MORRO BAY FIRE DEPARTMENT

5 YEAR STRATEGIC PLAN

1. INTRODUCTION:

This is the Strategic Plan for the Morro Bay Fire Department. This plan is prepared solely for the Morro Bay Fire Department and the City of Morro Bay for their use in planning for increased fire protection needs in anticipation of the cumulative impact of the community, and the Duke Power Plant project, upon the Fire Department for the years 2004-2008. It is not intended for use by any other person or entity.

This plan profiles the current Fire Department delivery system and it's current capabilities. The current profile is then contrasted against the risks and impacts created by community and the Duke Power Plant, as well as current and projected incident demand. Then, based upon the data presented, and nationally accepted standards of good practice, recommendations are made for improvement of the Fire Protection Delivery System.

2. PROFILE OF MORRO BAY AND ITS FIRE DEPARTMENT:

A. City:

The City of Morro Bay is a picturesque 10.3 square mile (including the bay) seaport town in San Luis Obispo County. The town is situated between sea level and 600' above sea level. The year around population is 10,000, however, approximately 1.5 million tourists visit Morro Bay annually.

The town is mainly residential with a high percentage of retired persons. The Town includes a high-density waterfront area with many shops, motels, restaurants, and a commercial fishing port. The waterfront area includes piers and floating docks. The Duke Power Plant is located in the area of the Waterfront.

B. Fire Department:

For many years, the residents in Morro Bay have received a high level of emergency services from its Fire Department. The Department provides a full range of services including structural fire suppression, wildland fire suppression, paramedic emergency medical services, initial HAZMAT response, vehicle extrication, technical rescue and confined space rescue response. The Fire Department serves as first responder to all non-law enforcement related emergency incidents in the City including incidents at the Duke Power Plant.

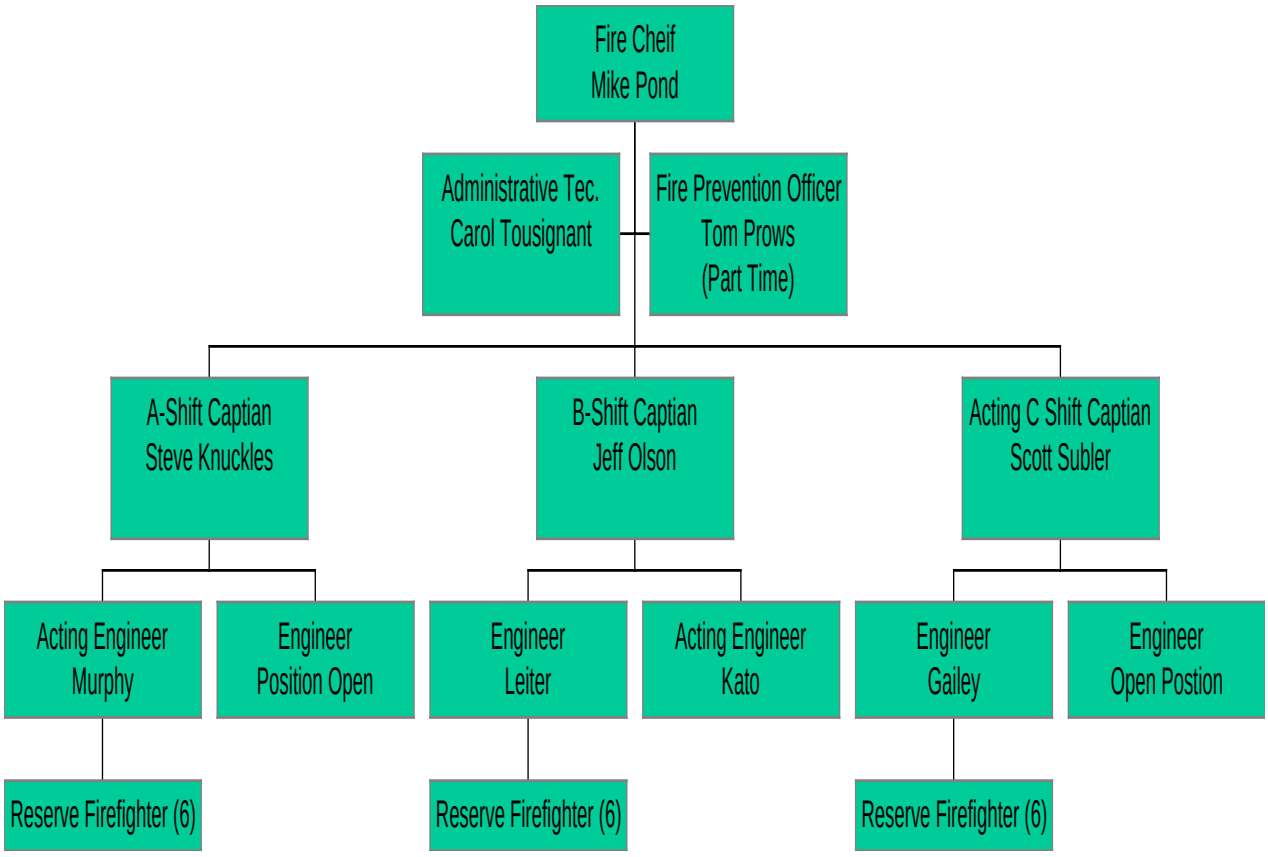
The success of a fire department is dependent on the Fire Department's ability to have resources readily available with the training and experience to use those resources effectively and efficiently. On an emergency incident, this success is achieved by the incident commander who

is responsible for managing the available personnel and equipment to achieve maximum results, depending on the situation, associated conditions, and the resources available.

The Department operates out of two fire stations. The main station (Station #53) is at 715 Harbor. This station, an old converted residence that has been added onto, is staffed daily. The other station (Station #54) is at 460 Bonita Street and is unstaffed. It is equipped with one engine.

Total paid fire suppression staffing for the Fire Department is 9 plus the Fire Chief. In addition to the paid staff, there is an average paid call force of 14 reserve firefighters. They are compensated at various rates based upon their training and experience. They fill in when paid staff is off duty. This amounts to a total of approximately 2700 hours per year.

The on-duty staffing is comprised of one captain and two fire engineers. Scheduled vacations, training and sick leave reduces staffing to two persons on duty. However, the Department attempts to keep three on duty by utilizing one reserve firefighter to fill in if a paid firefighter (engineer or captain) is off duty. If the captain is off duty, an engineer will assume an acting-captain position. There is one chief officer and that is the Fire Chief. There is also one secretary. There is no other 40-hour week staff. Therefore, the Chief is responsible to handle fire prevention, plan review and training matters that are usually handled by additional chief officers in most fire departments. The Department must also rely on utilizing the shift captains for additional administrative and programmatic duties.


Fire Cheif
Mike Pond
Administrative Tec.
Carol Tousignant
Fire Prevention Officer
Tom Prows
(Part Time)
A-Shift Captian
Steve Knuckles
B-Shift Captian
Jeff Olson
Acting C Shift Captian
Scott Subler
Acting Engineer
Murphy
Engineer
Position Open
Engineer
Leiter
Acting Engineer
Kato
Engineer
Gailey
Engineer
Open Postion
Reserve Firefighter (6)
Reserve Firefighter (6)
Reserve Firefighter (6)

Due to changing demographics, and the cost of living in Morro Bay only three of the full-time firefighters live in Morro Bay. Of the remainder, two live in Los Osos (a minimum of a 6-mile/12 minute response to Station 53), one lives in Paso Robles and two live in Atascadero. From the North County, it is a minimum of a thirty-minute response back to the City. If an earthquake or severe weather incident were to occur firefighters who live in areas outside the City might not be able to get to Morro Bay due to damage on the highways.

Records indicate that when a General Fire alarm is ordered (a total recall of off-duty and reserve personnel), an average of 3.61 off-duty personnel respond. This increases the on scene staffing to approximately six plus the Fire Chief. General Alarms occur approximately 57.25 times per year.

A single company routinely handles many incidents with the company officer functioning as the incident commander. When an incident requires a large commitment of resources, a chief officer should respond and assume command. A chief officer will usually take over incidents involving three or more companies.[1] In the City of Morro Bay this responsibility falls solely on the Fire Chief. If the Fire Chief is not available, there is no chief officer to assume command; which would allow the officer in charge of the first-arriving company to return to the supervision of his/her crew.

The Fire Chief is the only chief officer available to assume the role of the Incident Commander (IC) at significant incidents. Implementation of the Incident Command System (ICS), under the direction of the Incident Commander, is required at all incidents per OSHA, the State of California Standardized Emergency Management System (SEMS) and Mutual Aid System requirements. If the Chief is unavailable or out of town, a fire captain must assume the role of the IC and must therefore extract himself from the actual emergency activities, such as search and rescue or advancing hose lines. This further reduces the on scene company staffing.

At major incidents, ICS requires assignment of an Operations Chief to be in charge of actual combat operations, under direction of the Incident Commander. Division Supervisors are also required for major incidents with multiple divisions. In addition, there are other required ICS positions, such as Safety officer, etc., which must be filled. The MBFD, as currently staffed, cannot establish a regulation compliant ICS without the use of mutual aid personnel.

Fire fighting safety must be the primary concern of the incident commander. The National Fire Protection Association, who promulgates the majority of the national fire service standards for the Nation, recognizes that the size of the crew assigned to a company is a local decision and varies with the fire risk in a given area. NFPA 1500, Standard for Fire Department Occupational Safety and Health Program, recommends at least four crewmembers for interior structural fire fighting, on the basis of safety and efficiency.[2] This four-person recommendation is in addition to command staff. NFPA 1710; "Career Fire Department Organization and Deployment" recommends that a company be staffed by four firefighters.

The Fire Department is currently staffed with three persons to a shift and has contractual agreements to maintain a minimum of two full-time firefighters on-duty.[3] This staffing is

[1]National Fire Protection Association (NFPA), Fire Protection Handbook, Eighteenth Edition (1997), Page 10-11.
[2]NFPA Fire Protection Handbook; Eighteenth edition; Page 10-67
[3]City of Morro Bay, MBFF Memorandum of Understanding, Article 9, pg. 6.

augmented with the Reserve Firefighter program, by striving to add one part-time person when a full-time member is scheduled off-duty. This was mandated by the City Council 11-24-03.

The annual budget for the Fire Department is $1.3 Million.

The current Insurance Services Office (ISO) rating is a Class 5. An ISO Class 1 is the best community rating and a Class 10 is the worst.

C. Fire Apparatus:

The Fire department operates the following types of Fire Apparatus.

1. Engine 5391 - a 1995 Pierce, 1500 GPM Type I fire engine. This engine is Advanced Life Support (ALS) equipped and serves as the first out apparatus to emergency calls. The paid staff responds with this unit.

2. Rescue Squad 5351 - a 1995 GMC. This ALS equipped unit responds to traffic accidents, or secondary responses with an on-duty paid firefighter or with off-duty recalled staff or reserve personnel. The combination of the squad and the USAR response trailer qualify as a Type 2 (Medium) USAR unit.

3. Truck 5342 - a 1983 75' Pierce Aerial/ Quint with a 1500 GPM pump and a full complement of truck equipment. ISO grants full Ladder truck credit for this unit. This unit is staffed with off-duty recalled staff or reserve personnel.

4. Engine 5381 - a 1983 Pierce, Type II/III, Urban/ wildland interface fire engine. This unit is staffed with off-duty recalled staff or reserve personnel.

5. OES Engine 274 - a 1999 Weststates, 1,000 GPM Type I fire engine/Type III USAR. This engine is on loan from the State of California Office of Emergency Services. This unit is staffed with off-duty recalled staff or reserve personnel. It is available for response to mutual aid incidents statewide as a part of the Statewide Mutual Aid system.

6. Command 5300 - a 2000 Ford Expedition that is utilized by the Fire Chief as a response and command vehicle.

7. Utility 5331 – a 2001 Ford F-250 that is utilized as a work truck. This vehicle is a designated tow vehicle for the various emergency response trailers. Also used as a secondary command vehicle. This unit is staffed with off-duty recalled staff or reserve personnel.

8. Utility 5332 – a 2003 Ford F-250 that is utilized as a crew transport and work truck. This vehicle is a designated tow vehicle for the various emergency response trailers. This unit is staffed with off-duty recalled staff or reserve personnel.

9. USAR Trailer.

10. Multi-casualty trailer.

D. Community Risk Profile:

The City of Morro Bay has many varied risks. The risks are not concentrated in any one area, but occur in various locations. In order to assess such risks, the following risk classifications are used. The classifications are a product of the probability of an event occurring and the consequence of such event in terms of threat to life and property. The determination of risk is not based upon the number of incidents which have occurred at the occupancy.

Elements

The Risk Assessment can utilize four or more general risk categories. Basic risk categories include High Probability/High Consequence, High Probability/Low Consequence, Low Probability/High Consequence and Low Probability/Low Consequence. The intermediate risk category of "Moderate" can also be utilized. Such general risk categories are shown in each Emergency Response Area on the Emergency Response Area Activity Map. Significant occupancies, as determined by the Fire department, are also identified on the map for the purposes of Fire Department training and pre fire planning. The probability and consequence rating is based upon the general probability of a fire occurring in the particular area, the potential outcome if a fire occurs, and the ability of the Fire department to control such a fire based upon their limited staffing and equipment. It does not necessarily indicate that an occupancy is deficient in fire protection or fire safety, or that it has experienced any fires. It does indicate that a particular area or type of occupancy presents a risk, higher than certain other areas or occupancies, to a small Fire Department such as Morro Bay FD. The occupancies identified by the Fire department include one or more of the following: a high occupant load, 24 hour occupant load, a high combustible load, contents which include significant amounts of flammable and combustible liquids and hazardous materials, of a size or height which could create a fire which is beyond the capabilities of the current Fire Department staffing and apparatus.

Table 1
Examples of Four Risk Categories
(categories can be modified)

High Probability **High Consequences** ***High hazard***	**High Probability** **Low Consequences** ***Moderate Hazard***
Low Probability **High Consequences** ***Key High hazard***	**Low Probability** **Low Consequences** ***Low, isolated hazard***

1. Low Probability, Low Consequence (Low, Isolated Hazard):

Examples:

Golf Course, Parks, State Park, Beach, isolated and detached structures. These occupancies do not create a significant impact upon the Fire Department. However, if weather conditions favorable to wildland fire spread occurred, there could be a significant fire with potential structural loss in the State Park and the areas around the Golf Course. Medical Aid and rescue incidents on the beach create an impact on the Fire Department.

2. Low Probability, High Consequence (Key High Hazard):

Examples:

Retail centers, commercial occupancies, industrial occupancies, old brick commercial buildings downtown, multi story buildings, high fire load occupancies, schools, Fire station, City Hall, Police station.

The majority of these occupancies are found in the central core area of Morro Bay, in the area traditionally known as the Principal Business District, or" Old Town". This area, for example, includes various occupancies found in areas such as portions of Morro Bay Blvd. and Quintana Road. It also includes all schools and public buildings. Many of these structures are non-sprinklered and are of older, non-fire resistive, construction. Under the right conditions, a major structural conflagration (multiple buildings involved in fire) could occur in the old downtown area. The Fire Station is an old, non-fire resistive, non-sprinklered structure which is vulnerable to destruction by fire. Other key City facilities are also non-sprinklered and vulnerable to fire.

3. High Probability, Low Consequence (Moderate Risk):

Examples:

Single family detached dwellings, mobile homes, sprinklered multi-family occupancies, low income housing areas, sprinklered shops, low risk industrial, industrial or commercial areas under 10,000 square feet without a high fire load, sprinklered motels, restaurants, dumpsters, vehicles.

Moderate risk areas are found in all portions of the City. Some examples would include properly constructed and sprinklered shops and restaurants on the Embarcadero, and senior housing properties. The most likely structure fire in Morro Bay is a fire in a residence. The largest potential for life loss from fire is in residential occupancies.

4. High Probability, High Consequence (High Hazard):

Examples:

Large non-sprinklered multi-family, multi-story, occupancies, large hotel/motels, non-sprinklered motels, Piers and older buildings on piers and wharfs, non-sprinklered business centers, unsprinklered high risk industrial or commercial properties, non-sprinklered restaurants, non sprinklered shops and other buildings on the Embarcadero, large assisted care/ convalescent Communities, and the Duke Power Plant.

Comparative Risk Rankings for High Hazard/Key Risks in Morro Bay

A target hazard occupancy is an occupancy that presents an unusual or special fire, life safety or hazardous materials risk due to type of occupancy, size, value or unusual hazards. Such occupancies present a risk which exceeds the capabilities of the baseline level of service as defined and funded by the community. If such risks were sprinklered and/or if Fire Department on duty staffing were increased, the consequences could be reduced. Target hazards require an increased level of pre-fire planning, fire prevention inspections and training.

The determination of risk is an outcome of the components of the probability of an event occurring and the outcome or consequence of such event. Probabilities can range from low to moderate to high and consequence can range from low to moderate to high. The risk components are based upon type of occupancy, construction, risks presented by the occupancy, type and number of occupants, and built in fire protection. Evaluation of the ten top target hazards results in the determination that, in comparison to the other target hazards identified, the Maximum/ Worst Case target hazard risk is the Duke Power Plant. This is due to size, value, complexity of the operation, risk, potential for a fire or Hazardous Materials release, and the historical incidents which have occurred in the industry. The determination is not intended to mean that there are any operational problems at the facility, and is not meant to be a reflection of the efforts of the staff to provide Fire and Hazardous Materials safety. The Power Plant staff has always attempted to maintain Fire and Hazardous Materials safety

Other Community Risks:

A 22" PG & E Natural Gas Line serves the Duke Power plant. It is located in ERA 3. It has a relief valve on site at Duke which is set to operate at 1800 PSI. Operation of the relief valve on this line has resulted in high-pressure natural gas releases which could have necessitated closure of the freeway.

Morro Creek bisects the town south of Atascadero Road. This creek has overflowed and resulted in the town being divided in half. San Bernardo Creek and Chorro Creek have also overflowed making an island out of South Morro Bay.

Highway 1 traverses the city and thus presents potential risks for traffic accidents and Hazardous Materials incidents. Power lines can drop on to the freeway, during a windy condition or an earthquake, and block traffic, energize vehicles, etc. Power lines can drop into vegetation and cause a fire, and can fall onto lower utility or phone lines and cause structures to be energized. Such an incident did occur in Morro Bay. Bridges and overpasses can collapse or otherwise become unusable after an earthquake.

The community does have an Urban Wildland Interface vegetation risk due to the hillsides, the State Park, and areas around the golf course. The risk is one of low probability/ High consequence due to the prevailing fuel moisture and type of vegetation. Under the right fire conditions, an Urban Wildland Interface fire could threaten the community and structural loss could occur.

Morro Bay is within the Emergency Planning Zone for the Diablo Canyon Nuclear plant. That facility poses a risk of low probability/ High Consequence.

Morro Bay is vulnerable to Earthquake, as are many other towns in California.

There is a significant water front area, along Embarcadero, in Morro Bay. This area contains the Power Plant, several piers, warehouses, stores, commercial and industrial occupancies, restaurants and many docked boats. Most of the major, historical fires in Morro Bay have occurred along the waterfront area. Under the right weather conditions, this area presents a significant conflagration potential. The Shoreline at Morro Bay is at risk to oil spills from off shore operations. The recent Ammonia release (10-8-01) occurred near the Embarcadero.

The Fire Department responds to marine fires, rescues, EMS calls and hazardous materials releases in the Harbor, and out into the ocean via the Harbor Patrol boats and the USCG vessels.

There are approximately 23 Mobile Home parks in Morro Bay. Mobile home park fires can quickly spread from the mobile home of origin to the homes on each side, and can easily trap and kill occupants, especially the elderly or infirm.

Morro Bay has several schools. Schools are vulnerable to arson from disgruntled students, vandalism, chemical lab and chemical storage fires, other types of fires and incidents, and terrorism related incidents. The Morro Bay High School and Del Mar Elementary School present all the normal issues associated with classrooms and large assembly buildings. The size of structures and lack of complete sprinkler systems would challenge the capabilities of the department.

The Fire Department responds frequently to a large board and care facility, with an attached skilled nursing facility, at 1405 Teresa Drive. Many of the occupants are non- ambulatory and in poor health, requiring frequent use of fire paramedic services.

The community is vulnerable to terrorism at the Diablo Canyon Nuclear Power Plant or the Morro Bay Power plant, as both are critical power facilities.

Overall, the community reflects the risks which are typical of a bedroom community rather than an industrial based community. The highest risk for a fire is in a single-family dwelling. The highest potential for life loss in a structural fire in Morro Bay is a 2-story dwelling. Large commercial and industrial occupancies create an unusual impact for the Fire Department which has a delivery system that is necessarily designed around EMS calls and incipient fires, rather than commercial/Industrial occupancies. A major incident at a commercial or industrial occupancy is beyond the tactical capabilities of the Morro Bay Fire Department as currently staffed, and the local Automatic Aid or Mutual Aid responders.

Emergency Incident Data:

There were an average of 1515 emergency responses for 2003. This amounted to 4.15 calls per day. In 2002, the Department responded to a total of 1598 incidents, 1175 calls (73.5%) were for medical emergencies, and 51 (3%) were for fires.

There were 44 general alarms sounded in 2003. In 2002 there were 42 general alarms and in 2001 there was a total of 69 general alarms. The five-year average of annual general alarms is 49 per year. A General Alarm results in a total call out of all fire department personnel. There were 224 occurrences of multiple Queuing (which means that 2 or more calls came in to 911 during the same time) in 2003. 234 multiple queuing calls occurred in 2002.

Table 2

The emergency response data is summarized in the following table.

Emergency incident data for 2003			
Type of Incident	***Number of Incidents***	***Number Per Day***	***% of Total Calls***
Total average annual calls; 2002-2003	1556	4.26	100
Total calls; 2003	1515	4.15	100
Total fire calls; 2003	46	.12	3%
Total EMS calls; 2003	1103	3.02	72%
% Of EMS which are ALS; 2003	54% (595)	1.6	39%
Structure fires; 2003	18	.04	1%
Fires outside; 2003	2	.005	.1%
Electrical fires (not in structures)	0		
Refuse fire; 2003	9	.02	.5%
Vehicle fire; 2003	9	.02.	.5%
Wildland/vegetation fires; 2003	2	.005	.1%
Fire; not otherwise specified; 2003	6	.016	.3%
Multiple queued calls; 2003	224	.6	14%
Mutual aid/Automatic aid out of city; 2003	56	.15	3.6%
Average annual dollar loss due to fires; 1998-2003	$719,003.00		
Annual property saved from fire; 1998-2003	$68,182,335.00		

Latest annual budget (FY 2003/04): $1,390,072.00
Cost per call: $1010.96

The data shown on the table clearly demonstrates that the Fire Department is configured to respond to incipient fires and EMS calls. Fires account for 3% of all calls. This is typical of many suburban fire agencies. In recent years, fire departments have become more diversified and are often the first responder to most emergencies or perceived emergencies.

Over the past 6 years, the number of emergency incidents has increased from 1357 to 1515; an increase of 11%. Of great concern is the trend in multiple queued calls. If this trend continues, the need for a second response company, in order to maintain an acceptable level of service, will become more critical. There is an average of one multiple queued call every 3 days. During the summer months, there is a noticeable increase in multiple queued calls. One example of multiple queuing occurred on October 8, 2001. A 300 gallon release of Anhydrous Ammonia from a refrigeration unit at an old fish processing plant near the Embarcadero required the response of at least 200 responders from 35 agencies. It was necessary to evacuate 3500 people. This incident lasted two days. When the incident occurred, the primary Morro Bay Fire Department resources were committed to a major injury traffic accident in the automatic aid area. During the incident, the Fire Department responded to 8 additional incidents, including 1 reported explosion and fire in a residence (false alarm), 2 ALS calls and 5 public assists.

Multiple queuing of calls indicates that increasing call volume is impacting the single on duty Fire Company's availability for response. Thus, reliability of response is affected. This results

in delayed responses that can result in larger fires or reduced numbers of successful discharges of medical patients from hospitals. Increased incidences of multiple queuing can result in the need for multiple fire companies. It is not uncommon in busy response areas to have two Fire Companies responding out of the same station.

*** During the years 1998-2003 the Fire Department saved an annual average of $68,182,355.00 of property exposed to fire. The amount of property saved is 49 times more than the annual budget of the Fire Department, which was $1,390,072.00 in fiscal year 2003-2004. This is a good indicator of the efficiency and value of the Fire Department. Refer to the following table which shows property loss, property saved and annual budgets from 1998-2003.

Table 3

Year	*Total Number of Fires*	*Property Loss*	*Property Saved*	*Annual Budget*	*Budget Compared to Property Saved (percent)*
1998	45	$267,125.	$2,015,875.	$990,623.	49%
1999	72	$3,033,375.	$16,536,850	$1,181,124.	7%
2000	60	$231,533.	$362,917,00	$1,313,292.	.3%
2001	71	$131,845.	$9,917,735.	$1,364,642.	14%
2002	51	$338,545.	$8,316,555.	$1,360,927.	16%
2003	46	$311,600.	$9,390,000.	$1,390,072	57%
Six year annual average	***57.5***	***$719,003.00.***	***$68,182,355.***	***$1,266,780.00***	***22%***

97% of the property value actually exposed to a fire was saved in 2003. 3% of the property value actually exposed to a fire was lost.

The 5% increase in general alarms in the year 2003 indicates that the types of incidents occurring in Morro Bay are becoming more complex and labor intensive, and are beyond the capabilities of the limited on duty staffing. In addition, no community is immune to terrorist acts; especially a community with a major Power Plant, and a nearby Nuclear Plant. This further validates the need to consider a second staffed company, if this trend continues. It also further supports the need for 40 hour administrative staff, such as a Fire Marshal and Training Officer, to improve the ability to prevent and mitigate incidents through public education, code enforcement, and fire protection planning, and to meet all mandates for training of personnel to handle the incident load and the varied types of incidents.

The community has determined through budget allocations, that the current level of service is the acceptable level of service. Therefore, any development, such as the Power Plant, that

exceeds this community baseline, should fund any additional Fire Department needs generated by the particular risk of the development.

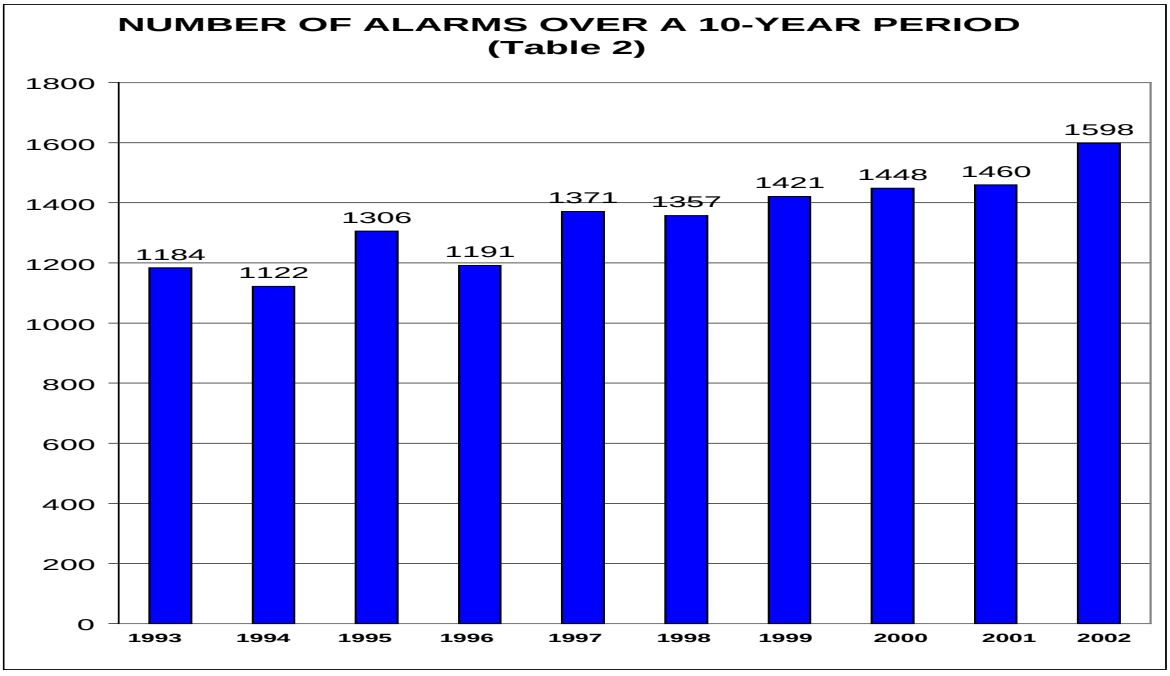
Most of the target risk occupancies with high consequences are located in the Station 1 Response District.

Incident data indicates that most Emergency calls to any single location occur at the Bayside Care and Casa De Flores facilities at 1405 Teresa. There were 191 responses to these occupancies in 2002 and 199 in 2003. This accounts for 12% of all Morro Bay calls. Most calls to this facility are for EMS.

The least number of calls occur in the South end of the City near the State Park, and in the State Park. This is consistent with typical incident data for upscale residential neighborhoods, and for parks. This is done without reimbursement through fees for service and without any revenue from property tax. The State should pay a fee per call to the Fire Department.

The following table illustrates the number of annual calls over the 10-year period from 1993 through 2002:

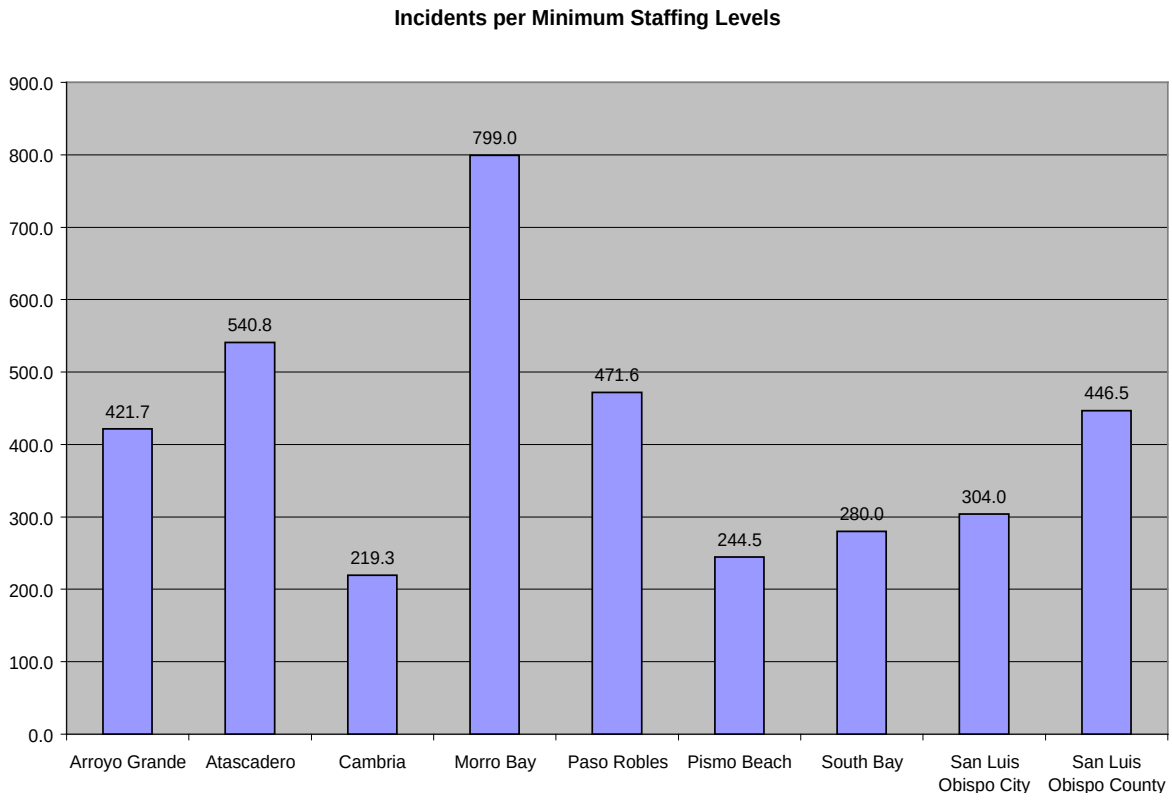
Table 4



Based upon annual increases shown in the previous table, the following table illustrates projected incident increases through the year 2008 assuming an annual increase of 3.5% per year.

Comparison of Countywide Fire Agencies

Table 5



A survey was conducted to compare the Morro Bay Fire Department with other fire agencies in San Luis Obispo County. The service levels provided in San Luis Obispo County widely varies from all volunteer to all career departments, and from providing emergency medical services that range from first responder to paramedic. For this report, the agencies surveyed included cities in the County and agencies that had on-duty scheduled daily staffing.

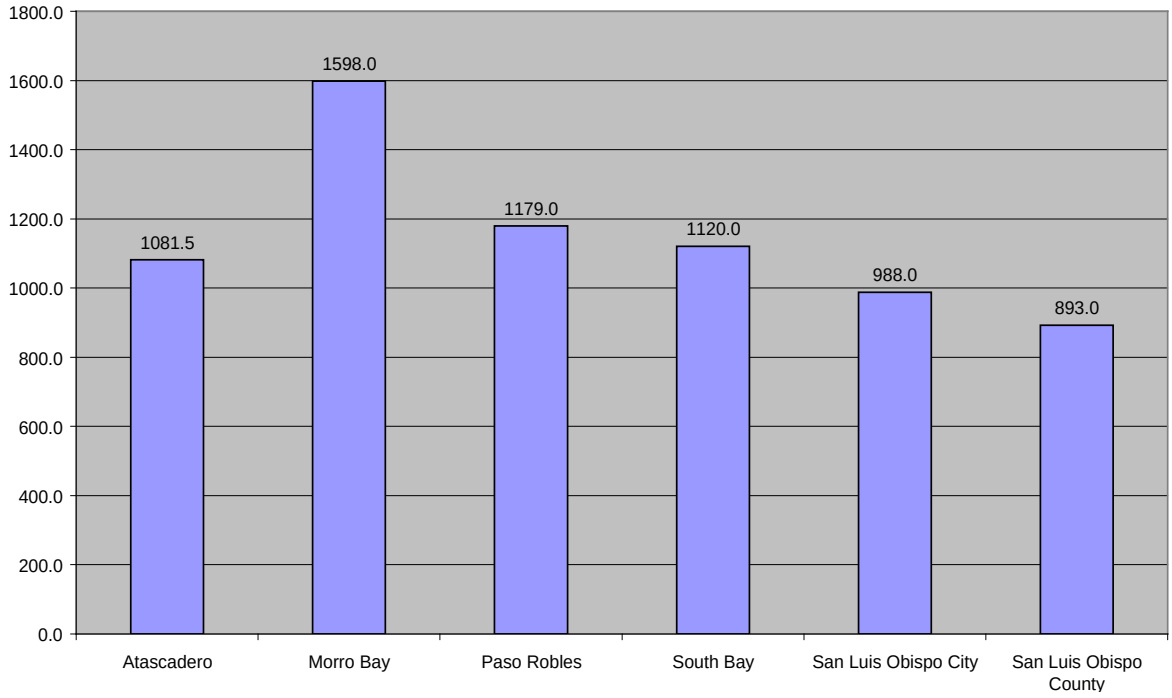
Due to the wide distribution of fire resources, the comparisons included views that outlines average responses per staffed fire station. This is a comparison of annual responses divided by number of staffed fire stations. For instance, the City of Pismo Beach has 978 incidents per year and operates out of two staffed fire stations. The incidents per staffed fire station are 489 responses. Morro Bay by comparison responded to 1598 incidents in 2002 and staffs a single fire station; the incidents per staffed station are 1598 responses.

As shown in Table 5 above, Morro Bay responds to a significantly higher number of incidents per year, per staffed station, than any other fire agency in San Luis Obispo County.

ALS response agencies were also evaluated to compare the number of incidents per staffed fire station. The results of that comparison are contained in the next table.

Table 6

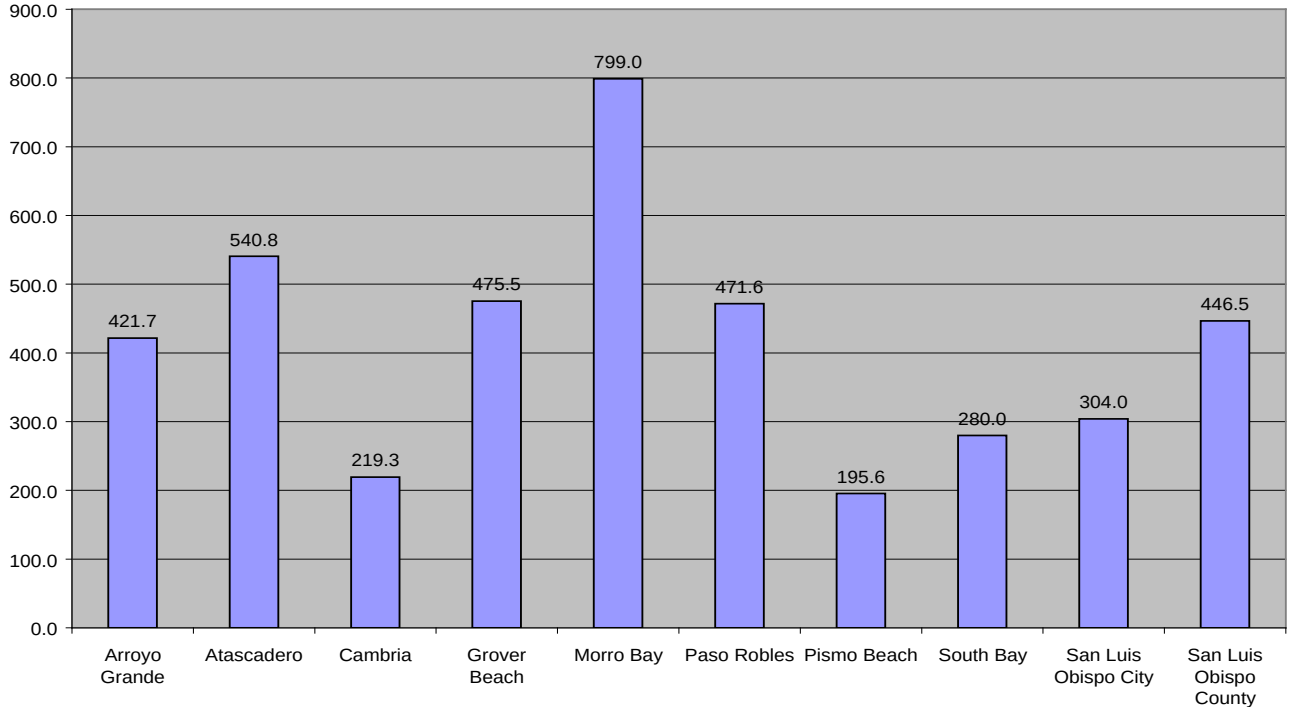
ALS Agency Incidnets per Staffed Engine
(Table 3.1)



The comparison also looked at the average number of incidents per minimum numbers of on-duty fire suppression personnel. This comparison examined the initial firefighting force available to respond to the initial report of an emergency incident. The reason that this is important is that off-duty personnel cannot be relied upon for emergency response; only the personnel on-duty are guaranteed for response.

The data in the table containing incidents per minimum staffing levels is a comparison of annual responses divided by the minimum daily staffing levels. For example, the City of Pismo Beach has 978 incidents per year, staffs 2 fire stations and has a minimum daily staffing level of 4 firefighters. When analyzed, the incident per on duty firefighter is equal to 244.5. Morro Bay, by comparison, responded to 1598 incidents in 2002, staffed 1 fire station and maintained a minimum daily staffing level of 2. This results in a number of the incidents per on duty firefighter of 799.

Table 7
Incidents per Minimum Staffing Levels



RESPONSE TIMES:

The average driving speed is about 35 MPH per the Fire Department. The national standard utilized by the Insurance Services Office (ISO) in recommending fire station locations is 35 MPH. The average Response time (driving time) for the fire department to emergency calls south of Highway 41 in 2003 was 3.42 minutes. In 2002 it was 3.37. In 2003, the average driving time to the north end of the City (north of Highway 41) from Fire Station 53 was about 5.13 minutes. In 2002 it was 5.14 minutes. Response (driving) times to the North and the South have not increased significantly. However, future growth, tourism, and traffic may result in longer driving times. Response times to addresses on hillsides can be longer due to narrow, winding roads and steep grades. Driving time to the north end of Embarcadero is 3 to 4 minutes. Driving time to the south end of Embarcadero is also about 3 to 4 minutes.

Calls to the Sandspit, the beach, and to portions of the State Park are lengthy responses. Calls to the extreme ends of the City create response problems, especially when multiple queuing occurs. Multiple queuing delays response, as there is only one staffed company. This can result in death if the call is a time critical EMS call and can result in greater fire damage if a fire call.

In 2003, the Fire Department arrived at 32% of all calls within the acceptable criteria of 3 minutes driving time; 68% of all calls are not reached within the acceptable driving time criteria. In 2002, the Fire Department arrived at 40% of all calls in 3 minutes driving time or less. This indicates a possible degradation of response times due to increased traffic. No calls in the area north of Highway 41 are reached in less than 4.20 minutes driving time. Only response areas 1,3 and 4 are reached in 3 or less minutes driving time. 97% of all calls in 2003 are reached in less than 10 minutes driving. A summary of dispatch center call processing time and response (driving) times, for year 2003, by response areas identified on the Emergency Response Area

Activity Map, are found on the following page. (data provided by Tom Prows; source Dispatch center).

Table 8

Response area	*General location*	*Number of calls*	*Average dispatch center alarm processing time (same for all calls)*	*Average turnout time assumed (same for all calls)*	*Average driving time in minutes*
1	Old downtown	495	Less than 1 minute	1 minute	2.62
1-A	Area around fire station	NA	"	"	
2	Embarcadero	114	"	"	3.58
3	South of 41, north of powerplant/north side of freeway	47	"	"	2.92
4	North of freeway by northbound off ramp to downtown	3	"	"	3.00
5	Bayside Care/Casa De Flores	212	"	"	3.83
6	State park area	23	"	"	4.59
Total calls/ average driving time south of Highway 41		894	"	"	3.42
7	North of Highway 41; High School, Mission Linen, etc	115	"	"	4.20
8	North of Highway 41;North of station 2	251	"	"	4.94
9	North end of City	149	"	"	6.27
Total calls/ average driving time north of Highway 41		***515***	***"***	***"***	***5.13***
Calls to response areas 10 and 11 (out of City or County)	***Mutual and automatic aid out of City or county***	***54***			
Grand total calls/average driving time		***1511***			***4.27***

As the table indicates, the driving times exceed the recommended standard of 3 minutes. When the call dispatching time and the turnout time in the fire station are added, the total time averages about 6.27 minutes. This significantly exceeds the recommended reflex time standards in this plan of 5 minutes from receipt of call until arrival on scene of the first unit and exceeds the NFPA 1710 standard of 6 minutes from time the call is received by dispatch center until the first fire unit arrives. In order to assure a successful discharge from a hospital, the time from receipt of call until shocking a stopped heart with a defibrillator is 5.5 minutes. Within 5 minutes of ignition, a non sprinklered structure can flashover with fire and be totally involved in fire.

Refer to the section on Reflex Time Criteria on Page 19 for more information.

MUTUAL AID/AUTOMATIC AID:

Due to the limited on duty and paid call staffing, the Fire Department must rely on automatic and mutual aid response for structure fires and other major incidents.

Emergency alarms are currently answered by the Morro Bay Police Department, which is the Public Safety Answering Point (PSAP) for incoming 9-1-1 calls. On average, one dispatcher is on duty at a time. This system is overloaded as the average annual alarms for the Fire Department, based upon a five-year average, is 1456. This amounts to 3.99 per day for the Fire Department in addition to the calls requiring Police assistance. The current system is not an Emergency Medical Dispatch qualified PSAP.

Forty-four (44) General Alarms occurred in 2003. This type of emergency creates a significant impact upon a dispatcher who also has to handle Police Department calls. On average, multiple queuing of fire department incidents occurs two hundred thirty nine (229) times per year. This call volume may increase.

Six private medic ambulances are available from throughout the county. One unit is stationed in the City, near Station 54. That unit covers Morro Bay, Los Osos, Cayucos and unincorporated County areas; therefore there are periods of time when that ambulance may be out of town. A move up unit and a multi-casualty unit are available from San Luis Ambulance. Response time for out-of-town units averaged 13.6 minutes in 1999.

When the Fire Department is requested to send mutual aid units out of Morro Bay, as a part of the State Mutual Aid system, three to four firefighters respond with an engine. Reserve and off-duty personnel are recalled to duty to staff Morro Bay equipment.

If a Hazardous Materials team is requested, the County-wide team, which is operated under a County Joint Powers Agreement, will respond with the Hazmat trailer from San Luis Obispo Fire Department. The response time of team members is about 1 hour.

The MBFD Squad is classified as a "Light USAR" unit. If a Type 2 (medium) Urban Search and Rescue Unit (USAR) is requested, the squad, trailer and MB/OES 274 must respond. The next closest USAR unit is at the Santa Maria Fire Department. Response time is about 1 hour.

To best explain the Auto Aid/ Mutual Aid system, a description of how a call is processed is included as follows. The example is an industrial occupancy:

1. Fire or Hazardous Materials release occurs.

2. Facility personnel investigate the report to confirm an emergency exists.

3. Personnel implement their Emergency response Plan and call 911. Note that by now a time delay of at least 5 minutes may have occurred.

4. Call received by 911 for an emergency

5. Dispatcher alerts MBFD Fire Station and pages all off duty and reserve personnel.

6. Dispatch center call processing time is 1 minute

7. Dispatcher calls Sheriff Office to request South Bay Fire Department Engine#5595.

8. South Bay Engine is dispatched with 2 Firefighters. Response from initial call to scene is about 12 minutes/ 6 miles. South Bay has to cover their Station before responding. Therefore, response may be unreliable if coverage cannot be attained.

   ISO does not give credit for Automatic Aid beyond 5 road miles.

9. Dispatcher then calls CDF/ County Fire to request 2 Engines and 1 Chief officer from the County-wide Mutual Aid system.

10 A standby ambulance is also requested.

11. The MBFD Paid Call personnel respond to the Fire Stations and pick up the Fire Apparatus. This requires about 5 minutes after notification.

12. One Paid Call person goes to Station 2 and obtains the OES pumper

13. Additional Mutual aid is based upon request of the Incident Commander.

14. The typical response will be 10 Firefighters from MBFD including the Chief, plus 2 from South Bay, for a total of 12, plus Mutual aid.

3. REFLEX TIME CRITERIA:

At this point, it is important to understand the constraints upon emergency response and on scene staffing for any emergency. Once this is understood, the staffing and tactical ability can be measured, and recommendations made for improvements.

In both fire suppression and in pre-hospital Emergency Medical Care, critical components define the timeline which measures and quantifies critical intervention in a results oriented manner. In each situation time is the critical factor and is the determinant component in the prevention of brain death or fatal fire spread within a structure. Despite the divergent origins between the two emergencies the priority of life preservation dictates approximately the same time restraints.

This time line contains several components which collectively are referred to as "REFLEX TIME." In order to manage response times it becomes necessary to compartmentalize and to identify each component in the timeline of events which occur. The clock starts at the beginning of an incident and continues until the physical on-scene intervention by emergency personnel and equipment. Some aspects are easily identified by task but the time it takes may vary.

Notification: The fire must be detected and then reported in order for the Fire Department to react and respond. Smoke detectors, alarm systems and fire sprinklers systems all minimize the time between ignition and receipt of the alarm at fire dispatch. Because the actual detection of the fire and notification may rely solely upon human intervention a variety of circumstances can effect the time affixed to this segment. An example of where this built in delay could occur is the Power Plant.

Alarm Processing Time: This segment of time also varies depending upon time of day, number of dispatchers on duty and the amount of fire and rescue activity being already handled by the center at the time of call. An efficient alarm center will process a call between 30 and 45 seconds. ISO requires answering and dispatching to occur within 60 seconds.

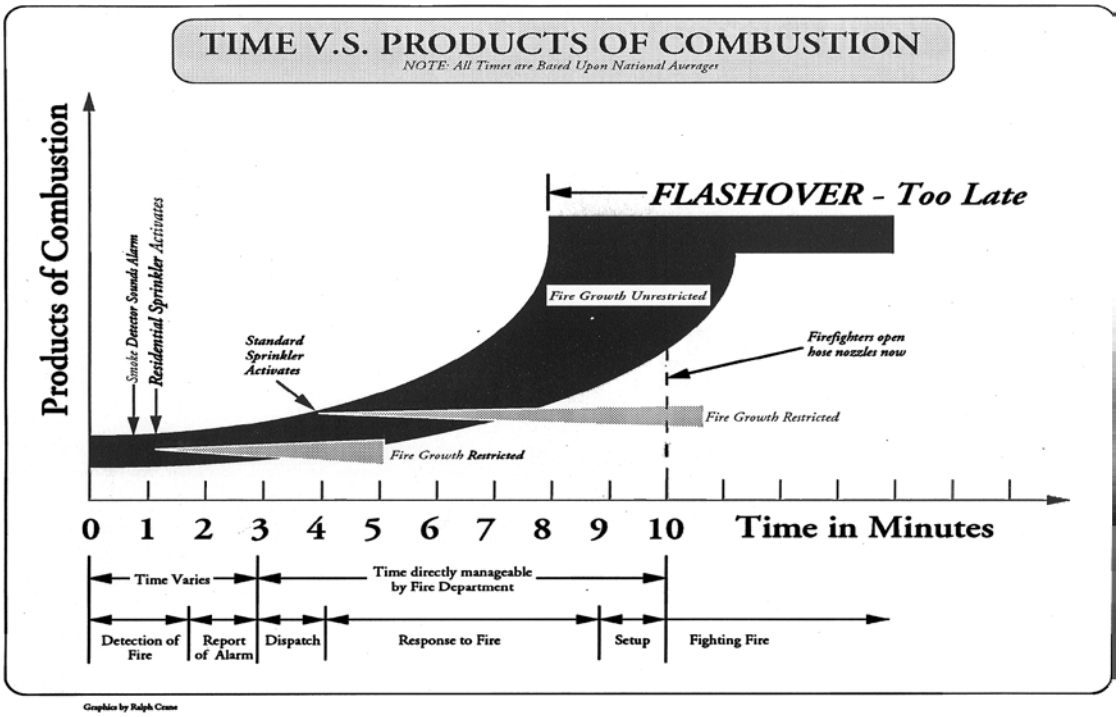
Turn Out Time: This is the time it takes crews to receive the call and leave the station. The national standard for this time, per NFPA 1710, is 60 seconds for on duty staffing. Turnout time for off duty paid call personnel is 5 minutes or more.

Driving Time: Once the units are on the street an average travel time and speed will determine the distance resources can travel, to arrive and set up and to intervene in an emergency. In Morro Bay, 35 miles per hour is the average response speed for equipment and personnel. By way of comparison, the Insurance Services Office (ISO) standard is 35 MPH. Other current studies by Hunt Research Corporation established actual driving speeds as 25 MPH in the City of Industry; a large industrial city with large amounts of truck traffic, and 26 MPH in Fontana; a large community with major traffic problems. Driving speeds will probably degrade as population increases In addition to detection time, notification time and alarm processing time, the combined factors of turnout time in the Fire Station and driving time determine how long it will take for equipment to arrive, set up and take definitive action. Approximately 3 minutes of travel time at 35 mph: equals about 1.74 miles. This assumes that traffic and roadway conditions are "normal." Factors such as traffic calming strategies (i.e.: speed bumps, traffic circles, etc.), road construction, tourist traffic, facility gates, large facilities, multi-story buildings, major public events, Fog, etc., can adversely impact response times. For the best results under "normal" conditions fire stations should be sited approximately 3 miles apart.

In a structure fire, after about 5 minutes of free burning, the Fire will heat up the interior of the structure and all combustible contents to their ignition temperature. At about 1,000 degrees F, a phenomenon called " Flashover" occurs. Under these conditions the structure deteriorates hope of survivors and the building of origin is destroyed, the fire department's mission is reduced to ensuring the fire does not spread to other structures and endanger other lives. It also indicates that the Firefighter may not be able to deploy water manually from a hose stream prior to Flashover occurring.

Refer to Table 9 for an illustration of Reflex Time.

Table 9



(assumes supervised detectors and supervised sprinklers)

Refer to Table 9 above. This illustration shows the Flashover curve and the Reflex Time line. It graphically illustrates the pre flashover time at which the activation of a fire sprinkler head can activate. It becomes apparent why built-in fire sprinklers are so effective when one studies reflex time. As soon as the fire grows in size sufficient to activate a sprinkler head, the fire department is notified and enough water is applied to prevent flash over. This protects both life and property quicker than can be done by physical intervention. Not only is this method more efficient and safer for everyone involved, it is also far more cost effective and reliable.

Refer to Table 10 below for an illustration of EMS Reflex Time.

Table 10

TOTAL REFLEX TIME IN MINUTES
(CUMULATIVE)

Ignite & Free Burn	Detection (0:30)	Notify (0:30)	Call Process (0:45)	Turn Out (1:15)	Travel (3:00)	Set Up (1:00)	Combat
0	0:30	1:00	1:45	3:00	6:00	7	
Cardiac Arrest	**Brain Death Starts in 4 to 6 Minutes**						**Death**

Emergency Medical responses are similarly time driven. Refer to Table 10 above. The critical point in an EMS incident is the point in time when a person stops breathing and their heart stops beating; a condition which will quickly lead to brain death. When breathing and or circulation stops the brain starts to die in four to six minutes. Brain damage is usually irreversible after ten minutes. It is the goal of the Morro Bay Fire Department to put an Advanced Life Support (ALS), Paramedic-staffed fire apparatus on scene of any medical emergency within 5 minutes to 90% of all emergency medical service responses. Nationally accepted good practice is to be able to defibrillate within 5.5 minutes of the call to 911.

4. GOALS & OBJECTIVES:

It is important for a Strategic Plan to include Goals and Objectives in order to establish a performance standard which the Fire Department should strive to meet.

Category A: Structural Fire Operations:

Goal A-1: Minimize the life loss, injury and property damage caused by structure fires.

Objective A-1-a:

Four on duty (4) firefighters shall arrive on scene within 5 minutes of receipt of call at 911 dispatch center, for 90% of all calls. Dispatch center time to be 1 minute, turnout time in Fire Station 1 minute, and driving time 3 minutes. Firefighters may arrive on more than one apparatus, and from more than one location, as long as they join together as one 4-person company, managed by one company officer, at the scene. Reference Sections 5.2.2.1.1 and 3.1.8.d of NFPA 1710.

Objective A-1-b:

Provide adequate response to all structure fires which allows for size up, Incident Command, search and rescue, confined space entry, augmentation of Sprinkler and other Fire Suppression systems, smoke management operations, and application of 360 GPM through two handlines, each which flow at least 180 GPM, inside of a structure while providing the required two person RIT team. Provide 15 Firefighters including a Chief officer on the initial response, within 10 minutes of receipt of the call to 911 (90% of all incidents). Ref. Section 5.2.3.2.2; NFPA 1710.

Objective A-1-c:

Provide adequate ground and Aerial Ladder capability on scene within 10 minutes of receipt of alarm at 911 dispatch center, to reach the upper floors of a building in the event stairs are untenable due to fire and smoke or building collapse, and to apply Fire water streams from an elevated position. Assign 4 firefighters assigned to these Truck Co. functions, at the scene. Ref Sec 5.2.3.2.2; NFPA 1710.

Objective A-1-d

Provide Fire Department capability to pump 3,000 GPM at adequate pressures into the Duke Power Plant on site main system and Sprinkler or other Fire Suppression system, in the event of a failure of the Fire Pump system.

Objective A-1-e:

Provide Fire Department capability to apply 3,000 GPM through master water streams and Aerial ladder streams at a major commercial or industrial fire or a pier fire.

Objective A-1-f:

Provide Fire Department capability to control fires exposing or involving interior or exterior storage tanks or vessels and other on or off site exposures at the Duke Power Plant.

Objective A-1-g:

Provide the means for rapid advancement of hoselines to an upper floor or roof, and for provision of immediately accessible and operational hose line water supply connections.

Objective A-1-h:

Provide a means to rescue persons from upper floor windows or other elevated locations.

Objective A-1-i:

Provide built in protection and tactical enhancements as recommended in this needs assessment to assist the Morro Bay Fire Department in accomplishing critical tasks more efficiently.

Objective A-1-j:

Provide adequate and reliable fire flow and pressure to all points of all buildings at times of peak domestic demand in the area, through design and installation of a proper fire protection system.

Objective A-1-k:

Assure adequate fire and life safety, and Fire Code hazardous materials compliance is provided by intensive review of all plans and specifications by the Fire Department prior to construction, and by ongoing fire department inspection during construction.

Objective A-1-l:

Pre plan and inspect all Target Hazard occupancies, including the Power plant, at least annually.

Objective A-1-m

Fire Department should pursue improvements, where possible, in the automatic and mutual aid system to assure reliability of response from outside agencies when multiple queuing of events occurs in Morro Bay and surrounding areas. This should include investigation of the feasibility of functional consolidations involving local Fire Agencies.

Such reliability of response should also include provisions to maintain on duty staffing of 4 at all times in Morro Bay, with Morro Bay Firefighters, including times when the first out Engine is committed on an incident in or out of Morro Bay.

Objective A-1-n:

In cooperation with the Harbor Patrol provide a fireboat capable of delivering at least 750 GPM. (NFPA Class C vessel).

Objective A-1-0:

The Fire department should strive to assure the ongoing viability of the Paid Call Firefighter program through various enhancements and programs such as enhanced pay scales and benefits.

Category B: Emergency Medical Service (EMS):

The purpose of this category is to reduce the impact of EMS calls on the Fire Department thereby increasing the reliability of response availability in the event a fire occurs.

Goal B-1: Reduce the number of EMS calls

Objective B-1-a:

Implement a program to educate the citizenry on what is and what is not an EMS emergency, in order to reduce unnecessary calls for service, and repeated calls for non- emergencies from the same callers.

Objective B-1-b:

Institute a fee schedule to charge for repeat non-emergency EMS calls to the same occupancy such as Bayside Care facility and Casa De Flores (1405 Theresa). Fee should be based on total Fire Department annual budget divided by number of total annual calls in the City equals charge per call. As an option, actual response costs (staffing and apparatus) plus an overhead charge could be used.

Objective B-1-c:

Pursue alternative dispatching solutions for the EMD dispatching system including the implementation of the "Clausen" computer aided EMS triage system in the Dispatch center.

Objective B-1-d:

Implement community safety programs to educate the citizenry, school children, etc. on the prevention of the most common types of injuries and disease occurring in the City.

Objective B-1-e:

Continue to support local health fairs, voluntary Blood Pressure monitoring of citizens at Fire Station, etc.

Goal B-2: Minimize life loss and further injury during medical emergencies in the community.

Objective B-2-a:

Pursue a partnership between the Fire Department and Insurance carriers for reimbursement of the Fire Department for pre hospital care, treat and release calls, etc.

Objective B-2-b:

Provide community training programs for school children, Power Plant workers and other citizen groups on basic First aid and CPR.

Objective B-2-c:

Formulate and encourage neighborhood volunteer groups for initial Emergency Service response, including during disasters.

Objective B-2-d:

Provide public access AED equipment and training at all major public assemblage facilities including community center, major churches, city hall, police station, major public events, restaurants, medical offices, urgent care centers, etc.

Objective B-2-e:

Arrive at 90% of all EMS Calls at an Advanced Life Support (ALS) level, with AED and 4 on duty firefighters within 5 minutes of receipt of alarm in the dispatch center. This includes 1 minute dispatch center time, 1 minute turnout time and 3 minutes driving time. Firefighters may arrive on more than one apparatus from more than one location as long as one Company officer is in charge at the scene. Ref. Section 5.3.3.4.3; NFPA 1710.

Objective B-2-f:

Provide state of the art EMS equipment, including Automatic External Defibrillators (AED) on all Fire Department response vehicles

Goal B-3: Provide an effective level of EMS response to major emergencies

Objective B-3-a:

Provide response of 14 firefighters trained to the level of EMT, plus one Chief officer, within 10 minutes of notification of 911, in the event of a major emergency. 90% of all calls.

Objective B-3-b:

Provide for response of 5 medic ambulances to the Power Plant for transportation purposes within 20 minutes in the event a major emergency requires mass movement of critical care patients to Medical facilities is needed.

Category C: Hazardous Materials (HAZMAT)

Goal C-1: Reduce the number, risks and severity of HAZMAT incidents at facilities and on the highway.

Objective C-1-a:

Fire Department should encourage the use of alternative chemicals in place of Ammonia and Hydrazine at the power plant, in order to reduce or eliminate the potential for an offsite toxic vapor cloud, and/or the potential for a tanker truck accident resulting in an Ammonia or Hydrazine release in the city.

Objective C-1-b:

Fire Department should Inspect and Inventory the Hazardous materials at commercial, industrial and storage facilities on a regular basis.

Objective C-1-c:

Assure all Areas where HAZMAT is stored or used are properly isolated from other areas and buildings.

Objective C-1-d:

Fire Department should review all plans and MSDS sheets for commercial and industrial occupancies to assure the storage, use and dispensing of HAZMAT is in compliance with the Fire Code.

Objective C-1-e:

Assure staff and Firefighters are adequately trained to the appropriate OSHA standards regarding Hazardous Materials emergencies.

Objective C-1-f:

Assure the Fire Department is properly equipped to handle HAZMAT emergencies including decontamination.

Objective C-1-g:

Provide ample amounts of approved Firefighting foam concentrate and application devices, and large wheeled Dry Chemical units, on site at applicable facilities for use by Fire department during a major flammable liquid fire.

Goal C-2: Minimize damage to humans, environment and property caused by Hazardous and/or flammable materials

Objective C-2-a:

Locate any LPG, LOX, Nitrogen and Ammonia tanks away from buildings and offsite exposures, and provide proper built in protection on all tanks, in order to facilitate rapid shutdown of releases.

Objective C-2-b:

Assure proper fire protection and Hazardous Materials mitigations for the Hydrazine storage and use at the power plant to prevent a release and potential on and off site impact involving Hydrazine.

Objective C-2-c:

Provide Fire Department capability to flow 3,000 GPM through master fire stream appliances and aerial streams to cool tanks and protect exposures.

Objective C-2-d:

Enhance automatic and mutual aid area response to provide one properly equipped and trained Hazardous Materials response team on scene within 30 minutes of request for response.

Objective C-e:

Review all proposed plans for facilities to assure mitigation of any potential offsite impacts due to fires, explosions, oil releases or Hazardous materials releases

Category D: Disaster Response:

Goal D-1: Minimize Life Loss, injury and property loss due to a disaster:

Objective D-1-a:

Train staff of major commercial and industrial facilities, critical facilities, and care facilities as to their roles during disasters including earthquake.

Objective D-1-b:

Assure major facilities, such as the Power Plant, have adequate, all risk, emergency response plans in place and that all personnel are trained on the plan. Conduct drills at least quarterly to exercise the plans.

Objective D-1-c:

Fire Department should review all construction plans for all facilities from the perspective of disaster response and mitigation. One example would be the provision of automatic shutoffs on storage tanks, gas lines, and vessels in the event of earthquake.

Objective D-1-d:

Enhance the Urban Search and Rescue (USAR) capability of the local fire agencies through addition of proper equipment, apparatus, and enhanced training.

Objective D-1-e:

Provide training and necessary personal protective equipment for Fire Department initial response to terrorism/WMD incidents.

Category E. Technical Rescue:

Goal E-1: Provide effective and safe response to Technical Rescue incidents

Objective E-1-a:

Provide Fire Department with ongoing training in all facets of Technical Rescue

Objective E-1-b:

Provide adequate Technical Rescue equipment on scene within 10 minutes driving time to 90% of all incidents.

Objective E-1-c:

Provide at least 4 persons on each responding fire company to facilitate timely confined space entry and other technical rescues in compliance with OSHA regulations.

Objective E-1-d:

Provide the capability to effect rescue of victims from elevated locations or from confined spaces.

5. STANDARDS OF COVERAGE:

Standards of Coverage are used to manage Fire Department resources based on probable risk within our community. A Standards of Coverage study utilizes information developed for the Risk Assessment, actual response data and the Fire Department's Goals and Objectives. Once established these standards form the basis for determining the needed Levels of Service.

Standards of Coverage include the following components:

1. Distribution of Companies based upon risk: This is the physical placement of apparatus in a fashion as to be able to reach the location where service is requested within a time frame to meet the goals and objectives (such as a Paramedic Engine Company on scene of 90% of the calls within 5 minutes of request.).

2. Concentration of Companies based upon risk: This is the physical placement with consideration not only for coverage based upon travel but with consideration to special challenges found in a local geographical area (such as the need for Engine companies to be located on opposite sides of the Highway 1 freeway, Morro Creek, which could dissect Morro Bay, or the Power Plant which could have a Hazardous Materials release, etc.).

3. Response efficiency of the companies: This could include the constraint upon response caused by features of a particular facility such as a gates, single point of access, a portion of the community separated from the rest of town by a freeway, highway flooding, Hazardous Materials vapor clouds, etc.

4. Effectiveness of the response force: This component is determined by the ability of the personnel arriving to perform critical job functions with in a time frame to effect the desired objectives. These could include gaining entry, search, rescue, obtaining water supply, ventilation, water and foam application. This effectiveness is addressed in post fire analysis as well during training to ensure the suppression forces can perform evolutions and produce fire flow within national Fire Service standards.

5. Response reliability when the potential for simultaneous calls (multiple queuing) is considered: After analyzing unit placement and alarm processing and turn out time, it is apparent that when the staffed unit is already busy and the next unit responds, the additional turnout and travel time is going to adversely effect performance (arrival time.) If this happens occasionally it is understandable, but when a large percentage of the time the first due unit is already committed, a second unit must be considered. Morro Bay Fire Department is already experiencing an unusually high number of multiple queuing. On one day in August 2000, three such incidents occurred in the morning. Nine incidents of multiple queuing occurred during the 10-8-01 Ammonia release.

   The ISO indicates that when the number of runs for a single unit exceeds 2500, there should be an effort to place a second unit in service.

6. Draw down of resources and resource exhaustion: This situation occurs when incidents, which require the response of multiple units such as complete commercial structure assignment (2 engines, 1 truck, and rescue), begin to compete with other service demands, such as separate medical responses. If this continuously occurs it may become necessary to consider additional units being placed into service in order to meet demands.

Differing levels of risk require different levels of response. For example a typical emergency medical service (EMS) call will require one Medic Engine Company, at least initially. The Morro Bay Fire Department responds to this type of call approximately 3 times a day. EMS calls represent the highest incident demand but have a low impact on the overall service delivery system. Conversely, first alarm residential fires require the response of at least two Engine Companies, one Truck Company, and a Chief. This level of response creates a significant impact upon the service delivery system, as there are no Medic Engine Companies which remain available for additional calls. While structure fires represent approximately 1% of the Fire Department's annual calls for service in 2003, the Fire Department must design the service delivery system to meet its demands. Stated another way, structure fires may not represent the highest number of calls but they represent one of the highest levels of risk, especially at Key Hazards such as the Power Plant.

Table 11
Levels of Service by Incident Type

	Typical EMS Call	***Typical Traffic Collision***	***HazMat Incident***	***Tech. Rescue***	***Veg. Fire***	***First Alarm Structure Fire***	***Fire at Power Plant***
First Engine	X	X	X	X	X	X	X
Second Engine			X	X	X	X	X
Third Engine						X*	X*
Fourth Engine							X*
Fifth Engine							X*
Truck Company or Squad	X	X	X	X	X	X	X
						X	X
Duty Chief			X	X	X	X	X
Requires Outside Resources					YES	YES	YES
Requires Additional Personnel for Station Coverage						YES	YES
Apparatus Available for Another Call	1 Eng. Truck Chief	1 Eng. Squad Chief	Squad	0	0	0	0
Personnel Available for Another Call	9	9	2	2	0	0	0

**** The third, fourth and fifth engine could be provided through automatic aid***

Table 11 illustrates the fact that the Morro Bay Fire Department cannot respond to more than one emergency at a time other than an EMS incident or traffic accident.

One of the key factors in planning for the next five years is to reduce the potential for multiple queuing (simultaneous calls) without having to add more than the projected 2 stations. The incident demands will continue to increase, in the next five years. The Insurance Industry (ISO) begins to consider the need for another Fire Station when annual alarms are about 2500.

This study recommends that the Fire Department staff two stations if, after construction of a new Station one at a more strategic response location, it is found that the new location does not improve standards of coverage to the area of the City north of Highway 41.

Another important component of Standards of Coverage is the provision of an effective response force. The fireground response and the EMS response both require numerous critical tasks to be performed simultaneously. The number of Firefighters required to perform the tasks varies based upon the risk. For example, the number of Firefighters needed at the Power Plant could be 49 or more. The number needed at a low risk fire could be 6 or less. This is illustrated in Table 12. The obvious question is where do you get 49 firefighters. Do you keep them on duty at all times for an incident that has a low probability? The answer is no when designing an efficient emergency force. This is where the levels of service become important. The Fire Department must identify the acceptable level of service, assume some unprotected risk levels, pass on costs of protecting high risks to the private sector, and rely partly on automatic and mutual aid for the Key high hazard fires.

Table 12
Minimum Firefighting Personnel Needed Based Upon Level of Risk

Task	*Power Plant*	*High Risk*	*Moderate Risk*	*Low Risk*
Attack Line	4	4	2	2
Search & Rescue	4	2	2	
Ventilation	4	2	2	
Back-up Line/Rapid Intervention	2	3	3	2
Pump Operator	1	1	1	1
Water Supply	1	1	1	
Utilities Support	1	1	1	
Command/Safety	2	2	2	1#
Forcible Entry	*			
Accountability	1			
Salvage	*			
Overhaul	*			
Communication	1*			
Chief's Aide	1	1		
Operations Section Chief	1			
Administration	*			
Logistics	1			
Planning	1*			
Staging	1*			
Rehabilitation	1			
Division Chiefs	2*			
Evacuation	10*			
Stairwell/ vertical Support	10*			
Relief/Rapid Intervention	*	*	*	*
Investigation	*			
Totals:	49	17	14	6

**** At maximum and high risk fires additional firefighters are needed to cover various points of attack as well as providing for incident management.***
 # Can often be handled by first-due officer.
Source: Rochester MN Fire Department, Hunt Research Corporation and The Commission on Fire Accreditation International.

Table 13, below, illustrates the number of personnel required to control and extinguish a fire in a small residential or commercial structure, such as 1080 Square feet for example. The average size structural fire controllable by the Fire Department involves a single room area of approximately 1080 Square feet in size. One can see that this relatively small incident requires a significant percentage of the staff of the Fire Department plus automatic and mutual aid. Fourteen Firefighters plus a Chief results in the need to respond four 3-person companies (four engines, one truck company and a Chief). This results in the need to respond Automatic Aid, initiate a General Alarm, and request Mutual Aid.This further justifies the need to contract Dispatching from CDF to allow a quicker, seamless dispatch.

Table 13
Minimum Standards of Cover for 1,080 Square Feet
Detached Single Family Residential or Small Commercial/Industrial Fire
Based on Necessary Fireground Tasks

Task	*Number of Firefighters*	*Company Assigned*	*GPM*
Attack Line	2	1st Engine	180
Attack Line`	2	2nd Engine	180
Search & Rescue	2	Truck	
Ventilation/Salvage	2	Truck	
Back-Up Line/Rapid Intervention	2	3rd Engine	
Pump Operator	1		
Water Supply	1	4th Engine	
Utilities Support	1	Rescue or Truck	
Command	1	Chief Officer	
Safety	1	Rescue or Truck	
Total Personnel	15		360
			24 GPM per firefighter

Source: Commission on Fire Accreditation International and Hunt Research Corporation

This illustrates the value of having Smoke detectors and Sprinkler systems in all structures. The same size fire in a Sprinklered structure, would require about six less personnel. This would free up two fire companies for other emergencies. Thus the response reliability of the Department is increased greatly.

There can be no question that the single best method by which the amount of staffing needed on the fire ground can be reduced by the installation of fire sprinklers. Fire sprinklers will in most cases extinguish or control a fire in its beginning stages. Therefore the number of necessary critical tasks is greatly reduced. Fire sprinklers reduce the need for multiple companies at fires and thus increase the reliability or availability of fire companies for other emergencies. By installing fire sprinklers the number of additional stations and staffing can be kept to the levels recommended in this Plan.

6. NATIONAL FIRE SERVICE BENCHMARKS:

Table 14 (on the following page) compares the current Fire Department Baselines to Benchmarks used by national Fire Protection agencies. Benchmarks are utilized as nationally accepted measurements for use by Fire Department managers to assure adequate levels of community Fire Protection which comply with national consensus standards of good practice and legal mandates.

Table 14
Nationally Accepted Response & Staffing Benchmarks

National Standard	*Organization*	*Current MBFD Standard*
4 per company at fire or other emergency with hazardous atmosphere	National Fire Protection 1710 Association (NFPA) Std. 1410 & 1500 & Federal OSHA	3 persons per engine co.
5 per crew needed for coordinated, effective, approach to search, rescue, suppression (high hazard occupancy)	NFPA Std. 1410, 1710 Dallas Fire Dept. study Seattle Fire Dept. study International City/County Management Association	3 persons per engine co.
Minimum effective company staffing is 4 firefighters	Dallas Fire Dept. study Seattle Fire Dept. study NFPA Std. 1710.	3 person per engine co.
Engine co. within 1.5 miles of built upon areas; 3 engines if fire flow 3,000 GPM >	Insurance Services Office (ISO)	Standard not met. Don't have 3 Engine companies in MBFD or Auto Aid.
Ladder truck within 2.5 miles of built upon areas	Insurance Services Office (ISO)	Partially Compliant with National Standard
Staffed ladder truck if 5 or more buildings 35' high or required fire flow of 3,500 GPM >	Insurance Services Office (ISO)	Truck is not regularly staffed
Fireground staffing to include 15 firefighters + BC	Commission on Fire Accreditation International (International Association of Fire Chiefs) and NFPA 1710	Amount of on scene staffing not guaranteed.
National average of on-duty personnel = .48 per 1,000	International City/County Management Association (ICMA)	MBFD has three on duty. (.3 per 1000)
On duty staffing per 1,000 pop.	San Luis Obispo (40,000 pop) 13 on duty .32 per 1000	MBFD (10,000 pop) (.3 per 1000)
On duty staffing per 1,000 pop.	Atascadero (26,000 pop) 4 on duty. .15 per 1000	MBFD= .3 per 1000
Crew staffing	San Luis Obispo = 3 (medic) Atascadero = 2 per co.	MBFD = 3 (medic)
National average total uniformed personnel = 1.59 per 1,000	International City/County Management Association (ICMA)	MBFD (total staff=10) is 1 per 1,000
Arrive at structure fire prior to flashover	FEMA National Fire Academy NFPA 1710	5 minutes from receipt of alarm
Arrive on scene of structure fire within 4 minutes driving time	NFPA 1710	4 minutes driving time or less for 50% of all calls.
Arrive at EMS call within 4 to 6 minutes of cessation of heart beat or breathing	Recommended by the American Red Cross	5 minutes from receipt of alarm
ALS unit arrive within 8 minutes driving time	NFPA1710	4 minutes driving time or less for 50% of all calls.
Provide 2 person rapid intervention team at fires and other hazardous atmospheres	Federal OSHA NFPA Std. 1410, 1500, 1710	Requires two Engine co. or engine and Truck; creates delays
Activate and staff an Incident Command team at hazardous materials emergencies, Continued from previous page:	NFPA Stds. Federal OSHA Stds &.State OES.	Delayed activation of full ICS due to lack of personnel on scene
Receive/dispatch alarm within 60 seconds	NFPA 1221,1710, ISO	MBFD; varies.
Turnout time; 60 seconds	NFPA1710	MBFD; Varies (paid and paid call)
Driving speed; 35 MPH	Insurance Services Office	MBFD; 35 MPH actual speed

7. LEVELS OF SERVICE:

In order to implement the Fire Department Standards of Coverage and Goals and Objectives, regarding emergency response, and to comply with the Intent of NFPA 1710, the following "Levels of Service" have been adopted by the Fire Department.

Preface

The "Level of Service" is that level which the Fire Department has adopted as it's baseline level of service. This level is determined based upon Goals, Objectives, nationally accepted benchmarks, national OSHA consensus standards, standards of coverage, the demands of emergency calls for service, fiscal constraints, and the need to avoid draw down of available community resources below the level established to meet community needs (i.e.; no other resources available if another emergency occurs).

Levels of Service

A. Structure Fire Calls:

1. One 4 person Paramedic Engine company should arrive within 5 minutes response time to 90% of all structure fire calls in the City. Response time shall be defined as 1 minute to receive and dispatch the call, 1 minute to prepare to respond in the Fire Station or field, and 3 minutes driving time at 35 mph average (approx.1.74 miles). The miles traveled in this period is 32% deficient when compared to the recommended 1.5-mile distance (at 35 MPH) from built upon areas to the nearest Fire Station, as recommended by ISO, in their Fire Suppression Rating Schedule, which is used to evaluate a community for insurance purposes, and to locate Fire Station sites.

   The 5 minute response time was arrived at after in-depth analysis of available data and actual times collected during emergency response, as well as the demands created by a structural fire and an EMS call, as previously discussed. It is divided up as follows:

   1 minute: Dispatcher receives, processes and dispatches the call. This is an average time which can vary based upon call volume, from a minimum of 30 seconds.
   1 minute: Fire company acknowledges call and apparatus begins to move. Actual time per data reviewed is as much as 1.5 minutes.
   3 minutes: Apparatus drives to scene at 35 mph average, based upon actual local data and tests. 35 mph for 3 minutes results in a travel distance of 1.74 miles. ISO recommends 1.5 miles from the closest station. ISO assumes 35 MPH.

   The 90% figure is stated as a goal to achieve. The 4 persons may arrive on more than one apparatus and from more than one location as long as one company officer is in charge at the scene. Regular, required, management audits by the Fire Chief should be conducted to reveal if the goal is being met. In many

communities, including Morro Bay, it is difficult to exceed the 90% figure in a cost-effective manner due to the following limiting factors:

a. Access obstructions.

b. Traffic calming devices and median strips on major highways.

c. Traffic congestion.

d. Weather.

e. Multiple alarms.

f. Delayed response.

g. Winding access roads in developments.

h. Road grades.

i. Large facilities, such as Power Plant, where it takes time to reach the victim in an EMS event, after arrival at the occupancy.

j. Potential for flooding to block through traffic on Highway 1 at Morro Creek.

k. Potential for collapse of highway overpasses / bridges after an earthquake

l. Potential for power lines to fall and block traffic on highway 1.

m. Potential for the 22" natural gas main feeding the power plant to fail and cause a major release, thus impacting traffic on Highway 1.

2. One truck company, with 4 firefighters assigned to the company at the scene, should arrive within a ten-minute response time interval to 90% of all structure fire calls within the City. This amounts to four miles in ten minutes at a speed of 35 miles per hour for the Quint/Truck. ISO recommends a Truck company within 2.5 miles if there are 5 or more buildings which are 3 or more stories or 35' or more in height or 5 buildings with fire flow greater than 3500 GPM.

3. A second Paramedic Engine company, with 3 persons assigned, should arrive within 10 minutes response time to 90% of all structure and vegetation fire calls within the City.

4. A third engine company, with 3 persons assigned, should arrive within 10 minutes response time to 90% of all structure fires in the City.

5. One squad company with 3 persons should arrive within 10 minutes response time to 90% of all structure fires in the City.

6. On Scene Staffing: A total of at least 14 firefighters plus the Duty Chief should arrive on scene within 10 minutes from receipt of call to 911, to 90% of all moderate risk structural fires; such as a single family detached dwelling. The on scene force shall be able to deploy a total of 360 GPM from 2 handlines; each of which deliver approximately 180 GPM, within the structure within 2.5 minutes of arrival of the first engine company to 90% of all calls. The forces shall be able to control a 1080 square foot fire in a one story, structure, within 2.5 minutes of arrival of the second engine company to 90% of all structural fires. This shall be accomplished while other fireground tasks such as forcible entry, search and rescue, ventilation, rapid intervention teams, relief teams, salvage and command functions are underway. Additional alarms will duplicate the first alarm and will include automatic aid/mutual aid companies.

   Three engine companies should automatically respond to each structural fire to comply with the ISO criteria for 3 Engine companies for the basic ISO community fire flow of 3,500 GPM. The average required fire flow for the Target Hazard Occupancies in Morro Bay is 3975 GPM. The highest community basic fire flow utilized by ISO is 3500 GPM. Beyond that, ISO evaluates the individual properties.

B. EMS Calls:

A Medic Engine Company, and a Paramedic Squad, (total of 4 firefighters responding), should arrive within five minutes response time (three minute driving time) from receipt of call by 911, to 90% of all EMS emergencies. A private ambulance company shall also respond and provide an additional Paramedic on scene as well as providing emergency transport services.

C. Vegetation Fires:

Two Engine companies and a Duty Chief should arrive at a low hazard vegetation fire, such as a grass fire within a tract, vacant lot or median strip, and away from the interface area, within 10 minutes to 90% of all vegetation fires.

Two Engine Companies with a total staffing of 7 for both companies (4 and 3), one type 111 Brush Engine, and a Duty Chief shall arrive at any high risk vegetation fire within ten minutes to 90% of all calls. Water tender to arrive in 15 minutes; 90% of all calls.

In addition, within SRA lands or if the fire poses a threat to the SRA the CDF will respond automatically.

D. Trash fires, vehicle fires, miscellaneous fires:

One four person Engine Company should arrive at all trash and vehicle fires within ten minutes response time to 90% of all calls.

E. Vehicle accident/vehicle extrication:

One four person Medic Engine Company shall arrive on scene within five minutes response time to 90% of all calls and the squad will respond within ten minutes to 90% of all extrication calls. Emergencies on Highway 1 may require dispatching two engine companies to travel in different directions.

F. Hazardous Materials:

One four person Medic Engine Company, one squad company, and one Chief will respond upon request to a Hazardous Materials incident, and arrive within five minutes of receipt of call to 911, to 90% of all calls.

One County Hazardous Materials team and vehicle should arrive on a Hazardous Materials incident within 60 minutes, 90% of all calls.

G. Technical Rescue:

One four person Medic Engine Company should arrive on scene within 5 minutes, 90% of all calls, and one Engine Company, one Squad Company, and one Chief, should arrive on scene within 10 minutes response time, 90% of all calls.

Based upon the nature of the incident, the Chief will determine the level of response. One Technical Rescue Group (Tech. Group) should arrive on scene within fifteen minutes response time to 80% of all calls.

There are no automatic aid truck companies which are within acceptable proximity to the City.

Table 15
Recommended Response Levels for Initial Response
to Emergencies in Morro Bay

	Structure Fire	***Vegetation Fires***	***Misc. Fires***	***Traffic Collisions***	***EMS***	***Hazardous Materials***	***Technical Rescue***
Engines	3	2	1	1	1	1	2
Truck	1	0	0	0	0	0	0
Squad	1	0	0	1	1	1	
Chief Officer	1	1	0	1	0	1	1
Firefighters	14	7	4	5	4	5	12

TACTICAL ABILITY

This profile indicates that the Fire Department is configured to respond to BLS and ALS emergencies and to respond to and suppress one-room fires in single unit residential occupancies. The total average number of MBFD personnel, and personnel from the one automatic aid engine, who can be on scene is about 12, within a time frame of about 10 minutes. However, The amount of staffing that can be generally expected to arrive on scene within the standard response criteria of 4 to 6 minutes of notification of the Fire Department, is three firefighters (unless multiple queuing has occurred) plus the Fire Chief if in town or available.

Three is therefore the current Baseline level of service in the community, and is what the community is willing to fund through tax dollars. Three Firefighters cannot place one hand held hose line in service within a structure, when one considers the requirement for a two person back up "Rapid Intervention" team per OSHA regulations, as found in CCR Title 8; section 5144. A three-person engine company is not in compliance with NFPA 1710. In addition, this does not allow personnel for Incident Command, ventilation, Search and Rescue, utility control, lock out-tag out, or other critical tasks until more personnel arrive. Upon arrival of off duty Paid Call Firefighters (PCF), the response of which averages three (but cannot be guaranteed), one interior attack hose line can be placed in service.

One hand held hose line can deliver about 180 GPM which can control a fire in a 540 Square foot area. Thus the MBFD may be able to protect a 540 Square foot unsprinklered structure, or a fully sprinklered and alarmed structure, until additional resources arrive.

The on duty force can attack a small, 1-acre or less, vegetation fire, if no structural protection is needed.

The on duty force can raise one 35' ground ladder or a 24' ladder. A 35' ladder will reach a third story window (28') or a second story roof.

The three-person crew can operate the aerial device on the Quint Truck and can reach upper floors, or place an aerial water stream over a fire.

The three-person crew can effectively intervene at a BLS emergency. An ALS emergency, such as a cardiac arrest, may require the assistance of the 2 person Medic ambulance.

The three-person crew can respond to vehicle extrication calls, and minor specialized rescue calls. However, they cannot do confined space entry or rescue until more staff arrives. This is because they cannot provide the back up rescue team required by OSHA in CCR Title 8, sections 5156,5157 and 5158.

The basic level of service should be increased to 4 on duty plus a Chief officer to assure that an interior attack can begin at a structural fire, or that confined space rescue can begin, before the arrival of PCF personnel or Automatic Aid personnel. The additional company staffing is also needed in order to comply with NFPA 1710 which will become the national consensus standard for staffing and will be cited by OSHA and Attorneys for those suing cities after incidents.

Adequate Fire Department staffing levels have long been recognized as a critical safety factor for emergency operations. Definitive studies have also demonstrated that when engine company staffing falls below a certain crew size it can lead to higher fire loss. (Cote and Bugbee, 1988)
The existing literature is quite clear in what constitutes a safe, effective minimum number of firefighters per engine company or to be available for response on a full-time basis: 4 firefighters per engine company or 0.5 full-time firefighters per 1000 in population. (Cote and Bugbee, 1988; NFPA 1992; McKinnon and Tower, 1980). Currently, the Morro Bay Fire Department only mandates a 2-person minimum.

The department has long recognized the disparity between current Morro Bay Fire Department staffing levels and what the fire service considers adequate for safe operation. The single attempt thus far to accommodate for this disparity has shown itself to be ineffective and disruptive to overall operations. This was the previous "Student Firefighter" program.

History

Prior to the spring of 1992, the Morro Bay Fire Department administered a "Student Firefighter" program on a limited scale. Positions were filled by Fire Academy/EMT 1 graduates who were looking to gain experience and insight into how fire departments operate. Each student was assigned a single, dedicated day of the week in which he or she would work a 24 hour shift with the on duty platoon. The student's role on responses and around the station was limited to basic First Aid skills, observation, and maintenance and housekeeping chores.

Because the position offered very little in the way of training or certification in desirable job skills, participation was incomplete and at no time were all available positions filled. Indeed, at one point the department had failed to attract any applicants for the position.

Student Firefighter performance was generally recognized as substandard and an inhibitor to overall teamwork and productivity standards. Because the students received no compensation or standardized training, quality applicants proved difficult to attract.

Recognizing the limitations of the program, as it currently existed, it was decided to redesign the entire position and offer a comprehensive training opportunities as well as State Fire Marshal Firefighter I and II certification at the successful completion of a 1-year program. The roles and responsibilities of the student would also be expanded to allow more participation on emergency responses. It was hoped by designing such modifications that the program would attract the cream of the academy graduates and the program would flourish as not only a valuable training ground for tomorrow's firefighters but provide a staffing supplement that would bring the department more in compliance with accepted industry staffing requirements.

Unfortunately, the revamped program failed in virtually every intention. The stringent new training standards, designed to make the students more versatile on emergency scenes, proved burdensome and labor intensive. The standard required students to demonstrate proficiencies and skills that were vast in number, basic by nature, and impressively time consuming to supervise. The overall time commitment to the new student program effectively compromised the training schedules of the full-time employees with no tangible benefit: a marginal competence attained at years' end couldn't possibly offset the disruption to individual shift productivity. Additionally, some students who demonstrated an exceptional learning aptitude and were beginning to prove useful adjuncts completed their 1-year commitment and found paid employment with other fire

departments. Any investment made in these quality employees was merely passed on to benefit their next employer.

The hallmark of the fire service is teamwork. Student Firefighters negate this concept because they are not assigned to a team or shift but to a dedicated day of the week. Individuals on a shift live and work together on a 24-hour basis, developing an intimate knowledge of each member's capabilities from constant training and shared exposure. The introduction of minimally trained, unskilled personnel into such teams on an irregular schedule hampers effectiveness, decreases productivity, and raises relevant safety considerations that have yet to be addressed.

8. FIRE STATION LOCATIONS AND NEEDS:

Fire Station needs are determined based upon the goals and objectives, standards of coverage, and desired levels of service.

The level of service identified in the Goals and Objectives and Levels of Service sections of this Strategic Plan is as follows:

"Four firefighters shall arrive on scene of an emergency call within 5 minutes of receipt of a call at the 911 dispatch center, for 90% of all calls. The 5 minutes includes 1-minute call processing time in the dispatch center, 1-minute turnout time in the fire station, and 3 minutes driving time. Average speed is estimated at 35 MPH. "

Current response data, based on a 2-year average, indicates that the 3-minute driving time is met on 36% of all calls. The average response (driving) time in 2003 was 3.42 minutes for the area south of Highway 41 and 5.13 minutes for the area north of Highway 41.

The Insurance Services Office (ISO) recommends an engine company within 1.5 road miles and a ladder- service truck within 2.5 road miles. At a speed of 35 MPH, the ISO standard, it takes approx. 2.58 minutes to travel 1.5 miles. Therefore, the 3-minute travel time is a valid criteria when compared to ISO standard for placing fire stations within 1.5 miles.

Table 16
Decision Criteria Matrix for Additional Fire Stations in Morro Bay

Choices	*Distance*	*Response Time*	*% of calls*	*Bldg inventory*	*Multiple Queuing*
Maintain status quo	All risks within 1.5 miles	1st due company is within 3 minutes driving time; 90% of time	100% in first in district	Existing inventory and infill	No multiple queuing
Temporary facilities and minimal staffing	When risks are 1.5 to 3 miles from an existing station	1st due company exceeds 3 minutes travel time 10% of the time but never exceeds 8 minutes	More than 10% of calls are more than 1.5 miles from current main station.	Area not covered within 1.5 miles has 25% of same risk distribution as in initial area	1 every 48 hours (consider staffing second company if additional station not affordable)
Permanent station needed	When risk locations exceed 3.0 miles from station	1st due company exceeds 3 minutes travel time 20-25% of the time. Some up to 8 minutes	More than 20-25% of calls are north of highway 41 (34% of all calls were north of 41 in 2003)	Uncovered area has 35% of same risk distribution as in initial area of coverage	5 in a week
Permanent station essential	Outlying risk locations exceed 4 miles from 1st station	1st due company exceeds 3 minutes travel time; 30% of the time. Some calls up to10 minutes. (3 minute travel time is exceeded 65% of the time now)	More than 30% of calls are north of Highway 41 (34% of all calls were north of 41 in 2003)	New area has 50% of same risk distribution as in initial area	1 every 24 hours

Credit: Commission on Fire Accreditation International. Multiple queuing criteria by Hunt Research Corporation.

When evaluating the proper location of fire stations in Morro Bay, the following factors should be considered:

1. Risk (probability versus consequences)
2. Incident demand
3. Travel routes and constraints (freeways, railroad tracks, rivers, etc)
4. Traffic, especially on high tourism days and during special events.
5. Multiple queuing of incidents (2 calls received at same time. This occurs about every 1.5 days in Morro Bay).
6. Station locations when compared to Hazardous Materials risks, including release from Diablo or the Duke Power Plant.
7. Potential for blockage of Highway one due to flooding at Morro Creek, collapse of overpasses/ bridges due to quakes, downed power lines, Major natural gas

release from pipeline, or Hazardous Materials released from fixed facility (Power Plant) or due to transportation accident.

8. Response times and distances
9. Needed concentration of companies.
10. Potential for excessive response times from extreme ends of City. This could occur if the engine company is on another call or out on Fire Prevention inspections, etc. For example, a response to the North end of the City, near Station 2, from the Inn at Morro Bay would be 7 minutes. The distance is 3.2 miles. This is unacceptable from an emergency response standpoint.
11. Need for redundant facilities in the event one is damaged due to earthquake.
12. Future growth patterns. For example, any significant future growth will probably be out Highway 41 towards Atascadero and/or out Highway 1 towards San Luis, and/or towards Cayucos.

RISKS IN MORRO BAY:

Most high consequence occupancies are within or adjoining the older core area of Morro Bay. The areas at the North and South ends are mostly low consequence risks.

Most incidents occur in the older core area of the City. Most calls are to 1405 Theresa (Bayside Care facility and Casa De Flores). The least number of incidents occur in the State Park area and the South end of town. Many incidents are walk in emergencies at Fire Station 1.

CURRENT FIRE STATION:

The current station is an old station which has exceeded its life cycle of 50 years. It has been added onto over the years. It is in a state of disrepair and would probably not withstand a credible earthquake or a significant fire. The engine room sustained damage in the December 2003 earthquake. A structural engineer has recommended that the engine room be condemned and not used until rebuilt.

The property upon which the station sits is too small for effective Fire Station operations.

The current station is located adequately for response into the older core area where most incidents occur, and where most high consequence incidents occur. The station is not properly located for response to the north end of the City, in Station 54's area.

The current station is poorly laid out and has little usable office space. There is no training or conference room, and no room for individual study. Quarters for on duty firefighters are cramped and unsuitable. Certain fire apparatus (the squad) must be parked outside due to lack of space within the engine room. The building has no Fire Sprinkler system and is vulnerable to fire.

There is no suitable facility for training of Firefighters on manipulative skills such as ladder raises, specialized rescue techniques, heavy hose stream operation and aerial operations.

The current Fire station needs to be replaced by a new facility as soon as possible. That station should preferably be a one story, three bay, 2 deep, drive through station with adequate, modern quarters, administrative offices, Information management systems room, training area and classroom, maintenance facility, public meeting room, and room for potential future Urgent Care facility. The approximate square footage should be about 10,000.00. The rough, approximate cost per square foot may be about $390.00 or more depending on the Architectural details, construction and furnishings.

FIRE STATION LOCATION STUDIES:

The author of this plan ran numerous actual driving tests in the City to determine response (driving) times at posted speed limits. The results are shown on Table 17 on page 47. In addition, the RRM Design Group, a Fire Station architectural firm, ran FLAME models to determine estimated travel times for the first in company, using posted speed limits. The results of the models and the results of the driving tests were similar. The entire northern end of the City is beyond the 3 minute driving time recommended in this plan and the 4-minute driving time used by RRM. The following options were considered in the RRM study. The options are listed along with the results of the model. The printouts of the models are found in the Appendix of this plan.

Table 17

Option	*Result*
Existing Station 53:	Response to downtown and1405 Theresa is acceptable
Option 1: Station at Main and Surf	This location is closer to the Freeway than the existing station. Allows rapid response to most of the community while still being close to the majority of calls in the downtown area.
Option 2: Quintana and Morro Bay	Closer to freeway than the existing station but does not significantly improve response times to North Morro Bay and delays responses to the Embarcadero.
Option 3: San Jacinto and Highway1	City owns this lot. It is at "the Cloisters". Improves response times to North Morro Bay but leaves central part of the city, where the majority of calls are, with a travel time in excess of 4 minutes.
Option 4: Station on Harbor and San Jacinto	A new station on the property that the City already owns on San Jacinto at Highway 1 (the Cloisters) in addition to a station at the existing location, provides excellent coverage to all parts of the community and leaves both ends of the City with response crews should the creek flood or one of the power lines from the Duke Power Plant fall across highway.
Option 5: Station on Atascadero Road	A new station located at the corner of Main St and Highway 41, where the Shell Gas Station is currently located, provides balanced coverage to all parts of the community. Anticipated driving times to the Embarcadero, which is a high-risk target hazard area, are just over 4 minutes. If the Morro creek floods or one of the Duke power lines falls across highway 1 and Main st, the station response could be cut off from the Southern half of Morro Bay.
Option 5-b: Station at Atascadero Rd with bridge over Little Morro Creek	If a new station were located at the corner of Main St., and Highway 41, where the Shell gas station is located, it's anticipated driving times to the Embarcadero would be improved by the addition of a bridge over Little Morro Creek. Driving times to the southern end of the Embarcadero would still be over 4 minutes.

The results of the RRM FLAME fire station models is that Option 4 is the optimum configuration for Fire Stations. The author of this plan agrees with that conclusion.

Refer to the following comparisons of response times and mileage to various locations from each site. These were driven in normal traffic without red light or siren. Time spent at traffic lights was excluded. However, this type of measurement is accurate in that a heavy emergency apparatus cannot go much faster with red light and siren on a city street, due to traffic, pedestrians, traffic lights, turns, etc.

Table 18

Destination	*Miles/time from current station 53*
Bayside Care/Casa de Flores (most emergency calls in MB)	1.4 miles/ 3.83 minutes
Yerba Buena and Tuscan	3.6 miles/ 5 minutes
Duke Power Plant	1 mile/ 2 minutes
Conejo and Laurel	2.6 miles/ 5 minutes
Inn at Morro Bay	1.5 miles/ 3 minutes
Embarcadero Inn; 456 Embarcadero	.8 mile/2.5 minutes
Fire Station 54	1.7 miles/ 4 minutes
State Park and South Bay Blvd	2.9 miles/8 minutes
North end of Embarcadero	1 mile/ 2 minutes

In addition, any future growth in the community will probably be out Highway 41 or Highway 1, rather than in the downtown core area or in the south end of the City.

THE TWO FIRE STATION CONFIGURATION:

At one time, two Morro Bay Fire Stations were staffed. Due to budget cuts, staffing at Station 54 was discontinued. There are definite advantages to having two stations staffed in Morro Bay. There are also some disadvantages. The following table compares the pros and cons of having two stations in Morro Bay. Refer to Table 19 on the following page:

Table 19
Pros and cons of two Fire Stations in Morro Bay

Advantages	*Disadvantages*
Offsets multiple queuing of calls	*Cost of construction*
Provides compliance with ISO and MBFD recommended Level of Service	*Annual Operations and Maintenance costs increased*
Provides faster initial intervention at Medical emergencies within the critical Reflex time of 4 to 6 minutes	*Communications between on duty personnel may be impacted*
Provides faster initial intervention at fires within the critical reflex time of 5 minutes from ignition.	*Inadequate staffing per company until adequate levels can be attained*
Provides redundant facility in the event of quake damage	*Delay in implementing a RIT team on scene*
Facilitates response from upwind of Power plant	*Need for a company officer on each company*
Provides for an approach and attack from 2 directions. Facilitates two company tactical operations at a scene.	*Increased future staffing/ apparatus costs*
Prevents isolation of a company due to Flooding on Highway 1	*Impact upon initial intervention at an ALS call*
Eliminates long responses from extreme south end or north end of city to the opposite end.	
Potential for joint station with CDF/ SLO county. Provides third engine as required by ISO for 3500 GPM needed Fire Flow. Increases immediately available staffing. Improves regional fire protection.	

The Table indicates that, if cost was not an issue, the optimum configuration for proper community Fire Protection planning is two properly located and staffed fire stations in Morro Bay. The drawbacks are a reflection of inadequate funding and the resultant need to phase in to proper levels of staffing (4 on duty firefighters) at each Fire Station. Once the phase in occurs and optimum levels of staffing are achieved, then there are no significant drawbacks. The communications issue can be resolved by the use of available communications technology, Internet, Email, inter station telephone, video conferencing and face-to-face meetings of both on duty crews.

The issue, if the two-station configuration is decided upon, is where should the second station be located? As stated, the city has a fire station site at San Jacinto and Highway 1. This is approximately 2.5 miles from the current station 1. This site would allow both stations to be within the recommended ISO 1.5 mile response distance and 4 minutes driving time for most of the City. It would also be within the ISO and 4 minute driving time to the north end of the city.

A significant portion of the area north of Highway 41 would be reached within the 3 minute driving criteria. The site is .5 miles north of the current station 54. However, it may be better to locate the station in the area of Bonita and Main, above the freeway so that the engine does not have to cross the freeway for most calls. In addition, this site would be further from any Tsunami threat.

The current station 54 is approximately 1.5 miles from station 1. The distance from this site to the north end of the city exceeds the 1.5 mile/ 3-minute criteria. This site is too small to allow an adequate "drive through" facility.

Response from the San Jacinto site to the southern portion of the City (downtown core) would take about 30 seconds longer (via Highway 1) than from the current station 2.

Due to the cost implications of building fire stations, it would be more economical to rehabilitate station 54 and staff the current station 54 until funds are made available to build a station on the San Jacinto or in the area of Bonita and Main. The new station site may be a candidate for a jointly funded station with CDF/ San Luis County. This presents the potential for cost sharing. It would also improve regional fire protection and increase the automatic response into Morro Bay by CDF. Such response would be credited by ISO as it is within 5 road miles of most of the city. The added advantage is that ISO would also count the third engine company (CDF engine) towards the requirement of 3 engines based upon the maximum basic community needed fire flow requirement of 3500 GPM.

If the community (reflected by the City Council) is willing to accept the average deficient driving time of 5.13 minutes (7:13 including dispatch and turnout) north of Highway 41, with a significant area which is 6.27 minutes driving time from station 53, then the most cost effective option is to rebuild station 53 at it's current site. The MBFD response standard of 5 minutes 90% of the time (3 minutes driving time) to the areas north of Highway 41, would have to be reduced in quality to 66% of the time as 34% of all calls occur in Emergency Response Areas 7, 8 and 9 and they all exceed the 3 minute driving standard.

Staffing:

NFPA 1710; "Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the public by career Fire Departments" applies to the Morro Bay Fire Department, as most emergency calls are substantially responded to by career Firefighters. NFPA 1710 recommends four firefighters on duty on each fire company. However, the current interpretation (2-01) by Steve Foli, NFPA staff Liaison to the 1710 committee, is that the four can arrive on separate apparatus and from separate locations as long as they join up as one company at the scene under the command of one officer. A two person company operating by itself is ineffective and unsafe on calls other than minor outside fires, or BLS level EMS calls, however it may serve as an interim solution if two companies respond.

National standards and benchmarks recommend a minimum staffing of 4 per company. Four are needed at the scene of a structure fire to provide a RIT team and a 2-person hose team for an interior fire attack. Obviously, there is a significant cost associated with staffing. The two stations could be staffed on an interim basis by splitting the one current 4-person company into a

2-piece company with 2 on each apparatus, until funding is available for full time staffing of at least 3 full time firefighters and one reserve on each company. Both companies would respond on a structural fire and could join up at the scene. As for Medical emergencies, the 2 persons would be joined by the 2-person ambulance company.

Most Likely Scenario for Fire Station Configurations:

The most likely scenario for optimum fire station configurations is two Fire Stations. One at or near the current location of the main Fire Station, and one at San Jacinto and Highway 1 or in the area of Bonita and Main (with interim staffing of station 54).

In the interim, a four person, two piece, engine company consisting of 2 firefighters on each apparatus (1 medic and 1 EMT) could operate out of station 1, and can operate as one company on structure fires and ALS emergencies, or as 2 companies on minor incidents or BLS emergencies. This may reduce the effects of the increasing number of multiple queued calls.

When both stations are activated, there could be two full time firefighters (Captain and Engineer) plus reserves at each station, until paid on duty staffing can be increased to four at the main station and three at the second station. The private ambulance could be stationed at the San Jacinto station, for a monthly fee. This would increase initial on scene staffing at EMS emergencies north of highway 41, to five.

The potential for a jointly funded station with CDF/San Luis County FD should be pursued. This would decrease cost to the City. And potentially increase the number of personnel on scene for initial attack. It would also reduce the impacts of multiple queued calls on response to calls in the area north of Highway 41, as there would be two engine companies available if CDF was not on another call.

9. FIRE DEPARTMENT TRAINING LEVELS AND NEEDS:

The following levels of training, certifications and qualifications exist in the Morro Bay Fire Department:

1. All full time personnel except 1 person are Paramedics.
2. All full time personnel are trained to a level of Rescue Systems #1.
3. All full time personnel and reserves are trained to a level of First Responder Operations, and decontamination, for Hazardous Materials. Two firefighters are trained to the Hazmat Specialist level.
4. All full time personnel are trained in OSHA Confined Space Entry requirements, and are certified to Confined Space Rescue Operations level.
5. All Full time personnel are certified as Firefighter 1 or 2.Many reserves are Firefighter 1; PCF academy's minimum standard.
6. Most engineers are certified to level of Driver/Operator 1 and 2.
7. Two Captains are certified Fire Officers; one is not.
8. All full time personnel have completed ICS 200 and 300.
9. Many of the full time staff have technical rescue and cliff rescue training.

There appears to be a need to assure that all appropriate staff have completed all OSHA mandated training

Training Schedule:

The Fire Department training schedule is as follows:

- 2 hours daily training for on duty crews.
- 4 multi company night drills per year for all members.
- 24-multi-company night drills per year with reserve force and full time crews.
- Officer training: 2 days per year each officer.
- Driver training: 40 hours initial training for new Engineers. The objective is to obtain a DMV license to allow driving apparatus.
- Firefighter recruit training: 240 hours for full time firefighter. 100 hours for PCF.

The MBFD training program schedule complies with ISO recommendations set forth in Section 580 of the Fire Suppression Rating Schedule. The Fire Department training facilities and aids do not comply with the ISO recommendations. This is due to the lack of slide and movie projectors (however video, CD's, power point and the internet are becoming state of the art and should be considered in compliance with ISO recommendations). In addition, there is no training tower or fire building.

10. CITY EMERGENCY PLAN AND EMERGENCY ORGANIZATION:

The City Multi-Hazard Emergency Response Plan (MERP) was updated in the fall of 2003 to meet state OES requirements.

The Emergency Plan and the City EOC are exercised annually. City employees have been trained in the State mandated SEMS ICS system.

The City reportedly has a good training program for SEMS and for the operation of the EOC. The program is said to exceed similar preparedness and response programs in other communities.

EOC and SEMS training has been a high priority for the Fire Department. The Fire Department staff conducts annual training for city employees and conducts scenario based exercises. FEMA representatives were very complimentary of the department after an evaluated drill in 2003.

11. CITY EVACUATION/ PROTECTIVE ACTION PROGRAM AND PUBLIC NOTIFICATION SYSTEM

The City Evacuation/Protection Action program was reviewed with the Fire Chief. The Sirens installed for Diablo Canyon can be activated upon request by the City. These are activated from the County EOC. There apparently is a back up activation system at the Duke facility (formerly PG&E). There would obviously be a time delay. Therefore, the siren system is probably not viable for a short term (less than 30 minutes) Hazardous Materials release from the Duke facility. Therefore, the Police and Fire Departments will need to make notifications to those potentially exposed downwind. This can create a health risk for such personnel if exposed to a hazardous plume, such as Ammonia. This may also not be possible due to a lack of staffing. The Fire and Police Departments need to develop a safe and effective method for such notifications. This may include the requirement for a computerized auto dial system.

The City has an EOC in the Recreation Center. In addition, the County EOC can be utilized by the City.

The Fire Chief is satisfied with the current system. However, a decision flow chart and checklist should be developed for utilization in determining when to order evacuation or sheltering in place.

12. STRATEGIC PLAN RECOMMENDATIONS:

The following are examples of current deficiencies related to the Fire Department capabilities to mitigate a major fire, Hazmat release, major medical facility, or technical rescue. These deficiencies have existed for a long time and will continue to exist if not mitigated.

The following recommendations are necessary in order to consider the significant impacts upon the Fire Department to be mitigated:

A. The engine room at the main fire station has been deemed structurally unsafe by a structural engineer. Therefore, the engine room needs to be rebuilt. Preferably, the entire station should be replaced by a suitable modern facility which is compliant with NFPA fire station standards. The current station has outlived its useful life as a fire station.

Solution: Upgrade the current Engine room as part of a project to build a new fire *station on the site or a nearby site*.

B. 3 Firefighters are currently on duty. NFPA 1710, NFPA 1500 and the legal OSHA mandate, found in CCR title 8; 5144, result in a requirement of 4 per company at the scene, in order to implement the required Rapid Intervention team. The minimum on duty staffing should be increased to 4 on duty to assure that an interior attack can begin at a structural fire, or that confined space rescue can begin, before the arrival of reserve personnel or automatic aid personnel.

Solution: Increase paid on duty staffing to four.

C. Estimated needed fire flow for a worst-case fire in Morro Bay is 8000 GPM per the MBFD. Fire Department can apply 300 GPM from handlines or 1000 GPM from an aerial stream. Thus the application ability for handlines is 3% of that required, and the heavy stream capability is 12% of the required fire flow.

Solution: Implement increased staffing and require all new structures, and significantly remodeled properties (51%), to have internal Fire Sprinklers. Require all structures which are exposed to potentially flammable vegetated areas to comply with Fire resistive requirements for Urban Wildland Interface areas.

D. There is only one Chief officer in the MBFD. OSHA Hazardous Materials regulations in 29 CFR 1910, as well as the State OES Standardized Emergency Management System, required by Government Code 8607, require the Fire Department to implement an ICS at emergencies. This requires trained and certified staff, which are not involved in actual fire attack, to implement such a system. Such a system requires at least an Incident Commander and an Operations Section Chief. At a major power plant fire, a total of at least ten ICS positions would be required, in addition to the Firefighters involved in the incident. The bulk of needed ICS staff would have to come from other agencies if available, and then with a delay in arrival of up to 1 hour.

Solution: Hire Fire Marshal at Chief Officer rank. Hire one Training Officer Captain.Train and certify all Captains in ICS. Implement other requirements as listed in this report in order to prevent or mitigate a major incident, thus reducing the need for a major ICS.

E. Response times to the north end of the City, north of Highway 41 are excessive. Multiple Queuing of incidents is increasing. Staffing on the existing fire units is not adequate for OSHA compliant initial interior attack on structure fires.

Solution: Construct a second fire station on city owned property at San Jacinto and Highway 1, or sell lot and buy property in area of Bonita and Main. Initially staff an engine company with 2 paid firefighters (Captain/ Engineer) plus reserves. Offer to house private ambulance and crew at station. Increase Fire Crew to 3 paid firefighters as funds permit. Consider joint funded facility with CDF. In the interim, rehabilitate and staff the current station 54.

F. The MBFD does not have adequate training props.

Solution: Provide the Technical rescue props and specialized training requested by the Fire Department.

G. A major evacuation effort due to an offsite Hazardous Materials release from the Power plant (such as Ammonia; an offsite release did occur in the past) or smoke from a major oil fire, would require up to five additional engine companies (15 firefighters) and numerous police officers. The Ammonia release on the Embarcadero, 10-8-01, required at least 200 responders from 35 agencies.

Solution: Implement the recommendations found in this report.

F. The current emergency dispatch system is overloaded, inadequate and prone to causing delays in dispatching. This results in incidents becoming larger.

Fire Department dispatching should be contracted from the San Luis Obispo County/CDF Dispatch center next year. The CDF center is a CAD system which is Emergency Medical Dispatch qualified (EMD). This will vastly improve dispatching for the Fire Department. It will result in a more seamless dispatch of automatic and mutual aid units and will result in a faster response to a major incident. In addition, it should improve the Insurance Services Office (ISO) rating for the Dispatching system.

Solution: Contract with the CDF county Fire Department for dispatching services, as requested by the Fire Department.

G. The Fire Department has no one to check construction plans, review fire protection system plans, review Hazardous Materials plans and MSDS, do complex facility inspections for Fire Code Compliance, or handle complaints. Fire Prevention is critical when a small Fire Department serves a community with significant risks such as Morro Bay has.

Solution: Hire a full time Fire Marshal and provide funds for third party review of complex plans, specifications and reports.

H. The occurrence of more than 1 emergency call at the same time (multiple queuing) is increasing in Morro Bay. Thus, delays in response to an incident can occur if units are committed to an emergency. This can be fatal if the second call is an ALS call, or can result in a fatality or high dollar loss in the event of a significant structural fire.

Solution: Initially increase the on duty staffing to four, so that the company can be split if necessary and appropriate to respond to certain triaged multiple calls. Then, activate a second Fire Station and company.

I. The Fire Department is impacted by repeated responses to the same occupancies, many times for routine, non emergencies. The types of persons generating these calls are referred to, in the Fire Service, as "frequent Fliers". Such calls result in taking a company out of service for other calls, result in unnecessary wear and tear on equipment, and increase the risk of traffic accidents during response.

Solution: Reduce the number of "frequent Flyer" EMS calls by charging fees for response to occupancies that have frequent routine, non emergency, EMS calls. The fee for such calls should be $917.53 (Fire Department annual budget divided by annual number of calls equals cost per call) or as an option, charge actual cost plus an overhead charge. The fee would be charged after responding to the same occupancy for a frequent flier call more than once per month.

J. In order to save a victim of cessation of heart action, it is necessary to defibrillate the victim within 5.5 minutes. Reflex time in Morro Bay can easily exceed 5.5 minutes from the call to 911, until the Paramedic is set up and can defibrillate. Great success is occurring with the use of Public Access AED (Automatic External Defibrillator) devices. Such devices should be placed in all public occupancies, City offices, Police Department, convalescent hospitals, assisted living occupancies, etc. Employees will require minimal training to operate them.

Solution: begin a program to encourage certain higher risk occupancies to provide public access AED's. Provide AED's in City facilities.

K. Morro Bay is considering annexations to the City. In addition, new occupancies continue to be constructed, and increase the demand upon the Fire Department. A cap should be placed upon the fire problem in the community to reduce the need to expand the Fire Department beyond that recommended in this plan.

Solution: Require all new or significantly remodeled occupancies (51%) to be equipped with internal fire sprinkler systems. Require any new structure exposed to a wildland vegetated area to have Fire Resistive Construction as recommended by the International Urban Wildland Interface Fire Code.

L. Assure all Fire Department apparatus is up do date, meets NFPA standards, and is reliable

Solution: Provide for an ongoing apparatus replacement program which replaces first line squads at 10 years, Engines at 20 years and first line truck company at 25 years.

M. Provide an adequate data base for tracking, interpretation and analysis of Emergency Data and other Fire Department data. The tracking and retrieval of data is inadequate currently.

Solution: Fund the acquisition of suitable computer equipment and software so that data may be entered, retrieved, analyzed and archived. Provide funding for a computer consultant to set up the system, enter the data and train personnel in its use.

N. A Fire Boat is needed to suppress offshore fires in boats.

Solution: In cooperation with the Harbor Patrol, obtain and operate a fire boat meeting the Requirements of NFPA for a Class C fire boat, with a 750 GPM pump.

O. There may be opportunities for cost savings and efficiencies in the functional areas of Fire Investigation, training, apparatus maintenance, purchasing, fire prevention, plan reviews, code enforcement, and emergency response.

Solution: Pursue opportunities, with Fire Chiefs of surrounding agencies, to enter in to Joint Powers Agreements as applicable.