



THE CITY OF SAN DIEGO  
**REPORT TO THE CITY COUNCIL**

DATE ISSUED: February 27, 2009 REPORT NO:  
ATTENTION: Public Safety and Neighborhood Services Committee  
Agenda of March 4, 2009  
SUBJECT: Fire Station Master Plan  
REFERENCE: Fire-Rescue Standards of Cover Report to PS&NS

REQUESTED ACTION:

This is an informational item only. No action is required on the part of the Committee or the City Council.

STAFF RECOMMENDATION:

Accept the Report.

BACKGROUND:

The Fire Station Master Plan (FSMP) is a document developed and maintained by the Fire-Rescue Department for fire station planning and prioritization purposes. The need for a FSMP is referenced in the City's General Plan as a means of identifying the communities in which additional fire stations are needed to achieve service level objectives established by the City.

The FSMP provides guidance through which planned development projects in underserved communities can be required to contribute their fair share of funding for the construction and equipping of these fire stations. In addition, it allows the City to better plan for capital improvement project expenditures as well as ongoing staffing operating and maintenance costs associated with the replacement and addition of fire stations. By design, the FSMP is a living document whose content is subject to periodic review to ensure that assumptions and findings remain valid. It is proposed that this review be conducted every two years.

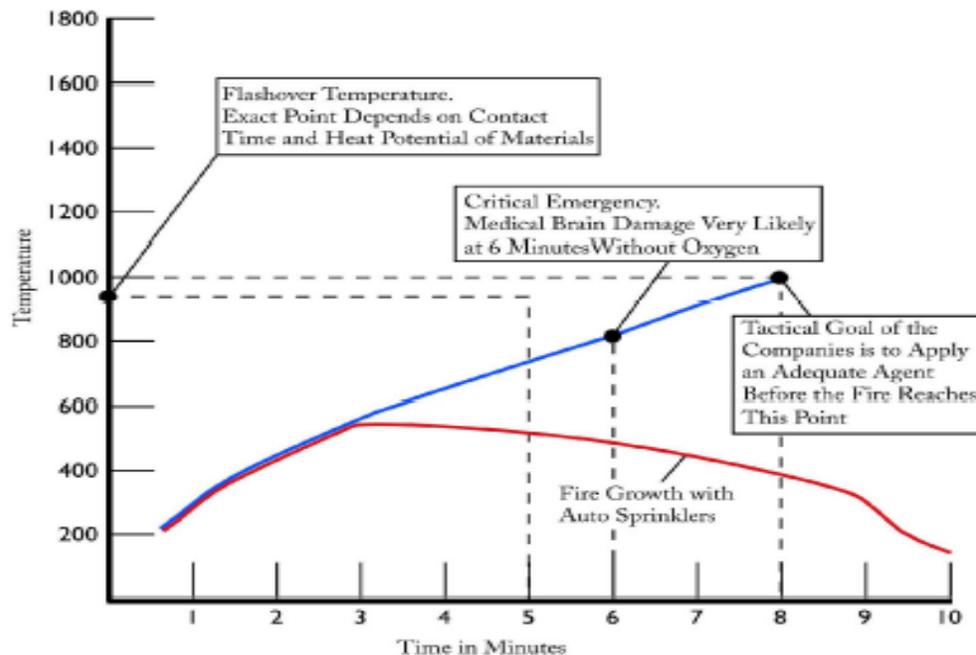
While the FSMP plays an important role in the fire station planning process, it does not constitute the final capital improvement project list for fire station construction in the City. Such a list can only be developed via a review of proposed projects listed in the FSMP by the City's Capital Improvement Project Review and Assessment Committee (CIPRAC). Adherence to this process will ensure that fire station projects are considered as part of the city-wide assessment of capital improvement project needs and are prioritized in accordance with approved city-wide

rating criteria. Final approval of the City's Capital Improvement Program (CIP) proposed by the Mayor is granted by the City Council as part of its annual budget review and approval process.

### Importance of Rapid Emergency Response

One performance metric most fire service agencies employ is emergency response times. This is done because there is ample scientific data to support that the more quickly the right type and number of resources can be brought to bear on an emergency incident, generally speaking, the better the outcome. Two examples of this are captured in the illustration below. The first speaks to how quickly fires progress and how much more controllable they are in the early stages of their development, and the second shows that medical brain damage is very likely to occur whenever oxygen deprivation occurs for six or more minutes; a condition that can result from traumatic or medical reasons.

#### Fire Time/Temperature Curve



### Components of Emergency Response Time

The processing of a request for emergency response and the actual response itself can be broken down into several key activities whose performance must be maximized to ensure no time is wasted. The components of response time are:

1. Emergency Call Answering Time – The interval from a dispatch center's receipt of a 9-1-1 call for service to the time the call is answered by a dispatcher.
2. Emergency Call Processing Time – The interval from the time the dispatcher answers the 9-1-1 call to the time the dispatcher alerts emergency responders of the need to respond. Activities during this interval include verifying the emergency type and location, selecting the appropriate type and number of emergency units that will be dispatched, and sending this information to the responding units to alert them of the response.

3. Turnout Time – The interval from an emergency responder’s receipt of the incident response information to movement toward the emergency incident. Activities during this interval include ceasing whatever activity is taking place at the time the emergency incident notification is received, securing the fire station, traveling to the response apparatus, acknowledging receipt of the response, donning all protective equipment, developing a route of response, and initiating response toward the incident.
4. Travel Time – The interval from the apparatus beginning to move toward the incident to the time of its arrival at the incident location given. Activities during this interval are limited to driving time and location of the incident.

Time consumed by the first three intervals can be minimized through the application of technology. One example of this would be to upgrade or replace Fire-Rescue’s deteriorating paging and alerting systems used to notify crews of an emergency response. The older technologies currently in use have become the slowest and most unreliable links in the response processing chain. These deficiencies often result in delays in notifying crews of an emergency response. The one-time cost to address station alerting is estimated be \$2 M. Paging solution options are still being explored.

In addition, efficiencies can be gained through refinement of emergency call processing procedures and the monitoring and correction of individual personnel performance shortfalls. Combined, these measures can provide for more time available to drive to the emergency, a factor that is more difficult to address as it is negatively impacted by traffic congestion, geography and the size of the area being covered.

#### Setting of Service Level Objectives for Emergency Response Time

It is important to note that there is no legally binding federal or state fire service response time standard. That said, there are two general approaches to determining appropriate response time objectives for a community. The first is to simply adopt criteria that have been developed by consensus standard setting groups such as the National Fire Protection Association (NFPA). The second is to undertake a comprehensive assessment of conditions in the community such as that offered by the Center for Public Safety Excellence, formally known as the Commission on Fire Accreditation International (CFAI), via its Fire Service Accreditation process. Both approaches are summarized below.

#### NFPA 1710 – Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Depts.

This document, first published in 2001, is regarded as a benchmark standard for emergency response. It addresses speed (response time) and weight (number and type of resources) of response. One example of the latter is the concept of an effective fire force. This refers to getting a prescribed number of firefighters (14-15) needed to perform all required initial tasks at a structure fire in nine minutes. Examples of response time standards to be met 90% of the time found in NFPA 1710 include:

<u>Structure</u> <u>Response:</u>	<u>Turnout Time</u> 1 minute	<u>Response Time</u> 4 minute	<u>Total</u> 5 minutes
<u>Medical</u> <u>Response:</u>	<u>Turnout Time</u> 1 minute	<u>Response Time</u> 4 minute	<u>Total</u> 5 minutes
<u>Effective</u> <u>Fire Force</u> <u>Response:</u>	<u>Turnout Time</u> 1 minute	<u>Response Time</u> 8 minute	<u>Total</u> 9 minutes

Very few, if any, fire departments in this country can meet the response times outlined in NFPA 1710, including San Diego. For example, in FY2008 Fire-Rescue only met the structure and medical response standard of first unit at scene in 5 minutes 46% of time when the goal is 90% and 6 minutes 70% of the time. Moreover, Fire-Rescue also meets the first responder arrival at medical emergencies in 8 minutes 90% of the time, as called for in the City's EMS contract.

As a comparison, based on their 2004 Standards of Cover document, the Orange County Fire Authority (OCFA) achieved 6 minute response time compliance 55% of the time. Their first unit arrival performance is 7:22 minutes 80% of the time.

Departments striving to comply with NFPA 1710 have encountered two significant challenges. The first is that turnout time, used to describe preparation for response, typically takes 1 ½ to 2 minutes as opposed to the 1 minute allowed under the standard. Secondly, it is exceptionally difficult to reach all areas of a community within the 4 minutes of travel time allowed under the standard due to road speeds, traffic congestion and relatively large geographic areas covered by individual fire stations. Consequently, many fire service professionals view the NFPA 1710 deployment model as unrealistic.

### Fire Service Accreditation

The national Fire Service Accreditation system was developed in 1986 as a joint effort of the International Association of Fire Chiefs and the International City-County Management Association as a means to evaluate the performance of a fire agency to determine if the programs and services provided are effective in meeting the needs of the community it protects. This system includes a critical analysis of historical data, existing and proposed deployment strategies, distribution and concentration of resources based on time parameters, identification of community risks and expectations, and collection of data on reliability of response.

A major requirement for agencies which pursue accreditation is development of a Standards of Response Cover Plan. The Standards of Response Cover Plan is defined as the written policies and procedures that determine the distribution, concentration and reliability of fixed and mobile resources of the department to respond to an "all-risk" environment. This is a critical element of Fire Accreditation as it represents the evaluation and/or creation of standards for response coverage.

The methodology used in the accreditation process is a systems approach to deployment rather than the one-size-fits-all prescriptive formula that is found in NFPA 1710. Through

development of the Standards of Cover, an evaluation is conducted to match local needs or risks and expectations with expected outcomes.

### DISCUSSION:

In 2003, the Fire-Rescue Department recognized the need to comprehensively evaluate its performance as a means toward improvement and to ensure community needs were met. For the reasons discussed above, instead of using the one-size-fits-all approach of NFPA 1710, the decision was made to pursue Fire Service Accreditation.

A significant amount of risk and performance data were gathered and analyzed to conduct the Standards of Cover study. After analyzing this data, it became evident that there were service delivery gaps in some communities that resulted from excessive:

- response times for first-in units and an effective response fire force
- incidents per engine district
- square miles covered per station
- population per firefighter

### Setting of Response Time Objectives

The Standards of Cover document recommended a phased approach be implemented to improve service delivery and address underserved communities. To ensure the FSMP accurately represents the current conditions of the City, risk factor performance has been updated from the FY2003 data used in the Standards of Cover to FY2008 data. In addition, the phased response time criteria recommended in the Standards of Cover document have been modified to make the service level objectives more realistic and to bring them more into line with City's ability to adequately fund the resources needed to achieve the objectives. An option for a phased emergency response time objectives is presented below.

### Phase One Response Time Objectives

- The first-in engine company for fire suppression will respond within 8 minutes or less 90% of the time.
- The first-in truck company will respond in 10 minutes or less 90% of the time.
- An effective response force will respond in 10 minutes or less 90% of the time.
- The first-in engine company or higher level capability for emergency medical will respond within 8 minutes or less 90% of the time.

### Phase Two Response Time Objectives

- The first-in engine company for fire suppression will respond within 7 minutes 90% of the time.
- The first-in truck company will respond in 9.5 minutes or less 90% of the time.
- An effective response force will respond within 9.5 minutes 90% of the time.
- A first-in engine company or higher level capability for emergency medical will respond within 7 minutes 90% of the time.

### Phase Three Response Time Objectives

- The first-in engine company for fire suppression will respond within 6.5 minutes or less 90% of the time.

- An effective response force will respond within 9 minutes or less 90% of the time.
- The first-in truck will arrive within 9 minutes or less 90% of the time.
- A first responder or higher level capability will arrive at emergency medical incidents within 6.5 minutes or less 90% of the time.

#### Fire Station Master Plan Prioritization Methodology

While there are numerous approaches possible to establishing a priority ranking of the communities in greatest need of additional fire resources based on the four principal risk factors used in this analysis, it is believed by Fire-Rescue that the following ranking methodology provides for the most efficient allocation of resources to deliver the greatest good for the City's communities:

1. Response Time Compliance
  - a. Non-compliant fire stations/communities are divided into one minute bands from ten through six minutes with those that experience difficulty meeting the 90% response objective at the higher minute intervals being prioritized above those at lower intervals.
2. Annual Incident Response Volume
  - a. Non-compliant fire stations/communities are listed in order of most responses to least responses above threshold value within the above response time bands.
3. Square Miles Protected
  - a. Non-compliant fire stations/communities are listed in order of most square miles protected to least square miles protected above threshold value.
4. Firefighter to 1,000 Population
  - a. Non-compliant fire stations/communities are listed in order of most firefighters per 1,000 population to fewest firefighters per 1,000 population above the threshold value.

#### 1999/2001 Fire and Lifeguard Facilities Bonds

The 1999/2001 Fire and Lifeguard Facilities Bonds were issued to address major deferred maintenance needs in the City's fire and lifeguard stations. Proceeds were used to rebuild fire stations in Lincoln Park, Del Cerro and San Ysidro and to site a temporary fire station at Qualcomm Stadium in Mission Valley. Additionally, land was acquired for a future fire station in Skyline and design work was initiated on the replacement of the Point Loma fire station. Major components such as emergency generators and apparatus roll-up doors were also replaced at many fire stations.

Unfortunately, funds were exhausted before the additional fire station projects in City Heights, Downtown, Hillcrest, Mission Valley (permanent), Paradise Hills, Point Loma and Skyline could be completed. It is recommended these stations continue to be a priority for completion. Discussions were also held regarding the relocation of the Tierrasanta fire station and the rebuilding of the Kearny Mesa fire station, although these were not formally in the bonds.

With respect to Lifeguard facilities, the South Pacific Beach tower was replaced and design work was started on towers at Children’s Pool, La Jolla Shores, La Jolla Cove, South Mission Beach and Mission Beach. The need for a tower at North Pacific Beach was also discussed.

Fire Station Master Plan

The FSMP is divided into two categories of proposed projects. The first consists of “Existing Projects” that are in various stages of development. The second consists of “Proposed Projects” and is further divided into two priority “tiers” listing communities that should receive future consideration for the addition of fire stations to meet emergency response time objectives.

Existing Projects

The following 16 fire stations are in various stages of development and are funded by Development Impact Fees, Facilities Benefit Assessments, Tax Increment Revenues or the City’s General Fund. Not all projects listed have accrued sufficient funds to begin construction.

**DIF/FBA/Tax Increment Funded Stations (7)**

Community	CD	Response Time Challenges Noted on _____ min. Map	Assessment Factors Exceeded	Funding Source
Black Mountain Ranch (Sta. 48)	1	10 min.	3 of 4	FBA
Otay Mesa (Sta. 49)	8	9 min.	2 of 4	FBA
North University City	1	8 min.	4 of 4	DIF
Mission Valley (Sta. 45)	6	8 min.	3 of 4	DIF
East Village	2	7 min.	3 of 4	Tax Increment
Bayside	2	7 min.	3 of 4	Tax Increment
East Otay Mesa	8	7 min.	2 of 4	DIF

**Fire and Lifeguard Facilities Bond Projects not Completed (2)**

Community	CD	Response Time Challenges Noted on _____ min. Map	Assessment Factors Exceeded	Funding Source
Skyline North	4	8 min.	3 of 4	General Fund
Paradise Hills	4	8 min.	3 of 4	General Fund

**Fire Stations Rebuilds – Various Funding Sources (7)**

Community	CD	Funding Source
Rancho Bernardo (Sta. 33 remodel)	5	DIF
Downtown (Sta.1 rebuild)	2	CCDC
Hillcrest (Sta. 5 rebuild)	3	General Fund
City Heights (Sta. 17 rebuild)	3	General Fund
Kearny Mesa (Sta. 28 rebuild)	6	General Fund
Point Loma (Sta. 22 rebuild)	2	General Fund
Tierrasanta (Sta. 39 rebuild/relocation)	7	General Fund

Of the 16 existing projects listed above, in addition to consideration of performance on the four risk factors, it is recommended that the following priority order be used to program construction for the reasons noted.

Priority #1 – Rancho Bernardo Fire Station (Sta.33) Funding Source: DIF

- The design/build contract for this fire station remodel has been awarded and construction is set to begin
- Completion of this project will address facility deferred maintenance issues, correct substandard crew quarters and reduce traffic interruptions in front of the station by providing drive-through capability
- One-time Costs: \$1.1M Ongoing Additional Annual Costs: \$0

Priority #2 - Mission Valley Fire Station (Sta. 45) Funding Source: DIF

- Crew is presently housed in trailer at Qualcomm Stadium
- Approximately 1 minute of response time is lost due to travel within the parking lot and lack of a traffic control device on Friars Rd.
- Construction of the fire station will allow for the eventual relocation of the Hazardous Materials Team from Mira Mesa to this larger facility and for a Truck 45 to provide additional truck coverage
- City owns land across the street from Qualcomm where fire station will be built
- Station design is 100% complete
- \$3M in DIF has accrued
- One-time Costs: \$6.4M (plus above DIF) Ongoing Additional Annual Costs: \$0

Priority #3 - City Heights Fire Station (Sta. 17) Funding Source: General Fund

- Facility was constructed in 1950 and is in need of replacement due to deterioration and lack of ability to expand its capacity to meet service demands
- Engine 17 is the busiest unit in the City with over 6,300 emergency incidents occurring in their response district annually when the desired maximum incident volume is 2,500
- Replacement of the fire station will allow for the assignment of a second fire engine to divide the total response
- One-time Costs: \$8.2M Ongoing Additional Annual Costs: \$2.2M

Priority #4 – Hillcrest Fire Station (Sta. 5) Funding Source: General Fund

- Facility was constructed in 1950 and is in need of replacement due to deterioration, substandard crew quarters, and lack of ability to expand its capacity to meet service demands
- There are over 4,300 emergency responses in Station 5's district annually when the desired maximum incident volume is 2,500
- Replacement of the fire station will allow the eventual redeployment of Truck 5 to assist with the high incident volume and provided needed truck coverage
- One-time Costs: \$8.2M Ongoing Additional Annual Costs: \$0

Priority #5 – Skyline North Fire Station Funding Source: General Fund

- A second fire station is needed in this community to address response coverage issues and to decrease the number of responses by Engine 32
- City owns the land on which the fire station will be built
- Addition of this fire station is an unmet need for 1999/2001 Fire and Lifeguard Facilities Bonds
- One-time Costs: \$7.2M Ongoing Additional Annual Costs: \$2.2M





Proposed Projects – Tier 2 (7 fire stations)

Community	CD	Response Time Challenges Noted on _____ min. Map	Risk Assessment Factors Exceeded	Funding Source
Emerald Hills/Encanto	4	7 min.	3 of 4	General Fund
W. Mission Valley	6	7 min.	3 of 4	General Fund
Navajo	7	7 min.	3 of 4	General Fund
Southpark	8	7 min.	3 of 4	General Fund
South Clairemont	6	7 min.	2 of 4	General Fund
Grantville	7	7 min.	2 of 4	General Fund
Liberty Station/NTC	2	7 min.	2 of 4	General Fund

Maintenance of Flexibility in Determining Final Priority

While this proposed FSMP provides a sound framework from which to prioritize and plan fire station capital improvement projects, it must be understood that there may arise unique opportunities to site, fund and construct fire stations that are not necessarily next in priority order. This can occur as a result of land acquisition and/or funding availability or be driven by development projects whose approval is conditioned upon first addressing fire protection shortfalls in the affected community. With this in mind, some flexibility will need to be shown in the final approval of fire station construction projects so that efficiencies achievable through unique opportunities can be realized.

In addition to the fire station needs described above, Fire-Rescue is in need of additional capital investment to address other operational needs including to allow: continued participation in the City’s fleet replacement program which includes adding surge capacity by increasing the number of reserve engines; lifeguard vessel and tower replacement; replacement of the station alerting and paging systems to improve reliability and speed of response notification; implementation of an electronic fire inspection program to improve data collection, reporting and billing processes; equipment/radio replacement and a permanent Air Operations facility to house Copters 1&2.

FISCAL CONSIDERATIONS:

The projects proposed through the FSMP represent a considerable one time capital investment for the acquisition of land, design and construction of the fire stations, and purchase of emergency response apparatus. In addition, the ongoing costs associated with staffing, operation and maintenance must be taken into account to ensure that completed facilities can be brought online to provide the anticipated service level benefits for which the capital expenditures were made.

Funding Required to Complete FSMP Projects

The costs estimates associated with constructing, equipping, staffing, operating and maintaining the proposed projects in the FSMP are shown below. The costs shown represent those that will be borne by the General Fund and do not include costs covered by DIF, FBA, and Tax Increment funds. These estimates are subject to change due to market forces and must be revised through further planning.

Project Category	One-Time General Fund Costs	Ongoing Annual General Fund Costs
Existing Projects (16)	\$62M	\$33M
Tier 1 Proposed Projects (8)	\$64M	\$19M
Tier 2 Proposed Projects (7)	\$62M	\$22M
<b>Total of all FSMP Projects (31)</b>	<b>\$188M</b>	<b>\$74M</b>

The following component costs are provided to facilitate cost estimation for individual projects.

Fire Station Configuration, Land Requirements and Costs

- 10,500 sq.ft., three-bay fire station housing 10 personnel
- 9,000 sq.ft., two-bay fire station housing 6-8 personnel
- minimum .79 acre lot with drive through capability
- \$724 per sq.ft. estimated design, permitting, construction costs (as of 8-3-08)
- \$750,000 placeholder for land costs

Annual Staffing, Operation and Maintenance Costs

- Fire station with four person engine crew - \$2.2M
- Cost of each additional four person engine/truck crew - \$2.2M
- Cost of battalion chief - \$150K

CONCLUSION:

The Fire Station Master Plan provides a framework to address replacement of fire stations that are at the end of their life cycle as well as identifying communities in which fire stations should be built to address service demands created by growth. As this situation developed over several decades, and the cost of correcting the deficiencies will strain the City’s limited resources, it is appropriate that the corrective plan be phased in over a period of time. What is essential is that a plan is developed and shared with all the stakeholders so we can begin to address the shortfall in a common sense approach addressing the most pressing areas of need first.

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