 7						
71	4	0.86	0	0	0.00	MALICIOUS, MISCHIEVOUS FALSE CALL
73	19	4.07	0	0	0.00	SYSTEM MALFUNCTION
74	22	4.71	0	0	0.00	UNINTENTIONAL
79	5	1.07	0	0	0.00	NOT CLASSIFIED
** Subtotal **	50	10.71	0	0		
*** Total ***	467	99.95	399435	1277225		

Sunville Fire Department

MUTUAL AID RECEIVED
Dates: 01/01/88 to 12/31/88
Numbers: All, Situations: All

Incident Exposure Number	Date	Alarm Time	Address	Zone & Station	Situation Found & Action Taken
880105-00	03/02/88	1221	MABTON/ALLEN RDS	000000/114	12/1
880235-00	05/10/88	1550	I-82/MIDVALE	000000/613	14/1
880255-01	05/19/88	1513	1RST & Y.V.H.	000000/613	14/1
880345-00	07/03/88	0040	129 W. LINCOLN	000000/116	14/1
880345-01	07/03/88	0040	129 W. LINCOLN	000000/116	11/1
880345-02	07/03/88	0040	128 W. MADISON	000000/116	11/1
880387-00	07/17/88	1530	1320 SO 13TH STREET	000000/116	14/1
880403-01	07/24/88	1322	710 SCOON RD	000000/116	14/1
880423-00	08/02/88	1145	409 W. EDISON AVE.	000000/116	15/1
880474-00	08/23/88	2254	804 GRANDVIEW AVE.	000000/116	14/1
880511-00	09/05/88	1504	711 WOODS RD.	000000/116	14/1

MUTUAL AID
RECAP



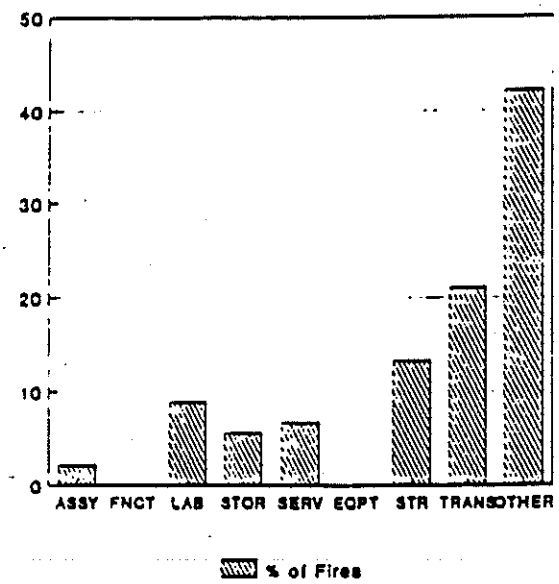
MUTUAL AID GIVEN
Dates: 01/01/88 to 12/31/88
Numbers: All, Situations: All

Incident Exposure Number	Date	Alarm Time	Address	Zone & Station	Situation Found & Action Taken
880254-00	05/18/88	0009	S.S.MABTON & ALEX.	000000/118	32/2
880258-00	05/20/88	2236	840 SO. HILL RD.	000000/118	32/2
880262-00	05/23/88	1727	231 SWAN RD.	000000/118	32/2
880264-00	05/24/88	0851	WANETA RD./ Y.V.H.	000000/118	32/2
880267-00	05/25/88	1131	271 MORSE RD.	000000/118	32/2
880269-00	05/26/88	1020	RT.2 BOX 2474 S'SIDE	000000/115	32/2
880272-00	05/26/88	1801	1420 SOUTH HILL RD.	000000/118	32/2
880273-00	05/26/88	2133	1420 SOUTH HILL RD.	000000/118	32/2
880276-00	05/27/88	1713	VANBELLE & RAY RDS.	000000/118	32/2
880281-00	05/30/88	1759	GAP/PRICE RDS.	000000/118	32/2
880290-00	06/05/88	0216	4071 VAN BELLE RD.	000000/117	11/1
880305-00	06/12/88	1441	EMERALD/MIDVALE	000000/118	32/2
880308-00	06/13/88	2345	SR 241-MILE POST #7	000000/118	32/2
880309-00	06/13/88	2345	SR 241-MILE POST #7	000000/O/J	41/5
880315-00	06/18/88	1227	OUTLOOK/AUCTION YARD	000000/118	32/2
880318-00	06/18/88	1602	RT. 1 BOX 1270	000000/118	32/2
880325-00	06/20/88	1519	I-82, MILE POST 65	000000/118	32/2
880331-00	06/27/88	0151	SS/MABTON-PENN AVE.	000000/118	32/2
880337-00	06/30/88	0959	I-82 MILE POST 63	000000/118	32/2
880340-00	06/30/88	2118	GAP/LESTER RD.	000000/117	14/1
880346-00	07/03/88	1301	4082 WASHOUT RD	000000/118	32/2
880347-00	07/03/88	1445	I-82 MILE POST #69	000000/118	32/2
880356-00	07/05/88	2250	SO. HILL/S.W.CRESCENT	000000/118	32/2
880360-00	07/07/88	1925	2131 FORDYCE RD	000000/118	32/2
880366-00	07/09/88	0826	410 FACTORY RD	000000/118	32/3
880368-00	07/10/88	0952	3790 OUTLOOK RD	000000/118	32/2
880376-00	07/12/88	2040	SR 241 / E. EDISON	000000/118	32/2
880381-00	07/15/88	0834	500 ALBRO RD	000000/118	32/2
880384-00	07/16/88	1654	S.S.MABTON/ALEXANDER	000000/118	32/3
880385-00	07/16/88	1847	VAN BELLE/DEKKER RDS	000000/118	32/2
880388-00	07/18/88	0650	2470 SCOON RD	000000/118	32/2
880394-00	07/20/88	1756	71 MURRAY RD	000000/118	32/2
880399-00	07/23/88	1500	SCOON/WOODIN RDS	000000/118	32/2
880405-00	07/25/88	1712	DEKKER/VAN BELLE RDS	000000/118	32/2
880408-00	07/26/88	1321	RT 2, BOX 2438,G'VIEW	000000/115	32/2
880409-00	07/26/88	1625	781 PIPELINE RD	000000/118	32/2
880410-00	07/26/88	1810	CEMETERY/VAN BELLERDS	000000/118	32/3
880412-00	07/28/88	0738	1ST ST / "D", OUTLOOK	000000/118	32/2
880430-00	08/04/88	2028	281 SWAN RD.	000000/118	32/2
880432-00	08/05/88	1500	Y.V.H./MONSON ENT.	000000/118	32/2
880434-00	08/05/88	2251	1014 SCOON RD.	000000/118	32/2
880435-00	08/06/88	0025	1420 SO. HILL RD.	000000/118	32/2
880436-00	08/06/88	0320	530 MIDVALE RD.	000000/118	32/2
880442-00	08/07/88	1806	1420 SO. HILL	000000/118	32/2
880444-00	08/08/88	0459	I-82/MABTON OVERPASS	000000/118	32/3
880458-00	08/17/88	1652	EUCLID & Y.V.H.	000000/118	32/2

SUNVILLE FIRE DEPT.

ORIGIN & IGNITION

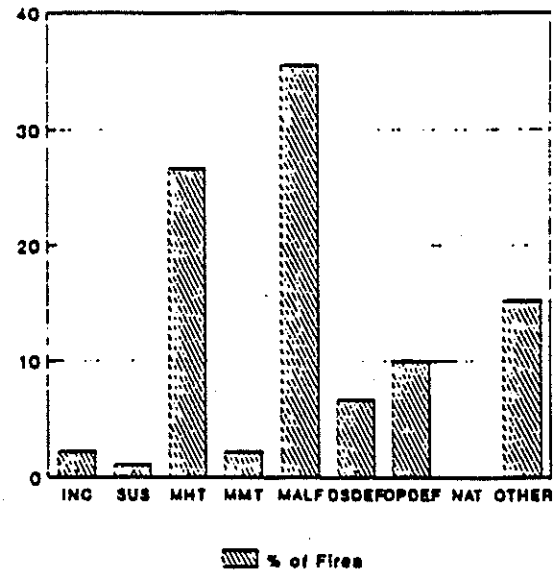
Area of Origin
% of Fires



Jan/Dec.

BASED ON 90 ALARMS

Ignition Factor
% of Fires



Jan/Dec.

BASED ON 90 CALLS

Sunville Fire Department

FIRE RECAP BY AREA OF FIRE ORIGIN
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
14	2	2.22	400	1250	32.00	LOUNGE AREA
** Subtotal **	2	2.22	400	1250		
** 2						
21	2	2.22	23900	64000	37.34	SLEEPING ROOM FOR UNDER 5 PERSONS
24	4	4.44	2100	90000	2.33	KITCHEN, COOKING AREA
25	1	1.11	0	30000	0.00	LAVATORY, LOCKER ROOM, CLOAKROOM
26	1	1.11	8000	22000	36.36	LAUNDRY ROOM, AREA
** Subtotal **	8	8.88	34000	206000		
** 4						
45	1	1.11	96000	96000	100.00	SHIPPING, RECEIVING, LOADING AREA
46	4	4.44	0	450	0.00	TRASH OR RUBBISH AREAS, CONTAINER
** Subtotal **	5	5.55	96000	96450		
** 5						
57	6	6.67	0	315000	0.00	CHIMNEY
** Subtotal **	6	6.67	0	315000		
** 7						
74	4	4.44	215100	330500	65.08	CEILING AND ROOF ASSEMBLY, CONCEALED FLOOR/CEILING
75	1	1.11	2000	40000	5.00	WALL ASSEMBLY, CONCEALED WALL SPACE
76	4	4.44	1600	33000	4.85	EXTERIOR WALL SURFACE
77	3	3.33	40050	230000	17.41	EXTERIOR ROOF SURFACE
** Subtotal **	12	13.32	258750	633500		
** 8						
81	4	4.44	2700	3700	72.97	PASSENGER AREA OF TRANSPORTATION EQUIPMENT
83	12	13.33	5900	15900	37.11	ENGINE AREA, RUNNING GEAR, WHEEL AREA
84	1	1.11	20	1000	2.00	FUEL TANK, FUEL LINE AREA OF TRANSPORTATION EQUPT
85	1	1.11	1000	1000	100.00	OPERATING, CONTROL AREA
86	1	1.11	200	2000	10.00	EXTERIOR EXPOSED SURFACE OF TRANSPORTATION EQUPMNT
** Subtotal **	19	21.10	9820	23600		
** 9						
91	1	1.11	0	0	0.00	ON OR NEAR RAILROAD RIGHT OF WAY, EMBANKMENT
92	4	4.44	0	0	0.00	ON OR NEAR HIGHWAY, PUBLIC WAY, STREET
94	30	33.33	415	1375	30.18	LAWN, FIELD, OPEN AREA
98	1	1.11	0	0	0.00	NOT APPLICABLE
99	2	2.22	50	50	100.00	NOT CLASSIFIED
** Subtotal **	38	42.21	465	1425		
*** Total ***	90	99.95	399435	1277225		

Sunville Fire Department

FIRE RECAP BY IGNITION FACTOR
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	12	13.33	1000	2050	48.78	UNDETERMINED OR NOT REPORTED
** Subtotal **	12	13.33	1000	2050		
** 1						
11	2	2.22	800	30800	2.60	NOT DURING CIVIL DISTURBANCE
** Subtotal **	2	2.22	800	30800		
** 2						
21	1	1.11	23000	40000	57.50	NOT DURING CIVIL DISTURBANCE
** Subtotal **	1	1.11	23000	40000		
** 3						
31	1	1.11	0	0	0.00	ABANDONED, DISCARDED MATERIAL
34	9	10.00	100	500	20.00	INADEQUATE CONTROL OF OPEN FIRE
36	13	14.44	41700	24500	170.20	CHILDREN WITH, CHILD PLAYING
37	1	1.11	0	250	0.00	UNCONSCIOUS - MENTAL, PHYSICAL IMPAIRMENT - DRUGS
** Subtotal **	24	26.66	41800	25250		
** 4						
41	1	1.11	15	25	60.00	FUEL SPILLED, RELEASED ACCIDENTALLY
48	1	1.11	0	0	0.00	CHILDREN WITH, CHILD PLAYING
** Subtotal **	2	2.22	15	25		
** 5						
50	1	1.11	700	700	100.00	UNABLE TO CLASSIFY FURTHER
51	8	8.89	4400	9100	48.35	PART FAILURE, LEAK, BREAK
52	1	1.11	300	0	0.00	AUTOMATIC CONTROL FAILURE
54	11	12.22	109400	238050	45.96	SHORT CIRCUIT, GROUND FAULT
56	7	7.78	40000	384000	10.42	LACK OF MAINTENANCE, WORN OUT
57	3	3.33	800	7000	11.43	BACKFIRE
59	1	1.11	20	1000	2.00	NOT CLASSIFIED
** Subtotal **	32	35.55	155620	639850		
** 6						
62	1	1.11	1800	30000	6.00	CONSTRUCTION DEFICIENCY
63	1	1.11	0	160000	0.00	INSTALLED TOO CLOSE TO COMBUSTIBLES
65	4	4.44	174500	214000	81.54	PROPERTY TOO CLOSE TO (EXPOSURE FIRES)
** Subtotal **	6	6.66	176300	404000		

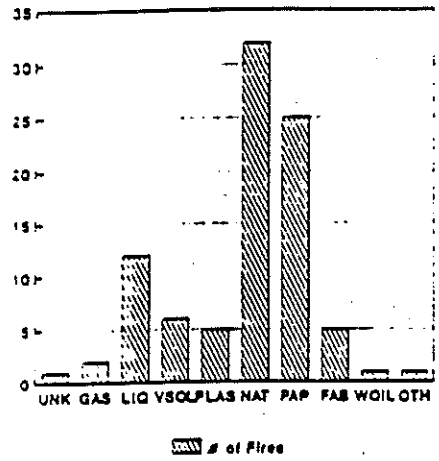
FIRE RECAP BY IGNITION FACTOR
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 7						
73	9	10.00	100	60250	0.17	UNATTENDED
** Subtotal **	9	10.00	100	60250		
** 9						
99	2	2.22	800	75000	1.07	OTHER IGNITION FACTOR NOT CLASSIFIED ABOVE
** Subtotal **	2	2.22	800	75000		
*** Total ***	90	99.97	399435	1277225		

SUNVILLE FIRE DEPT.

IGNITION FACTORS

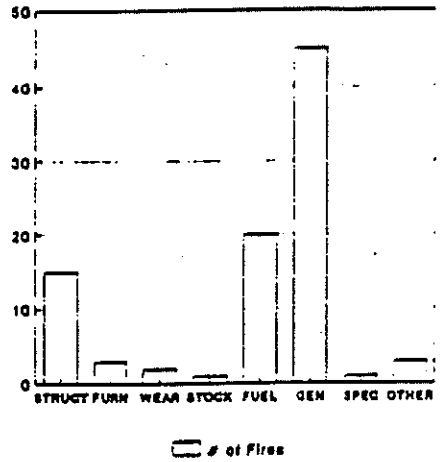
Type of Material
of incidents



Jan/Dec.

BASED ON 90 INCIDENTS

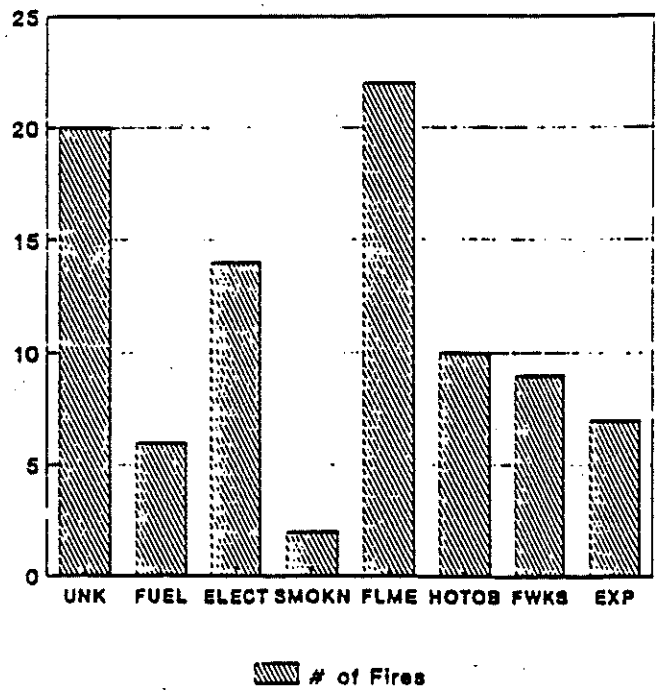
Form Material Ignited
of Incidents



Jan/Dec.

BASED ON 90 INCIDENTS

Heat of Ignition
of Incidents



Jan/Dec.

BASED ON 90 RESPONSES

Sunville Fire Department

FIRE RECAP BY TYPE OF MATERIAL IGNITED
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	1	1.11	750	750	100.00	UNDETERMINED OR NOT REPORTED
** Subtotal **	1	1.11	750	750		
** 1						
12	2	2.22	715	725	98.62	LP-CITY GAS (LP AND AIR MIX)
** Subtotal **	2	2.22	715	725		
** 2						
23	12	13.33	5220	17100	30.53	GASOLINE
** Subtotal **	12	13.33	5220	17100		
** 3						
34	6	6.67	0	315000	0.00	ADHESIVE, RESIN, TAR
** Subtotal **	6	6.67	0	315000		
** 4						
40	3	3.33	1300	61000	2.13	UNABLE TO CLASSIFY FURTHER
45	1	1.11	400	1000	40.00	POLYESTER
49	1	1.11	50	50	100.00	NOT CLASSIFIED
** Subtotal **	5	5.55	1750	62050		
** 5						
51	1	1.11	200	1100	18.18	RUBBER
54	30	33.33	300	1000	30.00	GRASS, LEAVES, HAY, STRAW
57	1	1.11	0	0	0.00	FOOD, STARCH
** Subtotal **	32	35.55	500	2100		
** 6						
60	1	1.11	0	0	0.00	UNABLE TO CLASSIFY FURTHER
61	1	1.11	0	0	0.00	GROWING WOOD
63	18	20.00	261550	527850	49.55	SAWN WOOD
67	4	4.44	96000	126000	76.19	PAPER, UNTREATED, UNCOATED
68	1	1.11	0	450	0.00	CARDBOARD
** Subtotal **	25	27.77	357550	654300		
** 7						
70	2	2.22	150	900	16.67	UNABLE TO CLASSIFY FURTHER
72	2	2.22	1800	2300	78.26	COTTON, RAYON, COTTON FABRIC, FINISHED GOODS
79	1	1.11	8000	22000	36.36	NOT CLASSIFIED

FIRE RECAP BY TYPE OF MATERIAL IGNITED
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** Subtotal **	5	5.55	9950	25200		
** 8						
86	1	1.11	0	160000	0.00	ASPHALT TREATED MATERIAL
** Subtotal **	1	1.11	0	160000		
** 9						
97	1	1.11	23000	40000	57.50	MULTIPLE TYPES OF MATERIALS FIRST IGNITED
** Subtotal **	1	1.11	23000	40000		
*** Total ***	90	99.97	399435	1277225		

Sunville Fire Department

FIRE RECAP BY FORM OF MATERIAL IGNITED
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
11	4	4.44	40850	305000	13.39	EXTERIOR ROOF COVERING,SURFACE,FINISH
12	5	5.56	1700	33250	5.11	EXTERIOR SIDEWALL COVERING, SURFACE, FINISH
17	6	6.67	219000	349500	62.66	STRUCTURAL MEMBER,FRAMING
** Subtotal **	15	16.67	261550	687750		
** 2						
21	3	3.33	1550	3150	49.21	UPHOLSTERED SOFA, CHAIR, VEHICLE SEATS
** Subtotal **	3	3.33	1550	3150		
** 3						
32	1	1.11	0	250	0.00	BEDDING, BLANKET, SHEET, COMFORTER
34	1	1.11	800	800	100.00	WEARING APPAREL NOT ON A PERSON
** Subtotal **	2	2.22	800	1050		
** 5						
51	1	1.11	96000	96000	100.00	BOX, CARTON, BAG
** Subtotal **	1	1.11	96000	96000		
** 6						
61	4	4.44	2100	1800	116.67	ELECTRICAL WIRE, CABLE INSULATION
65	16	17.78	5935	17925	33.11	FUEL
** Subtotal **	20	22.22	8035	19725		
** 7						
72	1	1.11	0	0	0.00	FENCE, POLE
74	29	32.22	300	1000	30.00	GROWING, LIVING FORM
75	13	14.44	0	315450	0.00	RUBBISH, TRASH, WASTE
76	2	2.22	0	60000	0.00	COOKING MATERIALS
** Subtotal **	45	49.99	300	376450		
** 8						
81	1	1.11	8000	22000	36.36	DUST, FIBER, LINT
** Subtotal **	1	1.11	8000	22000		
** 9						
97	1	1.11	23000	40000	57.50	MULTIPLE FORM OF MATERIAL IGNITED
99	2	2.22	200	31100	0.64	FORM OF MATERIAL NOT CLASSIFIED ABOVE
** Subtotal **	3	3.33	23200	71100		
*** Total ***	90	99.98	399435	1277225		

Sunville Fire Department

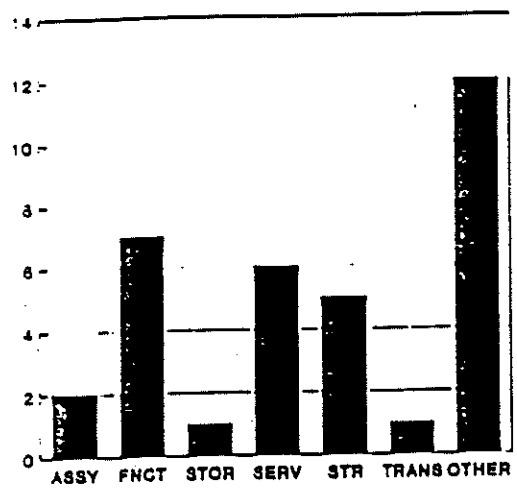
FIRE RECAP BY FORM OF HEAT IGNITION
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: ALL

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	20	22.22	27300	45250	60.33	UNDETERMINED OR NOT REPORTED
** Subtotal **	20	22.22	27300	45250		
** 1						
12	1	1.11	15	25	60.00	HEAT FROM GAS FUELED EQUIPMENT
14	2	2.22	700	3300	21.21	HEAT FROM LIQUID FUELED EQUIPMENT
15	2	2.22	40000	69000	57.97	SPARK ESCAPING FROM SOLID FUELED EQUIPMENT
16	1	1.11	0	60000	0.00	HEAT FROM SOLID FUELED EQUIPMENT
** Subtotal **	6	6.66	40715	132325		
** 2						
23	5	5.56	8700	76250	11.41	SHORT CIRCUIT ARC FROM DEFECTIVE, WORN INSULATION
24	5	5.56	98570	99550	99.02	UNSPECIFIED SHORT CIRCUIT ARC
26	1	1.11	300	0	0.00	ARC FROM OPERATING EQUIPMENT OR SWITCH
27	3	3.33	2950	64050	4.61	HEAT FROM OVERLOADED ELECTRICAL EQUIPMENT
** Subtotal **	14	15.56	110520	239850		
** 3						
31	2	2.22	0	250	0.00	CIGARETTE
** Subtotal **	2	2.22	0	250		
** 4						
45	7	7.78	400	1000	40.00	MATCH
46	3	3.33	800	30800	2.60	LIGHTER (FLAME TYPE)
47	8	8.89	200	750	26.67	OPEN FIRE
48	4	4.44	900	7500	12.00	BACKFIRE FROM INTERNAL COMBUSTION ENGINE
** Subtotal **	22	24.44	2300	40050		
** 5						
51	1	1.11	0	0	0.00	HEAT, SPARK FROM FRICTION
53	5	5.56	800	330000	0.24	HOT EMBER, ASH
54	1	1.11	0	160000	0.00	ELECTRIC LAMP
56	2	2.22	200	62000	0.32	HEAT FROM PROPERLY OPERATING ELECTRICAL EQUIPMENT
59	1	1.11	0	0	0.00	NOT CLASSIFIED
** Subtotal **	10	11.11	1000	552000		
** 6						
63	9	10.00	800	1500	53.33	FIREWORKS
** Subtotal **	9	10.00	800	1500		
** 8						
81	7	7.78	216800	266000	81.50	HEAT FROM DIRECT FLAME, CONVECTION CURRENTS
** Subtotal **	7	7.78	216800	266000		
*** Total ***						

SUNVILLE FIRE DEPT.

RESIDENTIAL ANALYSIS

Area of Origin
Residential Fires

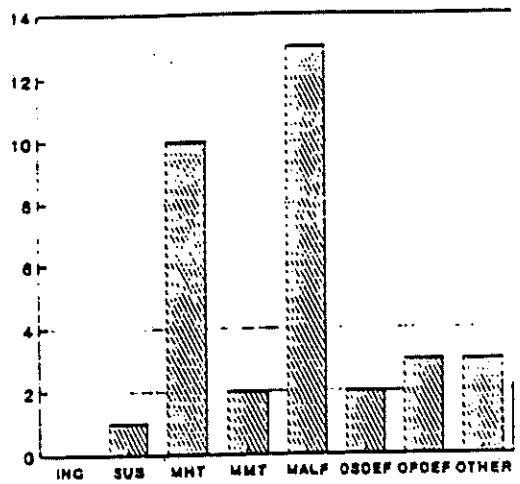


# of Alarms

BASED ON 34 RESIDENTIAL RESPONSES

Jan/Dec.

Ignition Factor
Residential Fires

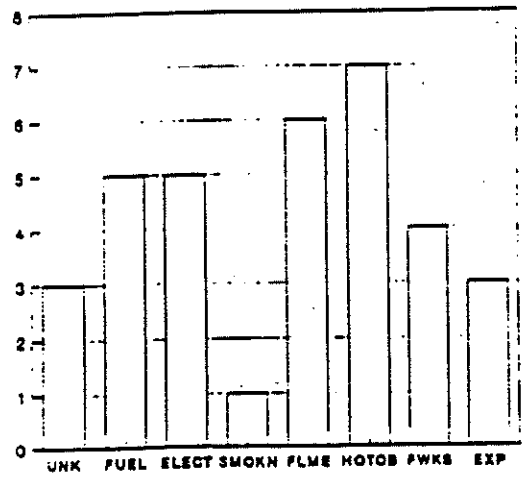


# of Alarms

BASED ON 34 RESIDENTIAL INCIDENTS

Jan/Dec.

Heat of Ignition
Residential Fires

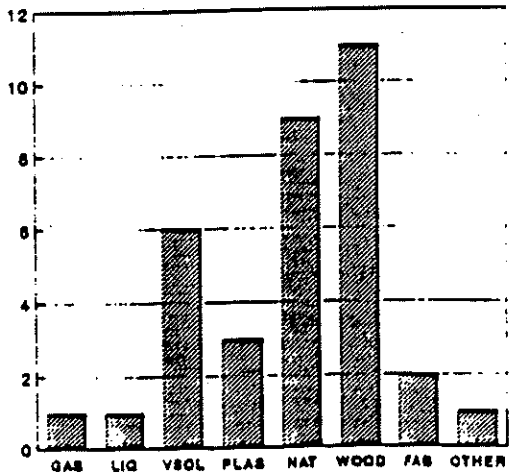


# of Alarms

BASED ON 34 RESIDENTIAL INCIDENTS

Jan/Dec.

Material Ignited
Residential Fires



# of Fires

BASED ON 34 RESIDENTIAL INCIDENTS

Jan/Dec.

:unville Fire Department

FIRE RECAP BY AREA OF FIRE ORIGIN
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: 400 TO 499

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
14	2	5.88	400	1250	32.00	LOUNGE AREA
** Subtotal **	2	5.88	400	1250		
** 2						
21	2	5.88	23900	64000	37.34	SLEEPING ROOM FOR UNDER 5 PERSONS
24	4	11.76	2100	90000	2.33	KITCHEN, COOKING AREA
26	1	2.94	8000	22000	36.36	LAUNDRY ROOM, AREA
** Subtotal **	7	20.58	34000	176000		
** 4						
46	1	2.94	0	0	0.00	TRASH OR RUBBISH AREAS, CONTAINER
** Subtotal **	1	2.94	0	0		
** 5						
57	6	17.65	0	315000	0.00	CHIMNEY
** Subtotal **	6	17.65	0	315000		
** 7						
74	3	8.82	41100	146500	28.05	CEILING AND ROOF ASSEMBLY, CONCEALED FLOOR/CEILING
75	1	2.94	2000	40000	5.00	WALL ASSEMBLY, CONCEALED WALL SPACE
77	1	2.94	40000	20000	200.00	EXTERIOR ROOF SURFACE
** Subtotal **	5	14.70	83100	206500		
** 8						
83	1	2.94	200	1800	11.11	ENGINE AREA, RUNNING GEAR, WHEEL AREA
** Subtotal **	1	2.94	200	1800		
** 9						
94	11	32.35	415	1375	30.18	LAWN, FIELD, OPEN AREA
98	1	2.94	0	0	0.00	NOT APPLICABLE
** Subtotal **	12	35.29	415	1375		
*** Total ***	34	99.98	118115	701925		

Sunville Fire Department

FIRE RECAP BY IGNITION FACTOR
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: 400 TO 499

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	2	5.88	0	100	0.00	UNDETERMINED OR NOT REPORTED
** Subtotal **	2	5.88	0	100		
** 2						
21	1	2.94	23000	40000	57.50	NOT DURING CIVIL DISTURBANCE
** Subtotal **	1	2.94	23000	40000		
** 3						
34	2	5.88	0	0	0.00	INADEQUATE CONTROL OF OPEN FIRE
36	7	20.59	40700	22000	185.00	CHILDREN WITH, CHILD PLAYING
37	1	2.94	0	250	0.00	UNCONSCIOUS - MENTAL, PHYSICAL IMPAIRMENT - DRUGS
** Subtotal **	10	29.41	40700	22250		
** 4						
41	1	2.94	15	25	60.00	FUEL SPILLED, RELEASED ACCIDENTALLY
48	1	2.94	0	0	0.00	CHILDREN WITH, CHILD PLAYING
** Subtotal **	2	5.88	15	25		
** 5						
51	1	2.94	200	1800	11.11	PART FAILURE, LEAK, BREAK
52	1	2.94	300	0	0.00	AUTOMATIC CONTROL FAILURE
54	4	11.76	11200	88500	12.66	SHORT CIRCUIT, GROUND FAULT
56	7	20.59	40000	384000	10.42	LACK OF MAINTENANCE, WORN OUT
** Subtotal **	13	38.23	51700	474300		
** 6						
62	1	2.94	1800	30000	6.00	CONSTRUCTION DEFICIENCY
65	1	2.94	0	0	0.00	PROPERTY TOO CLOSE TO (EXPOSURE FIRES)
** Subtotal **	2	5.88	1800	30000		
** 7						
73	3	8.82	100	60250	0.17	UNATTENDED
** Subtotal **	3	8.82	100	60250		
** 9						
99	1	2.94	800	75000	1.07	OTHER IGNITION FACTOR NOT CLASSIFIED ABOVE
** Subtotal **	1	2.94	800	75000		
*** Total ***	34	99.98	118115	701925		

Sunville Fire Department

FIRE RECAP BY FORM OF HEAT IGNITION
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: 400 TO 499

12/06/88

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 0						
00	3	8.82	23000	40100	57.36	UNDETERMINED OR NOT REPORTED
** Subtotal **	3	8.82	23000	40100		
** 1						
12	1	2.94	15	25	60.00	HEAT FROM GAS FUELED EQUIPMENT
14	1	2.94	200	1800	11.11	HEAT FROM LIQUID FUELED EQUIPMENT
15	2	5.88	40000	69000	57.97	SPARK ESCAPING FROM SOLID FUELED EQUIPMENT
16	1	2.94	0	60000	0.00	HEAT FROM SOLID FUELED EQUIPMENT
** Subtotal **	5	14.70	40215	130825		
** 2						
23	2	5.88	8300	24500	33.88	SHORT CIRCUIT ARC FROM DEFECTIVE, WORN INSULATION
26	1	2.94	300	0	0.00	ARC FROM OPERATING EQUIPMENT OR SWITCH
27	2	5.88	2900	64000	4.53	HEAT FROM OVERLOADED ELECTRICAL EQUIPMENT
** Subtotal **	5	14.70	11500	88500		
** 3						
31	1	2.94	0	250	0.00	CIGARETTE
** Subtotal **	1	2.94	0	250		
** 4						
45	2	5.88	400	1000	40.00	MATCH
46	1	2.94	0	0	0.00	LIGHTER (FLAME TYPE)
47	3	8.82	100	250	40.00	OPEN FIRE
** Subtotal **	6	17.64	500	1250		
** 5						
53	5	14.71	800	330000	0.24	HOT EMBER, ASH
56	1	2.94	0	60000	0.00	HEAT FROM PROPERLY OPERATING ELECTRICAL EQUIPMENT
59	1	2.94	0	0	0.00	NOT CLASSIFIED
** Subtotal **	7	20.59	800	390000		
** 6						
63	4	11.76	300	1000	30.00	FIREWORKS
** Subtotal **	4	11.76	300	1000		
** 8						
81	3	8.82	41800	50000	83.60	HEAT FROM DIRECT FLAME, CONVECTION CURRENTS
** Subtotal **	3	8.82	41800	50000		
*** Total ***	34	99.97	118115	701925		

Sunville Fire Department

FIRE RECAP BY TYPE OF MATERIAL IGNITED
DATES: 01/01/88 TO 12/31/88
NUMBERS: ALL, SITUATIONS: ALL, FPU: 400 TO 499

Code	Number	Percent	Estimated Loss	Estimated Value	Loss/Value Ratio	Description
** 1						
12	1	2.94	15	25	60.00	LP-CITY GAS (LP AND AIR MIX)
** Subtotal **	1	2.94	15	25		
** 2						
23	1	2.94	200	1800	11.11	GASOLINE
** Subtotal **	1	2.94	200	1800		
** 3						
34	6	17.65	0	315000	0.00	ADHESIVE, RESIN, TAR
** Subtotal **	6	17.65	0	315000		
** 4						
40	2	5.88	300	60000	0.50	UNABLE TO CLASSIFY FURTHER
45	1	2.94	400	1000	40.00	POLYESTER
** Subtotal **	3	8.82	700	61000		
** 5						
54	8	23.53	300	1000	30.00	GRASS, LEAVES, HAY, STRAW
57	1	2.94	0	0	0.00	FOOD, STARCH
** Subtotal **	9	26.47	300	1000		
** 6						
61	1	2.94	0	0	0.00	GROWING WOOD
63	10	29.41	85900	260850	32.93	SAWN WOOD
** Subtotal **	11	32.35	85900	260850		
** 7						
70	1	2.94	0	250	0.00	UNABLE TO CLASSIFY FURTHER
79	1	2.94	8000	22000	36.36	NOT CLASSIFIED
** Subtotal **	2	5.88	8000	22250		
** 9						
97	1	2.94	23000	40000	57.50	MULTIPLE TYPES OF MATERIALS FIRST IGNITED
** Subtotal **	1	2.94	23000	40000		
*** Total ***	34	99.99	118115	701925		

EMS INCIDENT DATA

NOTE: DATA COMPILED FOR
A 3+ YEAR PERIOD

Sunville Fire Department

EMS PATIENT RECAP OF CAUSE CODES
Numbers: All
EXCLUDED: 34 Patient Zero Records & 4 Invalid Records

EMS Code	Number	Percent	Severity 0	Severity 1	Severity 2	Severity 3	Severity 4	Description
MV	151	19.61	0	10	33	68	34	Motor Vehicle
PV	9	1.17	0	0	3	4	2	Pedestrian/Vehicle
MC	14	1.82	0	0	5	6	3	Motorcycle (incl. motorcycle/car)
BI	6	0.78	0	0	2	4	0	Bicycle (incl. bicycle/car)
ME	9	1.17	0	1	5	2	1	Machinery/Equipment
GS	1	0.13	0	0	1	0	0	Firearms
BU	5	0.65	0	2	2	0	1	Burns
BL	3	0.39	0	0	0	2	1	Blunt Instrument
KN	5	0.65	0	0	0	4	1	Sharp Instrument
AS	26	3.38	0	0	4	14	8	Beating/Fight/Assault (w/o weapon)
FA	87	11.30	0	0	28	39	19	Fall
SP	12	1.56	0	0	6	6	0	Sports or Play Injury
AN	3	0.39	0	0	1	2	0	Animal-Caused Injury
AC	3	0.39	0	0	1	1	1	Other Accident/Injury
DR	2	0.26	0	0	1	1	0	Drowning
ST	2	0.26	0	1	0	1	0	Strangulation or Suffocation
AL	11	1.43	0	0	0	5	6	Alcohol Intoxication
CD	16	2.08	0	1	8	7	0	Drug (incl. combined drug-alcohol)
DT	2	0.26	0	0	0	1	1	Drug-alcohol withdrawal
AX	1	0.13	0	0	1	0	0	Accidental overdose/poison
AD	2	0.26	0	0	2	0	0	Adverse drug reaction
MD	324	42.08	0	42	143	112	26	Medical (illness)
CB	3	0.39	0	0	1	2	0	Obstetric
PS	8	1.04	0	0	0	6	2	Psychiatric
XX	65	8.44	0	0	1	7	53	Other Alarm
*** Total ***	770	100.02	0	57	253	294	159	

EMS CODE — Explained under description

SEVERITY
1 Immediate life threatening
2 Urgent
3 Non-urgent
4 Not Applicable

Sunville Fire Department

EMS UNIT RECAP
Numbers: All
Unit Codes: All
EXCLUDED: 2 Invalid Records

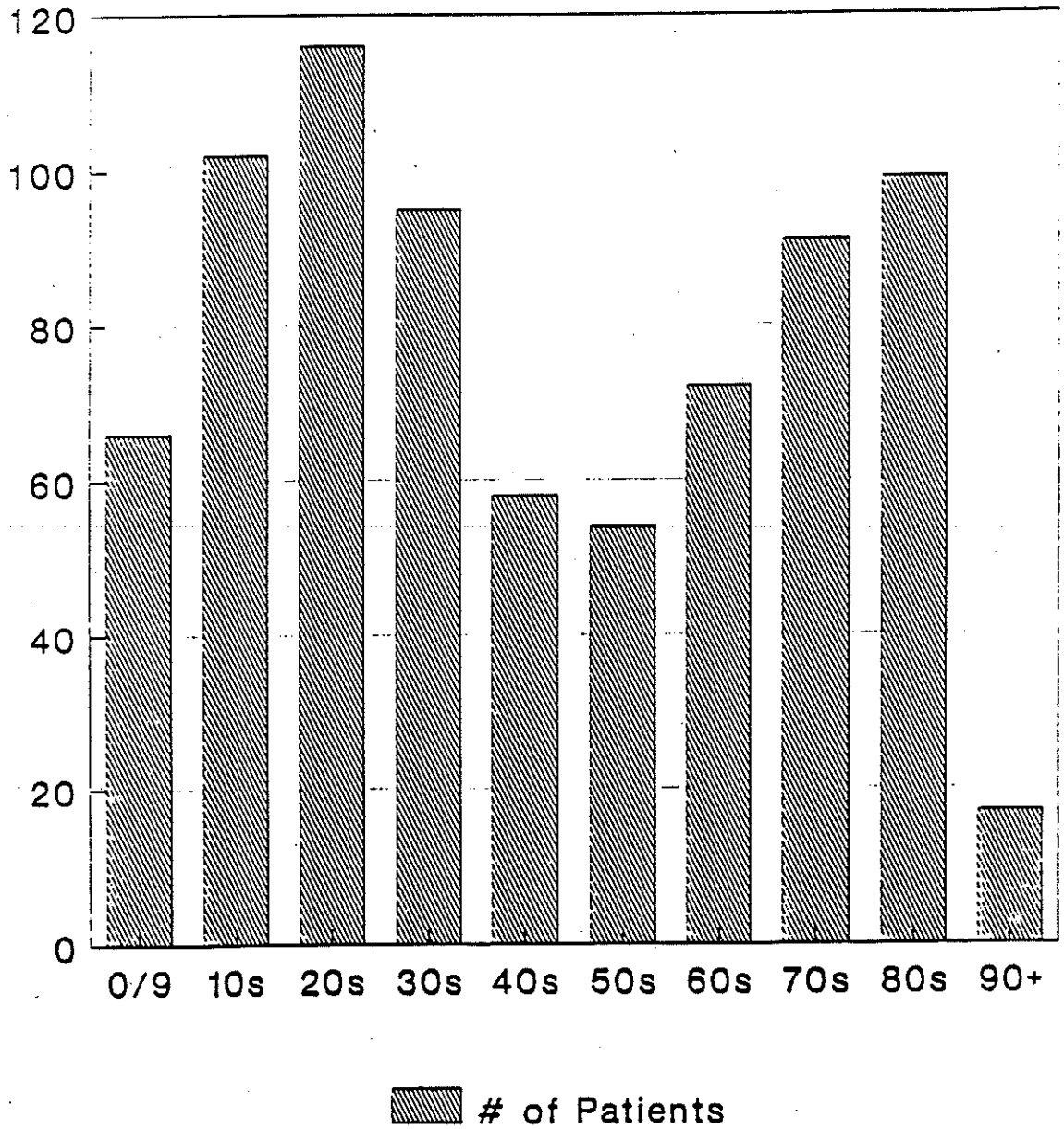
Unit Code	Runs	Percent	Miles	Time	0 to 3 Minutes	4 to 5 Minutes	6 to 7 Minutes	8 to 10 Minutes	Over 10 Minutes	Nonemergency Runs Or No Patient Supported	Description
05	42	5.45	170	1763	11	7	8	7	3	6	Northview Ambulance Comp
08	726	94.29	2074	****	314	174	79	64	29	66	Sunville Fire Department
112	1	0.13	4	49	0	0	0	0	1	0	Sunville Police
113	1	0.13	0	0	0	0	0	0	0	1	Ridgeview Fire Departmen
*** Total ***	770	100.00	2248	****	325	181	87	71	33	73	

EMS FIRST RESPONSE RECAP - BLS
As Of 02/20/89 For Sunville Fire Department
Dates: to 12/31/88; Numbers: All

	0000 0600	0601 1200	1201 1800	1801 2400	TOTAL
3 Minutes & Under	7	95	149	79	330
4 To 5 Minutes	13	49	57	52	171
6 To 7 Minutes	14	27	17	26	84
8 To 10 Minutes	24	15	17	6	62
Over 10 Minutes	14	4	4	8	30
	72	190	244	171	677

Average First Response Time (Zero Response Times Excluded) 4.45

PATIENT AGE
EMS Incidents



3 YEAR PERIOD

Sunville Fire Department

EMS PATIENT RECAP OF AGE/SEX
Numbers: 870000 to 889999
EXCLUDED: 34 Patient Zero Records & 4 Invalid Records

	Age	Number	Percent	Males	Females
** 0					
	0	22	2.86	13	4
	1	9	1.17	5	4
	2	4	0.52	2	2
	3	3	0.39	2	1
	4	2	0.26	1	1
	5	5	0.65	1	4
	6	3	0.39	1	2
	7	5	0.65	4	1
	8	6	0.78	3	3
	9	7	0.91	3	4
** Subtotal **		66	8.58	35	26
** 1					
	10	1	0.13	1	0
	11	10	1.30	7	3
	12	3	0.39	1	2
	13	7	0.91	4	3
	14	11	1.43	6	5
	15	8	1.04	4	4
	16	17	2.21	4	13
	17	21	2.73	9	12
	18	14	1.82	10	4
	19	10	1.30	6	4
** Subtotal **		102	13.26	52	50
** 2					
	20	15	1.95	9	6
	21	11	1.43	6	5
	22	14	1.82	7	7
	23	9	1.17	4	5
	24	15	1.95	11	4
	25	11	1.43	5	6
	26	13	1.69	7	6
	27	11	1.43	7	4
	28	7	0.91	6	1
	29	10	1.30	5	5
** Subtotal **		116	15.08	67	49
** 3					
	30	16	2.08	9	7
	31	8	1.04	5	3
	32	13	1.69	9	4
	33	11	1.43	6	5
	34	11	1.43	8	3

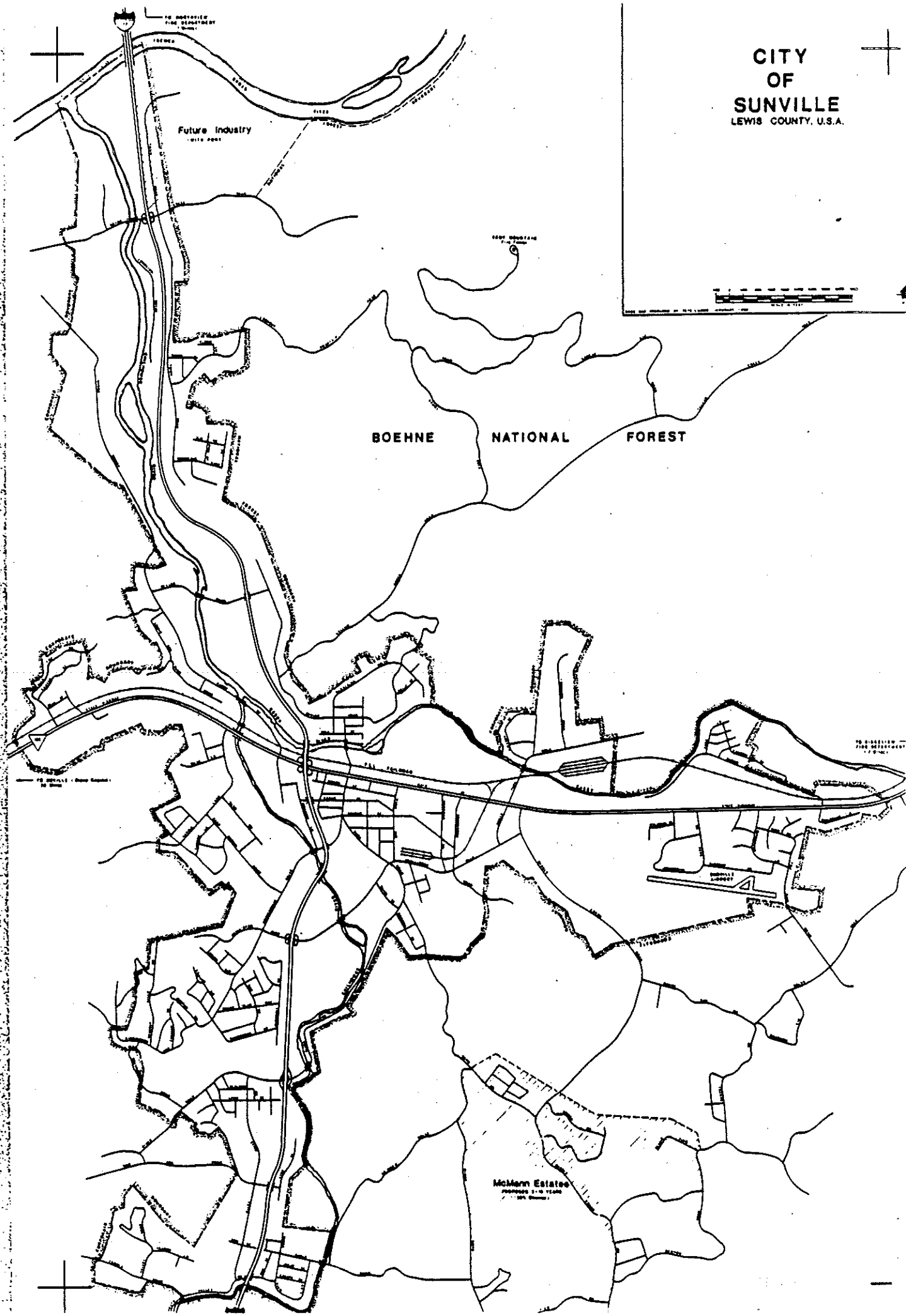
EMS PATIENT RECAP OF AGE/SEX
Numbers: 870000 to 889999
EXCLUDED: 34 Patient Zero Records & 4 Invalid Records

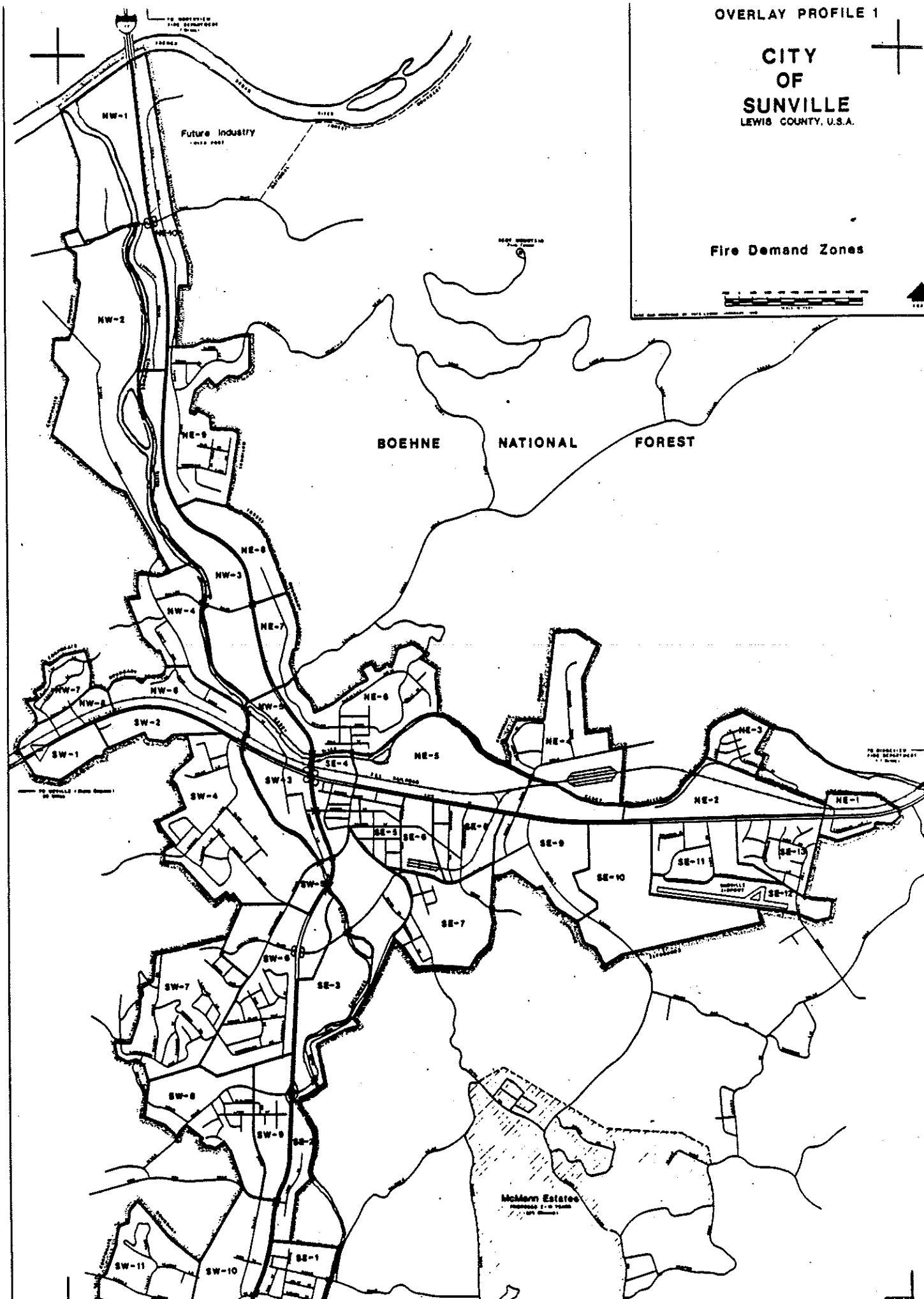
	Age	Number	Percent	Males	Females
	35	7	0.91	3	4
	36	5	0.65	3	2
	37	7	0.91	4	3
	38	6	0.78	2	4
	39	11	1.43	7	4
** Subtotal **		95	12.35	56	39
** 4					
	40	8	1.04	4	4
	41	5	0.65	1	4
	42	8	1.04	4	4
	43	6	0.78	3	3
	44	3	0.39	2	1
	45	9	1.17	2	7
	46	2	0.26	0	2
	47	3	0.39	1	2
	48	4	0.52	1	3
	49	10	1.30	4	6
** Subtotal **		58	7.54	22	36
** 5					
	50	6	0.78	4	2
	51	4	0.52	4	0
	52	5	0.65	4	1
	53	4	0.52	2	2
	54	4	0.52	2	2
	55	6	0.78	0	6
	56	4	0.52	4	0
	57	6	0.78	4	2
	58	12	1.56	7	5
	59	3	0.39	1	2
** Subtotal **		54	7.02	32	22
** 6					
	60	7	0.91	7	0
	61	6	0.78	3	3
	62	6	0.78	3	3
	63	6	0.78	2	4
	64	6	0.78	3	3
	65	10	1.30	7	3
	66	6	0.78	5	1
	67	9	1.17	2	7
	68	8	1.04	3	5
	69	8	1.04	7	1

EMS PATIENT RECAP OF AGE/SEX
Numbers: 870000 to 889999
EXCLUDED: 34 Patient Zero Records & 4 Invalid Records

	Age	Number	Percent	Males	Females
** Subtotal **		72	9.36	42	30
** 7					
	70	9	1.17	5	4
	71	7	0.91	4	3
	72	7	0.91	6	1
	73	6	0.78	3	3
	74	7	0.91	2	5
	75	11	1.43	7	4
	76	12	1.56	4	8
	77	16	2.08	6	10
	78	9	1.17	5	4
	79	7	0.91	3	4
** Subtotal **		91	11.83	45	46
** 8					
	80	3	0.39	2	1
	81	5	0.65	2	3
	82	10	1.30	3	7
	83	9	1.17	4	5
	84	8	1.04	2	6
	85	7	0.91	1	6
	86	7	0.91	1	6
	87	16	2.08	9	7
	88	13	1.69	11	2
	89	21	2.73	16	5
** Subtotal **		99	12.87	51	48
** 9					
	90	4	0.52	2	2
	91	3	0.39	1	2
	92	1	0.13	0	1
	93	2	0.26	1	1
	94	2	0.26	0	2
	95	1	0.13	1	0
	96	1	0.13	1	0
	97	1	0.13	0	1
	98	1	0.13	1	0
** Subtotal **		16	2.08	7	9
** 0					
	102	1	0.13	0	1
** Subtotal **		1	0.13	0	1
*** Total ***		770	100.10	409	356

MAPS AND OVERLAYS


CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates


OVERLAY PROFILE 1
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Fire Demand Zones
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates
NW-1
NW-2
NW-3
NW-4
NW-5
NW-6
NW-7
NW-8
NW-9
NW-10
NE-1
NE-2
NE-3
NE-4
NE-5
NE-6
NE-7
NE-8
NE-9
SW-1
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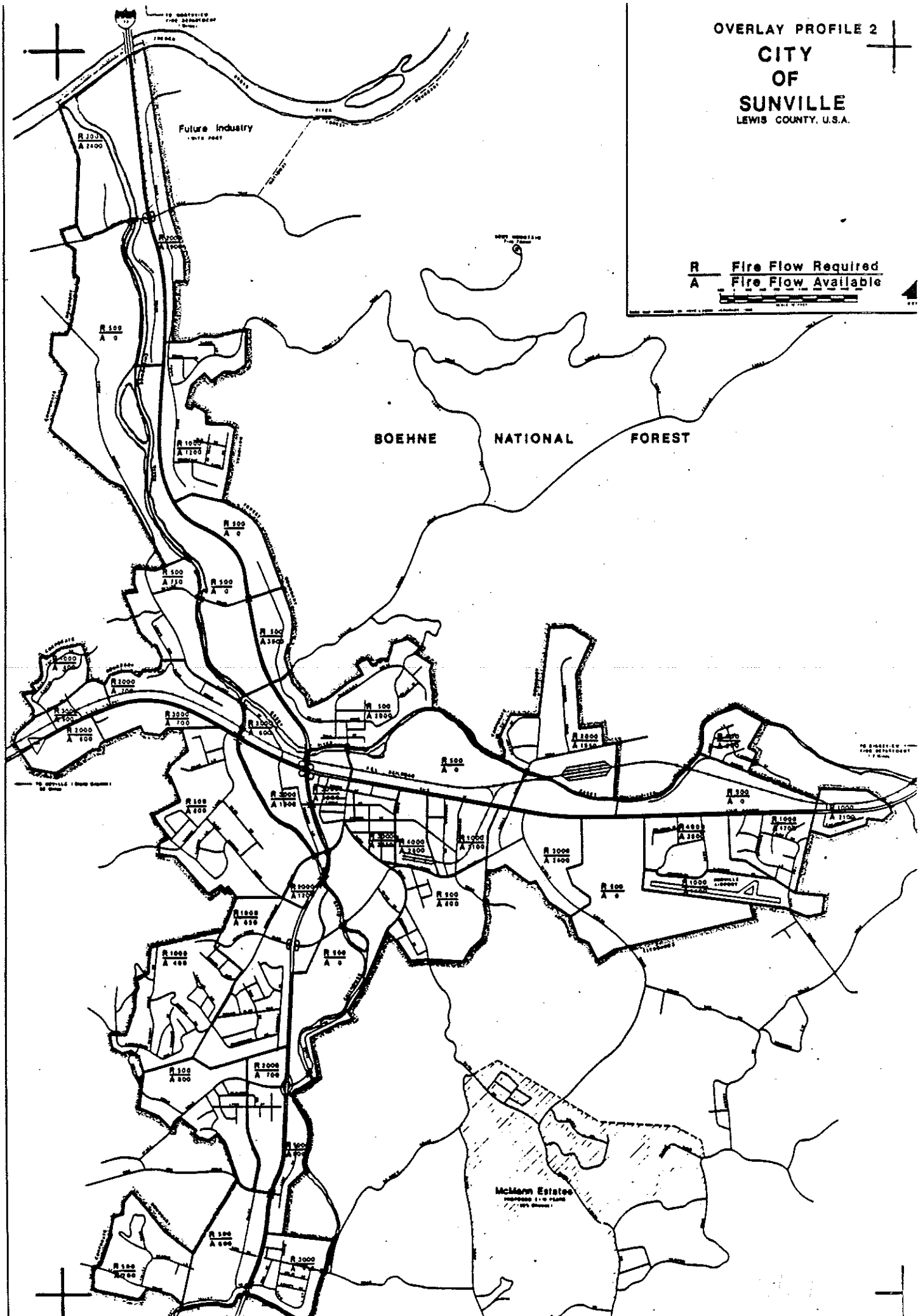
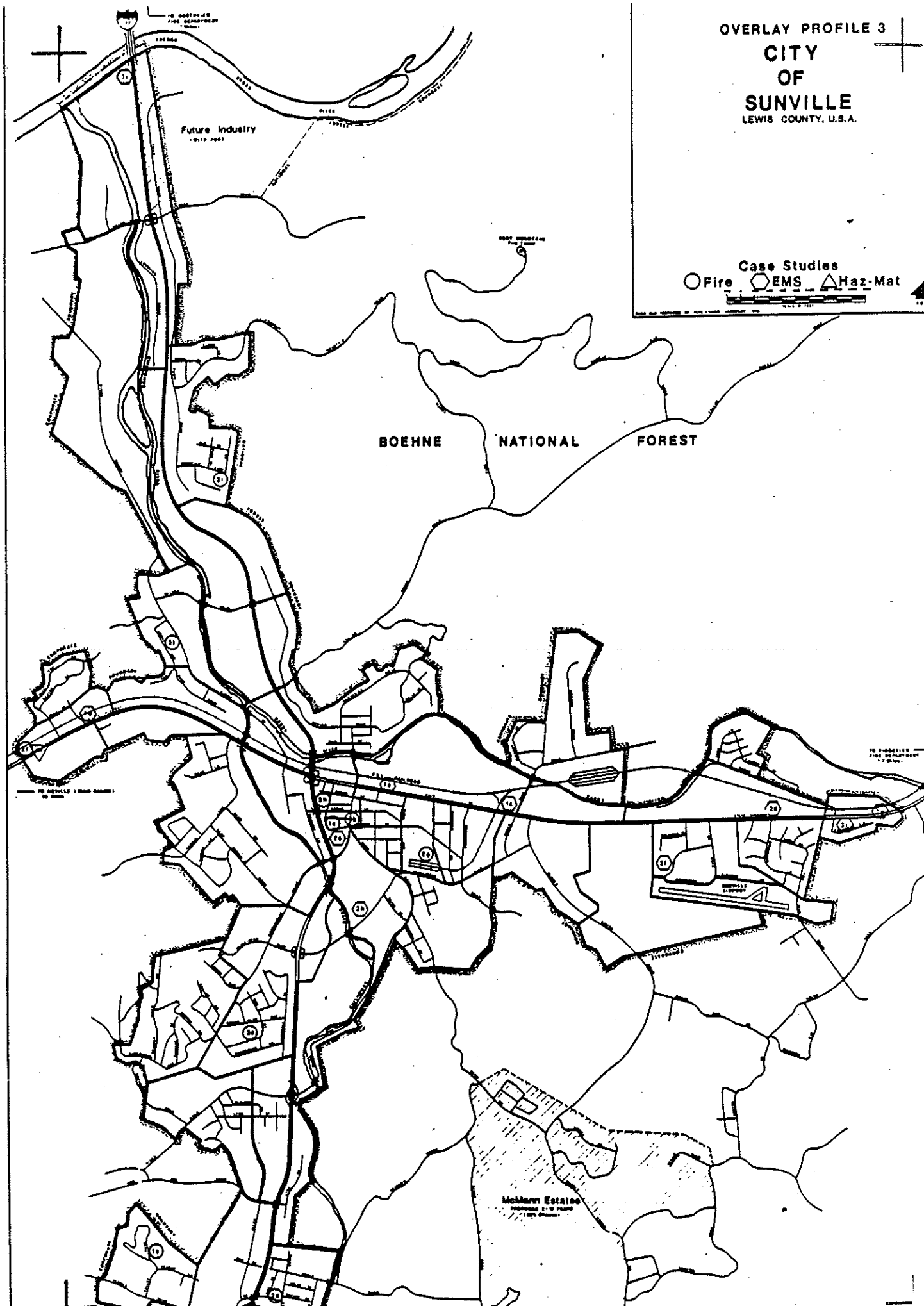
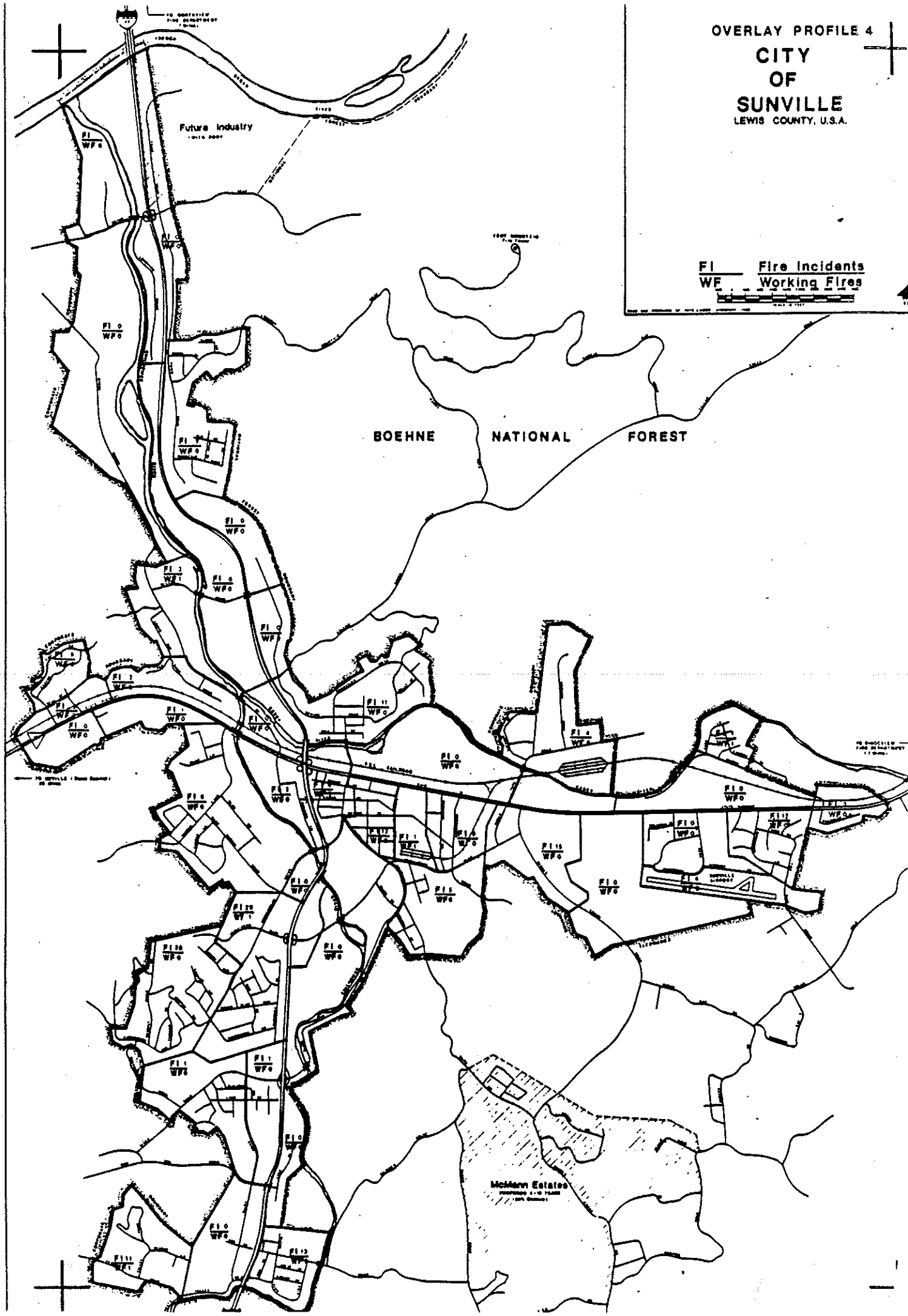
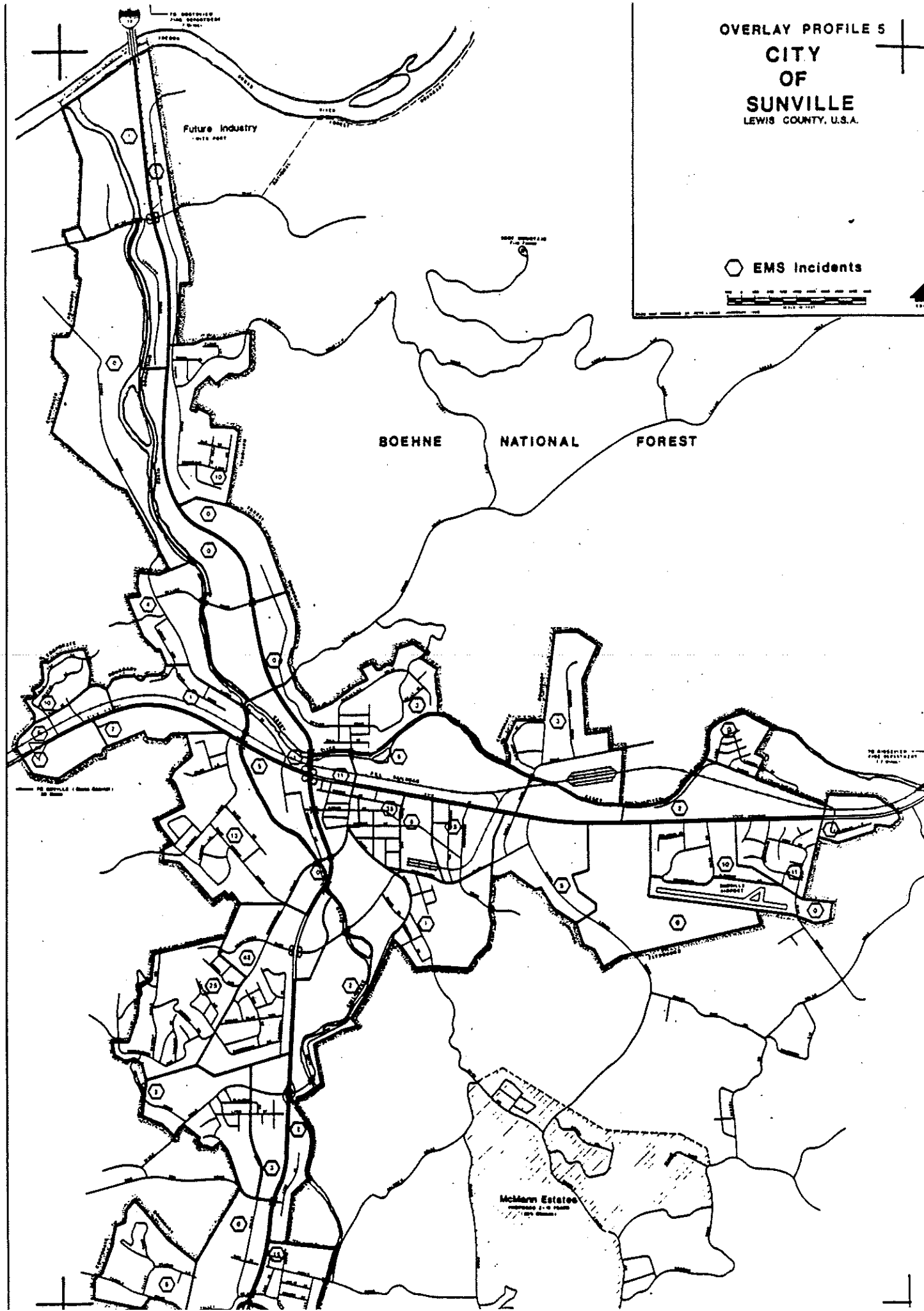
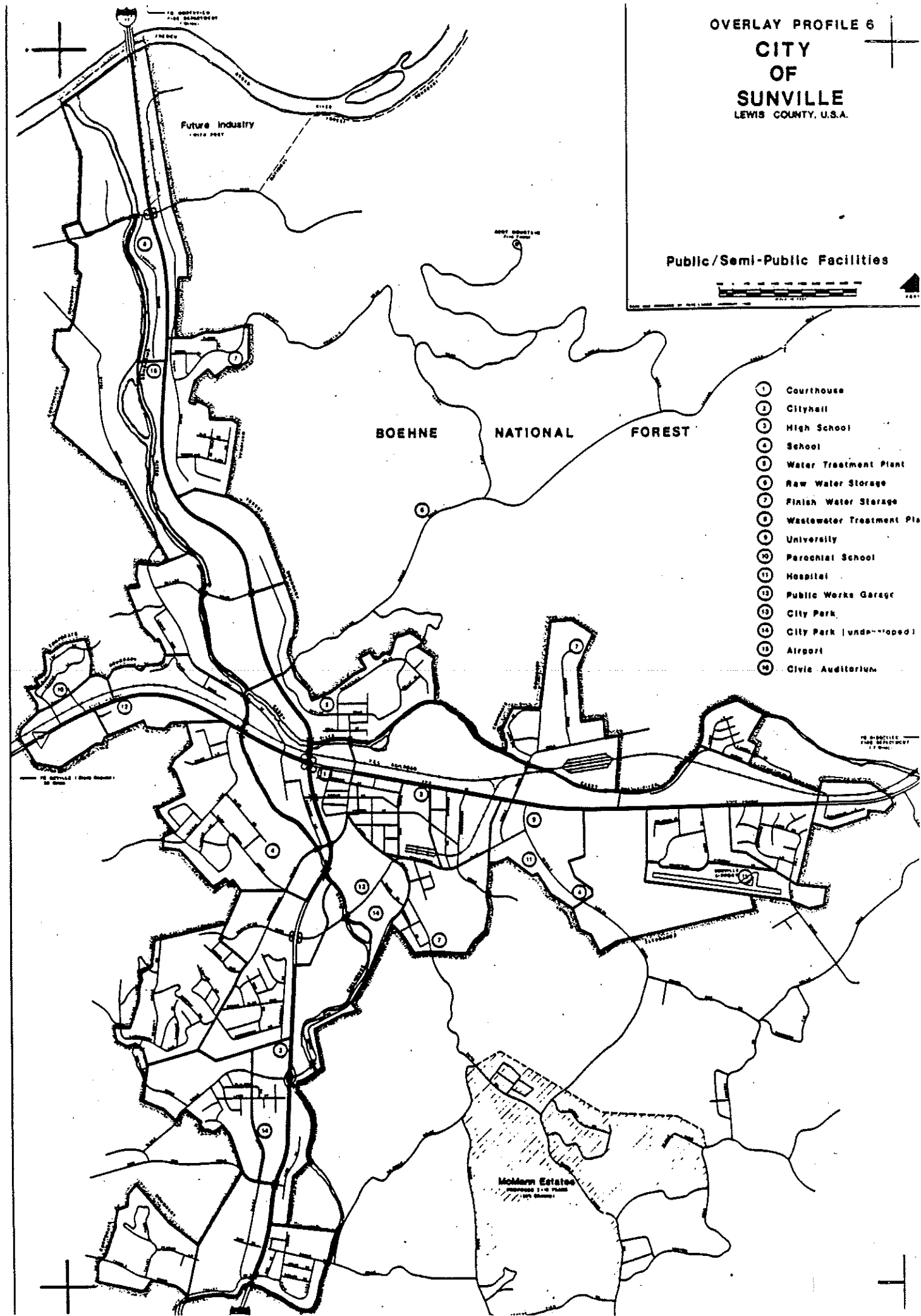
SE-10
SE-11
SE-12
SE-13

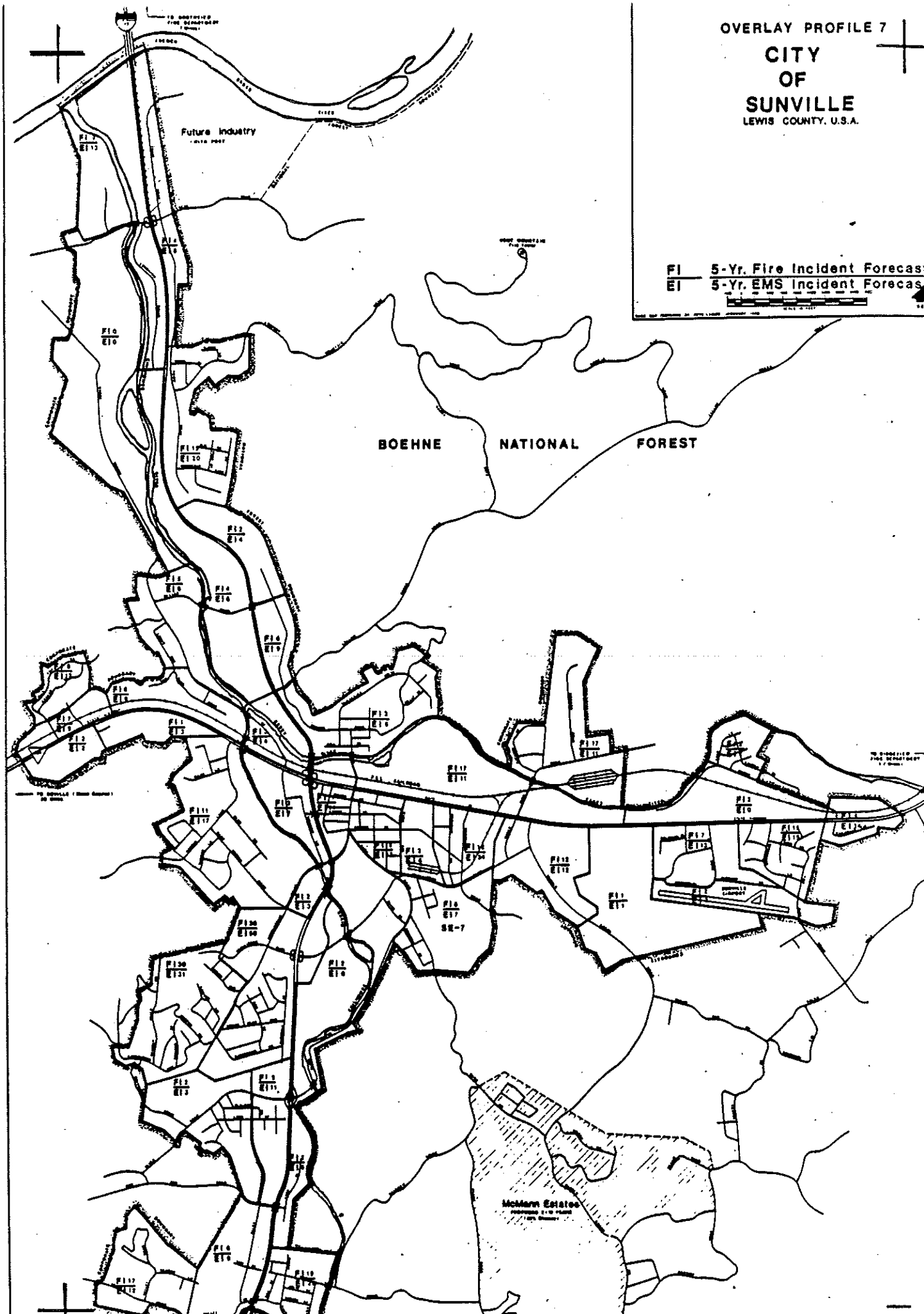

OVERLAY PROFILE 2
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
R Fire Flow Required
A Fire Flow Available
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates

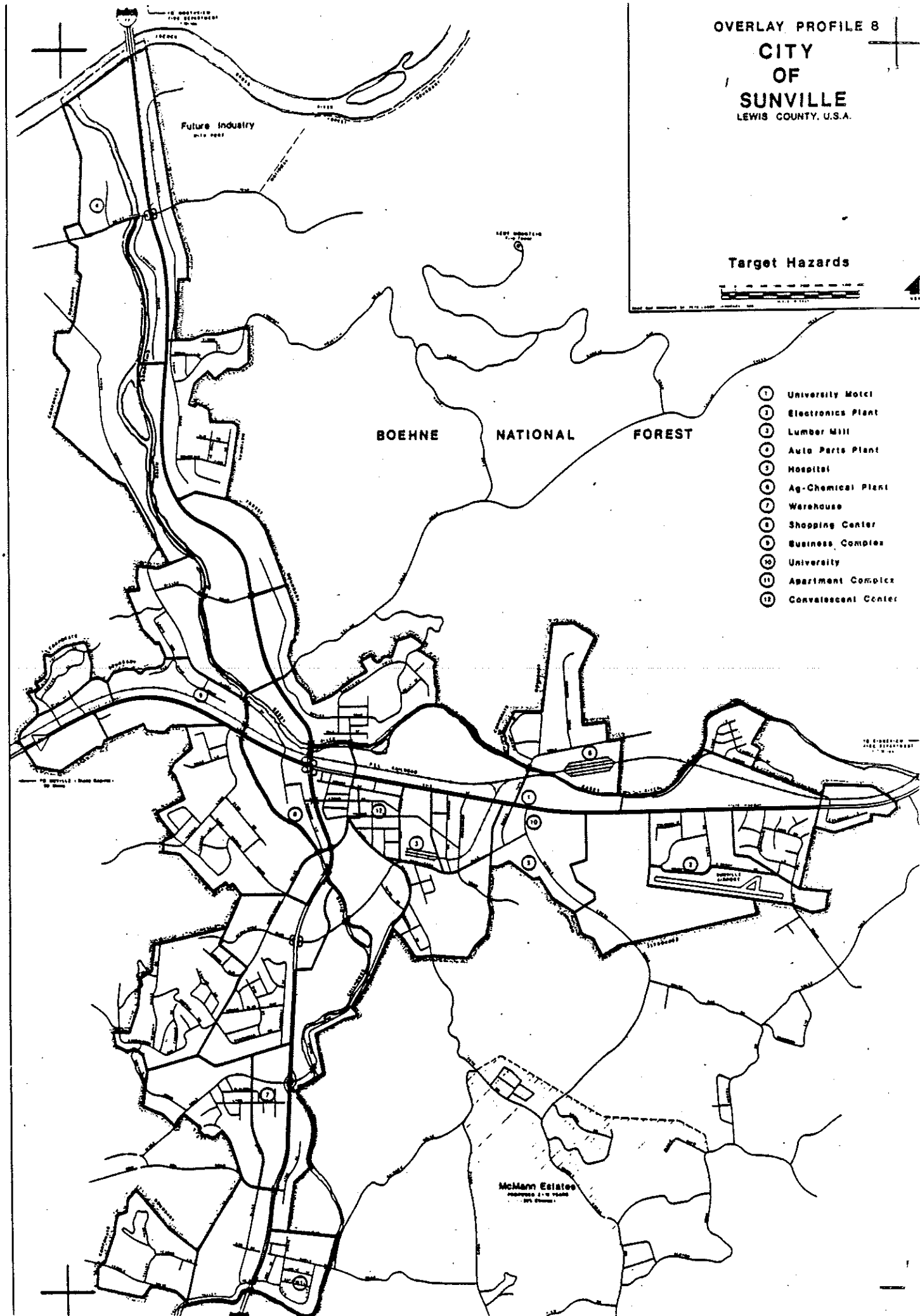

OVERLAY PROFILE 3
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Case Studies
Fire
EMS
Haz-Mat
Future Industry
BOEHNE NATIONAL FOREST
Mohlmann Estates

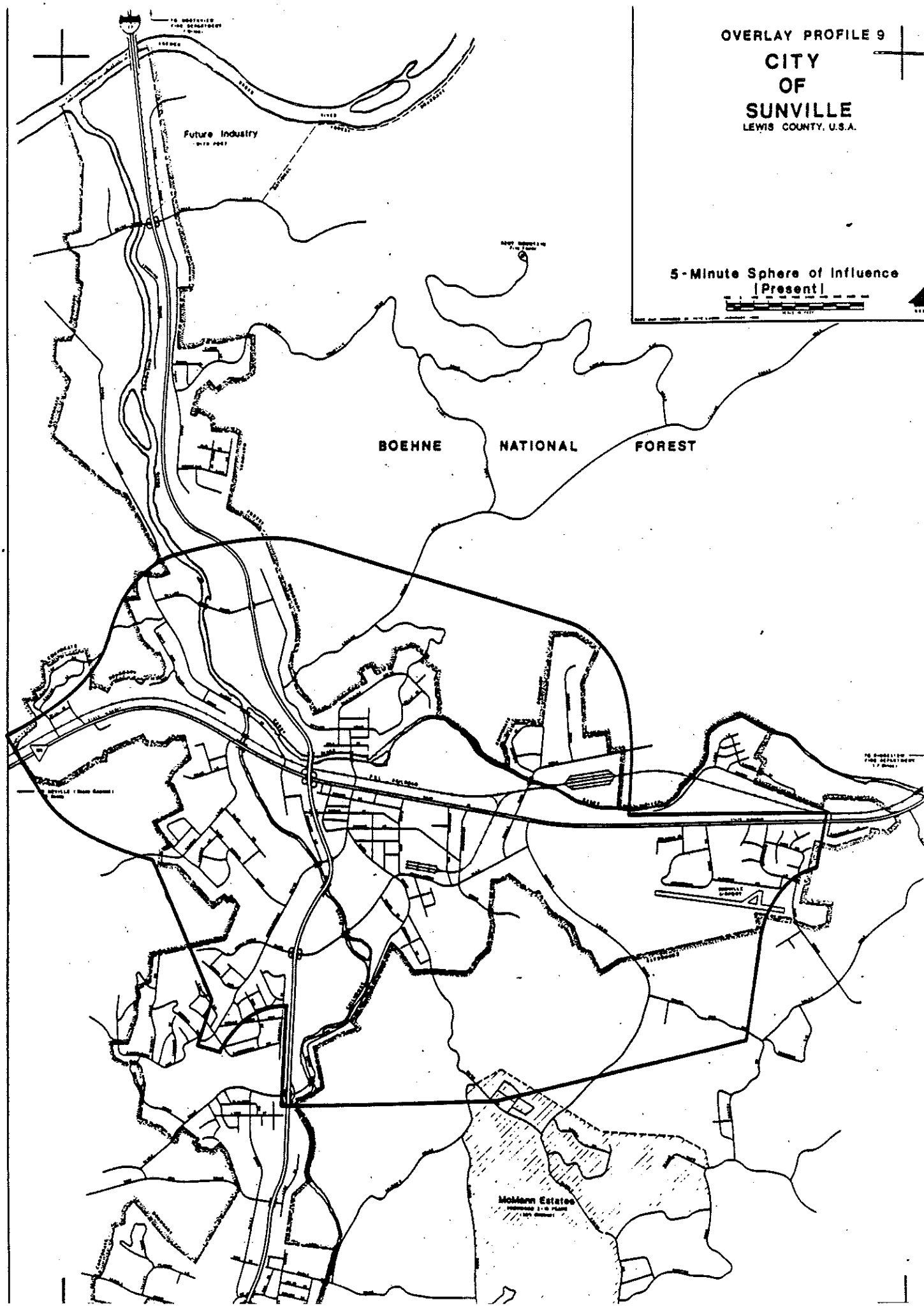

OVERLAY PROFILE 4
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
FI Fire Incidents
WF Working Fires
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates


OVERLAY PROFILE 5
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
EMS Incidents
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates


OVERLAY PROFILE 6
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Public/Semi-Public Facilities
Future Industry
BOEHNE NATIONAL FOREST
1 Courthouse
2 Cityhall
3 High School
4 School
5 Water Treatment Plant
6 Raw Water Storage
7 Finish Water Storage
8 Wastewater Treatment Pla
9 University
10 Parochial School
11 Hospital
12 Public Works Garage
13 City Park
14 City Park (unde-eloped)
15 Airport
16 Civic Auditorium
Moldern Estates


OVERLAY PROFILE 7
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
FI 5-Yr. Fire Incident Forecast
EI 5-Yr. EMS Incident Forecast
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates


OVERLAY PROFILE 8
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
Target Hazards
Future Industry
BOEHNE NATIONAL FOREST
McMann Estates
1 University Motel
2 Electronics Plant
3 Lumber Mill
4 Auto Parts Plant
5 Hospital
6 Ag-Chemical Plant
7 Warehouse
8 Shopping Center
9 Business Complex
10 University
11 Apartment Complex
12 Convalescent Center


OVERLAY PROFILE 9
CITY
OF
SUNVILLE
LEWIS COUNTY, U.S.A.
5-Minute Sphere of Influence
(Present)
Future Industry
BOEHNE NATIONAL FOREST
Mobiarn Estates

UNIT 10: IMPLEMENTATION TECHNIQUES

OBJECTIVES

The participants will:

1. *Describe what they can do to implement the skills covered in this course.*
2. *Evaluate the course.*

ACTIVITY 10.1

RETURNING HOME

It is recommended that each student develop a plan of action to apply the information which has been gained during this course. The action plan should include the actions which will be completed the first day you return to work, by the end of the first week, and by the end of the first month.

Actions--First day:

Actions--By the end of the first week:

Actions--By the end of the first month:

Planning for community fire protection

Planning is a basic step in fire protection management. Texts on the subject universally list planning as one of the major management functions, usually the first.[1] Timely and dynamic fire protection planning provides the basis for systematic control of current and future fire risks and efficient and effective use of fire protection resources, thereby limiting fire losses and fire protection costs.

Most fire protection agencies are experiencing escalating demands for fire suppression and fire prevention services, fire safety education, emergency medical services, and hazardous materials control. However, the resources required to provide these services are limited or diminishing. To adequately meet these demands, a community—with the guidance of the fire department—must take the following steps:

1. Identify the nature and extent of the risks it faces
2. Establish the levels of service desired
3. Identify the most efficient and effective use of public and private resources to provide the established service levels
4. Implement a management and evaluation system that ensures the attainment and timely revision of service-level standards.

This chapter describes the planning process that encompasses all these steps as it applies to the community fire protection system. The fire protection system (its components are described in detail in Chapter 2) includes all public and private services that are available to protect people and property from fire. The following components should be included in the planning process:

1. The fire department. It enforces fire safety codes, provides fire safety education, provides rescue and emergency medical services, controls or suppresses fires, provides hazardous materials controls, determines the cause of fires, investigates arson, and supports arson prosecution.
2. The building department. It maintains and enforces building codes, a major factor in the establishment and control of fire risks and fire protection costs.
3. The planning or community development department. It regulates the use of land within a community through land use controls, such as zoning limitations, development density controls, height limitations, open space requirements, transportation systems, and utility system requirements. These factors influence the fire protection risks and the fire protection system requirements of a community. Community general plans, developed and maintained by planning departments, are the primary long-range planning documents for communities.

Burns, Robert B., Managing Fire Services, Second Edition, 1988.
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4. The water system. This component is essential to firefighting operations and to automatic sprinkler system design and performance. Fire protection requirements should be a key element in the design and construction of community water systems.

5. The public works or engineering department. This department is responsible for engineering and design related to utility systems, public roads, and traffic signal systems. Traffic circulation patterns, including road width, cul-de-sac length, maximum load capacity of road structures, and other factors affect the fire department's ability to respond to requests for service.

6. The police department. It investigates and assists in prosecution of arson, controls crowds at emergency incidents, reports hazardous conditions, and evacuates persons exposed to fire or hazardous materials risks.

7. The educational system. It plays a role in providing fire safety education. However, only a few schools have adopted a curriculum that requires fire prevention education.

8. Private-sector fire protection, including water companies, fire protection engineering firms, industrial or commercial emergency response teams (fire brigades), fire protection system manufacturers, contractors, and service companies.

9. Regional, state, and national organizations. Community fire protection efforts are frequently supported by regional, state, and national fire protection agencies, such as county fire departments, military fire departments, and state and federal emergency services offices. At the same time, state and federal legislation may place constraints on planning and managing local fire protection via preemption of authority in building code modifications, labor laws (e.g., Fair Labor Standards Act), safety practices, and hazardous materials reporting and control requirements.

An effective community fire protection plan cannot be developed without input from each of these components of the system. All organizations that have a major impact on the fire protection system should be involved so that their appropriate roles can be established and mutually agreed on.

The tangible end result of this planning process is a document, often called a community fire protection master plan. An even more important outcome of this effort should be a dynamic long-term planning process that can adjust to community demographics, land development patterns, and technological changes. This planning process should be integrated into the community management process. It is essential that the fire protection goals and standards that are developed within this plan be integrated into the community general plan.

The ability to project or predict future conditions that will affect the fire protection system is quite limited. Communities are dynamic. Changes with impacts on the fire protection system will occur. Therefore, the plan must be periodically revised and updated through an ongoing planning process that is coordinated with other community planning efforts such as general plan revisions, annual budget preparations, capital improvements programs, and utility system projections. As Peter Drucker has written: "Decisions exist only in the present. The question that faces the long-range planner is not what we should do tomorrow. It is: what do we have to do today to be ready for an uncertain tomorrow?"[2]

The rest of this chapter looks at the plans and planning processes used in the fire service, reviews the reasons for planning, and examines the systems concept in planning. It then presents a detailed examination of the planning process from the initial decision to plan through the process for updating a plan. The

central theme is that good management is an essential part of planning. Although elected representatives often are the ones who decide how safe our communities will be by the enactment of the budget, sound policy decisions regarding priorities in expenditure cannot be made without objective and thorough planning, and decisions cannot be carried out as intended without effective, ongoing, professional management. This connection between policy-level decision making and planning and management cannot be emphasized enough.

A basic premise in fire protection planning is that no federal, state, or regional body or private-sector organization has yet developed fire protection standards that a community can adopt to meet its needs. What does exist is a series of laws, fire code standards, empirical data, and nationally recognized good practices that a community can use to determine its own levels of adequate service and acceptable risk. These are the major policy decisions which form the basis of fire protection planning. These actions are taken through the development and adoption of fire protection goals and objectives.

Types of plans

Planning—the creation of plans—is carried out on several levels. For fire protection, three levels might be identified: (1) long-range or master planning, (2) operational planning, and (3) tactical planning.

Long-range planning

Long-range or master planning is concerned with evaluating and changing the fire protection system to meet the needs of a changing environment. It is by nature policy-oriented, long range in time frame, and wide in scope, and it provides the major focus for this chapter. It strives to confront the technical, financial, operational, legal, legislative, and political aspects of fire protection.

Long-range planning is not a new concept. Industry has used it for many years (sometimes under the name of *strategic planning*) in developing and marketing products. Government, particularly the federal government, uses long-range planning, especially in technology-intensive areas such as space exploration. Long-range planning has also been used by the military, especially since World War II, to define the military threat and to define, develop, and acquire systems to protect against that threat. Long-range planning emphasizes anticipating conditions rather than merely reacting to them. In the past, long-range planning was not generally applied to service-oriented organizations, perhaps because the end product is not as visible as, say, a water system or a transit system.

To be useful to the decision maker, long-range planning must perform the following key functions: define the problem(s), identify the solution(s), and provide a scheme or plan by which to implement the solution(s). Since fire protection is a system of independent interacting elements, effective long-range planning has a high potential for improving efficiency and effectiveness.

In the 1970s, the National Fire Prevention and Control Administration (NFPCA; now the U.S. Fire Administration) embarked on a project designed to help local communities prepare fire protection master plans. NFPCA tested master planning procedures in numerous communities and produced several publications on the subject.[3] Subsequently, the master planning process has been used in other communities to develop effective long-range plans.[4]

Operational planning

Operational planning is done to make a system work on a day-to-day basis. It is primarily administrative in nature. It is exemplified by organizational plan-

ning, response planning, regional incident command and mutual aid planning, capital improvements planning, and so on. During the 1980s, for example, a great deal of emphasis has been put on general emergency planning for the community, as detailed in Chapter 13. Each of the four phases of emergency planning—mitigation, preparation, response, and recovery—requires continuous operational-level planning.

Tactical planning

Finally, tactical planning is detailed planning that focuses on achieving specific objectives. An example is pre-fire planning. Because of its technical nature, tactical planning is not discussed in detail in this chapter.

The need for planning

Why should a fire department or community expend the resources required to develop a long-range fire protection plan? In many communities, fire protection services are considered adequate by top management and elected officials. They receive fewer complaints about fire protection than any other service, and major fire losses are infrequent. Fire department budget requests often exceed the community's ability or willingness to expend funds, raising the question of whether the department is seeking to provide a level of service greater than that desired by the community. In addition, the community frequently is unaware of the direct and indirect impacts of fire losses.

The planning process can help confront such issues by

1. Establishing levels of service and risk that meet the needs and expectations of the community and fire department
2. Identifying the options and opportunities for controlling fire loss and cost within the public and private sectors
3. Defining fire protection standards that can serve as management criteria.

Public fire protection systems in the United States and Canada have developed in reaction to major fire incidents, with an emphasis on fire suppression. Typically, about 95 percent of paid fire department budgets are devoted to staffing for fire suppression activities. Few general plans contain community fire protection goals that establish acceptable levels of risk and cost for fire services in coordination with other development interests. Communities are frequently planned and constructed with little or no concern for the control of fire losses and fire protection costs, and many structures are built with minimal fire protection features.

For example, building codes are a primary factor in the establishment of fire risks and fire department operating costs. They establish allowable limits for building construction type, occupancy class, area, height, and building separation. Minimal automatic fire suppression systems are required for some construction types and occupancy classes. However, a growing number of cities and counties are enacting regulations that exceed these "minimal" requirements. The characteristics of buildings affect the work load of fire departments during fire fighting operations and prevention activities and consequently play a major role in determining resource requirements and expenditures. However, these fire protection impacts are rarely considered in the planning and development of building codes.

The fire protection elements of building and fire codes are primarily reactions to major fire disasters. For example, panic hardware requirements for public assembly occupancies were adopted only after the 1903 Iroquois Theatre fire in Chicago, Illinois, which resulted in 602 deaths. Flame spread requirements

for public assemblages resulted from the Cocoanut Grove nightclub fire in 1942, which caused 492 deaths. Similar examples can be found throughout the codes.

Fire departments have little influence on the adoption and enforcement of "standard" building codes and frequently cope with codes and enforcement procedures that are counterproductive to efficient and effective fire protection. If a community desires to control fire losses and fire protection costs, it must limit the fire risks at the time buildings are constructed by incorporating building code provisions into its planning. Long-range planning emphasizes such prevention and control measures.

The lack of adequate planning and control with respect to new or increased service demands can be seen in the manner in which emergency medical services (EMS) and hazardous materials programs have evolved. These services are usually provided by fire departments, but not without significant organizational and economic impacts. For example, EMS demands can overtax volunteer fire departments owing to the volume of calls. Before such programs are initiated or expanded, a thorough evaluation needs to be performed to define work load and resource requirements and also to consider other methods that may be more efficient and/or effective. An established plan provides a method of conducting such analysis.

Fire protection planning also provides a means of evaluating the potential impacts of increased fire safety education, which is a major untapped resource of fire risk reduction. While some communities have developed effective communitywide fire safety education programs, most have not. A comparison of U.S. fire protection with that of other countries demonstrates the United States has consistently had the worst fire loss record in the world.[5] Although there are many contributing factors, the absence of comprehensive fire safety education stands out as a deficiency of U.S. fire protection in comparison with other industrialized nations.

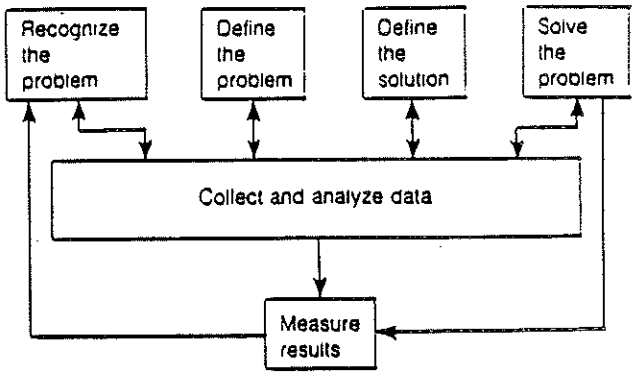
The systems concept in planning

Systems analysis is a much used, much abused, and often misunderstood term. It has its genesis in the notion that large systems must be viewed as a whole, rather than as a number of integrated components, because these parts interact with a resultant effect on each other and on the system, and also because the system has an effect on the outside world (vice versa).

Systems analysis, in a general form, can be thought of as a closed loop feedback process, as illustrated in Figure 4–1.

The process begins with someone recognizing that a problem exists. This finding is usually expressed in a vague statement such as "We have a problem."

Figure 4–1
Systems analysis.



The first thing to do is to define the problem precisely. This may mean collecting and analyzing some pertinent data. Once the problem has been defined, an appropriate solution can be formulated. The next step is to choose an appropriate method of implementing the solution, consistent with the available resources. The preferred solution is then implemented and the results are measured by analyzing data. If the problem is not solved satisfactorily, the process is repeated, with changes in the level and or method of solution until the desired result is obtained. Fire protection master planning, or long-range planning, uses the techniques of systems analysis to determine the existing levels of service and risk provided by the community fire protection system and the concept of goal setting to establish the levels of service and risk desired in the future. (Again, note that there are no absolute requirements, in the legal sense, or in the form of national or regional standards that determine or establish the level of fire protection to be provided by a community.) The techniques of systems analysis are then used to formulate various ways and means of identifying, adopting, and providing the desired level of fire protection. These programs are analyzed and compared, and the best programs are selected. These programs—including an implementation program that defines authority, responsibility, and time frames—are consolidated into a fire protection plan.

The planning process

Long-range planning is a systematic process that has been used successfully in industry, in the military, and in the federal government. It is used in many communities throughout the country, not only for fire protection, but also for law enforcement, utility systems, parks and recreation, and other community services. It is applicable to any type of community—rural, suburban, urban—a county, a region (council of governments), or a state.

Cooperation and commitment

One of the most important ingredients of long-range planning is commitment. Long-range planning by its very nature requires commitment over a long period of time. Commitment is obtained through the cooperative involvement of the many community agencies that participate directly or indirectly in fire protection. The review and approval of interim planning products at various stages in the planning process enhances understanding and commitment. Cooperation is the key to commitment. To be successful, a plan must be understood and accepted by all who are to participate—in fire prevention and control, that is more or less everybody in the community. A plan frequently fails because some person or group was not committed to it, perhaps because of a misunderstanding. This process encourages negotiation and compromise among competing interests and produces a plan that obtains broad support throughout the community. When people are involved in a plan, they will identify with it, support it, and make it work.

It follows that commitment can best be achieved through the cooperation of all community organizations involved in fire protection. These would include the planning, building, and police departments; and in the private sector, merchants' associations, builders' associations, homeowners' groups, and industry representatives. The successful implementation of a plan depends directly on the extent to which the community is involved in developing the plan. The use of a planning team and advisory committee is intended to enhance cooperation and commitment.

Phases and activities

Planning is carried out in three phases or stages: preparation, planning, and implementation (Figure 4–2). Planning and implementation are iterative or repetitive, reflecting the fact that planning never stops, that implementation involves planning, and that planning is part of implementation.

A more detailed picture of the planning process is shown in Figure 4–3, which clarifies the major activities and their relations to each other. Here the iterative nature of the process is more apparent. Briefly, the primary planning activities are the following:

1. Deciding whether to undertake long-range planning
2. If a planning effort is to be undertaken, getting organized for it
3. Collecting and analyzing data to find out what the problems are
4. Defining goals and objectives (i.e., setting standards for service and risks)
5. Defining the programs and resources required to attain goals and objectives
6. Defining alternative programs, where appropriate
7. Comparing alternatives and selecting the best programs
8. Preparing a documented plan to implement and maintain the selected programs
9. Implementing and evaluating the plan (organizing, directing, and controlling)
10. Updating and modifying the plan.

At several points in the process, approvals are needed (see Figure 4–3). Approvals at interim stages of planning are necessary to maintain community awareness and participation and to obtain the commitments necessary to proceed to the next step in the planning process. Approvals of plan elements during the planning process are provided by management personnel, the planning team, or the citizens' advisory committee, as specified in the planning proposal. Final approvals are provided by elected officials.

Deciding whether to plan

The fire protection leadership in the community must make a conscious decision to embark on long-range planning. This is not to be made lightly: To be successful, planning efforts require a great deal of time and resources. In communities of 100,000 or less, one person should spend at least half of his or her time on managing the planning effort. Communities with populations of 100,000 or more should assign at least one person full time if possible.

Personnel time and some resources from other existing programs will be required to successfully complete this project. Furthermore, the climate has to be right before planning can exist in the community, since long-range planning is not necessarily acceptable to everyone. The decision to plan or not to plan should be made after stating and examining the reasons for and against it. Some reasons for planning might be an unacceptable level of fire deaths or property loss, the desire to stabilize or reduce public fire protection costs, the need to reduce duplicated or overlapping fire protection services, a desire to improve joint use of regional resources, or the need to increase fire protection as a result of the community's growth. Some reasons for not planning might be the existence of a satisfactory plan, or satisfaction with the status quo.

The decision to develop a fire protection plan should be outlined in a written proposal and presented to top management within the community (city manager,

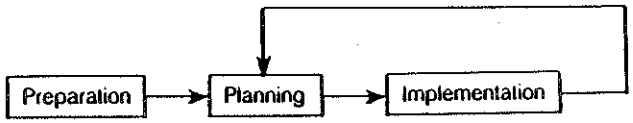


Figure 4-2 The three phases of planning

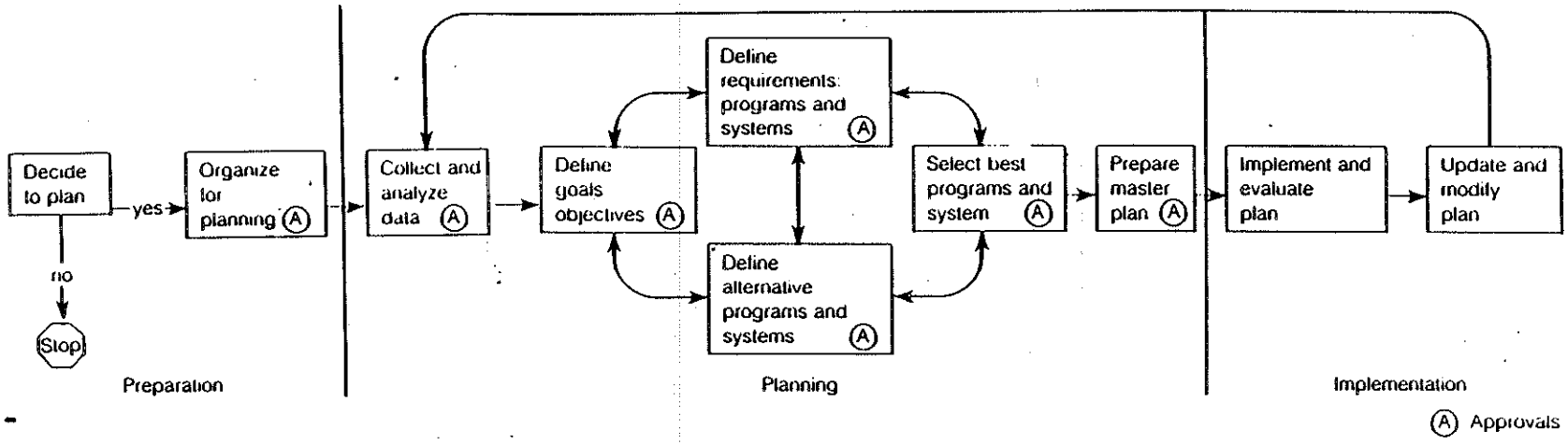


Figure 4-3 The planning process

county executive officer, etc.). Since there will be substantial economic, political, and policy impacts from this decision, a formal written proposal should be developed for adoption by the elected governing body after it has been approved by top management.

The proposal might contain the following items:

1. A discussion of the need for a fire protection plan, such as high fire loss or anticipated rapid growth
2. The benefits potentially available from a plan, such as increased citizen awareness of fire risks and fire protection, control of fire protection costs and losses, increased private sector participation with resulting reduced public sector costs, improved fire department efficiency and effectiveness, and improved coordination between public agencies
3. Identification of the planning organization, including planning team leadership, membership and functions, advisory committee membership and functions, and the responsibilities of these groups
4. The budget and schedule, with milestones, for the planning work.

Organizing for planning

Once the decision to go ahead with planning has been made, the next step is to get organized. There are many things to do: select a planning leader and team, form an advisory group, and fund and schedule the planning as specified in the planning proposal.

Planning team The planning team does the planning work. It is composed of a permanent cadre of a few planning and management-oriented professionals, augmented by resource persons as needed. Typical membership includes persons from the fire department, the planning department, the finance department, the building department, and the water department. The team is headed by a planning team leader whose functions are to assign tasks, provide guidance to the team members, coordinate the work, and report progress.

The planning team leader should also serve as the staff liaison with the advisory committee, if one is formed. The team members should be able to make decisions—to commit the group they represent—without having to obtain authorization. In other words, they have responsibility backed up by the requisite authority; this is very important—if it can be obtained. The planning team leader must be given the time and resources to manage this project.

Advisory committee The advisory committee is an ad hoc group convened especially for the planning effort. It comprises community leaders who collectively provide guidance to the planning team so that the community is represented in the process. Typical membership includes representatives of the following bodies: major industries, the chamber of commerce, local financial institutions, major land developers, private water utilities, civic groups, educational institutions, labor organizations, news media, and similar groups.

Advisory committee members should represent the significant and influential community interests that will be affected by the plan and, like the planning team members, should be persons who are accepted as spokespersons for the groups they represent. Names of committee members should be proposed by the management or leadership of their respective organizations and submitted to the governing body of the community for official appointment to the advisory committee.

The role of the committee should be clearly identified. It should review the findings and proposals of the planning team and then make recommendations to the elected body. The primary function of the advisory committee is to ensure

that the needs of a broad spectrum of the community are met by the plan. The advisory committee is intended to provide a forum for the resolution of conflicting interests. The result should be a compromise fire protection plan that has broad community support. The committee should be activated upon completion of the data gathering phase, as that part of the planning effort has proven to be time-consuming. It is important to maintain consistent progress in the planning process, with review and approval conducted in a timely fashion in order to maintain the interest and participation of the advisory committee.

The primary drawback to the use of a citizens advisory committee is the time and resources required to organize, coordinate, and support the deliberations of a committee. Successful master plans have been developed without an advisory committee. In general, however, plans developed with such committees have greater success in dealing with controversial issues and have a high rate of implementation of plan recommendations.

Using consultants Although fire protection planning must be done by those persons and organizations that constitute the fire protection system, fire protection consultants who are experienced in this process can provide technical assistance and serve as a catalyst in this process. If a community is unwilling to relieve a fire officer of a substantial number of his/her duties in order to manage this planning project, it may consider employing a consultant to perform some of the planning organization and coordination tasks.

Collecting and analyzing data

As soon as the proposal has been approved and the team has been authorized to proceed (in the form of a resolution by the governing body), the team starts the actual planning phase. The initial step is to collect and analyze data to determine the risks and problems. (For a detailed discussion of data collection and analysis, see Chapters 5 and 6.)

Data should be developed that identify the current and future fire protection risks, service demands (including EMS and hazmat) fire protection capabilities, financial requirements and revenues, and legal constraints. There is a tendency in this process to collect too much data or data that are "nice to know" but are not useful to planning. A good procedure to follow is to identify how each piece of information is used and what decisions will be made. If those questions cannot be clearly answered—don't collect the data.

The accuracy and thoroughness of the plan to be developed will depend on the quality of the data collected. This will be most evident later, when the time comes to measure progress toward the objectives that have been established for the implementation of the plan. In order to evaluate the results, it is important that the data be accurate and quantifiable. Most communities, however, discover that the available data are not adequate to support the planning process at the depth of analysis desired. The available information is frequently found to be incomplete, inaccurate, or in a form that is not readily usable in the planning process. Communities are therefore frequently forced to conduct the planning effort with incomplete data or stop the planning process while all efforts are put into data gathering.

If management decides to proceed with incomplete data, the planning team and advisory committee should review and approve this decision. It is acceptable to conduct planning with some incomplete data if the limitations are understood. However, this should be accompanied by a recommendation that an improved management information system be implemented as part of the plan.

If management decides to delay planning until *all* data are collected in the desired format, the planning process may be permanently postponed. Also if a major data-gathering effort is conducted without providing for the maintenance of the data (usually a computerized management information system) the same

data-gathering effort may have to be carried out every year to measure the results of the implementation of the plan.

Experience has shown that it is more effective to proceed with some incomplete data than to delay the planning until *all* needed data are available. Again, this recommendation is based on the assumption that an improved management information system will be one of the outcomes of the plan.

Categories of data The data required will probably fall into six general categories: demographic, geographic and physical, building and occupancy, organizational and functional (including fire incidence and loss, and EMS and other non–fire incident activities), financial, and legislative and legal. Specific data items can be identified within each of these categories. The subsequent analysis and planning cannot proceed without data on what has happened, what is happening, and what will probably happen. Insights into the future can be obtained from the historical and current data.

Demographic data Demographic data can be related to fire incidence and emergency medical services. For example, U.S. Fire Administration studies indicate that age, sex, income level, ethnic background, educational level, and neighborhood can be correlated to fire incidence and loss.[6]

Geographic and physical data The geography and physical characteristics of a community identify its existing and projected boundaries. These have a bearing on fire station locations, response times, and service demands, as do transportation networks, water systems, terrain and weather. Where brush or timber fires are a factor, the risk of the vegetation and climatic conditions should be identified. Natural disasters such as earthquakes, tornados, and floods influence emergency and rescue services and fireground operations.

Building and occupancy data For most communities, the major fire risks result from and occur in the "built" environment (that is, in existing structures and occupancies). For this reason it is important to collect building and occupancy data that include the classification and location of occupancies, number of occupancies protected by alarm systems and sprinklers, age of buildings, and heights and areas of buildings. The relative fire risk of structures is frequently stated in terms of fire flow requirements, which identify a firefighting work load based upon building size, construction type, occupancy classification, height, fire resistance of roofing, building separation, and credits for automatic sprinkler systems. Corresponding fire department resources required to deliver this fire flow can be quantified.[7]

The types and densities of structures and occupancies that are allowed in the community's zoning ordinances also determine the current and future fire protection needs of the community.

Organizational and functional data Data must be obtained on work loads in order to assess the allocation of current and future resources. These should cover fire prevention, pre-fire planning, and suppression activities; non–fire incident services; training activities; facilities and equipment maintenance; and public education. Where possible, work loads should be identified by personnel hours devoted to programs. The personnel hours should indicate the title of personnel assigned.

Fire prevention program data should identify the number and types of occupancies inspected, hazards found and corrected, fire safety education programs conducted and persons contacted, numbers and types of fire investigations, personnel time requirements by type of activity, suppression division resource allocations and activities in fire prevention, the measure of successful performance related to fire prevention programs (i.e., standard inspection frequencies.

plan check "turnaround time," maximum allowable time for hazard correction), and citation program description.

Fire suppression data should include the numbers and types of incidents that occur by occupancy type and area of the community (these are most useful when expressed as rates); injuries and fatalities to citizens and firefighters; response times and distances (for first-due apparatus and full assignments); resource commitment to incidents (personnel hours and apparatus); mutual and automatic aid agreements, mutual aid resources available and frequency of mutual aid activity; communications system capabilities and equipment; and incident command system description.

The planning team also needs data on non–fire incident services such as emergency medical services and hazardous materials control. In many jurisdictions, emergency medical service responses account for the greatest proportion of the emergency service activities of the fire department. The extent to which a fire department is involved in these activities has major economic, political, and organizational implications. Data that accurately define these factors are essential to long-range community fire protection planning.

Training program data should include training and certification requirements for employment and promotion, records of skill maintenance training by task and personnel hours, career development training; and a physical fitness program description.

A facilities inventory should include the location, size, and age of fire stations and other facilities. A description of the adequacy of the facilities and projected relocations should be included.

Data related to fire apparatus and equipment should include an inventory of the number of vehicles by type, capacity, age, and general operating condition. Schedule replacement and maintenance programs should be defined. Records of maintenance costs and downtime should be provided.

The planning effort should also include data on fire protection functions that are or should be performed by other agencies, public and private.

Financial data Among the financial data required to conduct long-range planning are current and projected costs, current and projected revenues, limitations on revenues and expenditures, and optional revenue sources.

Operating and capital expenditures for the fire department for the past five years should be provided to assess current expenditure levels and to project future cost trends. In addition, in order to determine the *total cost* of providing fire protection services, expenditures incurred by other departments must also be considered. For example, certain expenditures by the water department (such as expenditures for water storage tank capacity and water pumps) directly or indirectly support fire protection, and certain expenditures by the police department (such as expenditures for traffic control and riot control) also support fire protection. The following are some other examples of cost data:

1. Operating budgets of community departments with expenditures related to fire protection (i.e., fire hydrant testing, maintenance, and repair by the water department)
2. Capital improvement budgets of other departments for items related to fire protection (water mains and fire hydrants, for example)
3. Private expenditures for fire protection (i.e., general costs of sprinkler installation and maintenance, alarm systems installation, maintenance, and operation, industrial fire brigades, rescue and ambulance services, and hospital emergency care and burn centers).

Data on current and projected revenues come from the operating budget, public revenues available by category (i.e., taxes, fees, grants, bond issues, and revenue projections related to future growth and/or redevelopment). Optional revenue sources, both actual and potential, also should be identified.

These include fees for service, augmented fire service availability fees, permit fees, fines related to citations, environmental impact report fire protection mitigation requirements, special district assessment revenue, and property tax increases for fire protection. Limitations on revenues include state-mandated tax or expenditure limitations, legal restrictions on use of funds, legal restrictions on collection of fees, and limits on bond indebtedness.

Legislative and legal data Many legislative acts and legal decisions affect the provision of fire protection, and an informed planner needs to keep in touch with these developments at the local, state, and federal levels. The data should include current legal decisions and legislation, and projected future actions. Examples of such data are Fair Labor Standards Act provisions and enforcement, hazardous materials transportation regulations, affirmative action plans, state fire marshal regulations, OSHA safety regulations for personnel, state emergency medical and rescue service regulations, and building or fire code provisions. Preemption of local authority to adopt and enforce safety requirements should be noted.

Sources of data When the required data are identified, the possible sources should be identified as well. Data will be obtained from sources both within and outside the community. Local sources include city departments (fire, planning, building, water, finance, public works, the administrative office, school administration, the attorney's office, the clerk's office), commercial businesses and organizations (insurance companies, merchants' associations), and industry. Other sources include county agencies, regional agencies (such as councils of governments and regional planning organizations), state agencies, and federal agencies.[8] A matrix of data required together with potential sources can be constructed. Figure 4–4 shows a simple example of this, and Chapters 5 and 6 outline further sources of data.

In addition to obtaining data from traditional sources, planners may need to collect some original data. For example, fire loss and incidence data may be obtained from fire department reports and insurance records—but these traditional sources will not indicate unreported fires or losses not covered by in-

	Data required					
Data source	Demographic	Geographic	Building and occupancy	Organizational and functional	Financial	Legislative
Fire department			X	X	X	X
Planning department	X	X	X	X	X	X
Building department			X	X	X	X
Water department			X	X	X	X
Finance department				X	X	X
Public works department		X		X	X	X
Administrative office	X	X		X	X	X
School administration	X			X	X	X
Attorney's office				X	X	X
Clerk's office	X	X		X	X	X
Commerce				X	X	
Industry				X	X	
County agencies	X		X	X	X	X
Regional agencies	X			X	X	X
State agencies	X			X	X	X
Federal agencies	X				X	X

Figure 4–4 Data required and sources of data.

surance. To complete the loss/incidence data, a survey of homeowners and businesses might be conducted. The survey could be carried out by mail (in water bills, for example), by telephone, or in person. Such a survey could be instituted on an annual basis and would ask respondents to evaluate community service expectations and the extent to which those expectations are being met.

Collection methods When the data required and data sources are known, the data collection assignments should be made. Data collection will be performed primarily by the members of the planning team. As good a match as possible should be made between the collector and the source: For example, someone who is credible and known to the insurance industry will have a much better chance of obtaining insurance premium data than someone who is not. One person should be assigned to coordinate data gathering to ensure that information is complete, appropriate, and accurate.

Some persons or businesses may be reluctant to supply the data. In those cases, extra time will have to be spent on explaining the purpose of the project and use of the data, particularly to the private sector, as it is more likely to be reticent about supplying data. Confidentiality of data is all-important. Each data collector should be prepared to explain the data needed and how the data will and will not be used: the desired format should also be explained, and assurance given that confidentiality will be maintained.

There are many means of collecting the data: those employed will depend on the particular data desired. Building and occupancy data, for example, can be collected from building department records, fire inspection records, planning department zoning maps, county assessors' data, utility company records, and special surveys of the pre-fire plans of the fire department.

Previous planning reports conducted by local or regional agencies can provide valuable data. These include transportation system studies, utility system studies, and regional population and economic growth studies. Projections of future growth and development are particularly difficult. The local planning director can identify the best source of development projections. Fire departments should not attempt to develop such projections but should rely on the projections being used by other governmental agencies, especially the local planning departments.[9]

The data should be assembled as a report and displayed in graphic and tabular forms, where possible. Examples of the graphic display of information are shown in Chapter 6.

Analyzing data When sufficient data are available, the next step is to organize and analyze the data to define the current status of the fire protection system—risk conditions and performance—and to identify existing or future problems.

Criteria for useful data The analysis should be both quantitative and qualitative. Some questions that should be answered are

1. Do the data clearly and accurately specify conditions and problems?
2. Will the data selected enable managers to measure results (i.e., to determine when desired conditions or problem resolutions are attained)?
3. Do management personnel within the fire protection system and the advisory committee agree that the data are acceptable measures of results?
4. Can the data be readily maintained and updated to meet planning and management needs throughout the anticipated life of the plan?

After this analysis it may be necessary to conduct additional data gathering or to delete certain data. Two key points regarding the data gathering and analysis should be kept in mind:

1. These data will be the criteria used to choose the "best" programs.
2. These data will form the basis for measuring performance and the subsequent results.

Defining the situation Fire risk and protection can be analyzed in several ways. One is to make a statistical summary of the structures and other risks in the planning area, including, for example, the distribution of building construction (type, area, and height), occupancy classification, and fire flow required. Such a summary will give a picture of what there is to burn and how it will change with time in the future (i.e., the fire risk).

A second method of analysis would be to summarize the fire and emergency medical response history within the community. For fire, such a summary might include, for each year, total responses, actual fires per 1,000 population, fires by type, fires by time of day, fires by occupancy, fires by source, fires by type and form of material, fires by ignition factor, civilian deaths by age and by cause, firefighter deaths by cause, civilian and firefighter injuries by type. Other information that might be included is property loss by occupancy and total property loss as well as the rate or percentage of incidents by type. For emergency medical services, useful data would be the number of responses by area of community, type of EMS calls, response times, types of service provided (basic life support or advanced life support). These fire and EMS histories can be extrapolated to the end of the planning period to obtain a projection of the fire and EMS experience for the near future.

A third means of analysis employs scenarios. A fire scenario is a sequential listing of the events and circumstances resulting in a loss, injury, or fatality. It can be used to link the type of loss with the events of a fire and to provide a description of the many elements of the fire problem in a concise form that is easy to comprehend.

Losses from fire are a direct result of a sequence of events embedded in a set of circumstances. If the chain of events should be broken or the circumstances altered, the end result—a loss—could be averted. Greater knowledge of the events and circumstances and of their causal relationships could help to prevent loss by indicating where to intervene in the chain of events or how to modify the circumstances.

The losses, events, and circumstances can be grouped into six categories: type of loss, type of occupancy, time of day, ignition source, item ignited, and direct cause of loss. Major constituent elements of each category can then be defined. (Figure 4–5 is an example of such a grouping.) A scenario can then

Type of loss	Type of occupancy	Time of day	Ignition source	Item ignited	Direct cause of loss
1. Death 2. Injury 3. Property	1. Industrial 2. Commercial 3. Public assembly 4. Institutional 5. Transportation 6. Residential 7. Independent of occupancy	1. Day 2. Night	1. Friction 2. Flame 3. Matches/lighters 4. Smoking material 5. Electrical equipment 6. Electrical wiring 7. Heating/cooking surface 8. Spontaneous 9. Arson 10. Other	1. Flammable fluids/gases 2. Furnishings 3. Structure 4. Interior finish 5. Apparel 6. Other	1. Smoke/gas 2. Heat/flame

Figure 4–5 Fire scenario elements.

be formed by linking the elements, using one from each category (for example, death–residential–night–smoking–furnishings–smoke and gas.)

This scenario indicates that death occurs directly from smoke and gas emitted from burning furnishings, such as a mattress or a blanket, which were ignited by smoking materials, perhaps a cigarette that was carelessly handled, at night in a residence. It might be pointed out that this sequence of events, or scenario, represents perhaps the most common cause of fire-related death.

In general, the data needed to perform fire scenario analysis are obtained from fire incidence reports, which should contain the following information for each fire incident:

1. The occupancy identification
2. The time of day of the fire occurrence
3. The source of ignition
4. The spreading agent (item ignited)
5. The direct cause of loss
6. The loss(es).

Scenarios are by no means arbitrarily generated. They are derived by ranking fire incident data as follows:

1. Losses ranked in order of frequency
2. Occupancies ranked in order of frequency of each of the losses (death, injury, property)
3. Time of day ranked in order of frequency for each occupancy
4. Ignition source ranked in order of frequency for each time of day
5. Item ignited ranked in order of frequency for each ignition source
6. Direct cause of loss ranked in order of frequency for each item ignited.

Scenarios give a good idea of the causes of fire losses and the relative importance of these causes. This information can be used to devise intervention strategies such as educational programs, automatic suppression devices, and early warning devices, which would break the scenario chain of events and would thus prevent or reduce the loss. These events can be the subjects requiring action that have been identified as goals and objectives.

In order to use the scenario process effectively, a department needs an accurate data base containing a significant number of incidents. Fire departments that experience a low volume of incidents can use regional or statewide fire incident data where available. If data are unavailable, a department can develop a generalized scenario and identify effective intervention actions. Figure 4–6, for example, is a generalized scenario that indicates fire growth to flashover as compared with fire suppression response elements. The significant intervention is the activation of an automatic sprinkler system. These generalized scenarios are best displayed graphically rather than statistically. The result of this analysis should be a comparison of the fire control resources and fire risks as compared with current and projected fire protection resource capabilities.

Other methods of analysis that can contribute to planning are described in Chapter 6. They include detailed evaluations of comparative service levels and fire attack capabilities.

Defining goals and objectives

The next major step is to define goals and objectives that identify the purposes and results desired of the fire protection system. Together, goals and objectives establish the level of service to be provided in the community. The goals are policy statements of organizational purpose or intent. They describe ends toward which the department is working. Objectives, on the other hand, are specific interim results that are expected within a given time; in this sense they are

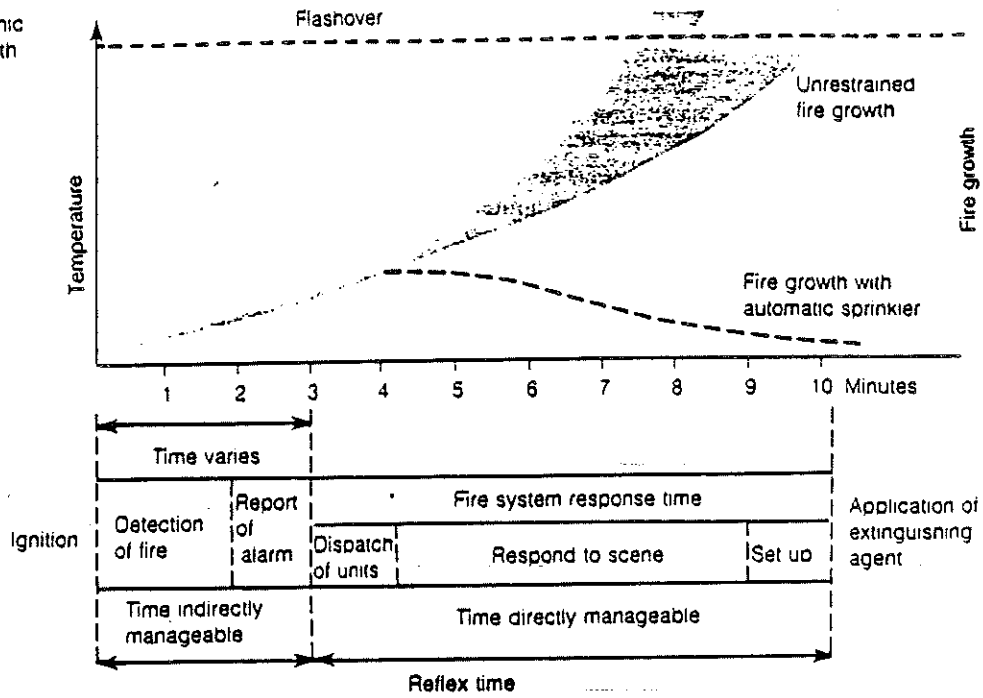


Figure 4–6 Graphic scenario: fire growth versus reflex time.

milestones. Goals and objectives should address the current status of fire and emergency medical services and outline measurable increments of change toward the desired status. Each time an objective is achieved, the level of service moves closer to a given goal. Goals and objectives should be as independent of the means of accomplishment as possible; they should state what to do, not how to do it. The "how" is addressed later in programs.

Mission statement The goals and objectives that come out of the planning process need to relate directly to the mission of the organization. If the department does not have a formal mission statement, the planning process is a good time to formulate one. The mission statement can be compared to the top of a pyramid—it is the capstone of the organization (see Figure 4–7). It states why the fire service delivery system exists and provides a structure for all of

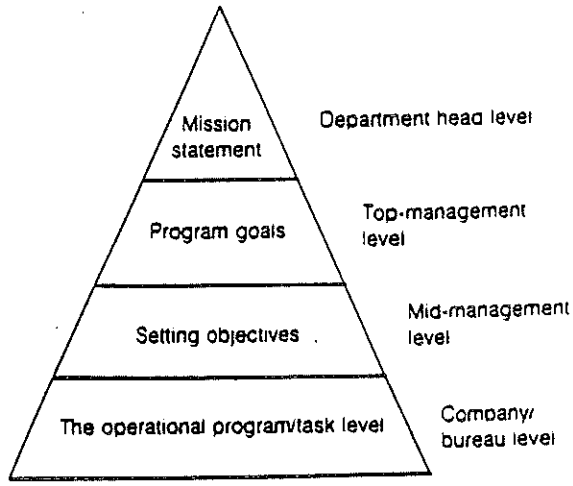


Figure 4–7 Mission statement as the capstone of the organization, with supporting goals and objectives, carried out by operational-level tasks.

the department's goals and objectives. It should look at the needs of the community as well. An example of a mission statement appears in Figure 10–2. Note that a mission statement should be closely linked with the enabling legislation that forms the overall organization.

Goals Fire protection goals define the levels of service and acceptable risks that meet the unique needs of a community. They form the basis for fire protection "standards," which are established as objectives. Here are some sample goals:

1. Provide adequate fire protection at acceptable cost
2. Reduce fire risks
3. Control fire losses
4. Achieve fire safety awareness at all levels of the community
5. Provide emergency medical life support services
6. Provide hazardous materials control services
7. Reduce overlapping services.

The fire protection system consists of subsystems, the goals of which may be in conflict. For example, the building department may prefer to modify building codes by submitting proposed changes to national building code organizations, whereas the fire department may consider local modifications to be more timely and effective. Resolving such conflicts is one of the primary purposes of the planning team and advisory committee reviews, deliberations, and recommendations.

Public fire protection policy is established when the elected body approves and adopts the goals. Although details of a plan are not normally reviewed with the elected officials during the development phase, a study session to review proposed goals would be an appropriate method of providing guidance to the planning team, since future steps in the planning will be based on the basic policies defined by these goals.

Objectives After goals have been tentatively adopted, the next step is to develop the objectives, which are then reviewed and approved by the advisory committee. Objectives define the standards for community fire protection (i.e., the levels of service) and are used to measure progress toward the attainment of goals. Objectives are used to develop specific fire protection system programs and resource requirements, to evaluate alternative programs and ultimately select the "best," and to evaluate the efficiency and effectiveness of programs that have been implemented. Guidelines for setting objectives appear in Figure 4–8. At least one objective should be developed for each goal. Here are some sample objectives:

1. The first-due engine will arrive within five minutes at 95 percent of the fire incidents.
2. All firefighters will attain and maintain Emergency Medical Technician certification with eighteen months.

Figure 4–8 Guidelines for setting objectives.

1. An objective should be consistent with authoritative goals (local government and fire department policy, charter provisions, and so on).
2. An objective should be stated in behavioral terms, as a guide to action. That is, it should clearly describe desired, observable results.
3. An objective should have intermediate targets and a specific completion date—in terms of the budget year or other time schedule.
4. An objective should include specific performance criteria, such as how many, what percent, which site, personnel levels, and costs.
5. An objective should be both challenging and attainable.

3. All hospitals and rest homes will be inspected semiannually by the fire prevention bureau.
4. A fire safety education program will be provided to all school-age children annually.
5. All apparatus shall receive a six-month preventive maintenance inspection, and no apparatus failures will result from a lack of preventive maintenance.

The accompanying sidebar gives examples of goals and corresponding objectives for the EMS component of a fire department plan.

Defining programs and resources required

After goals and objectives are set, planners need to determine what programs and resources are required to attain them. They need to answer the following questions:

1. What must be done to attain the objectives?
2. How will it be done?
3. When will it be done?
4. Who will do it (identified authority and responsibility)?
5. What resources (personnel, apparatus, materials, legislation, codes, etc.) are needed?

The programs proposed must meet the requirements of each objective. One program may provide the requirements for more than one objective.

Defining alternative programs

Often it is desirable to propose several possible ways to achieve a given objective. Each set of alternatives will be analyzed and the "best" program selected. A word of caution is in order here, however. While classical planning doctrine requires that two or more alternative programs be developed for each objective, attempts to do this can overwhelm and stall the planning effort. Develop alternative programs only when there are viable alternatives.

For example, here are alternatives to accomplish two objectives:

1. *Objective:* Inspect all commercial occupancies annually.
   a) Alternative 1: All inspections will be performed by fire prevention personnel.
   b) Alternative 2: Thirty percent of inspections will be performed by fire prevention personnel and 70 percent by suppression division personnel.
2. *Objective:* All fire apparatus shall recieve preventive maintenance inspections every six months.
   a) Alternative 1: Preventive maintenance will be performed by city shops.
   b) Alternative 2: Preventive maintenance will be performed by a qualified apparatus manufacturer.

The planning team then discusses alternatives to determine which ones are viable and deserve further analysis. The results should be reviewed with the advisory committee.

The planning team may be directed to evaluate major system alternatives as options (e.g., police-fire consolidation, contract fire protection, civilianization of certain divisions or positions, joint service agreements, volunteer/career staffing, and so on). These alternatives, which are discussed in detail in Chapter 17, can be evaluated effectively and unemotionally if the goals and objectives

accurately and specifically define service level standards. It is recommended that a guideline be established that requires a proposed alternative system to meet *all* goals and objectives. It has frequently been found that some of the most controversial systems are able to meet documented goals and objectives only after major revisions to the basic concept.

EMS goals and objectives For the fire department planning the development of an EMS component the following goals and objectives might be typical:

Goal I: Provide first-response and basic life support services in cases of medical emergency

Objectives:

1. Develop operational policies in coordination with hospital, medical director, police agencies, and ambulance services, by (*date*)
2. Design, purchase, and install radio and telephone communications equipment to permit public access to emergency medical services and to permit coordination between EMTs, public safety agencies, ambulance services and hospitals, by (*date*)
3. Equip designated apparatus and rescue vehicles with basic life support equipment and supplies, by (*date*)
4. Modify department training programs to provide continuing education of EMTs and maintenance of basic life support skills, by (*date*)
5. Train [*number to be inserted*] firefighters to level of EMT, by (*date*)
6. Initiate service, by (*date*).

Goal II: Provide advanced life support services and emergency ambulance transportation in cases of life-threatening medical emergency

Objectives:

1. Establish contractual relationship with medical control hospital for training of [*number to be inserted*] personnel as mobile intensive care paramedics and for continuing education, skill maintenance, and medical control functions, by (*date*)
2. Establish selection criteria and solicit paramedic training applications from among personnel previously trained to EMT level, by (*date*)
3. In coordination with medical control hospital, establish commencement date for paramedic training and arrange for appropriate staffing to replace personnel assigned to training program, by (*date*)
4. Establish specifications for mobile intensive care vehicles, equipment, and communications hardware and commence purchasing procedures, by (*date*)
5. Initiate paramedic training program, by (*date*)
6. Develop operational policies in coordination with medical control hospital, medical director, police agencies, and ambulance services, by (*date*)
7. Conduct community public education/orientation program in preparation for initiation of mobile intensive care service, by (*date*)
8. Take delivery of vehicles, equipment, and communications hardware and prepare for service, by (*date*)
9. In coordination with medical control hospital, medical director, and appropriate health-related agencies, prepare reporting instruments and procedures to facilitate ongoing evaluation of mobile intensive care program, by (*date*)
10. Conduct paramedic graduation exercises and initiate service, by (*date*).

The foregoing goals and objectives are not intended as a complete list of planning considerations for the respective programs; they merely illustrate the distinction between generalized goals and specific objectives.

At this point the viability of those alternatives would be identified and documented for analysis in the next task. Programs and program alternatives are reviewed and approved by the advisory committee.

Comparing alternatives and selecting the best programs

The planning team then analyzes the alternatives that have been identified and selects the ones that members believe will work best as components of the community's fire protection system. Alternatives should be judged against the quantifiable elements of the objectives as the selection criteria if at all possible. In some instances, however, qualitative analysis will be required. The results of this analysis also should be reviewed and approved by the advisory committee.

Preparing a documented plan

The planning document is prepared using the programs and/or systems selected in the previous step. The document should contain the following:

1. An executive summary, giving the highlights of the plan
2. A description of the reasons for conducting the plan, including a summary of the data analysis (a complete listing of data collected may be provided in an accompanying document)
3. A description of the planning organization, including acknowledgment of contributions to the planning effort, especially those of citizens, public agencies, and private sector organizations
4. Goals and objectives for the fire protection system
5. Requirements for achieving the goals and objectives
6. A summary of the alternatives and a description of the programs and systems selected
7. An implementation plan that specifically identifies the time schedule and management responsibility for the implementation of the programs
8. A budget for the forthcoming fiscal year
9. A long-range capital improvements plan
10. A community general plan element that incorporates the appropriate goals and objectives of the fire protection plan into the community general plan
11. Ordinances for adoption or modification of building/fire codes, zoning changes, fee schedules, and so on
12. A schedule for the periodic evaluation and revision of the plan and programs.

Implementing and evaluating the plan

The first step in the implementation phase is to have the plan approved by the governing body. The governing body should schedule study sessions and/or public hearings at which the community management personnel, the planning team leader and the advisory committee present the completed plan. The governing body will generally take the following actions:

1. Approve and adopt the plan in concept (this document is too large and dynamic to be formally approved and codified)
2. Approve annual budget
3. Approve capital improvements schedule
4. Approve revision of community general plan
5. Approve revised codes and ordinances.

After approval, the managers of the various departments and community agencies implement the plan as they assign program responsibility, establish resource allocation plans, and monitor the progress of programs that are part of the plan. Specific day-to-day management techniques are covered in other chapters.

An integral part of implementation is evaluating the results. Reporting and evaluation procedures should be established to ensure that the intended results of the plan are achieved. These evaluations should be conducted on a schedule to coincide with other reporting—for example, monthly activity reports, annual reports, and scheduled expenditure analysis. Again, it should be noted that most fire departments need to upgrade their management information systems to effectively monitor and evaluate the implementation of a long-range plan.

Updating and modifying the plan

The plan should be designed to respond to changing conditions in the community. It should be modified if projected or unexpected changes occur that affect the fire protection system or if the programs that have been selected as part of the plan are not producing the desired results (goals and objectives). These plan updates should become a part of ongoing management activities (i.e., annual budget preparations, capital improvements plan revisions, general plan amendments, and building/fire code revisions).

Some communities retain the advisory committee or planning team to review progress toward goals and to recommend plan modifications, but most find it preferable to integrate this process into the normal management functions of the organization.

The outlook

What trends in fire protection will affect the planning efforts of local communities? Perhaps the forecast might be:

1. Fire protection will focus less on suppression as a result of increased fire prevention activities.
2. Increased installation of automatic fire detection and suppression systems will continue to reduce fire losses.
3. Fire protection responsibility will continue to shift to the private sector.
4. The emergency medical service demands will continue to be a significant part of the fire protection system.
5. Fire departments will be expected to provide increased services in hazardous materials incident prevention and control.
6. Planning—along with organizing, implementing, and measuring—will continue to change the technician role of the fire service manager. He or she will increasingly need to assess future possibilities and plan to meet them rather than react to changes as they occur. An important criterion in assessing the effectiveness of the fire department will be the ability to manage change and innovation (see Chapter 16).
7. Funding for fire protection will continue to be limited. Reductions in available "public safety" funding will result from limited public financing and increased competition for the public safety dollar.

The need for long-range planning is evident and the methodology is available. Whether it can help solve some of the problems of providing fire protection will undoubtedly depend on how public-sector managers perceive the benefits and costs of initiating and implementing planning. There are definite costs or disincentives to planning. Foremost is the consideration that the planning should be participatory—that is, that planning is best done by the community, not by

a small group in the fire department or by an outside consultant. Only through community participation, however, will the commitment and cooperation be forthcoming to support the programs in the plan. Many of the cities that have performed fire protection planning have discovered that the *process* of planning was as important as the end product. In many instances the planning project provided a unique opportunity for an interdisciplinary effort toward a common goal. The experience of working with members of other departments and with citizens gave fire department members a new perspective, which was just as important as the plan.

Another disincentive is a lack of planning expertise and experience. Many communities, especially small ones, feel that they have no personnel with sufficient planning and management abilities to lead or participate in a major planning project. A number of options are available to communities to meet this need:

1. Master planning guides developed by the U.S. Fire Administration contain procedures that may be used by any fire department or government official. These guides went out of print but are still valid if they can be obtained from a library or another source.
2. Training courses in planning procedures are available through some state fire academies.
3. A member of a local or regional planning agency may be recruited to serve on the planning team to provide expertise in planning methods.
4. Consultants with fire protection planning experience are available to provide assistance.

1 For example, Michael J. Jucius and William E. Schlender, *Elements of Managerial Action* (Homewood, Ill: Richard D. Irwin, 1965), 4–5. Peter F. Drucker, *Management: Tasks, Responsibilities, Practices* (New York: Harper & Row, 1974), 121–22; and Robert C. Ford and Cherrill Heaton, *Principles of Management* (Reston, Va.: Reston Publishing Company, 1980), 19.

2 Peter F. Drucker, *Technology, Management & Society* (New York: Harper & Row, 1970), 131.

3 National Fire Prevention and Control Administration, National Fire Safety and Research Office, *Urban Guide for Fire Prevention and Control Master Planning* (Washington, D.C.: Government Printing Office, 1977 and *A Basic Guide for Fire Prevention and Control Master Planning* (Washington, D.C.: Government Printing Office, 1977).

4 The U.S. Fire Administration lists 91 communities that contacted the administration for technical support and developed master planning documents. In addition, the following agencies are known to the author to have developed community fire protection master plans using the process developed in this chapter: Auburn, Washington, 1982; California State Fire Marshal, 1986; Clark County No. 5, Washington, 1985; Contra Costa County, California, 1981; Cowlitz County No. 2, Washington, 1983; El Segundo, California, 1983; Fresno County, California, 1981; Gig Harbor, Washington, 1984; Hanford, California, 1985; King County Fire District No. 20, 1979; Lake Tapps, Washington, 1985; Livermore, California, 1984; Morgan Hill, California, 1986; Palm Coast, Florida, 1985; Pleasanton, California, 1982; Sierra Vista, Arizona, 1985; and Vancouver, Washington, 1985.

5 See, for example, Philip S. Schaenman and Edward F. Seits, *International Concepts in Fire Protection: Practices from Japan, Hong Kong, Australia, and New Zealand* (Arlington, Va.: TriData, 1985); and Philip S. Schaenman, *International Concepts in Fire Protection: Ideas from Europe That Could Improve U.S. Fire Safety* (Arlington, Va.: TriData, 1982).

6 See, for example: National Fire Prevention and Control Administration, *The Human Factor in High Fire Risk Urban Neighborhoods: A Pilot Study in New Orleans, Louisiana* (Washington, D.C., 1976); *Highlights of the National Household Fire Survey* (Washington, D.C., n.d.); and *Fire Education Planning* (Washington, D.C., 1977).

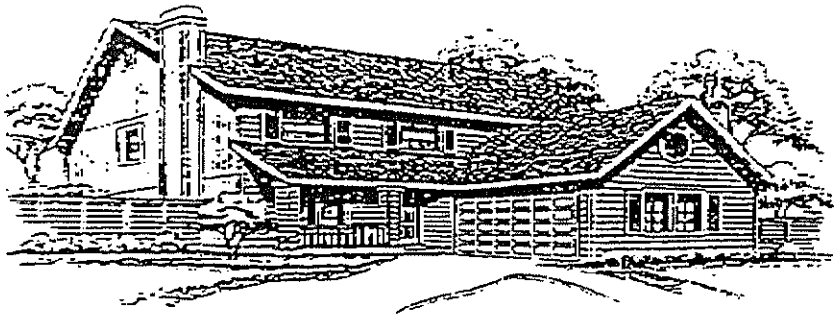
7 National Fire Prevention and Control Administration, *Urban Guide for Fire Prevention and Control Master Planning*, appendices V and VI.

8 See, for example, National Fire Incident Reporting System (NFIRS), developed by the National Fire Prevention and Control Administration; the Uniform Fire Incident Reporting System (UFIRS), developed by the National Fire Protection Association; the California Fire Incident Reporting System (CFIRS); the Fire Incident Reporting and Evaluation System (FIRES), developed and used by the California cities of Huntington Beach, Seal Beach, Fountain Valley, and Westminster; and the Field Incident Reporting System (FIRS), developed by the Los Angeles Fire Department in the early 1960s.

9 A good reference on techniques of data gathering is: Carl V. Patton, "Information for Planning," in *The Practice of Local Government Planning*, ed. Frank S. So and Judith Getzels, 2d ed. (Washington, D.C.: International City Management Association, 1988).

WHY JOHNNY CAN'T AFFORD

A HOUSE



LUXURY HOME

3,064 SQ. FT.

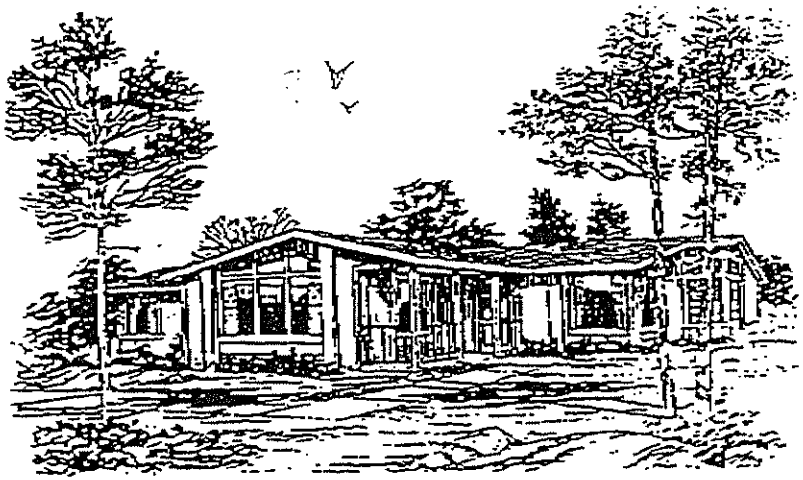
COST

CONSTRUCTION ($50.00 sq. ft.)		$153,200	38%
DEVELOPER PROFIT		$107,924	27%
LOT		$ 80,000	20%
REALTOR FEE		$ 24,000	6%
FINANCIAL LOAN POINTS/INTEREST/TAXES		$ 20,000	5%
PERMIT FEES			
HUD1	$ 4,766		
SCHOOL	$ 4,596		
SANITATION	$ 1,900		
		$ 11,262	3%
FIRE PROTECTION			
RESIDENTIAL FIRE SPRINKLERS	$ 3,524		
SMOKE DETECTORS	$ 90		
		$ 3,614	1%

SALES PRICE= $ 400,000

WHY JOHNNY CAN'T AFFORD

A HOUSE



MODULAR/MANUFACTURED HOME

1,152 SQ. FT.

COST

CONSTRUCTION ($37.00 sq. ft)		$ 42,600	28%
DEVELOPER PROFIT		$ 47,173	32%
LOT		$ 35,000	23%
REALTOR FEE		$ 9,000	6%
FINANCIAL LOAN POINTS/INTEREST/TAXES		$ 7,000	5%
PERMIT FEES			
MUNI	$ 3,917		
SCHOOL	$ 1,720		
SANITATION	$ 1,900		
		$ 7,537	5%
FIRE PROTECTION			
RESIDENTIAL FIRE SPRINKLERS	$ 1,600		
SMOKE DETECTORS	$ 90		
		$ 1,690	1%

SALES PRICE= $ 150,000

WHY JOHNNY CAN'T AFFORD A HOUSE

This analysis is the result of a frustration with myths concerning the alleged relationship between the cost of residential fire protection and the cost of affordable housing. As John Kennedy once said, "The great enemy of the truth is very often not the lie, deliberate, contrived and dishonest; but the myth, persistent, persuasive and unrealistic."

The accompanying figures are based on actual homes constructed in the City of Napa. As shown on the accompanying diagrams, costs have been listed in descending order and are believed to reflect statewide patterns.

Local governments are constantly under criticism regarding building requirements, permit fees and environmental impact mitigation measures, and their effect on affordable housing. However, reducing these costs will not substantially alter the cost of housing. Several other conclusions may be drawn from these simple diagrams, and several myths may be dispelled:

1. Actual material and construction costs may be assumed to be fairly constant throughout the state, therefore costs per square foot as shown reflect a statewide average.

2. Lot costs do fluctuate widely throughout the state and may differ from the lot cost represented on the diagram. Lower land costs can result in lower selling prices or increased developer profits. Without local or state government intervention, any savings probably will be reflected in increased developer profits.

3. Real estate fees are also a large cost factor n the diagram. Commissions, while officially negotiable, tend to average around 6% in the California residential sales market. The total commission has been escalating sharply in the past several years along with the substantial price increase in housing. Real estate fees will only continue to increase, to the detriment of the possibility of affordable housing, until there is a consistent voluntary effort, or legislation, to control them.

4. Financing costs for the land and construction of houses vary with the market. Reducing the cost of financing can provide some assistance to those seeking affordable housing. However, as shown on the diagram, the amount that can be saved as a percentage of the total cost of a house is minimal. A minor reduction in financing rates will have little effect on the sales price of the house.

5. Permit fees do vary by locale, but once again represent a minor portion of the sales price of a house. Reducing permit fees will not substantially alter the production of affordable housing in a

community and may result in developers not paying their fair share for municipal services.

6. The cost of fire protection is the issue that is, as John Kennedy stated, "the myth, persistent, persuasive and unrealistic." The accompanying figures show that life safety fire protection being provided at the local level is the least costly factor in the affordable housing budget. In fact, the application of fire retardant roofing, residential fire sprinklers, smoke detectors and other fire and life safety systems will permit increased densities, decreasing land costs per house.

7. A very substantial factor in the affordability dilemma is the amount and percentage of profit realized by developers. This factor does fluctuate throughout the state as costs fluctuate and the supply and demand equation comes into play. Without governmental intervention to address developer profits as it affects affordable housing we will continue to see an escalation of profit as any of the other cost factors decrease.

It is hoped that this document and the accompanying diagrams will dispel some of the myths regarding fire and life safety protection and its relationship to affordable housing. It is further hoped that the real obstacles to affordable housing - escalating land costs, real estate fees and developer profits - will be highlighted.

The California Fire Service will work with any group to provide fire safe affordable housing. However, we believe that all income groups are entitled to equal protection from the ravages of fire.