



0 - EXECUTIVE SUMMARY

0.1 Purpose, Goals, Objectives

The goal of this study is to ensure that the Bellevue Fire Department has safe, survivable, and appropriate facilities which will enable it to maintain its current capacity for providing excellent fire and emergency medical response to the citizens of Bellevue and its neighboring communities as they grow and change.

The purpose of this study is to provide City of Bellevue policy makers with the Fire Department's long-term vision for their facilities. This planning tool is meant to help prioritize and inform future capital improvement decisions. The fire facilities plan will document a vision for the City of Bellevue Fire Department's current and future facility needs.

The objective of the study is to provide the City of Bellevue with a plan that addresses three separate but concomitant elements which include:

- An evaluation of current station locations in light of current and projected changes in development and population, taking into account projected changes in downtown and the planned redevelopment of the Bel-Red Corridor.
- A facility assessment of all nine fire stations and recommendations for long-range planning for operation, repair, and replacement of evaluated stations.
- An assessment and long-range plan for the Public Safety Training Center (PSTC).

The plan is based on an assessment of response data, current resources and facilities, the department's operational goals/latest fire suppression strategies, code/legal requirements balanced with the City's available resources for funding and schedule impacts.

0.2 Process

Schreiber Starling & Lane Architects, together with Mary McGrath Architects and TriData Corporation, and in coordination with BFD and other city staff, conducted several meetings and site visits to gather data, make physical



observations, evaluate existing facilities, and determine current/future fire operation needs and goals.

To determine space standards, comparative analysis was undertaken and facility standards developed based on fire industry standards and similar departments including Seattle, San Jose, CA and Long Beach, CA. Based on this analysis, component diagrams (a layout of each functional space within a fire station) were developed as a tool for confirming that the space standards are supportive of current and future fire operations. Then, using the space standards, building codes, NFPA recommendations, and the latest industry standards, each existing fire station was evaluated for its ability to meet the established space standard.

The existing facility studies include site/floor plan diagrams. Based on this information, schedule considerations and the assumption of a 50-year performance lifespan for new facilities, renovation and/or replacement alternatives were ranked or prioritized for each reviewed facility.

0.3 Population, Fire Risk, and Demand Analysis

The study team conducted an analysis of the current response patterns of the fire department for use in the development of neighborhood based, optimized response recommendations that respond to current and future development changes within the City.

Population

Between 1960 and 1970, Bellevue experienced a dramatic increase in population, with steady growth since then. The current population is approximately 132,100 and it is projected that by 2030 it will be 156,300. Population density classifies nearly all of Bellevue as “urban” (+2,000 people per square mile) with Downtown and parts of Bel-Red, Crossroads, and Factoria classed as “metropolitan” (+10,000 people per square mile)

Development

Downtown: The downtown has the vast majority of high-rises and high-rise development is continuing at a fast pace. In the next decade, it is expected that the downtown area will have a significant number of additional jobs and residential population.





Bel-Red: This area is one of the high growth and development areas due to rezoning to mixed use and the SoundTransit Link Light Rail coming through this area. It is expected that over the next decade this area will also have a significant number of additional jobs and residential population as envisioned in the Spring Hill Development.

Demand

EMS calls account for about seven out of every ten calls the department responds to and with the projected increase in residential growth area, and the aging of the population.

Less common incident types (fire, haz-mat, etc.) have remained fairly constant over the last ten years and are expected to increase. The vast majority of fire demand is located in the Downtown, as well as the Crossroads and the intersection of NE 8th Street and 140th Avenue NE. There is also a smaller hotspot north of Station 4 in the Factoria area.

Over the past ten years, the total number of incidents has slightly increased by 3% (from 16,213 to 16,624) and the statistical regression projected that the total number of incidents will remain relatively consistent over the coming years. However, we know that Bellevue is undergoing significant growth and development, which is not taken into account in the regression. For that reason, our judgment is that demand will experience a slight increase going forward, especially in some areas such as the Downtown and Bel-Red areas.

Risk

On average, Bellevue has about 366 fires and zero fire deaths per year. Annual dollar loss is about \$3.8 million dollars. Downtown, Bel-Red, Wilburton/NE 8th St., Northeast Bellevue, and Southwest Bellevue had the highest number of fires per square mile from 2010-2012 and are projected to have the highest future fire risk.

0.4 Performance Analysis

The amount of time it takes the initial unit to respond to a call is most critical for EMS calls when minutes can quite literally be life or death. EMS calls account for about seven out of every ten calls that the department responds to and with the projected increase in residential growth and the aging of the





population, EMS calls are expected to continue to increase well into and through the next decade.

Response Time

Bellevue has somewhat of a challenging response problem because many of the roads have slow speed limits and the city roads are very disconnected in certain areas, particularly because of Interstate 90 and Interstate 405. Additional impacts are expected from an increase in traffic, with Bellevue growing as a regional job center, and congestion due to large scale construction projects including SoundTransit's Light Rail.

Travel Time: Travel times were 4:47 for EMS incidents and 5:29 for fire and special-operation incidents, which is longer than the NFPA standard of four minutes. It ensures that any facility changes made as a result of this report maintain the current level of response, we have used a five minutes travel time for assessing current and future stations location

Total Response Time: The total response time for EMS incidents was 6:45, which is 45 seconds longer than the NFPA six-minute total response-time objective. Fire and special-operations incidents had an average total response time of 8:01, which is over a minute and a half longer than the 7:20 time objective which includes the current travel time average of 5 minutes.

Areas where high-rise buildings currently exist and which are zoned to permit high-rises (Downtown, Bel-Red, Factoria), require a shorter travel time standard from the station to the base of the high-rise to allow for vertical travel. NFPA typically notes that vertical travel time for EMS (using an elevator) is 4-6 minutes. This can be much longer for fire response if the elevators are not usable and stair access with full gear is necessary. A standard of three minutes travel to the base of high-rise buildings is recommended by NFPA to allow for the vertical travel time. Due to the vertical travel time, the higher density and higher risk of a high-rise, the study team did not recommend adjusting the travel time standard as was done for non high-rise response. Based on current station locations, not all areas with or planned for high-rise development can be covered within three minutes from the closest stations. This is particularly critical in the Downtown as it has





the highest density of high-rise buildings and the highest number of EMS calls.

Workload

Unit workloads have an effect on response time performance because as units become busier, they are unavailable more of the time to respond to the calls where they would be first-due. Workloads for Bellevue vary by call/equipment type and were noted as follows:

- AID UNITS: High workload.
- ENGINES: Low to high, depending on the engine. Engine 6 has a high workload, Engine 8 has a low workload, and the remainder has a moderate workload.
- LADDER TRUCKS: Moderate workload.
- MEDIC UNITS: Moderate workload.

Unit Availability

Using NFPA 1710, the performance objective is a 4-minute travel time; however, as it is not always possible or reasonable to achieve a 4-minute time in all areas of the city, we recommend a more practical standard of under 5-minute travel time. Owing to the combination of response time, workload and location, Stations 1, 3, 6, and 7 meet the recommended standard with Stations 2 and 5 close to falling under the 80-percent threshold, and Stations 4, 8, and 9, which do not meet the threshold.

Station Location

Overall, the current locations of fire stations are good with the current station layout covering the vast majority of the city within the current five minutes travel time with some exceptions. There are areas with high-rise buildings and development potential which cannot meet the reduced goal of three-minute travel time.

Station Overlap

The current station layout provides good overlap in the Downtown area, but little overlap in the Crossroads area, where there are EMS and fire hotspots.

Weight of Response

To be considered effective, the goal is to have an appropriate number of firefighters within ten minutes to fight a structure fire. This is termed "Weight of Response". The NFPA 1710 standard is:





- Low-risk residential areas receive a complement of at least 16 firefighters within ten minutes
- High-rise structures (Downtown) receive a complement of at least 27 firefighters within ten minutes.

The analysis shows that there are large areas which cannot meet this standard. Some parts of the downtown fail to respond 16 firefighters in 10 minutes and there are large areas of the city that appear to only get 12 or fewer firefighters in 10 minutes. None of the current and projected high-rises areas can meet the standard of 27 firefighters within ten minutes.

Support/Command

The previous 1979 Fire Master Plan employed the operational concept of designating “task force” and “satellite” stations. In executing this plan, it was determined that the task force stations should be placed in the general area of city growth; thus Stations 1 and 3 were developed as task force stations as the primary growth at the time was generally east-west. The current response analysis and population census indicates that the focus of growth has shifted to a more north-south orientation.

- Ladder companies are typically part of the complement responding to fires and other multi-unit emergencies. Per NFPA standard, a ladder should arrive within ten minutes of the initial emergency call. Aerial ladder units are currently assigned to Stations 7 and 3 resulting in a significant coverage gap in the south of the city. Most areas of the city south of Interstate 90 cannot be reached within ten minutes, except for some limited areas in Factoria.
- Battalion Chiefs are also part of the complement responding to fires and other multi-unit emergencies. Bellevue currently has a single Battalion Chief located at Station 1. Per NFPA standard, a Battalion Chief should arrive within eight minutes of the initial emergency call. While Station 1 may provide good proximity to the Downtown it does not provide very good coverage for the rest of Bellevue. Currently the BC is only able to reach the northwest part of Bellevue within the target travel time of eight minutes.





0.5 Operational/Functional Analysis

There have been several major shifts in fire suppression operations over the last 30 years that directly affect the operational functionality of the fire stations and the headquarters facility. These include:

- The size and weight of fire apparatus has increased greatly since the 1960s to accommodate larger pumps, carry larger equipment, additional emission control standards, and more personnel causing the apparatus bays to be undersized.
- The introduction and growth of the Emergency Medical Services response within the fire service requiring specialty apparatus and equipment, decontamination facilities, specialty storage, and additional apparatus bay space.
- The introduction and growth in the number of female firefighters led to the development of gender-neutral facilities.
- The recognition that health and safety risks involved in the fire service can be mitigated through fire station design.
- The steady increase in the number of annual training hours required by each fire fighter for not only suppression but also medical training has led the growth in on-site training facilities to limit the payment of overtime for training.
- The introduction of specialty units/response capabilities including Urban Search and Rescue, etc., increase the need for equipment and apparatus storage.

In short, these shifts in fire operations have created the need to modify older facilities in order to maintain effectiveness and efficiency. Many of the added mission and roles and the increase in the size and quality of equipment and apparatus have also increased the amount of space needed in a typical station.

The key elements that the planning team focused on in analysis of the physical assets of the Bellevue Fire Department are:

- Protect firefighter health/safety



- Assess station ability to maintain operational effectiveness and meet current regulations/best-practices
- Facilitate effective recurrent training in firefighting and EMS skills

Firefighter

Health & Safety

Current standards for the design of fire stations, whether for new construction or renovation, require the inclusion of state-of-the-art equipment and systems for adequate air flow, removal and capture of carcinogens and particulates, appropriate location and ventilation of storage rooms for contaminated Personal Protective Equipment (PPE) and other equipment, washer-extractor and gear drying equipment, as well as clear separation of living quarters from the apparatus floor.

The three primary health objectives are to improve the air quality in a station, reduce the incidence of infection from bloodborne pathogens due to the increased focus on EMS, and reduce the incidence of injury on the job through better fitness and training.

The focus of the recommended renovations to address firefighter health and safety include:

- Dedicated bunker gear storage separate from the apparatus bays
- Dedicated medical clean up rooms adjacent to the apparatus bays
- A separation of suppression and EMS operations from the living quarters
- Adequate storage for suppression and EMS equipment separate from the living quarters.
- The development of fitness rooms that are of adequate size to facilitate company workouts as this is also a significant component of unit cohesiveness and has been adopted as an industry best management practice.

Functional Efficiency and Standards Compliance

Other findings related to station efficiency and compliance with standards include:



Sleeping Quarters and Restrooms: Group or non-separate sleeping rooms do not provide adequate privacy or while changing. Accommodating the need for privacy as the gender balance of firefighting changes can become a significant human/employee relations issue. It should be addressed in any station modernization program.

Special Projects Space: The current design at each fire station does not provide a dedicated special projects space. It should be addressed in any station modernization program to assure these important tasks can continue safely and efficiently.

Firefighter Training

The most cost-efficient as well as effective way to conduct individual and small group training is to conduct it while in-service at the station house. Currently most training occurs at the kitchen table or in the living room. The current NFPA standard and best-practices for providing in-service training requires individual computer access and group class areas that cannot typically be accommodated at the kitchen table.

To make the in-service training more efficient and cost-effective, the station office in single company stations should be expanded to allow access to the required training equipment and a dedicated training area should be provided in the larger stations for training classes and individual study.

The existing Bellevue Training Center is comprised of a 6-story training tower, an 8,000 SF training classroom and administrative building, and a Police Shooting Range and K-9 Unit outdoor facility. There is an operational necessity to transition the training operations at this location from an in-service focus to one that can support multiple agencies, recruit academies, and an expanded number and type of specialty drills. Built in 1983, the current facilities are not designed to host recruit academies which will be heavily in demand due to the need to replace a good portion of the department staff over the next 10-20 years. Additionally, the current facilities cannot accommodate the additional service demands that are a result of the recently-signed ILA for regional training.





The 7-10 acre site needed for a training facility make relocation of this function unfeasible, thus the existing site was evaluated for expansion. The training center grounds lack the area to develop alternative training scenarios/props for specialty drills including trench rescue, collapse structure search and rescue, hazardous material handling and containment, etc.

Supply and Maintenance

The department maintenance and supply administration is at Station 1 while the supplies are stored at Stations 1, 2, and 3 (in the basement). There currently is no location available to house out-of-service apparatus indoors, thus they are located at the training center. This operational model is very unusual for a department of the size and complexity of Bellevue. It is very inefficient and was the result of making do with the space available within existing fire stations.

0.6 Physical Condition Analysis

In 2011 and again in 2013, the Bellevue Facilities Department conducted a thorough assessment of the physical condition of all the current Bellevue Fire Stations. The objective of this survey was to provide an overall comparative assessment of the condition and adequacy of each building by means of visual analysis. After review of the past reports, the study team made an on-site tour of all BFD facilities. The intent of this review process was to become familiar with the construction, configuration, and systems comprising the existing facilities. Validation of actual facility construction in comparison with existing documentation was beyond the scope of this study.

For the purposes of this survey, each station was evaluated on its capability to address program need. Observations were:

Station 1: Feasible and effective to address space and program needs through renovation.

Station 2: Feasible and effective to address space and program needs through renovation and small addition.



Station 3: Feasible and effective to address space and program needs through interior renovation.

Station 4: Site limitations preclude an approach which would address space needs or the desired expansion to support taskforce functions by reconfiguring or expanding at the existing location.

Station 5: Age and un-reinforced masonry construction combined with small site preclude ability to reconfigure or expand at existing location.

Station 6: Site limitations preclude an approach which would address space needs or the desired expansion to support taskforce functions by reconfiguring or expanding at the existing location.

Station 7: Feasible and effective to address space and program needs through renovation and small addition.

Station 8: Feasible and effective to address space and program needs through renovation and small addition.

Station 9: Feasible and effective to address space and program needs through renovation and small addition.

0.7 Recommendations

Options Considered

Status Quo

In this option, the City does not implement a plan to address the facilities location or condition needs of the Bellevue Fire Department.

Pro:

This option has no initial cost.

Con:

This option has the higher maintenance and repair costs.





This option does not mitigate the negative impacts to response time and service expectations due to continued population and development growth in key areas. It will not be possible for the BFD to maintain its current level of response and service given the projected population growth and density change.

Without bringing the existing buildings up to newer, more stringent seismic code for essential facilities, all existing stations will continue to be vulnerable to damage from a seismic event that could compromise their ability to function.

This option does not correct issues of firefighter life/safety, risk management, and cost-efficiency inherent in the existing facilities.

Not providing the needed quantity and variety of training space at the PSTC the BFD cannot accommodate the projected increase in both the frequency and size of new recruit classes.

Not consolidating operational support and special project execution will continue to be inefficient with increasing direct cost for travel and cost of moving special services spaces between stations.

Budget Summary:

\$0	Initial Capital
\$14.5M	M&R (for 15 years)

Repair/Remodel/Limited Expansion Option

In this option, only one station (#5) is replaced. Other scope is limited to remodel, renovation, and minor expansion of existing stations (as possible given site limitations). Other than Station 5, this option does not include any new or other replacement stations.

Pro:

By not requiring the acquisition of new property or construction of new or replacement stations (other than Station 5), this option has a lower





total cost than options that include property acquisition for new and replacement of Stations 4 & 6.

This option will address the physical and operational issues at the station that is in the worst physical condition. (Station 5)

Con:

This option does not mitigate the negative impacts to response time and service expectations due to continued population and development growth in key areas. It will not be possible for the BFD to maintain its current level of response and service given the projected population growth and density change.

The extent of renovation needed at some stations will require temporary relocation of station operations during construction phase into rented or portable facilities. The cost of temporary facilities provides no long-term benefit to the city.

Not consolidating operational support and special project execution will continue to be inefficient with increasing direct cost for travel and cost of moving special services spaces between stations.

Not providing the needed quantity and variety of training space at the PSTC the BFD cannot accommodate the projected increase in both the frequency and size of new recruit classes.

This option will increase the cost of any subsequent change that requires more or expanded site as the cost of land will increase steadily making later implementation of any expansion proportionally more costly.

Budget Summary:

\$48.0M	Initial Capital
\$7.1M	M&R (for 15 years)

Replacement/Relocation/Remodel Option:

In this option, response time issues are addressed by the construction of a new station in the CBD and by relocating and expanding Stations 4 and 6 to





serve as taskforce stations. Station condition and operational deficiencies are addressed through replacement of Station 5 and select remodel/renovation/expansion of all the remaining stations. It also addresses training needs by expanding the Training Center, constructing a new training building and a central Department Support warehouse.

Pro:

This option ensures that the BFD will be able to maintain its current level of response and service into the future with its projected population growth and density change.

Every area of the city will have a station designed and/or modified to meet essential facilities seismic performance as defined by current code.

The condition of the existing buildings will be addressed to extend their expected service life to 30+ years.

Location of a three-company station in the downtown area will address current response shortfall and will ensure goal achievement as the area develops and grows higher and denser.

Relocation of Battalion taskforces to new Stations 4 and 6 correct deficiencies and aerial and incident command response as well as addressing the shortfall in weight of force response in the Downtown, Bel-Red, and Factoria areas which have the highest level of projected growth/density.

At stations that have remodel capability (site area and configuration) the interior remodel/expansion will be focused on correcting deficiencies in air quality; medical bio-safety health safety, and accommodation of in-station training and fitness.

Wherever possible, providing individual sleeping quarters will be accommodated at existing stations.

Existing vehicle bays will be expanded/remodeled to accommodate larger modern fire apparatus.



The PSTC site will be expanded to accommodate BFD Training and serving as a regional training facility for the East Metro Training Group.

At the expanded PSTC site, a centralized department support facility will be constructed to consolidate supply, operational support, and special project execution. This facility will also be sized to house reserve apparatus.

This option can secure the needed land early in the implementation process when it will likely be least costly.

Con:

This option will be the most costly of all the alternatives explored.

The needed land for new or relocated stations may not be readily available at the costs projected.

Budget Summary:

\$129.6M	Initial Capital
\$5.8 M	M&R (for 15 years)

Summary of Recommendations

Operations

1. Develop Stations 4 and 6 as new Taskforce Stations and provide the capacity to locate an engine, ladder, and aid unit at each.
2. Plan for additional space to accommodate adding or shifting location of apparatus and/or personnel during the next 6 to 12 years.

Stations

1. Acquire land for new/relocated stations:
 - a. Downtown
 - b. Clyde Hill
 - c. Factoria
 - d. Bel-Red
2. Construction of a new Station 10 located in Downtown
3. Replace Station 5 at an expanded site adjacent to its existing location





4. Replace Stations 4 and 6 at new, larger sites to accommodate possible future expansion as north and south Taskforce Stations
5. Remodel and expand Station 1, 2, 3, 7, 8, and 9
6. Recommend further exploration of relocating Station 1 in lieu of remodel (should the cost be relatively equal)

Support

1. Acquire land adjacent to the existing Training Center
2. Construct new Training Center
3. Construct Departmental Support Facility
4. Repair/renovate the Burn Tower

0.8 Implementation

Cost Planning

As the specific designs for the recommended projects have not been completed; it is too premature to develop detailed cost estimates for projects. The study team evaluated each project for cost planning which is different from cost estimating. Cost planning occurs before design begins and relies on historical or standard industry data to predict the project's probable cost. In planning costs for the recommended projects, the team evaluated each proposed improvements/replacement on a cost per square foot basis based on recent project types to establish anticipated costs for the construction and development of each project.

Land acquisition costs were estimated based on the optimum size established in the space standards and the average cost of land (on a square foot basis) for target location. Please note that these property acquisition numbers are 'place-holders' only, since we do not know the exact parcels that will be selected. We will also carry the various sales of existing property as an unquantified contingency as it is not certain that the city will dispose of the property.

A program cost factor has been identified which accounts for costs that are not specifically attributed to a specific project. These include non-operational costs incurred in the development, execution, and management of the overall



program. Typically these costs include direct management labor, temporary relocations, non-project fees and regulatory compliance, etc. Similar recent multi-year programs have reported program costs in the 4-5% range; thus the study team has recommended that 5% be planned to cover non-project program costs.

All cost planning calculations are based in current dollars. As the plan will be executed over a period of time, the team applied an escalation factor on the elements of the cost based on an assumed construction inflation rate applied to the estimated time from 2014 to the mid-point of planned construction. The assumed escalation rate for construction established by the Washington State Office of Financial Management (3% per year) was used.

Schedule

The recommended Option has an estimated total program cost of \$129,600,000 in 2014 funds which includes \$40m in site acquisition costs.

In order to allow sufficient time for developing a funding plan and to equalize annual costs, it is proposed that a multi-year execution plan be implemented. Implementation plans over a 6, 8, and 12 year period were studied to identify the impact of escalation on overall program costs. Total program costs for the three alternative schedules are:

- 6-Year: \$139,500,000
- 8-Year: \$145,000,000
- 12-Year: \$151,800,000

The 6-year option has all land acquisition occurring in the first year of the program to minimize the impact of escalation and inflation on volatile land prices. This was not done on the extended time alternatives to extended period of other/no use on the land assets, however the total cost of the longer period alternatives can be lower by early land purchase.