



OPERATIONAL & MANAGEMENT ASSESSMENT BALTIMORE CITY FIRE DEPARTMENT

Final Report



November 2021

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EXECUTIVE SUMMARY

Fire has been a salient concern for Baltimore residents, businesses, and visitors since before the founding of the United States, with the city's first municipal fire ordinance established in 1747. The Baltimore City Fire Department (BCFD) has a history of service dating back to its formation in 1858 with 153 professional firefighters. Now serving a diverse and historic city of almost 600,000 residents, the mission of the BCFD has evolved to include emergency medical services (EMS), the city's Office of Emergency Management (OEM), 9-1-1 telecommunications, and several related support functions; the BCFD also protects the Port of Baltimore complex on land and sea.

FACETS Consulting, LLP (FACETS) was contracted by the City of Baltimore in December 2019 to perform a comprehensive assessment of the BCFD. During this study, with cooperation from BCFD leadership and stakeholders, FACETS evaluated every aspect of the BCFD's operations and management.

KEY FINDINGS

- The BCFD, in its present system configuration, deploys a Pareto-efficient distribution of fire suppression and incident command resources to safely and effectively address current fire-related service demand; this level of resourcing provides minimal surge capacity. Any reduction in resources from the existing baseline would negatively affect certain areas of the city by compromising performance to applicable national standards.
- The BCFD's present deployment of EMS resources is not sufficient to meet the current and expected demand for pre-hospital emergency medical care across Baltimore.
- At current staffing levels, the BCFD's scheduling methods and work schedules—largely driven by the requirements of labor contracts with union-represented firefighters, EMS providers, and fire officers—are quite complicated; this leads to a host of daily operational/management inefficiencies and related effects on organizational cohesion, coordination, and communication.
- Current BCFD policies and practices for managing employees' leave usage and injury processes, also resulting primarily from contractual requirements, were repeatedly identified as areas for potential streamlining and cost savings.
- The BCFD's current dispatch policies and response assignments are generally aligned with national standards and operating practices in peer jurisdictions.

- At current service levels, the BCFD has not been allocated enough full-time, funded operational positions to maintain minimum staffing on front-line response units without a significant and ever-increasing reliance on firefighters, fire officers, and single-role EMS providers working overtime beyond their regularly scheduled shifts.
- Current policies and compensation schemes for uniformed staff assignments were repeatedly identified as a barrier to recruit and retain qualified personnel in these vital support roles.
- The current labor agreements between local unions and the City of Baltimore have created operational and management issues repeatedly identified by BCFD personnel, at all levels, as potential opportunities for labor-management dialogue and negotiation.
- The BCFD does not have a sufficient allocation of full-time, funded, “overhead” positions (uniformed and non-uniformed) to properly resource key operational support roles in administration, training, logistics, fire prevention, and community risk reduction.
- Overall, the BCFD’s management and operating procedures are similar to those in peer jurisdictions. To the extent certain procedures are outdated, out-of-synch with actual practice, or perceived as overly complicated, it is generally a result of the issues noted above.
- While every fire-related death is a tragedy, in 2020 the BCFD recorded the lowest number of civilian fire fatalities in its entire history. The etiology of fire-related deaths and injuries can be extremely complex; it seems likely, however, that the BCFD’s current fire suppression performance, fire prevention and community risk reduction efforts, EMS clinical care, and the service of its many dedicated personnel have made meaningful positive contributions to this laudable achievement.
- The BCFD has positive working relationships with mutual-aid partners in surrounding jurisdictions; given sufficient resources, these partnerships could be expanded to the strategic benefit of the entire region.

Overall, the BCFD requires additional resources to safely, effectively, sustainably, and equitably perform its current mission—in accordance with applicable state and national standards—across Baltimore’s many diverse neighborhoods and geographies.

INTRODUCTION

Baltimoreans have been concerned about fire since before the founding of the United States, with the city's first municipal fire ordinance established in 1747. The Baltimore City Fire Department (BCFD) has a history of service dating back to its formation in 1858 with 153 professional firefighters.

As the City of Baltimore grew to become a mid-Atlantic hub for commerce, industry, and employment, the risk of fire also expanded; culminating in the Great Baltimore Fire that started on February 7, 1904, in a six-story brick building occupied by the firm of John E. Hurst & Company. The aftermath of this epic blaze, which destroyed 1,526 buildings and 70 blocks after burning for more than a day, affected fire protection standards across the entire nation.



Over time, the mission of the BCFD has evolved to include emergency medical services (EMS), the city's Office of Emergency Management (OEM), 9-1-1 telecommunications, and several related support functions; the BCFD also protects the Port of Baltimore complex on land and sea.

In 2021, despite ongoing changes to Baltimore's built environment and after recording a historically low number of civilian fire deaths in 2020, fire remains a significant threat to the city's almost 600,000 residents, its businesses, and many visitors. The BCFD has a vital role in protecting Baltimore's housing stock and economic livelihood by ensuring fire safety for residents and local businesses; from rowhouses and neighborhood stores, to downtown high-rises occupied by major corporate tenants.

Beyond its fire protection mission, the majority (more than 80 percent) of BCFD's incident responses are delivering pre-hospital emergency medical care across the City of Baltimore. BCFD operates one of the busiest EMS systems in the United States and is a national leader in collaborative efforts to address urban health issues that disproportionately affect communities of color; these longstanding inequities have been further highlighted during the COVID-19 pandemic and lend even more urgency

to the BCFD’s ongoing initiatives around mobile integrated healthcare, community paramedicine, and population health.

Several organizational characteristics of the BCFD were palpable throughout our assessment. BCFD members are committed and competent professionals who consistently address emergencies of all types in one of the nation’s most challenging settings. This dedicated service has established BCFD as a trusted agency with a positive reputation in neighborhoods city-wide. BCFD leadership is highly capable and cognizant of the strengths, weaknesses, opportunities, and threats faced by the organization; with realistic plans—if not always available resources—to address them. Similarly, the leadership of the local unions charged with representing BCFD members seem to understand the broader challenges faced by city government.

BCFD maintains positive and collaborative relationships with other city agencies and external stakeholders, including mutual-aid partnerships with surrounding fire-EMS departments. At the same time, BCFD leadership recognizes the need to prevent complacency through proactive work to maintain existing relationships and cultivate new ones, especially given the current atmosphere of trust surrounding government institutions and roles.



FACETS appreciates the wide range of public policy challenges in front of cities today, particularly in the wake of the continuing COVID-19 pandemic. From contemporary experience, we understand the difficulties facing citizens and elected officials in reconciling competing policy priorities with limited resources. The scope of our work in this engagement, however, was focused *solely* on providing a comprehensive operational and

management assessment of the BCFD.

This report is loosely organized around the National Incident Management System, Incident Command System (NIMS-ICS) structure, tailored to the BCFD organization, with a central emphasis on operational performance. Recommendations are interspersed throughout the report and summarized in the final section of this document.

BACKGROUND

FACETS Consulting, LLP (FACETS) was contracted by the City of Baltimore in December 2019 to perform a comprehensive assessment of the BCFD. During this study, and despite the difficulties posed by the ongoing COVID-19 pandemic, FACETS evaluated every aspect of the BCFD's operations and management within the scope of our engagement. While a robust effort was made to obtain the highest quality information, the analyses and conclusions presented in this report are largely dependent on the availability, accuracy, timing, and completeness of the source data.

Over the past 15 years, FACETS has amassed substantial experience conducting studies of major metropolitan fire and EMS departments around the globe. Notwithstanding those successful efforts, 2020 presented a series of unprecedented challenges for completing this important work.

After our kickoff meeting with BCFD leadership on February 28, 2020, the first confirmed case of COVID-19 in the City of Baltimore was announced on March 14, 2020. While field research and planned site visits were necessarily delayed for several months due to COVID-related closures, restrictions, and other demands, FACETS continued working with BCFD staff to gather computer aided dispatch (CAD) records and other data from multiple sources.



We started virtual focus groups in June 2020; followed by on-the-ground research, with appropriate COVID-19 precautions, through December 2020. In parallel with these efforts, BCFD CAD data was compiled, assessed, and modeled by an expert team of analysts working from locations world-wide.

EQUITY ASSESSMENT

FACETS commends the City of Baltimore for its intentional efforts to apply an equity lens when considering the allocation and distribution of vital local government services. It was clear from the start of our BCFD engagement that service equity is a long-standing and widely accepted organizational value throughout the department.

In terms of service delivery, the BCFD is almost entirely organized to provide a consistent level of pre-hospital emergency medical care and fire protection to every neighborhood in the city. In

reviewing an entire year of CAD data for the BCFD, representing more than 300,000 individual EMS and fire suppression unit responses, it appears that the department is currently delivering services equitably across Baltimore. As with most fire departments, response time—for both fire and medical incidents—is a proxy metric for service quality. All other things set equal, longer response times lead to worse outcomes, while shorter response times—assuming the appropriate resource(s) arrive—lead to better outcomes.

The bulk of this report contains a detailed description of BCFD’s current service levels, using actual CAD data from 2018-2019. In reviewing this analysis, readers familiar with the City of Baltimore will see that BCFD response units are regularly deployed across the city, with more responses—and resources—in areas with higher service demand. It is important to note that during our assessment we confirmed the BCFD consistently dispatches the resources believed appropriate for a given



incident, based on the 9-1-1 caller’s description of the situation, to all locations across the city.

Certain programs, such as the BCFD’s mobile integrated health and community paramedicine (MIH-CP) pilots with the University of Maryland Medical Center, are focused on areas of the city where there is a demonstrated need; for example, the MIH-CP program is currently targeted to

patients in West Baltimore. In East Baltimore, the BCFD is planning “Project Linc” (not to be confused with the city’s “Project LINCS”), a population health program utilizing a multi-faceted approach to linking community members with resources needed to improve overall health.

With respect to internal equity, the BCFD has convened an equity task force to develop a comprehensive program with several crosscutting initiatives, including:

- Creating a BCFD LGBTQ+ community liaison program
- Launching a BCFD chapter of the Women in Fire network
- Developing a National Association of Hispanic Firefighters (NAHFF) chapter in the BCFD

BCFD leadership is very focused on recruiting, hiring, and training initiatives to help ensure a diverse, equitable, and inclusive workplace. The department has also conducted, with more offerings planned,

a series of town hall meetings, roundtables, and other learning sessions around unconscious bias, institutional racism in healthcare, and human trafficking awareness.

RISK ASSESSMENT

The City of Baltimore is at relatively high risk, compared to other localities across the United States and within Maryland, for structure fires and emergencies arising from other hazards. This section presents information from several sources describing Baltimore’s risk of, and readiness for, both “man-made” and natural hazards.

U.S. Department of Homeland Security

Urban Area Security Initiative (UASI)

For almost twenty years, the City of Baltimore has been at the center of a region identified by the Department of Homeland Security (DHS) as one of the nation’s high-risk urban areas for a terrorist attack. While the specific criteria for selection are not publicly available, once again in federal Fiscal Year 2021, the Baltimore region has been designated as one of only 31 (in FY21) U.S. metropolitan areas to receive funding under the DHS Urban Area Security Initiative (UASI) program.

Figure 1. DHS UASI Allocations for Federal Fiscal Year 2021 (February 2021)

2021 UASI ALLOCATIONS		
State/Territory	Urban Area	FY 2021 UASI Allocation
Arizona	Phoenix Area	\$5,250,000
California	Anaheim/Santa Ana Area	\$5,250,000
	Bay Area	\$37,500,000
	Los Angeles/Long Beach Area	\$68,000,000
	Riverside Area	\$3,900,000
	Sacramento Area	\$3,800,000
	San Diego Area	\$16,900,000
Colorado	Denver Area	\$3,900,000
District of Columbia	National Capital Region	\$51,750,000
Florida	Miami/Fort Lauderdale Area	\$14,750,000
	Orlando Area	\$3,800,000
	Tampa Area	\$3,800,000
Georgia	Atlanta Area	\$6,250,000
Hawaii	Honolulu Area	\$3,800,000
Illinois	Chicago Area	\$68,000,000
Maryland	Baltimore Area	\$4,250,000
Massachusetts	Boston Area	\$16,900,000
Michigan	Detroit Area	\$5,250,000
Minnesota	Twin Cities Area	\$5,250,000
Missouri	St. Louis Area	\$3,800,000
Nevada	Las Vegas Area	\$5,250,000
New Jersey	Jersey City/Newark Area	\$19,050,000
New York	New York City Area	\$178,750,000
North Carolina	Charlotte Area	\$3,800,000
Oregon	Portland Area	\$3,800,000
Pennsylvania	Philadelphia Area	\$16,900,000
	Dallas/Fort Worth/Arlington Area	\$16,900,000
	Houston Area	\$24,600,000
Texas	San Antonio Area	\$3,800,000
	Hampton Roads Area	\$3,800,000
Virginia	Hampton Roads Area	\$3,800,000
Washington	Seattle Area	\$6,250,000
Total		\$615,000,000

Source: <https://www.fema.gov/grants/preparedness/homeland-security#>

Federal Emergency Management Agency

National Risk Index for Natural Hazards (NRI)

The Federal Emergency Management Agency (FEMA) National Risk Index for Natural Hazards (NRI) is a relatively new product that is focused on U.S. communities' risk from the 18 natural hazards identified below in Table 1.

Table 1. Natural Hazards Included in FEMA National Risk Index for Natural Hazards (NRI)

Avalanche	Landslide
Coastal Flooding	Lightning
Cold Wave	Riverine Flooding
Drought	Strong Wind
Earthquake	Tornado
Hail	Tsunami
Heat Wave	Volcanic Activity
Hurricane	Wildfire
Ice Storm	Winter Weather

Source: <https://www.fema.gov/flood-maps/products-tools/national-risk-index>

Using an extensive methodology that included multiple working groups, a comprehensive literature review, and data from a wide range of sources, FEMA developed a risk equation that incorporates a community's social vulnerability, as depicted in Figure 2.

Figure 2. FEMA NRI Risk Equation

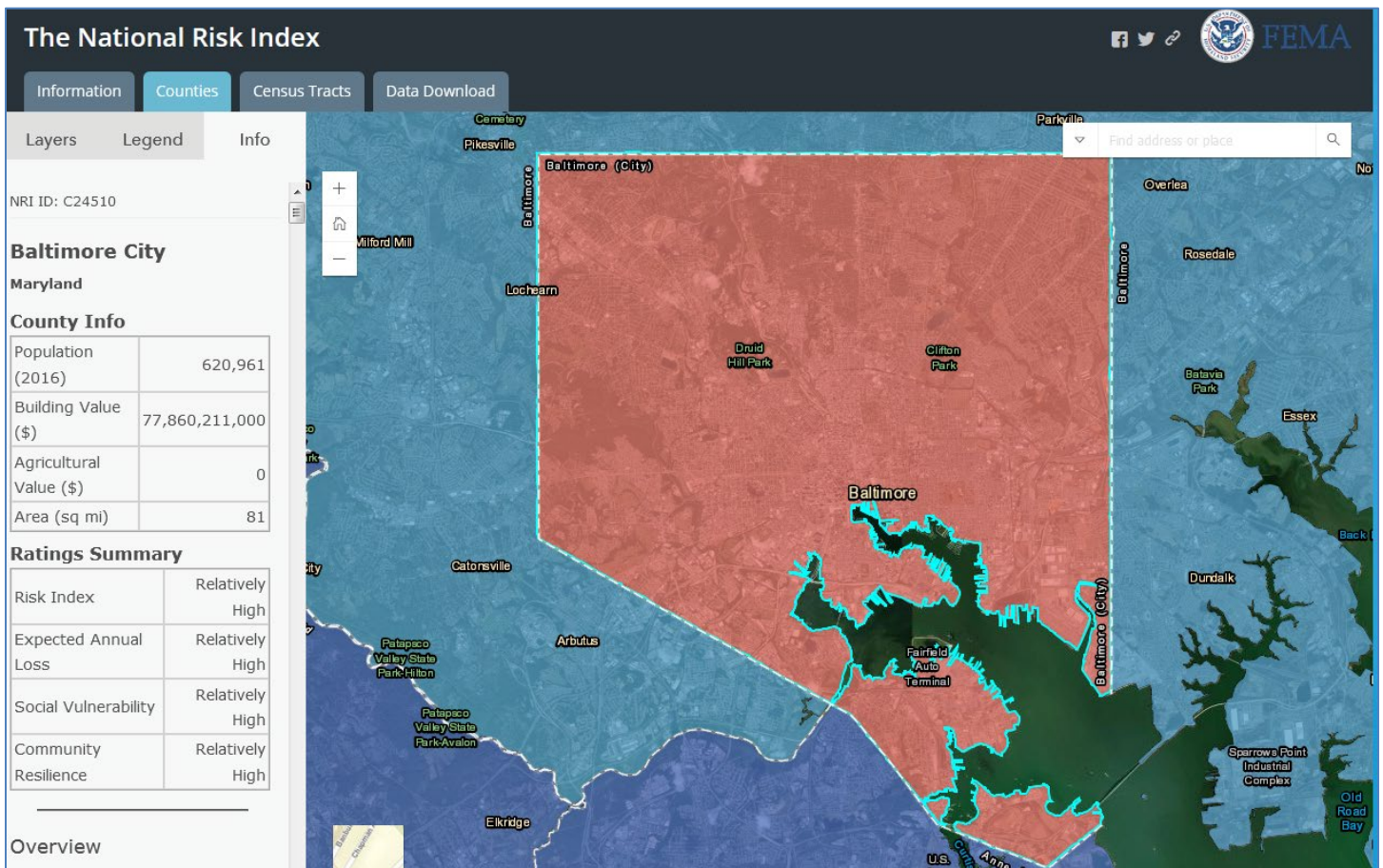
			1
Risk =	Expected Annual Loss X	Social Vulnerability X	-----
			Community Resilience

In its National Risk Index Primer, a companion document to the online NRI, FEMA notes that:

“An overall composite Risk Index score and individual hazard Risk Index scores are calculated for each county and Census tract included in the NRI. All scores are relative as each Census tract or county's score is evaluated in comparison with all other Census tracts or counties.”

Figure 3 presents the overall NRI ratings for the City of Baltimore, relative to the other communities assessed by FEMA nationwide.

Figure 3. FEMA National Risk Index Rating for Baltimore City (March 2021)



Source: <https://www.fema.gov/flood-maps/products-tools/national-risk-index>

Maryland Emergency Management Agency

Maryland 2016 Hazard Mitigation Plan (HMP)

In 2016, the Maryland Emergency Management Agency (MEMA) conducted a detailed statewide process to identify hazards and recommend mitigation actions; this resulted in publication of the Maryland 2016 Hazard Mitigation Plan (HMP).

According to MEMA's 2016 HMP, the City of Baltimore is at medium to high risk for all the hazards selected for analysis, except wildland fires; these rankings are summarized in Table 2.

Table 2. Summary of MEMA 2016 HMP Risk Rankings for Baltimore City

Hazard	High Risk	Medium-High Risk	Medium Risk	Medium-Low Risk	Low Risk
Coastal Flooding					
Drought					
Thunderstorm					
Flooding					
Tornado					
Wildfire					
Wind					
Winter					

Source: <https://mema.maryland.gov/Pages/publications.aspx>

International Public Safety Data Institute

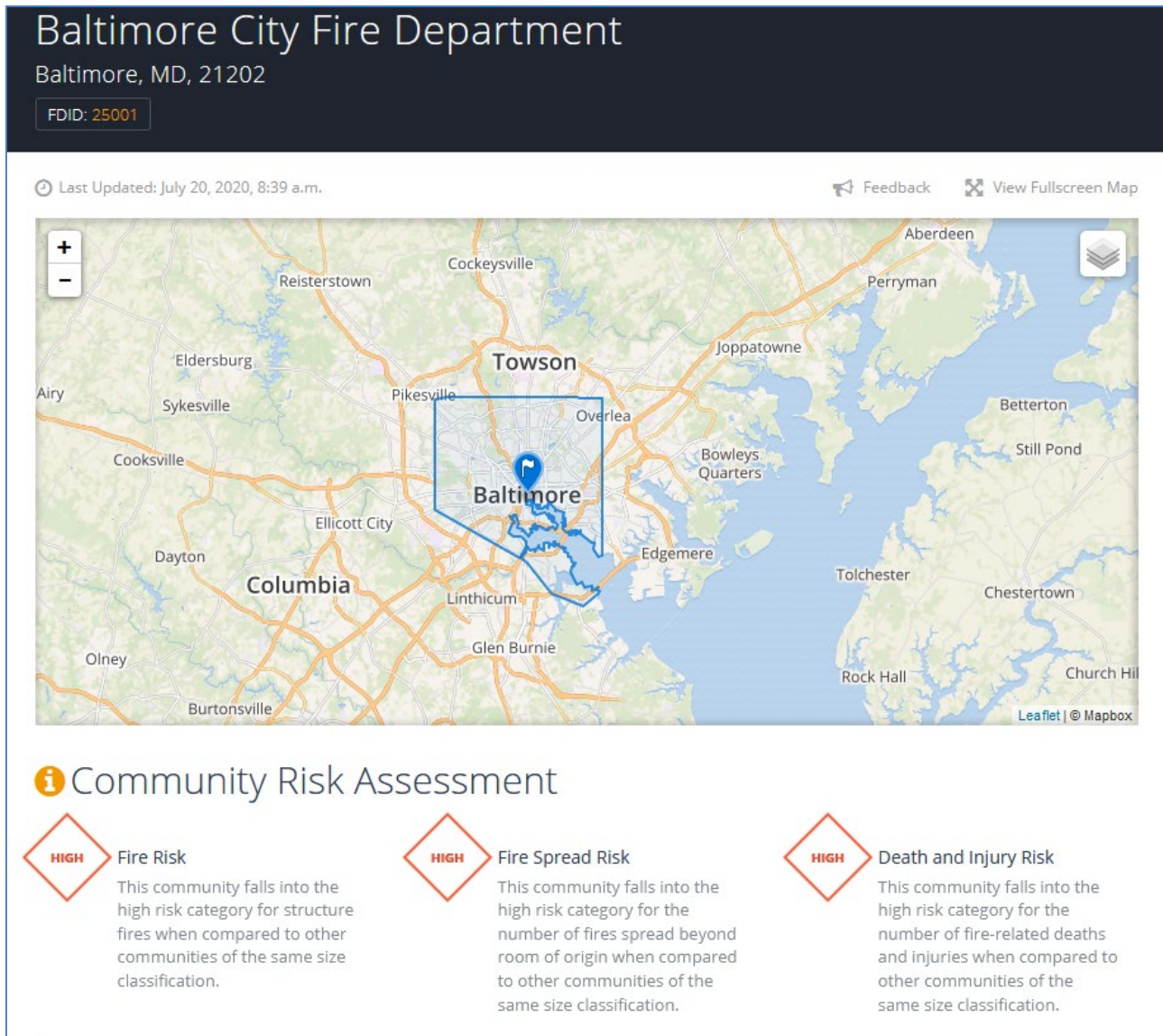
Fire-Community Assessment Response Evaluation System (FireCARES)

Developed over the past decade by a consortium of partners including, among others—the National Institute of Standards and Technology (NIST), The Urban Institute, the United States Fire Administration (USFA), the International Association of Fire Fighters (IAFF), Underwriters Laboratories (UL), and the International Association of Fire Chiefs (IAFC)—FireCARES quantifies the relative risk of structure fires and fire-related deaths/injuries in thousands of local jurisdictions across the United States.

The International Public Safety Data Institute (IPSDI) uses state-of-the-art data science techniques, coupled with research performed by its many partners, to analyze “big data” sets from a wide range of sources. The results of these analyses are depicted visually in FireCARES and made available to fire chiefs and other community stakeholders.

Figure 4 displays the top-line FireCARES community risk assessment for the BCFD.

Figure 4. IPSDI FireCARES Rating for the Baltimore City Fire Department (March 2021)



Source: <https://firecares.org/>

Insurance Services Office (ISO)

Public Protection Classification (PPC) Service

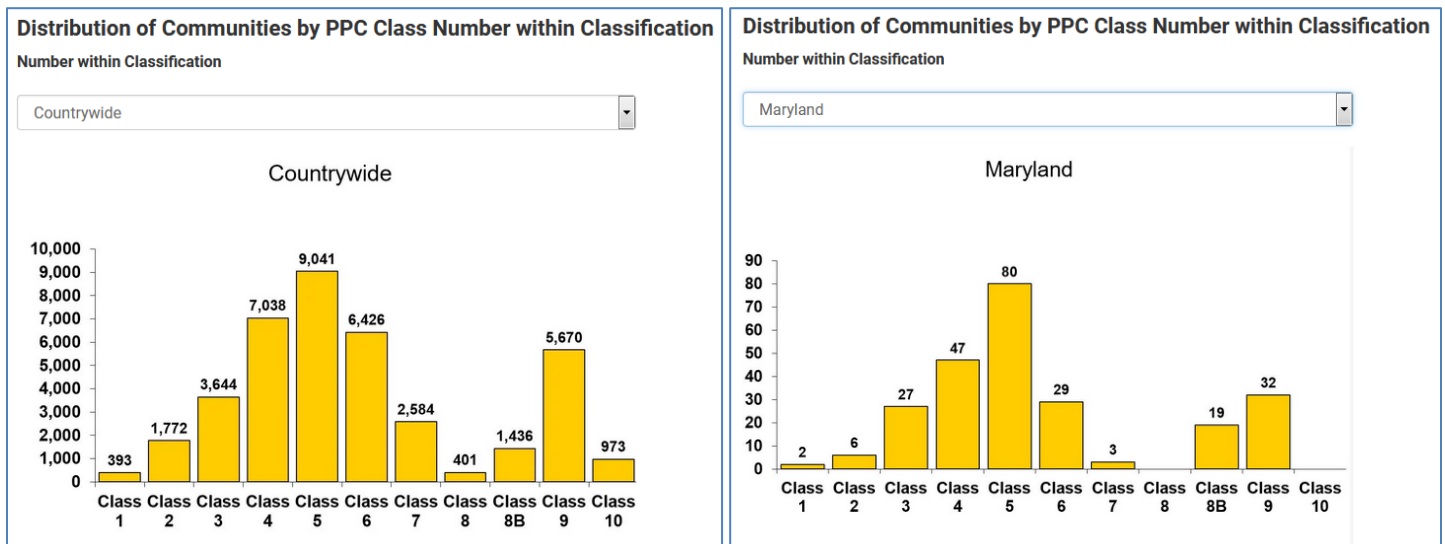
The origins of fire protection in the United States trace back to the development of the insurance industry and its continued concerns about the provision of effective fire protection in both urban and rural areas. The Insurance Services Office (ISO), a business unit of Verisk, Inc., maintains a Public Protection Classification (PPC) rating system for local fire departments in communities nationwide.

Local fire departments' "ISO (PPC) Ratings" are used to establish insurance rates for homeowners and businesses in the area serviced by that department. All other things being equal, insurance

policyholders protected by fire departments with lower ISO ratings will pay less in annual premiums than their counterparts in areas with higher ISO ratings.

As reflected in Figure 5, the BCFD is one of only 393 U.S. fire departments rated “Class One” (the lowest possible rating) by ISO’s PPC and one of only two “Class One” fire departments in Maryland. (To reiterate: a lower ISO rating is better than a higher ISO rating, all other things being equal.)

Figure 5. Distribution of U.S. and Maryland Communities by ISO Rating (March 2021)



Source: <https://www.verisk.com/insurance/products/location-fire-protection/>

U.S. Centers for Disease Control and Prevention

National Institute for Occupational Safety and Health (NIOSH)

Within the U.S. Centers for Disease Control and Prevention (CDC), the National Institute for Occupational Safety and Health (NIOSH) has operated the Fire Fighter Fatality Investigation and Prevention Program (FFFIPP) for more than 20 years. Recently, after a series of tragic firefighter deaths in Philadelphia, Baltimore, and Wilmington, DE, NIOSH released a special safety bulletin (excerpted in Figure 6) highlighting the serious risks posed to firefighters, and residents, from fires in rowhouses.

The rowhouse style of architecture is prevalent in Baltimore and several other historic east coast cities. While rowhouse fires can be effectively extinguished, safely conducting firefighting operations in these iconic structures is resource-intensive and extremely challenging compared to firefighting in a stand-alone single-family dwelling without adjacent/connected occupancies on either side.

Figure 6. Excerpt from NIOSH Publication No. 2020-117 (February 2021)

ROW HOUSE INFO & FEATURES

A TYPICAL ROW HOUSE



Photo courtesy of Christopher Naum

- ▶ 1 to 4 story residential house with a basement or cellar
- ▶ Constructed in a row, often running the length of a block with 30–45 occupancies
- ▶ Potentially occupied by multiple people
- ▶ Attached to houses on both sides, with separating fire wall
- ▶ Located on a narrow street
- ▶ Accessible only from a front and rear door

TYPICAL FEATURES

▶ EXTERIOR ROW HOUSE

- NARROW WINDOWS**
- FRONT STOOP (STEPS)**
leads to street
- 2ND & 3RD FLOOR 'BAY'**
3 or more windows that extend from the structure
- ORNATE CORNICES**
- SINGLE SLOPING ROOF**
modest ornate wood or brick cornice

▶ INTERIOR ROW HOUSE

- SINGLE RUN, STEEP STAIRS**
- LONG, NARROW HALLWAYS**
- WALKOUT BASEMENT**
- BASEMENT and/or CELLAR**
used for storage
- CELLAR**
only accessible from the basement

▶ CONSTRUCTION AND MATERIALS

- BALLOON**
frame construction
- BUILDING PERIOD**
late 1800s to early 1900s
- BRICK EXTERIOR WALLS**
- SOLID WOOD BEAM**
floor joists and roof rafters
- PLASTER and LATH**
over wood framing
- TYPE III CONSTRUCTION**



Conduct a community risk assessment to understand unique features of row houses in your jurisdiction. Row house modernization efforts may mean the exterior is refaced and interior has a different floor plan. Materials used for modernization or new row house construction may burn more quickly.



"Don't underestimate the danger to firefighters when fighting a row house fire. Access to the rear of the property is a major challenge. Basement and cellar fires in row houses have resulted in many line of duty deaths. You must be diligent and prepare as though you're going to a fire each time you report for duty."

Assistant Chief Harry Bannan
Philadelphia Fire Department, Platoon D

OTHER RESOURCES

NIOSH investigations of deaths involving row house fires:

- [cdc.gov/niosh/fire/reports/face201618.html](https://www.cdc.gov/niosh/fire/reports/face201618.html)
- [cdc.gov/niosh/fire/reports/face201425.html](https://www.cdc.gov/niosh/fire/reports/face201425.html)
- [cdc.gov/niosh/fire/reports/face201424.html](https://www.cdc.gov/niosh/fire/reports/face201424.html)

Follow us on Facebook, Instagram or Twitter @NIOSH

UL Firefighter Safety Research
Institute video on basement fires:

- <https://ulfirefightersafety.org/research-projects/understanding-and-fighting-basement-fires.html>

Acknowledgements: Assistant Chief Bannan and the Philadelphia Fire Department for their support with this material.

DHHS (NIOSH) Publication No. 2020-117 (revised Feb. 2021) • <https://doi.org/10.26616/NIOSHHPUB2020117revised012021> | March 2020 (revised Feb. 2021)
 1-800-CDC-INFO (1-800-232-4636) | TTY: 1-888-232-6348 | CDC/NIOSH INFO: [cdc.gov/info](https://www.cdc.gov/info) | [cdc.gov/niosh](https://www.cdc.gov/niosh)

Source: <https://www.cdc.gov/niosh/updates/upd-09-10-20.html>

METHODOLOGY

FACETS used a mixed methods approach to conduct our comprehensive assessment of the BCFD, applying both quantitative and qualitative research techniques.

In total, and despite the impact of the ongoing COVID-19 pandemic, FACETS team members spent hundreds of staff hours physically on the ground throughout the City of Baltimore, and many more hours interacting with BCFD employees and stakeholders through virtual means.

LITERATURE REVIEW

During the study period, FACETS reviewed hundreds of documents and background materials produced by city, state, federal and other organizations; including, but not limited to:

- BCFD Strategic Plan, 2016-2021
- BCFD CitiStat(SMART) reports
- BCFD Fire/EMS Coordination Committee reports
- BCFD Mobile Integrated Health Community Paramedicine Programs Annual Report
- BCFD Exposure Control Plan
- BCFD Rules and Regulations
- BCFD Manual of Procedures
- BCFD Local 734 MOU, 2018-2020
- BCFD Local 964 MOU, 2018-2020
- BBMR Fiscal Outlook, August 2020
- Baltimore City Code, Equity Assessment Program
- Maryland Consequence Management Operations Plan, January 2019
- NIOSH Fire Fighter Fatality Investigation and Prevention Program Report F2014-24
- National Institute of Standards and Technology (NIST) Staffing Studies
- UL Firefighter Safety Research Institute (FSRI), multiple studies
- National Fire Protection Association (NFPA), multiple studies



INTERVIEWS

FACETS staff visited every BCFD facility and conducted COVID-safe in-person interviews at a dozen different fire-EMS stations around the city, gaining additional input from a diverse and representative sample of on-duty personnel at all ranks of the organization.

The issues and themes raised by interview participants during these dialogue sessions were remarkably consistent. To help ensure candid and honest input by protecting discussants' confidentiality, FACETS does not identify the specific BCFD units that participated in these interviews.

FOCUS GROUPS

Over the course of this project, FACETS conducted more than 50 focus groups and meetings with internal BCFD staff and other stakeholders; including, but not limited to:

- Baltimore Fire Fighters, International Association of Fire Fighters (IAFF) Local 734
- Baltimore Fire Officers Association, International Association of Fire Fighters (IAFF) Local 964
- Vulcan Blazers, Inc.
- Baltimore Bureau of the Budget and Management Research
- Baltimore City Comptroller
- Baltimore Deputy Mayor for Public Safety
- Baltimore Department of General Services
- Baltimore City Health Department
- Baltimore City Department of Housing and Community Development
- Baltimore City Department of Planning
- Baltimore Police Department
- Anne Arundel County Fire Department
- Baltimore County Fire Department



OPERATIONS RESEARCH

Recognizing the complexity of Baltimore’s urban geography, combined with the large volume of daily EMS and fire-related responses, FACETS utilized state-of-the-art operations research (OR) tools and techniques to analyze BCFD’s deployment of front-line fire-EMS services across the city. These analytical processes provide higher-fidelity results than static geographic information system (GIS) models, since they use actual incident data to reflect the dynamic nature of providing 24x7x365 emergency response services in a dense, high-demand urban environment.

Modeling Approach and Data Assessment

For this study, FACETS worked with Optima—a specialized group of operations research analysts focused on emergency services, specifically the operational and performance aspects of system design, configuration, and function—to provide fire-EMS resource deployment analysis, modeling, and simulation using actual data provided by the BCFD.



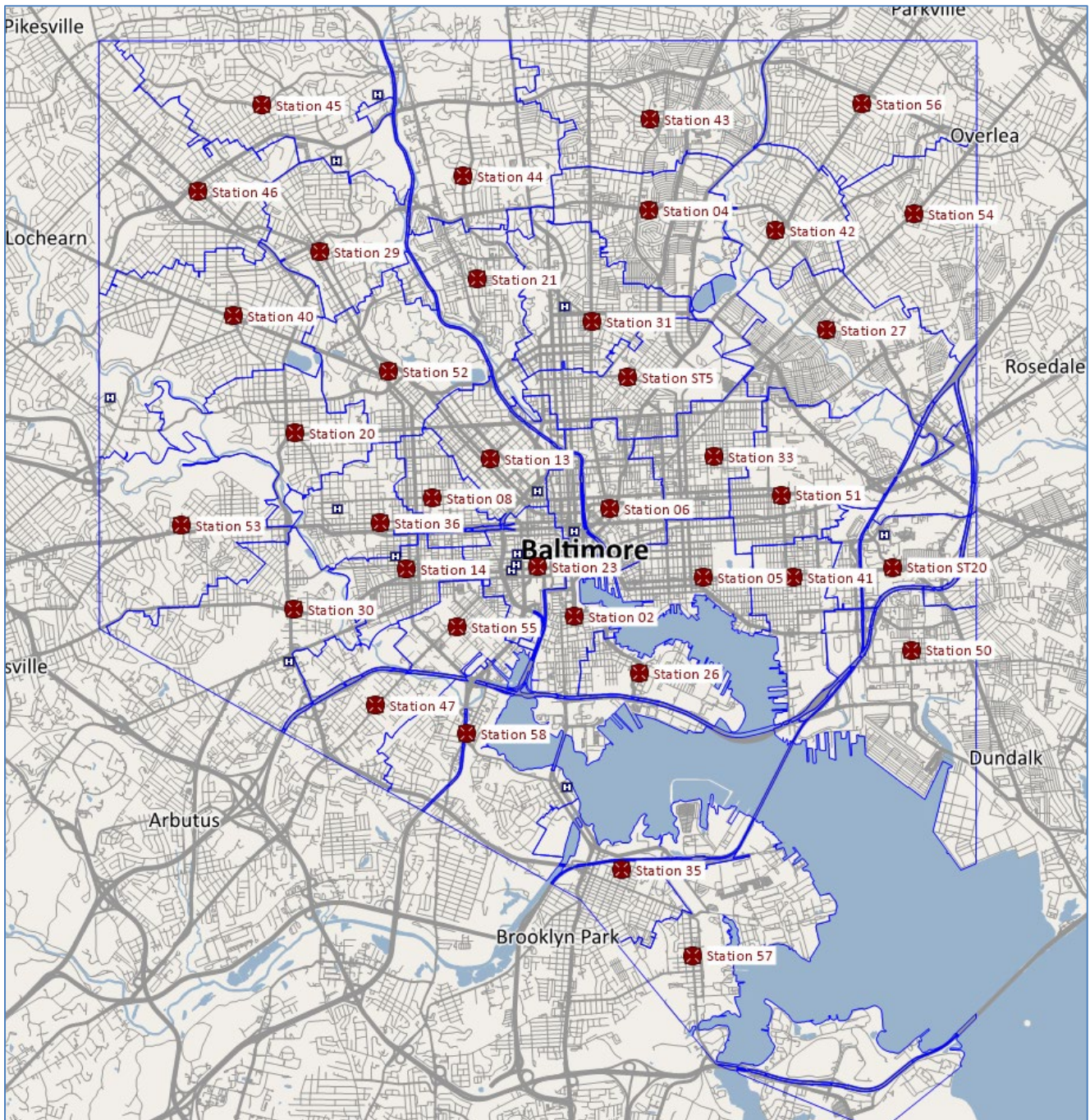
Incident and response data, along with specific operational aspects of dispatching and deployment activities, were collected directly from the BCFD through a combination of data extractions and exploratory discussions. The resulting model encompasses one full year of data (July 2018 to June 2019), which is the Optima standard approach for developing a high-fidelity simulation model.

A one-year period allows the model to account for the seasonal variation found in many fire and emergency services systems. Overall data quality is good, based on our experience in other large U.S. fire departments, and the data and operations teams from BCFD were able to provide excellent insight and reference information for all aspects of Baltimore’s fire-EMS system function. This cooperation and knowledge are critical to establishing an effective simulation model that is fit for purpose.

Optima has undertaken this assessment by using sophisticated geospatial analysis of historic incidents and developing a dynamic simulation model of the BCFD. The model includes the geography of the City of Baltimore (with some necessary extension into surrounding counties), the

BCFD infrastructure (i.e., fire-EMS stations, response units, and hospitals) illustrated in Figure 7, and the road network connecting the city's neighborhoods.

Figure 7. BCFD Fire-EMS Stations and Hospital Infrastructure (2018-2019)



Station first-due areas and city boundaries are shown in blue.

(BCFD facilities without front-line response units are hidden.)

Data Types and Usage

The data compiled for Optima’s sophisticated analyses are a combination of “historic data” and “modeled data.” This is important to recognize, because government officials and community members are routinely provided with information based upon a different type of data, “audited data,” that is not extensively used within this assessment. Understanding the differences between these data types and their uses is important; attempting to compare similar metrics using different data sources can cause confusion (i.e., comparing “apples to oranges,” versus “apples to apples”).

To help readers understand the different data types and applications, the following overview is provided.

Historic Data: The data contained within the BCFD computer aided dispatch (CAD) system is the organization’s historic data archive. This data is raw and exactly as collected, in real-time, during the daily operations of the BCFD. A broad range of data is captured and stored; the CAD is considered the “system of record” within the agency. Raw historic data, in any organization, is subject to inherent inaccuracies from technical errors and human behavior; these can range from an incorrect address being entered during the 9-1-1 call taking process, to a missed “at scene” button push when a unit is arriving at a critical event. Time stamps can also be delayed by technical issues related to network performance, interface issues, and the like. Historic data forms the foundation of the two remaining data types outlined below.

Modeled Data: Modeled data is primarily used to provide a comparative analysis between different courses of action. The Optima Predict model developed for BCFD, and used for the scenario analyses within this report, is based upon uncorrected historic data from the CAD system. Optima uses CAD data to ensure that our models can be calibrated or “tuned” to reflect the operation of the agency’s response system as closely as possible. We used the full range of the BCFD’s 187,000+ incidents requiring response from the complete one-year CAD data set to calibrate the model, allowing us to provide consistent simulation across all incident types.

Audited Data: Audited data is primarily used to help calibrate performance metrics within public safety organizations. Agencies frequently sample and perform manual audits of selected data sets to detect and correct errors; this process is particularly important when calculating key performance indicators. Sampling and auditing historic data are common processes within

public safety organizations and serve the purpose of ensuring that selected metrics accurately represent organizational performance. BCFD has undertaken this type of audit related to structure fire responses; a small, but critical, subset of the department's overall annual fire-EMS incident census. This audit focused on examining the automatic vehicle location (AVL) data to accurately determine when a unit(s) arrived at an incident. BCFD used the audited data in their CitiStatSMART reporting, which represents the accurate key performance indicator execution for the agency, specific to that relatively small subset of incidents.

It is worth repeating that attempts to draw a direct comparison from one type or application of data to another will often yield inconsistent results.

The BCFD, like most of its peer jurisdictions, does not replace historic CAD data with audited data. Given this fact, analysis of historic CAD data will likely present a different calculated performance for select metrics than what was reported in CitiStatSMART using audited data. In the case of BCFD and the metric **1st Engine Structure Fire**, this difference was reflected in a 4-6 percent faster response time across the audited subset of incidents. The BCFD's structure fire response audit was limited to a relatively small percentage of the department's total annual CAD incidents; it would be incorrect to generalize this variance in BCFD's overall performance to the balance of its responses.

Sensitivity testing on historic BCFD CAD data versus Optima's model performance indicates a high degree of "fit," suggesting that variations in data input anomalies are "smoothed out" across the complete data set. (I.e., "slow" input performance on some incidents is balanced by "fast" performance on some incidents, with the vast majority of incidents clustered around a central range of values.)

Model Match and Accuracy

Since historic, unmodified CAD data is used to build the Optima Predict model and calibrate its road network performance, there often will be variations among different applications (i.e., standard GIS applications versus Optima Predict) when reflecting geographic concepts such as fire-EMS unit coverage. For this reason, we assess the "match" or "fit" between historic data and our baseline model performance, to help ensure the validity and reliability of our analyses.

Optima was able to achieve an excellent match of simulated baseline performance (i.e., how the model performed using the historic fire-EMS system configuration) against the historic data from the BCFD's CAD system. This match was evaluated and confirmed using various incident types

encompassing both fire suppression and EMS incidents. A greater than 93 percent model match or “fit” was ultimately achieved for all incident types and configurations.

The graphs below (Figures 8 - 11) indicate the degree of match between the BCFD’s historic CAD data and the Optima Predict model’s baseline simulation, for different incident type cohorts.

Figure 8. Match for All Incidents, Clock Start to First Unit Onscene

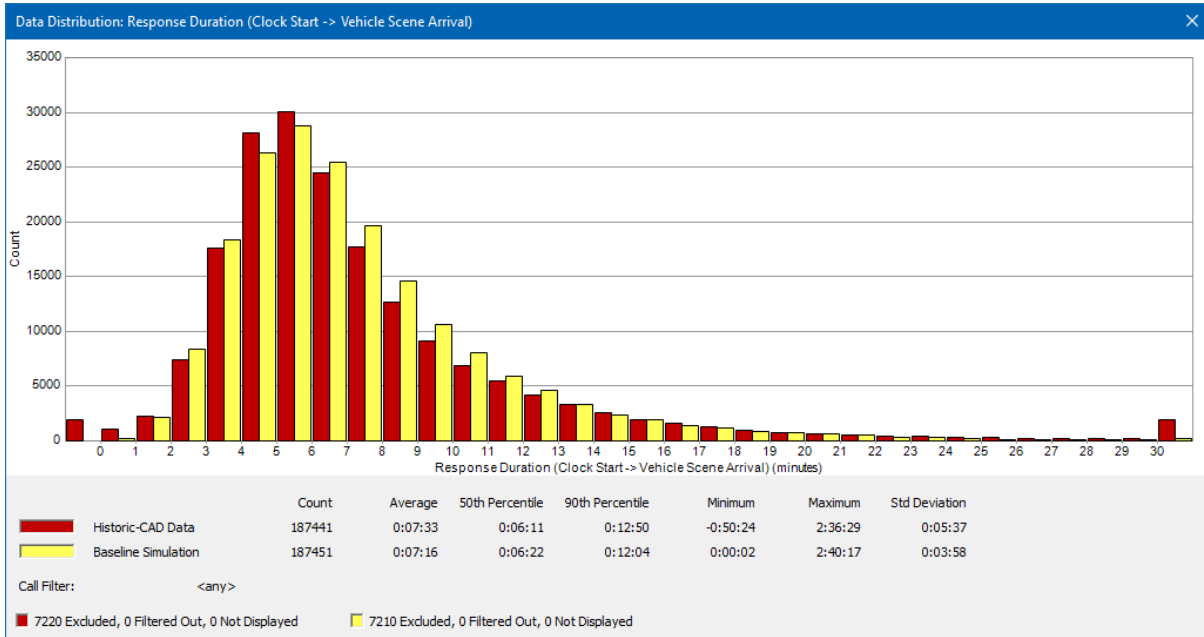


Figure 9. Match for Fire Box Alarms, Clock Start to First Unit Onscene

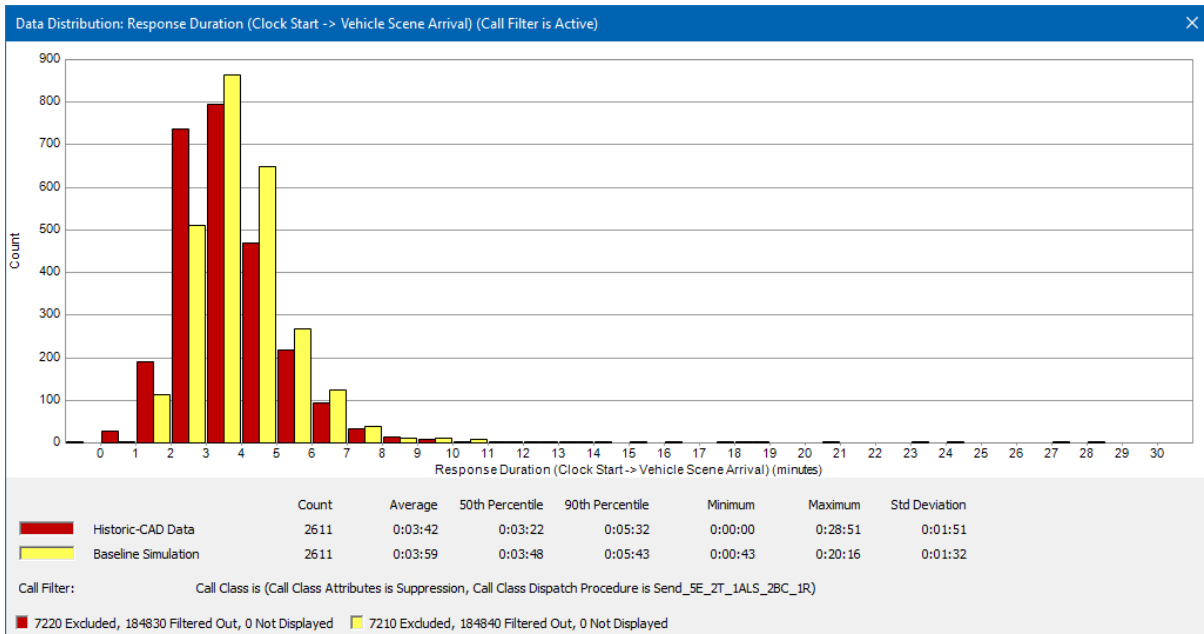


Figure 10. Match for All Fire Suppression Incidents, Clock Start to First Unit Onscene

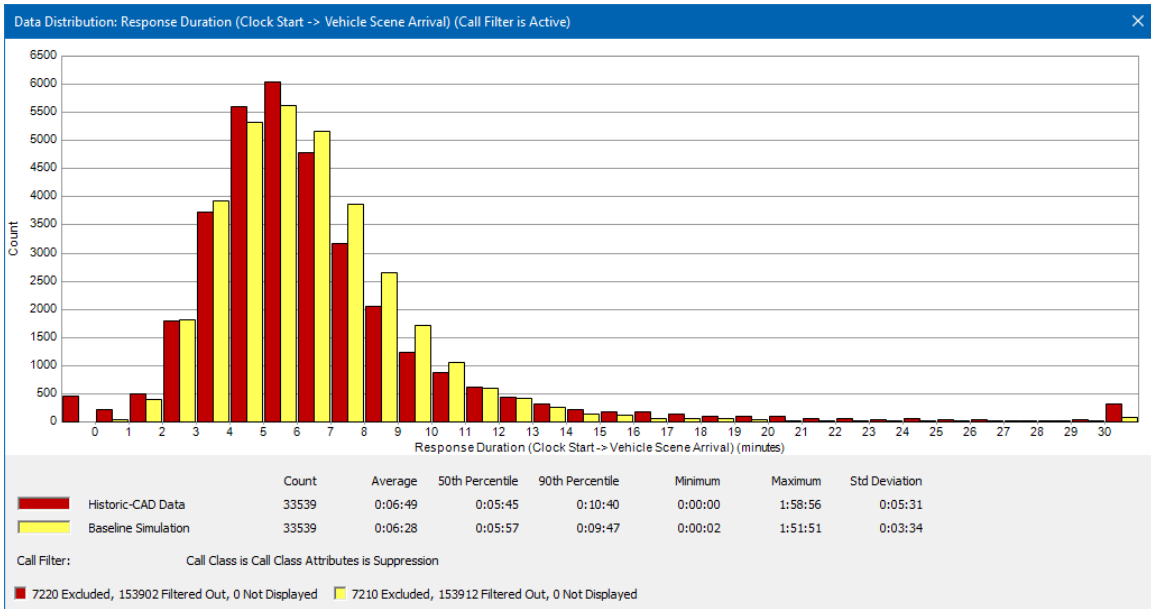
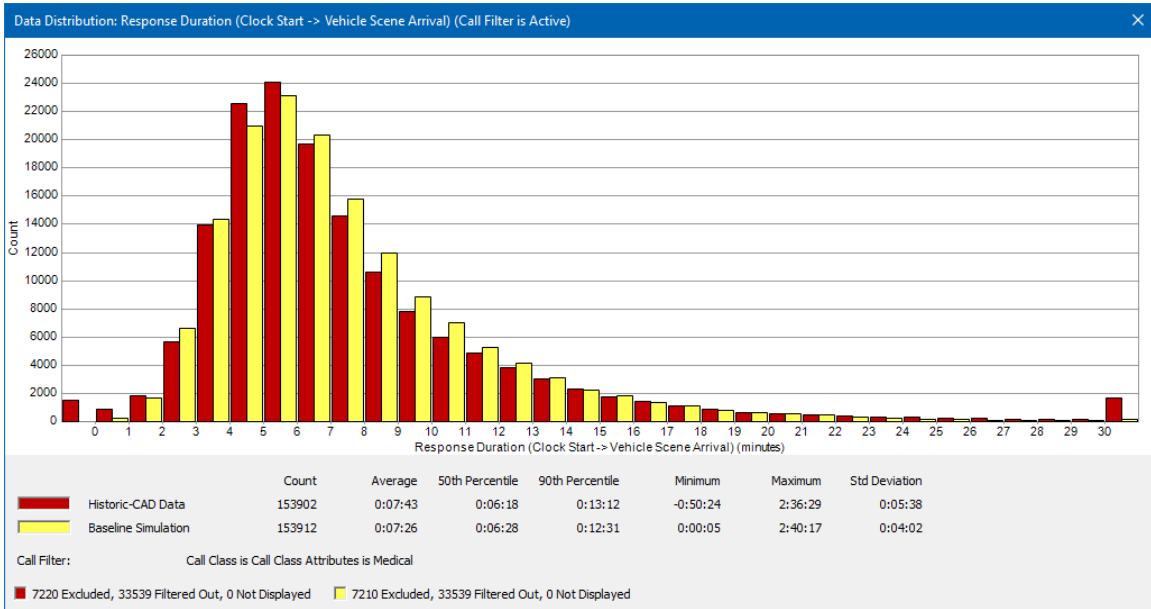


Figure 11. Match for All EMS Incidents, Clock Start to First Unit On-Scene



In summary, after a significant investment of time and effort for data acquisition, validation, and repeated sensitivity testing, Optima’s model of the BCFD’s current resource deployment appears to provide a valid and reliable baseline, at the 93 percent confidence level, to assess present fire-EMS system performance and simulate options for alternative configurations.

The details of FACETS analyses using the Optima Predict model and historic BCFD data are presented throughout the balance of this report.

STANDARDS SELECTION

Ultimately, decisions about how to provide fire protection and EMS are local public policy decisions. The variety of organizational structures and delivery models is almost limitless across the U.S. and one can find an example for almost every type of emergency response system and performance metric. For instance, within a relatively short radius around the City of Baltimore, fire and EMS delivery systems range from fully volunteer, to combination career-volunteer, to fully career.

Despite the wide range of potential system configurations, a number of voluntary, consensus-based standards exist to help guide communities' fire-EMS deployment decisions and outcomes. While these standards do not hold the force of law unless adopted by local ordinance, they are helpful in benchmarking and defining key service delivery characteristics.

The National Fire Protection Association (NFPA) develops a host of standards relevant to the BCFD. While NFPA standards and recommended practices are not regulations per se, they form a de facto standard of care for providing safe and effective fire, EMS, and related operations.

Key standards selected for application to BCFD operations and management included the following:

- NFPA 921—Guide for Fire and Explosion Investigations
- NFPA 1001—Standard for Fire Fighter Professional Qualifications
- NFPA 1002—Standard for Fire Apparatus Driver/Operator Professional Qualifications
- NFPA 1005—Standard for Professional Qualifications for Marine Fire Fighting for Land-Based Fire Fighters
- NFPA 1006—Standard for Technical Rescue Personnel Professional Qualifications
- NFPA 1021—Standard for Fire Officer Professional Qualifications
- NFPA 1030—Standard for Fire Prevention Program Positions
- NFPA 1031—Standard for Professional Qualifications for Fire Inspector and Plan Examiner
- NFPA 1033—Standard for Professional Qualifications for Fire Investigator
- NFPA 1037—Standard on Fire Marshal Professional Qualifications



- NFPA 1061—Standard for Public Safety Telecommunications Personnel Professional Qualifications
- NFPA 1071—Standard for Emergency Vehicle Technician Professional Qualifications
- NFPA 1072—Standard for Hazardous Materials/Weapons of Mass Destruction Emergency Response Personnel Qualifications
- NFPA 1201—Standard for Providing Fire and Emergency Services to the Public
- NFPA 1250—Recommended Practice in Fire and Emergency Service Organization Risk Management
- NFPA 1300—Standard on Community Risk Assessment and Community Risk Reduction Plan Development
- NFPA 1500—Standard on Fire Department Occupational Safety, Health, and Wellness Program
- NFPA 1521—Standard for Fire Department Safety Officer Professional Qualifications
- NFPA 1581—Standard on Fire Department Infection Control Program
- 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
- NFPA 1730—Standard on Organization and Deployment of Fire Prevention Inspection and Code Enforcement, Plan Review, Investigation, and Public Education Operations
- NFPA 1901—Standard for Automotive Fire Apparatus
- NFPA 1911—Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Emergency Vehicles
- NFPA 1915—Standard for Fire Apparatus Preventive Maintenance Program
- NFPA 1917—Standard for Automotive Ambulances
- NFPA 1971—Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting



- NFPA 1981—Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services
- NPFA 3000—Standard for an Active Shooter/Hostile Event Response (ASHER) Program

While meeting the national standards identified above is voluntary, for the most part, the BCFD is *required* to follow applicable state and federal regulations for certain types of response operations and administrative activities. EMS training/certification and many operational characteristics are regulated by the Maryland Institute for Emergency Medical Services Systems (MIEMSS); while EMS billing practices are regulated by the federal Centers for Medicare and Medicaid Services (CMS). Hazardous materials training and emergency response practices must comply with federal regulations promulgated by the U.S. Department of Transportation (USDOT) and the Environmental Protection Agency (EPA). Technical rescue training and operations (e.g., confined space, trench,



building collapse, high-angle, etc.) must be conducted according to relevant safety standards promulgated by the federal Occupational Safety and Health Administration (OSHA); administered in the State of Maryland by Maryland Occupational Safety and Health (MOSH). A host of additional MOSH regulations are applicable to the BCFD, including those addressing respiratory protection, hearing conservation, chemical safety, infectious disease exposure

protection, etc. As an employer, the City of Baltimore—and by extension the BCFD—is also subject to state and federal employment regulations, including the Affordable Care Act (ACA), Family and Medical Leave Act (FMLA), and Fair Labor Standards Act (FLSA), to name just a few.

BENCHMARKING

Given the high degree of variability in local governments’ delivery models and funding sources for fire and EMS systems, it can be difficult to compare services on equal terms. At the same time, benchmarking can provide some useful insights around peer jurisdictions’ relative performance inputs, outputs, and outcomes. Table 3 reflects an effort using available, but not necessarily equivalent, data to benchmark BCFD against some other fire-EMS departments serving urban areas.

Table 3. Selected Characteristics of BCFD and Other U.S. Fire-EMS Departments (2019-2021)

Department	Population ¹	FY20/FY21 Operating Budget ²	FY20-21 Capital Budget ³	COL Index ⁴	Stations ⁵	Engines ⁶	Ladders ⁷	Total Ambulance ⁸	ALS ambulances	On-duty Chiefs	Total Strength ⁹	Total Calls ¹⁰	Fire Incidents ¹¹	EMS Incidents ¹²	Budget Per Capita	Budget Per Capita COL	Budget per Call Adjusted	Land Area (sq mi) (2010)	Population density (people per sq mi)	Housing density (housing units per sq mi) (2010)	Housing unit	
Phoenix, AZ	1,680,992	\$418,741,000	\$13,906,303	103.7	58	68	14	37	37	12	2,092	225,406	21,914	194,406	\$249.10	\$204.21	\$1,857.72	\$1,522.89	516.7	3,253.3	590,149	1,142.2
Philadelphia, PA	1,584,064	\$454,464,883		101.2	63	59	27	60	36	17	3,448	374,408	49,526	274,659	\$223.77	\$179.02	\$946.73	\$757.39	134.1	11,812.6	670,171	4,997.5
San Antonio, TX	1,547,253	\$330,497,625	\$12,861,000	89.7	54	51	20	52	35	9	1,858	174,892	30,041	144,918	\$213.60	\$151.46	\$1,889.72	\$1,339.99	460.93	3,356.8	524,246	1,137.4
San Diego, CA	1,423,851	\$387,448,191	\$76,716,090	160.1	52	48	13	0	0	7	1,171	205,516	5,011	146,204	\$201.88	\$255.50	\$1,398.67	\$1,770.17	325.2	4,378.5	516,033	1,586.9
Dallas, TX	1,343,573	\$335,113,164	\$230,000	101.6	58	58	23	43	43	11	2,237	323,794	29,224	187,632	\$247.93	\$199.13	\$1,028.78	\$826.28	340.5	3,945.7	516,639	1,517.2
Columbus, OH	898,553	\$265,484,193	\$10,555,136	85.5	33	35	16	40	8	1,645	180,632	2,332	114,108	\$295.46	\$199.70	\$1,469.76	\$993.40	217.2	4,137.6	370,695	1,706.9	
Charlotte, NC	885,708	\$137,741,974	\$10,100,000	98.9	42	41	15	0	0	8	1,154	110,400	2,154	73,905	\$155.52	\$121.59	\$1,247.66	\$975.45	297.7	2,975.2	319,918	1,074.6
San Francisco	881,549	\$412,600,634	\$3,004,000	269.3	48	44	20	27	61	11	1,641	153,933	33,080	120,853	\$468.04	\$996.39	\$2,680.39	\$5,706.16	46.9	18,808.4	376,942	8,042.3
Indianapolis, IN	876,384	\$186,299,640	\$3,831,349	83.5	43	42	21	0	0	11	1,220	124,927	18,809	106,118	\$212.58	\$140.32	\$1,491.27	\$984.35	361.4	2,425.0	379,856	1,051.1
Seattle, WA	753,675	\$246,627,689	\$5,588,000	172.3	33	32	11	14	7	6	1,170	91,716	18,103	73,018	\$327.23	\$445.71	\$2,689.04	\$3,662.62	83.9	8,983.0	308,516	3,677.2
Washington, DC	705,749	\$265,862,490	\$39,700,192	152.1	34	33	16	39	17	11	2,196	212,458	30,889	173,004	\$376.71	\$452.95	\$1,251.36	\$1,504.61	61.1	11,550.7	296,719	4,856.3
Boston, MA	692,600	\$271,548,664	\$31,078,600	163.4	34	33	22	0	0	12	1,686	84,382	4,530	30,012	\$392.07	\$506.44	\$3,218.09	\$4,156.80	48.4	14,309.9	272,481	5,629.8
Nashville, TN	670,820	\$133,444,800	\$29,500,000	101.4	40	39	12	28	18	10	1,259	126,172	2,875	82,221	\$198.93	\$159.46	\$1,057.64	\$847.79	475.1	1,412.0	272,622	573.8
Detroit, MI	670,031	\$122,458,387	\$3,500,000	87.6	46	46	27	14	25	1,271	165,027	20,000	145,027	\$182.77	\$126.56	\$742.05	\$513.86	138.8	4,829.1	349,170	2,516.5	
Portland, OR	654,741	\$141,063,163	\$8,744,389	130.8	31	28	9	0	0	750	85,629	3,362	59,094	\$215.45	\$222.77	\$1,647.38	\$1,703.37	133.4	4,907.0	282,139	2,114.5	
Memphis, TN	651,073	\$172,900,000	\$16,874,471	76	58	56	21	35	14	1,784	135,310	21,304	114,006	\$265.56	\$159.55	\$1,277.81	\$767.69	315.1	2,066.2	291,883	926.3	
Baltimore City	593,490	\$288,181,426	\$1,400,000	88.2	38	35	17	36	24	7	1,734	235,000	163,874	183,306	\$485.57	\$338.56	\$1,226.30	\$855.02	80.9	7,336.1	296,685	3,667.3
Milwaukee, WI	590,157	\$114,496,084	\$1,950,000	84.9	31	30	10	12	12	6	874	93,029	16,166	70,461	\$194.01	\$130.21	\$1,230.76	\$826.02	96.1	6,141.1	255,569	2,659.4
Atlanta, GA	506,811	\$128,845,208	\$2,017,448	107.5	36	35	17	4	4	8	1,207	89,404	16,406	59,909	\$254.23	\$216.04	\$1,441.16	\$1,224.70	133.2	3,804.9	224,573	1,686.0
Kansas City, MO	495,327	\$188,092,835	\$5,800,000	86.2	34	33	12	23	21	9	1,310	309,115	17,650	95,183	\$379.73	\$258.76	\$608.49	\$414.64	315.0	1,572.7	221,860	704.4

1: Annual Estimates of the Resident Population for Incorporated Places of 50,000 or More, Ranked by July 1, 2019 Population; April 1, 2010 to July 1, 2019; Source: U.S. Census Bureau, Population Division; Release Date: May 2020

2 & 3: Adopted Budgets (FY20 or FY21) published on current official city budget/finance office websites

4: BestPlaces - Cost of Living Calculator; 2020

5: 12: Official city fire/ems department websites (2020) & 2018/2019 Firehouse National Run Survey Responses

13 & 14: U.S. Census Bureau, QuickFacts, 2020 and/or www.browncollege.com

Cells where data is circa 2015/2016 (or unknown for Portland & Detroit)

YELLOW cells: Departments that DO NOT generally provide EMS ambulance transport

BLUE cells: Reported budgets DO NOT include fringe benefits

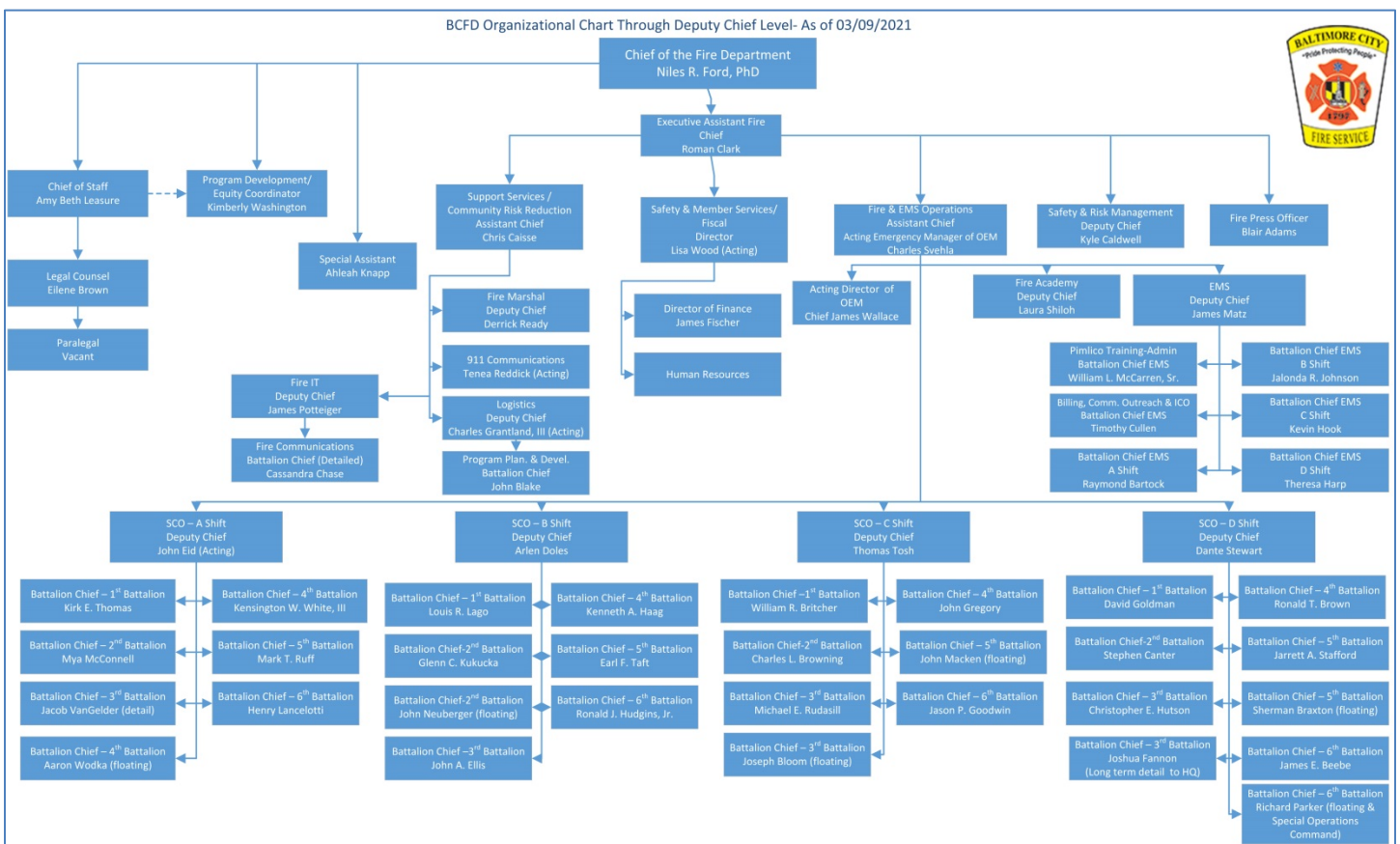
COMMAND

The term “command” is used here to define the strategic leadership and policy aspects of the BCFD; in private-sector terms, the “C-suite” of the organization. Fire Chief Ford and his command staff are capable, competent, and clearly committed to serving the City of Baltimore’s residents, businesses, and visitors.

ORGANIZATIONAL CHART

The BCFD’s organizational structure, displayed in Figure 12, is similar to those of peer cities’ fire departments.

Figure 12. BCFD Organizational Chart



The BCFD uses a fairly standard set of administrative and management positions within its command staff; overall, however, the organization is understaffed for the work required to effectively manage the “overhead” functions of a 24x7x365 agency with approximately 1,700 total employees and a \$289 million annual budget.

Since there is so much variation in size, structure, and workload, benchmarking is not particularly helpful in selecting the most efficient operational to support staff ratio for local fire-EMS departments; plus the fact that many fire departments have historically prioritized their limited resources to hire front-line personnel, versus rear echelon staff. As a point of comparison, however, a private sector firm operating with 10 percent overhead might be considered “lean;” in that view, the BCFD is even “leaner,” with only 49 purely administrative positions supporting the entire department (approximately 3 percent “overhead”).

Even a conservative estimate of the desired ratio of administrative to front-line operational staff would suggest that BCFD needs additional full-time equivalent positions (FTEs), both uniformed and non-uniformed, dedicated to the organization’s overall administration and management.



The BCFD is ultimately accountable to the Mayor and City Council, with additional oversight from a 5-member Board of Fire Commissioners appointed by the Mayor to 4-year terms.

From our experiences throughout the study period, BCFD leadership appears firmly committed to the organization’s stated vision, mission, and values.

“The BCFD is a diverse and evolving extension of the community, committed to providing excellent service to all we serve, in a professional and humanitarian way. We pledge to protect lives, property, and the environment through a safe, effective, and timely response. We will be innovative in providing service in emergency medical services, fire suppression, rescue, emergency communications, fire prevention, community outreach, education, and other services.”

Baltimore City Fire Department, Strategic Plan 2016-2021

OPERATIONS

The operations domain of the BCFD encompasses the direct, community-facing functions required to address all hazards across the city’s complex and diverse environment, including:

- Community Risk Reduction
- Emergency Management
- Fire and EMS Deployment
- Special Operations

This section will describe the operational components of the BCFD, with a detailed analysis of fire-EMS deployment and current performance.

COMMUNITY RISK REDUCTION

For many years, the BCFD has embraced the value of community risk reduction (CRR) as a vital element of its overall strategy to reduce fire incidence and losses across Baltimore. In 2020, the city recorded its lowest number of fire deaths in BCFD history; this is likely a testament to the value of CRR efforts, along with the effective and efficient deployment of fire protection resources city-wide. CRR programs in the BCFD include three

main facets:

- Community education
- Fire prevention and plan review
- Fire investigations

The balance of this section will provide an overview of these vital program areas.

Community Education

BCFD’s community education and outreach

efforts are led by a dedicated three-person staff that relies heavily on on-duty firefighters and EMS providers to serve as the “boots on the ground” ambassadors for programs targeted at high-risk groups (e.g., children and seniors). Given the heavy workload and limited availability of most front-line BCFD response units, the assignment of additional full-time personnel to community education would likely prove beneficial for enhancing this aspect of the department’s mission.



BCFD provides free smoke alarms to residents upon request, and during its community outreach programs; with additional resources, more smoke alarms could be proactively distributed across the City of Baltimore.

The BCFD has some key partnerships to help advance fire prevention and injury reduction efforts around the city; for example, the Mobile Safety Center developed in conjunction with Johns Hopkins University. Further engagement with academic and other community organizations holds promise for enhancing BCFD's outreach and public education footprint.

BCFD also participates in the city's child fatality review committee to help identify areas where efforts could be expanded to help save the lives of Baltimore's youngest residents from preventable injuries.

Fire Prevention and Plan Review

BCFD's Fire Prevention Bureau (FPB) and plan review staff work in close partnership with the Baltimore City Department of Housing and Community Development (DHCD) to proactively address fire risk by promulgating the city's fire code—based on state regulations and international model codes, reviewing plans for fire protection systems (e.g., fire alarms, fire sprinklers, etc.), and conducting proactive code enforcement to identify and correct fire and life safety issues before problems occur.

The current workload for the relatively small staff of 31 includes almost 2,000 plan reviews and approximately 12,000 fire prevention inspections per year. For inspections alone, this equates to 387 inspections per assigned employee, every year.



BCFD's inability to consistently meet the city's desired 10-day turnaround time for fire prevention permits is identified regularly in CitiStatSMART reports; meeting this goal is not possible with the current workload and limited number of assigned staff.

Updating the city's fire prevention fee schedule, last revised in 2011, could provide revenue for adding staff and providing faster service, without compromising the quality of

this important work. In some jurisdictions, stakeholders (e.g., contractors and developers) have

indicated a willingness to pay more in fees, for the higher level of service provided by additional fire prevention staff.

Fire Investigations

The BCFD Fire Investigation Bureau (FIB) has primary responsibility for determining the cause and origin of fires within the city. The FIB works in close partnership with the Baltimore Police Department and the federal Bureau of Alcohol, Tobacco, and Firearms (ATF) to investigate suspicious fires and bring the perpetrators to justice, with the aim of reducing arson fires and their often tragic consequences.

The FIB currently rosters one on-duty investigator 24x7x365, and one full-time investigator on a daywork schedule, for a total of 5 assigned FTEs. Since NFPA 921, used by many courts as a de facto standard for conducting fire investigations, requires a minimum of 2 qualified investigators on scene at an incident, FIB staff or 8 fill-in investigators are frequently called back to duty, often on overtime, to lend assistance at fire scenes. Fire investigators also have significant training demands and are routinely required to appear in court or give depositions for both civil and criminal matters.

Given the relatively high incidence of suspicious fires in the City of Baltimore, and the extensive nature of the investigatory work required to close these cases, the FMO would benefit from additional full-time staff and resources to ensure BCFD fire investigators have the support, time, and training they need to help identify and prevent arson fires.



EMERGENCY MANAGEMENT

As a coastal community in a temperate zone along the Chesapeake Bay, the City of Baltimore is susceptible to a wide range of natural hazards including tidal and inland flooding, hurricanes, winter storms, drought, and heat waves. Current experience also emphasizes the vulnerability of urban populations to other types of hazards, such as pandemics.

At present, the BCFD is responsible for managing Baltimore's Office of Emergency Management (OEM); this configuration is not entirely atypical. Peer cities organize their emergency management functions in a variety of ways, and this appears to be the norm in the Baltimore region. The current arrangement has led to some reportedly positive synergies during the COVID-19 pandemic and the recent natural gas explosion on Labyrinth Road in northwest Baltimore.



Currently assigned staffing includes one emergency manager, one emergency director, and ten planning/operational positions, with several vacancies; OEM is creating a functional duty officer program to provide 24x7x365 response capability.

Beyond its central role coordinating the city's COVID-19 response and supporting major incidents, OEM is working on professional development pathways for non-uniformed

personnel and revising the city's basic emergency operations plan (EOP) for the first time since 2013, along with hazard-specific annexes. OEM is also helping other city agencies update their continuity of operations (COOP) plans.

Given the high risk of flooding throughout Baltimore, OEM is working on several flood mitigation projects in areas that include: Northpoint Road, Frederick Avenue, Pulaski Highway/Monument Street, and South Hanover Street.

FIRE AND EMS DEPLOYMENT

The BCFD's core mission is preventing, preparing for, responding to, and recovering from emergency incidents arising from all hazards. The built environment of Baltimore is different than many other U.S. cities in terms of its overall age, density, and the interconnected nature of its iconic rowhouse structures. The density and proximity of buildings in Baltimore have meaningful implications for resource deployment since, all other factors being equal, the risk of fire propagation beyond the point of ignition is related to the proximity of additional fuel sources.

Research performed over the past decade by federal agencies, universities, and other researchers suggests that structural fires are burning hotter and faster than ever before. While fire dynamics in buildings is a complex phenomenon, much of this change relates to the construction of contemporary home furnishings from hydrocarbon-based materials (e.g., plastics, foams, etc.), versus legacy materials such as wood, cotton, and steel.



Simply from viewing the official (@BaltimoreFire) photographs throughout this report, it should be clear that fire is still a problem across the City of Baltimore. While the BCFD has embraced CRR as a vital aspect of its mission, neither the city nor the fire department has much control over the many variables that combine to create fires and the resulting losses. For these reasons, maintaining a robust fire suppression and all-hazards emergency response capability is essential for protecting Baltimoreans' lives, property, and economic activity. While the BCFD has retained its ISO Class One rating despite chronic fiscal stress, the department requires additional resources to keep up with existing service demand and to be ready for low-frequency, high-risk events.

Despite the continued impact of fires and other emergencies on the city and its residents, most of the BCFD's workload, by volume, is providing EMS response. By any measure, BCFD's EMS units are among the busiest in the nation and their crews, while incredibly dedicated, are reporting symptoms of burnout, post-traumatic stress, and other signs of overwork.

As in many large U.S. cities, EMS in Baltimore is often used as a safety net to provide primary care for a population with multiple health challenges, and to help overcome a history of racial inequality in the broader healthcare system. Given this fact, additional EMS transport capacity and advanced life support (ALS) response capability are urgently needed to meet performance targets and help improve patient outcomes city-wide. BCFD is exploring private sector partnership opportunities for transporting low-acuity patients and working to help enhance triage of 9-1-1 calls before dispatch by providing a nurse in the emergency communications center.



At the same time, the BCFD is recognized as a leader in national efforts to refocus EMS provision from a response-oriented approach toward a more holistic model centered on patients' and population health. The department's mobile integrated health and community paramedicine (MIH-CP) pilot programs are highly successful.

Continued expansion of these programs—and developing new ones in partnership

with MIEMSS, hospitals, and universities—while addressing immediate performance deficiencies with additional response units, holds promise for eventually reducing overall system demand and, most importantly, for ensuring patients get the care they need, when and where they need it.

Similarly, BCFD involvement in the emergency triage, treat, and transport (ET3) pilot—sponsored by the U.S. Department of Health and Human Services (HHS) through CMS—should help improve patient care, and reduce EMS system demand over time, by leveraging telemedicine technologies while acknowledging (and compensating) the department's overall role in community health.

Even as the COVID-19 pandemic wears on, BCFD personnel remain on the front lines of the nation's opioid crisis. Again, the BCFD has been a leader in developing programs to address opioid use disorder, including an Opioid Intervention Team, naloxone leave-behind program, and expanded overdose survivors' program.

BCFD clinical outcomes on EMS incidents are monitored through an extensive quality assurance and quality improvement (QA/QI) process with oversight from the department's team of part-time operational medical directors (board certified emergency physicians). Additional BCFD staff are

needed to ensure these vital programs are maintained, particularly as EMS service demand continues rising.

On a 24x7x365 basis, the BCFD deploys the resources displayed below (Table 4) to fire and EMS incidents across the City of Baltimore.

Table 4. BCFD Front-Line Response Units and Assigned Personnel

Unit Type	Response Units 0700-0700 (24x7)	Personnel	Response Units 0900-2100 Daily	Personnel
Engines	35	4		
(Ladder) Trucks	17	4		
ALS Ambulances	20	2		
BLS Ambulances	6	2	10	2
Heavy Rescue	1	4		
Airflex	2	1		
HazMat	1	1		
Fire (rescue) Boats	2	3		
Battalion Chiefs	6	1		
EMS Battalion Chief	1	1		
EMS Supervisors	6	1		
Shift Commander (DC)	1	2		
TOTAL per shift	98	286	10	20

Depending on the type of incident and its severity, determined primarily from 9-1-1 callers' information, different combinations of response units are sent to emergencies based on their capabilities and geographic location(s). For example, a reported structure fire or "box alarm" requires the closest available 5 engines, 2 ladder trucks, 2 battalion chiefs, and 1 medic unit on the initial dispatch. A low-acuity EMS incident may require a single (BLS) medic unit; while a more severe emergency, such as a suspected cardiac arrest, will receive the nearest fire suppression (engine, ladder, squad, or rescue) unit, a medic (ALS) unit, and an EMS supervisor.

The balance of this section presents a comprehensive and detailed analysis of BCFD incidents, service demand, current fire-EMS system response, and selected deployment alternatives.

Incident Characteristics

The BCFD CAD data set from the modeled (one year) period contained a total of 194,661 incidents. 7,220 of these incidents (3.7 percent) were excluded from the simulation or further analysis; these were primarily “Priority 5” incidents, which do not require response by BCFD and, therefore, do not impact system performance.

Baltimore’s distribution of incidents between EMS and fire suppression is like many other large, urban fire-rescue agencies; 159,183 (81.8 percent) of the incidents are classified as EMS and the remaining 35,478 (18.2 percent) are classified as fire suppression incidents. The highest risk fire suppression incidents, “box alarms,” represented 2,622 (1.3 percent) of the total BCFD incidents during the analysis period.

FACETS heard from BCFD personnel at all levels that the actual number of structure fires in the city each year is likely higher than what gets reported through the BCFD’s records management system and, ultimately, the National Fire Incident Reporting System (NFIRS). In our experience across the United States, inaccurate reporting of fire incidents is a common phenomenon. Undercounting fires appears quite regularly due to human factors, since the incident reporting process for field personnel is much more extensive, and time-consuming, for an incident classified as a working structure fire, versus an incident classified as a more minor event. Further, what seems to be a simple process of categorizing fires by severity is, in actual practice, more complicated than it appears, with several variables to consider and many potential categories from which to select a specific incident type.

The use of CAD data for the Optima Predict model in this study is likely to offset this reported undercounting, although it is difficult to truly audit fire cause and severity without real-time oversight and quality assurance.



It is important to recognize that no fire department truly knows the actual number of fires occurring in their jurisdiction, since only fires that become severe enough for someone to call 9-1-1 are generally reported to the fire department. The NFPA has estimated the actual frequency of fires occurring annually in the U.S. could be as much as nine times the reported incidence. While this distinction

does not affect response time analyses, it is a factor to consider when assessing or targeting CRR and fire prevention efforts.

The following maps (Figures 13 and 14) provide a sense of the geographic distribution of emergency incidents across the City of Baltimore.

Figure 13. Fire Suppression Incidents (2018-2019)

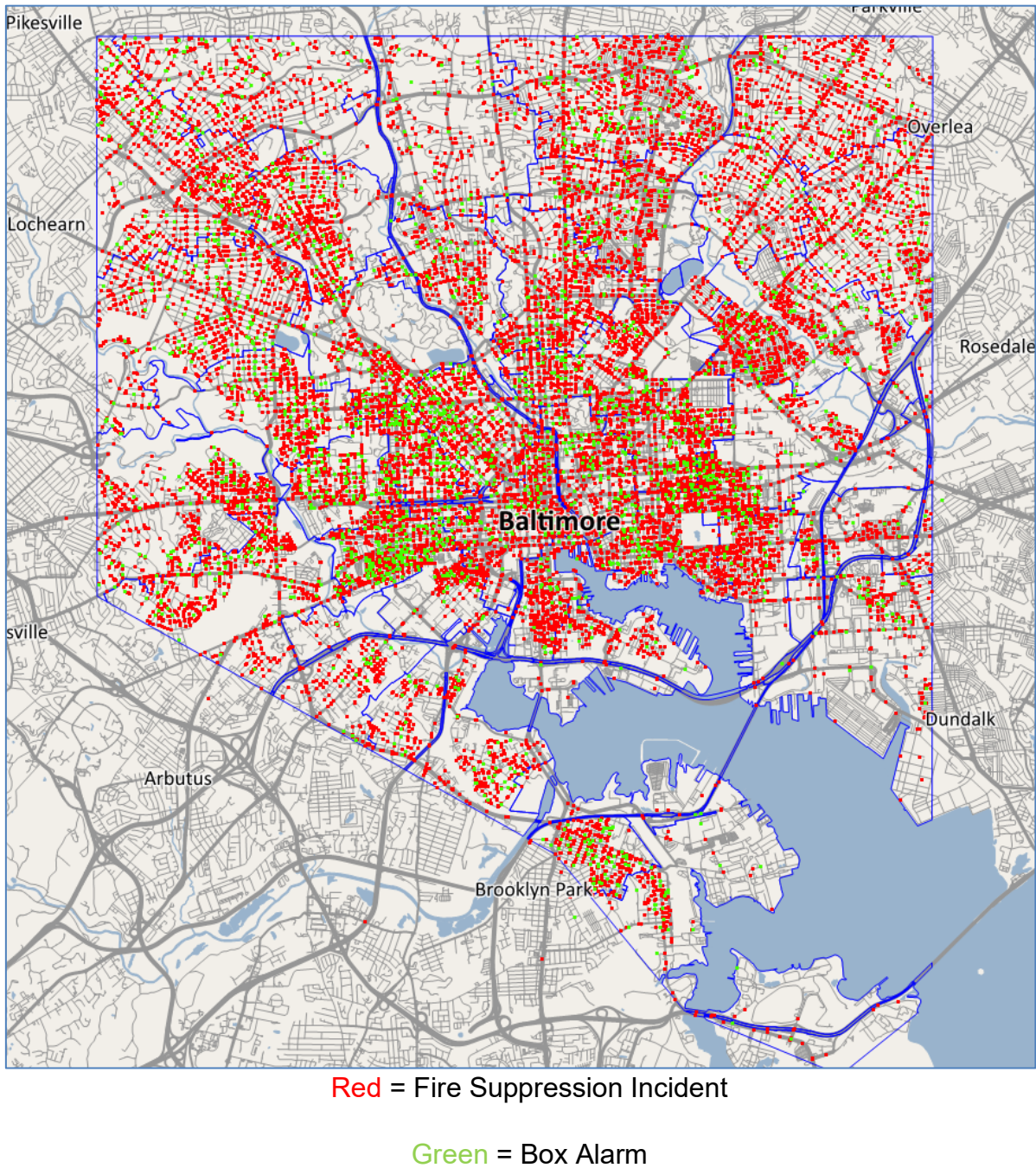
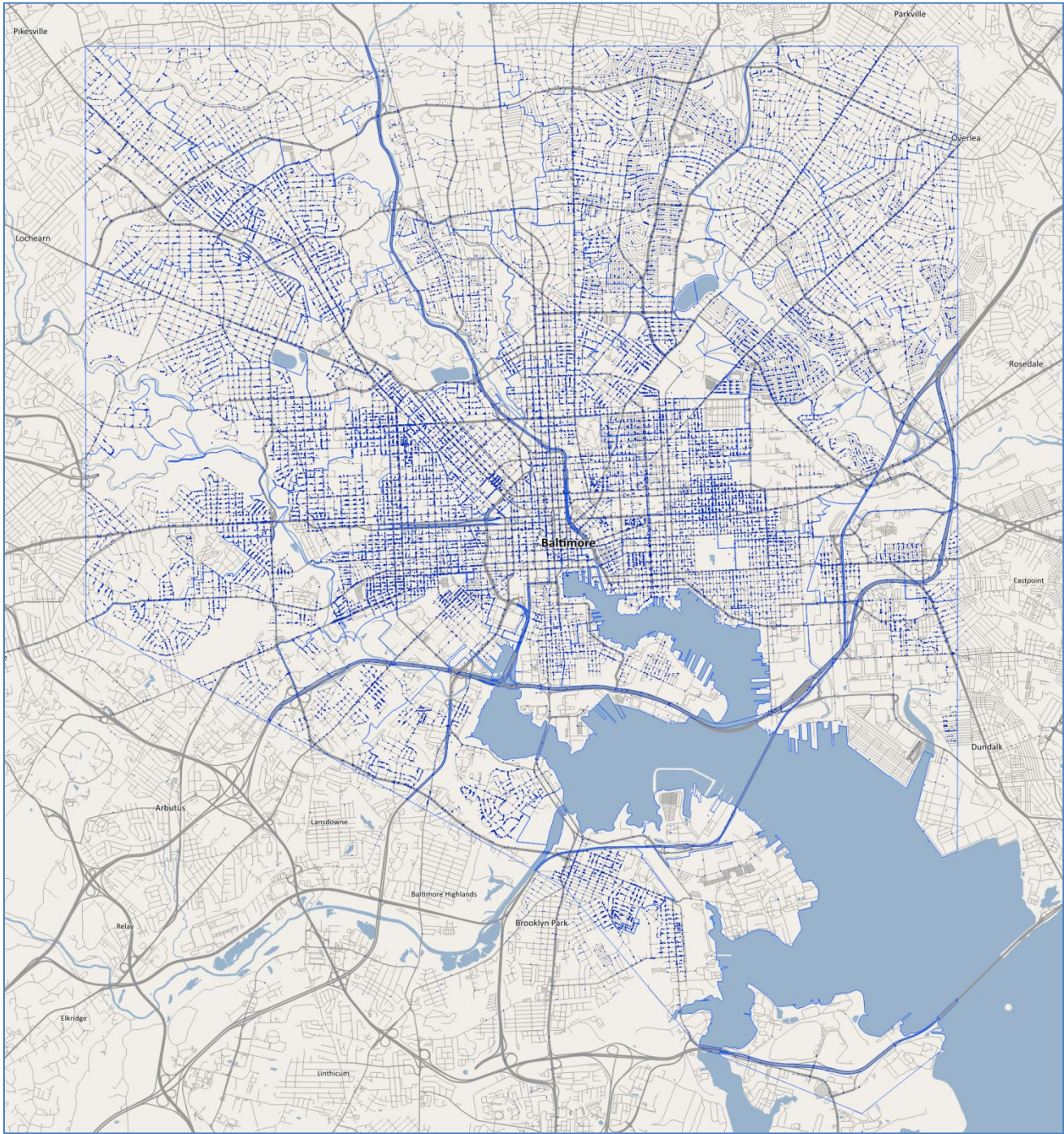


Figure 14. BCFD EMS Incidents (2018-2019)



EMS incidents in Blue

Baseline Performance Analysis, Fire Suppression and EMS

Most fire-EMS departments use response time—for both fire and medical incidents—as a proxy metric for service quality. All other things set equal, longer response times lead to worse outcomes, while shorter response times—assuming the appropriate resources arrive—lead to better outcomes.

Generally speaking, fires in buildings that are unprotected by automatic fire suppression systems (e.g., fire sprinklers) grow exponentially from the time of first ignition to the point known as “flashover,” when the contents of a space involved in fire simultaneously combust, reaching temperatures in excess of 1,000 degrees Fahrenheit. At the risk of oversimplifying the complex interplay of phenomena that influence fire dynamics in structures, it is accurate to say that firefighters responding to a building fire are in a race against time to save lives and property.

Similarly, medical research performed in pursuit of evidence-based medicine has reinforced the critical importance of response time for high-acuity emergency medical incidents, such as penetrating trauma, cardiac emergencies, and respiratory difficulty. Anyone who has taken a cardiopulmonary resuscitation (CPR) class has learned that, after 4-6 minutes without proper oxygenation, irreversible brain death begins to occur and can only be mitigated by the prompt initiation of skilled clinical care; ideally from trained bystanders, then fast-arriving EMS providers in the field, and followed by swift transport to a nearby hospital for definitive care.



Our analysis of BCFD’s baseline performance uses the historic (actual) CAD data that is the foundation of the Optima Predict simulation model. This allows us to effectively model the various scenarios that will be presented within this document. The performance benchmarks displayed in Table 5 are based on the NFPA 1710 (2020 Edition)—Standard for the Organization and Deployment of Fire Suppression Operations,

Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments.

It is important to note that most of our analyses are performed using the dynamic simulation model, which accounts for: incidents (events) in progress simultaneously; the actual locations of response units when dispatched; and the impact of proposed changes on the city’s overall fire-EMS response

system. The Optima Predict simulation can evaluate an entire year’s incidents and responses for different scenarios, dynamically accounting for the effects of potential changes cascading through the entire system.

The value of scenarios modeled using discrete event simulation (DES) is focusing on the scope and direction of change noted between two scenarios. Does a specific action improve or worsen response time performance? Where does it make the biggest difference? Are there any unintended consequences from the proposed alternatives?

The analyses described in this section focus on the measures specific to fire-EMS response operations. These metrics initiate at the dispatch of the resource(s) required to manage an incident based upon the information collected during the 9-1-1 call taking and dispatching processes. The following measures, primarily derived from the NFPA 1710 (2020) document, will be used in various scenarios.

Table 5. Baseline Performance Measures

Measure Name	Incident Type	Time Interval Definition	Time Target min:sec (90th % Goal)
1 st Engine Structure Fire	Fire	Dispatch to On-Scene (First Engine)	5:20
EMS 1 st Unit	EMS	Dispatch to On-Scene (First Unit)	5:00
2 nd Unit Structure Fire	Fire	Dispatch to On-Scene (Second Unit)	7:20
Initial Alarm Assignment	Fire	Dispatch to On-Scene (Initial Units)	9:20
ALS Arrival	EMS	Dispatch to On-Scene (ALS Unit)	9:00

Additional metrics will be used to focus on select areas of performance and will be defined when presented.

Fire Suppression Performance

Fire suppression incidents comprised 35,478 of the total incidents evaluated. Within that number are the 2,622 “Box Alarm” (BA) incidents; the BCFD’s initial assignment to these incidents is generally: 5 engines, 2 ladder trucks, 1 ALS medic unit, and 2 battalion chiefs.

In many cases, the initial arriving fire suppression units can determine that the incident does not require all the dispatched resources and will cancel the balance of the initial assignment. For this

reason, almost all fire suppression incidents will have a measure for **1st Unit Structure Fire** arriving on-scene, but many will not have a performance measure for **Initial Alarm Assignment**.

It is important to note that “fire suppression” incidents include a wide range of non-EMS incidents to which the BCFD responds, whether or not an actual fire is present; these include, but are not limited to: fire alarm activations, hazardous materials releases, technical rescues, marine emergencies, etc.

Table 6. BCFD Baseline Performance vs. NFPA 1710 (2020) Measures

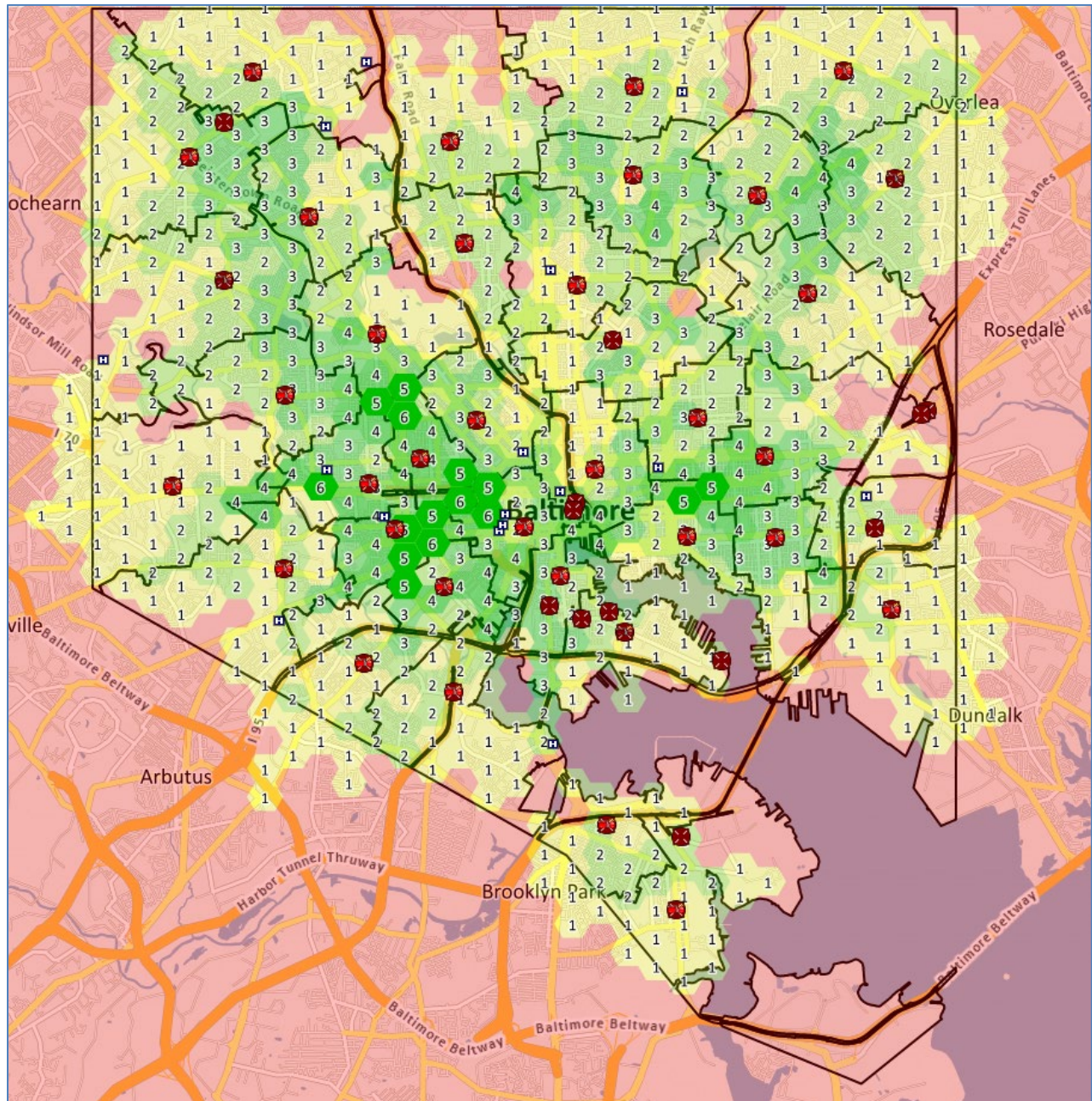
Fire Suppression: Baseline Performance			
Measure	Average Time min:sec	90th Percentile Time min:sec	Target 90th % Time min:sec
1st Engine Structure Fire	3:48	5:41	5:20
2nd Unit Structure Fire	4:37	6:24	7:20
Initial Alarm Assignment Low Risk (3 Engines / 1 Truck)	6:20	7:56	9:20
Initial Alarm Assignment Medium Risk (4 Engines / 2 Trucks)	6:59	8:29	9:20
BCFD Initial Box Alarm (5 Engines / 2 Trucks)	7:40	9:01	9:20

At present, BCFD is meeting or exceeding all NFPA 1710 (2020) fire suppression performance targets with the exception of the **1st Engine Structure Fire** metric, which exceeds the target by 21 seconds. The following graphics provide perspective on the coverage that BCFD is able to provide to the community from existing stations and with existing engine and squad companies (both of which meet the requirements for **1st Engine Structure Fire** as defined by NFPA 1710).

Figure 15 shows static coverage and assumes that all engines/squads are available and in their stations; this situation does not represent the operational reality of the BCFD, however, since there are almost always multiple fire and EMS incidents occurring throughout the system, 24x7x365. Areas with no color or number indicate that a BCFD engine or squad is greater than 4 minutes from that area. It should also be noted that areas showing yellow coloration and a coverage depth of 1 are those most likely to result in an exception to the **1st Engine Structure Fire** target; these units are

often a primary first responder for EMS incidents, during which they are unavailable to respond to fire suppression incidents in their first-due area(s).

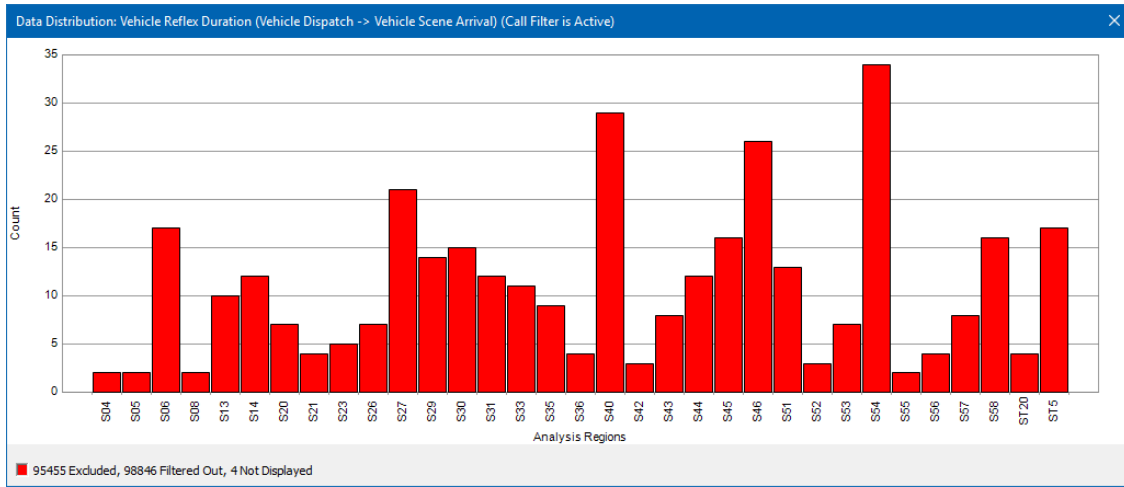
Figure 15. Fire Suppression: 1st Engine Structure Fire Coverage



(Red indicates No Coverage, Other Colors and Numbers indicate Depth of Coverage calculated at 4 minutes of Drive Time for Engine and Squad Units)

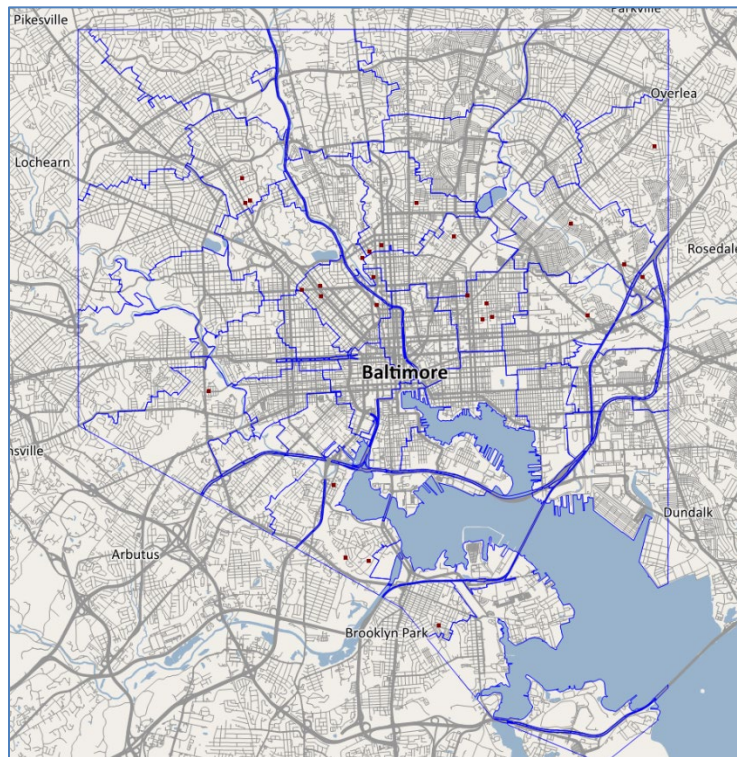
Based on actual performance, during 2018-2019 there were a relatively small number of fire suppression incidents where responses for the first engine exceeded the NFPA 1710 (2020) target; these incidents are displayed in Figure 16, by station area.

Figure 16. Fire Suppression: **1st Engine Structure Fire** exceeds Target by Station First Due Area



The small number of incidents that failed to meet the **Initial Alarm Assignment** metrics are mapped in Figure 17; these are randomly distributed across the service geography, indicating that there is likely no systemic issue creating those exceptions and no intervention needed.

Figure 17. Fire Suppression: **Initial Alarm Assignment** exceeds Target



The analyses presented in this section use the baseline Optima Predict simulation and actual CAD data. BCFD, as part of Baltimore’s CitiStatSMART process, invested effort in the manual review and correction of assigned unit response timestamps for “Box Alarm” incidents. It is not uncommon, especially during high-risk incident responses, for the initial units to have inaccurate technological

timestamps caused by system delays or missed button pushes while personnel, correctly, focus on the lifesaving tasks that are immediately required. For this reason, the historic data and baseline simulation slightly understate performance and are conservative in their estimates of performance for comparison scenarios in “Box Alarm” incidents. As described previously in this report, the BCFD’s audited data for “Box Alarm” incidents suggests that actual performance (on those incidents) is 4-6 percent faster than modeled performance, based on the full set of historic data for all incident types, reflects.

EMS Performance

EMS system performance presents a major challenge in Baltimore, as in many other major cities around the globe. The 159,183 EMS incidents within the 1-year study period represent both advanced life support (ALS) and basic life support (BLS) incidents; patients were transported to hospital(s) from these incidents 97,889 times, resulting in a transport percentage of 61.5 percent.



ALS incidents require immediate medical intervention, delivered by highly-trained paramedics, similar to what a patient might receive in an emergency room; including: advanced airway access (such as the placement of an endotracheal tube), cardioversion, defibrillation, cardiac monitoring, intravenous (IV) therapy, and administering a wide range of medications in the field.

Patient care on BLS incidents can be started by basic emergency medical technicians (EMTs) and BLS providers can also transport lower-acuity patients directly to an emergency room for definitive care, without ALS intervention.

Since all BCFD fire suppression units are staffed with trained EMT/Firefighters, fire apparatus are often dispatched to EMS incidents as first responders, or to assist the 2-person medic unit crews with patient care during high-acuity ALS emergencies or other incidents requiring more than two providers.

It is important to note that EMS incidents are classified by relative priority and dispatched based on 9-1-1 callers’ statements, using a series of scripted questions asked by non-EMS-trained call takers working in the BCFD’s emergency communications center. Despite 9-1-1 telecommunicators’ efforts to accurately classify EMS incidents from a remote location—over the phone, with limited additional information—it is not uncommon for incidents dispatched as ALS to become BLS incidents, once a

patient is assessed in-person by BCFD EMS providers, and vice versa. Since historic CAD data is not updated to reflect the actual conditions found at a given incident, including patient presentation, it is likely that many EMS incidents are, in an abundance of caution, overclassified for an ALS response.

ALS incidents represented 77,275 of all dispatched EMS incidents, accounting for 48.5 percent of the total EMS requests.

Table 7. BCFD Baseline Performance for All EMS Incidents

EMS All Incidents: Baseline Performance			
Measure	Average Time min:sec	90th Percentile Time min:sec	Target 90th % Time min:sec
EMS 1st Unit	5:28	8:17	5:00
Ambulance Arrival	8:31	13:56	9:00

Note: The **Ambulance Arrival** measure is not included in NFPA 1710 (2020) and is used to represent the operational reality of the BCFD where both BLS and ALS ambulances respond and transport patients within the EMS system based upon approved protocols.

Table 8. BCFD Baseline Performance for ALS Incidents

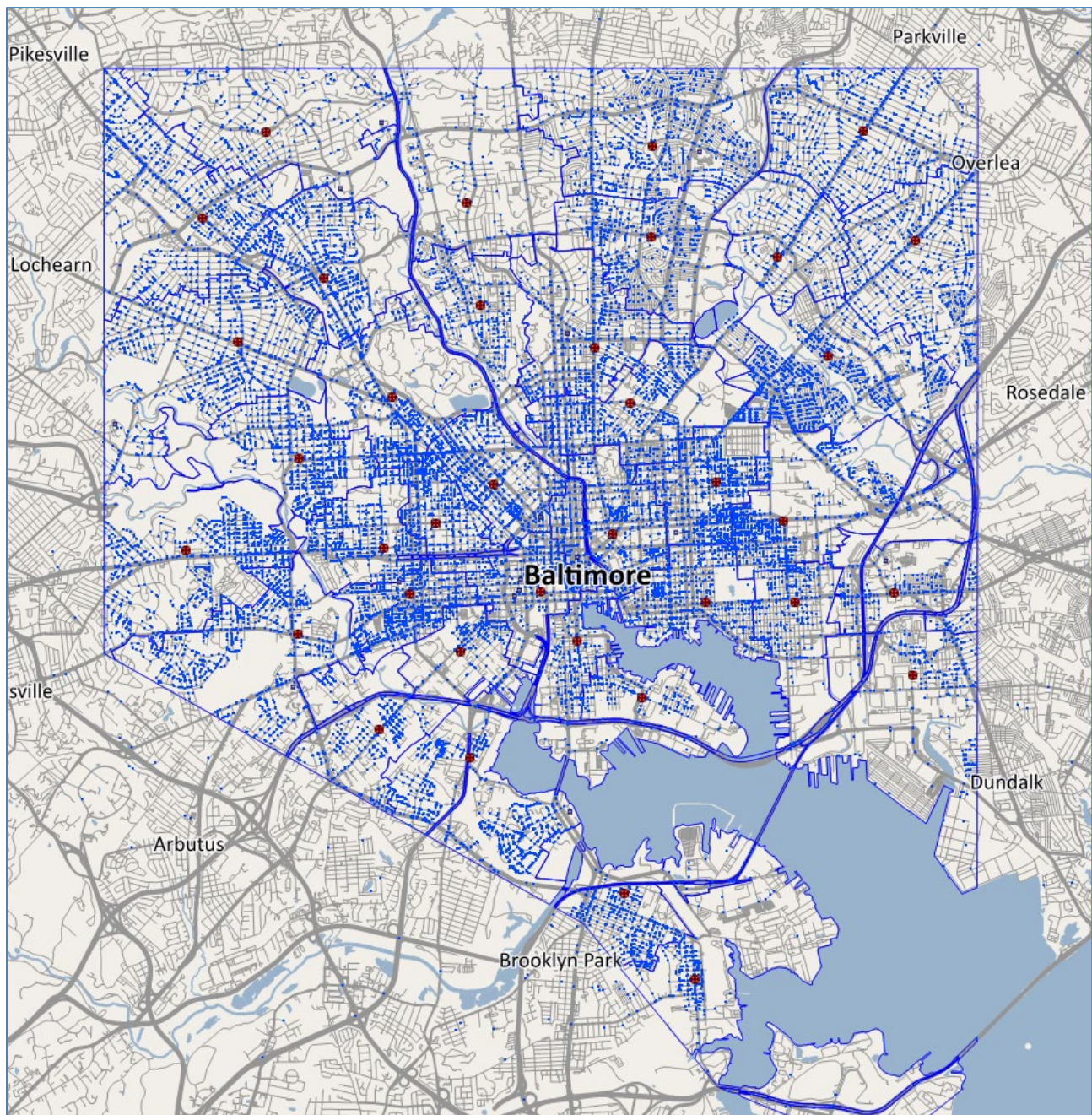
EMS ALS Incidents: Baseline Performance			
Measure	Average Time min:sec	90th Percentile Time min:sec	Target 90th % Time min:sec
EMS 1st Unit	5:28	8:15	5:00
ALS Arrival	8:43	14:17	9:00

Table 9. BCFD Baseline Performance for BLS Incidents

EMS BLS Incidents: Baseline Performance			
Measure	Average Time min:sec	90th Percentile Time min:sec	Target 90th % Time min:sec
EMS 1st Unit	5:30	8:23	5:00
Ambulance Arrival	8:20	13:36	9:00

56,115 EMS incidents exceeded the 9-minute target in the model (Figure 18), making overall EMS compliance with the response time goal 64.7 percent. ALS incidents performed slightly better, with an ALS unit arriving on scene within 9 minutes 68.4 percent of the time.

Figure 18. Geographic Distribution of EMS Response Time Exceptions



53.9 percent of the ALS incident exceptions have a response time between 9 and 12 minutes, meaning that additional EMS resources will have a substantial positive impact on overall EMS system performance.

For example: simulating the addition of one ALS unit to the system for 24 hours per day, 7 days per week, decreased the average response time by 12 seconds for the entire system, decreased the 90th

percentile response time by 14 seconds, and allowed an additional 1,769 ALS incidents to have an ALS unit respond immediately on dispatch.

Hospital Patient Transfer and Waiting Time

Pre-hospital EMS system performance can be significantly affected by patient transfer and waiting (or “wall”) times at receiving hospitals. Hospitals can also become de facto EMS stations as units collect at, and then respond from, these destination facilities after completing the patient transfer process. Delays in the patient transfer process can have a substantial negative impact on the performance of the EMS system by limiting the availability of BLS and ALS ambulances for the next response(s).

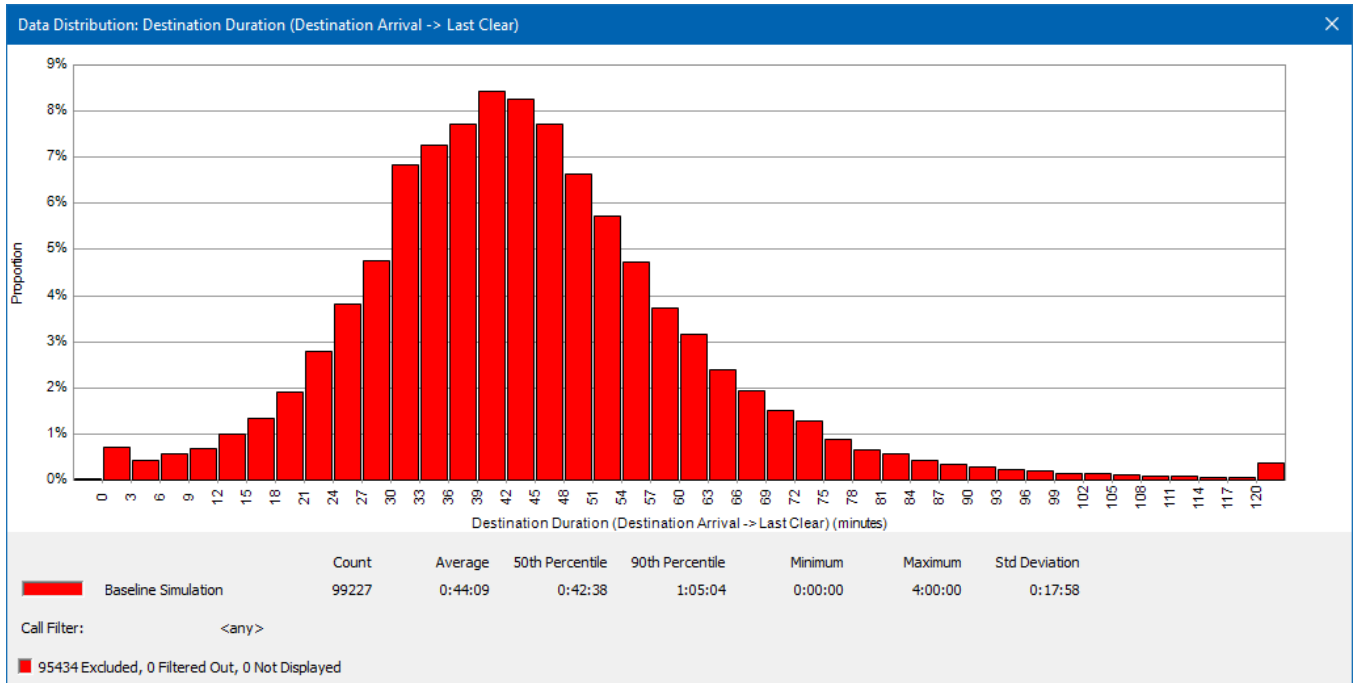
In our experience, EMS organizations generally attempt to have ambulances at the hospital for under 30 minutes at the 90th percentile. This results in an average **Hospital Duration** of approximately 20 minutes. The current **Hospital Duration** performance for BCFD EMS transport units is presented below and in Figure 19.

Table 10. BCFD EMS Incident Hospital Duration for Patient Transfer

EMS Incidents: Hospital Duration			
Measure	Average Time min:sec	90 th Percentile Time hr:min:sec	Target 90 th % Time min:sec
ALS Incidents	45:22	1:06:43	30:00
BLS Incidents	42:53	1:03:02	30:00
Combined	44:09	1:05:04	30:00

Discussions with BCFD EMS providers validated the results of our quantitative analyses, with some reporting hospital transfers taking as long as several hours, in isolated cases.

Figure 19. BCFD EMS Incident Hospital Duration for Patient Transfer



Reducing transfer times through targeted efforts with local hospitals could result in significant EMS system performance gains, with no additional investment required by the City of Baltimore.

For example: if the BCFD, through coordination with local hospitals, can decrease **Hospital Duration** by 10 percent, that is equivalent to the performance improvement obtained by adding one additional medic unit (ALS or BLS) 24x7x365; a 25 percent decrease is equivalent to 3 units, and a 50 percent decrease would result in an improvement equivalent to 6 new units being deployed daily. Detailed aspects of the 50 percent hospital transfer time reduction scenario are presented later in this report; this option was chosen as it reflects the target times discussed above.

Workload Analysis

Workload is an important dimension of fire-EMS system performance that also affects employees' health and safety. The ability to assess the impact on individual units of changes in system configuration/structure allows operations and planning leadership to avoid creating untenable work environments as the system evolves over time. Workload is also a good indicator of the need to plan for system resource augmentation as select units approach the point of exceeding reasonable levels of activity based upon their shift duration.

Workload is measured within our simulation as the time a resource is assigned to incidents expressed as a percentage of total on-duty time (100 percent). Workload does not consider assignments such as training, administrative tasks, ad hoc out-of-service time, or maintenance.

The BCFD, like many other high-demand urban fire-EMS agencies, reflects a high level of variability in the workload experienced by specific units across the organization. Each of the tables below display **Workload** aggregations by unit type for fire suppression and EMS units, as well as an overview of the busiest units within each category. We also present the range of workload for each unit type.

This variability, as noted above, is not unusual within organizations serving communities with varying levels of population density and a broad range of infrastructure types. This is further reinforced when unique industrial environments (such as ports) are included, since these types of facilities present substantial risks that must be addressed, but do not typically result in large numbers of incidents.

Table 11. BCFD Fire Suppression Unit Average Workload

Suppression Unit by Type	
Unit Type	Average Historic (%)
Engine	15.1
Squad	5.5
Truck	7.6
Rescue	16.0
Battalion Chief	8.9

Table 12. BCFD EMS Unit Average Workload

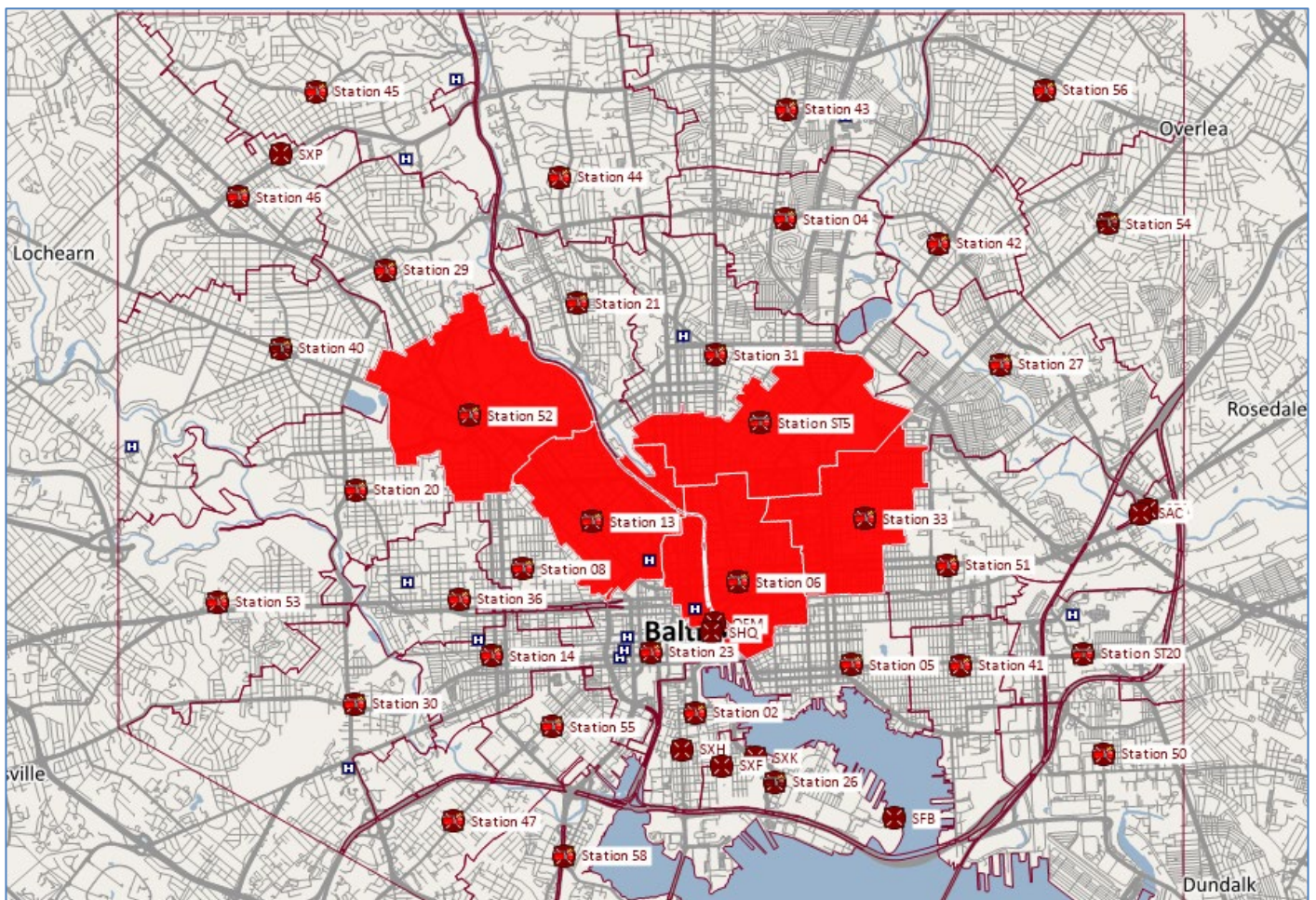
EMS Unit by Type	
Unit Type	Average Historic (%)
ALS Ambulance	62.4
BLS Ambulance	56.5
EMS District Officer	4.5

The workload among BCFD unit types is highest for the ALS and BLS ambulances (ranging from 39.27 percent to 71.07 percent). These numbers are exceptionally high, especially for employees working a 24-hour shift. Even the least busy ambulance exceeds the workload percentage recognized by many agencies for 24-hour shift durations (30 percent) by almost 10 percent. This level of workload can result in substantial employee wellness issues, does not provide on-duty time for

essential training, and also leads to extended response times at the current level of resource deployment. Moreover, fatigue can negatively affect patient care and decision-making at incidents.

The average workload among BCFD fire suppression units is more reasonable, but specific units exhibit much higher than typical levels of work in surrounding jurisdictions. These workload (more than 20 percent) levels have cascading impacts on the availability of units to respond to incidents in their first-due areas. For example, within the Station 6 first due (Engine 6), approximately 1 in 5 incidents (20 percent) are typically managed by a unit responding from a neighboring first-due area. This is not an uncommon occurrence, but several of the busiest fire suppression companies within the BCFD are located near one another (Engine 6, Engine 13, Engine 33, Engine 52, Truck 5), as illustrated in Figure 20, with the specific first-due areas highlighted in red. This results in a cascading effect across these first-due areas and is one of the challenges that results in the performance measures **1st Unit Structure Fire** and **EMS 1st Unit** both performing below NFPA 1710 targets.

Figure 20. BCFD Busiest First-Due Areas (2018-2019)



Details for each type of unit and the busiest units within each type are provided in the following tables.

Table 13. BCFD Busiest Engines/Squads

Busiest Engines/Squads	
Unit	Historic (%)
Engine 6	27.73
Engine 13	25.70
Engine 33	22.18
Engine 46	21.70
Engine 52	21.05

Engine/Squad workload ranges from 27.73% to 1.06%

Table 14. BCFD Busiest Trucks

Busiest Trucks	
Unit	Historic (%)
Truck 5	21.63
Truck 12	19.56
Truck 1	13.34
Truck 3	13.22
Truck 16	11.76

Truck workload ranges from 21.63% to 2.60%

Table 15. BCFD Busiest ALS Ambulances

Busiest ALS Ambulances	
Unit	Historic (%)
Medic 15	71.07
Medic 4	69.15
Medic 7	69.01
Medic 21	68.65
Medic 11	68.62

ALS Ambulance workload ranges from 71.07% to 39.27%

Table 16. BCFD Busiest BLS Ambulances

Busiest BLS Ambulances	
Unit	Historic (%)
Ambulance 36	71.91
Ambulance 29	66.46
Ambulance 28	65.13
Ambulance 30	64.92
Ambulance 27	62.94

BLS Ambulance workload ranges from 71.91% to 48.81%

Performance Impact of BCFD Critical Alert Units

The BCFD has been using a method to address episodic peaks in EMS service demand known as the Critical Alert program. This approach uses personnel assigned to fire suppression apparatus to temporarily transfer to an EMS unit (either BLS or ALS ambulance), with the intent of providing additional system capacity within the EMS operation to address peak demand periods that result in “Level 0” conditions within the system (i.e., zero EMS transport units available for response).

This simulation examines the actual impact of Critical Alert units within the system during the modeled period, as well as providing additional perspective on the system-level benefit (using simulation) of these additional, temporary EMS resources versus the temporary impact on fire suppression coverage from losing either an engine or truck company for a concurrent period.

For the comparative component of the analysis, two specific scenarios were used; these were selected based upon the two highest activity level Critical Alert units identified in the data (Ambulance 65 and Medic 44). In this scenario, each unit was put in service daily from 1000H to 2200H and a corresponding suppression unit was placed out of service within the simulation. The specific scenarios were:

- Station 20: A65 in service 1000H to 2200H; T18 out of service 1000H to 2200H
- Station 42: M44 in service 1000H to 2200H; E42 out of service 1000H to 2200H

The historic data period for this analysis is July 1, 2018, to June 30, 2019. During this period, the following Critical Alert units were identified within the incident and response data:

- BLS Ambulance Units: A61, A64, A65, A66
- ALS Ambulance Units: M40, M44, M60, M61, M64, M65, M66, M67, M68, M99

These units responded to a total of 2,723 incidents (an average of 7.5 incidents per day) during this period and the distribution was variable by day of the week and hour of the day. Figure 21 illustrates the daily distribution of these Critical Alert units over the course of the analysis period. The busiest single days were:

- February 5, 2019 – 21 Incidents
- December 3, 2018 – 20 Incidents
- May 17, 2019 – 19 Incidents

It was also noted that usage was more frequent during the period from July 2018 through early September 2018.

Figure 21. Daily Distribution of Critical Alert Unit Incidents

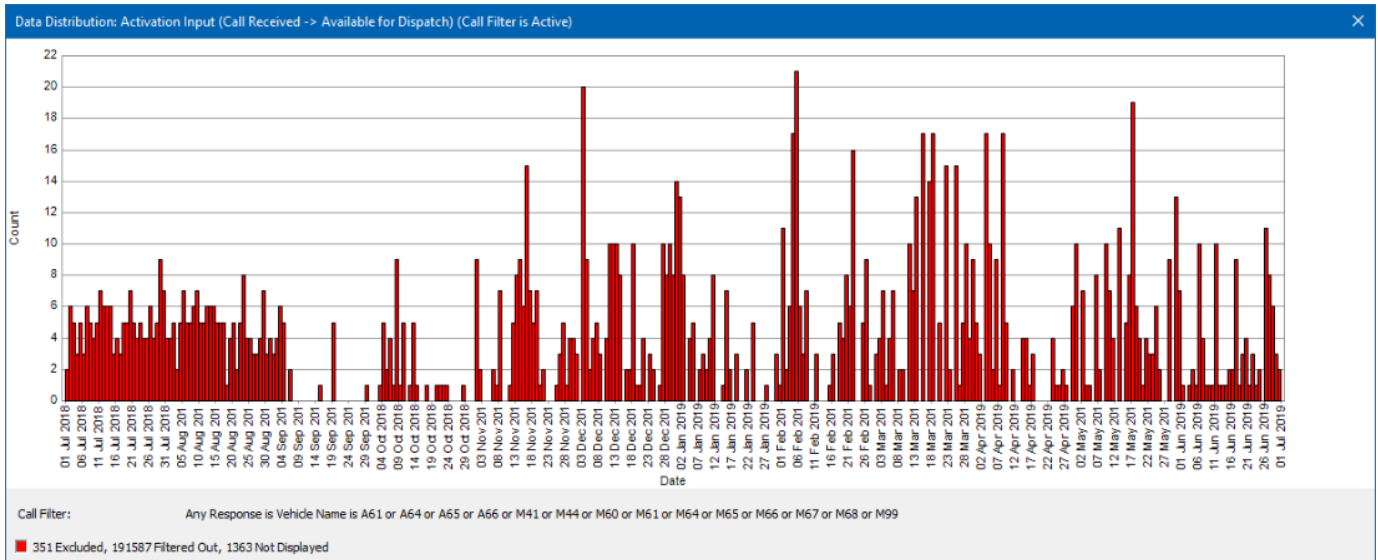
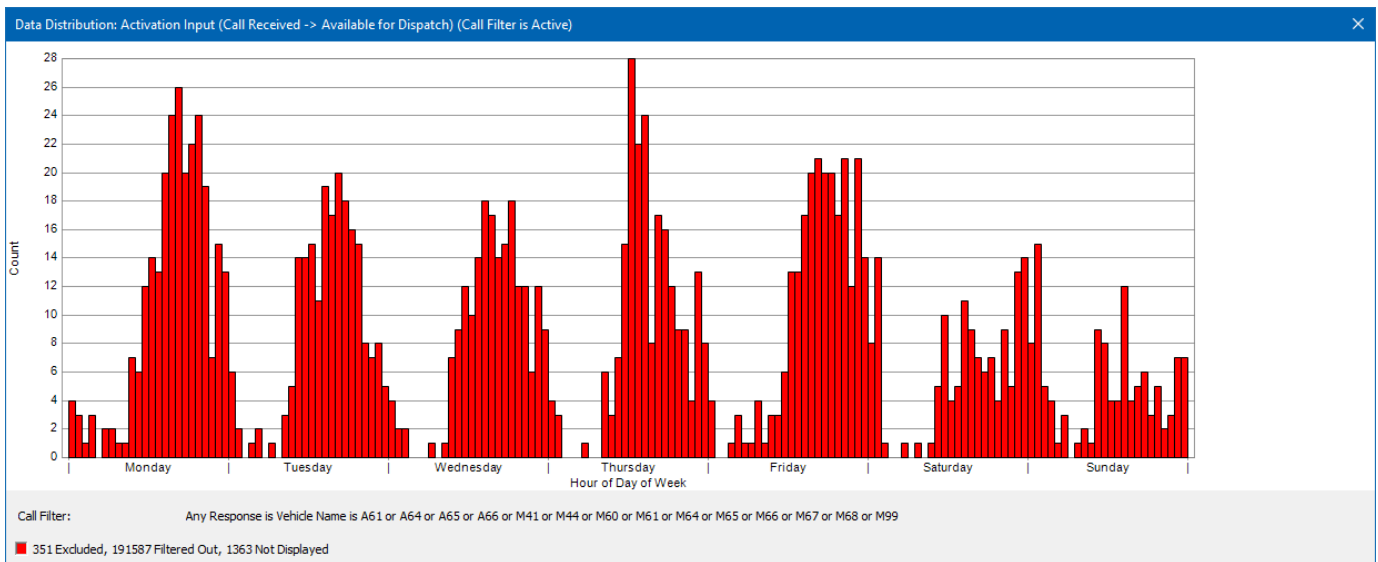


Figure 22 illustrates the usage by hour of day and day of week; the peaks in usage can be seen on Monday and Thursday and usage is notably lower on the weekends.

Figure 22. Hour of Day and Day of Week Distribution, Critical Alert Unit Incidents



The performance impact of these units is difficult to isolate using the historic data, but these units do perform substantially slower on their assigned incidents than the system in general (by a 4 minute average response time). However, this is not surprising as these units are, by design, introduced into the system during periods of intense demand; meaning that drive time and hospital wait times are likely at their peaks. This serves to skew the data for these resources to the negative. For this reason,

we undertook a more focused analysis to measure the impact of a single EMS resource for a window of time daily.

Scenarios were created using A65 and M44 based upon the level of activity noted for these two units in the historic data. Specifically, the scenarios are:

- Station 20: A65 in service 1000H to 2200H; T18 out of service 1000H to 2200H
- Station 42: M44 in service 1000H to 2200H; E42 out of service 1000H to 2200H

The impact of each unit was evaluated at a system level and a regional level to attempt to quantify and isolate the specific benefit of the Critical Alert unit within the EMS operations, and the inverse cost noted within fire suppression operations.

The addition of A65 or M44 had the following impacts on EMS operations during their in-service period:

System Level:

- Decrease in average response time of 9-12 seconds and decrease in the 90th percentile response time of 26-30 seconds.

Regional Level:

- Decrease in average response time of 20-23 seconds and decrease in the 90th percentile response time of 50-56 seconds.

The impact on the fire suppression performance was:

System Level:

- Increase in 1st Unit Structure Fire average response time of 2 seconds and no change in the 90th percentile response time.

Regional Level:

- Increase in 1st Unit Structure Fire average response time of 1 second and no change in the 90th percentile response time.

Alternative Deployment Scenarios

COVID-related fiscal challenges have resulted in acute funding shortfalls requiring the leadership of City of Baltimore departments, including the BCFD, to evaluate options that could result in decreased levels of service within the community.

In consultation with BCFD leadership, FACETS and Optima modeled several alternative deployment scenarios.

Disbanding Front-line Fire Suppression Units

This analysis comprised three distinct but related scenarios for disbanding front-line fire suppression units as a component of a potential strategy to close the BCFD's funding gap.

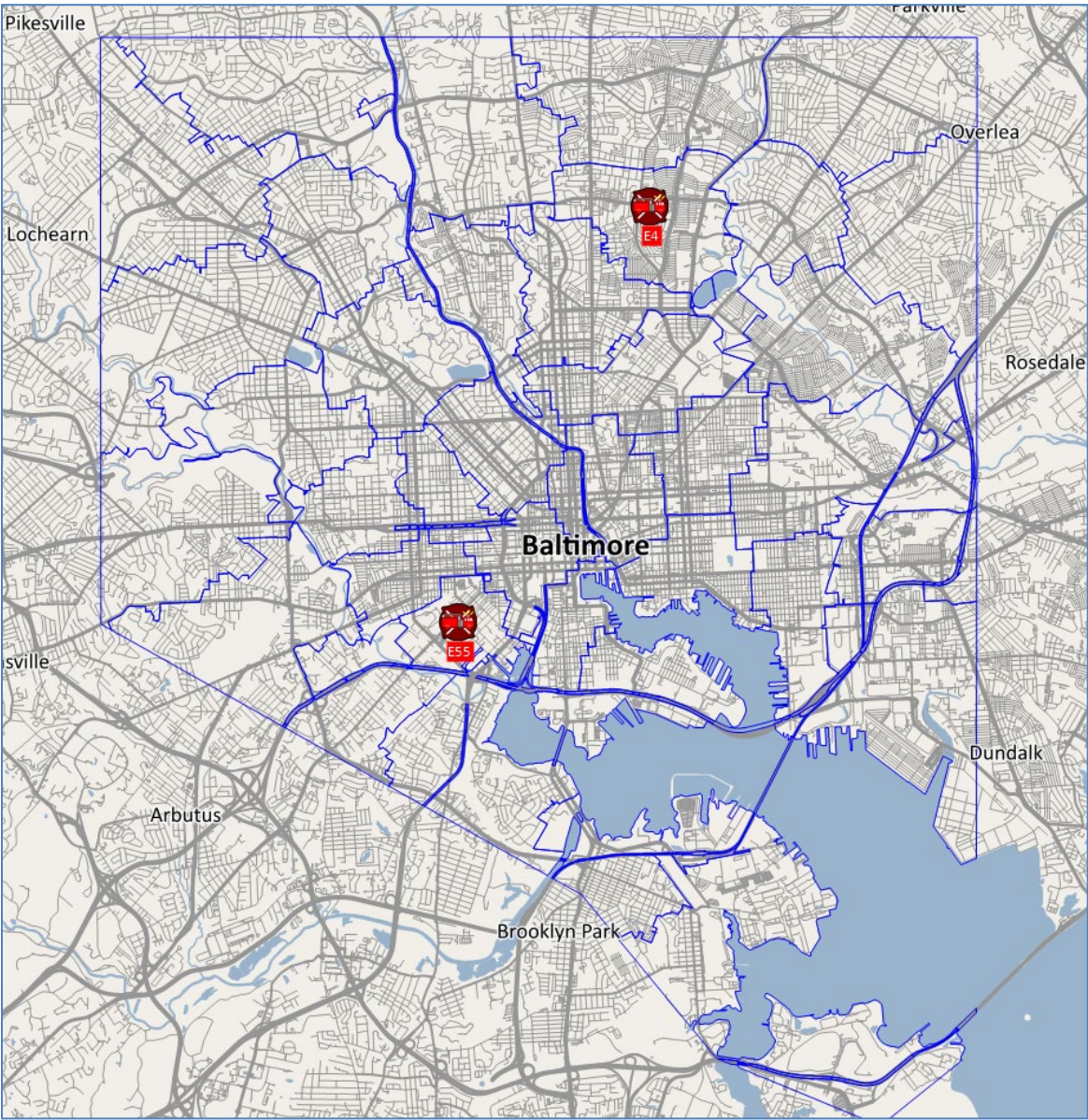
The modeled scenarios are:

- Disband Engine 4 (Station 4)
- Disband Engine 55 (Station 55)
- Disband both Engines 4 and 55

These scenarios will be presented individually to allow for a clear understanding of both the isolated impact of each alternative, as well as a more holistic understanding of the system-level impact of disbanding both companies.

The affected fire-EMS stations are highlighted on the following map (Figure 23).

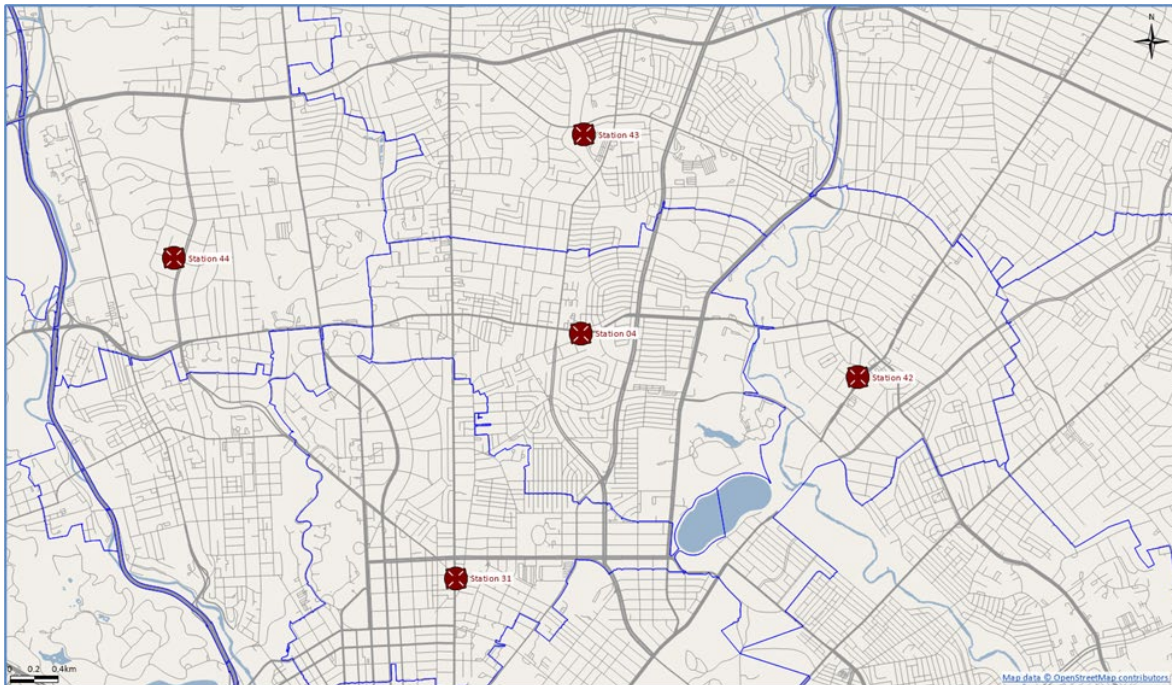
Figure 23. Alternative Deployment Scenarios: Engine 4 and Engine 55



Impact Analysis: Disband Engine 4 (Station 4)

Engine 4 is housed at Station 4. Station 4 also houses Truck 29. No additional units are located in this station. The area included in this analysis is illustrated in Figure 24.

Figure 24. Analysis Areas: Engine 4 Disbanding Scenario



Disbanding Engine 4 results in several negative impacts within the Station 4 first due as well as in adjacent stations' first-due areas. These impacts are:

- Average time for the **1st Engine Structure Fire** metric increases more than 35% from an average of 3 min. 12 sec. to 4 min. 22 sec.
- 90th percentile for the **1st Engine Structure Fire** metric increases more than 5% from 4 min. 41 sec. to 5 min. 28 sec. This change moves the district outside compliance for this NFPA 1710 metric.
- 90th percentile for **Initial Alarm Assignment** response time also moves out of NFPA 1710 compliance for the area surrounding Station 4; from 8 min. 53 sec. to 9 min. 23 sec., with a target time of 9 min. 20 sec.
- **Workload** for Truck 29 increases more than 250% to 14.84% and the workloads for Engines 44, 43, and 42 also increase in excess of 5%.

Workload - E4 Disbanded		
Unit Designator	Historic (%)	Scenario (%)
Engine 4	15.07	N/A
Truck 29	5.50	14.84
Engine 44	7.63	8.03
Engine 43	16.01	16.98
Engine 42	8.91	9.39
Engine 31	16.58	17.19

The impact of disbanding E4 is further illustrated in the following table.

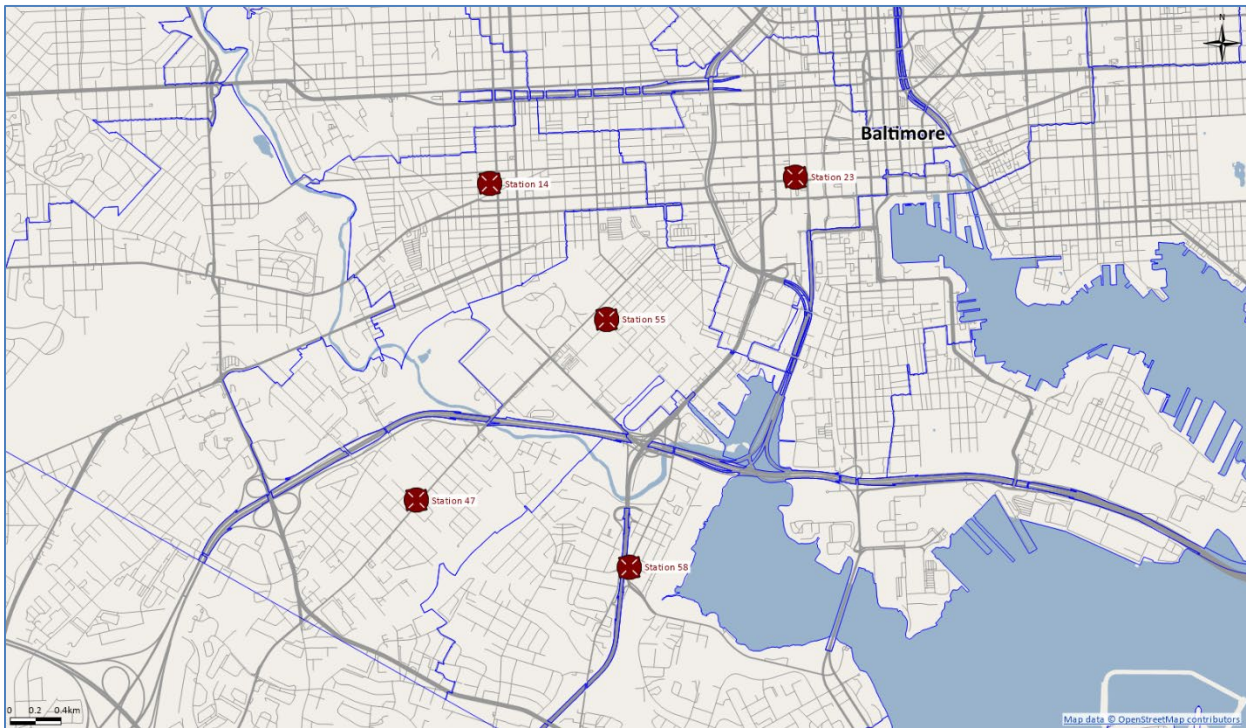
Performance - E4 Disbanded	Station First Due Areas					Area Total
	4	44	43	42	31	
Incidents (All Types)	3933	1849	5942	3173	5537	19434
Baseline: 1st Engine Structure Fire - Average	3:12	4:18	3:37	3:53	3:49	3:40
Scenario: 1st Engine Structure Fire - Average	4:22	4:40	3:50	3:41	4:05	4:04
Baseline: 1st Engine Structure Fire – 90th Percentile (5:20)	4:41	6:12	5:14	5:19	5:58	5:32
Scenario: 1st Engine Structure Fire – 90th Percentile (5:20)	5:28	5:56	5:50	5:06	6:31	5:51
Baseline: 2nd Unit Structure Fire – 90th Percentile (7:20)	5:06	7:29	6:32	6:09	6:37	6:37
Scenario: 2nd Unit Structure Fire – 90th Percentile (7:20)	5:43	7:44	7:09	5:45	6:31	6:45
Baseline: Initial Alarm Assignment – 90th Percentile (9:20)	8:02	9:43	9:21	7:53	8:29	8:53
Scenario: Initial Alarm Assignment – 90th Percentile (9:20)	8:02	9:45	11:15	7:56	9:26	9:23
Baseline: EMS 1st Unit – 90th Percentile (5:00)	7:08	10:17	9:11	7:50	8:19	8:40
Scenario: EMS 1st Unit – 90th Percentile (5:00)	7:46	10:29	9:45	8:07	8:33	8:59

Red indicates worsened performance of 5% or greater.

Impact Analysis: Disband Engine 55 (Station 55)

Engine 55 is housed at Station 55. Station 55 also houses Truck 23 and Medic 22. No additional units are located in this station. The area included in this analysis is illustrated in Figure 25.

Figure 25. Analysis Areas: Engine 55 Disbanding Scenario



Disbanding Engine 55 results in several negative impacts that are reflected within the Station 55 first-due area as well as in adjacent stations' response districts. These impacts are:

- Average time for the **1st Engine Structure Fire** metric increases 39.3% from 3 min. 17 sec. to 4 min. 34 sec.
- 90th percentile for the **1st Engine Structure Fire** metric increases 9.7% from 4 min. 54 sec. to 5 min. 23 sec. This change moves the district outside compliance for this NFPA 1710 metric.
- 90th percentile for **Initial Alarm Assignment** in the Station 58 area (adjacent station) also moves out of NFPA 1710 compliance for the area surrounding Station 55; from 7 min. 53 sec. to 9 min. 54 sec. with a target time of 9 min. 20 sec.
- 90th percentile for **EMS 1st Unit** increases in excess of 9% to 7 min. 25 sec.

Workload – E55 Disbanded		
Unit Designator	Historic (%)	Scenario (%)
Engine 55	13.61	N/A
Truck 23	5.27	13.11
Engine 14	17.44	18.02
Engine 23	18.11	18.86
Rescue 1	10.02	10.25
Engine 58	12.16	12.75
Engine 47	8.29	8.75

- **Workload** for Truck 23 increases almost 150% to 13.11% and the workload for Engine 47 also increases in excess of 5%.

The impact of disbanding E55 is further illustrated in the following table.

Performance – E55 Disbanded	Station First Due Areas					
	55	14	23	58	47	Area Total
Incidents (All Types)	2598	7542	9999	3757	2272	26168
Baseline: 1st Engine Structure Fire - Average	3:17	3:17	3:50	4:44	2:54	3:33
Scenario: 1st Engine Structure Fire - Average	4:34	3:17	3:48	4:48	3:02	3:42
Baseline: 1st Engine Structure Fire – 90th Percentile (5:20)	4:54	4:24	5:11	6:19	4:18	5:18
Scenario: 1st Engine Structure Fire – 90th Percentile (5:20)	5:23	4:31	5:07	6:41	4:05	5:20
Baseline: 2nd Unit Structure Fire – 90th Percentile (7:20)	5:08	4:56	5:05	8:01	6:24	6:23
Scenario: 2nd Unit Structure Fire – 90th Percentile (7:20)	5:19	5:06	5:15	7:47	6:20	6:26
Baseline: Initial Alarm Assignment – 90th Percentile (9:20)	7:43	7:23	7:41	7:53	9:07	8:09
Scenario: Initial Alarm Assignment – 90th Percentile (9:20)	8:00	7:24	7:45	9:54	8:39	9:03
Baseline: EMS 1st Unit – 90th Percentile (5:00)	6:47	7:12	8:12	10:55	8:26	8:26
Scenario: EMS 1st Unit – 90th Percentile (5:00)	7:25	7:12	8:12	11:02	8:20	8:29

Red indicates worsened performance of 5% or greater.

Combined Impact Analysis: Disbanding Engine 4 and Engine 55 (System Level)

The combined impact of disbanding both E4 and E55, at the system (versus first due) level, is not detectable across the NFPA 1710 (2020) metrics within the level of model error. The issues specific to each engine within their first-due area and surrounding geographies are well defined in the previous scenarios and no additional substantive variability was noted, as reflected in the below table.

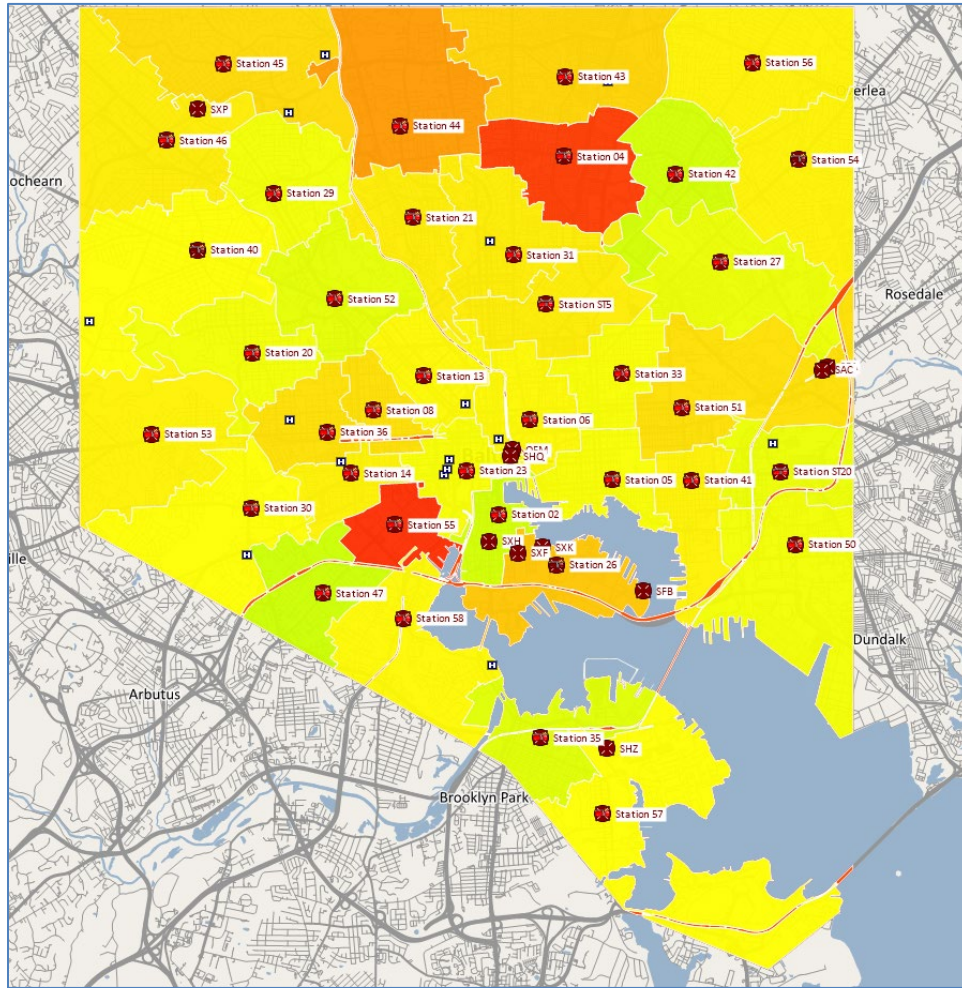
Performance – Combined Impact E4/E55	System
Baseline: 1st Engine Structure Fire - Average	3:48
Scenario: 1st Engine Structure Fire - Average	3:53
Baseline: 1st Engine Structure Fire – 90th Percentile (5:20)	5:41
Scenario: 1st Engine Structure Fire – 90th Percentile (5:20)	5:46
Baseline: 2nd Unit Structure Fire – 90th Percentile (7:20)	6:24
Scenario: 2nd Unit Structure Fire – 90th Percentile (7:20)	6:27
Baseline: Initial Alarm Assignment – 90th Percentile (9:20)	8:29
Scenario: Initial Alarm Assignment – 90th Percentile (9:20)	8:32
Baseline: EMS 1st Unit – 90th Percentile (5:00)	8:17
Scenario: EMS 1st Unit – 90th Percentile (5:00)	8:19

Red indicates performance outside NFPA 1710 parameters.

The following maps provide a visual sense of the impact areas created by disbanding Engine 4 and Engine 55.

Figure 26 represents the impact on NFPA 1710 metric **1st Engine Structure Fire**. It is focused, as previously defined, in the first-due areas of Station 55, Station 4, Station 43 and Station 57.

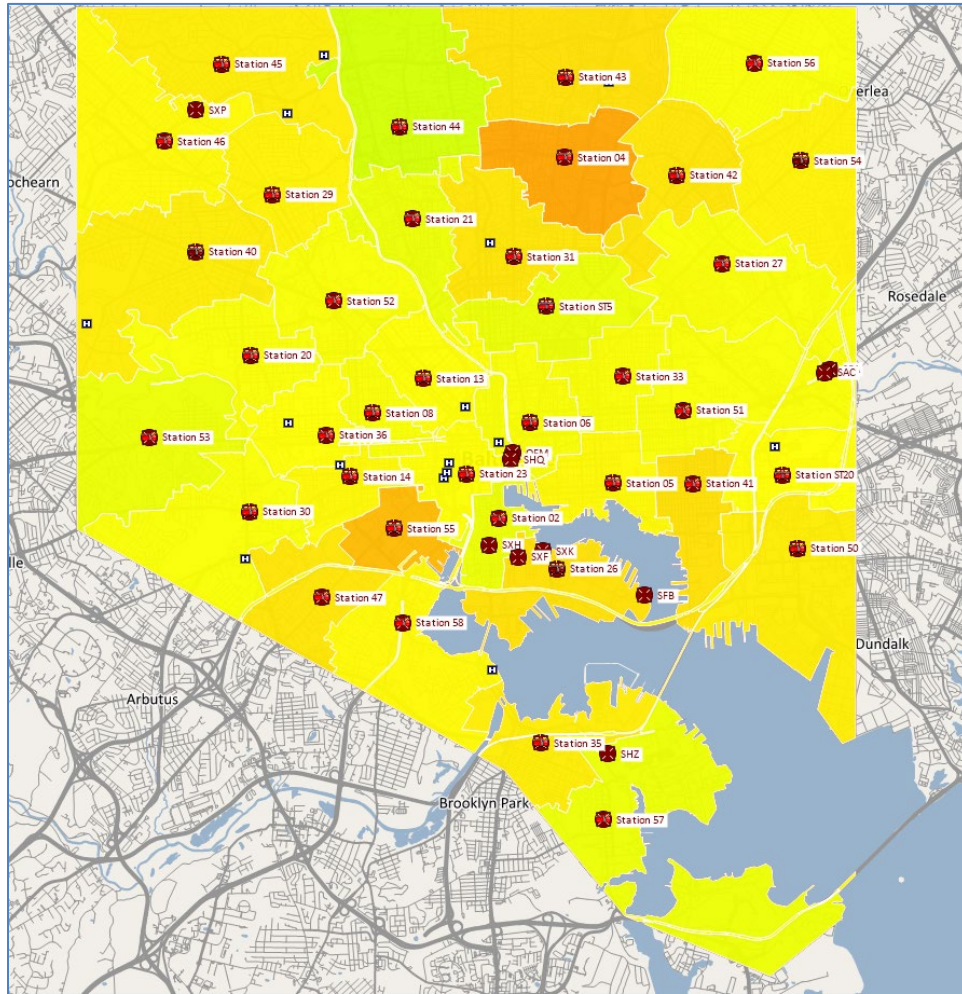
Figure 26. Combined Impact of Disbanding E4 and E55, 1st Engine Structure Fire



Darker shades of Yellow/Gold reflect Increased Impact, **Red** Indicates Substantial Negative Impact.

Figure 27 represents the impact on NFWA 1710 **EMS 1st Unit**. This impact is also centered in the Station 55, Station 4, and Station 43 first-due areas; seen with the darker yellow/gold coloration.

Figure 27. Combined Impact of Disbanding E4 and E55, 1st EMS Unit

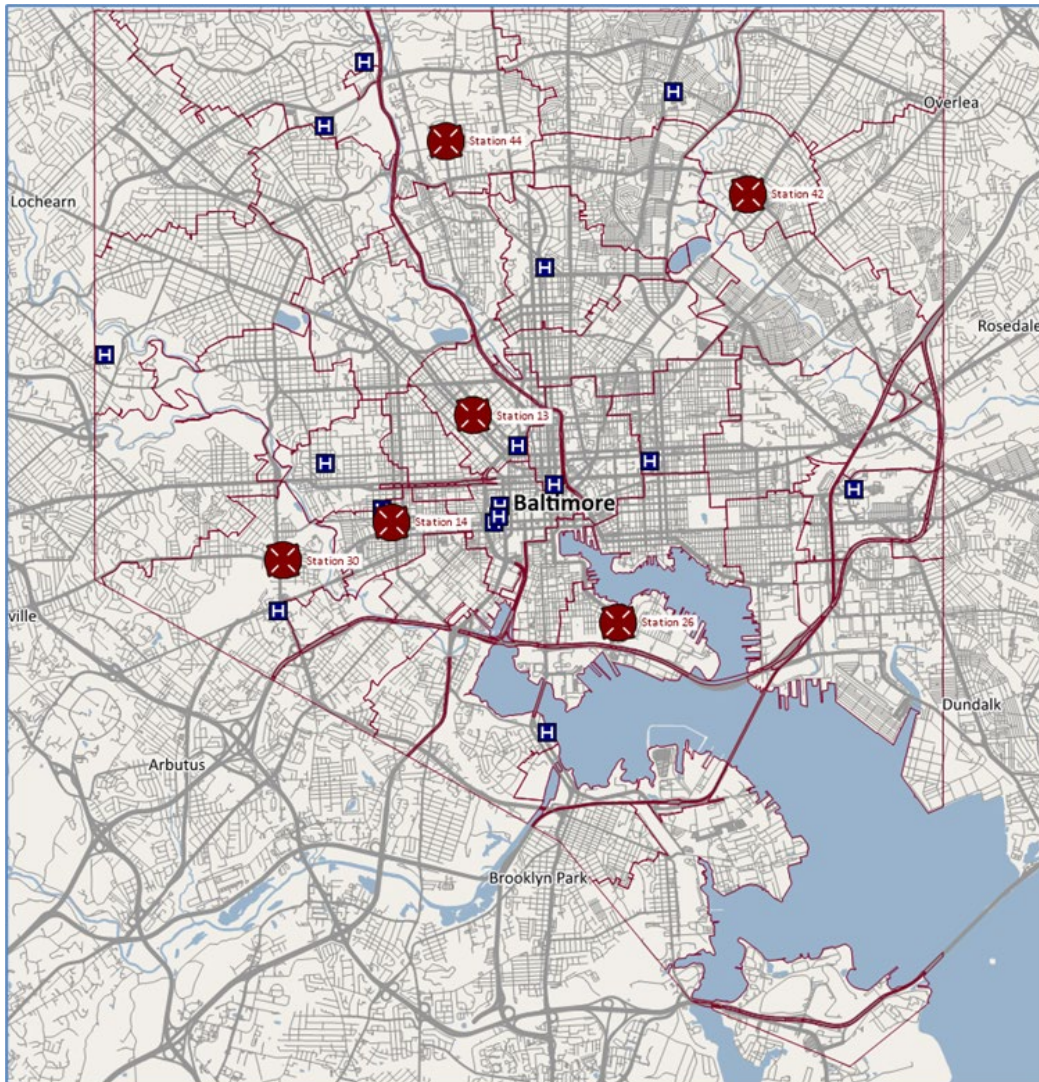


Darker Shades of Yellow/Gold reflect Increased Impact

Scenario Analysis: Impact of Increasing ALS Ambulance Resources

In this scenario, our analysis begins by examining the BCFD first-due areas across the City of Baltimore with the highest number of EMS incident exceptions to the **ALS Arrival** performance metric. This metric is measured from dispatch of the assigned unit(s) to arrival of the first ALS capable unit on the scene. The target response duration is 9 min. 00 sec. measured at the 90th percentile. The first-due areas used for this simulation are Stations 26, 42, 44, 14, 30, and 13; illustrated in Figure 28.

Figure 28. BCFD First-Due Areas with Highest Exceptions to ALS Arrival Performance



We did not evaluate the suitability of the identified fire-EMS stations to house an additional medic unit; this type of operational evaluation would need to be completed prior to deployment of additional resources. Given the overall incident volume within the system, however, adding a medic unit (ALS or BLS) in almost any location across the city will have a meaningful positive impact on the overall fire-EMS system performance.

We modeled several scenarios to assess the impact of resource augmentation. In these scenarios, we added 1 additional unit, 3 additional units, and 6 additional units to evaluate potential performance gains. Other scenarios, focusing on specific numbers of unit additions, can be modeled in Optima Predict, along with the option to place the resources in alternate locations.

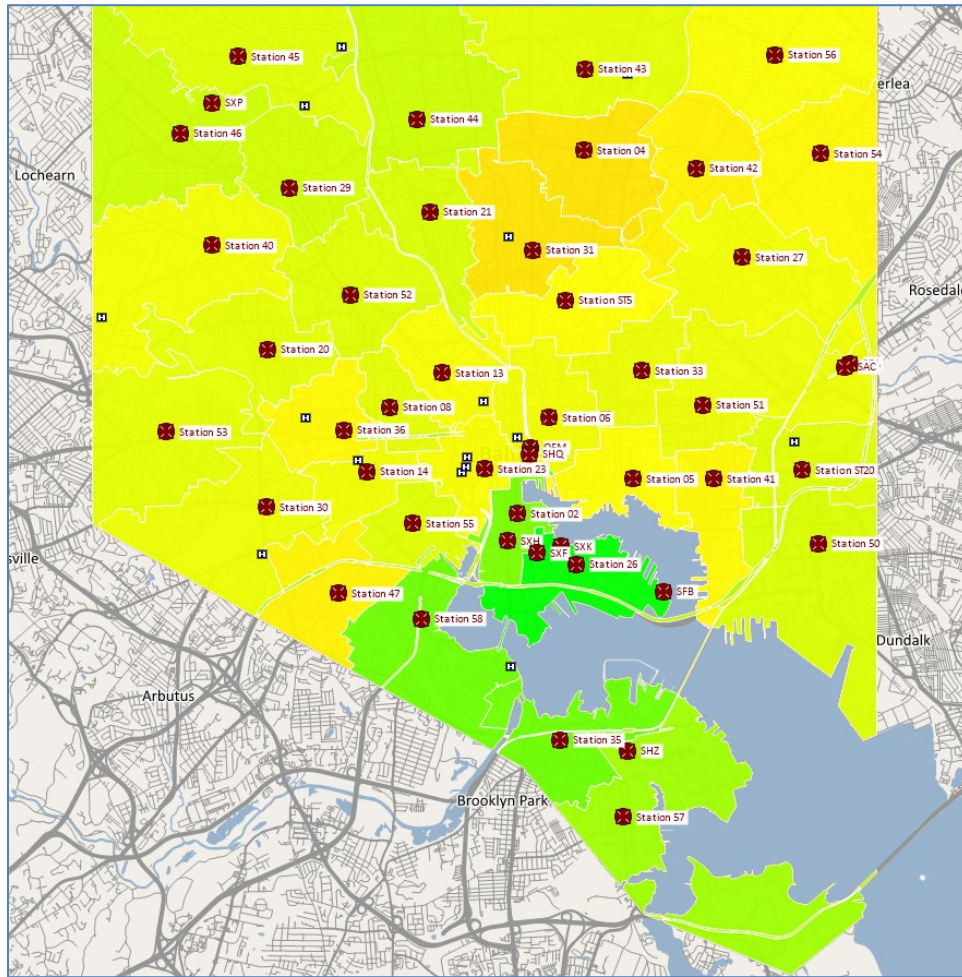
The specific scenarios were:

- 1 ALS medic unit added to Station 26; 24 hours a day, 7 days per week.
- 3 ALS medic units added to Stations 26, 42, and 44 (one unit each); 24 hours a day, 7 days per week.
- 6 ALS medic units added at Stations 26, 42, 44, 14, 30, and 13 (one unit each); 24 hours a day, 7 days per week.

The addition of ALS ambulances, in all scenarios, produced performance improvements in both the geographic area of the assigned stations as well as at a system level. This improvement was manifested as both decreasing response time durations (both average and 90th percentile) and by allowing a greater number of ALS-level incidents to receive an ALS unit response at time of dispatch.

The geographic impact of adding a single ALS ambulance is illustrated in Figure 29. This unit has been added to Station 26 and marked performance improvements are noted in the Station 26, 2, 58, 35, and 57 first-due areas.

Figure 29. Geographic Impact of Additional ALS Ambulance at Station 26



Darker Green reflects Increased Positive Impact, Yellow/Gold reflects Stable Performance

The improvements created by each scenario are detailed in Table 13. We have provided a range of metrics related to response including the number of ALS incidents responded to in each scenario, as well as the total number of EMS incident exceptions present in each scenario. This last metric aids in understanding the percentage of incidents exceeding the 9 min. 00 sec. standard and if the augmentation scenario is improving the BCFD's overall fire-EMS system performance.

Table 17. Impact of Additional ALS Ambulances

ALS Ambulance Increased Units	Ambulance Augmentation Scenarios				
	Baseline	1 Unit	3 Units	6 Units	Hospital Wait Time ↓
Incidents with ALS Response	85,808	87,561	91,173	97,315	90,688
ALS Arrival - Average	8:44	8:39	8:25	7:58	8:00
ALS Arrival – 90 th Percentile (9:00)	14:24	14:10	13:40	12:52	12:57
EMS Incident Exceptions (ALS)	24,362	24,752	24,723	23,086	22,766
ALS Incident Exceptions (%)	28.39%	28.26%	27.12%	23.72%	25.10%
All EMS Incidents	144,715	145,519	147,120	149,898	148,987
Ambulance Arrival - Average	8:31	8:24	8:11	7:48	7:48
Ambulance Arrival – 90 th Percentile (9:00)	13:59	13:44	13:15	12:32	12:35
EMS Incident Exceptions (All)	38,440	37,640	35,050	30,294	29,945
EMS Incident Exceptions (%)	26.56%	25.87%	23.82%	20.21%	20.10%

Red indicates worsened performance of 5% or greater

Green indicates improved performance of 5% or greater

In these scenarios, we focused on the addition of ALS resources based upon the percentage of incident types within BCFD that require an ALS unit assignment. It is important to note, however, that *any* combination of new ALS and BLS units added to the system is beneficial and will improve performance across the city. Though ALS units will result in slightly better performance in a head-to-head comparison, the realities of recruiting and maintaining additional ALS personnel—versus the additional flexibility gained by leveraging existing BLS providers—may make a combined deployment of resources the soundest strategy to achieve improved performance in the shortest time.

As noted above, the assumption in this scenario is that each additional resource is staffed 24 hours per day, 7 days per week. Given the temporal distribution of both incidents and exceptions within the

system (Figures 30 and 31), it is likely that a more targeted application of the resources would be possible resulting in either decreased cost or increased performance with an equivalent investment. *It is also critical to note that the Hospital Wait Time Duration Decrease scenario presented subsequently results in almost the exact same performance gain as adding 6 new ALS Ambulances to the BCFD EMS delivery system.*

Figure 30. Temporal Distribution of BCFD EMS Incidents (2018-2019)

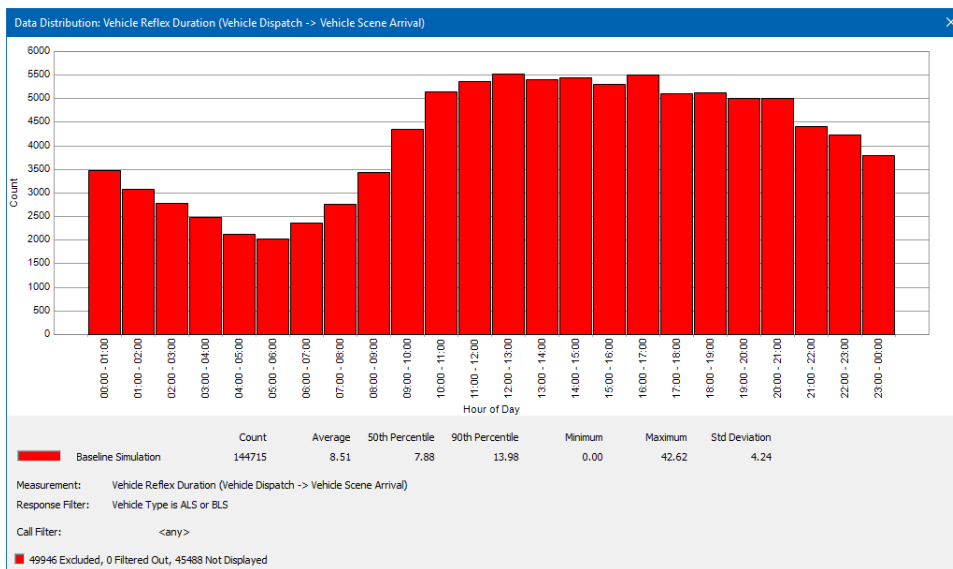
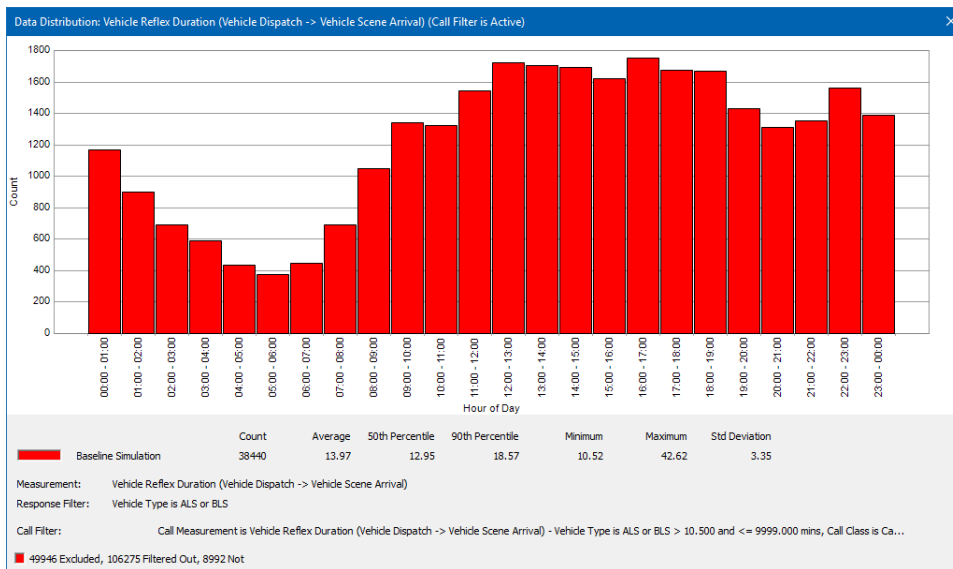


Figure 31. Temporal Distribution of BCFD EMS Response Time Exceptions (2018-2019)



Workload also decreases in all the presented scenarios, though not sufficiently to prevent the need for addressing the wellness issues previously discussed.

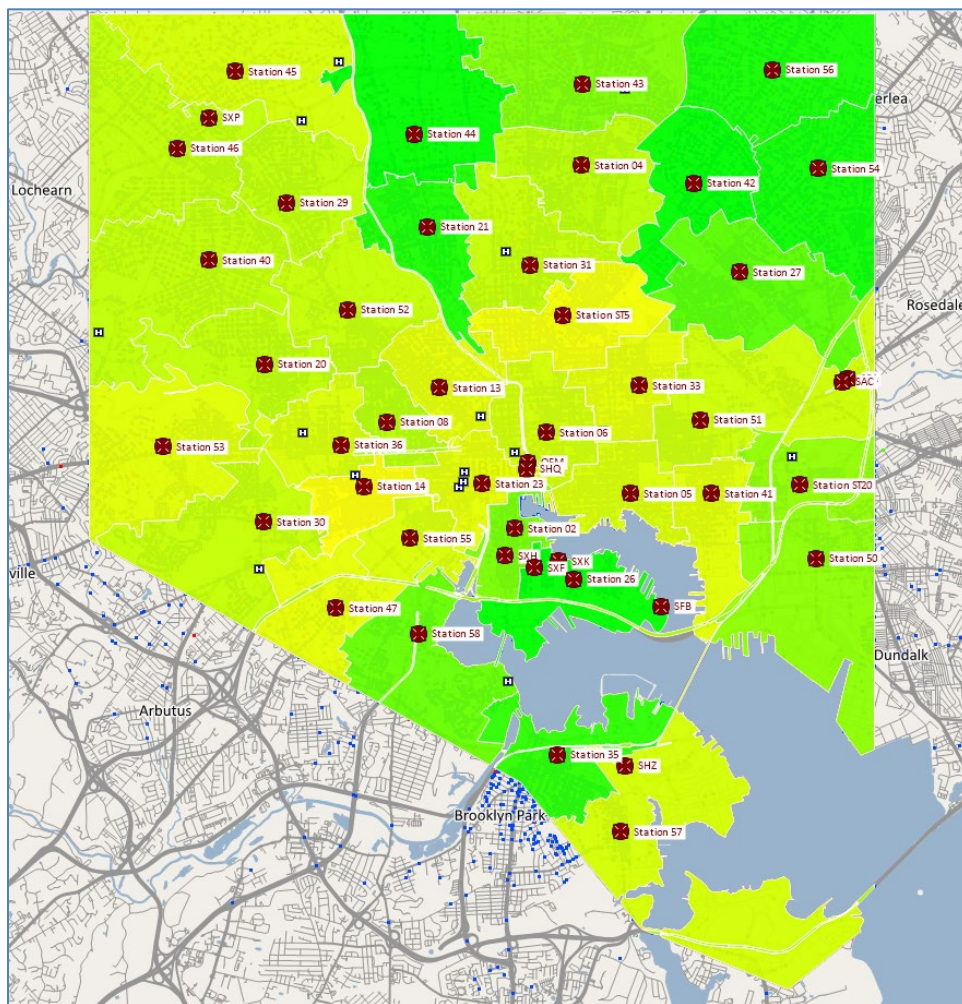
Workload – Ambulance Units					
Type	Baseline	1 Unit	3 Units	6 Units	Hospital Wait Time ↓
ALS	62.42%	60.13%	56.08%	51.34%	50.09%
BLS	57.12%	55.33%	52.99%	49.26%	42.43%

Red indicates worsened performance of 5% or greater

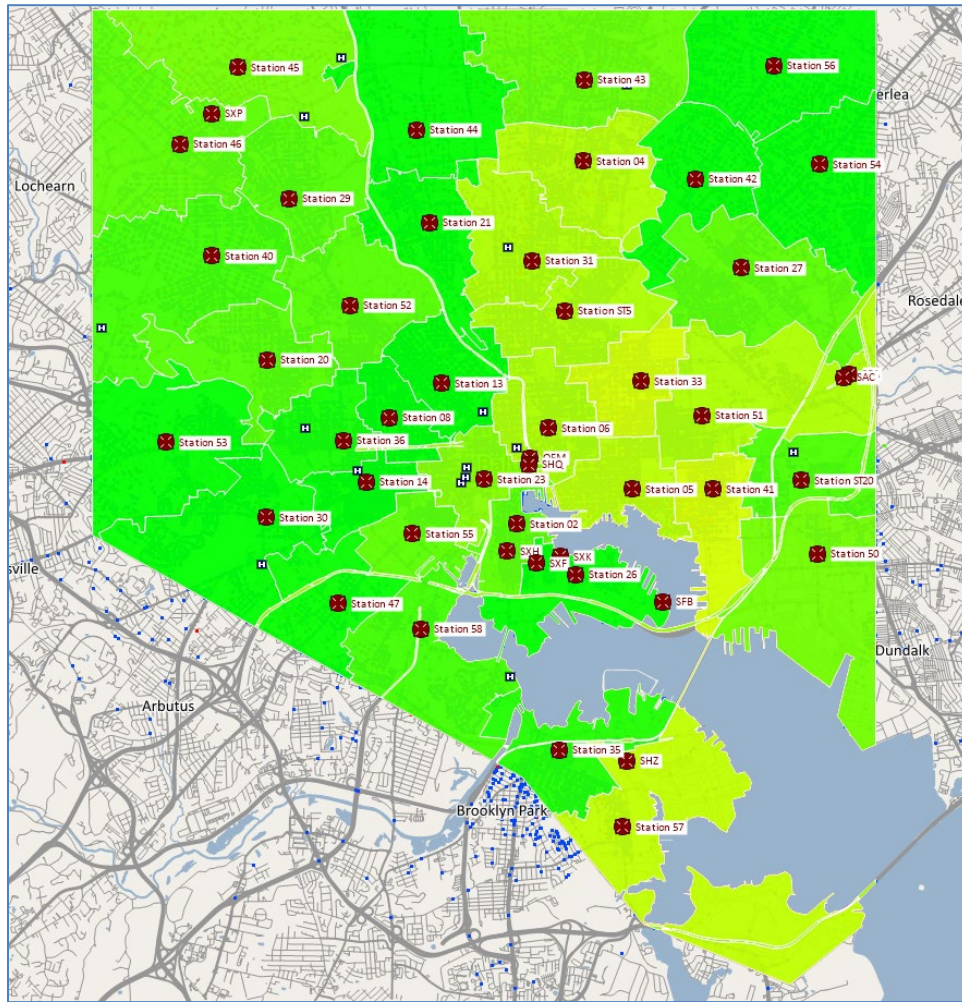
Green indicates improved performance of 5% or greater

As noted in the performance metrics presented above, overall fire-EMS system performance is improved markedly with the addition of resources. Figures 32 and 33 present the geographic impact of the 3 and 6 additional ambulance scenarios on the system.

Figure 32. Geographic Impact of Additional ALS Ambulance at Stations 26, 42, and 44.



Darker **Green** Indicated Increased Positive Impact, Yellow/Gold Indicates Stable Performance



Darker Green Indicated Increased Positive Impact, Yellow/Gold Indicates Stable Performance

Scenario Analysis: Impact of Decreasing Hospital Transfer Time to 30 Minutes at the 90th Percentile

One of the most insidious negative factors affecting EMS organizations is the lengthening duration associated with transferring patients to the care of a receiving facility. For this analysis, we assess **Transfer Time** at receiving hospitals and examine the impact of moving this duration from current durations to a desired duration of 30 minutes at the 90th percentile with an average of approximately 20 minutes from arrival at destination (hospital) to available at destination. The assumption in this analysis is not that a unit actually left the facility, but that it was available, as needed, to respond to emergency incidents within that new time window.

Optima's Predict software contains the ability, through a tool known as Call Generator, to modify the historic incident data used as the foundation for the baseline simulation. In this instance, we decreased the **Transfer Time** duration by 50 percent, resulting in the average time decreasing from

44 min. 07 sec. to 22 min. 03 sec.; and the 90th percentile time decreasing to 32 min. 29 sec. from 1 hr. 4 min. 57 sec. The distribution of hospital **Transfer Time** is illustrated in Figure 34.

Figure 34. Hospital Transfer Times Baseline (Red) vs. Scenario (Yellow)

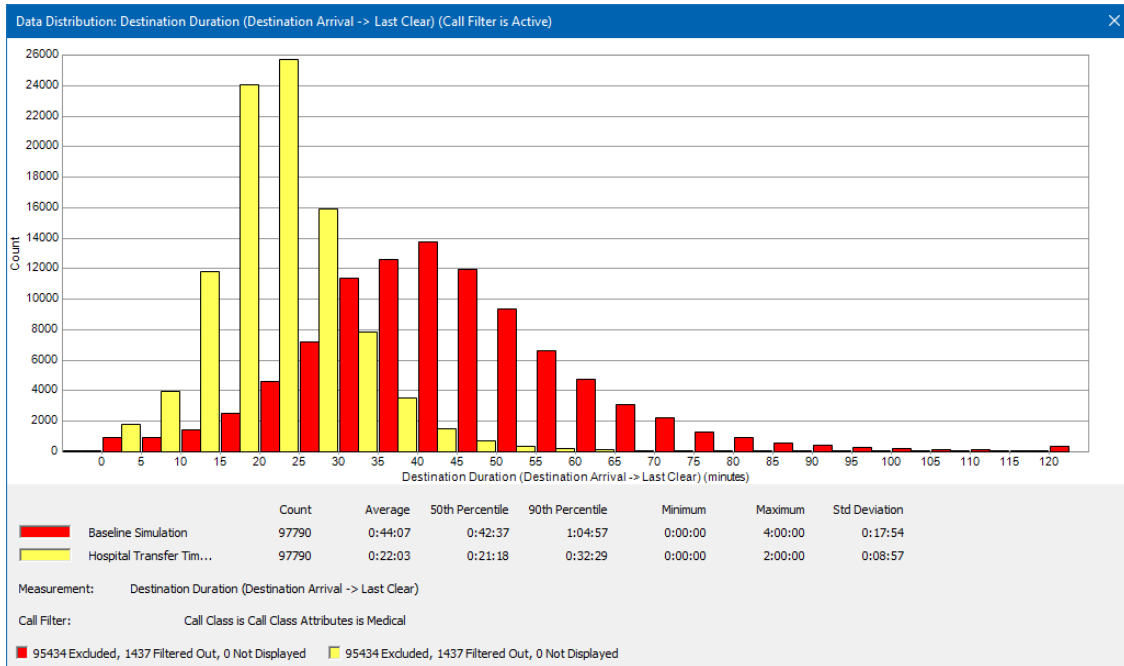
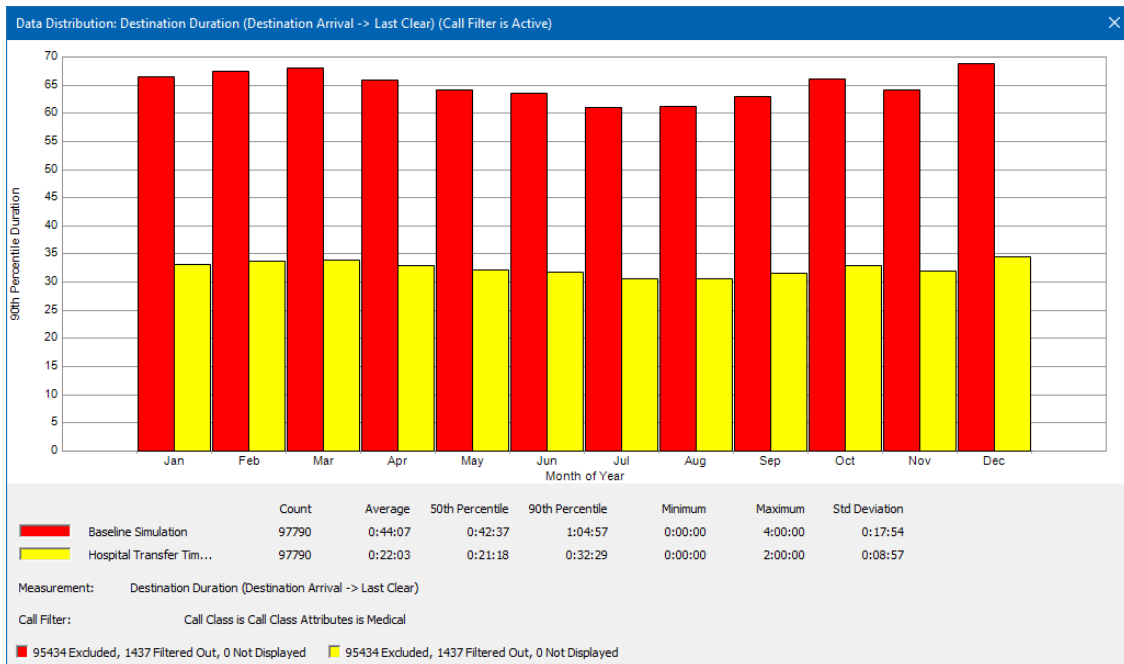


Figure 35 reflects monthly variability, with December having the longest wait times and July the shortest. The difference is approximately 7 minutes at the 90th percentile (1 hr. 8 min. to 1 hr. 1 min.).

Figure 35. Hospital Transfer Times Baseline (Red) vs. Scenario (Yellow), Variability by Month



This potential change results in multiple beneficial impacts for the entire BCFD fire-EMS system. The primary advantages are seen for the ALS and BLS ambulance units (discussed in detail below), but all unit types that are used for EMS first response assignments (including engines, squads, and trucks) saw small, but quantifiable, decreases in workload.

ALS and BLS ambulance units achieved the following, most substantial, improvements:

- Workload decrease
- Improved response times
- Increased availability for response

Workload Decrease: Decreased hospital transfer times resulted in substantial **workload** decreases for both ALS and BLS ambulance units. This is related to overall decreased task duration and is slightly less than a 20% improvement for ALS ambulances and more than a 25% improvement for BLS ambulances despite increased actual responses (since these units become more available to respond).

The table below provides the specific impact.

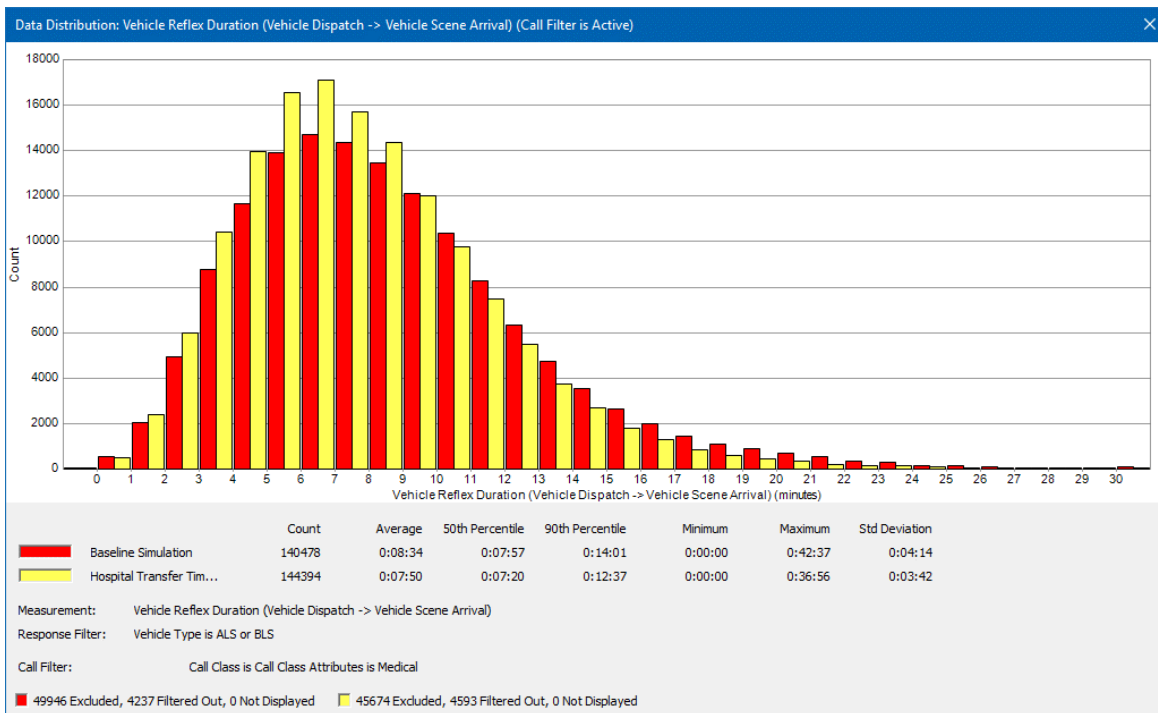
Workload – Ambulance Units		
Type	Baseline (%)	Scenario (%)
ALS	62.42	50.09
BLS	57.12	42.43

Red indicates worsened performance of 5% or greater

Green indicates improved performance of 5% or greater

Improved Response Performance: The increased availability of medic units also translated into improved performance across the system. The distribution of this performance improvement is noted in Figure 36.

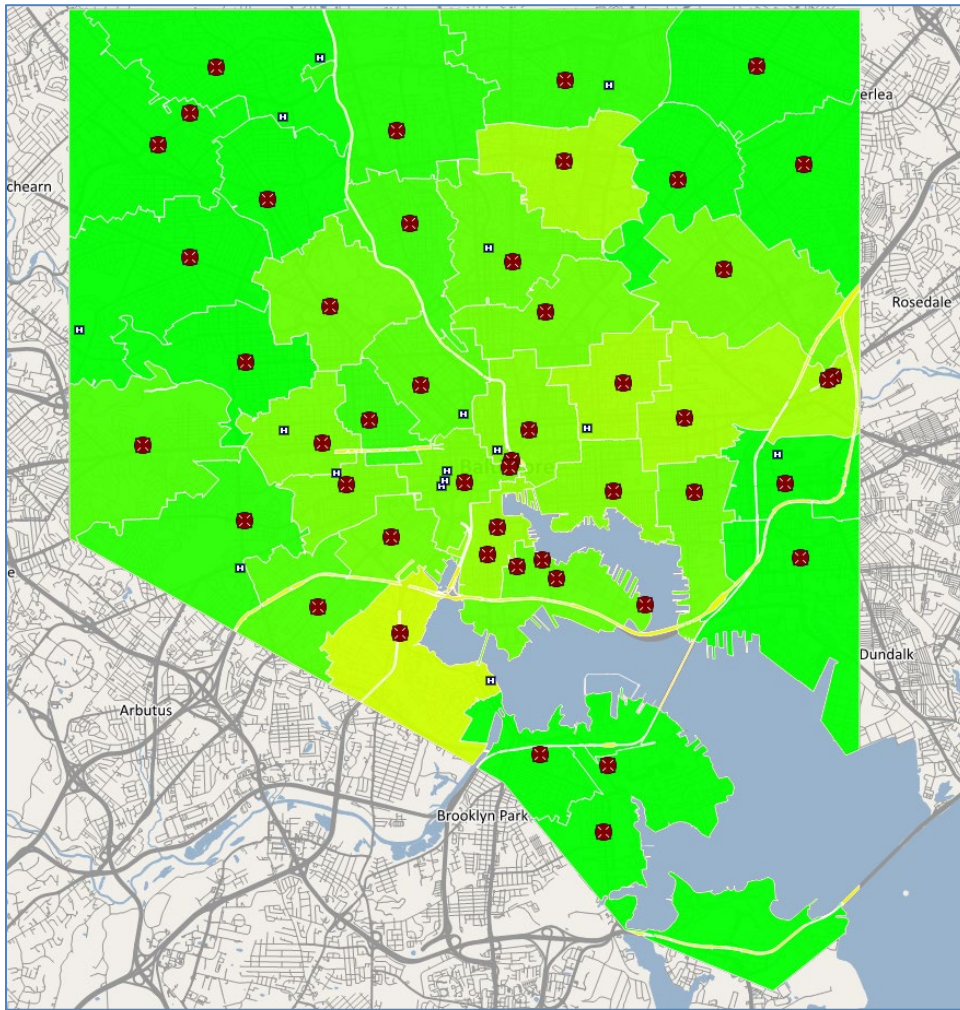
Average **Response Duration** decreased by 44 seconds and the 90th percentile **Response Duration** decreased by 1 min. 24 sec.; in addition, 3,916 additional incidents were able to have either an ALS or BLS ambulance respond on the initial dispatch.



Performance – Decreased Hospital Transfer Duration	System
Baseline: ALS or BLS Ambulance - Average	8:34
Scenario: ALS or BLS Ambulance - Average	7:50
Baseline: ALS or BLS Ambulance – 90 th Percentile	14:01
Scenario: ALS or BLS Ambulance 90 th Percentile	12:37
Baseline: ALS Arrival – 90 th Percentile (8:00)	14:18
Scenario: ALS Arrival – 90 th Percentile (8:00)	13:01

Red indicates worsened performance of 5% or greater
Green indicates improved performance of 5% or greater

These improvements accrue to the entire BCFD fire-EMS system without additional cost and with substantial benefit to both the community and BCFD personnel, as illustrated in Figure 37. The green coloration indicates improved performance and is present throughout the BCFD service area.



(Green Indicates Improved Performance)

The impact of delayed transfer times is also financial. For BCFD to achieve the same level of **Response Duration** improvement accomplished through the decrease in hospital **Transfer Time**, the City of Baltimore would have to fund between 5 and 6 additional, full-time ALS or BLS ambulances.

In these scenarios, we have focused on the addition of ALS resources based upon the percentage of incident types within BCFD that require an ALS unit assignment. *It is important to reiterate, however, that ANY combination of new ALS and BLS units added to the system is beneficial and will improve fire-EMS performance across the city, as reflected in the following tables.*

ALS and BLS Unit Increase Options	Ambulance Augmentation Scenarios			
	Baseline	6 BLS	3 ALS/3 BLS	6 ALS
All EMS Incidents	144,715	147,720	148,830	149,898
Ambulance Arrival - Average	8:31	7:49	7:48	7:48
Ambulance Arrival – 90 th Percentile (9:00)	13:59	12:38	12:32	12:32

Red indicates worsened performance of 5% or greater

Green indicates improved performance of 5% or greater

ALS and BLS Unit Increase Options	Ambulance Augmentation Scenarios			
	Baseline	6 BLS	3 ALS/3 BLS	6 ALS
ALS Response Plan Incidents	57,817	58,837	62,297	65,439
ALS Unit Arrival - Average	8:49	8:20	8:12	8:02
ALS Unit Arrival – 90 th Percentile (9:00)	14:18	13:13	13:05	12:50

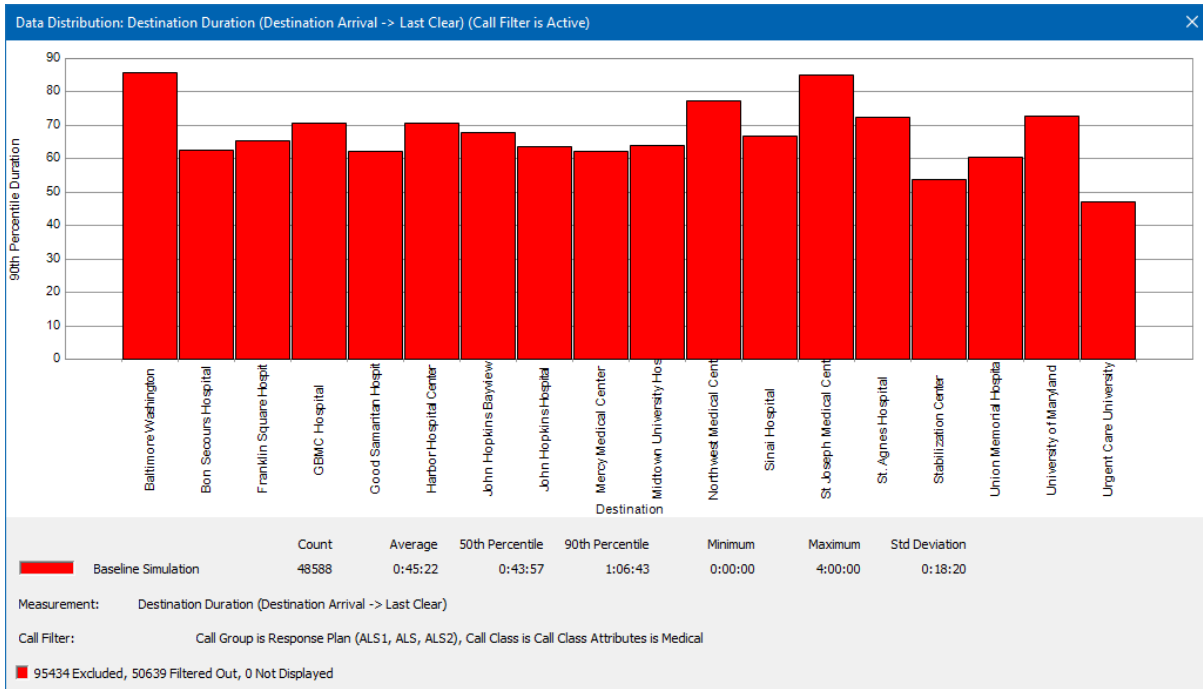
Red indicates worsened performance of 5% or greater

Green indicates improved performance of 5% or greater

At present, the City of Baltimore is funding the solution to internal hospital issues related to patient flow through unreasonable hospital transfer time durations. Other EMS systems have surfaced this issue with the federal CMS and an expectation of 20- to 30-minute hospital transfer durations has been deemed reasonable within many EMS systems.

It should also be noted that there is substantial variability between the **Transfer Time** performance of destination facilities based upon the historic data. Baltimore Washington Medical Center and St. Joseph Medical Center have the longest durations, with Urgent Care University and Stabilization Center having the shortest. The full distribution is illustrated in Figure 38.

Figure 38. 90th Percentile Hospital Duration Times by Facility



Optima also evaluated the impact of decreasing **Hospital Duration** by 25% and 10% within the system. As noted previously, both these scenarios created substantive improvements in performance across the system. Specifically:

- A reduction in **Hospital Duration** of 10% yields an improved system performance equivalent to adding one new ambulance to the system 24 hours a day, 7 days per week. Decreases are also noted in workload and a slight improvement in availability for response.
- A reduction in **Hospital Duration** of 25% adds three new ambulances to the system around the clock and has more substantial positive impacts on workload and availability.

Like new EMS resource additions, any movement to shorten **Hospital Duration** will result in BCFD being better positioned to respond to its substantial fire-EMS service demand, while also having positive impacts on the extraordinarily high EMS transport unit workloads within the system.

SPECIAL OPERATIONS

The term “special operations” in this context describes a range of services that are expected by the community and regularly, if not as frequently as the majority of fire suppression and EMS incidents, addressed by the BCFD. In the City of Baltimore, the BCFD is the primary response agency to special operations incidents, including hazardous materials emergencies, water rescues, and technical (i.e., structural collapse, confined space, trench collapse, and rope/high-angle) rescues.

By their very nature, these incidents are low-frequency, high-risk events and responding units must have highly trained/certified personnel and specialized equipment for safe and successful resolution. It is estimated that BCFD responds to approximately 1,000 such incidents annually; with hazardous materials, structural collapses, and water/dive rescues comprising the largest cohorts.

During the study period we noted a number of high-profile special operations incidents in the city, including the tragic gas explosion on Labyrinth Road and the rooftop explosion and rope rescues at the BG&E building downtown. These were in addition to multiple water rescues and other hazardous materials emergencies of various types.



materials emergencies of various types.

While local jurisdictions use a wide range of models for addressing these specialized incidents, for a city the size and complexity of Baltimore—with a mix of industries, transportation corridors, and a busy port complex—building and maintaining a robust special operations capability is essential and incorporated in the NFPA 1710 Standard.

Maintaining this capability at the required

level is expensive and difficult to sustain with the usual movement of personnel through an organization the size of the BCFD. The BCFD’s special operations command deploys a marine unit, hazardous materials team, dive rescue team, and technical rescue team; using a mix of dedicated and cross-staffed (with engine and ladder companies) personnel.

Given BCFD’s chronic resource constraints and ongoing fiscal stress, it seems likely the department’s special operations capabilities require some reinvestment in terms of staffing, training, and equipment.

PLANNING

Planning in this context describes a range of functions, often performed at the upper levels of the BCFD, to maintain organizational alignment with the external operating environment.

The BCFD has published a 2016-2021 strategic plan and kept that plan updated through a regular review process led by the fire chief.

The BCFD's latest strategic plan identifies many of the issues reflected in FACETS' comprehensive operational and management assessment.

BCFD leadership deserves commendation for developing such an in-depth plan; FACETS believes that if the department had been provided sufficient resources to execute the initiatives described through its own strategic planning process, then many of the items identified in this report would have been addressed over the past several years.

It is important to note that funding and executing many of the activities specified in the BCFD strategic plan requires coordinated action with other stakeholders and city agencies, many of whom are also experiencing resource constraints at various levels.



LOGISTICS

Logistics describes a range of support functions required to sustain 24x7x365 emergency response and recovery operations.

FLEET

The BCFD operates a diverse fleet with more than 350 vehicles of all types; ranging from standard passenger sedans to highly specialized fire and rescue apparatus, including: fire engines, ladder trucks, ambulances, fire-rescue boats, an aerial tower apparatus, and air-light (“Airflex”) vehicles. On a daily basis, the BCFD’s front-line operational units require almost 100 vehicles deployed city-wide.

As described previously in this report, the BCFD is one of the busiest fire-EMS agencies in the U.S. This sustained level of activity, under all conditions and at all times, places severe demands on the fire department’s vehicle fleet. While contemporary fire apparatus and ambulances are designed and built according to robust national standards, the level of physical punishment they receive during “normal” operating conditions in Baltimore neighborhoods would be considered “extreme” for many other fire-rescue departments.



All BCFD vehicles are owned and maintained by the City’s Department of General Services (DGS). The BCFD has a few people who facilitate the interactions between DGS and BCFD operational personnel, occasionally performing very minor repairs.

Additional dedicated BCFD logistics staff would likely be able to improve uptime for operational units by addressing the large volume of minor vehicle/equipment

issues occurring 24x7x365, without requiring front-line companies to go out-of-service and compromising neighborhood fire-EMS coverage while repairs are completed.

From direct observation and interviews with operational personnel, front-line BCFD vehicles are in good condition and members reported a noticeable improvement in the status of the overall fleet during the past several years. At the same time, the reserve fleet—including heavy apparatus that are

used every day to replace front-line vehicles that are out of service for maintenance and repair—is extremely limited and in relatively poor condition.

Cities configure their vehicle fleet operations in any number of ways. While the central/enterprise service model makes good sense for general purpose and pool vehicles (i.e., sedans and other vehicles used for basic transportation), the specialized nature of fire and EMS vehicle fleets often leads local governments to establish dedicated repair and maintenance capabilities for heavy fire apparatus, ambulances, and other specialized vehicles. These dedicated facilities are often staffed with mechanics who have received highly technical and focused training on the systems unique to fire apparatus and are certified as Emergency Vehicle Technicians (EVTs).

Given the impending relocation/co-location of several BCFD support facilities, this might be an opportune time for the City of Baltimore to consider the relative costs and benefits of different models for ensuring the 24x7x365 readiness of the specialized fire-EMS fleet.

Grants and a master lease program have been used successfully over the past five years to start renewing the apparatus inventory; reducing overall fleet age, improving uptime, and reducing repair costs by replacing aging apparatus. In 2020, DGS added three new ladder trucks and one new engine to the BCFD fleet.

On a related note, the development and sustained/reliable funding of a realistic capital replacement plan



for the BCFD fleet seems to be an immediate opportunity. Even with the obvious limitations of the current fiscal environment, even a minimally funded plan could help streamline procurement and deployment for specialized fire apparatus that require a lengthy specification, design, and custom-build process.

FACILITIES

BCFD operates from more than 40 facilities of all types, ranging from 38 neighborhood fire-EMS stations to fire and EMS training structures. All of these buildings are owned and maintained by the DGS, with BCFD essentially the tenant. The Department of Planning also has a role in BCFD's physical infrastructure, with responsibility for prioritizing the overall capital facilities budget in coordination with DGS and BCFD.

As part of this study, FACETS team members (including a licensed architect with significant experience designing, building, and maintaining fire-EMS stations) conducted visual assessments of every BCFD facility for compliance with applicable provisions of the NFPA 1500—Standard on Fire Department Occupational Safety, Health, and Wellness Program (2021 edition). It is important to note that this superficial assessment was not, nor was it intended to be, a comprehensive architectural and engineering evaluation of BCFD facilities.

The physical condition of BCFD fire-EMS stations varies widely. As might be expected, newer facilities tend to be in better condition than older ones, except where extensive renovations have occurred during the overall lifecycle; the oldest, Station 14, opened in 1888 (132 years old) and the newest, Station 26, opened in 2003. There are 5 stations from the late 1800s, 17 stations from 1900 to the late 1930s, 11 stations from 1950 to 1980, 3 stations from 1980 to 1999, and the two most

recent stations were built in 2000 and 2003.

As a general observation, BCFD personnel take great pride in their fire-EMS stations and have done a fantastic job maintaining them, with limited outside assistance or resources. They were all kept clean and tidy; no evidence of rodent or insect infestation was observed during our visits.



It should be acknowledged that although there are no codes, or guides, for the functional life of a fire station, the generally accepted longevity goal is an approximately 50-year facility life. It is also generally assumed that renovations and remodeling will occur at periodic intervals so new trends in health, safety, and apparatus design can be applied to the fire station, thus extending its functional

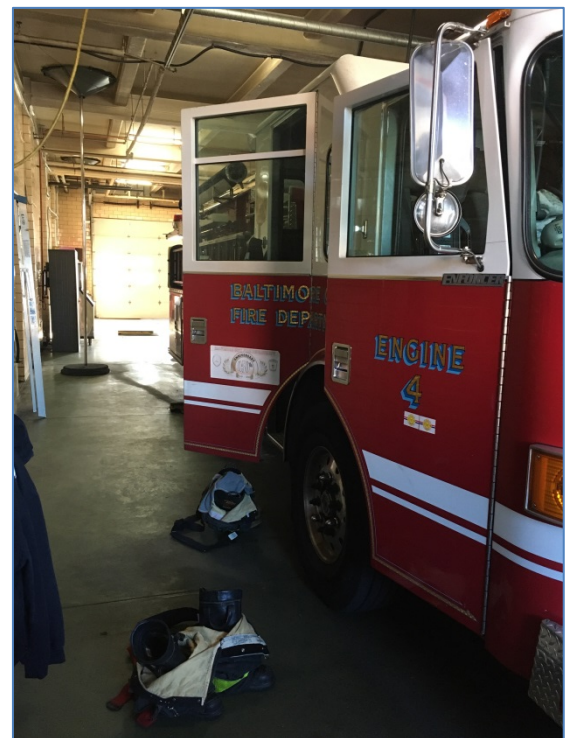
life. It was apparent that, while changes have been made to several BCFD fire-EMS stations, most are as originally designed and constructed with only minor remodeling; primarily improvements to kitchens, restrooms, and to isolate circular stairs at 2nd floor landings. Stations in the 50 to 100-year-old range are virtually impossible to modify or significantly improve and can rarely be changed to meet relevant NFPA standards, the Americans with Disabilities Act (ADA), or current life safety codes without expensive renovations or complete replacement.

In summary, substantial capital improvements are needed to address health and safety deficiencies in many BCFD facilities. From discussions with BCFD staff and stakeholders, these deficiencies are largely understood and concerted efforts are underway to remedy these conditions, with an immediate focus on gender neutral dormitory and bathroom/shower facilities in existing fire-EMS stations. In 2020, DGS and BCFD completed renovations to one fire-EMS station and designed plans for renovating three additional stations. As anyone who has renovated an old house is aware, however, rejuvenating a historic structure is usually a complex, time consuming, and extremely costly proposition. Compounding these issues for fire-rescue facilities is the need to maintain equitable response time coverage on a 24x7x365 basis during renovation.

The BCFD, DGS, BBMR, and the Department of Planning should coordinate to perform a comprehensive A&E study of neighborhood fire-EMS stations to develop 5-, 10-, and 15-year capital facilities improvement plans. Again recognizing the current fiscal challenges and the magnitude of the required investments, having complete plans might allow the city to take advantage of future development opportunities and potential public-private partnerships.

In that vein, BCFD is exploring opportunities for consolidating and co-locating some of its support functions with other city agencies at the former Baltimore Sun building, including: logistics, EMS administration and training, community education and special events, the safety office, and 9-1-1 emergency communications and fire communications centers.

Detailed results from our facilities health and safety assessment are located in the Appendix to this report.



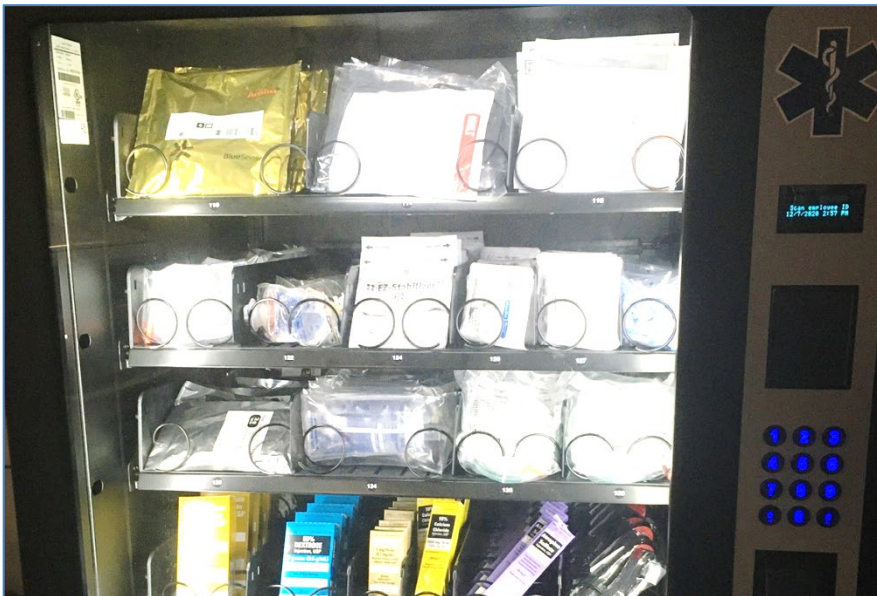
EQUIPMENT

The safe and effective performance of firefighting and EMS work requires specialized tools and equipment of all types; ranging from automated external defibrillators (AEDs), to fire hose and nozzles, medical supplies, self-contained breathing apparatus (SCBA), and everything in-between.

Interviews with field personnel confirmed our observations that front-line BCFD response units are properly equipped according to applicable national standards and members' personal protective equipment (PPE), including structural firefighter protective clothing (SFPC) and SCBA, is generally kept in good repair.

One opportunity for enhancement in this area is the fitting and procurement of SFPC specifically designed for women, since this type of PPE has continued to evolve and is now more readily available on the market.

BCFD EMS providers report the department has made great strides recently in providing new patient care equipment, such as the Lucas automated CPR-assist devices that are being readied for deployment on field response units, and medication vending machines to help restock critical supplies



in fire-EMS stations. BCFD leadership is planning additional EMS equipment purchases, such as power-operated stretchers, that will improve both provider safety and patient outcomes.

Several vital items of EMS equipment are in need of replacement, including the BCFD's cardiac monitors/defibrillators.

BCFD Logistics staff perform research and development on new equipment, often in conjunction with the training academies, to help test potential new items before they are procured at-scale and deployed in the field; a comprehensive, automated inventory management system is also in the works. BCFD Logistics has also been managing the city's COVID-19 central distribution warehouse to distribute critical cleaning supplies and PPE across all city agencies.

While BCFD Logistics does an incredible job with its limited staff and funding, additional resources would help bring projects to completion sooner, increase uptime for front-line response units waiting on critical supplies or equipment repairs, reduce out-of-service time during the switch from first-line to reserve apparatus, and allow BCFD to perform additional R&D, potentially identifying efficiencies that might accrue from updated equipment or processes.

TRAINING

Structural firefighting in the 21st Century remains a dangerous and complex endeavor. Research from the National Institute of Standards and Technology (NIST), Underwriters Laboratories (UL), and other organizations reinforces what many firefighters have experienced: building fires are burning hotter and faster than ever before, as synthetic materials and building products have replaced natural products over the past decades. Based on these findings, fire departments around the globe are changing their longstanding tactics for structural firefighting, even as their ancillary missions continue to expand in scope and complexity.

Pre-hospital medicine is also an extremely complicated endeavor; the expected standard of care has continually changed over the past decades, as evidence-based medicine has informed EMS agencies' scope of practice.

The continual advancement of knowledge in the BCFD's core mission areas requires a commensurate commitment in training and education to ensure the latest tactics, techniques, and procedures are employed during emergency incident responses across the City of Baltimore.

The BCFD operates two primary training facilities; a fire academy with associated indoor/outdoor training props, and an EMS training academy geared toward clinical training.

The BCFD burn building is relatively new, although the balance of the fire training academy complex has experienced deferred maintenance, as with every other BCFD facility.



Full-time fire academy staffing includes a director, one captain, two lieutenants, one instructor supervisor, and six instructors. During recruit training schools and special training initiatives, additional adjunct instructors are detailed to the training academies or teach on their scheduled days off.

Full-time EMS academy staffing includes two battalion chiefs, three captains, five lieutenants, four paramedic instructors, one population health paramedic, and five non-uniformed administrative positions.

A reported 18-20 percent pay disparity between personnel at the same rank assigned to operational shift work positions, versus daywork support positions, was frequently identified as a problem for maintaining the proper staff complement at the training academies.

Initial training for new EMT/Firefighters is conducted according to relevant state regulations and national standards. The BCFD would benefit from a consistent plan to fund two academy classes per year, with 40-50 EMT/Firefighter cadets per class. The current episodic hiring model makes it difficult for the fire academy to maintain an experienced instructor cadre. This issue relates directly to broader



issues around the overall BCFD operating budget, position counts, overtime usage, double filling positions, etc.

Over the years, BCFD has identified and accomplished a number of initiatives providing advanced technical training and professional development. Additional investment is needed to sustain these initiatives and ensure their availability to all BCFD personnel.

BCFD labor and management should be commended for their support of employees' independent educational efforts, with incentives for higher education memorialized in existing contracts. It seems clear from our interactions with BCFD personnel that employees are taking advantage of this program, which can be expected to yield positive benefits to the department for years to come.

The high workload placed on BCFD's EMS providers has precluded opportunities for additional training beyond that required for maintaining state/national certifications. As new equipment, protocols, and medications are rolled-out, it would be helpful to provide additional opportunities for

EMS providers to develop familiarity before having to use these items in patient care settings. Again, this issue relates directly to the lack of capacity in the overall EMS system, since BCFD's limited resources are consistently prioritized for maintaining core fire-EMS coverage across the city.

A dedicated field training officer (FTO) program to help onboard new EMS providers during their initial months on front-line medic units would likely prove beneficial for recruitment, retention, and patient outcomes.

BCFD personnel at all levels identified a willingness to seek training and experiences from outside agencies and partners, including mutual-aid departments, local universities, the National Fire Academy (NFA), and the Maryland Fire and Rescue Institute (MFRI).

SAFETY

The BCFD prioritizes organizational safety by assigning a Safety and Risk Management deputy chief who serves as part of the fire chief's command staff; a shift safety officer is also available 24x7x365 for field response to incidents. From our engagement with personnel at all ranks of the organization, it appears that operational safety is a primary concern for BCFD members.

Tragically, a BCFD safety officer was killed during an incident in 2014. The NIOSH FFFIP report (F2014-24) on that incident contained a number of key recommendations, summarized by NIOSH in the following list:



- *Fire departments should utilize a functional personal accountability system requiring a check-in and check-out procedure with the designated accountability officer or the incident commander*
- *Fire departments should ensure that the incident commander accounts for all resources before dissolving command*
- *Fire departments should train fire fighters on the principles of situational awareness*
- *Fire departments should train and empower all fire fighters to report unsafe conditions to Incident Command*

- *Fire departments should train all fire fighters and officers to report when tasks are completed or cannot be completed to their officer or the incident commander*
- *Fire departments should ensure that every fire fighter on the fire ground utilizes a Personal Alert Safety System (PASS) device including the ability to provide PASS devices for personnel operating in a potentially dangerous environment not requiring the use of self-contained breathing apparatus*
- *Fire departments should provide Battalion Chiefs and Chief Officers with a staff assistant or chief's aide to help manage information and communication*
- *Fire departments should ensure that single resource units (e.g., safety officers, fire investigators, etc.) do not function alone in IDLH [Immediately Dangerous to Life and Health] environments at emergency scenes*
- *Fire departments should ensure that dispatch centers forward all reports of suspicious or unusual events to the appropriate authorities in a timely manner*
- *Fire departments should ensure that Mayday training program(s) are developed and implemented so that they adequately prepare fire fighters to call a Mayday*



The BCFD's persistent resource constraints have limited action on some of these items, such as command aides, while other safety-related initiatives are ongoing; this includes the development of tactics for safely fighting fires in "vacant" or degraded structures, allowing the protection of adjacent/connected buildings at lower risk of firefighter death and injury. BCFD also has the opportunity to develop a routine, non-punitive after-action

review (AAR) process for significant incidents, including working structure fires.

The BCFD is working with the Baltimore Police Department to develop an active shooter response program that is compliant with NFPA 3000.

The BCFD has a regular program of PPE cleaning, maintenance, and repair; it is also providing additional turnout gear extractors and dryers to address firefighters' exposures to carcinogens and their documented risk of developing certain cancers at higher rates than the general populace. The

department is also working to provide diesel exhaust filtration and/or capture systems for all BCFD apparatus.

The BCFD's safety program includes DriveCam products in front-line vehicles. While this is a useful tool for reducing the risk of vehicle crashes under emergency and non-emergency driving conditions, it is important that the DriveCam system is utilized for its intended purpose, so field personnel can develop/maintain trust in the BCFD's overall health and safety program.

The BCFD has a robust infection control program that was tested in 2020 by the COVID-19 pandemic. Based on available information from peer departments, it appears the BCFD was less affected by COVID-19 than many other public safety organizations.

The City of Baltimore will benefit from providing additional resources to BCFD for enhancing its ongoing health, safety, and wellness programs.

Multiple studies and the experiences of peer departments suggest that safety-related investments pay immediate and long-term dividends by reducing the frequency and cost of employee injuries, illnesses, and other casualties.



ADMINISTRATION

Beyond the fact that its mission is focused on providing public service, the BCFD is also a relatively large and complicated business that requires administrative support around the clock.

FINANCE

The BCFD’s annual operating budget for FY21 is approximately \$289M. Due to the operational impacts of COVID-19 and maintaining the department’s core mission, BCFD is currently projecting an FY21 year-end deficit of approximately \$6.7M.

Table 18. BCFD FY21 Budget Summary by Program

Administration	\$ 11,139,397
Fire Suppression & Emergency Rescue	\$ 168,481,338
Emergency Management	\$ 1,608,362
Emergency Medical Services	\$ 51,579,951
Fire & Emergency Community Outreach	\$ 391,371
Fire Code Enforcement	\$ 5,800,409
Fire Investigation	\$ 784,186
Fire Facilities Maintenance & Replacement	\$ 23,877,084
Fire Communications & Dispatch	\$ 20,412,038
Fire Training & Education	\$ 5,187,873
TOTAL	\$ 289,262,009

Notwithstanding the challenges of the past year, the BCFD appears to have a persistent structural imbalance in its operating budget that seems to have existed for decades. BCFD’s annual overtime allocation has exceeded the available budget for more than 20 years; this is usually an indication that there is simply not enough money to properly resource the department’s wide range of missions for safe and effective service provision. At current service levels, without sufficient budgeted full-time positions to fill its projected daily vacancies, BCFD relies heavily on overtime to maintain minimum staffing on front-line response units.

The BCFD and BBMR have started a dialogue, through the CitiStatSMART process, around options to reduce overtime by anticipating attrition and potentially double filling positions while new recruits are trained to replace retiring incumbents. Given the nature of fire-EMS work and the need to maintain minimum staffing levels on front-line response units, as discussed repeatedly in this report, this discussion might also include the provision of additional “floater” positions to provide a built-in 24x7x365 relief factor above the BCFD’s daily minimum staffing complement.

BCFD members throughout the organization highlighted the department's ongoing success identifying and obtaining federal grants, despite the lack of a dedicated grant writing position. It seems likely that additional staff for the fiscal component, beyond the current allocation of 14 positions, could help enhance this success, as well as performance in other fiscal functions.

The BCFD also benefits from state grants to provide the marine firefighting and rescue units protecting the Port of Baltimore, currently funded at \$1.4M per year. Maryland's William H. Amoss grant program has been used in recent years to help fund needed fire apparatus replacements and facilities improvements. BCFD's successful MIH-CP programs are funded by the Maryland Hospital

Services Cost Review Commission (HSCRC) for 3 years, with the possibility of extension.



While BCFD fiscal staff members are consistently praised for their successful prompt-pay rates, the ability to conduct routine procurements was repeatedly identified as a problem by BCFD staff at all levels. At the same time, BCFD personnel recognize the staffing challenges faced by their counterparts throughout the city's procurement process.

The inability to procure goods and services in a timely fashion has, however, placed grant funds and several major purchases at risk; BCFD has expressed a willingness to work jointly with partner city agencies to streamline processes for routine items, freeing both staffs' limited bandwidth to focus on larger or novel purchases.

EMS Billing

Several ongoing efforts are targeted at increasing the BCFD's EMS collection rates for ambulance transports. In addition, the department is a national leader in efforts to collect revenue that is potentially available for delivering EMS care when ambulance transport to an emergency room is not required; with "treat and release" care or alternative destination transport provided instead.

BCFD uses a third-party vendor for EMS billing, although additional in-house support is also needed to perform related internal functions that cannot be outsourced. BCFD has implemented several programs to improve the timeliness and quality of electronic patient care reports (ePCRs) completed by EMS providers after patient contacts. These efforts appear to be helping the overall revenue

collection effort, although it is important to recognize that many of the challenges surrounding ePCR data input are likely related to the workload issues described previously in this report.

BCFD recognizes the need to balance revenue collection with the fact that many city residents lack access to primary healthcare and rely on federal programs for their medical care.

Regardless, additional potential revenues are available by continuing to improve the collection rate for ambulance transports, along with collections that are now becoming available for alternative treatments and transports.

Thanks to its proactive MIH-CP initiatives, the BCFD seems well-positioned to benefit from additional changes in federal Medicare/Medicaid reimbursement programs. For example, BCFD was selected to participate in the Centers for Medicare and Medicaid Services (CMS) emergency triage, treat, and transport (ET3) program; this voluntary, five-year innovation payment model allows greater flexibility for alternative care and destinations with allowable cost recovery from Medicare and Medicaid.



Fees

While raising fees is often considered unpalatable, particularly during times of fiscal stress, the BCFD's fire prevention fee schedule appears to have been last revised in 2011. Even a modest fee increase could help offset other revenue losses and/or be used to add additional staff, allowing improved service delivery by expediting required reviews and permits.

Other Revenue Sources

Beyond EMS billing and permitting fees, there are other potential funding sources for BCFD. Some jurisdictions assess user fees for a range of services; from auto extrications and malfunctioning fire alarms, to hazardous materials responses and even, in some cases, to structure fires.

While many fee-based models are economically sound, most local governments, especially in major cities, consider fire protection a "public good" and fund it with limited fees for actual incident responses, beyond ambulance transportation.

HUMAN RESOURCES

The BCFD human resources unit operates with only six full-time positions supporting approximately 1,700 employees. Given the size of its workforce, the 24x7x365 nature of its mission, and the complicated nature of the myriad rules, regulations, and contract requirements affecting BCFD

employees, the department would undoubtedly benefit from additional staff dedicated to the HR function.

While a full compensation and classification study is beyond the scope of this assessment, there are some salient compensation issues affecting the overall operations and management of the BCFD.

Uniformed personnel in administrative and support roles are compensated at an

estimated 18-20 percent less than their peers at the same rank(s) who are assigned to front-line operational roles. This fact has led to a chronic inability for BCFD to recruit and retain vital support staff for training, logistics, and other areas. Furthermore, the residency requirement for executive positions reporting directly to the fire chief has made it challenging to recruit and retain a diverse command staff.

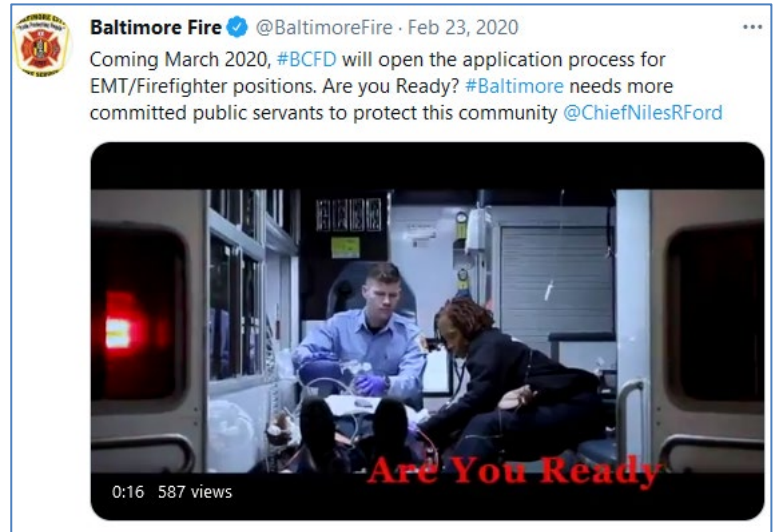
Compensation for field EMS providers, in particular, was frequently identified as out-of-step with the regional labor market, particularly given a national shortage of certified advanced life support (ALS) providers and the heavy workload of BCFD medic units compared to those operated by most other fire-EMS departments.

The BCFD has placed continued emphasis on recruiting, hiring, and retaining a diverse workforce reflecting the City of Baltimore. Efforts to recruit more women into the BCFD include Camp Sparks, a summer program aimed at young women who are Baltimore residents, and the development of a BCFD chapter of the Women in Fire organization. For several years, BCFD has incorporated community input during its entry-level hiring process by including community members on hiring panels.



BCFD also has a successful high school cadet program in concert with the Baltimore City Public Schools. This program has resulted in approximately 20 new hires since its inception, and we heard several times that additional resources toward this program would be highly beneficial for increasing BCFD's pipeline of diverse candidates who are city residents.

The BCFD's efforts to build a more diverse workforce would likely benefit from the ability to consistently recruit, hire, and train new employees; at present, however, the fire department is not able to conduct continuous hiring, in similar fashion to the Baltimore Police Department. The resulting episodic hiring processes make it difficult for BCFD to hire suitable candidates when they are available, versus asking them to wait an indeterminate amount of time until the fire department is allowed to hire for vacant positions.



BCFD leadership has empaneled an All-Hazards EMS and Fire Committee, with broad representation, to help identify strategies for unifying and cross-training the entire BCFD workforce to reflect the operational realities and competitive labor market.

On a related note, the City of Baltimore might explore the opportunity to revise civil service regulations and allow current BCFD single-role EMS providers, including EMTs, to matriculate directly into the EMT/Firefighter training pipeline without starting the entire employment process from scratch. Many peer jurisdictions also offer single-role EMS providers access to firefighter/EMT positions as a promotion or provide bonus points on the relevant civil service examination.

Recognizing the volume and intensity of the workload faced by BCFD personnel, both labor and management have identified the need for additional resources to help provide behavioral health support for employees, on- and off-duty.

BCFD leadership is currently working to make the transfer policy more transparent and enhance internal communication by relaunching the Fire Chief's Newsletter.

Labor-Management Relations

BCFD employees are represented by four different labor unions, depending on their role in the department.

Most BCFD employees, including the entire uniformed workforce except a few personnel reporting directly to the fire chief, are represented by International Association of Fire Fighters Local(s) 734 and 964; the Baltimore Fire Fighters Association and Baltimore Fire Officers Association, respectively.

During the course of our engagement, and with the encouragement of the fire chief, FACETS met with the Local 734 and 964 executive boards on several occasions to gather input and discuss preliminary findings.



Given recent changes in the executive boards of both local unions and the BCFD command staff, along with impending contract negotiations, the timing seems opportune for advancing a facilitated dialogue between labor and management.

For example: the Relationships-by-Objectives (RBO) process developed by the Federal Mediation and Conciliation Service (FMCS); or the IAFC/IAFF Labor-Management Alliance

(LMA) program.

Unit Staffing

The BCFD assigns staffing on front-line response units in accordance with applicable state regulations and NFPA standards.

For EMS units, compliance with state regulations promulgated by the Maryland Institute for Emergency Medical Services Systems (MIEMSS) requires a minimum of 2 personnel on all ambulances: one ALS provider (Nationally Registered Paramedic or EMT-Intermediate) and one BLS provider (EMT-Basic) on ALS units; and two BLS providers, usually a combination of single-role EMTs and/or EMT/Firefighters, on BLS units. To address EMS staffing challenges and the extreme workload described throughout this report, the BCFD has—for the past year—been using contracted

private ambulances to handle BLS transports, thus making more BCFD EMS units available for emergency responses.

Assigned staffing levels for BCFD fire suppression units align with the requirements found in NFPA 1710.

These staffing levels are essential for providing safe and effective firefighting and rescue services, since interior structural firefighting relies inherently on teamwork and the simultaneous accomplishment of multiple fireground tasks.



It is important to note that strict adherence to NFPA 1710 would require assigning additional firefighters to units in high-hazard areas, including high-rise districts and neighborhoods with particularly high density or the presence of special hazards. Some of Baltimore's peer departments have more firefighters assigned to engines and trucks on a routine basis; other jurisdictions dispatch additional units to box alarms and/or working fires to meet the NFPA requirements for assembling an effective firefighting force within the 9 min. 20 sec. initial alarm assignment goal. The BCFD takes the latter approach by providing five engine companies on every box alarm assignment, followed by additional units when a working fire is confirmed.

Since the 2020 edition of NFPA 1710 has increased the number of firefighters required to comprise an effective firefighting force, the BCFD might consider adding a special service unit (heavy rescue or squad) to box alarm assignments or the working fire dispatch, particularly in high-hazard zones.

Minimum Staffing

On a daily basis, the BCFD requires 286 on-duty personnel 24x7 and 306 on-duty personnel from 0900-2100 to staff its full deployment of front-line fire-EMS response units (specified previously in Table 4). Each of these 98 response units has a minimum effective staffing level that must be maintained 24 hours per day, 7 days per week, 365 days per year. If at any point in a 24-hour period a front-line unit has insufficient personnel assigned to maintain this level, then that unit is no longer operationally effective and must be placed out of service until sufficient personnel are assembled to fill all assigned roles on the unit.

As previously described in this section, firefighting and EMS work is inherently team-oriented and cannot be safely or effectively performed with any missing team members. To use an analogy from elsewhere in Baltimore, it would be akin to asking the Baltimore Ravens to take the playing field at M&T Bank Stadium with less than eleven players on the gridiron at any given time.

At the currently budgeted staffing and funding levels, BCFD depends heavily on overtime to fill minimum staffing positions on front-line response units when temporary vacancies occur due to



employees using their earned leave benefits, recovering from on-the-job injuries, attending training and education opportunities beyond the fire-EMS station, or during their terminal leave before retirement.

For some time, BCFD and BBMR have been discussing the potential opportunity to hire against anticipated vacancies and/or double fill positions where the incumbent is on terminal leave. This dialogue could be expanded to jointly identify, and fund, an

additional number of “floater” positions on each shift to give the BCFD a continuous relief factor using full-time personnel who are detailed to fill daily minimum staffing vacancies at their regular pay rates, instead of having to rely on overtime at higher rates of pay.

Work Schedules

BCFD work schedules were changed during labor union negotiations in 2013 and the current schedules took effect on January 1, 2014.

City and BCFD compliance with the current MOUs for uniformed personnel required the establishment, and ongoing management, of ten different shift schedules to maintain 24x7x365 coverage on front-line response units.

Personnel assigned to the EMS Division work a base schedule consisting of two 10-hour days, followed by two 14-hour nights, then four days off; this schedule corresponds to an average 42-hour work week.

Personnel assigned to Fire Suppression, who account for the bulk of the BCFD workforce, work a 24-hour shift schedule for two consecutive days, with a day off in-between, then a 5-day period where they are off-duty unless required to work a 24-hour “impact day(s)” on a rotating 30- and 34-day schedule. This schedule corresponds to an average 47.4 hour work week.

The operational and management challenges of coordinating multiple work schedules for BCFD personnel performing the same missions was a consistent and recurring theme in almost every interaction with both labor and management across BCFD.

2020 IAFF Local 734 BCFD Suppression Schedule																																																																																												
JAN 2020			FEB 2020			MAR 2020			APR 2020			MAY 2020			JUN 2020			JUL 2020			AUG 2020			SEP 2020			OCT 2020			NOV 2020			DEC 2020																																																											
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Compounding this issue are multiple MOU requirements that attempt to balance EMS details and overtime distribution across different cohorts of employees.

3-4 hour involuntary holdovers are reportedly commonplace as multiple employees are recalled to duty (on overtime), detailed, and otherwise shifted around to accommodate the “pecking order” specified in the contract.

With contract negotiations at-hand, the opportunity seems to exist for labor and management to collaborate on jointly developing a streamlined and sustainable set of work schedules that addresses each group’s stated dissatisfaction with the status quo ante.

Leave Benefits

Like many of its peer fire-EMS departments, the BCFD controls employees’ usage of their earned leave benefits. Uniformed personnel are allowed to take vacation leave on a defined schedule, with ad hoc planned personal leave controlled on a slot-limited basis.

When uniformed employees retire, they are entitled to a terminal leave benefit that has the net effect of leaving their assigned position(s) vacant for months. As mentioned previously, when these positions are located on front-line response units, the need for BCFD to maintain minimum staffing requires a high level of overtime use at current staffing/funding levels.

Performing EMS work, structural firefighting, and responding to incidents arising from all hazards—any time day or night—in one of the busiest fire-EMS departments in the United States, can be expected to take a toll on BCFD employees. BCFD staff report an average of 30 non-injury sick leave callouts every 24 hours.

During FACETS interviews and focus groups, concerns about proper leave usage and the return-to-work process were expressed constantly by employees at all levels of the organization. There was a

general perception that these issues are more difficult to identify and address under the current MOUs, as further complicated by multiple shift schedules and involved supervisors.

Again, given the impending process of negotiating new contracts, it appears that labor and management have the opportunity to jointly dialogue the balance between providing leave benefits that recognize employees' service, while ensuring their



appropriate use to limit broader fiscal and operational impacts.

INFORMATION TECHNOLOGY

The BCFD has demonstrated a laudable commitment to using information technology (IT) to help improve service delivery. That said, many routine functions are still conducted on paper and/or across multiple systems.

The BCFD IT unit operates with a very small but talented staff of three dedicated personnel.

BCFD is currently planning to deploy a technology-based command and control application to aid incidents commanders tasked with managing large-scale events.

The land mobile radio (LMR) system used by public safety agencies in Baltimore is state-of-the-art; maintaining this system is costly, but required for supporting daily operations. New portable radios will provide additional functionality of cell phones and tactical LMR.

As part of its population health initiatives, BCFD is evaluating the potential for participating in the Chesapeake Regional Information System for Our Patients (CRISP); a health information exchange for Maryland.

9-1-1 TELECOMMUNICATIONS AND FIRE DISPATCH

In addition to its fire-EMS dispatch and tactical communications operation, BCFD operates the city's primary public safety answering point (PSAP) for more than 1.4 million 9-1-1 emergency calls annually.

The city's legacy 9-1-1 system is being upgraded to Next Generation 9-1-1 (NG911) that will allow greatly enhanced functionality, including text-to-911 (in 100 different languages), video, photos, etc. This enhancement, while welcome, could also increase the workload of BCFD's already-strained public safety telecommunications workforce.

BCFD is looking at options to replace its existing 9-1-1 facility with a state-of-the-art emergency communications center (ECC).

A separate, comprehensive study of the city's 9-1-1 telecommunications and fire dispatch center management/operations is underway and beyond the scope of FACETS' current engagement.

SUMMARY OF RECOMMENDATIONS

- The BCFD should work with DGS and the BBMR to develop and fund a realistic five-year capital fleet replacement plan.
- The BCFD should work with DGS and the Department of Planning to develop and fund 5-, 10-, and 15-year capital facilities renovation and replacement master plans.
- The BCFD and BBMR should continue evaluating options for double filling impending vacant positions to help reduce overtime.
- The BCFD and its local unions representing uniformed employees should consider the sustainability of current contract provisions for terminal leave and sick leave.
- BBMR and BCFD management should work together to develop realistic funding levels to maintain minimum staffing on front-line response units by hiring additional (float, relief, pool) employees and/or consistently funding sufficient overtime in annual operating budgets.
- The BCFD should conduct outreach with its receiving hospitals to reduce emergency room wait times, freeing ambulances to respond to critical incidents.
- The BCFD should continue and expand its laudable initiatives around mobile integrated healthcare and community paramedicine (MIH-CP).
- The BCFD and its partner agencies should continue exploring the benefits of co-locating logistical support functions in the former Baltimore Sun building.
- The BCFD, in consultation with partner agencies and stakeholders, should update the fire prevention fee schedule that was last revised in 2011.
- BCFD labor and management should jointly consider the relative costs and benefits of maintaining multiple shift schedules, including the resultant management complexities and impacts on 24x7x365 front-line unit staffing.
- Beyond and between contract negotiations, BCFD labor and management should explore opportunities for dialogue, cooperation, and collaboration. The IAFC/IAFF Labor Management Alliance (LMA) and the FMCS Relationships-by-Objectives (RBO) process could serve as useful models.
- The BCFD and partner agencies should work together to develop realistic expectations around administrative workflows, given the BCFD shortfall in non-uniformed/uniformed administrative staff, and consider the benefits of adding overhead support staff across all lines of business.
- BCFD leadership should continue supporting the commendable efforts of the All-Hazards EMS and Fire Committee.

- The BCFD should continue its efforts to provide state-of-the-art patient care equipment and training to its very busy EMS providers.
- The BCFD should continue its commendable efforts to partner with academic institutions throughout the City of Baltimore.
- Leveraging the revenues from potential fee increases, the BCFD should consider adding fire prevention and plan review staff to improve turnaround times and customer service.
- The BCFD should continue its efforts to upgrade information technology across the department.
- The BCFD, in consultation with DGS, should consider the potential benefits of a dedicated BCFD fleet maintenance facility and staff.
- Given the complexity of the BCFD's operating environment, consideration should be given to additional staffing, training, and resources for effectively handling special operations incidents.
- Recognizing the current fiscal environment, the City of Baltimore should consider the benefits of providing sufficient resources to maintain the BCFD's ISO Class One rating.
- The BCFD should continue its efforts around cancer reduction by continuing to provide turnout gear cleaning through outside vendors and in selected fire-EMS stations.
- The BCFD should consider providing structural fire fighter protective clothing (SFPC) designed specifically for women firefighters and EMS providers.
- The BCFD should revisit any open recommendations from past NIOSH Firefighter Fatality Investigation Program reports.
- BCFD and its labor unions should continue efforts to provide additional behavioral health support for all employees.
- The BCFD and Baltimore Public Schools should explore opportunities to expand the current high school cadet program as a pipeline for city residents to pursue fire-EMS careers.
- Consideration should be given to allowing continual recruitment, hiring, and testing for EMT/Firefighter positions.
- The BCFD and BBMR should jointly plan and fund a consistent number of EMT/Firefighter recruit academies annually. These efforts are important to manage attrition and build an appropriate relief factor, given the amount of time it takes to train a new employee.
- The BCFD should consider expanding its successful mutual-aid partnerships with surrounding fire departments to include joint training and professional development, including assessing the potential advantages of CAD-to-CAD and/or automatic mutual aid with surrounding counties.

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APPENDIX

FIRE STATION SAFETY SURVEY

As part of our assessment, FACETS staff visited every existing BCFD facility to perform a safety survey based on applicable NFPA standards and best practices. This survey is confined to salient health and safety issues and does not constitute, nor should it be considered, a comprehensive architectural and engineering evaluation of BCFD fire-EMS stations or other facilities.

CAD Name	Station Address	Units	Battalion
S05	2120 EASTERN AVENUE, 21231	E5/T3/M10	BC-1
S27	4315 MANNASOTA AVENUE, 21206	E27/T26	BC-1
S41	520 S. CONKING ST., 21224	E41/BC1	BC-1
S50	1601 BROENING HWY., 21224	E50/M2/EMS1	BC-1
S51	646 N. HIGHLAND AVE., 21205	E51	BC-1
ST20	5714 EASTERN AVENUE, 21224	T20/M20	BC-1
S06	1100 HILLEN STREET, 21202	E6/T1/M7/M24/AC2/BC2/BCEMS/FIB/SO/IT/MCU/SC	BC-2
S13	405 McMECHEN ST., 21217	E13/T16/M4	BC-2
S31	3123 GREENMOUNT AVENUE, 21218	E31/M3	BC-2
S33	1223 NORTH MONTFORD AVENUE, 21213	E33	BC-2
ST5	801 E. 25TH ST, 21218	T5/EMS2/M16	BC-2
S08	1503 WEST LAFAYETTE AVE., 21217	E8/T10/BC3/M15	BC-3
S14	1908 HOLLINS STREET, 21223	E14/M21	BC-3
S30	3220 FREDERICK AVENUE, 21229	E30/T8/M12	BC-3
S36	2249 EDMONDSON AVE., 21223	E36/EMS3	BC-3
S47	2608 WASHINGTON BLVD., 21230	SQ47	BC-3
S53	608 SWANN AVENUE, 21229	E53	BC-3
S55	1229 BUSH STREET, 21230	E55/T23/M22	BC-3
S04	1201 EAST COLDSRING LANE, 21239	E4/T29	BC-4
S21	3724 ROLAND AVENUE, 21211	E21/T25	BC-4
S42	4522 HARFORD ROAD, 21214	E42/M6/BC4	BC-4
S43	1100 WALTERS AVE., 21239	E43/EMS4/M18	BC-4
S44	2 UPLAND ROAD, 21210	E44/M19	BC-4
S54	5821 BELAIR RD, 21206	SQ54/T30/M13	BC-4
S56	6512 HARFORD ROAD, 21214	E56	BC-4
S20	3130 W. NORTH AVENUE, 21216	E20/T18/M8	BC-5
S29	4312 PARK HEIGHTS AVENUE, 21215	E29/M17	BC-5
S40	3906 LIBERTY HEIGHTS AVE., 21215	SQ40/T12/M11/BC5	BC-5
S45	2700 GLEN AVENUE, 21215	E45/M14	BC-5
S46	5500 REISTERSTOWN ROAD, 21215	E46/T27/EMS5	BC-5
S52	3525 WOODBROOK AVE., 21217	E52	BC-5
S02	800 LIGHT STREET, 21230	E2	BC-6
S23	15 S. EUTAW STREET, 21201	E23/M1/M23/R1/AC1/HM1/BC6/EMS6	BC-6
S26	1001 E FORT AVE, 21230	SQ26/T6/M5/SCUBA1	BC-6
S35	430 MAUDE AVE. 21225	E35/T21/M9	BC-6
S57	4427 PENNINGTON AVENUE, 21226	E57	BC-6
S58	2425 ANNAPOLIS ROAD, 21230	E58	BC-6
SFB	2609 LEAHY STREET, 21230	FB1/RB1	BC-6

BCFD Station 5 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 5 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 5 opened in 1964 as a 2 story, 4 apparatus bay facility.



The first floor is the apparatus bays and ancillary spaces like turnout storage, the weight room, and utility spaces. The 2nd floor is the living spaces. This station has many qualities in its original construction: glazed block, Terra Cotta tile bay floors, and interior masonry partitions. The exterior is relatively low maintenance with red brick and stone trim. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Apparatus bays viewed from the front right corner



Back of bays – stair to alley and hose tower



Pole hole



Back of bays



Adjacent turnout locker room



View of public entrance from apparatus bays



Public entry and stairs to 2nd floor



Weight room in the 4th apparatus bay





2nd floor foyer at top of stairs to all spaces



Captain's dorm with office adjacent



Day room



Restroom



Showers



Bunk room and pole holes



Kitchen



Dining adjacent to kitchen

BCFD Station 27 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 27 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 27 opened in 1935 as a 2 story, one bay station.



The 2nd apparatus bay was added in the 1970s. Station 27 lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking in towards the back.



View to bay addition



Small watch room



Laundry and free weights



Day room at back of bay



Ground floor restroom



Circular stairs to 2nd floor



Kitchen and dining table



2nd floor stair landing enclosure



Landing enters directly into bunk room



2nd floor bunk room



2nd floor restroom



2nd floor restroom, shower & supply closet



2nd floor captain's office and bunk room with adjacent private restroom



Large lawn area on side of station

BCFD Station 41 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 41 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 41 opened in 1893; it is a 2 story station with 2 apparatus bays.



This station does not have the typical ornamentation common in firehouse construction in the late 19th century. The station has had the entire 2nd floor remodeled and it has been architecturally updated. The remodeling has definitely extended this station's functionality and useful life. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking in towards the back



Turnout lockers in middle of bays



Main electrical service



Circular stairs to 2nd floor



Primary stairs in middle of bays



Weightlifting at back of bays



Laundry in bays



Storage room is under 2nd floor patio



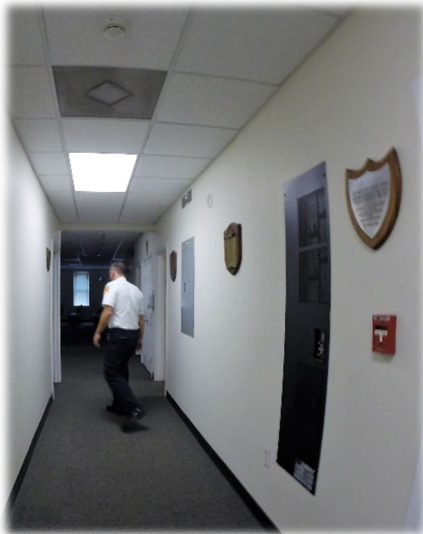
Kitchen addition at back of bays



1st floor dining table and day area



2nd floor stair landing



2nd floor main central hallway



2nd floor main restroom



2nd floor locker room



2nd floor bunk room next to restroom



2nd floor training area at end of hall



2nd floor day room



2nd floor outdoor patio and BBQ (over storage room below)



2nd floor captain's office with dorm and restroom beyond

BCFD Station 50 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 50 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 50 was opened in 1982; it is a 1 story station with 4 apparatus bays.



It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



View of bays from front to back



Public entrance is in front center of the station



Watch room is in back of bay looking forward



Turnout locker room



Public lobby



Bunk room



Day room



Captain's office and dorm



Captain's restroom



Locker & restroom corridor



Lockers are next to lavatory



Lavatory



Restroom



Shower



Medic office next to medic bay



Medic Bay



Watch room in middle area at back of bays with antique bell

BCFD Station 51 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 51 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 51 was opened in 1922; it is a 2 story station with a single apparatus bay.



Station 51 is a historic, red brick firehouse. This station features stone masonry core with arched bay door and frames the windows above. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards the back



View to front of bay



BBQ in the apparatus bay



Back of bay to kitchen



Dining table



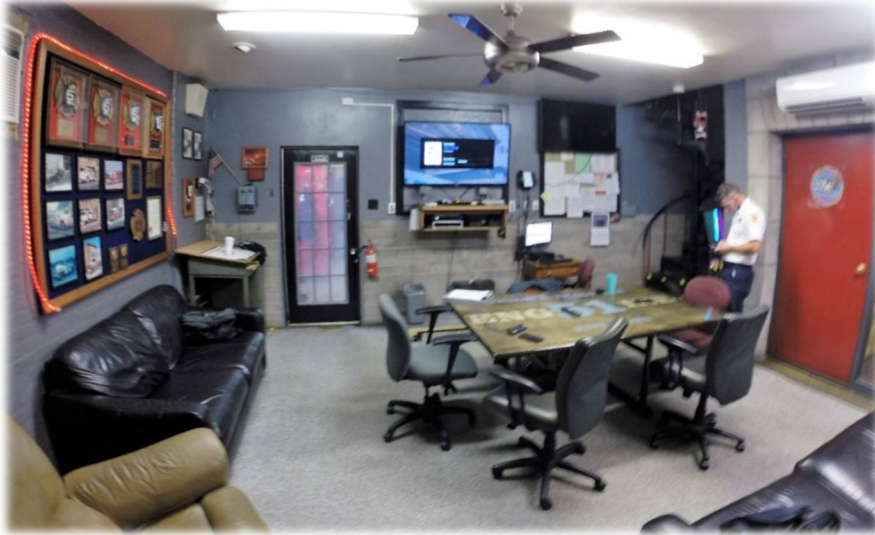
Dining and day room area at back of station



Kitchen and back door beyond



Laundry at back of kitchen



Dining and day room door to bay and circular stairs in right corner



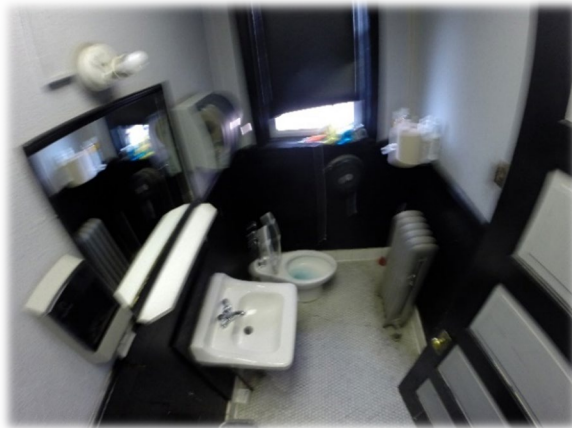
2nd floor circular stair landing



2nd floor bunk room and pole hole



2nd floor captain's dorm



Captain's private restroom



2nd floor restroom and lockers



2nd floor restroom



Attic storage space



Primary pole from bunk room



Concrete apron

BCFD Station 20T - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 20T does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 20 Truck was opened in 1961; it is a 1 story station with 4 apparatus bays.



The two middle bays are “pull-through” and the station quarters flank the two middle bays, behind the two side bays. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



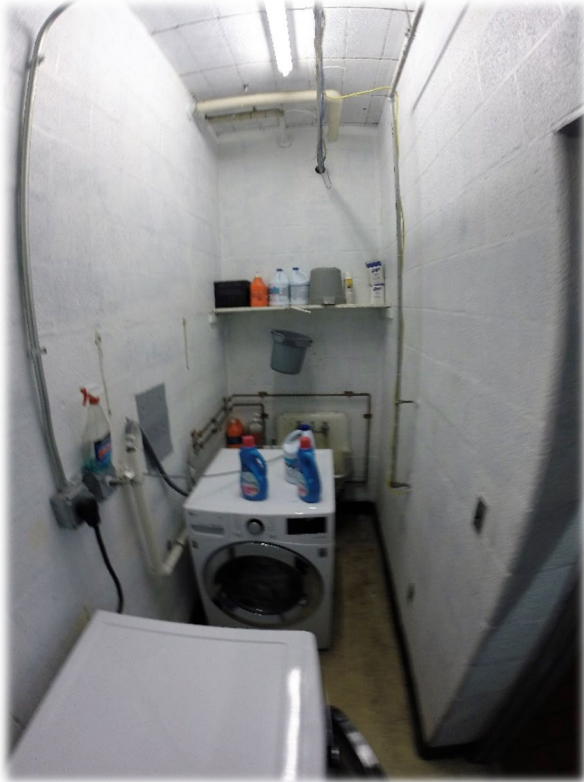
Front of bays looking towards the middle



Captain's dorm



...and restroom



Small laundry space in storage closet right off apparatus bays



Kitchen/dining and day room also have immediate access off the apparatus bays



Turnout lockers are in the apparatus bays



Staff lockers are adjacent to bays



Restrooms and showers are also accessed directly from dorms and apparatus bays



Dorms are located off the apparatus bay; the door in the back leads to the restrooms.



Medic quarters are separate from other spaces



Storage and shop space at the back of station



Watch room at front of the station



Terra cotta tile bay floor with BBQ and vending machine

BCFD Station 6 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 6 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 6 was opened in 1976; it is a 2 story station with 10 apparatus bays.



The first floor is the apparatus bays and ancillary spaces like turnout storage, the weight room, and utility spaces. The 2nd floor is the living quarters. This station also houses some BCFD IT functions and the Emergency Operations Center (EOC). The exterior is relatively low maintenance red brick. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Apparatus bays viewed from the front right corner



Back of bays



Training/hose tower



Turnouts



Restroom



Watch room

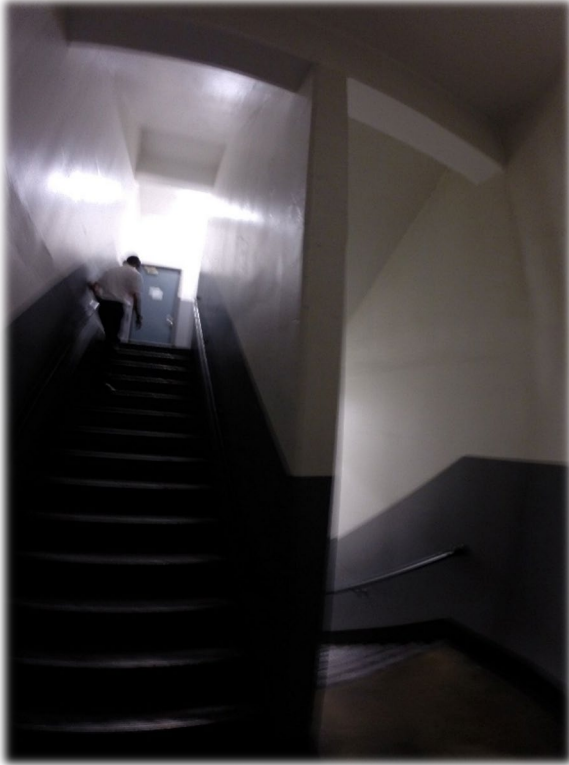


Storage for IT Division



Hallway in IT office area





Stairs to 2nd floor



2nd floor stair landing vestibule



Day room



Hallway to offices and dorms



Kitchen and dining



Bunk room



Restroom



Main hallway and pole holes



Weight room



Emergency Operations Center (EOC)



Training Room



Locker Room



Captain's office, dorm, and restroom



Back of station has secure parking lot



Electric Vehicle charging stations



Back of station

BCFD Station 13 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 13 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 13 was opened in 1963; it is a 1 story station with 4 apparatus bays.



The station quarters flank the bays. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



One bay has access from rear of station



Turnout lockers are on sides of bays



All living spaces have direct access to bays



Watch room with bunk



Captain's dorm, office, and private restroom



Day room, dining table, and kitchen beyond



Kitchen



Captain's dorm, office, and restroom



Bunk room



Locker room



Restroom



Lounge at back of bays, note the turnout lockers flanking sides of the bays



Utility room has laundry washer and dryer, several refrigerators, and the ice machine

BCFD Station 31 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 31 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 31 was opened in 1901; it is a 2 story station with a single apparatus bay.



Station 31 is a beautiful example of a historic, red brick firehouse. The BCFD has had a complete renovation of the 2nd floor living spaces and restrooms. This renovation has injected new life into this very old station keeping it a viable part of the neighborhood. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated. However, the renovation has extended its useful life well into the future.



The circular stairs are in the middle of the bay at this station. They extend up to the hose tower which is the shed space left of the stairs. Note poles adjacent on either side.



BBQ grills on bay floor near kitchen



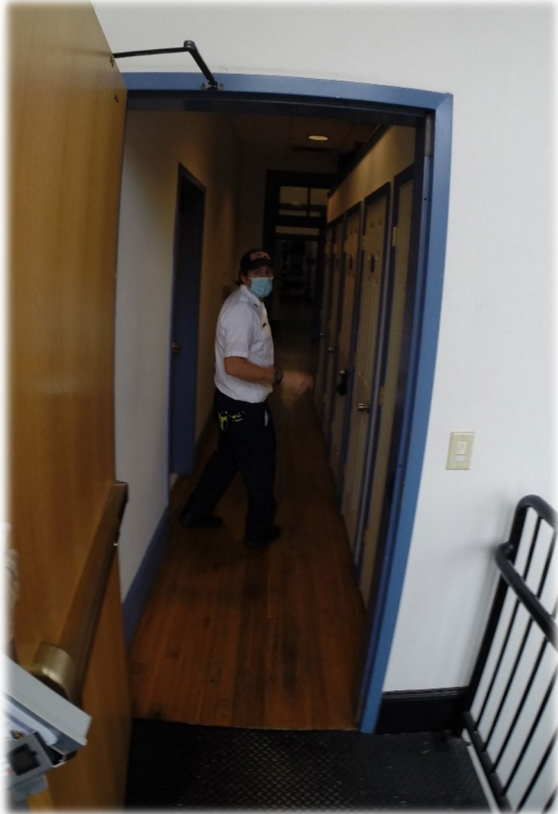
Kitchen/dining addition at back of bays



Dining and lounge area adjacent to kitchen



2nd floor stairs accessed from kitchen



Hallway access at 2nd floor landing



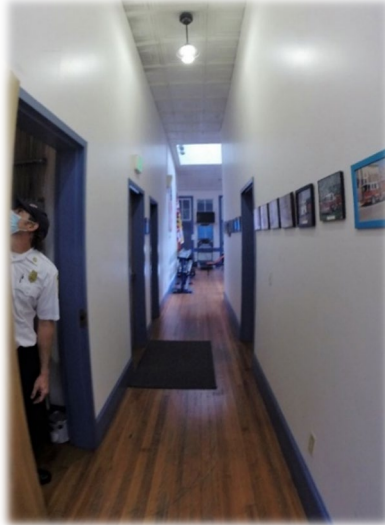
Renovated restroom



Renovated lockers reused originals. Note the remediated ceiling to remove old lead paint and add new modern LED light fixtures.



Renovated bunk room with pole access



Central hallway - bunk rooms adjacent



Captain's office



Captain's restroom



Captain's bunk room

BCFD Station 33 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 33 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 33 was opened in 1908; it is a 2 story station with a single apparatus bay.



Station 33 is a historic, red brick firehouse. The BCFD has managed to keep this iconic station viable even in today's operational and deployment model requirements. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards the back



Work bench, pole hole and BBQ



Turnout lockers are on sides and back of bay



Day room and watch station desk



Day room with kitchen area on left



Kitchen



1st Floor Stair enclosure door



2nd floor bunk room and pole hole



2nd floor captain's office



Adjacent restroom renovation



Abandoned pole hole is secured but not sealed



Basement has all utilities and a new furnace and water heater



2nd floor windows are relatively new



Coal chute has permanent roof

BCFD Station 5T (Truck) - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 5T does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 5 Truck was opened in 2000; it is a 1 story station with 4 apparatus bays.



Station 5T is BCFD's 2nd newest station. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Apparatus bays



Bunk room



Computer in closet



Watch room



Day room, dining table, and kitchen in the back



Kitchen towards day area



Restroom



Adjacent locker room



Doors to bay are directly across from the doors to the dorm rooms



Laundry niche off side of apparatus bay

BCFD Station 8 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 8 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 8 was opened in 1967; it is a 1 story station with 3 apparatus bays.



The station quarters flank the bays. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of bays looking towards the middle



Bunk room direct access from bays



Captain's quarters also have direct access



Captain's dorm adjacent to the office with private restroom and shower



Captain's dorm, office, and restroom



Back of bays with lounge and vending



Turnout lockers on sides of bays



Weight room



Day room dining table and kitchen beyond



Kitchen



Locker room

Restroom



Bunk room



Utility room also has laundry



Washer and dryer



Lounge at back of bays with turnout lockers flanking sides of the bays

BCFD Station 14 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 14 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 14 was opened in 1888; it is a 2 story station with a single apparatus bay.



Station 14 is a historic, red brick firehouse. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



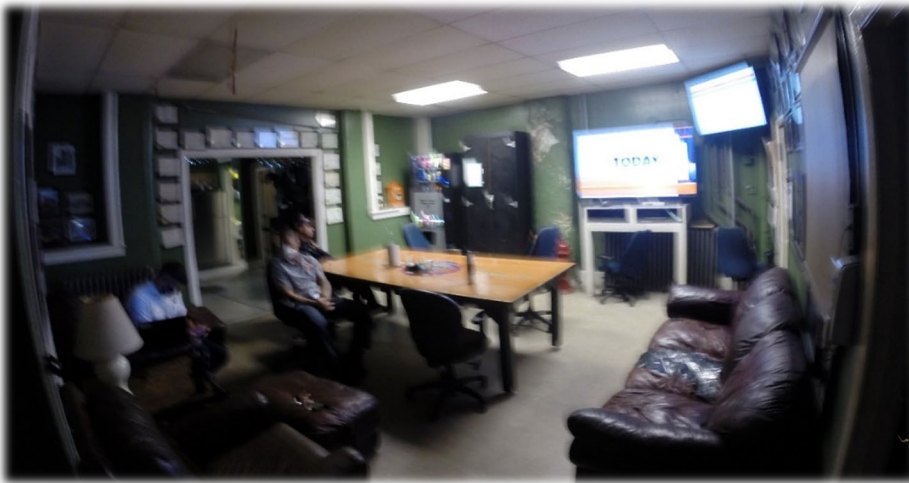
Front of apparatus bay looking towards the back



Day room door to watch room and bay beyond



Watch room



1st floor day room



1st floor kitchen



1st floor restroom



BBQ is in bay; no patio space near kitchen



2nd floor circular stair landing



2nd floor restroom



2nd Floor open dorm room



2nd floor weight room and lounge



Captain's dorm and office



Captain's dorm restroom



2nd floor laundry and locker room



2nd floor dorm pole hole with typical plywood cover

BCFD Station 30 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 30 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

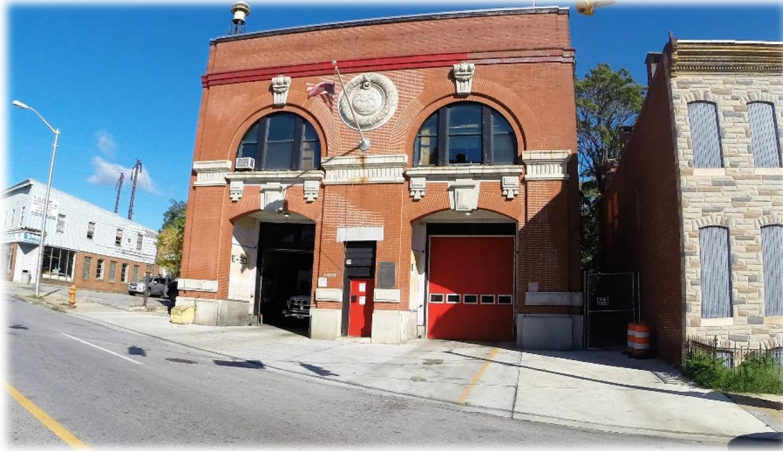
9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 30 was opened in 1907; it is a 2 story station with 2 apparatus bays.



Station 30 is an ornate, historic, red brick firehouse. This station features stone accents in the masonry with arched windows and bay doors. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards the kitchen/dining addition in back



Bay of bay laundry adjacent to side of kitchen



Back of bays looking toward front



Circular stairs are behind door in back corner of kitchen/dining addition at back of bays



Kitchen door to circular stair



Looking up through stair



2nd floor landing



Top of stairs at 2nd floor enters into restroom/lockers Toilets are adjacent to stairs



2nd floor weightlifting



2nd floor day room



2nd floor medic dorm



2nd floor captain's dorm and office



2nd floor bunk room

BCFD Station 36 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 36 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 36 was opened in 1910; it is a 2 story station with 1 apparatus bay.



Station 36 is a historic, red brick firehouse. This station was once the training academy site. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Back of apparatus bay looking towards the front



Pole hole, vending, and turnout lockers on sides



Turnout lockers on sides of bay



Kitchen and dining room behind bay on 1st floor



Watch desk in dining area



Open circular stair to 2nd floor



2nd floor stair landing



2nd floor restroom



2nd floor stair landing and hall



Captain's dorm and office



2nd floor weightlifting and lounge area



2nd floor bunk room and pole holes



2nd floor captain's office



Adjacent restroom renovation



Basement has all utilities and is used for storage



Kitchen patio and BBQ



Exterior door to basement

BCFD Station 47 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 47 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 47 was opened in 1923; it is a 2 story station with a single apparatus bay.



Station 47 is a historic, red brick firehouse. This station features stone masonry core with arched bay door and frames the windows above. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards back.



Front of bay



Turnouts are on the sides and back of the bay



Day room



Kitchen and dining



2nd floor stair landing



Circular stairs to 2nd floor



2nd floor weight room and lounge



2nd floor bunk room and pole holes



2nd floor lockers and laundry



2nd floor captain's dorm



Captain's private restroom



2nd floor restroom



Cracks in floor and wall



Captain's private restroom – floor and wall cracks



Shower floor repairs

BCFD Station 53 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 53 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 53 was opened in 1921; it is a 2 story station with 1 apparatus bay.



Station 53 is a historic, cedar shingle and stucco firehouse. This station features stone masonry core with arched bay door and frames the windows above. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards back.



Front of bay



Turnout lockers on the sides and back of the bay



Day room door from bay



Day room area at back of station



Kitchen and door to bay beyond



Circular stairs to basement



Day room and dining area with kitchen along the back wall



1st floor stair landing back of bay Stair flight up to 2nd floor 2nd floor looking down stair



2nd floor bunk room and weight lifting



2nd floor restroom



Captain's dorm, office, and private restroom

BCFD Station 55 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 55 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 55 was opened in 1923; it is a 2 story station with 2 apparatus bays.



Station 55 is another historic, red brick firehouse. This station features stone masonry that included the engraved dedication plaque. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking back



Turnout lockers in apparatus bay



View to front from back of bays



Steps to kitchen/dining



Back of bay to kitchen



Dining table



Kitchen view of door to bays and dining table



Circular stair landing at 2nd floor (back of station)





Traditional staircase at front of station



Traditional stair door to 2nd floor



Medic dorm at circular stair landing



2nd floor day room and lockers



2nd floor restroom



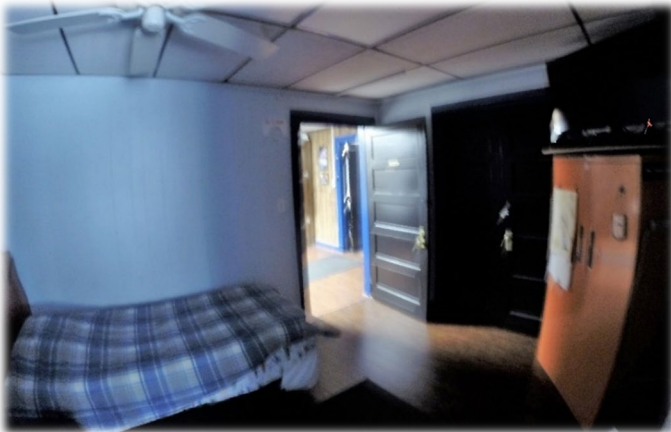
2nd floor restroom and laundry



2nd floor bunk room



Captain's office



Captain's dorm adjacent to the office



Captain's restroom adjacent to dorm



Abandoned pole hole



Pole from bunk room

BCFD Station 4 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 4 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 4 was opened in 1952; it is a 2 story station with 2 apparatus bays.



Station 4 is a traditional, red brick firehouse. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay



Apparatus bay looking front to back



Side of bay utility & storage

Side of bay utility & storage

2nd floor stair lobby



Stairs to 2nd floor

Turnout lockers

Laundry room



Restroom off bay

Restroom off bay

Pole pad and clamshell



2nd floor captain's office #1



2nd floor captain's office #2



2nd floor weight room



2nd floor restroom



2nd floor dorms



2nd floor circular stair at back of station

BCFD Station 21 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 21 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 21 opened in 1897; it is a 2 story station with 2 apparatus bays.



Station 21 is an ornate, historic, red brick firehouse. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking in towards the back



Turnout lockers flank both sides of bays



Watch room at front center of bays



Circular stairs to 2nd floor



BBQ, abandoned pole holes, and original bell



Vending machines at back of bays



Laundry tub, cooking griddle, & laundry in bays



Watch room



Kitchen addition at back of bays



1st floor kitchen and dining



1st floor kitchen and dining



1st floor day room at back of kitchen and dining (single access/egress)



2nd floor circular stair landing



2nd floor restroom



2nd floor locker room



2nd floor weightlifting area



2nd floor dorm room

BCFD Station 42 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 42 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

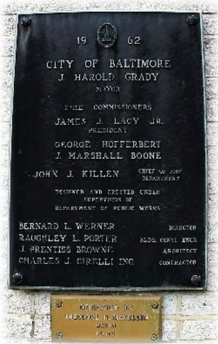
Station 42 opened in 1962; it is a 1 story station with 4 apparatus bays.



The station quarters flank the bays. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front door and public entrance



1962 dedication plaque



Front of bays looking towards the back



Front door lobby and restroom



Small bay on left of front door for medic unit



Watch room office



Bunk area for watch room



Kitchen and dining room



Turnout locker room



Captain's office and dorm



Bunk room



Locker room



Restroom



Weightlifting area at back of bunk room adjacent to bays



Day room adjacent to bunk room and direct access to bays



Utility room and shop

BCFD Station 43 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 43 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 43 was opened in 1985; it is a 1 story station with 3 apparatus bays.



It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Medic unit in small bay on right side



View of bays from front to back



Public entrance is around the corner on the right side of the station



Back of bay looking forward



Locker room



Public lobby



Laundry



Kitchen



Dining and day area adjacent kitchen



Door to bay from kitchen



All functions are accessed from bay



Dorms and offices accessed from bay



Crew bunk and lockers



Captain's bunk and office



Restroom



Shower



Turnout lockers next to bay



Utility and storage at back of bays



Supply closet



Captain's dorm and office

BCFD Station 44 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 44 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 44 opened in 1895; is it a 2 story station with 2 apparatus bays.



Station 44 is a historic, brick firehouse. Its design influenced the adjacent German-themed buildings. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking in towards the back



Turnout lockers at back of bays



Circular stair at back of bays



Bays with turnouts in middle



Original folding doors intact



Laundry in bay



Electrical panel in bay



Kitchen



Dining room



Utilities and storage in basement



2nd floor captain's office and dorm



2nd floor restroom



2nd floor bunk room



Bunk room pole hole

BCFD Station 54 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 54 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 54 opened in 1955; it is a 1 story station with 2 apparatus bays.



The station quarters flank the two middle bays. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of bays looking towards the back



Captain's dorm



...and restroom



All spaces are accessed directly from bays



Restrooms and showers are also accessed directly from dorms and apparatus bays



Dorms are located right off the apparatus bay; the door in the back corner leads to the restrooms/showers.



Kitchen and dining table



Day room in same space as kitchen and dining



Stairs down to basement weight rooms



Laundry is in basement behind weights & utilities

BCFD Station 56 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 56 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

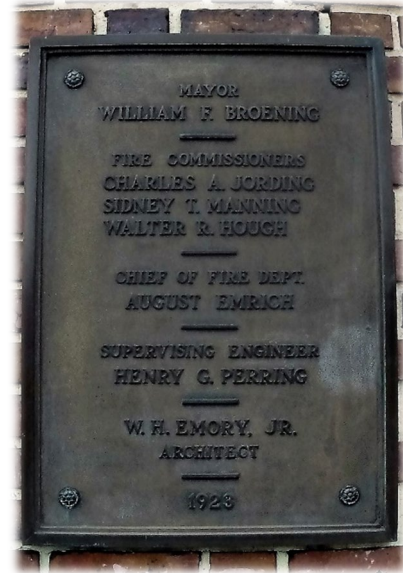
9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 56 opened in 1923; it is a 2 story station with a single apparatus bay.



Station 56 is a historic, red brick firehouse. This station features stone masonry core with very detailed fenestration. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards back.



Front of bay



Turnouts are on the sides and back of the bay



Day room



Kitchen



2nd floor stair landing



Circular stairs to 2nd floor



2nd floor weight room and bunks



2nd floor bunk room and pole holes



2nd floor lockers



2nd floor captain's dorm



Captain's private restroom



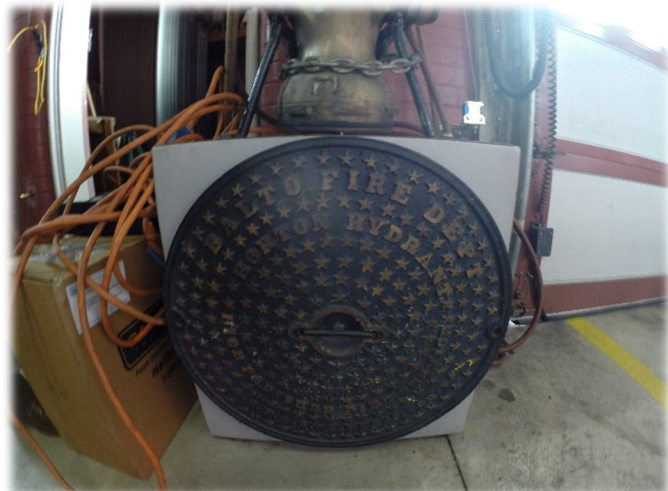
2nd floor restroom



Shower



Antique brass "street" hydrant...



and associated brass manhole cover

BCFD Station 20 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 20 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

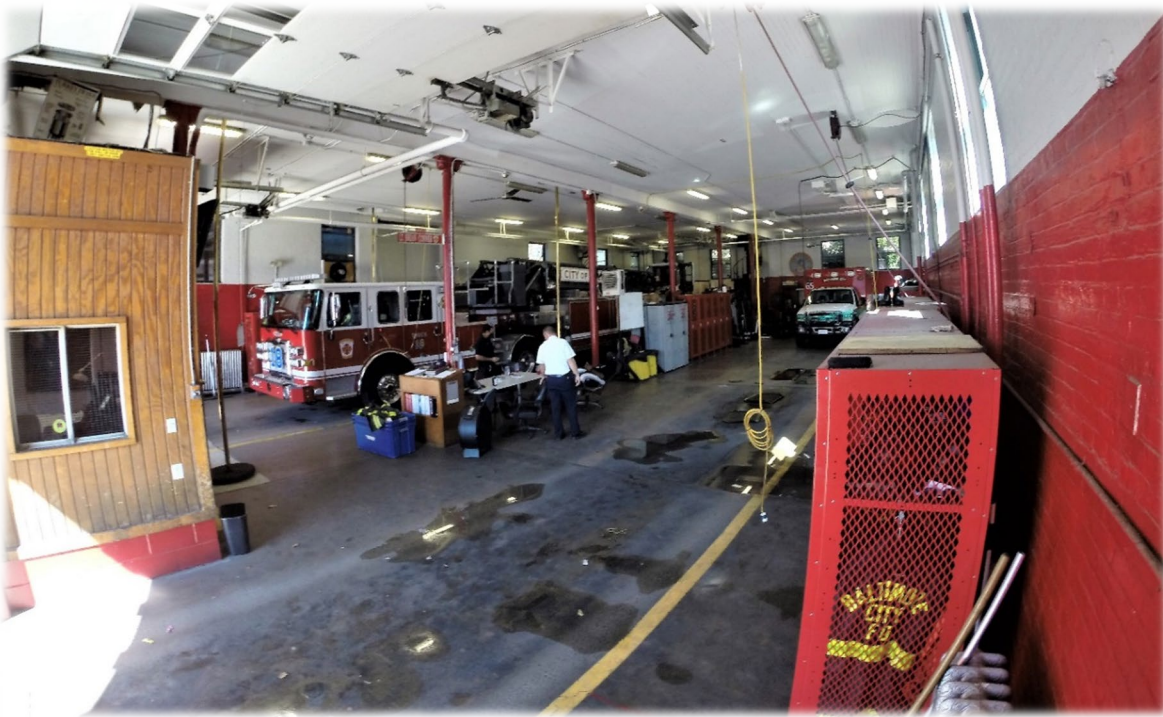
A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 20 opened in 1896; it is a 2 story station with 2 apparatus bays.



Station 20 is a historic, red brick firehouse. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards the back



Turnout lockers flank both sides of bays



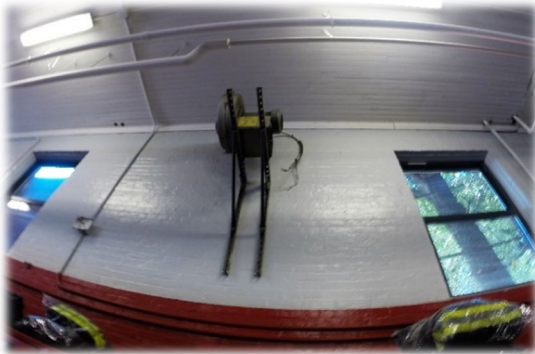
Toilet room at back of Station



Circular stairs to 2nd floor spaces



BBQ to the left of medic unit



Disconnected Plymovent exhaust fan



Top of circular stairs



2nd floor locker room



2nd floor bunk room



2nd floor kitchen & dining



2nd floor weightlifting area



2nd floor restroom and laundry

BCFD Station 29 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 29 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 29 opened in 1907; it is a 2 story station with 2 apparatus bays.



Station 29 is an ornate, historic, red brick firehouse. This station features incredible stone masonry that is highly detailed. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards the back with watch room in middle



Turnout lockers flank both sides of bays



Laundry area at back of bays



Circular stairs to 2nd floor spaces.



Weight room



Top of stairs at 2nd floor



2nd floor day room



2nd floor weightlifting



2nd floor bunk room and pole holes



2nd floor captain's office and dorm

BCFD Station 40 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 40 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 40 opened in 2000; it is a 1 story station with 4 apparatus bays.



Station 40 is BCFD's 3rd newest station. It should be considered for renovations so that it can meet current NFPA and ADA requirements. It lacks a complete fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Public entrance is at middle bay



Front looking into bays



Watch room



Public restroom



Kitchen and dining room



Kitchen



Doors to kitchen from bay



All functions are accessed from bay



Dorms and offices accessed from bay



Crew bunk and lockers



Captain's bunk and office



Captain's restroom



Shower



Crew entrance



Utility and storage at back of bays



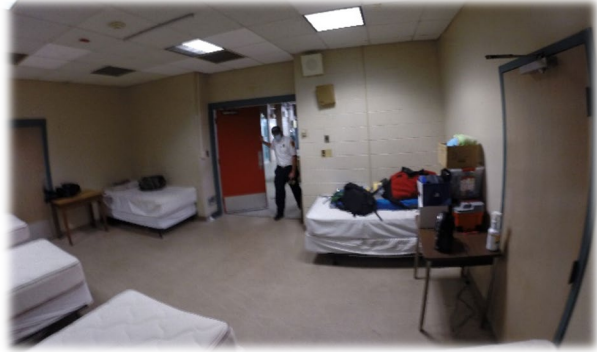
Supply closet



Mop closet



Former bunk room now weightlifting



Bunk room adjacent to bays



Locker room is adjacent to...



the lavatory and laundry room



Restroom



Day room



Turnout lockers in bay



Shop space with electrical equipment



Medic quarters



Public art wall



Secure staff parking lot behind station

BCFD Station 45 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 45 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 45 opened in 1951; it is a 2 story station with 2 apparatus bays.



It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated. One obvious structural condition was noted (below).



Water line leaked causing moisture to rust rebar reinforcing in slab and beam. Rust caused metal to swell spalling concrete surrounding rebar. Vehicle traffic above caused vibration in slab and beam causing additional cracking and spalling to the point of beam failure.



Watch room – not originally constructed



Front of bay looking west



Turnout storage adjacent to bay



Pole hole with typical plywood "lid"



Lower stair landing



Upper stair landing



Captain's dorm



2nd floor common area



2nd floor dorms



2nd floor weight training



2nd floor day room



2nd floor dining room



2nd floor kitchen



2nd floor roof deck BBQ patio



2nd floor restroom



Laundry next to shower

BCFD Station 46 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 46 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 46 opened in 1982; it is a 1 story station with 4 apparatus bays.



It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Medic unit is in small bay on right side



View of bays from front to back



Public entrance is in front center of the station



Watch room in back of bay looking forward



Turnout locker room



Public lobby



Kitchen and dining room



Day room



Captain's office and dorm



Captain's restroom



Locker & restroom corridor



Lockers are next to lavatory



Restroom facilities



Restroom



Shower



Medic office



Medic restroom



Weight room in basement with utilities

BCFD Station 52 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 52 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 52 opened in 1921; it is a 2 story station with a single apparatus bay.



Station 52 is a historic, red brick firehouse. This station features stone masonry core with arched bay door and frames the windows above. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards back.



Front of bay



Turnouts are on the sides and back of the bay



Day room door from bay



Day room area at back of station



Kitchen and back door beyond



Circular stairs to 2nd floor



2nd floor bunk room with captain's dorms at the back



2nd floor weight training area and lounge



2nd floor bunk room and pole hole



2nd floor captain's dorm



Captain's private restroom



2nd floor restroom and lockers



2nd floor restroom



Circular stairs to 2nd floor

BCFD Station 2 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 2 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 2 opened in 1920; it is a 2 story station with 1 apparatus bay.



Station 2 is a beautiful example of a historic, red brick firehouse. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Day space at back of bay



2nd floor weight room



Typical group dorm room



2nd floor restroom



2nd floor toilet and lavatory



2nd floor shower



Dining & day room looking towards bay



Dining & day looking towards kitchen



Kitchen looking to back toilet and laundry



Kitchen looking to dining and day room



Day room looking into kitchen



Captain's dorm

BCFD Station 23 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 23 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 23 opened in 1973; it is a 2 story station with 11 apparatus bays.



Station 23 is a very large downtown station on the corner with the historic Bromo Seltzer Tower. The entire ground floor is all apparatus bays and some support spaces with turnout storage, air compressor, and utility closets. There is also a watch room and public restroom at the front main entrance. All the station living spaces and offices are on the 2nd floor. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated. Staff parking is also a challenge at this facility.



South facing bays



West facing bays



Turnout locker room



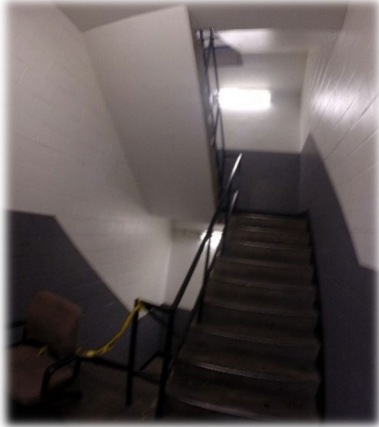
Utility and cleaning



Watch room at intersection of bays



Ice machines and storage rooms in bay



Single stair to 2nd floor



Main 2nd floor lobby



Typical office



Typical dorm



Kitchen



Day room and dining beyond



Weight room



Captain or chief's office with adjacent dorm and restroom



Typical captain or chief's dorm



Adjacent restroom



Training room

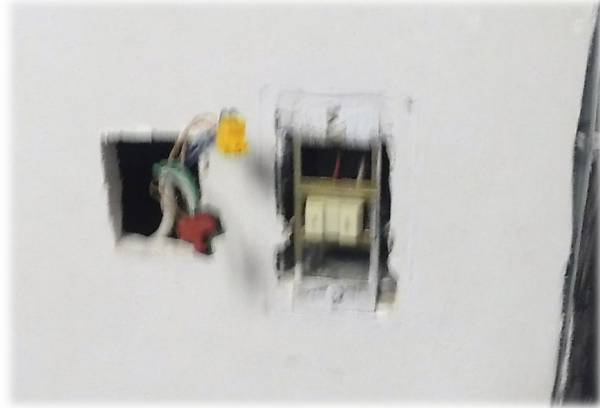


Locker room



Group restroom





Unfinished repairs to plumbing and electrical



Main utility equipment and primary electrical service in basement

BCFD Station 26 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 26 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 26 was opened in 2003; it is a 1 story station with 4 apparatus bays.



Station 26 is BCFD's newest station. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Apparatus bays



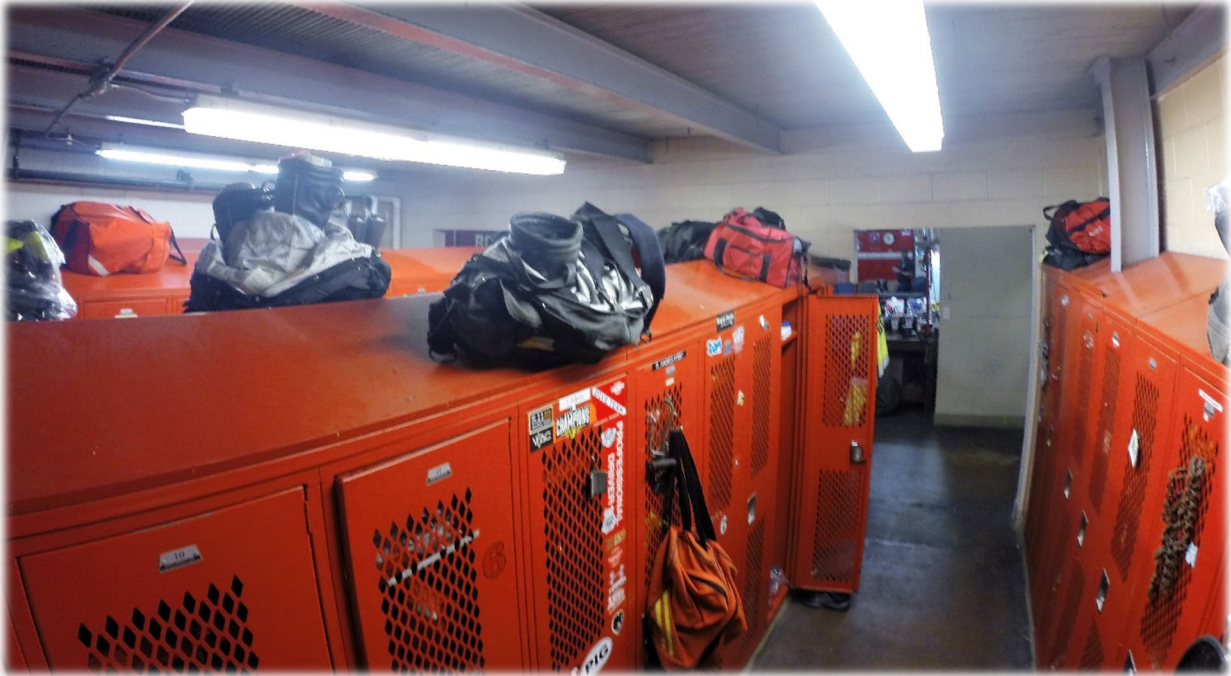
Front of bays



Back of bays



Bay structure is conventional metal building steel frame



Turnouts are adjacent to apparatus bays



Hallways wrap the apparatus bays and provide access to all living quarters without directly going into bays.



Living space access directly across from bay Double doors to apparatus bays



Bunk room access doors are directly across from bay access doors as shown above



Group restroom



Locker room is adjacent to the restrooms



Weight room



Day room to the left, dining table in the middle, with kitchen on the right. Note door to BBQ and side patio.



Hallway access open to front public entrance Public restroom in front entrance lobby



Watch room

BCFD Station 35 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 35 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 35 opened in 1951; it is a 1 story station with 4 apparatus bays.



The two middle bays are “pull-through” and the station quarters flank the two middle bays, behind the two side bays. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of bays looking towards the back



Captain's dorm



...and restroom



All spaces are accessed directly from bays without doors or seals



Operable clerestory windows



Watch room front middle of bays



Turnout lockers are in apparatus bays



Staff lockers are adjacent restroom & bays



Restrooms and showers are also accessed directly from dorms and apparatus bays





Dorms are located right off the apparatus bay, the door in the back corner leads to the restrooms/showers.



Day room, dining tables in the middle, and kitchen along back wall



Stairs down to basement weight rooms



Weight room



Laundry and back day room



Back of Station 35

BCFD Station 57 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 57 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

Station 57 opened in 1923; it is a 2 story station with a single apparatus bay.



Station 57 is a historic, red brick firehouse. This station features stone masonry core with very detailed fenestration. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Front of apparatus bay looking towards back

Back of bay



Watch station & day room at back of the bay



Kitchen



Day room



Back of kitchen



2nd floor stair landing is open



Circular stairs to 2nd floor



2nd floor restroom



2nd floor bunk room & pole hole



2nd floor lockers



Basement laundry and utilities

BCFD Station 58 - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *All stations need to seal doors and/or windows, as well as pole-holes in 2-story stations, to the apparatus bays. All stations have had some form of partition or wall built around upper stair landings, however there were no HVAC systems to ventilate or exhaust these areas and door hardware did not have sweeps or seals.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Station 58 does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions: *All stations have direct source capture diesel exhaust extraction systems installed. However, none of these systems are useable. Systems have not been maintained.*

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays: *Diesel exhaust removal system (Plymovent) in place, but not functional.*

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *Yes.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety:

Pole hole “covers” are present but are not airtight. Pads exist and are in fair condition.

BCFD Fire Station 58 opened in 1923; it is a 2 story station with 1 apparatus bay.



Station 58 is a beautiful example of a historic, red brick firehouse. The BCFD has had a complete renovation of the entire interior of the station, on both floors. This renovation has injected new life into this very old station keeping it a viable part of the neighborhood. It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated. However, the renovation has extended its useful life well into the future.



The apparatus bay has had all lead paint remediated, been freshly painted and had a suspended ceiling and ventilation system installed.



Dining table and lounge area



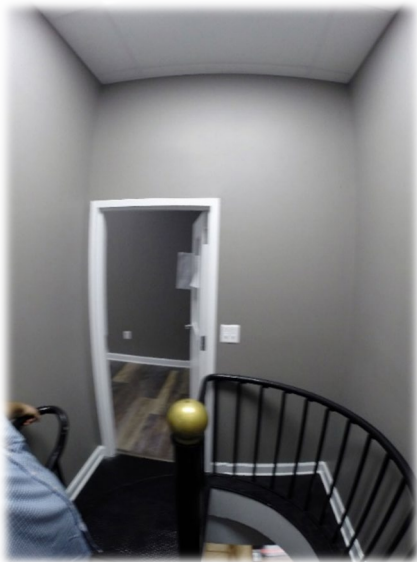
Kitchen view from doorway



Opposite end of the kitchen



View from circular stairs



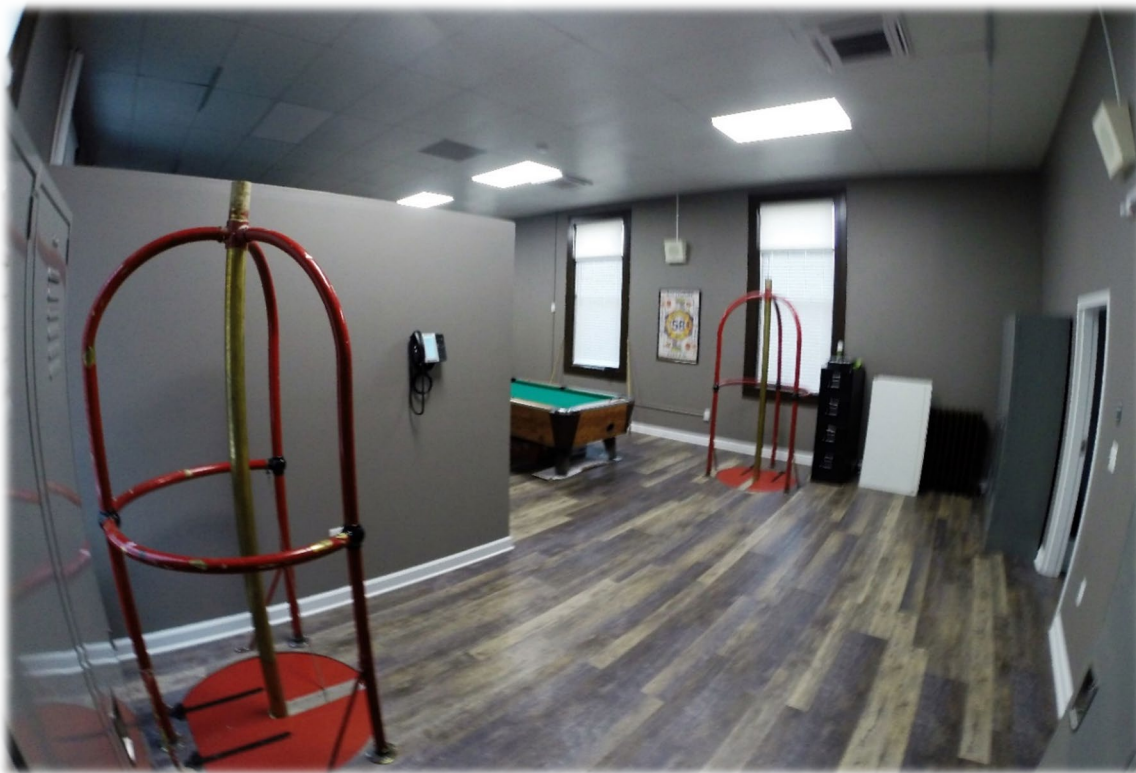
2nd floor circular stair landing



2nd floor landing – stairs accessed from kitchen



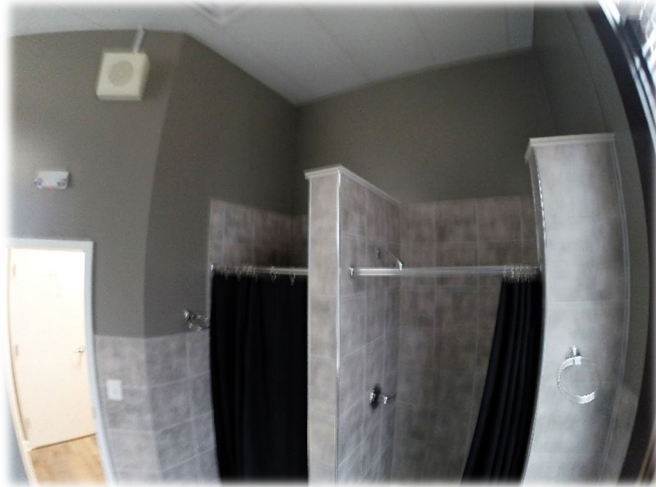
2nd floor hallway and open space adjacent new restrooms and dorm rooms



The renovation replaced floors and ceilings, painted all surfaces and created non-structural partitions to redefine the floor plan.



Completely new restroom



New showers



Storage space



Individual sleeping spaces

BCFD Boat House - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – close inspection was not conducted to determine detector specifications.

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *N/A – No apparatus bays.*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Boat House does NOT have fire sprinklers. This station has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions:

N/A – No apparatus bays.

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays:

N/A – No apparatus bays

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *None found.*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected and secured: *N/A – no poles.*

A.9.1.8 - Regularly check pole hole and landing pad for member safety: *N/A – no poles.*

The BCFD Boat House was built in 1937 on historic Fort McHenry and is used as a base for Fire Boat 1.



It lacks a fire sprinkler system as well as a fire alarm system. HVAC, plumbing, and electrical systems could be updated.



Fire Boat on dock



Sidewalk from dock to station



Main entrance on dock side



Front door inside front porch



Front porch looking north



Front porch looking south



Large open 1st floor with day room, watch station, kitchen, lockers and laundry



Watch station



Lockers



Kitchen



Staircase to 2nd floor



2nd floor stair landing



2nd floor bunk room



2nd floor weightlifting and lounge



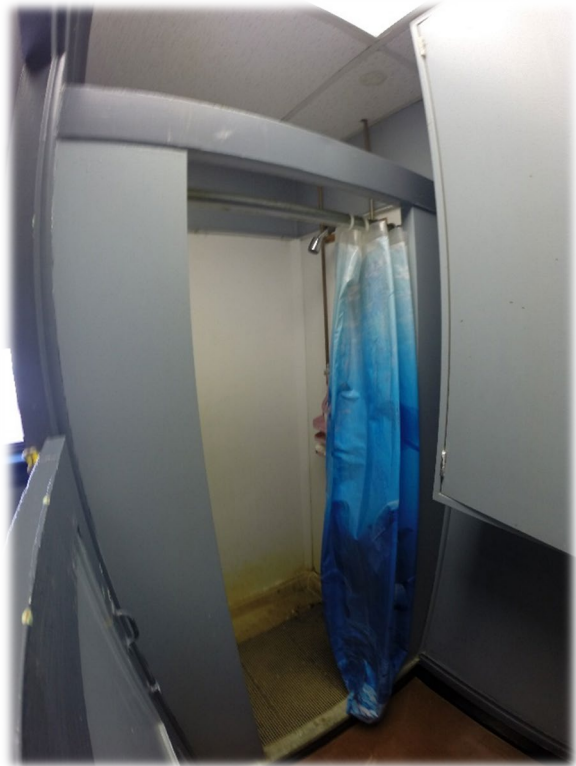
2nd floor captain's office and dorm



2nd floor captain's restroom



2nd floor restroom



...and shower



1st floor laundry, storage and toilet room

BCFD Fire Training Academy - NFPA 1500, CHAPTER 9 - FACILITY SAFETY:

9.1 - Safety Standards

9.1.1 - Comply with all legally applicable health, safety, building, and fire code requirements: *Not practical or feasible due to age and floor plan configurations.*

A 9.1.1 - When codes are not legally required, ensure equivalent standards are applied and enforced: *Not practical or feasible.*

9.1.2 - Provide facilities for disinfecting, cleaning, and storage (NFPA 1581 – Infection Control): *None provided that comply with NFPA 1581.*

9.1.3 - All Fire Facilities shall comply with NFPA 101, Life Safety Code:

9.1.3.1 - Smoke detectors throughout, including basements: *Yes*

9.1.3.2 - (If no fire sprinklers) Smoke detectors are in sleeping room(s): *Yes*

9.1.3.3 - Smoke detectors are wired together (one activates, all activate): *No*

9.1.3.4 - Carbon Monoxide detectors in sleeping and living areas:

N/A – no sleeping or living areas

A.9.1.3 - Provide separation between apparatus floor and living quarters in new or renovation projects: *N/A – no apparatus bays*

9.1.4 - All New Fire Facilities shall have automatic sprinkler systems: *None – Fire TA does NOT have fire sprinklers. This facility has handheld ABC type fire extinguishers.*

9.1.5 - Prevent crews, living, and sleeping areas from exposure to exhaust emissions:

N/A – no apparatus bays

A.9.1.5 - NIOSH recommendations for limiting carcinogen exposure in apparatus bays:

N/A – no apparatus bays

9.1.6 - Do Not allow any PPE components in living or sleeping areas: *N/A*

9.1.7 - All Fire Facilities shall be smoke free: *None found, no signage either.*

9.1.8 - Pole Holes are covered, enclosed, protected, and secured: *N/A*

A.9.1.8 - Regularly check pole hole and landing pad for member safety: *N/A*



The BCFD Fire Training Academy is a “campus” style facility originally built in 1950. The offices, auditorium, classroom, and storage functions are in the two front buildings facing the road. There have been several modular trailer type buildings added in back for classroom, storage, and locker facilities. The back of the property is a “grinder” type of area with a drill tower, burn building, open classroom area, and additional storage sheds. The grinder is both concrete and asphalt with plenty of room to train on apparatus and maneuver around the burn buildings.



Slogans over main entry to auditorium



Main exterior doors



Auditorium looking north



Auditorium looking south



Main parking area for staff between buildings



Door sill



Dining area



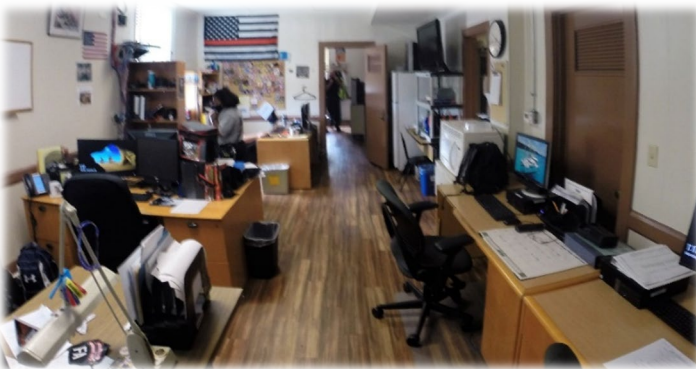
Staircase



Restroom in auditorium building



Bays are used for storage



Desks in common office space



Restroom



Modular classroom, storage, and locker space



Classroom



Storage



Classroom



Space between modular buildings



Additional modular and storage containers along north side of property



SCBA & equipment storage



Recruit lockers



Propane prop on left, burn building in middle, and outdoor classroom area on the right



Burn tower in middle of drill field



Burn tower



Tanker prop and main access driveway