Health & Human Services and Public Safety Committee Agenda
Tuesday, March 20, 2018, 5:30pm
Room 24, City Hall
Councilor Belinda Ray, District 1, Chair
Councilor Brian Batson, District 3
Councilor Pious Ali, At-Large

1. Health And Human Services Committee Agenda Tuesday, March 20, 2018 Room 24, City Hall

   Documents:

   HHS PS AGENDA MAR 20 2018.PDF

1.I. HHS PS Minutes Feb 13 2018

   Documents:

   HHS PS MINUTES FEB 13 2018 DRAFT.PDF

2. Functional Assessment Of Fire Station Locations

   Documents:

   PORTLAND FINAL REPORT 2017 (1).PDF

3. Update On Sound Issues

   Documents:

   2018-03-12 SOUND MEMO.DOCX (1).PDF

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1. Announcements

2. Review and approval of minutes from February 13, 2018 meeting

3. Fire Department Facilities Assessment Presentation

    - Review of the Fire Department Facilities Assessment Report

    - Committee discussion and questions

4. Sound in the City: Part III

    - Members of city staff will share their recommendations for updates to the current Noise Ordinance.

    - Committee discussion and questions

    - Next steps

5. Upcoming meeting dates, all at 5:30 at City Hall, room 209

    - April 10th
    - April 24th
    - May 8th
    - May 22nd

NOTE: Since there are no action items on the agenda, there will be no opportunity for public comment at this meeting. Please feel free to send comments to members of the committee on any issue at any time via email. Councilors' email addresses are available on the city website: www.portlandmaine.gov

Portland, Maine Yes. Life's good here.

Health & Human Services and Public Safety Committee Minutes

Tuesday, February 13, 2018
5:30pm, Room 209, City Hall

Committee Attendance:

Councilor Belinda Ray, Chair (District 1), Brian Batson (District 3), Pious Ali (At-Large)

City Staff: Mayor, Ethan Strimling; Director of Health and Human Services, Dawn Stiles; Police Chief, Michael Sauschuck; Fire Chief David Jackson; Corporation Counsel, Anne Torregrossa; Director of Public Assembly Facilities, Andy Downs; Director of Public Health, Dr. Kolawole Bankole; Code Enforcement Officer, Chuck Fagone; Public Health Program Manager, Kristen Dow; Director of Permitting and Inspections, Mike Russel

Kristina Foster; Casey Gilbet; Steve Dimillo

AcenTech Representatives: Alex Odum, Andy Carellera

AGENDA ITEM 1 – Meeting Called to Order and Minutes Reviewed:
Meeting was called to order at approximately 5:30PM.
Councilor Batson moved to accept minutes from previous meeting. The motion was seconded with all in favor.

AGENDA ITEM 2 – Sound Monitoring Equipment Update

Acentech representative Andy Carbellera presented the results of the noise level study. He described why the study was done, how data was collected, and what the study found:
(Link to the report:
https://www.portlandmaine.gov/AgendaCenter/ViewFile/Item/5951?fileID=32289)

- What are the typical ambient sound levels in the City and where is it noisy?
- Provide a baseline: average sound levels during the day and at night
- 15 microphones to measure sound pressure (A-weighted and C-weighted) across Portland and South Portland over three months.
- What sound level is annoying or would wake someone up?
- Amusements (Chapter 4) upper limit of a minute average of 92 dBA
- HUD guidelines on community sound levels where single family homes would prefer lower outside noise levels versus hotels and outside. (HUD screening criteria for new construction.)
- Most sound is from traffic except for music in the entertainment areas on the weekend.
- Do concerts bother people?
- Sunday is the quietest and Friday/Saturday are the loudest

- In places where sound is considered "unacceptable," it simply describes where mitigation such as windows and walls would be appropriate.

Chair Ray described what the City is interested in:

- Noise levels at concerts
- Amusements part of city code (Chapter 4); knowing what the weekends sound like is useful
- Land Use (Chapter 14) regulation is applicable where people sleep.
- Heavy base is a big predictor in what noise people file complaints over.
- Keep A-Weight Criteria
- Most complaints are from outside patios.
- The data is most useful in the design process of construction.

Chief Sauschuck asked if Acentech has best practices to share. Andy does and explained they have model ordinances with back up documentation to support them. Chief Jackson asked if there are additional surfaces for the exterior of buildings that can minimize sound. Chief Jackson asked if there are mitigating materials one can put on the exteriors of buildings. Anne hopes that these data will help simplify City Code. Dr. Bankole asked what the public health implications are in the findings. Andy said that when noise prevents or interrupts sleep is when noise can impact health.

Andy will look at the noise level change at the borders of areas that affect vulnerable people.

Mike Russell asked about noise over water, the concerts that are on the water; Andy did not have a recommendation but notes that sound moving over water is amplified.

Councilor Ali asked if a pattern was noticed where the sources of sound is measured at multiple points. Andy said he would need to design a different study to answer the question.

Chair Ray asked if the microphones captured the ambient sound level. Andy explained that they do, including background sound levels with respect to concerts.

Chair asked how we would use the data to inform noise ordinance. Andy cautioned against writing ordinance too prescriptively to dB readings as most sound comes from traffic and would enforcement would be difficult.

Chair asked the staff present who are working on a noise ordinance if in light of the presentation that they will have recommendations at the end of February. Chief Sauschuck responded no and asked what the data means if it wouldn't inform dB level thresholds in ordinance.

Mike Russell- asked about methodology where 10 dB was added. Andy explained that just the nightly average levels received the extra 10 to account for sleeping individuals' sensitivity to sound.

Chair clarified that the ordinance needs work and staff will continue to work.

AGENDA ITEM 3 – Fire Department Facilities Assessment Presentation

The committee postponed the item for time.

AGENDA ITEM 4 – Flu Update

Dr. Bankole explained that an emerging strain of Influenza A (H3N3) is very virulent and contagious. The public health concern is high as there have been 34 fatalities in Maine. It brings with if 4 complications:

- Viral pneumonia
- Sepsis
- Heart Attack Risk
- Dehydration

Dr. Bankole explained that public health must make vaccines more available to vulnerable populations: children, elderly, and pregnant individuals, including a vaccination clinic that occurred on October 27. Last week PPHD pushed to get staff and the public vaccinated.

PPHD is looking to partner with other City departments to increase vaccination clinics. HR, Parks and Rec, and Media to see how city staff will help: all city buildings and bathrooms have hand sanitizer

- Clean
- Cough into the elbow
- Stay at home when you feel sick

PPHD wrote guiding protocols for the city shelters when shelter residents become infected. This includes a 3-5 day quarantine for treated individuals returning to shelter. A shelter representative must coordinate with the medical continuum of care.

People calling out reduces hospitals' ability to respond. The supply of saline is managed but reaching critically low levels.

Interdepartmental collaboration is key

PPHD is targeting outreach to vulnerable minority populations to get people vaccinated.

Councilor Ali suggested that Portuguese be added to the Flu materials to reach the growing Angolan population.

AGENDA ITEM 4 – Work Plan

Goal Setting should occur on the last day in March.

- New Shelter
- Paid Sick Leave

- Sober/Recovery Housing – Anne did research, PCRC wants organizations to be appropriately accredited; this will come when ready.
- Comprehensive user engagement site was added and is closely tied to Opioid Epidemic, Substance Use Disorder (Lowers endocarditis) PPHD has already started researching SES facilities.

Next meeting:
March 20th in Room 24.

Meeting adjourned

FUNCTIONAL ASSESSMENT OF FIRE STATION LOCATIONS

City of Portland, Maine

October, 2017

FINAL REPORT

FACETS
CONSULTING

FINAL REPORT

FUNCTIONAL ASSESSMENT OF FIRE STATION LOCATIONS

PORTLAND, MAINE

OCTOBER, 2017

FACETS Consulting, LLP
PO Box 30146
Flagstaff, AZ 86004
602-421-7602

DISCLAIMER

FACETS Consulting, LLC provides services to municipalities and other clients in an advisory capacity only. The firm, during the course of its work, does not attempt in any way to imply it serves as a representative or endorser of any association, organization or special interest group nor does its recommendations to its clients serve as directives or mandates for future public policy.

The firm supports the view that the level and type of public services provided by municipal government should be based on sound and rational decisions determined by locally elected and appointed officials who may be assisted by objective and creditable information. It is the quest to provide this assistance in the form of optimum public fire and emergency services administration and planning that FACETS provides its services to municipalities and other forms of local government.

ACKNOWLEDGEMENTS

Portland City Officials

The FACETS team would like to express their appreciation to the following Portland officials for their assistance and cooperation during course of the study.

Jeff Levine, Director, Department of Planning & Urban Development

Mathew Fitzgerald, Department of Finance and Purchasing

Andrew Dziegielewski, Director, Portland Regional Communication Center

Nasir Shir, Manager, GIS Unit

Portland Fire Department

Special recognition is made to the members of the Portland Fire Department for their assistance, particularly during the team's onsite work. During station tours all members represented their department in the most professional way. Chief Jackson and his staff gave untiring assistance and their accommodations made the FACETS team's work most productive.

David Jackson, Fire Chief

Amy Legere, Senior Administrative Officer

Scott Thomes, Assistant Fire Chief

Peter Daigle, Lieutenant, Quality Assurance Officer

Benjamin Bettez, Principal Financial Officer

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SUMMARY

The City of Portland retained the services of FACETS Consulting, LLC to conduct a Fire Station Functional Assessment on behalf of the Portland Fire Department. The purpose of the study was to determine the functional conditions of current and future fire department facilities. Working closely with city staff, the project team conducted a strategic analysis of the current fire station locations in conjunction with an assessment of the current and future functionality and condition of each station.

The project team conducted its work through a four phase process that combined onsite meetings and tours of fire stations and an offsite collection and analysis of relevant data and records. During the study, the team referenced nationally recognized standards and best practices, including those of the National Fire Protection Association (NFPA) and the Insurance Services Office (ISO). Using computer-based analytical tools and best practices, a picture was developed as to the effectiveness of the city's current fire station locations and their future usability.

Findings and Recommendations

The project team provides the following findings and recommendations regarding the functionality of current fire stations and future improvements. A detailed description of each recommendation may be found in the proceeding sections.

Deployment

Fire Stations — Maintain the current number of stations. Analysis indicates the vast majority of the city can be reached by a fire or EMS resource within established travel times.

Chief Officers — Reorganize the city into two response districts and add an additional on-duty chief officer. The current organization requires the one on-duty deputy fire chief to supervise 12 station officers; four more than the accepted span of control of eight. In addition, the deputy chief responds to all multi-company incidents within the city proper, marine and airport specialty units and volunteer forces stationed on the city's outlying islands.

Company Personnel — Increase company personnel to a minimum of an officer and three (3) firefighters at all times. The current staffing level of one officer and two (2) firefighters is marginal for effective firefighting operations.

Station Repair and Replacement

Facilities Management Master Plan — Create a Facilities Management Master Plan and a Five (5) Year Plan for budgeting maintenance and repairs of fire stations.

Minor Upgrades — Provide minor renovation projects to include the painting of interior and exteriors, flooring replacement, kitchen and bathroom cabinet replacement, and small modifications and upgrades.

Replacement — A replacement of several fire stations should be considered.

East Deering. The station should be replaced in the near future due to a significant slab settling problem in the dormitory.

Central. Although a historic and landmark structure, overtime the Central Station's functionality has become limited providing limited use with modern fire apparatus due to features such as smaller bay door dimension and aging building systems and overall condition. If replaced, the current site should be considered as the location of a new Central Fire Station.

Rosemont, North Deering, Riverton. These stations should be replaced due to their cramped quarters, small lot, age and environmental upgrades.

The remainder of this report is organized in major sections each detailing FACETS' work including the purpose and objectives of the study, methodology and an in-depth discussion of the major analysis of fire station locations and condition. Following the report are appendices which include supporting material for each section of the study.

SECTION I: STUDY OVERVIEW

Request for Proposals

During the month of December 2016 the City of Portland released RFP #4017: Request for Proposals to provide a functional assessment of fire department locations. The RFP was open to qualified consulting firms specializing in fire service administration, deployment and planning.

The intended purpose of the study was to determine the functional conditions of current and future fire department facilities. Working closely with city staff, the selected firm was to identify future fire station locations and current fire station updates and upgrades to meet the future service needs of the community.

Prior to the RFP's deadline of January 11, 2017, FACETS Consulting, LLC, along with eight (8) other competitive bidders, submitted to the city's purchasing manager a proposal that addressed all facets of the RFP's requirements and scope of work. On February 8th FACETS was informed by the manager that FACETS was recommended by the city's selection committee to be awarded a contract for the study. The contracted was awarded on March 6th with work beginning soon after.

Study Implementation

Beginning during the month of April, the project team conducted a series of conference calls, e-mail communications and two on-site visits to the Portland community in order to gain as much detailed information while seeing firsthand fire risks and related characteristics of the community while assessing the organization and facilities of the Portland Fire Department. In conjunction with the onsite visits, the team began the process of identify and assimilating detailed data, records and other related material. Subsequent to the onsite work, the team began the detailed off-site review of material in order to begin the process of the station location analysis and assessment of each station's condition and functionality.

FACETS Project Team — FACETS selected from its cadre of specialists a four-member team that possessed the knowledge, experience and recognition of assessing the organization and deployment of fire and emergency services with specialties in the location and design of fire stations in communities similar of the City of Portland. The following gives a brief overview of team members including their background and role during the course of the study.

Kevin Roche. Mr. Roche is a co-owner of FACETS and serves as the team's manager and senior consultant with specialization in fire department administration and planning.

Elise Fisher. Ms. Fisher specializes in fire station location and deployment analysis and serves as the team's GIS Analyst and cartographic specialist.

John Cochran. Mr. Cochran served as the coordinator of the study's work and technical reviewer of each phase of the work plan. His area of specialization is fire service administration and planning.

James Zwerg. Mr. Zwerg's role during the study was that of fire station feasibility specialist. He is an architect who specializes in fire station design and renovation.

Scope of Work — FACETS' technical proposal offered the following five (5) primary areas of focus that mirrored the requirements of the study's RFP:

Fire Station Location Analysis. Review and analyze of the geographical boundaries for each of the current station's response areas.

Fire Service Demand Influences. In conjunction with the Fire Station Location Analysis, analyze trends in the city's population, socio-economics, and building and constructions types. Other factors include statutory and legal requirements governing the department's delivery of services, call volume and service trends and other factors.

Facility Repair and Replacement Plan. Conduct an onsite review of each fire station in order to develop a Facility Repair and Replacement Plan.

Funding Sources. Identify potential funding sources so the city may implement any recommendations and secure funding for future replacement or upgrade of certain fire stations and their amenities.

Final Report and Presentation. Subsequent to the completion of the above areas of study, a list of findings and recommendations would be provided to the fire chief and his staff. A draft and final report would be presented to the department upon approval of the final report.

Approach and Work Plan

The project team's approach to conducting the study consisted of work on and off site. The following provides a brief overview of the approach and work plan.

Four-Phase Process — A multi-phase process was used consisting of the above identified onsite work coupled with offsite analysis. The following provides an overview of the project's work plan and includes phases and corresponding tasks:

Phase I: Project Kickoff
Task I-A: Project initiation and development of work plan
Task I-B: Initial stakeholder input
Task I-C: Acquire and review of background Information

Phase II: Onsite Assessment
Task II-A: Community Risk Analysis
Task II-B: Fire Station Tour and Inspection
Task II-C: Fire Department Method of Operation

Phase III: Data Analysis and Material Review
Task III-A: Fire Station Location Modeling
Task III-B: Service Demand Analysis
Task III-C: Fire Station Improvement Plan
Task III-D: Alternative Funding Sources
Task III-E: Related Initiatives

Phase IV: Report Development and Presentation
Task IV-A: Draft Report
Task IV-B: Final Report and Presentation

Onsite Work — Much of the preliminary work consisted of a series of onsite visits to the city whereby the team conducted tours of the city while reviewing fire risks in conjunction with interviews with key city and fire department representatives. As part of the tours, members of the project team visited each of the seven (7) fire stations in review to gain information regarding their site, condition and usefulness. Parallel to this work the team worked closely with city and fire department representatives in the identification and collection of data, records, maps and related material.

Offsite Work — In conjunction with and subsequent to onsite work, the team processed and analyzed the data and material collected. From this analysis the team began the formation of findings and results in the form of maps and charts.

Assistance — Throughout the study the team utilized assistance from city officials in the following manner:

- Fire department liaison assistance for meetings, tours, and logistical assistance.
- Access to fire department and other relevant municipal facilities.
- Review on data, records, reports, and other pertinent material.
- Interviews with fire department management and line personnel and city staff relevant to the study.
- Conference room or similar office space for conducting interviews, project team meetings, and telephone calls.
- Transportation to fire stations and other facilities.

Methodology

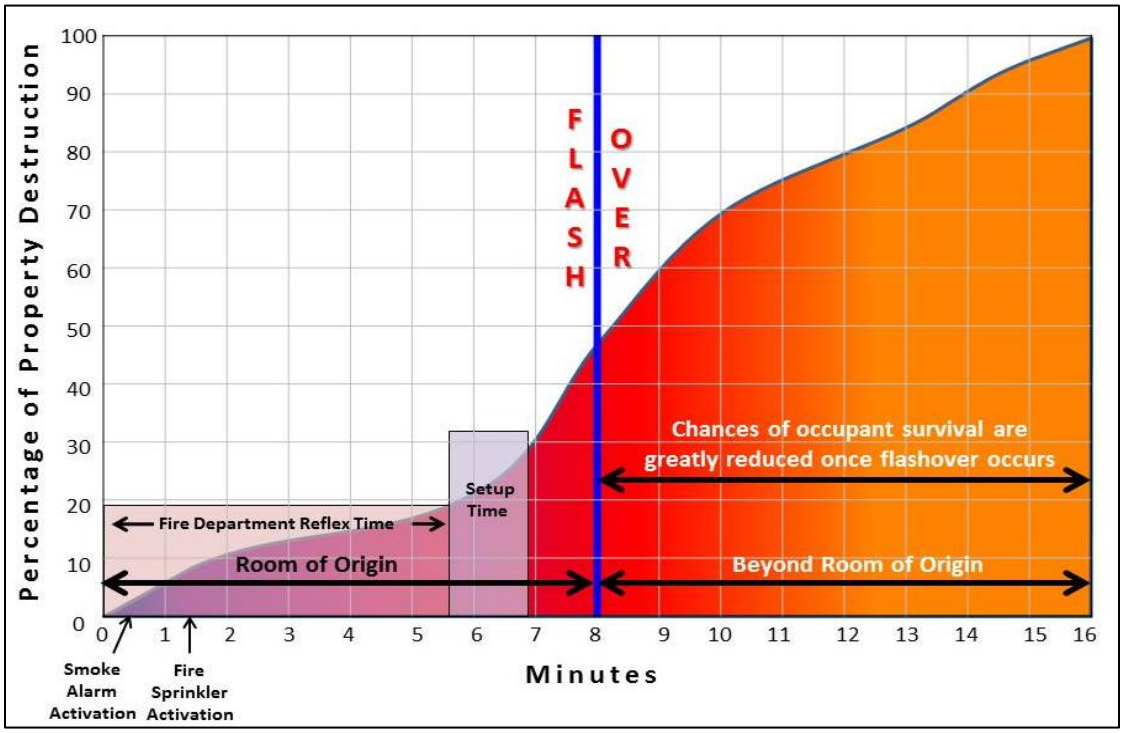
The primary method used to determine the best locations for a fire station is based on the built environment and the severity of risk of fire to structures and other fixed properties within the city. The key issue to keep in mind is that the ultimate goal is to ensure the fire department can muster a sufficient amount of resources that can minimize the loss of life and property once a fire becomes out of control. A secondary goal is to ensure a sufficient backup force is available to minimize the probability of fire spreading to other areas of a structure or worse, spreading to other structures and escalating into a ‘group fire’ or worse, an all-out conflagration where large swaths of the city burns.

Fire Behavior — The general consensus is fire stations and their assigned personnel and apparatus should be strategically placed to arrive at the scene of a structure fire or similar incident in time to marginalize the threat to occupants or, where no threat is present, reduce the damage to property due to the direct effect of fire or its byproducts, such as heat and smoke damage.

Flashover. During a structure fire, the point between survivability and minimal property damage and severe harm to occupants with significant damage to a structure and contents occurs at the point of flashover; the sudden involvement of a room or an area in flames from floor to ceiling caused by thermal radiation feedback. Thermal radiation feedback is the energy of the fire being radiated back to the contents of the room from the walls, floor, and ceiling. This thermal radiation confined to the interior of the room will raise the contents to their ignition temperature. When all of the contents of the room suddenly ignite the room has reached the point of flashover, or the fully involved stage of a structure fire.

Fire Propagation Curve. The time sequence of a developing fire within a space, such as a living room or kitchen within a home, apartment or a work cubicle in a downtown office building consists of a process from which a fire may begin in a small, incipient way then evolving into an all-out or 'fully involved' room full of fire with heavy smoke and heat extending to nearby rooms and upper floors. This can be best illustrated in the Fire Propagation Curve as illustrated in **Figure 1**.

Figure 1. Fire Propagation Curve



Fire Extension. A quick response by the fire department is usually the most effective strategy to reduce loss of lives and property damage in unsprinklered structures, such as much of the building stock of Portland. As can be seen in the Figure 1, the line, which combines temperature rise and time, represents a rate of fire propagation in an unsprinklered room and roughly corresponds to the percentage of property destruction. At approximately eight (8) minutes into the fire sequence, the hypothetical room of origin flashes over. Extension outside the room begins at that point and exposes occupants in other parts of the structure to harm.

Built-in Protection. In contrast, between the one (1) and two (2) minutes it can be seen that a fire's severity can be greatly diminished while reducing occupants to harmful conditions when there is the presence of smoke detection and automatic fire sprinkler systems. According to the National Fire Protection Association only one (1) sprinkler head operated in four (4) out of five (5) (79%) fires in which sprinklers operated. In 97% of fires with operating sprinklers, five (5) or fewer heads operated. It is widely accepted that most fires that occur in structures with properly working sprinklers are extinguished by the system before the fire department arrives on the scene.

As the figure illustrates, a fire's propagation leads to flashover which often occurs around eight (8) minutes after ignition. The curve also indicates occupants can greatly reduce their risk to fire through the installation of smoke alarms and automatic fire sprinkler systems. These two (2) life safety features, whether installed together or independently have, in conjunction with other elements of modern building codes, have greatly reduced the severity of property damage in the event of a fire while improving the survivability of occupants.

Fire Department Deployment — Establishing the time for flashover to occur at the eight (8) minute mark, the location of fire stations in an urbanized area such as Portland is promulgated by the concept of the fire department arriving in time to effect rescue of any trapped occupants while mitigating the fire's damage to the structure and its contents. This concept is referred as the reflex time for the fire department to mobilize sufficient personnel and resources before the point of flashover.

Reflex time. The total time sequence for the fire department to receive an emergency call for assistance from the public, assimilate personnel and resources, respond to the scene of the emergency and set up equipment for fire attach and rescue operations is referred to as reflex time **(Figure 2)**. Referencing nationally accepted criteria, the following is a breakdown of each segment of reflex time.

Establishing a water supply, one of many tasks that must be carried out simultaniously during the early stages of fire operations.

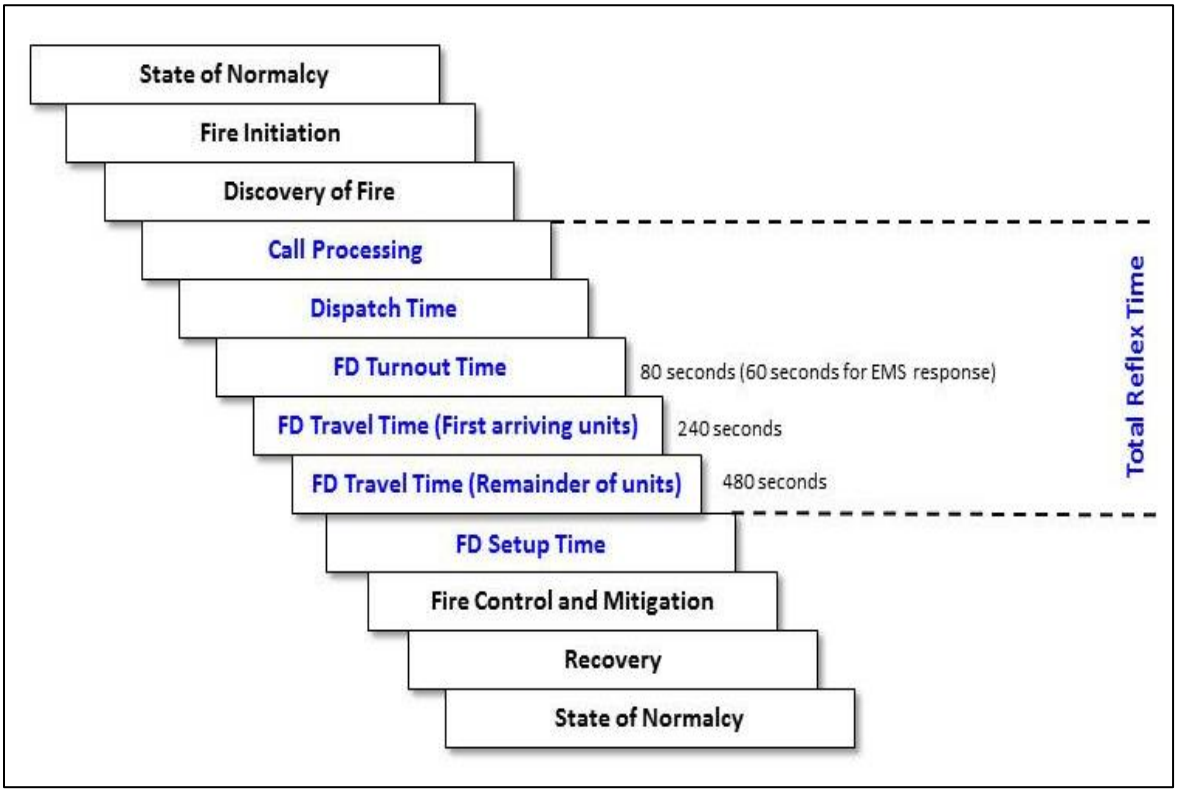
Call processing and dispatch time. This is the time for a public public-safety answering point (PSAP) such as Portland's Regional Communications Center to receive a call for a reported fire or other emergency usually through the 911 telephone number and processing the call through a computer-aided dispatch system that dispatches the closest fire companies and chief officers. Generally, the "receiving and handling" of the processing and dispatch of fire companies should take no longer than 90 seconds.

Turnout time. As soon as firefighters in their station are alerted in their stations of the location and type of incident they begin to don protective clothing and board their assigned apparatus. This process is turnout time and should take no greater than 80 seconds to complete. For medical assist responses, the maximum turnout time should be no greater than 60 seconds.

Travel time. As soon as firefighters board their apparatus a response is begun from their fire station to the scene of the emergency. This is timeframe is called travel time and in the majority

of emergency responses a fire department makes, that is, reported fires and calls for medical assistance, the maximum travel time for the first arriving unit is 240 seconds (4-minutes) and for fire responses 480 seconds (8 minutes) the remainder of fire companies and a chief officer.

Figure 2. Fire Department Response Reflex Time



Setup time. Upon fire companies arriving at the scene of a structure fire or other emergency, firefighters must quickly setup their apparatus and get equipment into operation. This includes conducting simultaneous procedures, such as laying supply fire hose to fire hydrants and stretching other hose lines in preparation for attacking the fire, while conducting multiple other functions such as raising ladders to upper floors, forcing doors and windows and preparing to rescue any trapped occupants.

Effective Response Force. The fire department should have in place a force of officers and firefighters along with apparatus and equipment strategically deployed to effectively mitigate fires and other emergencies that one can typically expect within the community it serves. An effective response force for structural fire operations should be contingent upon the severity of the fire threat in the community. An example would be the City of Portland with its large building stock of older frame and brick-and-joist multi-story structures nestled closely together creating conditions for rapid fire spread to adjoining structures. These conditions often call for a sizable firefighting force with an appropriate number of engine and ladder apparatus. In contrast, a community with similar population, but less dense structural conditions, may warrant a smaller force.

Concentration. Regardless of local conditions, it is universally accepted in the realm of municipal fire administration and by the fire insurance industry that a sufficient amount of fire defenses must be concentrated to minimize life and property loss. A concentration of firefighters and appropriate apparatus must be present. This often equates to a measurable number of fire stations being concentrated in high-density city centers and other congested regions of a city.

Initial assignment. **Figure 3** provides an overview of the accepted minimum staffing needs for the initial response to a reported structure fire. The figure illustrates the assignment and description for each position of the initial response. During the early stages of a working structure fire fast-paced conditions require each assignment to be carried out simultaneously in order to effectively and safely mitigate the fire and protect the structure's occupants. The fire scenario reflects the initial response to a structure fire in a typical 2000 square foot, two-story single-family dwelling, without basement and with no immediate exposures – a scenario that is present in most communities.

Figure 3. Minimum Initial Assignment for Reported Structure Fire

Position	Description	Staffing Level
Incident Commander	Usually, chief officer who is responsible for overall management of incident and fire attack strategy including scene safety.	1
Fire engine pump operator	Assigned as a member of an engine company, regulates volumes and pressures of intake and discharge of water through hose lines.	1
Fire attack hose line	Members usually of the first arriving engine company, primarily assigned to use and backup attack hose lines and effect an aggressive attack on the fire.	3
Backup fire attack hose line	Members usually of the second arriving engine company assigned to back up the primary fire attack hose crew.	3
Search and rescue	Conduct interior or exterior search for potential occupants who may be trapped or overcome due to heat and/or smoke.	2
Ladder and ventilation	Raise ladders to upper floor windows and/or roof to allow access for search and rescue team and to perform vertical ventilation of the structure.	2
Aerial ladder operation	Usually, driver of aerial ladder truck who raises and operates the aerial ladder or similar device.	1
Initial rapid intervention team	Assigned outside the hazard area who serve as a special rescue team in the event of other firefighters becoming entrapped.	2
Total personnel		15

The figure identifies a total of 14 to 15 personnel needed to conduct the multiple functions required on the scene of a working single-family structure fire. It is important to note the scenario exist in many communities such as Portland, but equally important are other single-family dwelling scenarios where homes are located closely together, mostly in older 'pre-war'

neighborhoods where less fire resistive construction exist. These situations, in conjunction with homes built closely together often with basements, create conditions that warrant a greater assignment of personnel and resources on the initial assignment. Such is the case for much of the City of Portland.

National Standards and Best Practices

There exist in the United States several nationally recognized methods for determining fire station locations. Each method has the same intended goal of strategically placing firefighters and their equipment for the most optimum effectiveness within a community. Ultimately the goal of each method is to reduce the risk of life and property in the event of fire, medical emergency or other responses.

All of the methods place particular emphasis on the placement of fire stations and accompanying number and types of units, including engines and ladder trucks, and their level of staffing with regards to structural fire protection. This is understandable due to the potential monetary influence by the fire insurance industry on individual property owners and their community leaders. Optimum municipal fire station locations serve as a major element in the industry's formula for individual and commercial property fire insurance premiums.

Each method is organized as either a standard or best practice derived from standard-making organization such as the National Fire Protection Association (NFPA) or the fire insurance industry whose interests in the effectiveness of public fire protection is derived through the Insurance Services Office (ISO); a leading source of information for the industry about property/casualty insurance risk. A similar method sometimes utilized by the team is the Commission on Fire Accreditation (CFAI) Self-Assessment and Accreditation Program.

During the early stages of the study, the team determined the fire department's preference for analysis included both the NFPA and ISO methods. The following includes a brief overview of each organization's method.

NFPA 1710 — *The Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments* was first adopted in 2001 and is currently under the 2016 edition. The standard's purpose is to specify the minimum criteria addressing the effectiveness and efficiency in the delivery of public fire suppression operations, emergency medical service, and special operations.

With relation to fire station location, a section of the standard focuses on the response time of fire companies to arrive on the scene of a fire or medical emergency to effectively organize and deploy personnel and equipment. The standard sets forth criteria for total reflex time for fire department response consisting of alarm handling time, turnout time, and travel time. Due to the nature and scope of the study in relation to the distance from a fire station to any point in the city, a description of the standard's travel time criteria is provided for an initial structure fire and emergency medical response.

Structure fire response. The standard recognizes the industry-wide practice of sending at a minimum two (2) engine companies and one (1) aerial ladder company under the supervision of

a chief officer to all reported structure fires and similar properties such as lumber yards and bulk fuel facilities. The standard sets forth the maximum response time for the above mentioned units.

Table 1. NFPA Structure Fire Response

Unit/Company	*Maximum Travel Time*
1st Due Engine Co.	4 minutes
Chief Officer	8 minutes
2nd Due Engine Co.	8 minutes
Ladder Co.	8 minutes

Emergency medical response. Similarly, the standard identifies travel time criteria for a fire department that provides basic or advanced response to medical emergencies.

Table 2. NFPA 1710 EMS Response

Unit/Company	*Maximum Travel Time*
Basic Life Support	4 minutes
Advanced Life Support	8 minutes

Special operations. The standard provides little direction regarding response time criteria for special operations. Examples include response to hazardous materials spills, rescue operations requiring specialized technical expertise such as high angle, confined space, swift water and urban search and rescue. The standard does stipulate the fire department should within its organization statement include criteria for the various types of special operations response and mitigation activities to for which the fire department is expected to respond.

To apply 1710's response time criteria, an analysis must be conducted that extensively utilizes a community's Geographic Information Systems (GIS) data such as centerlines and layout, Computer-aided Dispatch (CAD) including the fire department's fire incident records. The analysis is labor intensive and to be effective, must rely on reliable and adequate data.

ISO Fire Suppression Rating Schedule — The Fire Suppression Rating Schedule (FSRS) is a manual containing the criteria ISO uses in reviewing the structural fire prevention and fire suppression capabilities of individual communities or fire protection areas. The schedule measures the major elements of a community's fire protection system and develops a numerical rating called a Public Protection Classification (PPC). A community's rating is then used by insurance firms providing coverage for residential and commercial properties. A good PPC rating often leads to reduced annual insurance premiums for property owners; thus the incentive for municipalities such as Portland to retain public fire prevention and mitigation services to a level that generates lower premiums for its residents and commercial properties while incidentally reducing the risk of life and property loss due to structure fires. The schedule addresses the three major elements of a community's structural fire defenses consisting of the following:

Fire department. A review of the fire department's capabilities is reviewed with emphasis on the prevention and mitigation of potential structure fires.

Water system. Emphasis is placed on the system's ability to provide sufficient pressures and volumes corresponding to local structural fire conditions.

Emergency communication. The service is reviewed in relation to the ability to adequately dispatch fire department units to reported structure fires.

In contrast to NFPA 1710's response time method, the FSRS views the strategic location of stations based on response distance. The schedule applies a theory whereby developed areas of a community should be no further than 1.5 road miles from the closest engine company and 2.5 miles from the closest ladder company. Using the least distance of the two (2) criteria equates to an engine company providing coverage over an area of 4.5 miles on a flat and uniform street grid.

Table 3. ISO Structure Fire Response

Unit/Company	*Maximum Travel Distance* *	*Travel Time*
1st due Engine Co.	1.5 road miles	3.2 minutes
1st due Ladder Co.	2.5 road miles	4.9 minutes

* Average travel speed at 35 mph

Response distance rationale. The response distance criterion has long been used by ISO Field Representatives due to its ease of application. In recent years the method has undergone much scrutiny due to its perceived over simplification of the subject of fire station location and analysis. However, a review of the background and origins of the method reveals at the time of ISO's adoption, extensive research into the characteristics of interior structure fire behavior, particularly the time for flashover to occur coupled with travel times in congested area of several America cities. The research, conducted by the RAND Corporation, revealed an *average* speed of 35 miles per hour for fire apparatus traversing through city streets where heavy traffic, narrow lanes, topography, tight intersections and other barriers to reach a theoretical location before the 4- to 6-minute time for flashover to occur. The criteria produce an expected response time of 3.2 minutes for an engine company and 4.9 minutes for a ladder-service company.

Response distance formula. Taking into account the average speed and the time required for an apparatus to accelerate from a stop to the travel speed, RAND developed the following equation for calculating the travel time:

$$T = 0.65+1.7D$$

Where:

T = time in minutes to the nearest 1/10 of a minute
0.65 = a constant for vehicle acceleration for the first 0.5 mile traveled
1.7 = a constant vehicle speed validated for response distances ranging from 0.5 miles to 8.0 miles
D = distance

ISO conducted a recent review of the formula and found the earlier RAND work still valid as a predictive tool.

It is important to note that in its analysis of fire company distribution, ISO does not measure or use actual historical response times of individual communities. This is due to many fire departments lack of accurate and reliable response-time information. This is in conjunction with their view that there is no standardized national recordkeeping system that would allow for the determination of fire department response times.

Self-Assessment and Evaluation Model — Another nationally recognized program is published by the Commission on Fire Accreditation International (CFAI). The self-assessment and accreditation model enables a fire department to evaluate past, current, and potential future service levels and performance and compare them to local adopted or industry best practices so that a department may determine community risk and safety needs and develop community-specific standards of cover. Primary evaluation includes:

- Determining community risk and safety needs and develop community-specific standards of cover.
- Evaluating the performance of the department in relation to the standards of cover.
- Establishing a methodology for achieving continuous organizational improvement in relation to the standard of cover.

CFAI provides the tools for a fire department to assess its performance against national standards or locally adopted performance goals. The program is voluntary and does not set standards. A successful process leads to accreditation; compliance reports must be made annually and the assessment process is repeated every five years.

A key difference between the self-assessment and accreditation program, NFPA 1710, and the ISO's FSRS is that it does not reference a concrete method for the placement of fire stations and resources. Instead, local officials determine performance benchmarks such as response times, staffing levels and related elements of deployment, some of which may include NFPA, ISO or other criteria.

Special Considerations

During Phase I's meetings with fire department representatives, the project team revisited the study's scope of work including applicable standards and special conditions or considerations that may be unique to the city that may impact the department's programs and services. The following includes special considerations that were considered while conducting the study:

Travel time delays. The department identified a three-minute delay of travel times where response calculations included at-grade railroad crossing locations.

Heavy snowfall and terrain. Excessive snowfall and ice, coupled with step hills, were considered as a detriment to response times.

Fire conditions. Conjected construction, particularly of older structures, create above normal fire and exposure conditions requiring a heavier than normal assignment of firefighters and equipment.

City boundaries. The city is landlocked with no expansion of jurisdictional boundaries into the foreseeable future.

Street network barriers. Several obstructions exist throughout the community that hinder quick access including unconnected street network, large parcels of land dedicated to municipal services such as cemeteries and school yards, undevelopable land due to deep ravines or steep grades and transportation barriers such as interstate and railway right of ways and utility easements.

Data Sets

A series of local data sources were utilized during the course of the project including those from within the fire department in conjunction with city emergency dispatch, as well as state and local data. Much of the data spans at a minimum the years 2014 through 2016, the three (3) most recent years with complete data sets.

Maine Fire & EMS Incident Reporting System (MEFIRS**) —** As part of its reporting system, the fire department completes an MEFIRS report for every emergency incident to which it responds. The system is an information and data-gathering system supported by the State Fire Marshal's Office and the Maine EMS office. Its purpose is to encourage fire departments to use a standardized incident reporting system to report their activities. The MEFIRS fire report information is reviewed and uploaded to the National Fire Information Reporting System (NFIRS), which is jointly administered by the U.S. Fire Administration and the National Fire Information Council. Records for the years 2014-16 were provided to the project team to identify trends in call volume and deployment trends.

Computer-Aided Dispatch (CAD) — The regional communications center utilizes a CAD system when dispatching fire, EMS, and law enforcement agencies to emergencies. The system tracks and stores reflex time segments including call taking and dispatch, turnout and travel times. These data played a critical role in the team's ability to measure the performance with regards to various aspects of deployment including travel time and unit workloads.

Geographic Information System (GIS) — The project team utilized much of the city's GIS data for deployment analysis and mapping. GIS software is designed to capture, store, manipulate, analyze, manage, and present spatial or geographic information from its associated database data. The team used the system to integrate, analyze and visualize the geographic data within the scope of the study.

SECTION II: COMMUNITY OVERVIEW AND RISKS

The City of Portland is the largest city in the State of Maine with a 2017 population of 67,000. Serving as a metropolitan center, the city and the immediate region is the home to over half a million people which are more than one-third of the state's total population. The city's historic waterfront serves as a magnet for tourism and a port-a-call for cruise ships and luxury boating. The city was originally named Falmouth, but in 1786 was renamed for the English Isle of Portland. A portion of the city's population can be attributed four (4) colleges located within the city.

Government — The city is governed by a mayor-council form of government with an elected body of a nine-member council. The mayor and council make policy, approve ordinances and appropriations, appoint the city manager and oversee all aspects of the municipal government. The city manager oversees the daily operations of the city's government and is authorized to appoint and supervise the various municipal agencies, including the fire department, prepare the annual budget and execute laws and policies approved by the city council.

Area —The city has a total area of 69 square miles, of which, 21 are land with the remaining being water. The city lays on a peninsula in Casco Bay of the Gulf of Maine which is on the edge of the Atlantic Ocean.

Population Trends — The city's resident population is estimated to be approximately 67,000 with an additional 30,000 commuting into the city every day for employment or recreational purposes. **Table 4**. provides an overview population trends over the past 57 years.

Table 4. Population Change, 1960-2016

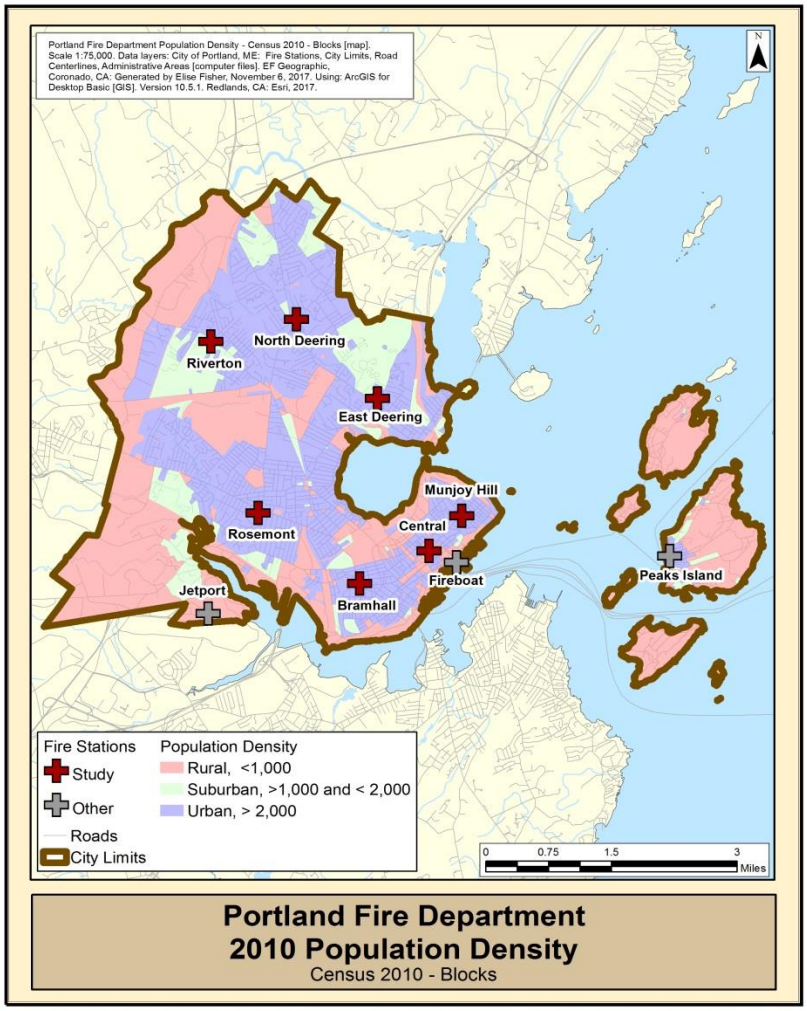
Census Year	Population	Percent
1960	72,566	-6.5%
1970	65,116	-10.3%
1980	61,572	-5.4%
1990	64,358	4.5%
2000	64,249	-0.2%
2010	66,194	3.0%
Est. 2016	66,937	1.1%

As the table indicates, the population gradually decreased between the years 1960 through 2000, but has seen a small increase of over 4 percent since then. This can be attributed to a variety of factors, most notably a surge in younger generations who desire the amenities of urban living. As more people move back into the urban center investments in neighborhood gentrification and reuse are becoming more common. This was observed most notably along the city's waterfront and the Munjoy Hill neighborhood.

Populations Densities — As can be seen in **Map 1**, the three (3) broad population density categories are represented with approximately fifty-percent (50%) of the area within the city being urbanized with a density of 2,000 or greater. The outer reaches of the city are classified as suburban or rural with densities of less than 2,000 and 1,000 respectively. It is important to point

out that all of the fire department's seven (7) stations are located in the middle of these urban centers.

Map 1. Portland Population 2100 Density

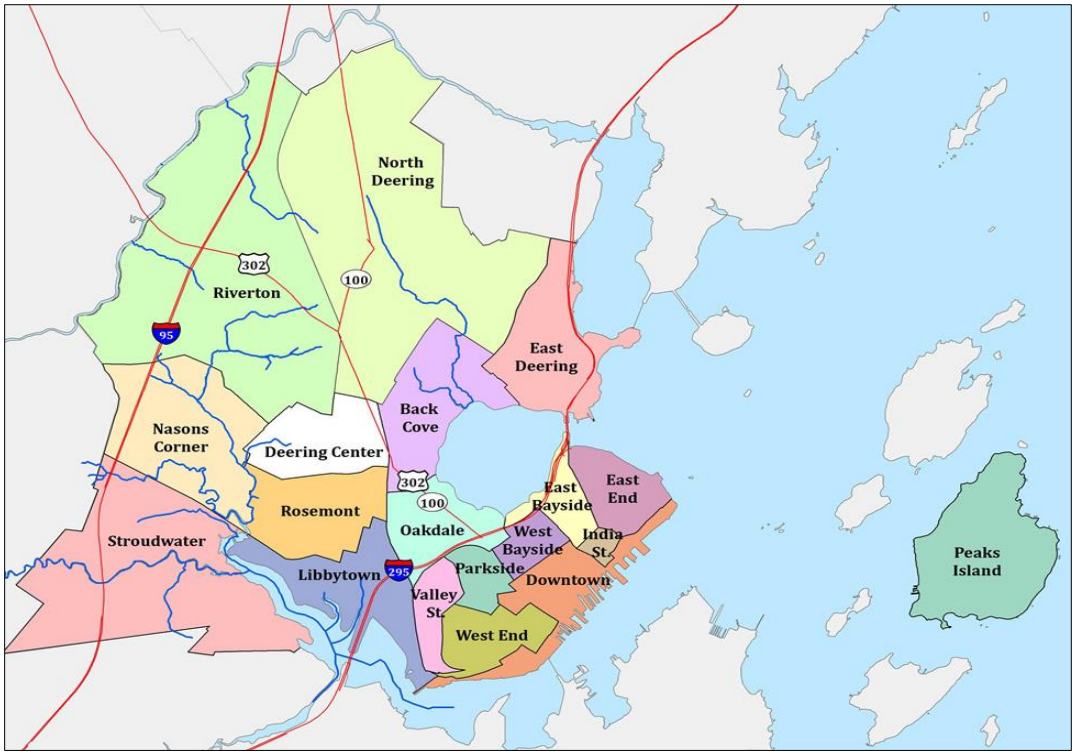


Neighborhoods — Outside the principal business district, the city is organized into 16 neighborhoods. Most have an association that in many cases maintains ongoing relations of varying degrees with the city government on issues impacting residents. In 1899, the city annexed the neighboring City of Deering whose neighborhoods now comprise the northern and eastern sections of the city. The neighborhoods include:

Back Cove	Nasons	Rosemont
Deering Center	Corner	Stroudwater
East Bay/India Street	North Deering	Valley Street
East Deering	Oakdale	Westbay
East End	Parkside	Westend
Libbytown	Riverton	

It is important to identify the varying neighborhoods, as it relates to the study, due to their strong presence of community and government representation; two vital elements to the location of fire stations, particularly those in older and historic areas. **Map 2** illustrates the boundaries of each neighborhood.

Map 2. Portland Neighborhoods



Demographics — As of the 2010 U.S. census, there were 30,725 households, and 13,324 families residing within the city accounting for a population density of 3,106 inhabitants per square mile. There were 33,836 housing units at an average density of 1,587.8 per square mile. The estimated per capita income in 2015 was $32,359.

Economy

Portland is one of Maine's major economic centers due to its large seaport, population, and its proximity to Boston. During the course of the city's history, the local economy has shifted from fishing, manufacturing and agriculture towards a more service-based economy. Many national financial companies such as Bank of America and Key Bank have operations in the city. The city and adjoining communities serve as headquarters to corporations such as Unum, Magellan Petroleum, Maine Bank & Trust, ImmuCell Corp, and Pioneer Telephone. Since 1867, Burnham & Morrill Co., maker of B&M Baked Beans, has had its main plant in the city with its manufacturing facility being considered a local landmark. The city's port is also undergoing a revival. The two highest employment categories are management (13%) and sales and related occupations (10%).

Local Conditions

As part of the study, local conditions were identified that were considered unique to the Portland community in relation to the location and condition of fire stations. The team identified the following conditions.

Terrain — Due to its location along Casco Bay, the city's topography consists of varying elevations that include a gradual change in elevation from the waterfront north to Back Cove. The most notable change in elevation with potential impact on fire department response are in the East End and West End neighborhoods **(see Map 3**).

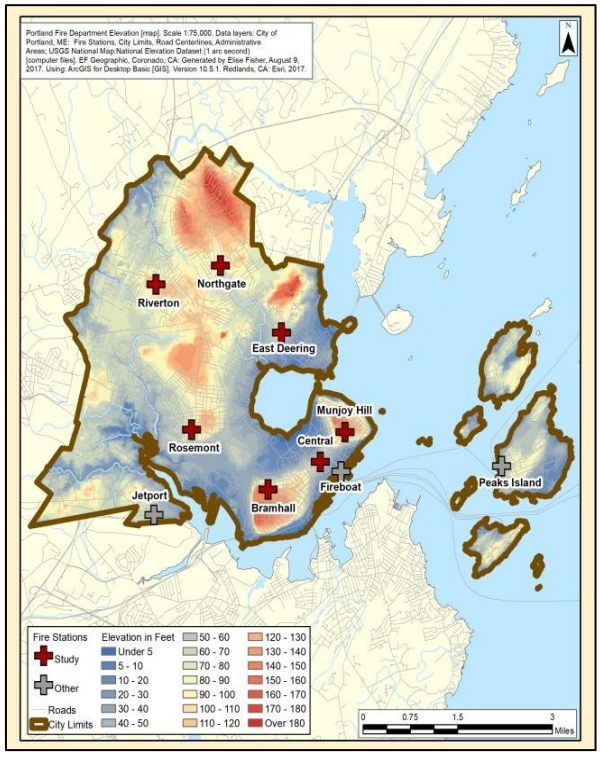
Structural Congestion — Much of the city's older neighborhoods are conjected and considered of the pre-war vintage, meaning construction was prior to 1940. This inventory of commercial and residential buildings consists of older wood-frame, brick-and-joist or heavy timber construction. Many of these structure's original construction occurred prior to the development and adoption of modern building and fire codes. Often, the features of these structures were designed and constructed with open stairwells and without fire doors or built-in protection, including automatic fire sprinkler systems. This, coupled with aging building systems such as electrical components, often lead to a higher frequency of accidental fires and rapid fire spread.

Obstructions — From a response perspective, the community has several obstructions that cause obstacles for adequate response times. These include limited street connectivity due to railways, terrain such as ravines that limit connectivity and permanent open spaces such as large cemeteries. In addition, frequent delays regularly occur due to railroad crossings being blocked by train traffic **(see Map 4)**.

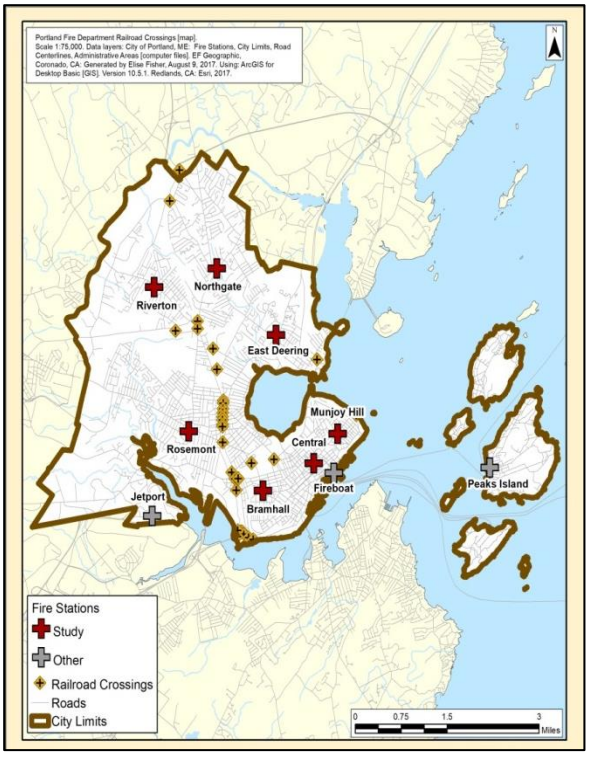
Climate — The region of coastal Maine where the city is located can be affected by severe nor'easters during winter, with high winds and large snowfall totals. The city is regularly exposed to a high amount of snowfall averaging 18 days during the winter months where there is one inch or more of snowfall in a day. Total seasonal snowfall averages between 60 and 90 inches annually. Winter temperatures generally range from the low to high 20s. At times, the region has experience long bouts of large snow accumulations which at times greatly hampered the fire department's ability to respond to emergencies within expected timeframes. During these conditions many neighborhoods are made difficult to access primarily due to narrowing of street lanes caused by snow piles, parked or stranded cars and other obstructions. At times, backup companies are delayed due to these conditions.

Heavy snowfall often hampers the department's response to fires and other emergencies.

Map 3. City Elevation



Map 4. At Grade Railroad Crossings



Fire Flow — Fire flow is the calculation of the amount of water measured in gallons per minute needed for the suppression of a specific floor or similar area within a structure that is fully involved with fire over a set time period. Fire flow calculations are sometimes calculated of the whole structure and nearby structures that are an immediate exposure to radiant heat or direct flame contact. Generally, fire flow calculations are made of individual structures or property complexes, as well as regions or a community as a whole by both fire code officials and ISO. It was beyond the scope of the study to identify needed fire flows within the community; however, the topic is worth mentioning due to its correlation to the fire severity within the community. This includes exposed properties, number and concentration of fire companies and the level of firefighters needed to quickly and adequately hold fires in check in the city's older multi-story structures where occupant safety and the exposure of nearby structures is extreme.

Waterfront — The Portland Harbor has played a vital role in the region's development as a major port for industry and commerce. Since its origins in the 1600s, the waterfront has served as an industrial port for the shipping of material and goods. As these industries declined in recent decades, the area has evolved into a mixed center of history, tourism and recreation, ferry service and a port-a-call for cruise ships, and a center for industrial shipping. The Harbor is generally described as being divided into three (3) overlapping sub-districts:

Western. The western waterfront is exclusively dedicated to freight and industrial uses that need access to the deep water of the harbor's channel. The Casco Bay Bridge connecting the city with nearby South Portland crosses the harbor where the Fore River empties into the harbor.

Eastern. The eastern area is home to Portland's passenger port with Casco Bay Island ferry

service, international ferry service, and cruise ship facilities. Passenger activity has helped to catalyze development in the nearby India Street neighborhood and on nearby underutilized industrial land.

Central. Between the eastern and western areas is the central waterfront. Geographically and functionally, the 19th century piers and wharves of the area form the heart of the harbor supporting traditional fishing, marine research, tourism, and non-marine uses. The central area is tightly connected with the city's historic downtown shopping district.

The waterfront poses unique challenges for fire protection due to the high concentration of mixed uses and limited access to built-upon piers. The department maintains a marine fire company consisting of an officer and two firefighters staffing a large fireboat and smaller craft which are housed at quarters in the lower deck of the Casco Bay parking garage at Franklin and Commercial Streets. The station serves the main harbor as well as provides transport and support to firefighting and rescue operations on the city's outlying islands and the region's open water and coves. When necessary, the marine company is supported by the U.S. Coast Guard station located across the harbor on the South Portland waterfront.

Fire Risks

The city is no stranger to the devastating effects of large fires. The city's seal depicts a phoenix rising from ashes, which is a reference to the recoveries from four (4) devastating fires. The most notable was the massive fire during the July 4th celebration of 1866 that left 10,000 homeless and destroyed the entire financial and trade center. The city was rebuilt largely with bricks and in the Victorian style, much of which has been beautifully preserved through the efforts of the citizen's commitment to historic preservation. The 1866 fire was a landmark event motivating the nation's stock insurance companies to form the National Board of Fire Underwriters (NBFU), the predecessor to today's Insurance Services Office (ISO). As with its predecessor, the ISO surveys and rates on behalf of most insurance companies municipal fire protection of over 47,000 cities and towns in the majority of states across the country.

A recent greater alarm fire in one of Portland's conjested districts.

Fire Risk Analysis — It is important when assessing the deployment of the city's fire stations to gain insight as to the level and kind of risks that a response force of firefighters and equipment must be planned for. The analysis conducted includes a review of the risk to life, property, and historical responses, based on the broad categories of fire, EMS and other emergency responses. Life and property analysis incorporates risk categories of low, moderate, and high.

Life Risk. All properties within the city were categorized based on the severity of life hazard due to potential fire and similar threats with categories of high, moderate and low risks. High risk consists of properties where there exists a high level of risk to life including theatres and auditoriums or other large facilities where people may congregate, homes and other permanent or short-term residential places where people may rest and sleep including hotels, motels and

college dormitories. Other high-risk occupancies include properties where certain occupants may be immobile due to illness or physical condition such as hospitals and nursing homes, as well as places of incarceration, including jails or similar correctional facilities. Moderate risks include those properties where the occupants are ambulatory and always awake, including office buildings, mercantile and other forms of businesses and college campuses, aside from dormitories and fraternity houses. Low risk properties are warehouses and storage facilities that occupy only a few people at any given time.

The rationale for the categories is based on the body of knowledge that has identified certain settings where one is not conscious such as during evening rest, the presence of overcrowding conditions in nightclubs or concert halls or when one is immobile such as a patient in a hospital or the confinement of jail as being those conditions the public most susceptible to injury or death.

High

Assembly:
- Auditorium/convention hall
- Night club
- Restaurant
- Theatre

Educational:
- Elementary–high school
- Kindergarten/daycare center

Healthcare:
- Hospital
- Nursing home

Residential:
- Apartment complex
- Apartment house
- Assisted living/group home
- Boarding/rooming house/hostel
- Dormitory
- Multiunit (2-4 family dwelling)
- Fraternity/sorority houses
- Hotel/motel
- Manufactured homes
- Mixed use (residential above commercial)
- Single family dwelling

Special:
- Detention center
- Hazardous manufacturing/storage
- Multi-story (all occupancy types, 3 stories and higher)
- Reformatory

Moderate

Commercial:
- Department store
- Enclosed mall
- Grocery store
- Shopping center
- Small shops/stores

Business:
- College campus (minus dormitories and fraternity /sorority houses)
- Professional office
- Doctor clinic
- Government (City hall/offices)
- Mixed office/commercial
- Transportation (Train/bus station, seaport/airport, etc.)

Manufacturing:
- Factory
- Mill
- Power plant
- Processing/assembly
- Still/paper mill
- Bulk plant

Special:
- Recreational

Low

- Incidental structures (small sheds, pump, house, etc.)
- Storage

Warehouse

Findings. The mapping analysis revealed that much of the life risk are fairly evenly located throughout the city. **Map 5** indicates most neighborhood include the range of risks with the western and northern extremities of the city having the least of the high risks.

Property Risks. In addition to life risks, properties were assessed based on physical characteristics including density, building height and square footage of open areas **(see Map 6)**. High property risk includes groups of structures that are attached or constructed closely together such as older commercial and row house neighborhoods. Other high property risks include multi-story structures three (3) stories or greater or with large floor areas and facilities such as chemical plants where there is exist the manufacturing or storing of large quantities of hazardous products or processes. Moderate properties include the older sections of Portland where it is common for unattached homes and other moderate sized structures are built close enough together to still pose an exposure hazard. Low property risks are newer residential neighborhoods where the risk of fire spread is minimal.

Greater alarm fire in a high density Portland neighborhood.

High

- Zero lot-line construction (All occupancy types)
- Multi-story (all occupancy types 3 stories and higher)
- 1-2 story structures with first floor area of 10,000 or greater
- Hazardous manufacturing/storage

Moderate

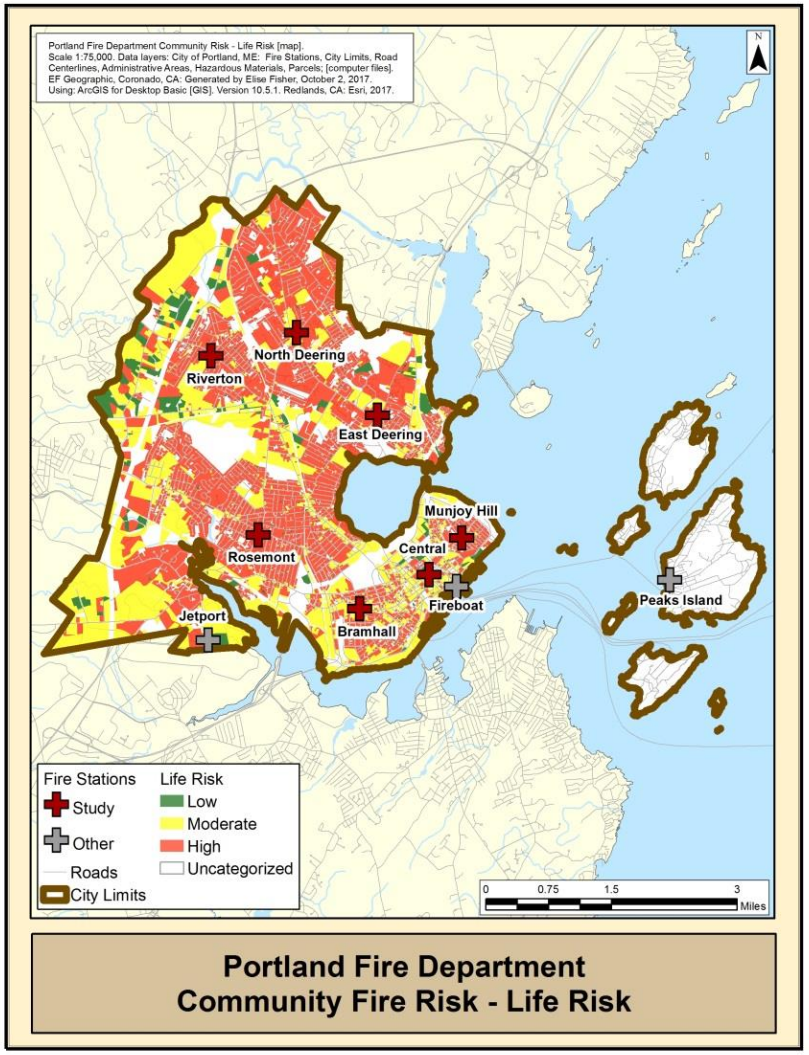
- Unattached single family and multi-family (2-4 unit) with 10 feet or less separation
- 1-2 story structures with first floor area of 9,999 square feet with 10 feet or less separation

Low

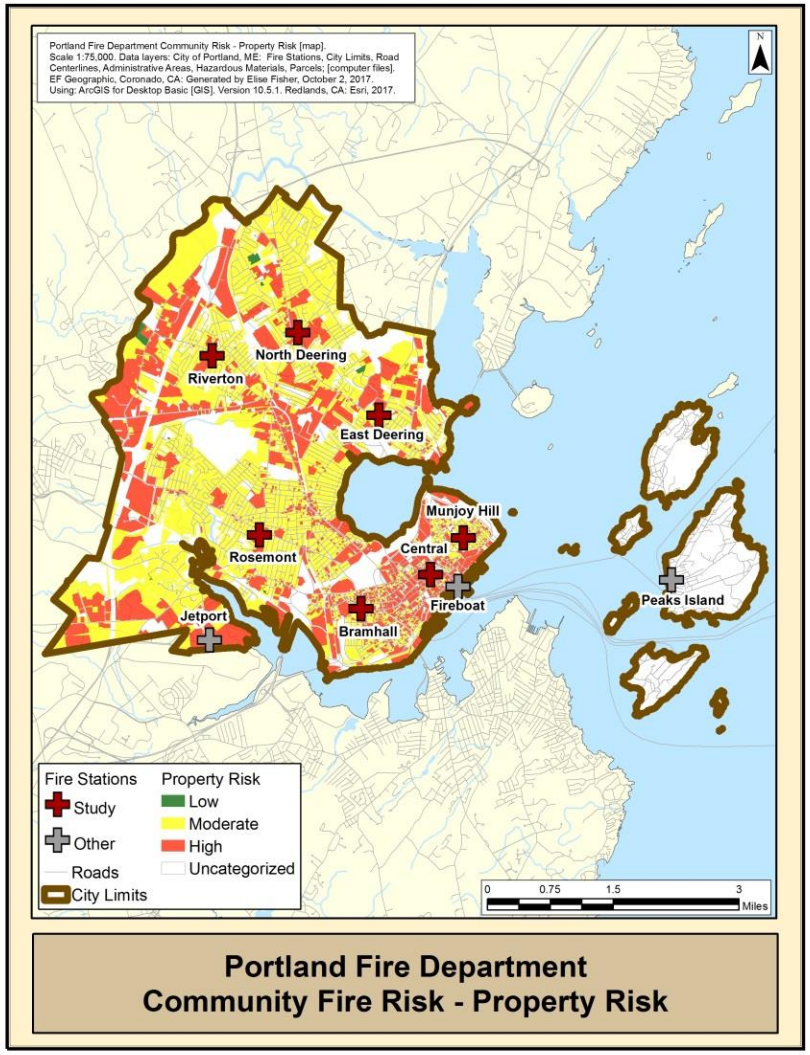
- Unattached single family and multi-family (2-4 unit) with 10 feet or greater separation
- Isolated incidental structures (small sheds, pump, house, etc.) with 10 feet or greater separation

Findings. **Map 6** indicates the concentration of the most severe fire risks located in the peninsula areas including downtown and Bramhall and the north central areas of the city.

Map 5. Community Fire Risk – Life



Map 6. Community Fire Risk – Property



Historical Incident Responses — Using data from the Maine Fire & EMS Incident Reporting System, incident call types were based on the broad categories of fires, emergency medical service and other calls for service. The fire category includes responses to structure, vehicle, grass and other outdoor fires and associated false alarms caused by unintentional activation of detection or suppression system and other good intent calls. The emergency medical category includes all incidents that are initially reported as requiring medical assistance, including that portion of incidents where no assistance was given. The remainder of incidents were categorized as other emergencies and nonemergency responses. Examples include physical rescues, vehicle extrication and responses to hazardous spills or releases.

Table 5. Incident Reponses, 2014-16

Incident Type	2014	2015	2016	Total	Average
Fire	3,796	3,877	3,495	11,168	3,722.67
EMS	11,321	11,764	11,682	34,767	11,589
Other	N/A	N/A	N/A	N/A	N/A
Total	15,117	15,641	15,177	45,935	15,311.67

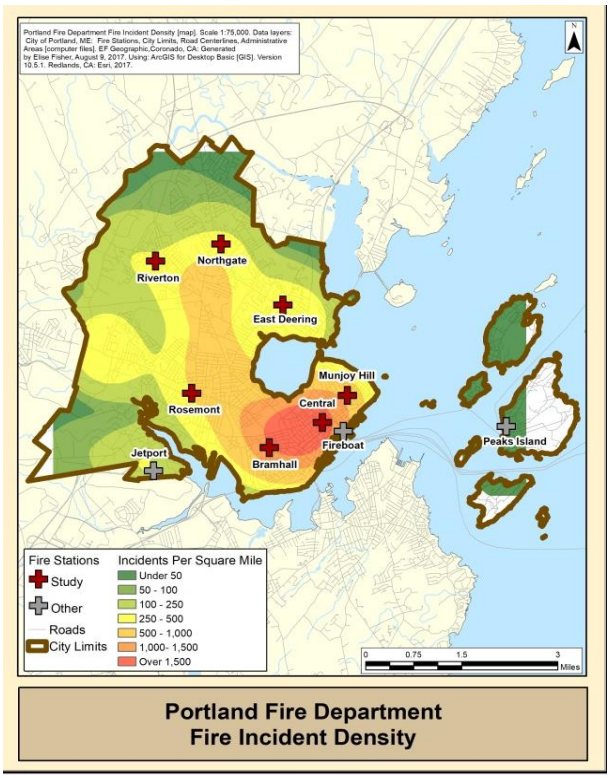
As demonstrated in **Map 7**, the highest concentration of emergency responses are the neighborhoods that surround the Back Cove waterfront and include the peninsula comprising the central business district and some of the oldest neighborhoods, such as those of the East and West Ends and and East Bayside.

The areas where there are the least number of responses include those along the most extreme northern, western and southwestern regions of the city. The bulk of fire responses, including those where there was an initial report of fire either by 911 telephone call or an automated detection or alarm system, is concentrated mainly in and adjacent to the downtown business district. This is understandable due to the higher concentration older building stock where fires are more frequent. Another factor is that these areas have many larger structures that are equipped with fire alarms systems, some of which are linked to detection and/or suppression systems, such as automatic fire sprinkler systems.

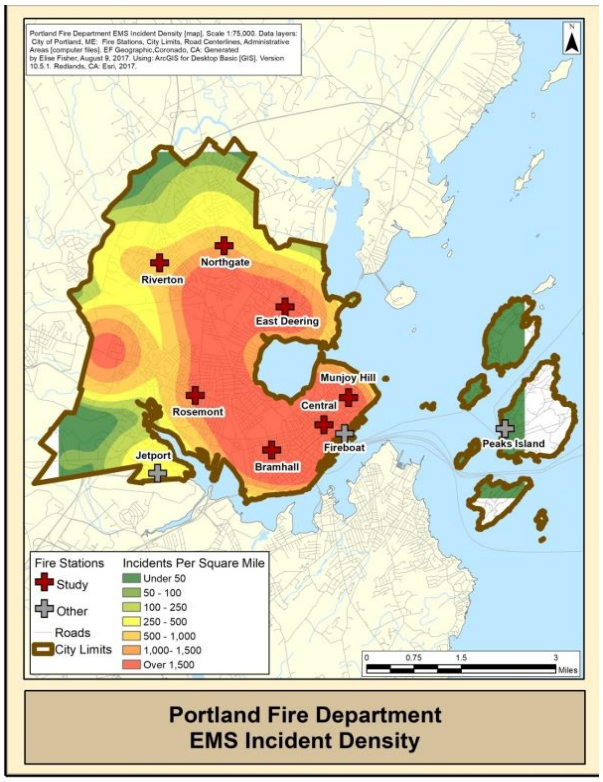
The highest concentration of emergency medical responses is in more expansive areas and include all neighborhoods in the peninsula region as well as the Deering Center, Back Cove, Oakdale, Rosemont, and Libbytown neighborhoods **(see Map 8)**. The department also responds to a significant number of EMS related incidents along the western edge of the city in the Nasons Corner neighborhood. The concentration of all incidents is similar to that of EMS responses.

Map 9 shows the combined concentration of all types of incidents.

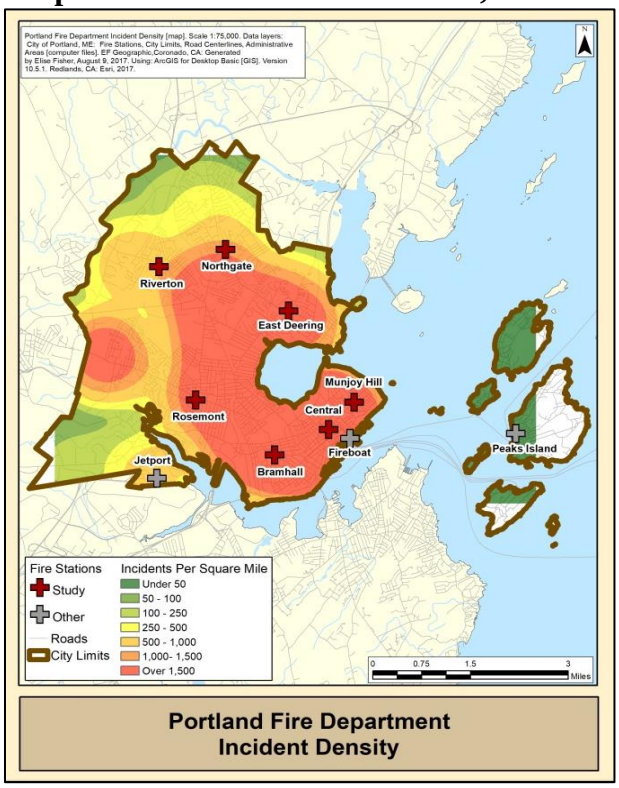
Map 7. Fire Concentration, 2014-16



Map 8. EMS Concentration, 2014-16



Map 9. All Incident Concentration, 2014-16

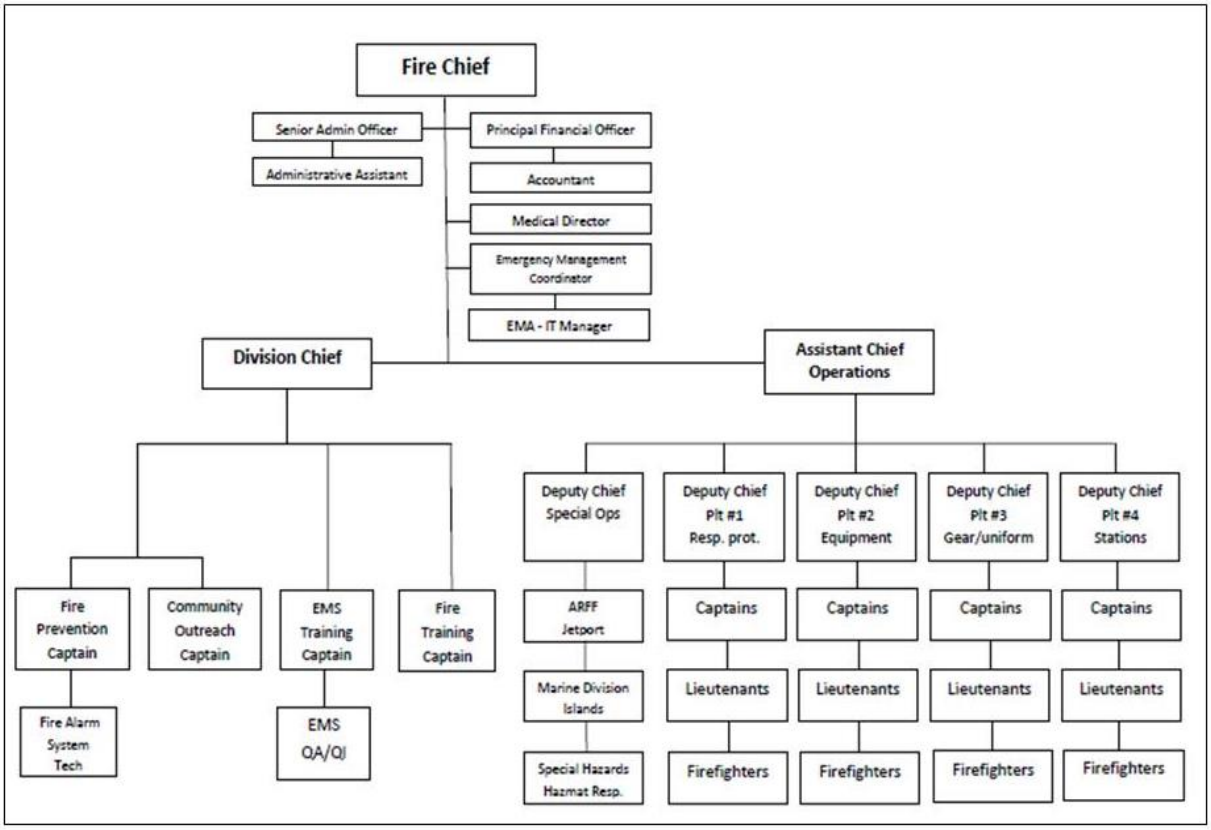


Portland Fire Department

Overview — The Portland Fire Department is an all-hazards agency providing fire and emergency medical programs and services on a fulltime basis. The department was established in 1768 and is currently staffed by 230 uniformed officers and firefighters staffing seven (7) stations within the city proper. On nearby islands that are within the city, the department provides its services utilizing "on-call" (volunteer) firefighters to residents and vacationers of Peaks Island, Great Diamond Island, Cushing Island, and Cliff Island. When necessary, these cadres of volunteers are augmented by a response of the on-duty career force that is transported by fireboat to the island needing assistance. In addition, the department provides on-site fire and rescue services at the Portland International Airport and a marine unit on the city's port and waterfront.

Organization. The department is organized into the four (4) major divisions of administration, emergency operations, fire prevention and support services **(Figure 4)**. The emergency operations division is under the command of an assistant fire chief who oversees an organization of four (4) duty tours, or shifts, each of which is comprised of a minimum staffing of 44 officers and members. **Table 6** provides a breakdown of each station's company assignments and respective staffing.

Figure 4. Portland Fire Department Organization



Response Resources. The department response resources consist of a chief officer, four engine companies, two ladder companies, two quint companies (combination pumper/ladder apparatus), one rescue company, five ambulances, an airport fire/rescue company and a marine firefighting and rescue company. The department augments its island on-call firefighters with a fulltime member who is located on Peaks Island. Auxiliary equipment consists of reserve, specialty and support vehicles such as spare pumpers, a hazardous materials truck and staff cars and trailers.

Each frontline fire company is staffed by an officer and two firefighters per shift. Each ambulance, or MEDCU Unit, is staffed by two firefighters per shift. The marine division is staffed by an officer and two firefighters per shift, who also cross-staff a reserve engine housed at the Central Fire Station in the event of a structural fire in the city not requiring a Marine Unit. Island firefighters operate a total of four engines, one ladder, four water tank units, and three MEDCU units. **Table 6** provides an overview of each station's location and assigned resources.

One of five (5) Portland Fire Department MEDCU units in service.

Method of Deployment —The department incorporates groups of officers and firefighters organized into engine, ladder and rescue companies. Two (2) of the seven (7) engine companies under review are assigned multi-functional engine-ladder apparatus commonly termed "quint." This type of apparatus is designed to serve the dual purpose with in addition to a pump, hose, and water tank are also equipped with a fixed aerial ladder usually either 85 or 100 feet in length and a greater amount of ground ladders than engine companies. The quint concept has been in use by many departments in recent years faced with budget constraints. In the case of Portland, the quint companies serve as an engine in their assigned first-in districts for responses requiring the services of only an engine such as vehicle or small outdoor fires, but may be assigned engine or ladder duties during structural firefighting operations.

Response Assignments

The department utilizes a tiered system for the initial deployment of personnel and equipment to reported fires, emergency medical and other calls for service. The department, in conjunction with the Portland Regional Communication Center, have developed a series of response level protocols that consider the number and classification of department resources suitable to the nature of a given incident category and type. The following includes an overview of each of the broad categories and incident types.

Fire Alarm/Detection Systems — Incident types include initial dispatch to automatic alarm activations for alarmed and sprinklered buildings and municipal fire alarm street boxes. The initial assignment is minimal due to the high probability of false alarms caused by unintentional activation of private systems or the malicious use of alarm boxes along public streets.

Fire — Incident types include structure, vehicle, outdoor, marine and aircraft. The department assigns a heavy initial assignment to all structure fires reported by the public either by phone. History and experience has conditioned the department to assign a heavy number of companies

to reported structure fires where there is a potential for fire spreading quickly to upper floors and adjacent properties in the city's congested neighborhoods and business districts. Vehicle and outdoor fires generally receive a much smaller initial assignment of engines and ladder companies. Special fire-related assignments are those along the waterfront or one involving an aircraft include a response of the marine and/or ARFF companies.


Fire in an occupied Portland multi-story structure requiring coordianbtion of engine and ladder companies.

Emergency Medical — Initial response to emergencies that are medical in nature are types as either Basic Life Support or Advanced Life Support. All incidents receive at least one ambulance and if necessary an engine company. All ALS responses have an ambulance and an engine company as part of the initial assignment. Calls for emergency medical assistance aboard nearby watercraft or any of the city's outlying islands will also include a response from the department's marine company who transport MEDCU personnel to the scene of the emergency.

Rescue — Responses categorized as rescue include those that are non-fire related incidents requiring some form of physical rescue such as vehicle entrapment, industrial related accidents and those requiring special training in high angle rope rescue or operations in confined spaces. Most rescue types require an assignment of fire and rescue companies, ambulances and in certain cases the marine company.

Hazardous Materials — Hazardous material categories include responses to reported spills or releases of hazardous substances or gases. The response is tiered with initial response requiring an investigation consisting of an engine, ladder and rescue response with potential upgrade of a full response including the department's hazardous materials response unit.

Table 7 provides an overview of the department's initial assignment protocols including the classification of companies and the total staffing level of each incident type. It is important to note the table is reflective of initial assignments which may be reduced or upgraded based on the situation found by the first arriving officer(s).

Table 6. Portland Fire Department Station and Resource Assignment

Station	Address	Assignments	Career Staffing
Primary Stations			
Bramhall	784 Congress Street	Car 2 – Deputy Chief Engine 6 Ladder 6 MEDCU 6 Rescue 1 Engine 10 - Reserve	1 3 3 2 3
Central	380 Congress Street	Engine 5 MEDCU 5 CAR 39 Engine 7 – Reserve MEDCU 8 & 9 Reserve	3 2 1
East Deering	576 Ocean Ave.	Engine 11 Engine 2	3
Munjoy	134 Congress Street	Engine 1 Ladder 1 MEDCU 1	3 3 2
North Deering	380 Allen Ave.	Ladder 4 (Pumper/ladder) MEDCU 4	3 2
Riverton	1592 Forest Avenue	Engine 9 Ladder 5 - Reserve	3
Rosemont	212 Stevens Avenue	Ladder 3 (Pumper/ladder) MEDCU 3	3 2
Specialty Stations			
Marine	380 Congress St.	Marine 1 Marine 2 Marine 3	3
Air Rescue	1005 Westbrook Street	Captain Red 2 Red 3 Red 4 Red 5-Spare	1 1 1
Island Volunteer Stations			
Cliff Island	Cliff Island	Engine 15 MEDCU 15 Tank 15 ATV Unit	
Cushing Island	Cushing Island	Engine 14	
Great Diamond Island	Great Diamond Island	Engine 13 MEDCU 13 Tank 13 Forestry 13	
Little Diamond Island	Little Diamond Island	Utility Vehicle	
Peaks Island	Peaks Island	Engine 12 Ladder 12 MEDCU 12 Tank 12	1
		Total on-duty career force	49

Table 7. Initial Assignment Protocols

Initial Incident Type	Chief	Engine	Ladder	Rescue	MEDCU	Other	Staffing
Fire Alarm/Detection Systems							
Private Fire Alarms: Includes initial dispatch for automatic alarm activations for alarmed and sprinklered buildings	1	2	1				10
Municipal Fire Alarm: Includes initial dispatch to activation of Portland municipal fire alarm boxes		2	1				9
Fire							
Structure: Includes initial response to "reported" fires within, on or adjacent to structures (Residential 1 (One and two family detached), Residential 2 (Multi-family up to four stories), Residential 3 (High-rise apartment houses 5 stories or taller), Commercial, Commercial High-rise, Hospital, Nursing Home, Schools, Industrial	1	3	2	1	1		21
Vehicle: Initial response to reported fires involving passenger-heavy truck when not adjacent to structure not warranting a structural response)		1	1				6
Outdoor: Initial response to reported brush or grass fires not involving structures or other significant properties		1					3
Marine: Includes all fire responses involving recreational or commercial watercraft		1	1				6
Waterfront		1	1			Marine	9
Open water		1	1			Marine	9
Aircraft		1	1			Marine	9
Airport	1	3	2	1	1	ARFF	24
Off airport property	1	3	2	1	1		21
EMS							
Basic Life Support		0/1			1		2/5
Advanced Life Support		1			1		5
Marine					1	Marine	5
Rescue							
Entrapment - vehicle		1	1	1	1		11
Entrapment - industrial		1		1	1		8
High angle		1		1	1		8
Confined space		1		1	1		8
Hazmat							
Investigation		1	1	1			9
Technician level		1	1	1		Hazmat	9

SECTION III: FIRE STATION DEPLOYMENT ANALYSIS

An analysis was conducted of the current location of Portland's mainland fire stations that are staffed by fulltime career personnel. Based on direction provided by the fire chief, the analysis excluded the specialty facilities including the air rescue station located at the Portland International Airport and the marine station at the city's waterfront. Further, the analysis did not consider on-call volunteer stations located on nearby islands that are within the city's limits. Island stations not included in the study are those that serve Cliff, Cushing, Great Diamond, Little Diamond and Peaks Islands.

Station Location Influences — The strategic placement of fire stations within a community is vital to providing efficient and effective fire department programs and services. Without good planning for station locations, response to fires, medical emergencies and other calls for service by the public may be negatively impacted by increased response times of first-arriving and backup companies of firefighters. Most communities varying factors also contribute to the number and location of fire stations:

- Budgetary limitations
- Available property
- Public's perceived level of risk
- Cultural and political influences and customs
- Preexisting locations
- Access barriers including terrain, transportation right-of-ways and bodies of water
- Unique local conditions

Many of the factors have influenced the location of Portland fire stations since the inception of the fire department.

Applied Data — The project team utilized a set of data provided by the city that were then used to analyze the various aspects of the department's response capability. Data included:

Geographic Information System (GIS). The project team collected multiple levels of data related to the city's fire stations, street network, boundaries and physical attributes from the city's GIS unit.

Maine Fire & EMS Incident Reporting System (MEFIRS). Response data as reported by the department using the MEFIRS was analyzed for the years 2014-16. The review included categorizing data based on incident type and frequency.

Computer Aided Dispatch (CAD). Records were reviewed from the Portland Regional Communication Center related to fire department responses, with emphasis on incident type, response times and unit workload.

GIS Analysis. From this collection and analysis of GIS, NFIRS, and CAD data, a series of maps were developed depicting fire station location efficiency including travel time and distance and the capability to assemble sufficient officers and firefighters and their equipment to quickly carryout an adequate and safe response.

Computer Mapping. FACETS utilized ArcGIS Desktop in conjunction with two (2) specialized analysis extensions (Network Analyst and Spatial Analyst), a series of commercial off-the-shelf ArcView GIS software programs developed by the Environmental Systems Research Institute (ESRI). The software package allows for the input of GIS, NFIRS, CAD and other relevant data to generate maps, charts and graphs that make the communication of analytical results in an organized and visual way. **Map 10** was developed by the project team for the use as the study's base map for identifying the city and its boundaries, current fire station locations and transportation network.

Map 10. City of Portland Base Map

Note the map identifies fire station that are part of the study in red.

ISO Travel Distance

As mentioned in Section I, the study included an application of travel distance model as applied by the Insurance Services Office. The analysis applied the model to the department's seven (7) engine companies (including two (2) pumper-ladder quint apparatus) and two (2) ladder companies. Quint apparatus are analyzed in the analysis of both engine and ladder response distance analysis.

Scope of Analysis

Analysis is based on ISO criteria that focus on a review of engine and ladder company capabilities with regard to the ability to the initial response to reported structure fires only and does not consider chief officers or special units, such as rescue companies. However, it is important to note that ISO does consider these resources when crediting on-duty staffing their surveys of community fire defenses.

Response Distance Criteria — Criteria is the calculation of a fire company responding along city streets with an average speed of 35 mph. The response distance for each company type consists of:

Engine companies – 1.5 miles
Ladder companies – 2.5 miles

Findings

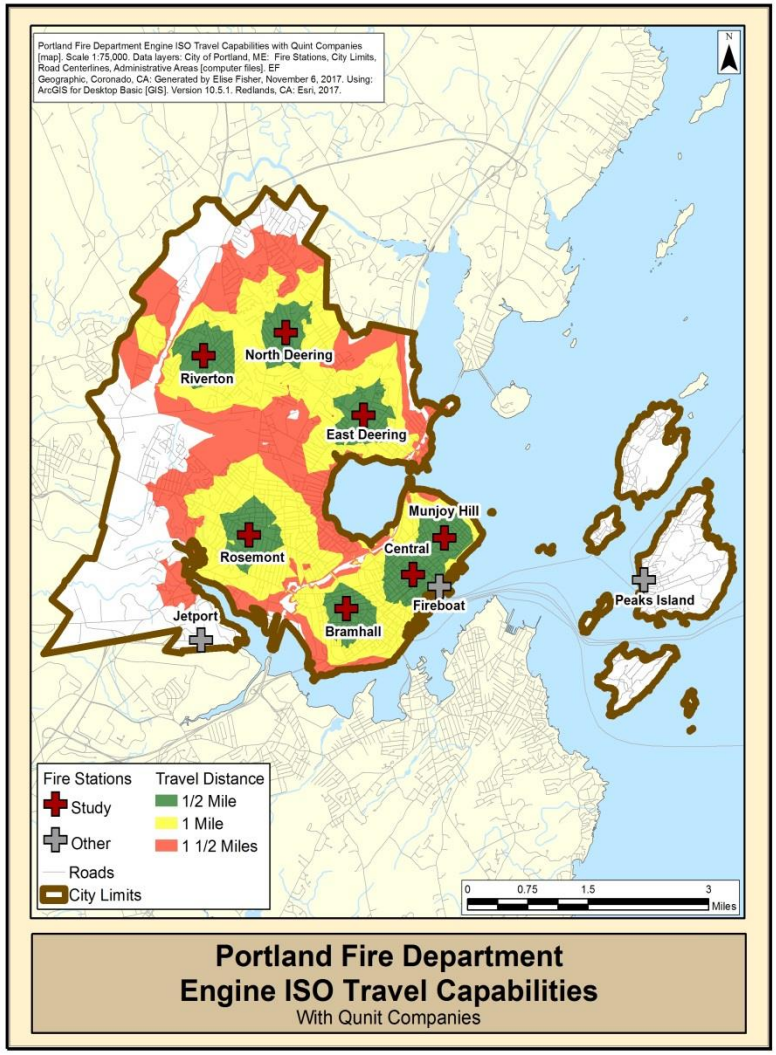
Engine Company Coverage — Map 11 illustrates the analysis which illustrates that most of the city proper is within 1.5 miles of one of the five (5) in-service engine and two (2) quint companies. Under most conditions, it is considered optimum coverage if there exists a slight overlap of coverage. Areas outside the response perimeters were primarily on the western edge of the city. This is in part due to the access barrier created by the Interstate 95 corridor.

Findings. The map also reveals overlap of coverage between most stations particularly between the Bramhall, Central and Munjoy Hill fire stations with significant overlap between the latter two.

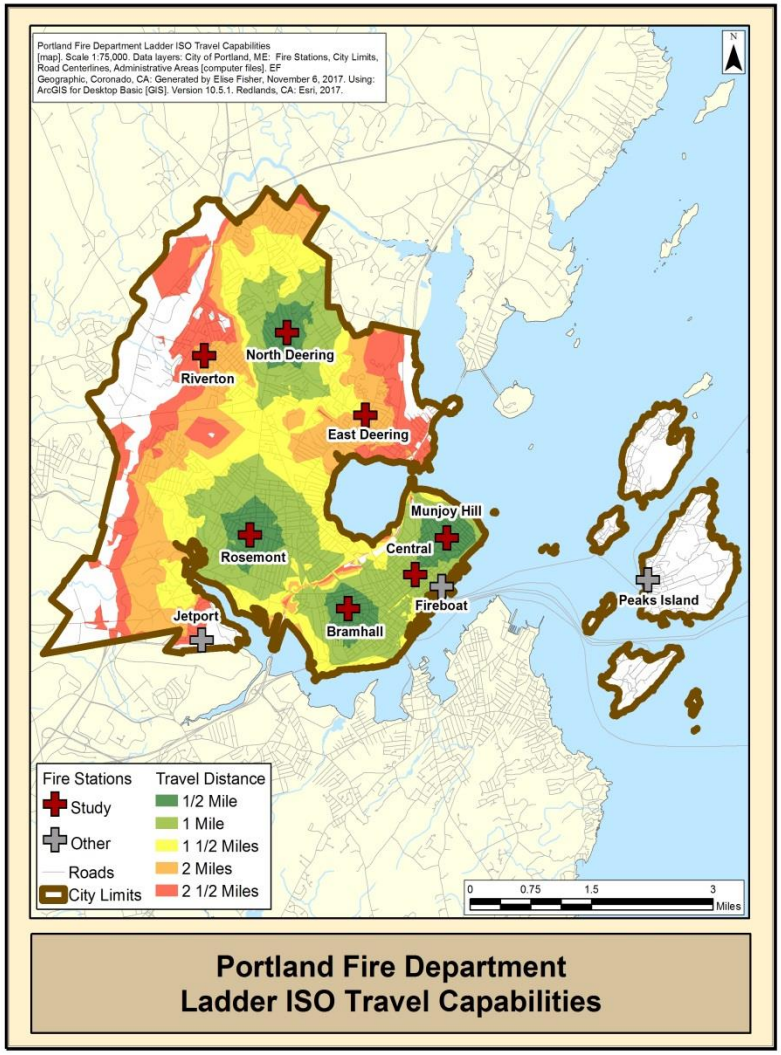
Ladder Company Coverage — Map 12 illustrates ladder company coverage and as with the above engine company coverage includes the two (2) quint companies located at the North Deering and Rosemont stations. As with engine company coverage, a small area outside the response perimeters was primarily on the western edge of the city, in part due to the access barrier created by the Interstate 95 corridor.

Findings. The analysis indicates an overlap of coverage mainly between the ladder companies whose primary response area includes the peninsula area and adjoining neighborhoods.

Map 11. ISO Engine Co. 1.5 Mile Travel Distance



Map 12. ISO Ladder Co. 2.5 Mile Travel Distance



NFPA 1710 Travel Times – Fire Response

Unlike the ISO response distance method, the NFPA 1710 method uses travel time to determine the effectiveness of fire station locations. Like the ISO method, the NFPA 1710 analysis includes the response times of engine and ladder companies. as well as chief officers, MEDCUs and the department's rescue company. Stations whose companies are assigned quint apparatus were analyzed as part of the review of both engine and ladder companies.

Analysis is based on criteria that focus on a review of the department's on-duty chief officers, fire companies, including the rescue companies, and their ability to respond an initial response to reported structures fires and EMS incidents.

Travel Time Criteria — Criteria is the calculation of response from fire stations based on 4 and 8 minutes. This is in line with NFPA 1710 response time benchmarks for structure fire and EMS responses as described in Section I. A three-minute delay was built into the calculations to demonstrate a worst-case scenario at grade railroad crossings (**See Map 4**.)

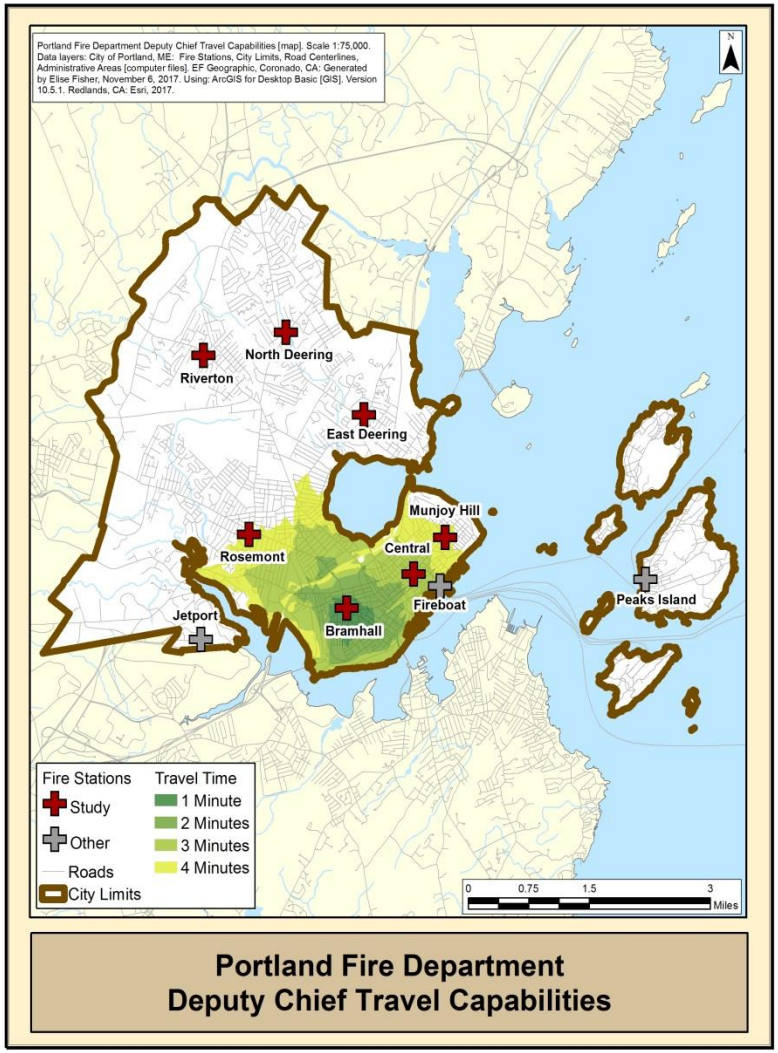
Findings — *Deputy Chief.* As part of the initial assignment to a reported structure fire, the standard assumes there is on duty enough chief officers that are strategically placed to arrive on the scene within eight (8) minutes or less. An analysis was made applying criteria with the deputy chief located in their current quarters at the Bramhall Station. As can be seen **Map 13** and **Map 14**, there is a significant section of the northern region of the city beyond the 4- and8-minute benchmarks.

Engine companies. Companies were analyzed based on both 4- and 8-minutes response benchmarks utilizing the stations housing engine and quint apparatus. **Maps 15 and 16** indicate adequate response times from all stations. However, there is significant redundancy between the Bramhall, Central, and Munjoy Hill stations. This is understandable in older sections of cities like Portland where delays due to traffic volume and snowfall coupled with companies unavailable on non-fire responses inhibit timely fire apparatus response.

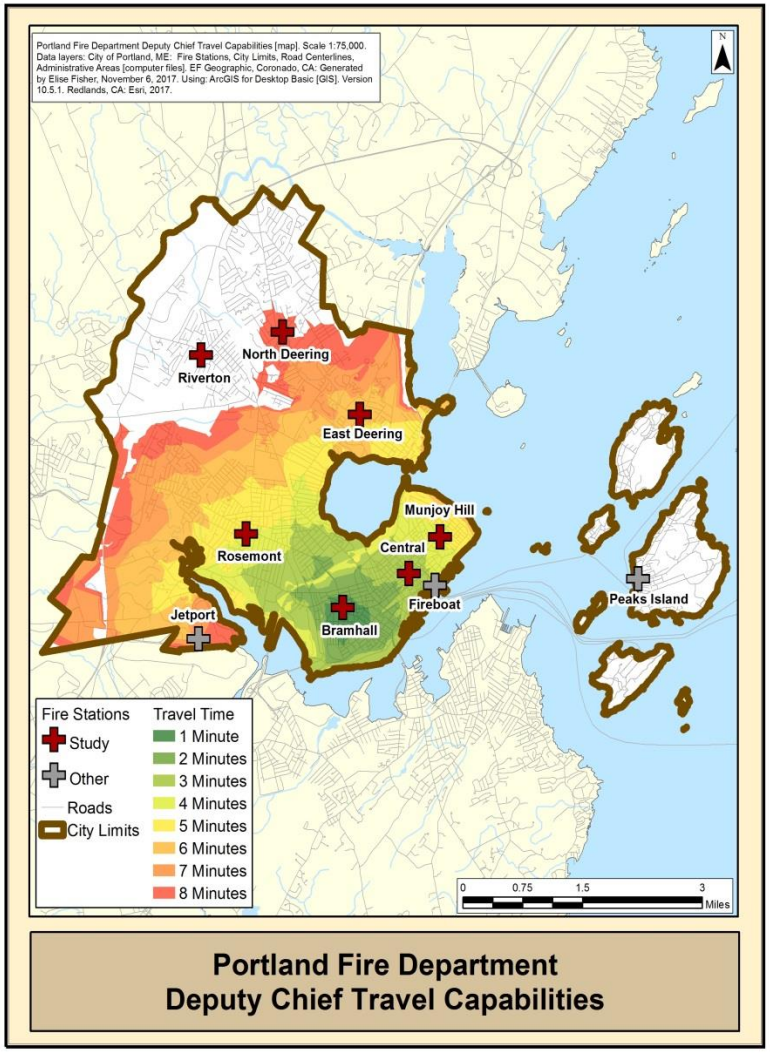
Ladder companies. Response times were analyzed applying the 8-minute criteria from stations currently assigned ladder companies including Bramhall and Munjoy Hill and quint companies located at Rosemont and North Deering stations. Utilizing both ladder and quint companies the clear majority of the city is covered within the 8-minute criteria. **See Map 17.**

Rescue company. Specifically, rescue or similar specialty companies are not directly considered as part of the initial response to reported structures fires. They can however serve as an integral part to the total staffing capabilities under the standard. This is particularly so with Portland due to the less than minimum engine and ladder company staffing. The analysis reveals the rescue company's current Bramhall location allows for an 8-minute response in all of the southern and central regions with much of the northern part of the city. **See Map 18**.

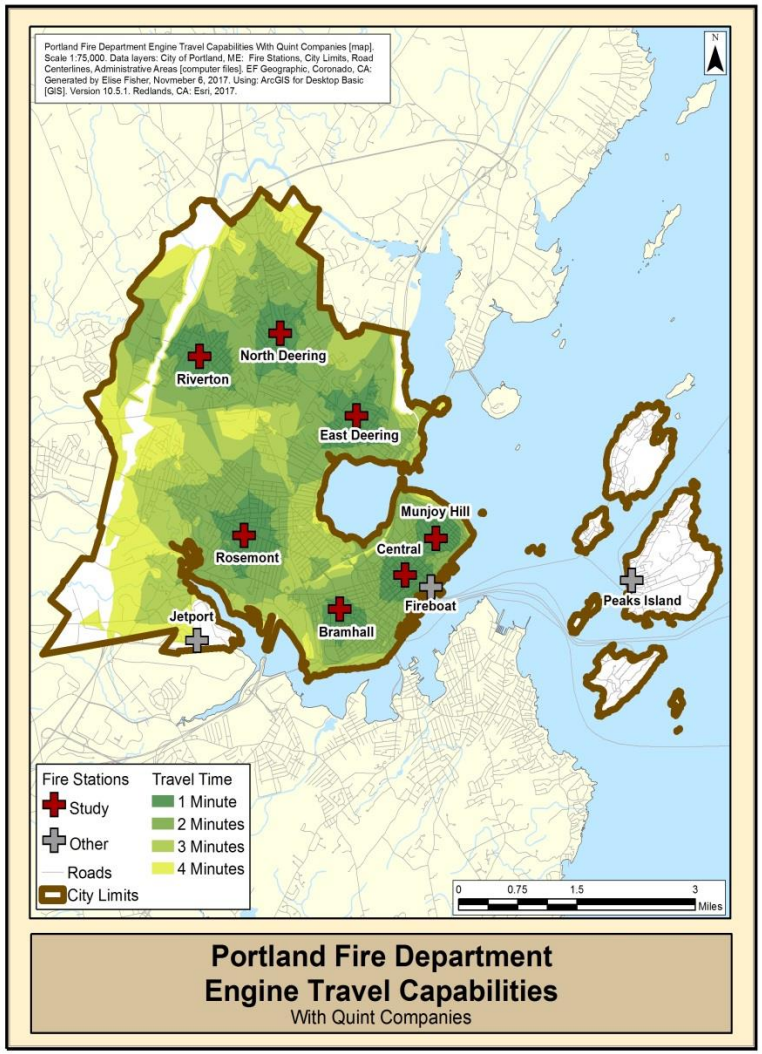
Map 13. NFPA 1710: 4-Minute Response – Deputy Chief



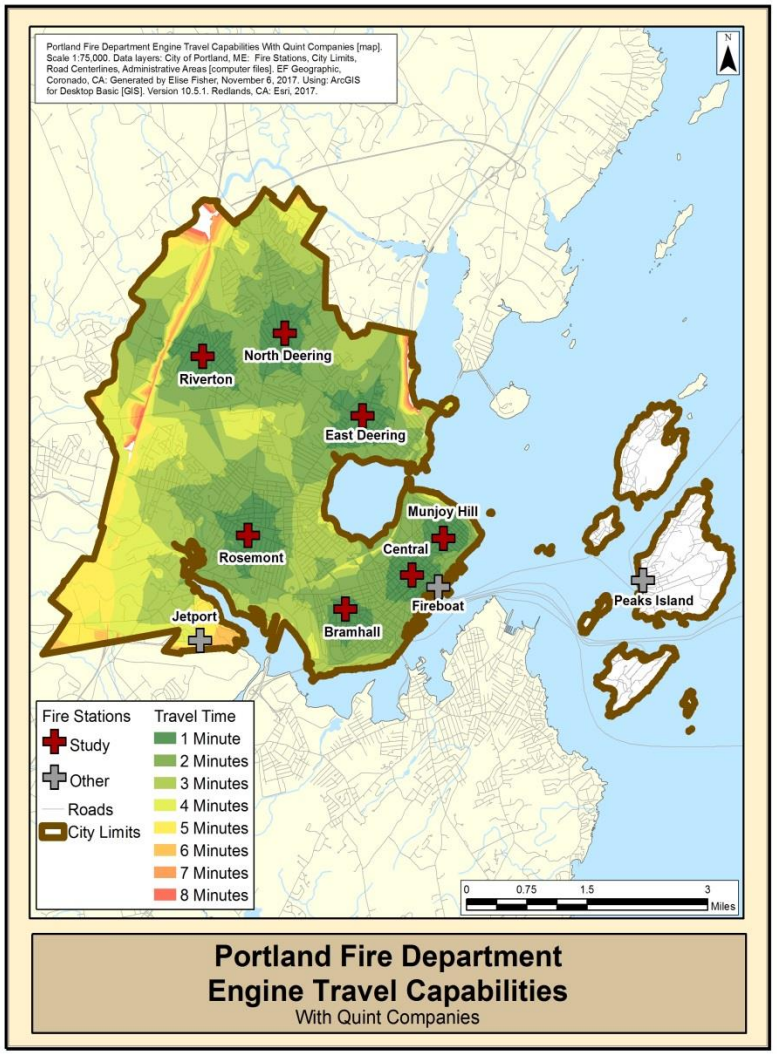
Map 14. NFPA 1710: 8-Minute Response – Deputy Chief



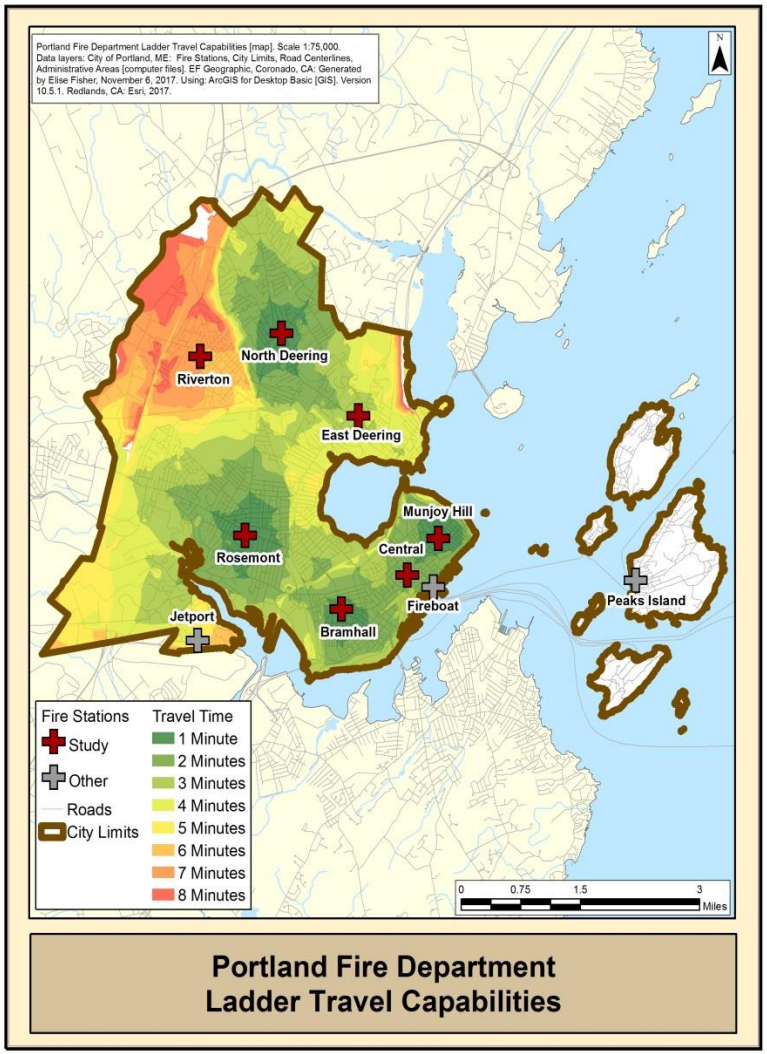
Map 15. NFPA 1710: 4-Minute Response – Engine Companies



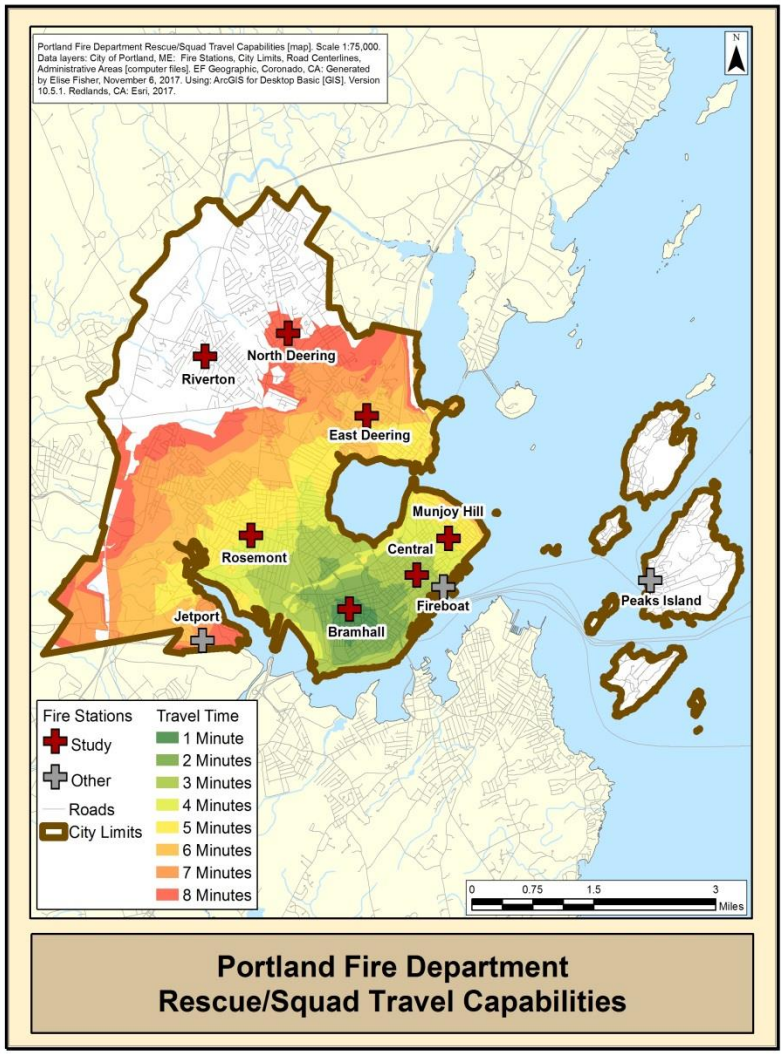
Map 16. NFPA 1710: 8-Minute Response – Engine Companies



Map 17. NFPA 1710 8-Minute Response – First Due Ladder Company



Map 18. NFPA 1710 8-Minute Response – Rescue Company



NFPA 1710: Initial Structure Fire Deployment Capability

Assignment Capability Criteria — Criteria for assignment capability consist of four (4) deployment scenarios. The scenarios are based on an 8-minute response capability. A three-minute delay was built into the calculations to demonstrate a worse-case scenario at grade railroad crossings.

Single-Family Dwelling. A two-story single-family dwelling of 2,000 square feet without a basement and no exposures. Staffing should include a combination of 15 officers and firefighters, comprised of one chief officer and the remainder of the assignment made of engine and ladder company personnel. Total firefighting force travel time is 8 minutes.

Open-Air Strip Shopping Center. A single story 13,000 to 196,000 square foot commercial structure. Total staffing should be a combination of 27 officers and firefighters, comprised of two (2) chief officers and the remainder of the assignment made of engine and ladder company and EMS personnel. Total firefighting force travel time is 8 minutes.

Apartment Building. A 1,200-square foot apartment within a three-story garden style apartment structure. Total staffing should be a combination of 27 officers and firefighters comprised of two (2) chief officers and the remainder of the assignment made of engine and ladder company and EMS personnel. Total firefighting force travel time is 8 minutes.

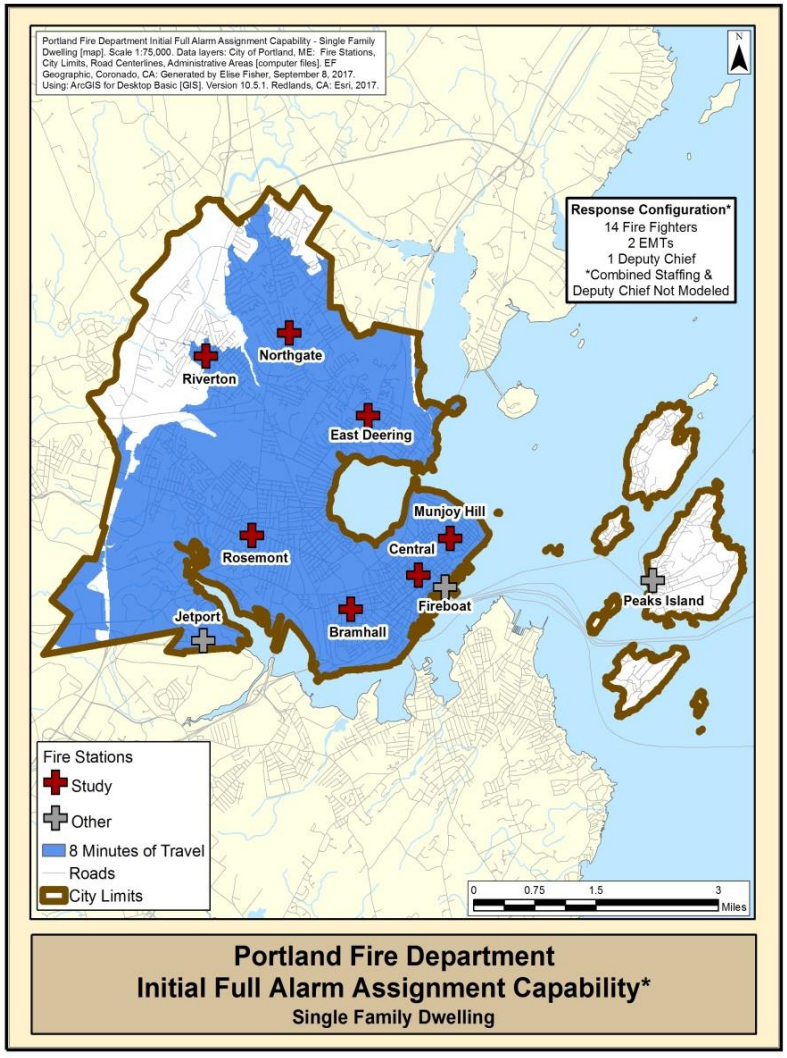
High-rise. A multi-story structure with the highest floor greater than 75 feet above the lowest level of fire department access. Total staffing should be a combination of 41 officers and firefighters comprised of two (2) chief officers and the remainder of the assignment made of engine and ladder company and EMS personnel.

Findings — *Single-family dwelling*. Response capabilities considered a total of 15 officers and firefighters. Given the department's staffing configuration and method of operation the assignment would require the deputy fire chief and five (5) three-person companies comprised of a combination of engines, ladders and the rescue company. Much of the Riverton and North Deering neighborhoods are beyond this level of assignment within 8 minutes without response from nearby mutual-aid fire companies. **(See Map 19**)

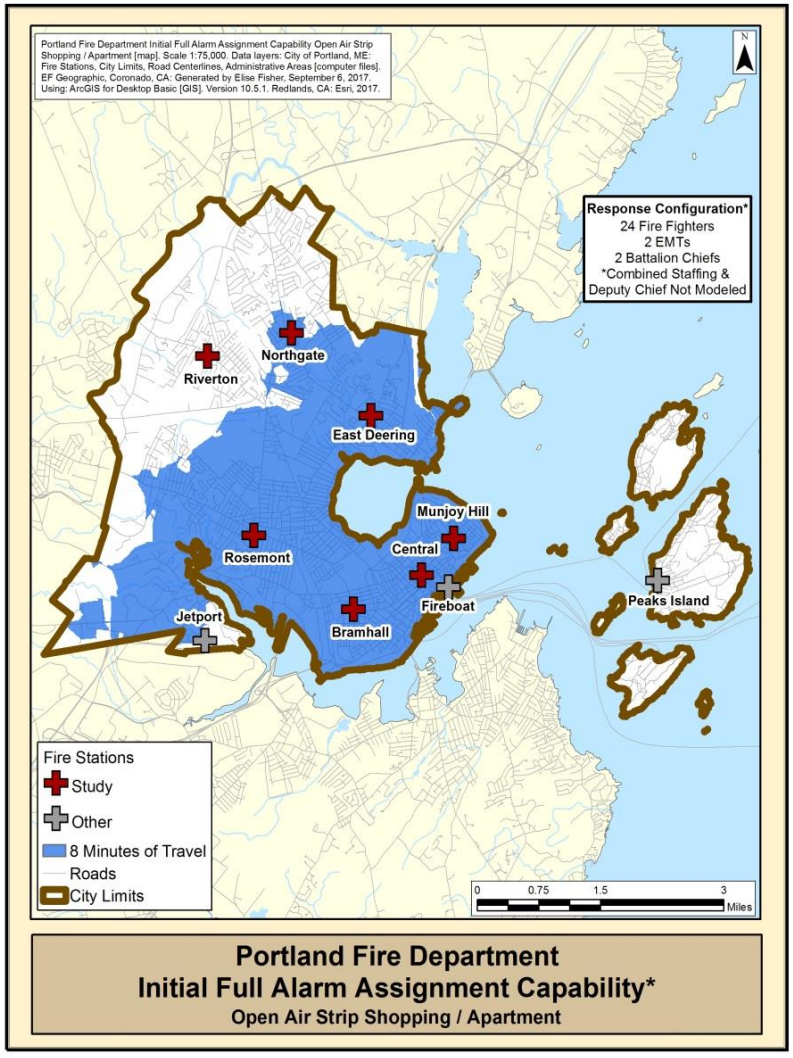
Commercial strip mall and apartment house. Response capabilities considered a total of 27 officers and firefighters. The assignment would require the deputy fire chief and one additional chief officer, eight (8) three-person companies comprised of a combination of engines, ladders and the rescue company and one MEDCU. Much of the Riverton and North Deering neighborhoods are beyond this level of assignment within 8 minutes. As with the single-family dwelling scenario, much of the Riverton and North Deering neighborhoods are beyond this level of assignment within 8 minutes without response from nearby mutual-aid fire companies. **(See Maps 20 and 21**)

High-Rise. Response capabilities considered a total of 41 officers and firefighters. The assignment would require the deputy fire chief and one additional chief officer, eleven (11) three-person companies comprised of a combination of engines, ladders, the rescue company and MEDCU units. Practically no area of the city can be reached within 8 minutes. **(See Map 22)**

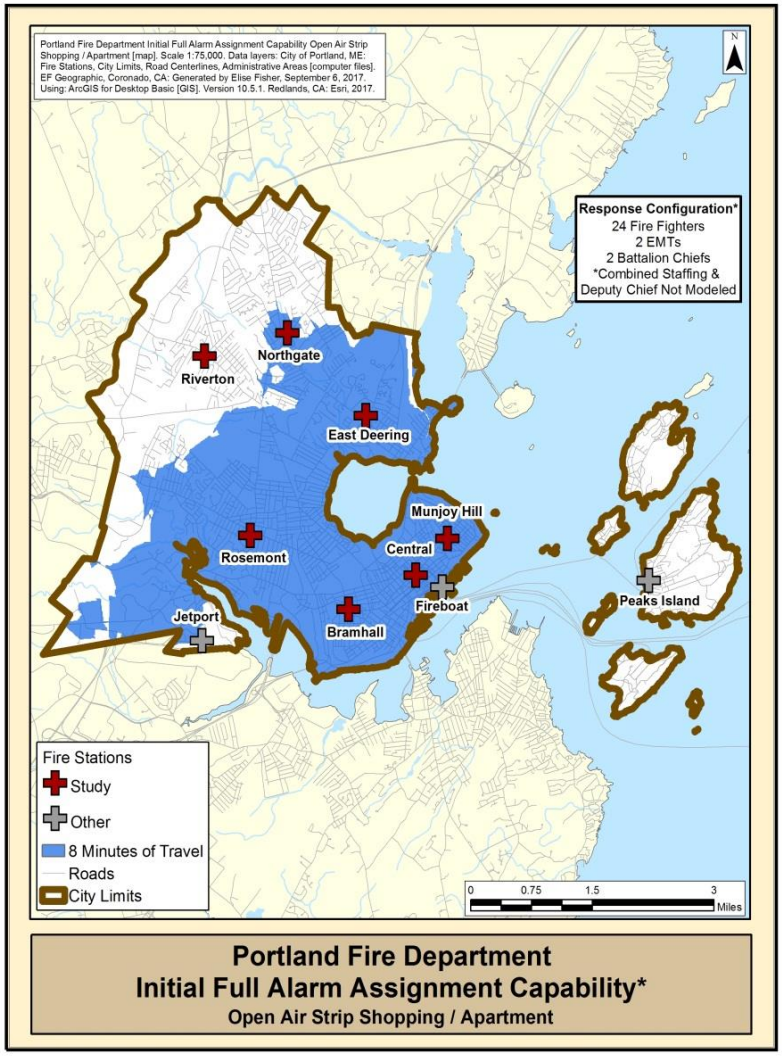
Map 19. NFPA 1710: Single Family Dwelling Initial Full Assignment



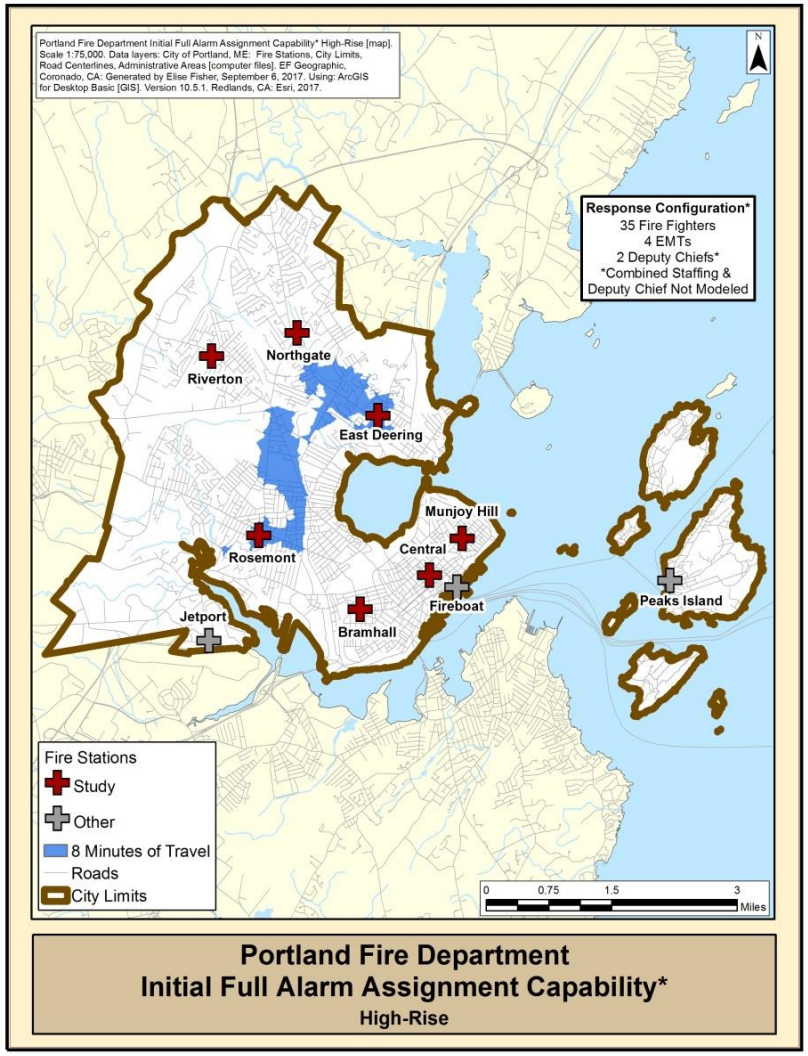
Map 20. NFPA 1710: Open Air Strip Shopping Center Initial Assignment



Map 21. NFPA 1710: Apartment House Initial Assignment



Map 22. NFPA 1710: High-Rise Initial Assignment



NFPA 1710: Initial EMS Deployment Capability

Assignment Capability Criteria — The standard identifies basic treatment levels as first responder, basic life support (BLS), and advanced life support (ALS) and allows for the community to determine what level, if any, of EMS to be provided by the fire department. The levels of service include first responder with AED, BLS non-transport, ALS non-transport and patient transport in an ambulance or alternative vehicle designed to provide for uninterrupted patient care at the ALS or BLS level while enroute to a medical facility

Unlike structure fire criteria, the current edition of the NFPA 1710 standard is silent with regards to specific travel times. Instead, it states the fire department should adopt service delivery objectives based on time standards for the deployment of each EMS service component for which it is responsible. Previous editions provide for the fire department's EMS travel times of a first responder or BLS service with AED to arrive within four (4) minutes and ALS service in no more than eight (8) minutes.

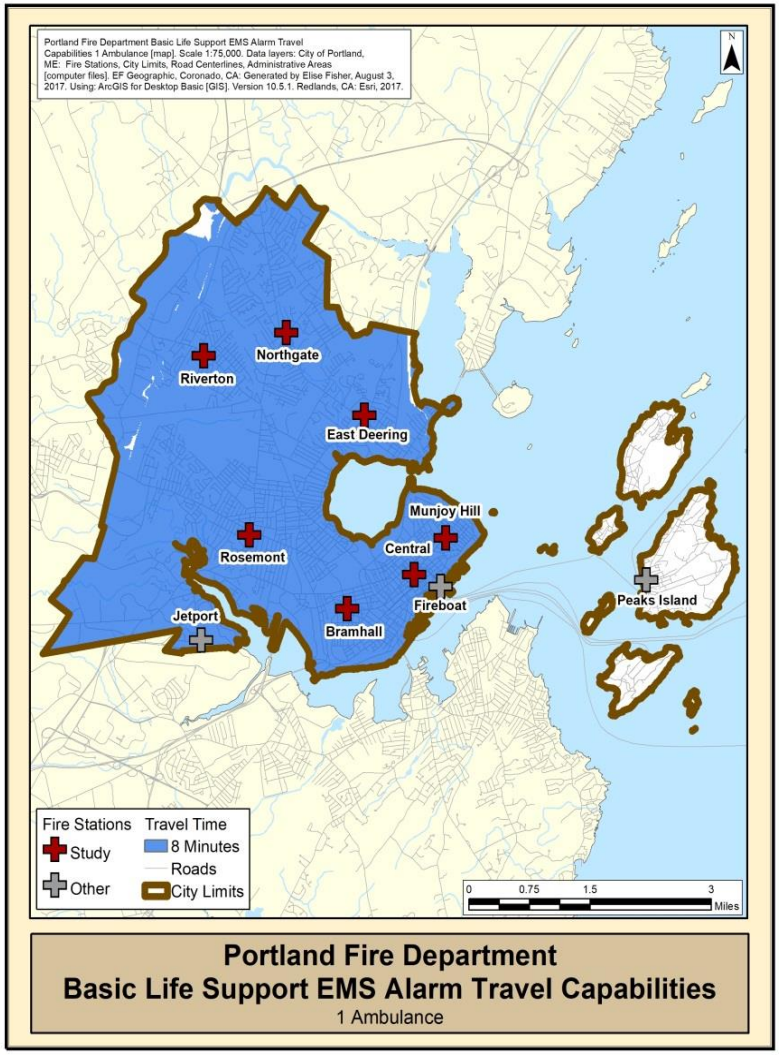
Considering the department's current method of operation that incorporates a tiered system of both ALS-level ambulances augmented by BLS-level fire companies, the above 4- and 8-minute travel time benchmarks were applied. Criteria for deployment capability consist of four (4) minutes for BLS and eight (8) for ALS. A three-minute delay was built into the calculations to demonstrate a worst case scenario at grade railroad crossings

Basic life support. Response includes one MEDCU unit with two (2) firefighters. Deployment was based on unit assignments at Central, Bramhall, East and North Deering and Rosemont stations.

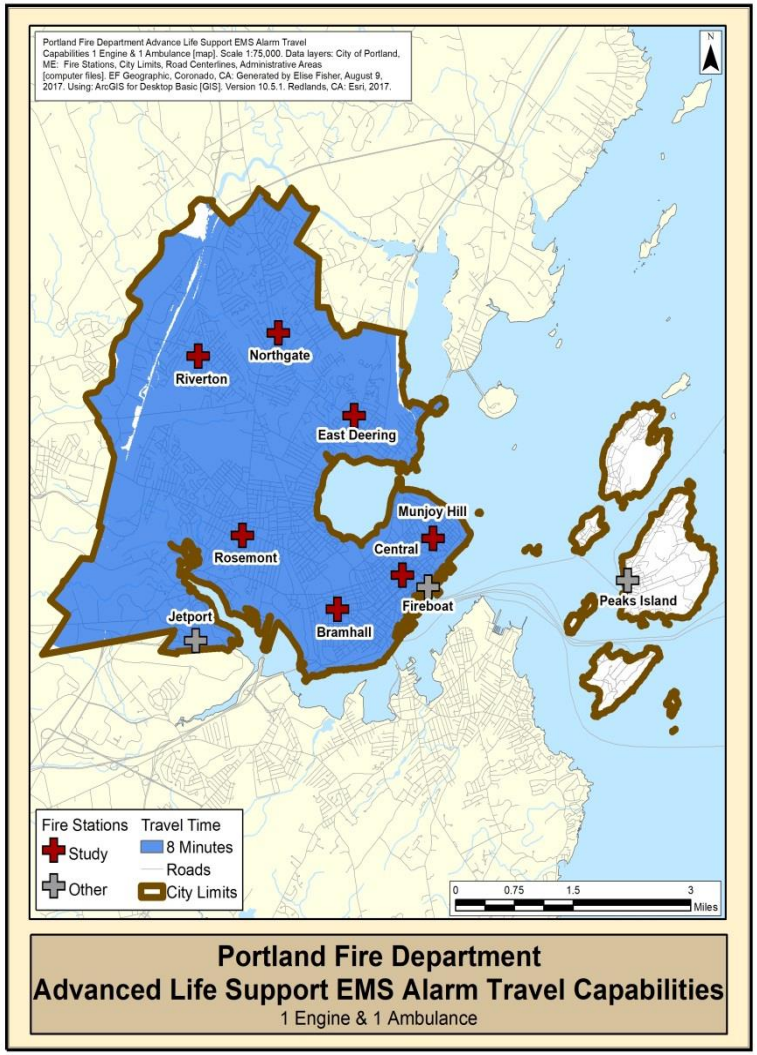
Advanced life Support. Response includes a minimum of five (5) members consisting of one (1) MEDCU unit with two (2) firefighters and one (1) fire company (engine, quint, ladder or rescue) with one (1) officer and two (2) firefighters. Deployment was based on the above MEDCU assignments.

Findings — Based on response time, **Maps 23 and 24** demonstrate most of the city is within the 4- and 8-minute benchmarks for BLS and ALS services.

Map 23. NFPA 1710: Basic Life Support EMS Travel Capabilities



Map 24. NFPA 1710: Advanced Life Support EMS Travel Capabilities



Portland Fire Department Deployment Protocols

As identified in **Table 6**, *Initial Assignment Protocols* (See Section I), the Portland Fire Department has predetermined protocols for the initial deployment to various fire and emergency incidents. The protocols are programed into the city's CAD system that includes the number of and classification of assigned companies. Like the ISO and NFPA analysis, the protocols were reviewed with respect to response times reflective of NFPA 1710's travel time criteria of four (4) and eight (8) minutes.

Classifications and Findings

Automatic Alarm and Detection Systems — The classification is divided into two (2) levels: *private fire alarm system* assignment consisting of the deputy chief and an engine and ladder company and a *municipal fire alarm street box* assignment including two (2) engines and one (1) ladder company **(Maps 25 and 26)**. Most of occupancies protected by automatic systems are within the prescribed response protocols, with the exception being along the western and northern areas of the city. The analysis may be skewed due to excessive travel times of the deputy chief and the analysis identifying quint companies as being identified as the assigned ladder company.

Emergency Medical — The classification consists of a BLS assignment consisting of a single fire company and an ALS response of one MEDCU unit **(Maps 27 and 28)**. Response to BLS and ALS incidents are met except for the Riverton fire station response area.

Fires — Fire responses are broken into three (3) categories:

1. A structure fire assignment, including the deputy chief, three (3) engine and two (2) ladder companies, the rescue company and one (1) MEDCU unit **(Map 29)**.
2. Fires involving vehicles with an initial response to include one (1) engine and one (1) ladder **(Map 30)**.
3. Outdoor fires such as grass and brush fires with an initial response of one (1) engine **(Map 31)**.

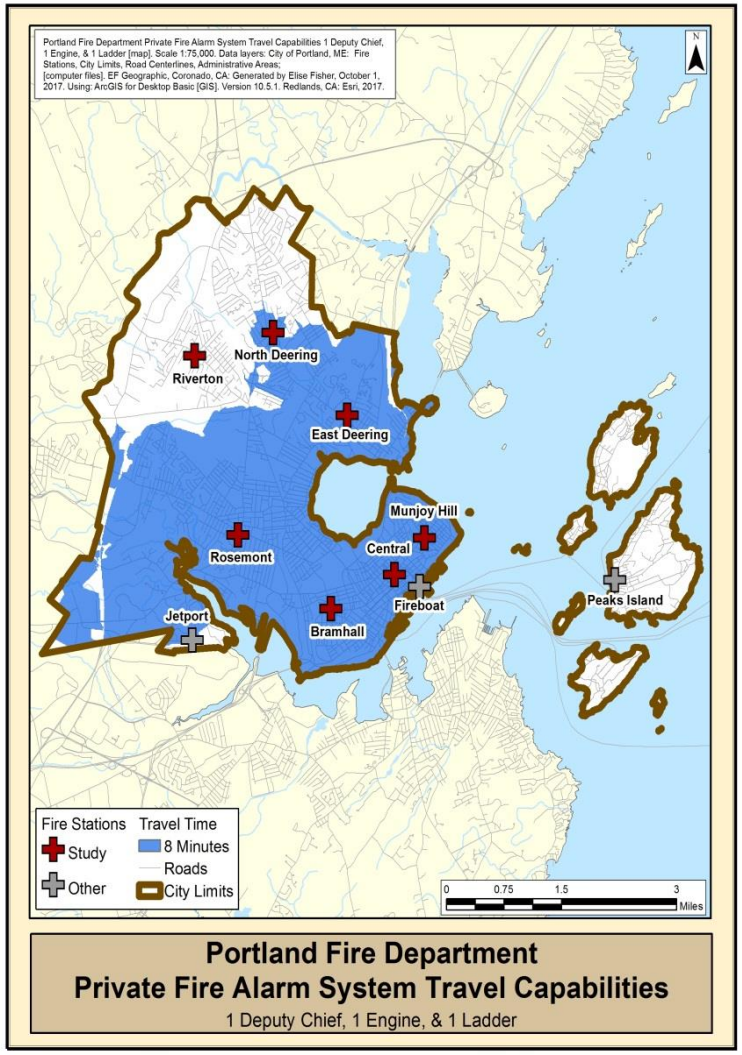
The ability to respond to reported structures fires with the prescribed resources is limited to the central and peninsula areas of the city. Northern areas cannot be reached with the same level of personnel and equipment. In contrast, vehicle and outdoor fires can be reached per the deployment protocols.

Hazardous Materials — Hazardous materials response includes an investigation response of an engine, a ladder and the rescue company. Similar to reported structure fires, response to hazardous material incidents within an 8-minute travel time is limited to the central and peninsula area of the city **(Map 32)**.

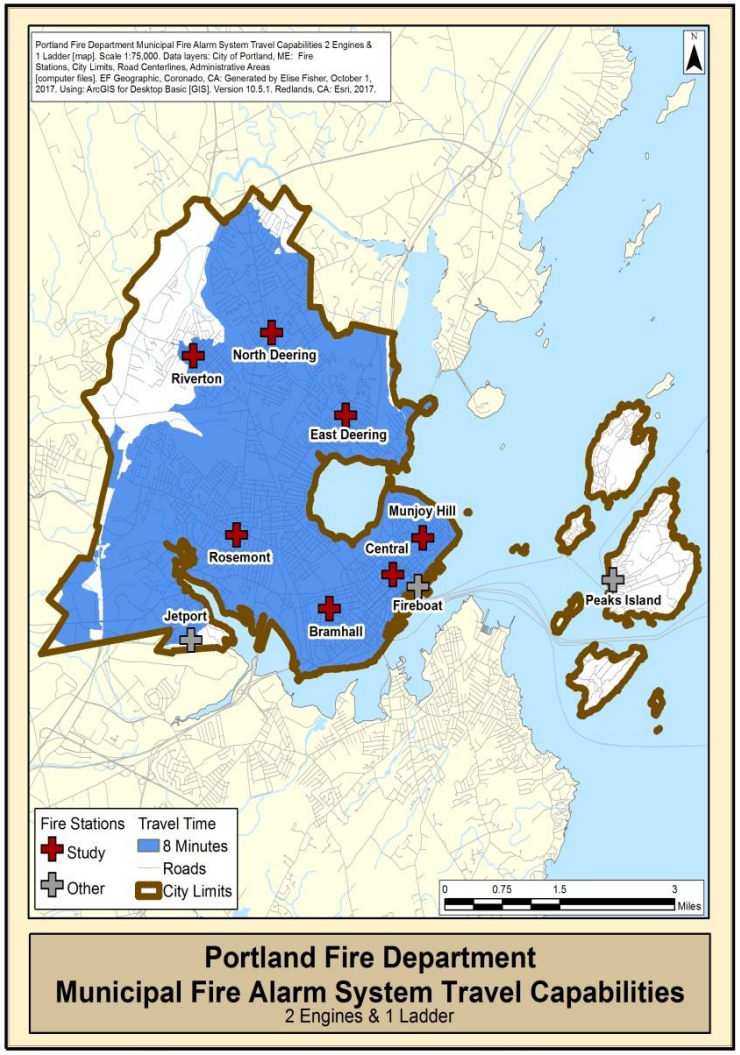
Rescues — Rescue responses are classified between vehicle entrapment and industrial accidents. Vehicle entrapment consists of one (1) engine, one (1) ladder, the rescue company and one (1) MEDCU unit **(Map 34)**. The response to industrial accidents is the same except for ladder company responding as part of the initial assignment **(Map 33)**. The north and western areas of the city cannot be reached within the protocol's prescribed level of personnel and resources.

The analysis indicates the Bramhall fire station serves as the department's strategic resource for backup response to the majority of neighborhoods. This, along with the level of staffing and resources, makes the station the pivoting point for the timely response, not just to fires, but also to other types of emergencies.

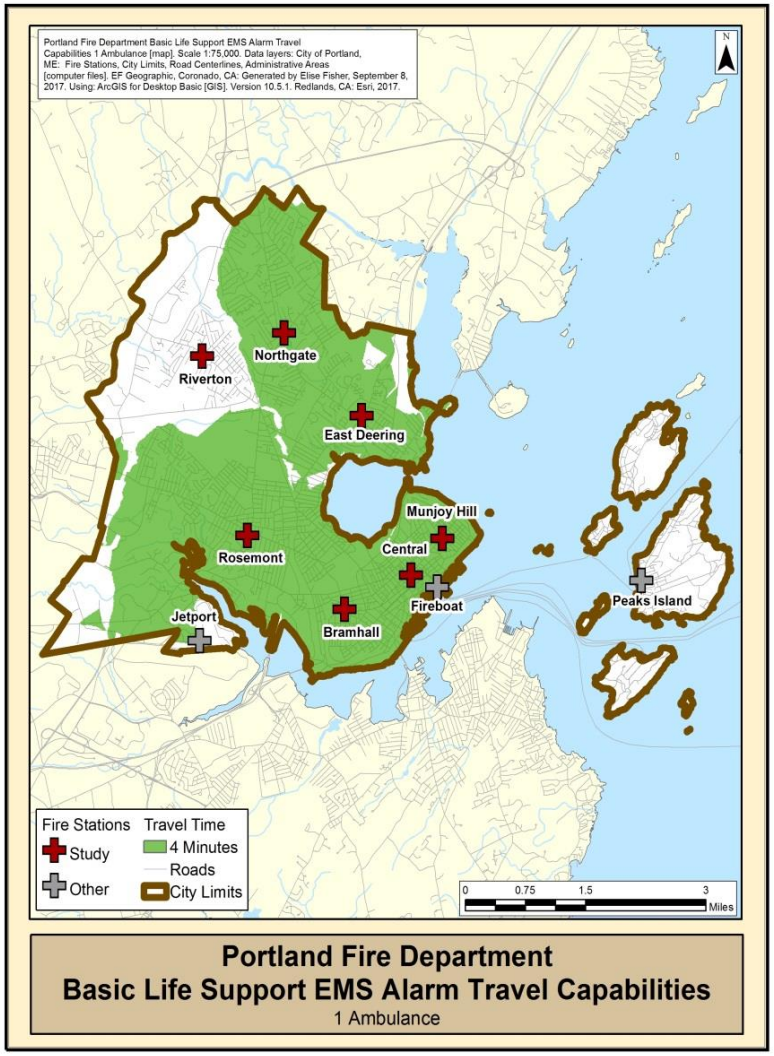
Map 25. Private Fire Alarm System Travel Capabilities (Deputy Chief, 1 Engine, 1 Ladder)



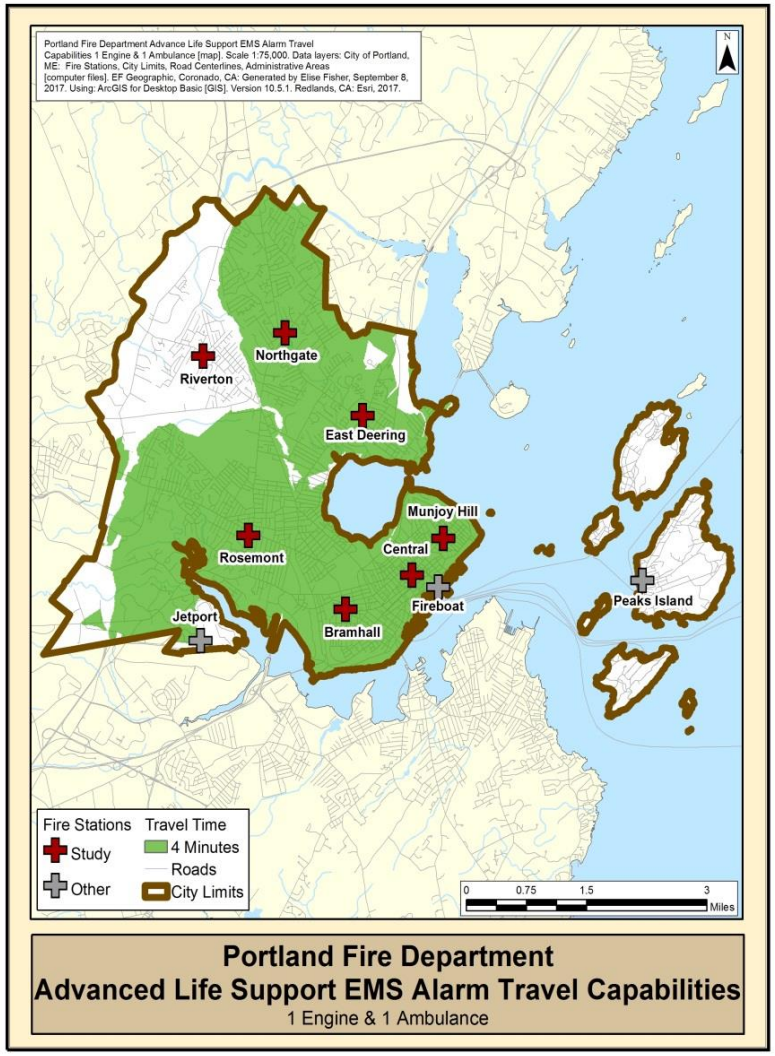
Map 26. Municipal Fire Alarm Box Travel Capabilities (2 Engines, 1 Ladder)



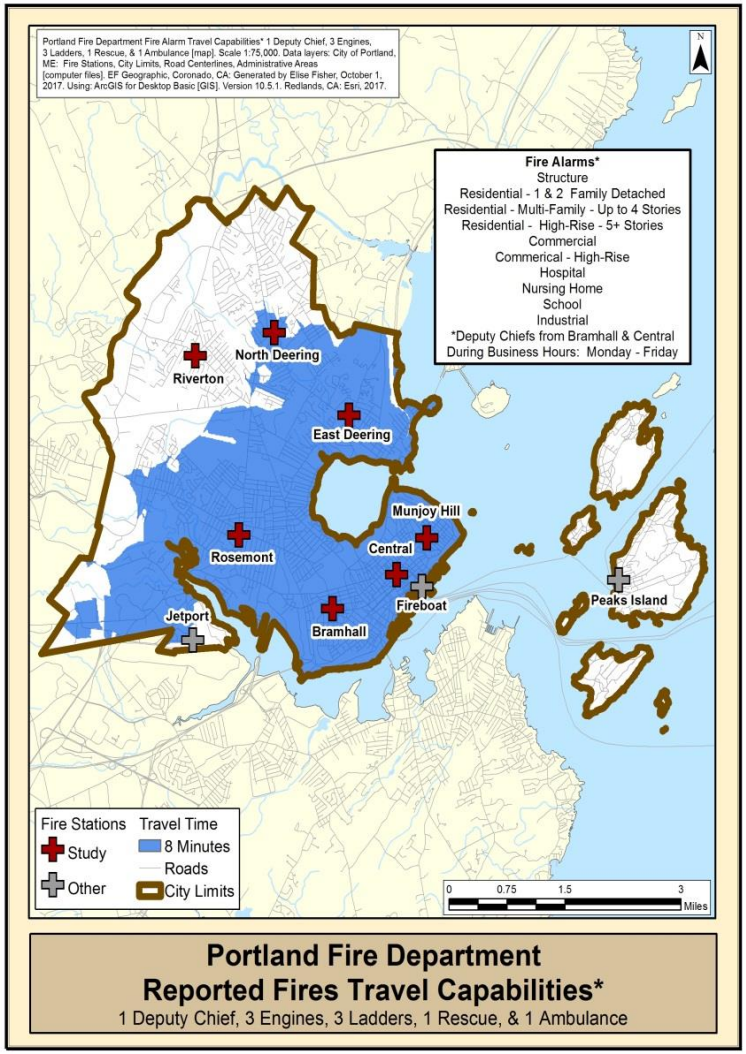
Map 27. Basic Life Support (1 MEDCU)



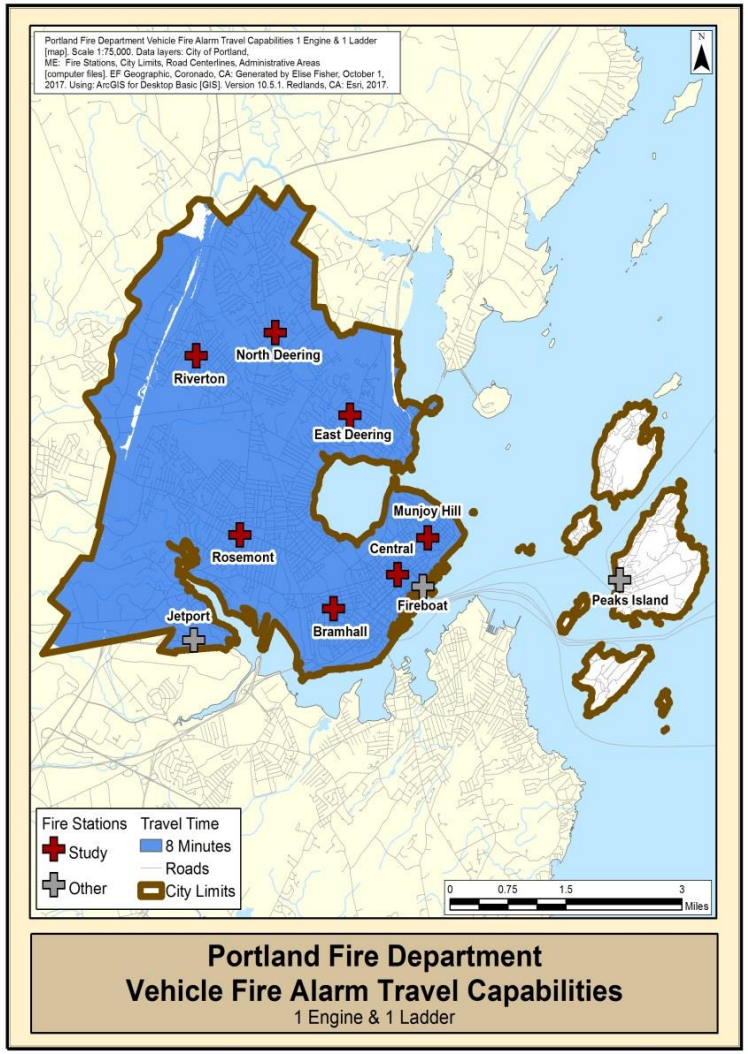
Map 28. Advanced Life Support (1 fire company, 1 MEDCU)



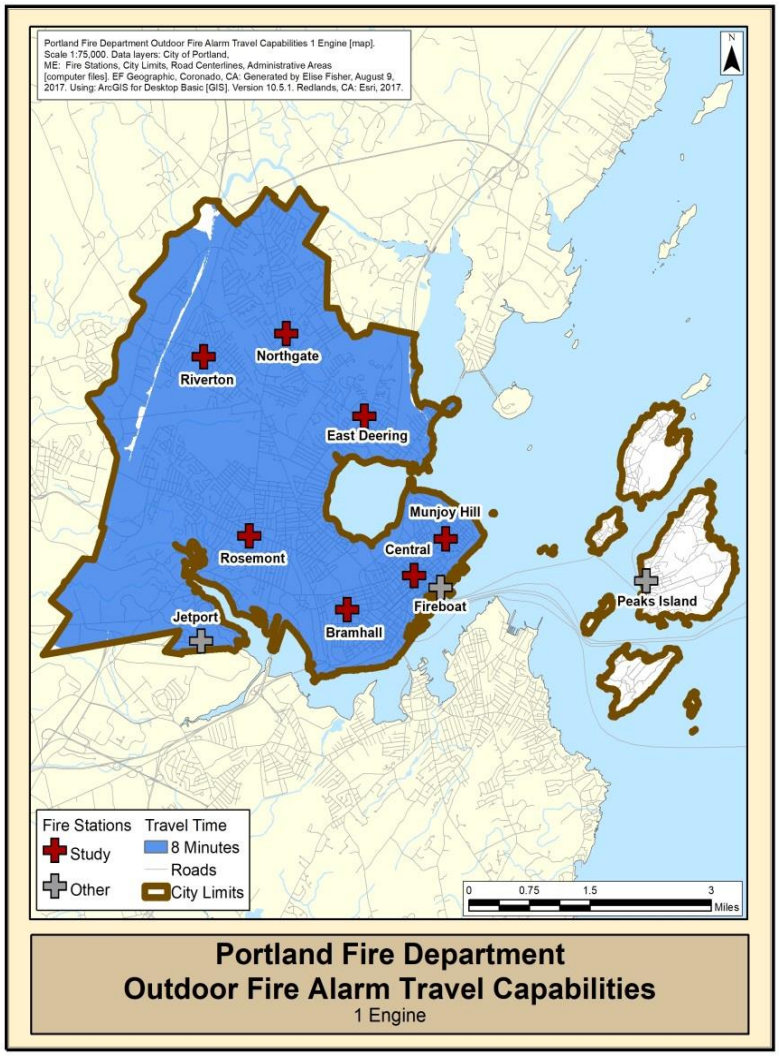
Map 29. Structure Fire Initial Response (Deputy Chief, 3 Engines, 2 Trucks, 1 Rescue, 1 MEDCU)



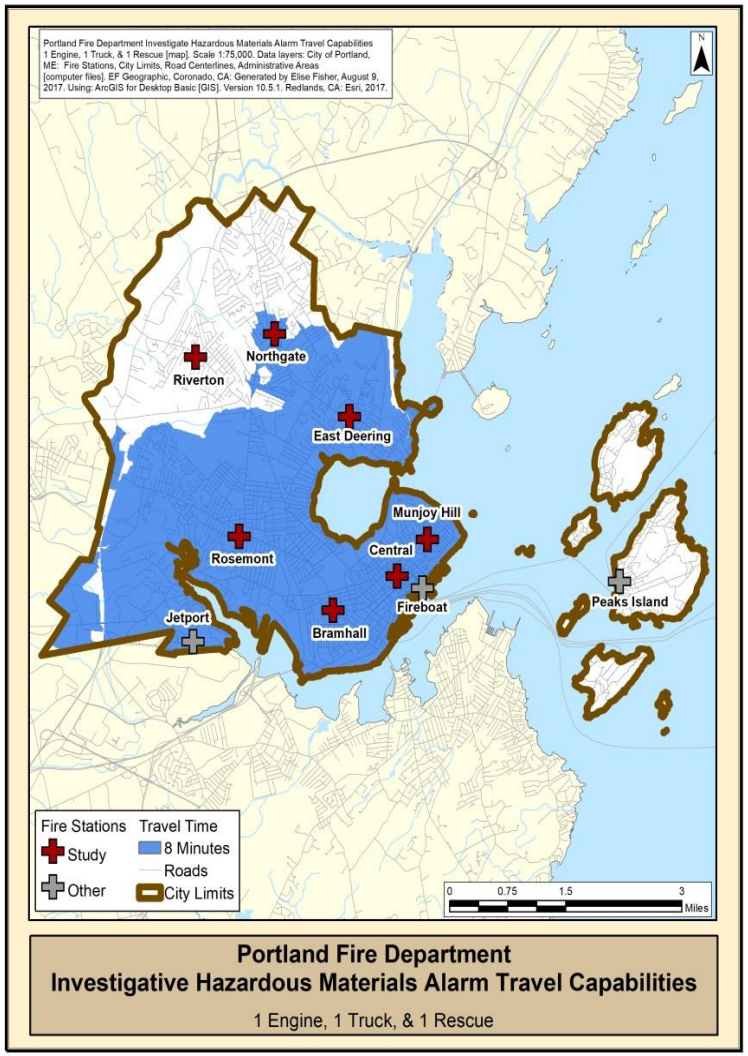
Map 30. Vehicle Fire Initial Response (1 Engine, 1 Ladder)



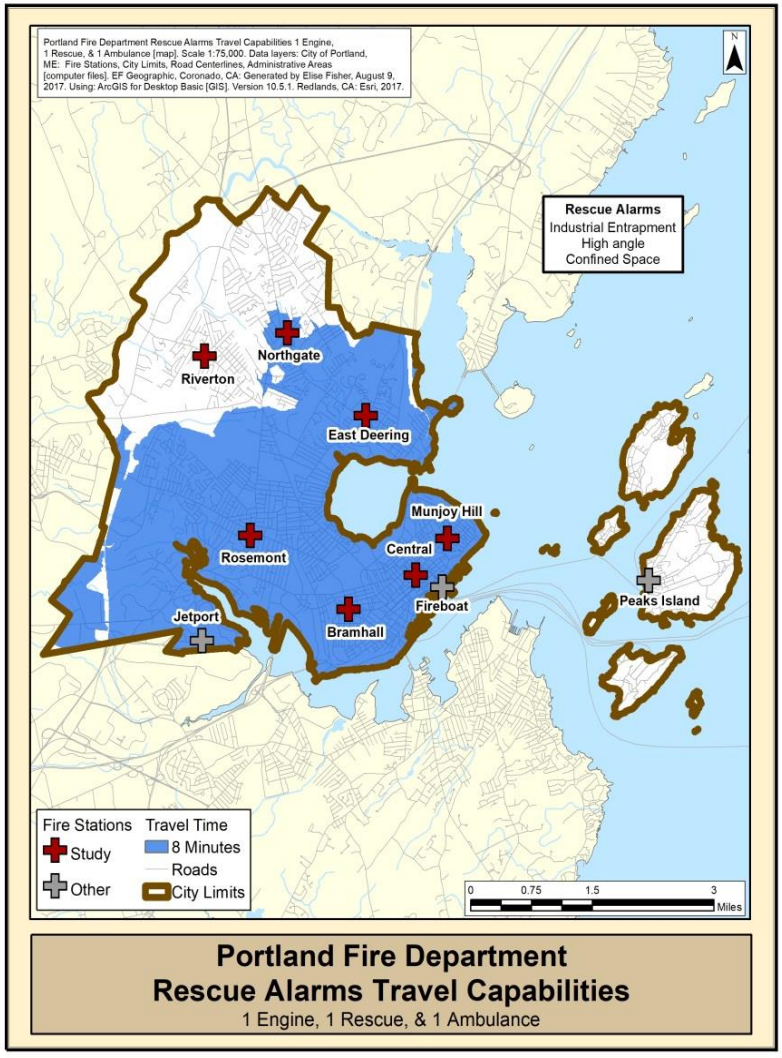
Map 31. Outdoor Fire Initial Response (1 Engine)



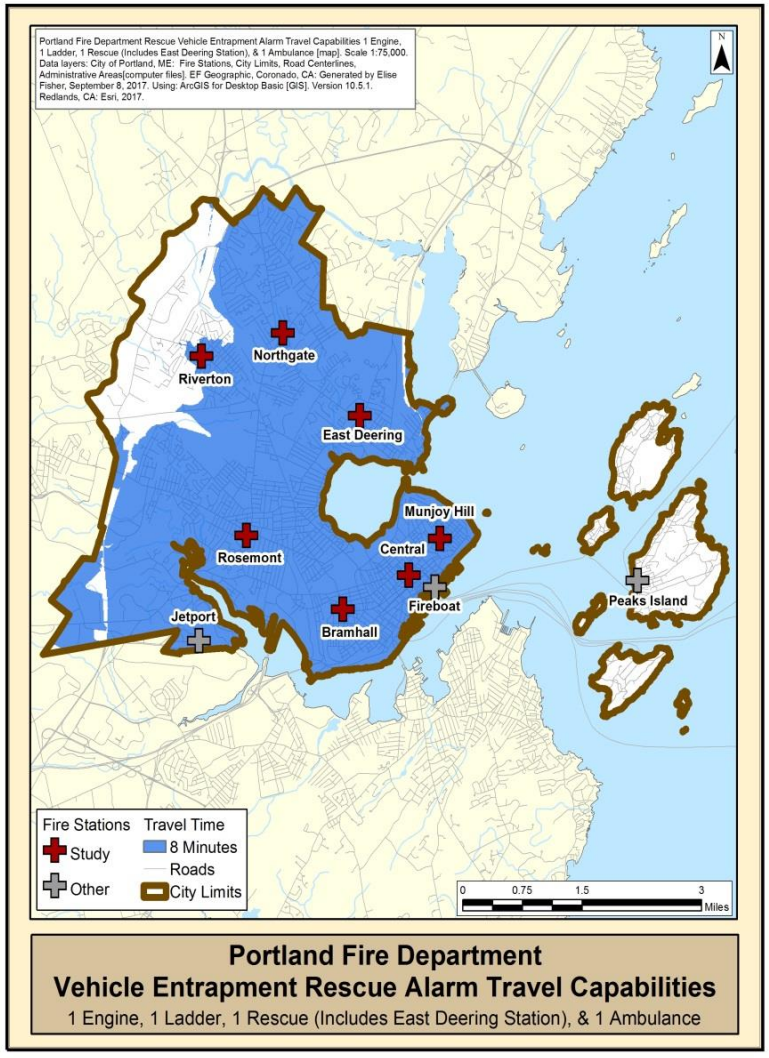
Map 32. Hazmat Investigation (1 engine, 1 ladder, 1 rescue)



Map 33. Rescue (1 engine, 1 rescue, 1 MEDCU)



Map 34. Vehicle Entrapment (1 engine, 1 ladder, 1 rescue, 1 MEDCU)



Recommendations

Fire Stations — Maintain the current number of stations. Analysis indicates the vast majority of the city can be reached by a fire or EMS resource within 4-minute travel time. What is not possible is the reach all areas of the city, particularly the north and western areas of the city with sufficient staffing and resource types per nationally recognized travel time criteria. Similar outcomes occur when applying the department's adopted protocols while applying NFPA's 4- and 8-minute travel times. Given the fact that much of the city is within the 4-minute travel time criteria, coupled with the political and financial factors that must be considered when adding an additional station, it is recommended maintaining the current number of fire stations.

Chief Officers — Divide the city into two (2) districts and increase the number of on-duty chief officers. The deputy fire chief supervises the administration and operations of a total of 11 fire companies and five (5) ambulances land-based units, as well marine, airport specialty units, and volunteer forces stationed on the city's outlying islands. Since referenced as part of the fire insurance rating system beginning in 1916, the recommended chief officer span of supervision is one (1) chief officer on duty for every eight (8) companies or a fraction thereof. This is due to the current on-duty deputy chief's span of supervision and administrative duties coupled with and the department's current inability to have a minimum of two (2) chief officers initially dispatched to multi-company incidents, particularly after hours. At a minimum, there should always be two (2) chief officers on-duty.

Company Personnel — Increase company personnel to a minimum of one (1) officer and three (3) firefighters at all times. The current staffing level of one (1) officer and two (2) firefighters is marginal for effective firefighting operations. The department's ability to meet initial deployment capabilities may be enhanced by increasing staffing levels, particularly on engine companies assigned quint apparatus.

SECTION IV: Fire Station Repair and Replacement

Station Assessment

In conjunction with an analysis of the effectiveness of their location, the FACETS project team was requested by the city to conduct a preliminary assessment of the condition and functionality of the seven (7) mainland fire stations. It is the intent of the assessment to serve as a catalyst for any future detailed study by an architectural or engineering firm of each station's usefulness. From this assessment, the team has developed a facility repair and replacement plan. The assessment was conducted by the team, including a member who is a registered architect specializing in fire station design, construction, renovation and maintenance. The assessments consisted of a thorough walk-through each station's interior and exterior spaces. An emphasis was placed on each facility's occupant health and safety features and future adaption and expansion related to personnel, apparatus and equipment in relation to the department's programs and services. It must be noted that an in-depth architectural and engineering study was not conducted due to the city's scope of work and timeframe. As a follow-up to the team's work, any further review of each station's condition should include a Building Condition Assessment by an architectural or engineering firm registered in the state of Maine as prescribed by local and state law.

Station Age — All of the stations in review have been in use for 40 years or more with the oldest being constructed in 1920s and newest in late 1970s **(Table 9)**. The Central Station is the oldest, being built in 1925, and has served the city well for over 90 years. Two (2) stations, Rosemont and East Deering, were constructed during the mid-1950s, followed by the Bramhall and North Deering stations being constructed in the mid-1960s. The Riverton station was constructed in 1971 with the newest, Munjoy Hill, being opened in 1977. Since their construction, most of the stations have undergone some level of renovation and upgrades with the Central Station undergoing a minor renovation during the mid-1980s.

Table 9. Fire Station Construction by Decade

Station	Decade
Central	1920s
Rosemont, East Deering	1950s
Bramhall, North Deering	1960s
Riverton, Munjoy Hill	1970s

Since the time that last station was built, the department has expanded services to include ALS level emergency medical services and specialty services, such as response to hazardous material spills and technical rescues. Further, during this same time fire apparatus have increased in size and weight, the workforce has become more diverse, and building climate control and systems have become increasingly energy efficient and complex. Together, these factors have gradually made most of the city's fire stations less functional and nearing the point of being completely obsolete. An example is the dimensions of engine room bay doors. To accommodate modern engine and ladder apparatus, at minimum, bay doors should be no less than the dimensions of 14 by 14 feet. Many of the stations in the review fall short of this best practice; the best example being the Central Fire Station with bay doors of ten (10) feet in width.

Station Life Span — The generally accepted life span of most fire stations is no more than fifty (50) years. However, either out of necessity or good design, many stations may serve their communities well beyond this timeframe. There are no specific guidelines for determining the usefulness of a station. However, the accepted longevity goal by the design community is 40 to 50 years. It is also generally accepted that this span of time significant renovations and remodeling are anticipated so that trends in firefighting and apparatus can be applied to the fire station, thus extending the functional life. It was apparent that although minor changes have been made to a few of the fire stations, most were as originally designed and constructed with only minor improvements, primarily the construction of partitions to create individual dorm spaces. Mechanically, most if not all boilers and water heaters have been replaced at some point during the life of these fire stations.

Some stations have limited use due to older features such as low bay clearence limiting the type and diminsions of apparatus.

Applicable Codes and Regulations — During the assessment, the team considered several applicable local building and fire service related codes and national standards. References include:

- International Building, Fire and Mechanical Codes
- NFPA firefighter health and safety related standards and best practices
- Fire station design guidelines

General Observations

Exterior Condition — Except for the Central Fire Station, all stations lack "curb appeal". There are no fences or gates to prevent the public from accessing the sites and there is a lack of clearly defined public parking and access routes making it difficult to ascertain how to ask for assistance from the crews. There is a lack of signage and the signage that exists is misleading and ineffective for the public.

Flat Roofs. Ironically for this part of the country, all the stations have flat, low slope roof systems. Although there were no significant structural deficiencies observed, two (2) stations have steel truss roof joists which probably could not meet current code for snow load strength.

Aprons and Drives. All have significant damage and wear to the front apparatus aprons, driveways, parking areas and sidewalks. Most parking and access drives are in a level of disrepair that complete removal and re-pavement is required.

Moisture Penetration. Due to age and the constant moisture penetration into the masonry walls and mortar, significant repair to the masonry of all stations is required and the use of a penetrating masonry sealer needs to be applied.

Exterior Condition. All stations need of a thorough restoration of painted exterior materials, as any fresh paint will not adhere properly to the damaged substrate. It is likely that lead based paint was used on the original finishes of every station. Thorough testing of the painted materials and proper environmental remediation methods will be required prior to any surface preparation. This adds significant cost to these basic renovations. Several locations, primarily East Deering Station the exterior grade is higher than interior slabs and the grade appears to slope towards the station, thus contributing to the moisture wicking and settling issues.

Landscaping. All landscaping consists of native plants, trees and grass. Some trees and shrubs require pruning, but all lawns are groomed and well kept.

Interior Condition — All station kitchens, bathrooms and dorm rooms require renovating and every station requires significant renovations to plumbing, mechanical, electrical, tele/data and dispatch systems.

Furnishings. All furniture is very worn, dirty, and in various stages of degradation. All chairs with fabric should be removed and replaced with those that have cleanable materials like plastic and vinyl.

Interior Finish. All interior finishes were generally old, but in very good condition. The crews provide all maintenance and upkeep and all stations were clean and tidy. Although asbestos floor tiles were found in several stations, they appear to be in good condition, but should any future renovations be performed, all surfaces will need to be tested and a remediation budget added to these scopes of work.

Functionality. In addition to age and environmental concerns, all stations floor plans and relationship to the site limit the ability to increase apparatus bay door size and ceiling heights thus restricting the size of the apparatus, and limits any expansion opportunities to the station itself. The existing site constraints and station design also contributes to the recommendation to "build new".

Building Systems — All supply pipe for hot and cold water, and all sewer waste and vent pipe are an ongoing issue for breaks and leaks. Some fixtures have been replaced, but no standard has been established or maintenance program has been incorporated.

Heating. Consisted of two-pipe supply and return of hot water to radiators throughout the stations fed by a boiler in a utility space on the perimeter adjacent to the apparatus bays or in basements. Air conditioning is via small individual "window" units and are only used at peak of summer.

Electrical. All panels are old, full, and cannot be updated without significant cost and disruption. All stations have standby propane or diesel generators that support most of the station electrically.

Protection. All stations have residential style smoke detectors, but no monitored fire alarm systems. There are no fire sprinklers at any station.

Repair Work. Station crews take on all maintenance and repair responsibilities. It was observed that the city's public works department has not been involved or participated in any department preventative maintenance or repair projects. The department uses in-house staff for minor purchases, needs, supplies, equipment, and appurtenances. When significant "project" type work is required, the department will hire contractors and or vendors directly. The department currently budgets $5,000 per station annually which has helped, but is obviously not enough to provide the necessary large-scale renovations or remodeling. The following provides a description of criteria suitable for fire station renovation:

Station Description and Condition

The following includes a detail of each station's specifications and condition as well as the team's recommendations for upgrades or replacement.

Central Station — The station serves as the department's headquarters housing administration, fire prevention, training and support services. The station is a historic structure with significant cultural value to the community.

Address: 380 Congress Street
Constructed: 1925
Renovation: Minor renovation - 1987
Stories: 2 with basement
Square Feet: 14,250
Front Bays: 5
Site: Large
Assignment/Staffing:

- Car 2/1
- Engine 5/3
- MEDCU 5/2
- MEDCU 1/2
- Engine 7 (Reserve)

Fire/Life Safety: No automatic fire sprinkler system, hardwire fire and smoke alarm system
Diesel Fume Exhaust System: Yes
Notes: The interior doors that separate the station from the apparatus bays are aluminum storefront and do not adequately seal or separate the spaces and there is no separation of the stairway from the second-floor dormitory spaces. The Administrative functions are also problematic due to the age of the building and the access limitations and code compliance problems. Its age also makes it significantly difficult to maintain and repair due to the quantity of hazardous building materials used throughout, e.g., asbestos, lead, and PCB's.
Recommendations: Replace with new headquarters station. A replacement station is suggested primarily due to the narrow apparatus bay door configuration which will significantly limit future apparatus selection and placement.

Bramhall Station — The station is the largest of the seven (7) stations and serves the southeast portion of the city and is at the pivotal point to assist downtown or outlying fire companies. When constructed during the peak of the Cold War, the station was designed to serve as community fallout shelter which explains its bunker-like construction of cast-in-place concrete and masonry. The station is built into a hillside and in certain areas exterior walls are 18 inches thick. This station is large and serves as a "special operations" station housing Rescue 1 and the department's hazmat apparatus. In recent years, spaces previously used for other functions have been adapted for bulk storage, repair of self-contained breathing apparatus and a classroom for training. Although this station has exceeded its 50-year life cycle without significant remodeling or renovating, its site, size, and support of department functions make it a good candidate for a major renovation and/or remodeling.

Address: 784 Congress St.
Constructed: 1964
Renovation: No major renovation
Stories: 2
Square Feet: 15,000
Front Bays: 5
Site: Medium, large apron, no rear yard.
Assignment/Staffing:

- Car 2/1
- Engine 6/3
- Ladder 6/3
- MEDCU 6/2
- Rescue 1/3
- Engine 2 - Reserve

Fire/Life Safety: No automatic fire sprinkler system, equipped with automatic detection system
Diesel Fume Exhaust System: Yes
Notes: Reinforced structure constructed at the height of cold war. Use of drill tower is limited due to the city not owning the adjacent drive and parking lot. The station is built into a hillside intentionally for fallout shelter capabilities, creating limited window openings for light and ventilation. The interior doors that separate the station from the apparatus bays are original and do not adequately seal or separate the spaces.
Recommendations: Conduct a major remodel of the facility or consider relocating to a larger site nearby that allows for a more functional station and training facility.

Munjoy Hill Station — This station serves the southeast region of the city's peninsula. Its first-due area is experiencing a gradual change with several existing sites being replaced with multi-story apartment buildings.

Address: 134 Congress St.
Constructed: 1977
Renovation: No major renovation
Stories: 2 with basement
Square Feet: 10,000

Front Bays: 3
Site: Medium
Assignment/Staffing:

- Engine 1/3
- Ladder 1/3
- Ladder 5 (Reserve)

Fire/Life Safety: No automatic fire sprinkler or monitored detection system
Diesel Fume Exhaust System: Yes
Notes: Modern combination station and municipal building. Contains shared space for a new EOC; formerly occupied by city parks and recreation department. The interior doors that separate the living spaces from the apparatus bays are original and do not adequately seal or separate the spaces.
Recommendations: Conduct a major remodel of the facility.

East Deering Station — The station serves the northeast portion of the city. This station has smoke detectors, but they do not appear to be wired per NFPA 72, 9.1.3. The interior doors that separate the apparatus bays from the station are original and do not adequately seal or separate the spaces per NFPA # A9.1.3. There is a diesel exhaust extraction system per NFPA # A9.1.5. This station has a significant slab settling problem in the dorm room area. No structural cracking or settling of the exterior walls was observed, yet the slab is sinking and sloping to one corner. The structural, environmental and code compliance issues make this station an excellent candidate for replacement.

Address: 576 Ocean Avenue
Constructed: 1956
Renovation: No major renovation
Stories: 1
Square Feet: 5,217
Front Bays: 2
Site: Small
Assignment/Staffing:

- Engine 11/3
- MEDCU 7/2

Fire/Life Safety: No automatic fire sprinkler or monitored detection system
Diesel Fume Exhaust System: Yes
Notes: Small neighborhood station; flat roof structural concerns; "sinking" dorm slab. Site required much infill which is considered the primary contributor to the station's slab problems.
Recommendations: Replace station with a new facility consisting of a minimum of three (2) drive-through bays and quarters spacious enough to accommodate current crew of three (3) with ability to expand to a minimum of ten (10)personnel (two (2) four-person fire companies and one (2) two-person MEDCU ambulance). The station should remain near Ocean and Washington Avenues.

North Deering Station —The station serves the north central region of the city. Although no significant structural issues were observed, this station's size, small site, age, environmental and code compliance issues make it a candidate for replacement.

Address: 380 Allen Avenue
Constructed: 1966
Renovation: No major renovation
Stories: 1
Square Feet: 5,217
Front Bays: 2
Site: Small
Assignment/Staffing:

- Ladder 4 (Quint)/3
- MEDCU 4/2

Fire/Life Safety: No automatic fire sprinkler or monitored detection system
Diesel Fume Exhaust System: Yes
Notes: Small neighborhood station; flat roof concrete deck "T"s and masonry walls. This station has smoke detectors, but it is not a wired smoke detection system per NFPA 72, 9.1.3. The interior doors that separate the station from the apparatus bays are original and do not adequately seal or separate the spaces per NFPA 1500 A9.1.3. There is a diesel exhaust extraction system per NFPA 1500 A9.1.5.
Recommendations: Replace the station with a new facility consisting of a minimum of three (2) drive-through bays and quarters spacious enough to accommodate current crew of five (5) with ability to expand to a minimum of 10 personnel (two (2) four-person fire companies and one (1) two-person MEDCU ambulance). The station should remain near Washington and Allen Avenues and Auburn Street.

Riverton Station — This station serves the northwest region of the city and is of similar design to the North Deering Station. Although no significant structural issues were observed, this station's size, small site, age, environmental and code compliance issues make it a candidate for replacement.

Address: 1592 Forest Avenue
Constructed: 1971
Renovation: No major renovation
Stories: 1
Square Feet: 5,217
Front Bays: 2
Site: Small
Assignment/Staffing:

- Engine 9/3
- Engine 10 (Reserve)

Fire/Life Safety: No automatic fire sprinkler or monitored detection system

Diesel Fume Exhaust System: Yes
Notes: Small neighborhood station; flat roof concrete deck "T"s and masonry walls. There are smoke detectors installed, but they are not a wired smoke detection system per NFPA 729.1.3. The interior doors that separate the station from the apparatus bays are original and do not adequately seal or separate the spaces per NFPA 1500 A9.1.3. There is a diesel exhaust extraction system per NFPA 1500 A9.1.5.
Recommendations: Replace station with a new facility consisting of a minimum of three (3) drive-through bays and quarters spacious enough to accommodate current crew of three (3) with ability to expand to a minimum of 10 personnel (two (2) four-person fire companies and one (1) two-person MEDCU ambulance). The station should remain on or near the current site.

Rosemont Station — The Rosemont station serves the central western area of the city. The station has a steel truss roof structure on red brick masonry walls. It is unlikely that it could withstand a significant snow load event. The station finish floor elevation is on a slope so there is significant fill and retaining walls used for the foundations. Originally, this was a single bay station with a second bay added in the late 1970's or early 1980's. A newer ladder truck required that the added bay door lintel height be raised eight (8) inches to accommodate the new apparatus. This work was done in the 1990's. This stations size, small site, age, environmental and code compliance issues make it a good candidate for replacement.

Address: 212 Stevens Avenue
Constructed: 1953
Renovation: Yes, additional bay
Stories: 1 with basement
Sq. Ft.: 4,945
Front Bays: 2
Site: Small
Assignment/Staffing:

- Ladder 3 (Quint)/3
- MEDCU 3/2

Fire/Life Safety: No automatic fire sprinkler or monitored detection system
Diesel Fume Exhaust System: Yes
Notes: Small neighborhood station - flat roof Steel truss structural concerns for snow load. The station has smoke detectors, but they are not a wired smoke detection system per NFPA 72 9.1.3. The interior doors that separate the station from the apparatus bays are original and do not adequately seal or separate the spaces per NFPA 1500 A9.1.3. There is a diesel exhaust extraction system per NFPA 1500 A9.1.5.
Recommendations: Replace the station with a new facility consisting of a minimum of three (3) drive-through bays and quarters spacious enough to accommodate current crew of three (3) with ability to expand to a minimum of 10 personnel (two (2) four-person fire companies and one (1) two-person MEDCU ambulance). The station should remain on or near the current site.

Recommendations

Facilities Management Master Plan — It is recommended the department create and adhere to a detailed Facilities Management Master Plan and Five-Year Plan for budgeting maintenance and repairs department wide. It is also suggested that a Stacking Plan be created to improve the use of the current and future administrative spaces and locations. It should be noted here that the City of Portland's age, topography, and geography create significant issues for the fire department and the location for any potential replacement station will be difficult. Also, the small existing station site dimensions and slopes will make building a new station on existing sites extremely difficult. **See Table 10.**

Minor Upgrades — Minor renovation projects include painting of interior and exteriors, flooring replacement, kitchen and bathroom cabinet replacement, and small modifications toward complete code compliance. Routine maintenance should be performed to extend the useful life of equipment and the station itself such as monthly filter changes, light fixture cleaning and re-lamping, drain line jetting, and roof cleaning and coatings. No stations fit this example. Short-term upgrades may include:

Kitchens and bathrooms. Renovate all kitchens and bathrooms
Furnishings. Provide new furniture and bedding at all fire stations
Built-in Protection. Install fire sprinkler systems and update smoke alarm systems at all stations
Exterior. Address the curb appeal issues; public parking, accessibility, station security, signage and overall inability to interact with the public.

Major Improvements — A station that are close to, or has exceeded its 50-year life cycle, but due to its location and site size could have improvements made to bring it into code compliance. This station type could also have additions made to increase station size and functionality. It also has a functional first-due location. In some instances, disruption to service delivery of the first due area could force the department to build new.

Due to age, reactive responses to equipment breakdowns, and normal wear, all stations require significant repairs, remodeling, and renovations to extend their useful life and to comply with current codes. In several locations, these costs will exceed the cost to replace the station, primarily due to the extent of remediation required to remove hazardous building materials – asbestos, lead, and PCB's.

Handicap requirements. The department, in conjunction with the city's department of public works, is in the process of conducting an assessment of each station's compliance with the federal Americans with Disabilities Act (ADA). Currently, all seven (7) stations have shortfalls in meeting the requirements of the ADA.

Stations that have exceeded its 50-year life cycle, and due to their age, cannot be renovated, expanded, or improved without excessive costs incurred and additional expenses to remediate hazardous building materials with new and safer material. The floor plans cannot be modified to be code compliant, and in some instances structural issues or conditions make renovation costly. In some instances, disruption to service delivery or a lack of available property to build on could force the department to perform major renovations and/or additions.

Replacement — As part of the Facilities Management Master Plan, the replacement of several fire stations should be considered. The following provides a list of recommended station replacement priorities:

East Deering. The station should be replaced soon due to significant slab settling problem in the dormitory. No structural cracking or settling of the exterior walls was observed' however, the slab is sinking and sloping to one (1) corner. In addition, the overall condition of the station appears to be inadequate. The station should remain near Washington and Ocean Avenues.

Central. Although the history and prominence to the area that the Central Station provides, the narrow, 10-foot wide bays doors, make this stations future as a fire station questionable. It was renovated in the 1980's to create administration space for the fire chief and staff. However, significant code violations and the lack of accessibility to this facility by the public and the civilian staff, the Central Station's ability to function as an administrative space is questionable. It is recommended that any future replacement of the station be at its current location, due to its strategic location and proximity to other municipal offices, downtown district, waterfront and older neighborhoods.

Rosemont, North Deering, Riverton. These stations should be replaced soon due to their cramped quarters, small lot, age and environmental and code compliance issues.

Table 10. Fire Station Repair and Replacement Plan

Station	Constructed	Sq. Ft.	Bays	Site	Description	Recommendations	Comments
Renovation							
Munjoy Hill 134 Congress St.	1977	10,000	3	Medium	2 story	Major Remodel	Conduct a major remodel of the facility.
Bramhall 784 Congress St.	1964	15,000	5	Large	2 Story hillside	Major Remodel	Conduct a major remodel of the facility or consider relocating to a larger site nearby that allows for a more functional station and training facility.
Central 380 Congress St.	1925	14,250	5	Large	Historic 2 story + Admin.	Major Remodel or Build New	Conduct major renovation or replace with new headquarters station. A replacement station is suggested primarily due to the narrow apparatus bay door configuration which will significantly limit future apparatus selection and placement.
Replacement							
East Deering 576 Ocean Ave.	1956	5,217	2	Small	1 story	Build New	Replace station with a new facility consisting of a minimum of three drive-through bays and quarters spacious enough to accommodate current crew of three with ability to expand to a minimum of 10 personnel (two 4-person fire companies and one 2-person MEDCU ambulance). The station should remain in the vicinity of Ocean and Washington Avenues.
North Deering 380 Allen Ave.	1966	5,217	2	Small	1 story	Build New	Replace station with a new facility consisting of a minimum of three drive-through bays and quarters spacious enough to accommodate current crew of five with ability to expand to a minimum of 10 personnel (two 4-person fire companies and one 2-person MEDCU ambulance). The station should remain in the vicinity of Washington and Allen Avenues and Auburn Street.
Riverton 1592 Forest Ave.	1971	5,217	2	Small	1 story	Build New	Replace station with a new facility consisting of a minimum of three drive-through bays and quarters spacious enough to accommodate current crew of three with ability to expand to a minimum of 10 personnel (two 4-person fire companies and one 2-person MEDCU ambulance). The station should remain on or near the current site.
Rosemont 212 Stevens Ave.	1953	4,945	2	Small	1 story	Build New	Replace station with a new facility consisting of a minimum of three drive-through bays and quarters spacious enough to accommodate current crew of three with ability to expand to a minimum of 10 personnel (two 4-person fire companies and one 2-person MEDCU ambulance). The station should remain on or near the current site.

SECTION V: FUNDING SOURCES

This section addresses potential federal and state funding sources that may be available to the city for the implementation of the project team's recommendation. It is important to note that opportunities for funding fire station improvements or new construction through federal or state grant programs are limited. Most programs focus on small or rural communities with limited abilities due to insufficient local funding sources.

The fire department may be able to obtain some funding from grant programs administered through the State of Maine and the U.S. government. In certain cases, funding may be made available based on the department serving as an EMS provider as opposed to solely as a fire protection agency. Some programs, such as community block grants, are not specifically earmarked for fire or EMS but can be used for both purposes..

A useful resource is the U.S. Fire Administration's 2012 publication, *Funding Alternatives for Fire and Emergency Services*. The manual highlights the pros and cons of funding sources being used by fire agencies throughout the nation and includes guidance for stated, federal and private funding sources such as grants and loans. A PDF version of the document can be downloaded from the USFA website: www.usfa.fema.gov/grants

The following are excerpts from the manual with highlights including state, federal and private grants and similar funding sources for which the City of Portland may qualify.

State of Maine

The state government provides the following programs either directly or on behalf of the U.S. Government:

U.S. Government

The Federal government offers the following grant programs to municipal government including the renovation and construction of fire stations.

U.S. Community Development Block Grant (CDBG) — CDBG is a flexible program that provides communities with resources to address a wide range of unique community development needs. The CDBG program provides annual grants on a formula basis to States and local governments.

Sponsor. U.S. Department of Housing and Urban Development (HUD)

Eligible activities. Seventy (70) percent of CDBG funds must be used for activities that benefit low- and moderate-income persons. In addition, each activity must meet one of the following national objectives: benefit low- to moderate-income persons, prevention or elimination of slum and blight, or address community development needs having a particular urgency because existing conditions pose a serious and immediate threat to the health or welfare of the community for which other funding is not available.

Eligibility. The CDBG entitlement program allocates annual grants to central cities of the Metropolitan Statistical Areas, cities of at least 50,000, and qualified urban counties over

200,000. States distribute CDBG funds to non-entitlement localities. HUD provides flexible grants to help cities, counties, and states recover from Presidentially-declared disasters, especially in low-income areas, subject to availability of supplemental appropriations.

For more information contact: www.hud.gov/offices/cpd/communitydevelopment/programs

Assistance to Firefighters Grants (AFG) — AFG provides financial assistance directly to fire departments and nonaffiliated EMS organizations to enhance their capabilities with respect to fire and fire-related hazards. Its primary goal is to help fire departments and nonaffiliated EMS organizations meet their firefighting and emergency-response needs. AFG seeks to support organizations that lack the tools and resources necessary to more effectively protect the life and safety of the public and their emergency-response personnel with respect to fire and all other hazards.

Sponsor. U.S. Department of Homeland Security (DHS)

Eligible Activities. Fire department priorities include training, equipment, personal protective equipment (PPE) gear, firefighter wellness and fitness, modifications to fire stations and facilities, and fire fighting vehicle acquisition. Nonaffiliated EMS organization priorities include EMS operations and safety, EMS training, EMS equipment acquisition, EMS PPE, EMS wellness and fitness, modifications to EMS stations and facilities, and EMS vehicle acquisition.

Eligibility. Fire departments and EMS organizations.

For more information contact: www.fema.gov/firegrants

Community Facilities Grant Program — The Community Facilities Grant program is funded by the Department of Agriculture (USDA). This program provides grants to communities with fewer than 20,000 residents to construct and renovate facilities used for public service, health care, recreation, community service and public safety. Funds are also used to purchase equipment that is needed to operate the facilities. Eligible applicants include nonprofit organizations, municipalities, towns, districts and tribal government agencies. Areas with the lowest population and income levels receive higher grant considerations. Up to 75 percent of the project costs are covered by the grant. The amount of funding is dependent on the median income and population of the applicant entity.

Small Cities Community Development Block Grant Program — The Department of Housing and Urban Development (HUD) sponsors the state-administered Community Development Block Grant (CDBG) program. Grants from this program are used to acquire real estate property for public use, demolish blighted structures, and construct and renovate public service facilities, recreational facilities, and public and private buildings. Funds are also used to support economic development activities including assisting micro-enterprises. Grants are administered by states to cities with fewer than 50,000 and counties with fewer than 200,000 residents. Up to three (3) percent of the grant can be allocated to cover technical assistance and administrative expense.

Rural Business Enterprise Grants (Rbeg) Program — The United States Department of Agriculture (USDA) has announced that two (2) grants not to exceed $929,111 have been appropriated for the Rural Business Enterprise Grant (RBEG) program. The two (2) grants

provide technical assistance to rural transportation (RT) projects, that could greatly help transportation projects in downtown areas. To be eligible, towns and cities must have a population under 50,000.

Neighborhood Stabilization Program Grants — The U.S. Department of Housing and Urban Development (HUD) offers the Neighborhood Stabilization Program Grants to help communities that have been hit hard by foreclosures and abandonment. Grantees of this program can develop their own funding priorities as long as 25 percent of the funds are appropriated for the purchase and redevelopment of abandoned or foreclosed homes. These homes must be used to house individuals or families whose incomes do not exceed 50 percent of the median area income.

Community Facilities Grant Program. The Department of Agriculture (USDA) funds the Community Facilities Grant Program, which provides financial assistance to low-income areas with less than 20,000 residents to develop facilities that are necessary to the community. Grants are used to construct facilities that are used for public safety, public services, community services and health care. Funds are also used to buy equipment that is needed to run the facilities. Grant amounts are formula-based with areas having the lowest income and population levels getting higher financial considerations. Eligible applicants include municipalities, counties, districts, tribal government agencies and non-profit organizations.

Other Funding Methods

Other funding methods include a variety of local means by which the city may secure funding for initiatives in the Facilities Management Master Plan. Certain methods such as capital improvement projects are often long-term commitments which sometimes make funding for fire station construction projects difficult.

Capital Improvement Appropriations — Municipalities may incorporate a Capital Improvement Plan for funding fire stations. Plans are usually short-range, usually four (4) to ten (10) years, which identifies capital projects and equipment purchases, provides a planning schedule and identifies options for financing the plan. Often the plan serves as a link between the municipality's comprehensive plan and its annual budget.

Impact Fees — An impact fee is sometimes imposed by municipal government on new or proposed land-use projects such as large track commercial or residential developments to share the cost of providing fire protection and other public services. The fees are used to help implement or reduce the economic burden on local jurisdictions that are trying to deal with population growth within the area. In certain communities, fire stations have been constructed by private developers through impact fees in concert with local government.

Municipal Bonds — Municipal bonds are issued by municipalities to finance public improvement projects including the renovation or construction of fire stations. Potential issuers of municipal bonds include states, cities, counties, redevelopment agencies, special-purpose districts, school districts, public utility districts, publicly owned airports and seaports, and other governmental entities (or group of governments) at or below the state level. Several communities have funded the construction fire stations through the issuance of municipal bonds.

Public/Private Partnerships — These are contractual partnerships between government and private sector entities. With this agreement, the skills and assets of each sector (public and private) are shared in delivering a service or facility for the use of the general public. This method of partnership has become more common in recent years for the construction of fire stations.

APPENDIX A: Definitions

Advanced Life Support (ALS)	Emergency medical treatment beyond basic life support that provides for advanced airway management, including intubation, advanced cardiac monitoring, defibrillation, establishment and maintenance of intravenous access, and drug therapy. This is a paramedic level of service.
Aircraft Rescue and Fire Fighting	The firefighting actions taken to rescue persons and to control or extinguish fire involving or adjacent to aircraft on the ground.
Alarm Answering Time	The time interval that begins when the alarm is received at the communication center and ends when the alarm is acknowledged at the communication center.
Alarm Handling Time	The time interval from the receipt of the alarm at the primary Public Safety Answering Point (PSAP) until the beginning of the transmittal of the response information via voice or electronic means to emergency response facilities (ERFs) or the emergency response units (ERUs) in the field.
Alarm Processing Time	The time interval from when the alarm is acknowledged at the communication center until response information begins to be transmitted via voice or electronic means to emergency response facilities (ERFs) and emergency response units (ERUs).
Alarm Transfer Time	The time interval from the receipt of the emergency alarm at the Public Safety Answering Point (PSAP) until the alarm is first received at the communication center.
Ambulance	Synonymous with Portland Fire Department's MEDCU.
Apparatus	A fire department vehicle designed to be used under emergency conditions to transport personnel and equipment, and to support the suppression of fires and mitigation of other hazardous situations.
Assignment	A specific combination of officers and firefighters and their equipment deployed to a specific incident classification.
Basic Life Support (BLS)	A specific level of prehospital medical care provided by trained responders, focused on rapidly evaluating a patient's condition; maintaining a patient's airway, breathing, and circulation; controlling external bleeding; preventing shock; and preventing further injury or disability by immobilizing potential spinal or other bone fractures. An Emergency Medical Technician (EMT) level of service.

Chief Officer	Synonymous with Deputy Fire Chief.
Company	A group of fire department members who are under the direct supervision of an officer and trained and equipped to perform assigned tasks and are usually organized and identified as engine companies, ladder companies, rescue companies, squad companies, or multi-functional companies that operate with one or more pieces of fire apparatus.
Company Officer	A supervisor of a crew/company of personnel.
Conflagration	A major fire usually covering a considerable area and one which crosses natural fire barriers such as streets, usually involving structures in more than one (1) block and frequently resulting in large loss. Considered larger than group fires.
Deployment	The act of bringing fire department resources into effective action.
Deputy Fire Chief	Senior officer of the Portland Fire Department assigned to one (1) of four (4) 24-hour shifts who oversees the management and supervision of all personnel on that shift and serves as incident commander during multi-company operations.
Emergency Incident	Any situation to which the fire department responds to deliver emergency services, including rescue, fire suppression, emergency medical care, special operations and other forms of hazard control and mitigation.
Emergency Medical Care	The treatment of patients using first aid, cardiopulmonary resuscitation, basic life support, advanced life support, and other medical procedures prior to arrival at a hospital or other health care facility.
Emergency Operations	Activities of the fire department relating to rescue, fire suppression, emergency medical care, and special operations, including response to the scene of the incident and all functions performed at the scene.
Engine Apparatus	A fire department vehicle normally equipped with a pump, water tank and hose.
Engine Company	A company of members consisting of an officer and firefighters assigned to an engine apparatus. A group of firefighters who work as a unit and are equipped with one (1) or more pumping engines that have rated capacities 750 gpm or greater.

First Responder (EMS)	Functional provision of initial assessment (i.e., airway, breathing, and circulatory systems) and basic first-aid intervention, including CPR and automatic external defibrillator (AED) capability.
Forcible Entry	Techniques used by fire personnel to gain entry into buildings, vehicles, aircraft, or other areas of confinement when normal means of entry are locked or blocked.
Group Fire	A major fire involving a group of structures, usually in a single block or area and threatening to spread to conflagration proportions.
Hazardous Material	Substance that is capable of creating harm to people, the environment, or property due to its toxicity, chemical reactivity, decomposition, or corrosiveness; is capable of explosion or detonation; or presents etiological hazards, whether used for its intended purpose or as a weapon of mass destruction (WMD) or for illicit labs purposes, environmental crimes, or industrial sabotage.
Incident Commander	The officer responsible during a specific incident for all incident activities, including the development of strategies and tactics and the ordering and the release of resources.
Initial Assignment	Those personnel, equipment, and resources ordinarily dispatched upon notification of a specific type of incident.
Initiating Action/Intervention Time	The time interval from when a unit arrives on the scene to the initiation of emergency mitigation.
Ladder Apparatus	A fire department vehicle normally equipped with a fixed ladder, telescoping boom or similar aerial device of 85 to 100 feet in length.
Ladder Company	A company of members consisting of an officer and firefighters assigned to an aerial ladder truck apparatus.
Marine Rescue and Fire Fighting	The firefighting action taken to prevent, control, or extinguish fire involved in or adjacent to a marine vessel and the rescue actions for occupants using normal and emergency routes for egress.
MEDCU	Portland Fire Department term for an ambulance.
Member	A person involved in performing the duties and responsibilities of a fire department, under the auspices of the organization.

Public Safety Answering Point (PSAP)	A facility, such a municipal emergency dispatch center, in which 9-1-1 calls are answered.
Quint Apparatus	A fire department vehicle with a permanently mounted fire pump, a water tank, a hose storage area, an aerial device with a permanently mounted waterway, and a complement of ground ladders.
Reflex Time	The combination of the time sequences of call processing, turnout and travel.
Rescue Company	A company of members consisting of an officer and firefighters assigned to a vehicle designed and equipped with special rescue equipment.
Risk	A measure of the probability and severity of adverse effects that result from an exposure to a hazard.
Special Operations	Those emergency incidents to which the fire department responds that require specific and advanced training and specialized tools and equipment.
Specialized Apparatus	Fire department vehicle that is used for support or specialized equipment and services at emergency scenes for functions such as, but not limited to, command, technical rescue, hazardous materials mitigation, urban search and rescue, air supply, electrical generation and lighting, or transport of equipment and personnel.
Structural Fire Fighting	The activities of rescue, fire suppression, and property conservation in buildings or other structures, vehicles, rail cars, marine vessels, aircraft, or like properties.
Total Response Time	The time interval from the receipt of the alarm at the primary Public Safety Answering Point (PSAP) to when the first emergency response unit is initiating action or intervening to control the incident.
Travel Time	The time interval that begins when a unit is enroute to the emergency incident and ends when the unit arrives at the scene.
Turnout Time	The time interval that begins when the emergency response facilities (ERFs) and emergency response units (ERUs) notification process occurs by either an audible alarm or visual annunciation or both and ends at the beginning point of travel time.

APPENDIX B: Recommendations

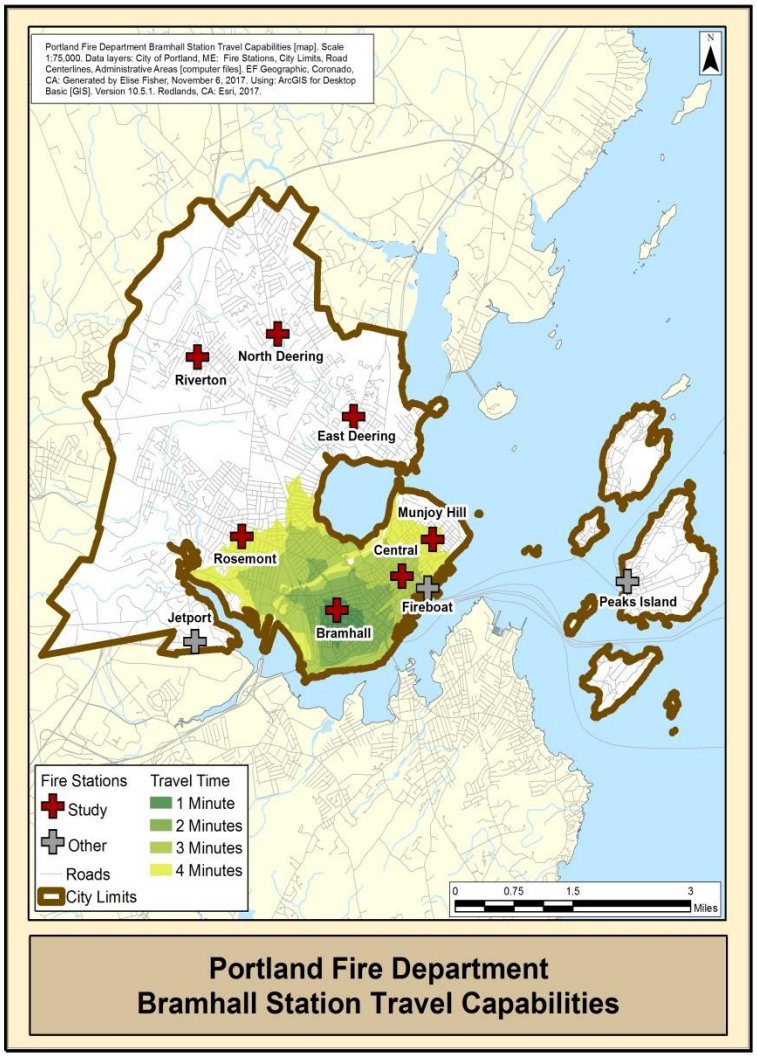
Fire Station Deployment Analysis

Fire Stations
Maintain the current number of stations. Analysis indicates the vast majority of the city can be reached by a fire or EMS resource within 4-minute travel time. What is not possible is the reach all areas of the city, particularly the north and western areas of the city, with sufficient staffing and resource types per nationally recognized travel time criteria. Similar outcomes occur when applying the department's adopted protocols while applying NFPA's 4- and 8-minute travel times. Given the fact that much of the city is within the 4-minute travel time criteria, coupled with the political and financial factors that must be considered when adding an additional station, it recommended with maintaining the current number of fire stations.
Staffing
Chief Officers — Divide the city into two (2) districts and increase the number of on-duty chief officers. The deputy fire chief supervises the administration and operations of a total of eleven (11) fire companies and five (5) ambulances land-based units, as well marine and airport specialty units and volunteer forces stationed on the city's outlying islands. The recommended chief officer span of supervision is one (1) chief officer on duty for every eight (8) companies or a fraction thereof. This increase is due to the current on-duty deputy chief's span of supervision and administrative duties, coupled with the department's current inability to have a minimum of two (2) chief officers initially dispatched to multi-company incidents, particularly after hours. At a minimum, there should be two (2) chief officers on-duty at all times.
Company Personnel — Increase company personnel to a minimum of one (1) officer and three (3) firefighters at all times. The current staffing level of one (1) officer and two (2) firefighters is marginal for effective firefighting operations. The department's ability to meet initial deployment capabilities may be enhanced by increasing staffing levels, particularly on engine companies assigned quint apparatus.

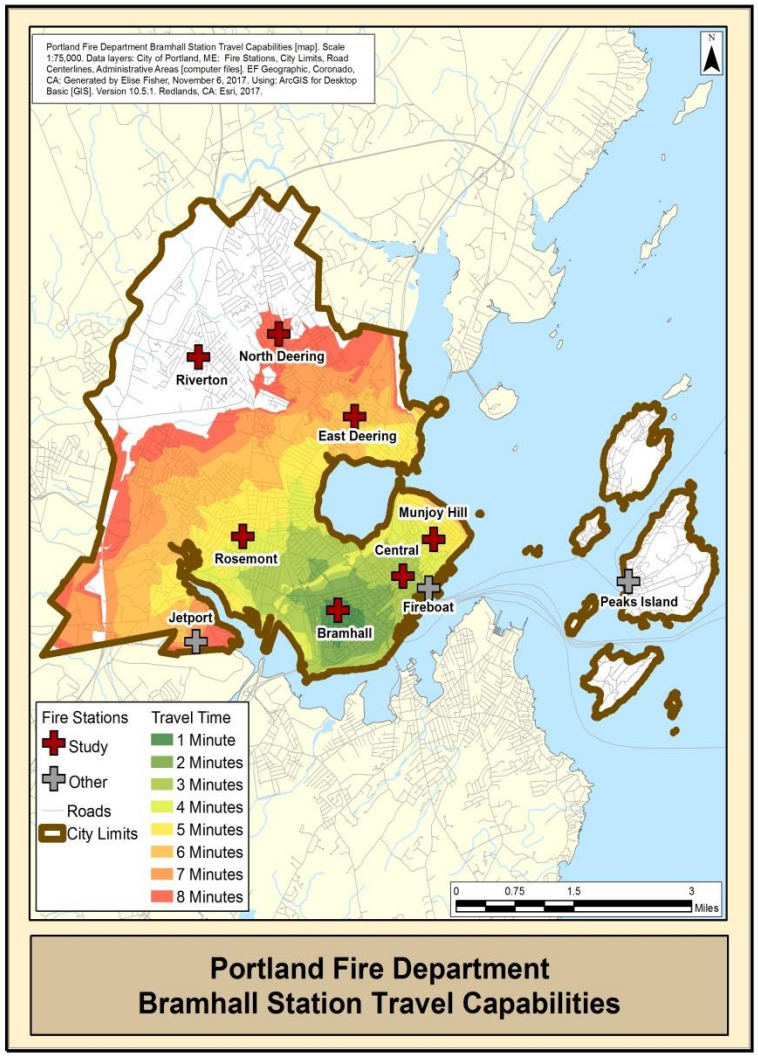
Fire Station Repair and Replacement							
Station	**Constructed**	**Sq. Ft.**	**Bays**	**Site**	**Description**	**Recommendations**	**Comments**
Renovation							
Munjoy Hill 134 Congress St.	1977	10,000	3	Medium	2 story	Major Remodel	Conduct a major remodel of the facility.
Bramhall 784 Congress St.	1964	15,000	5	Large	2 Story hillside	Major Remodel	Conduct a major remodel of the facility or consider relocating to a larger site nearby that allows for a more functional station and training facility.
Central 380 Congress St.	1925	14,250	5	Large	Historic 2 story + Admin.	Major Remodel or Build New	Conduct major renovation or replace with new headquarters station. A replacement station is suggested primarily due to the narrow apparatus bay door configuration which will significantly limit future apparatus selection and placement.
Replacement							
East Deering 576 Ocean Ave.	1956	5,217	2	Small	1 story	Build New	Replace station with a new facility consisting of a minimum of three drive-through bays and quarters spacious enough to accommodate current crew of three with ability to expand to a minimum of ten (10) personnel (two (2) four-person fire companies and one (1) two-person MEDCU ambulance). The station should remain in the vicinity of Ocean and Washington Avenues.
North Deering 380 Allen Ave.	1966	5,217	2	Small	1 story	Build New	Replace station with a new facility consisting of a minimum of three drive-through bays and quarters spacious enough to accommodate current crew of five with ability to expand to a minimum of ten (10) personnel (two (2) four-person fire companies and one (1) two-person MEDCU ambulance). The station should remain in the vicinity of Washington and Allen Avenues and Auburn Street.
Riverton 1592 Forest Ave.	1971	5,217	2	Small	1 story	Build New	Replace station with a new facility consisting of a minimum of three drive-through bays and quarters spacious enough to accommodate current crew of three with ability to expand to a minimum of ten (10) personnel (two (2) four-person fire companies and one (1) two-person MEDCU ambulance). The station should remain on or near the current site.
Rosemont 212 Stevens Ave.	1953	4,945	2	Small	1 story	Build New	Replace station with a new facility consisting of a minimum of three drive-through bays and quarters spacious enough to accommodate current crew of three with ability to expand to a minimum of ten (10) personnel (two (2) four-person fire companies and one (1) two-person MEDCU ambulance). The station should remain on or near the current site.

APPENDIX C: Individual Fire Station Response Time Capabilities

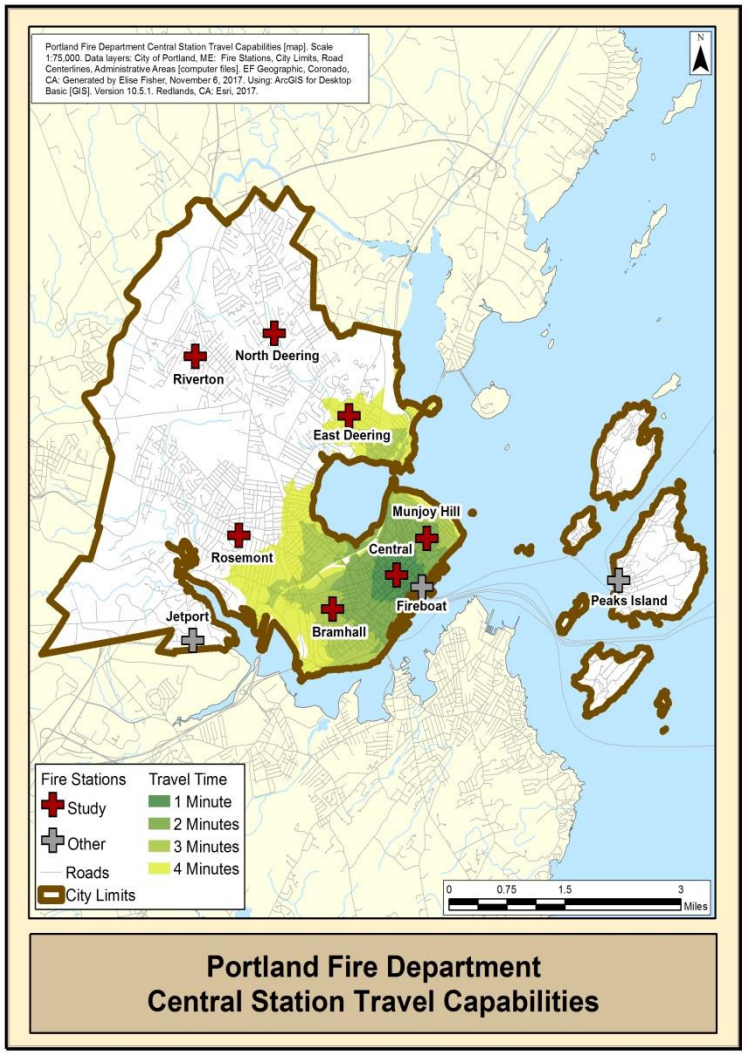
Map 35. Bramhall Fire Station 4-Minute Response



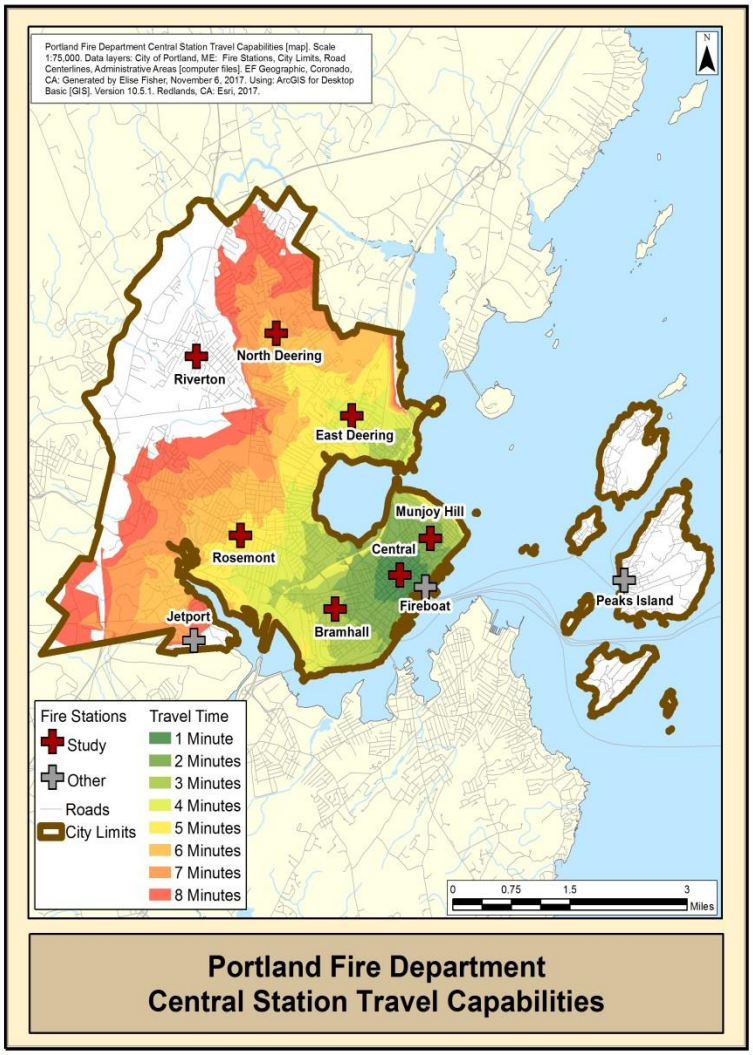
Map 36. Bramhall Fire Station 8-Minute Response



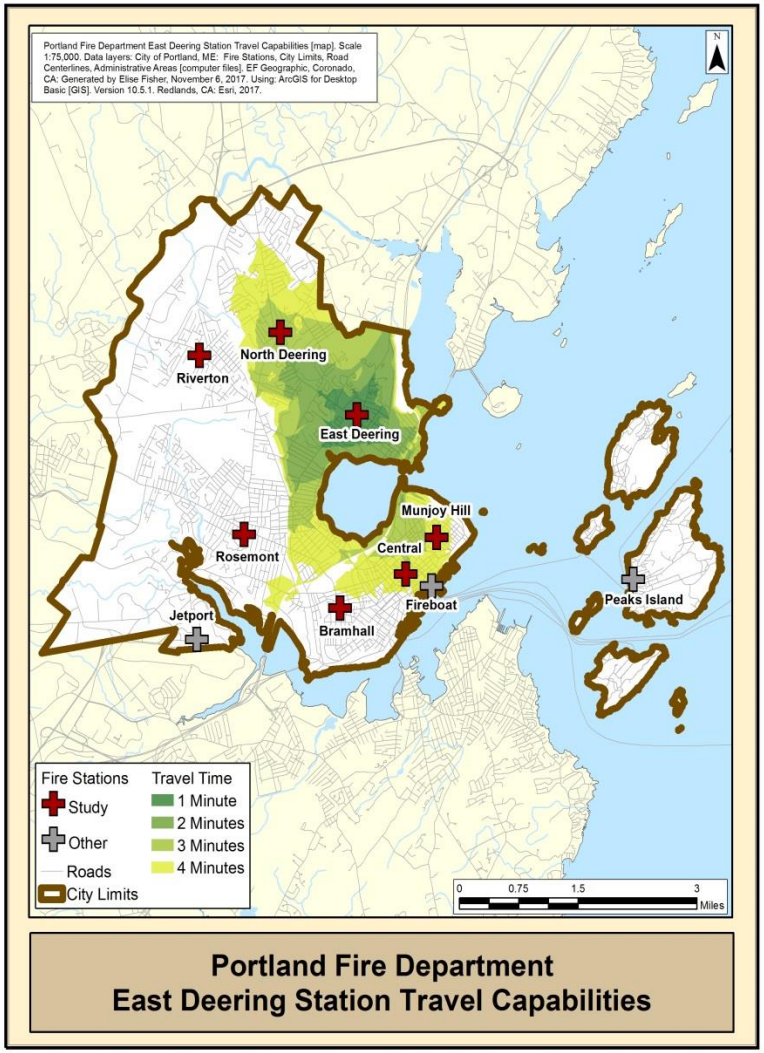
Map 37. Central Fire Station 4-Minute Response



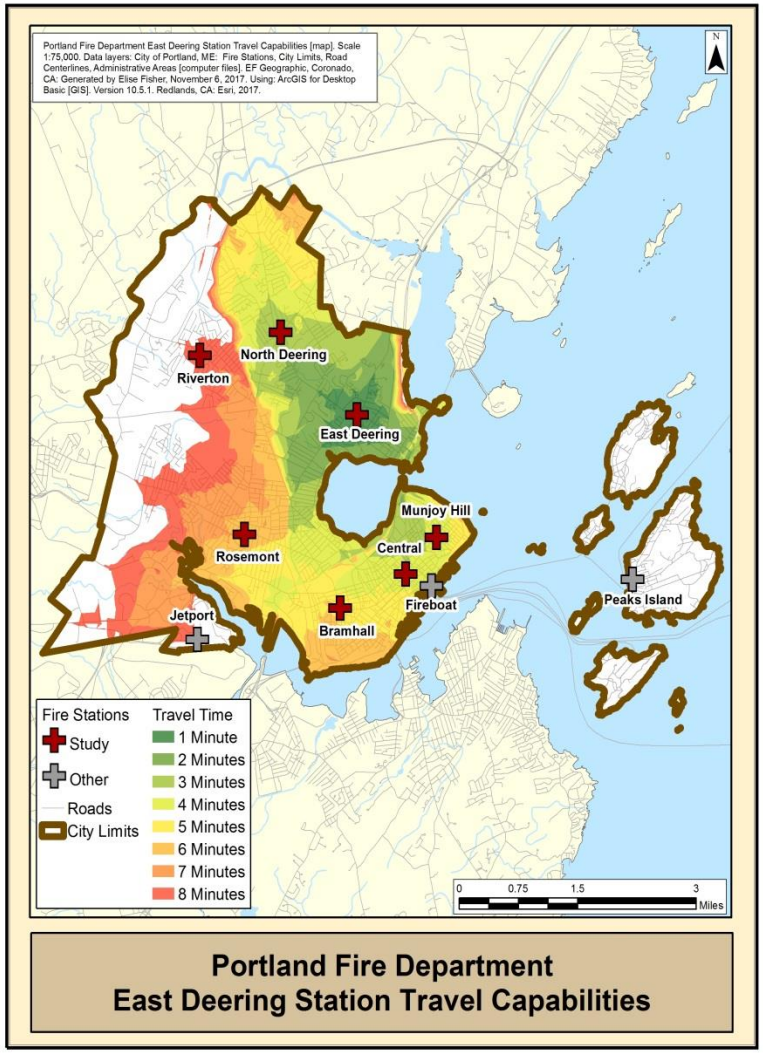
Map 38. Central Fire Station 8-Minute Response



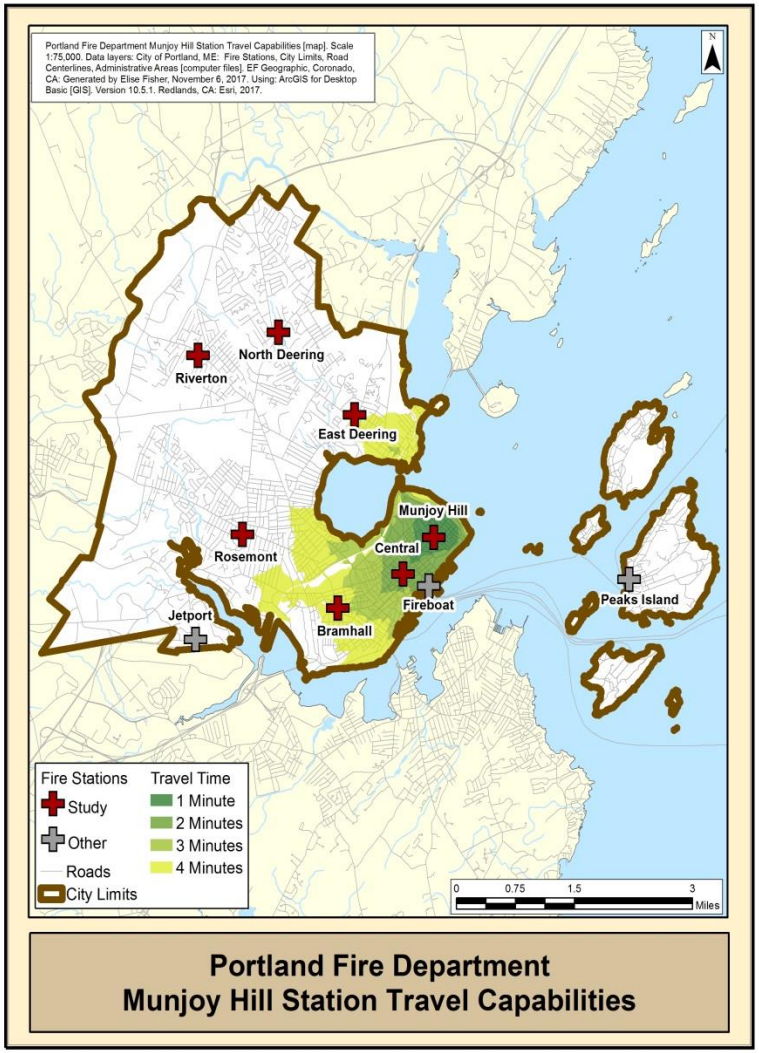
Map 39. East Deering Fire Station 4-Minute Response



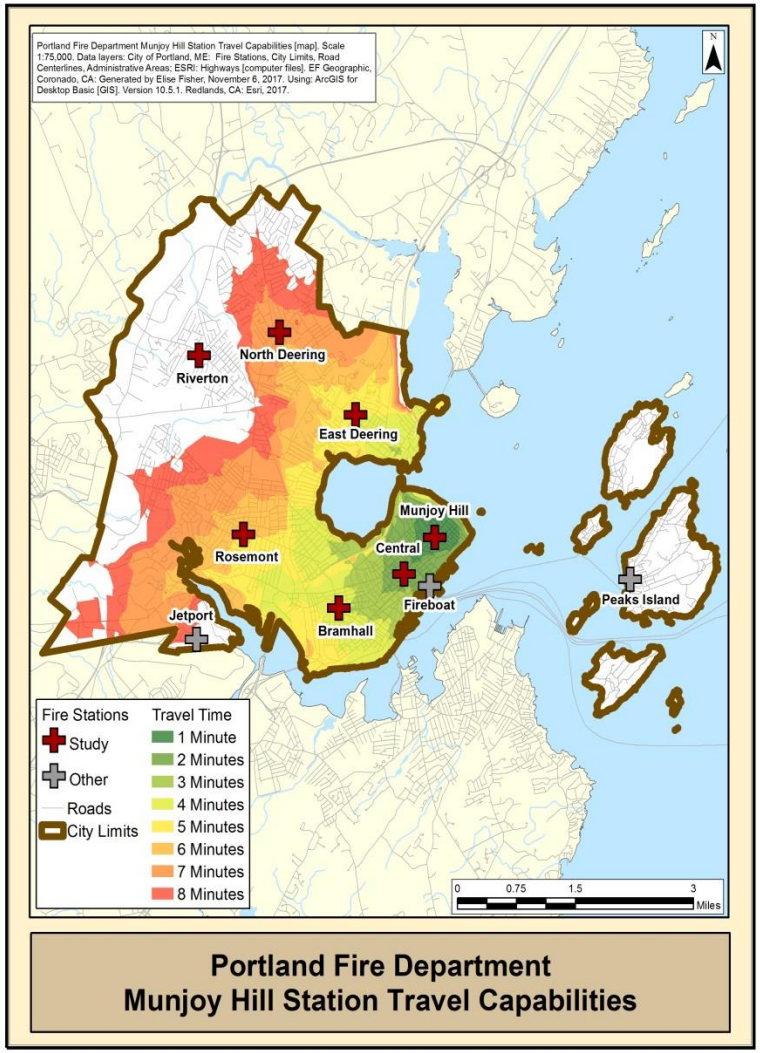
Map 40. East Deering Fire Station 8-Minute Response



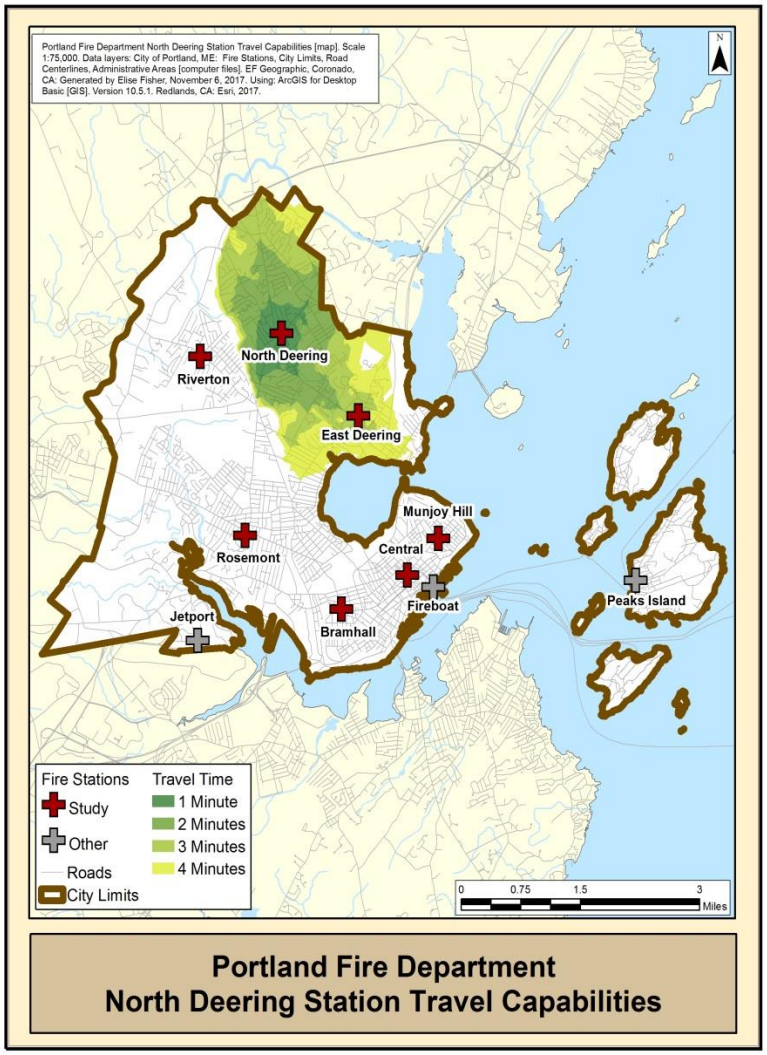
Map 41. Munjoy Hill Fire Station 4-Minute Response



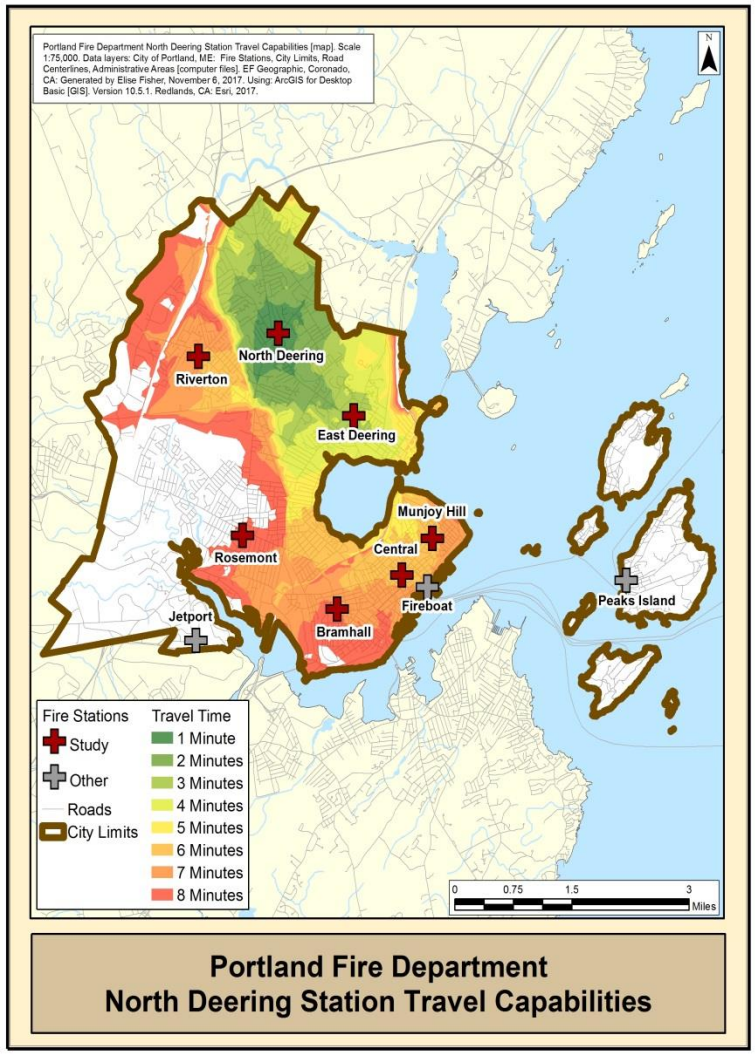
Map 42. Munjoy Hill Fire Station 8-Minute Response



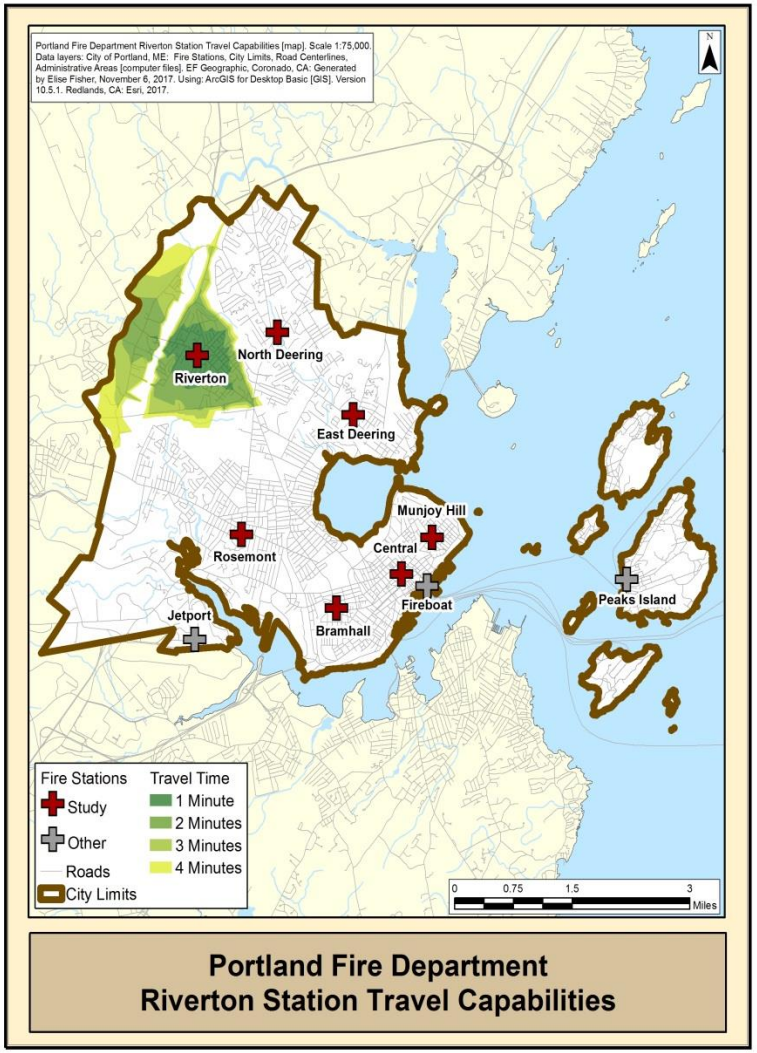
Map 43. North Deering Fire Station 4-Minute Response



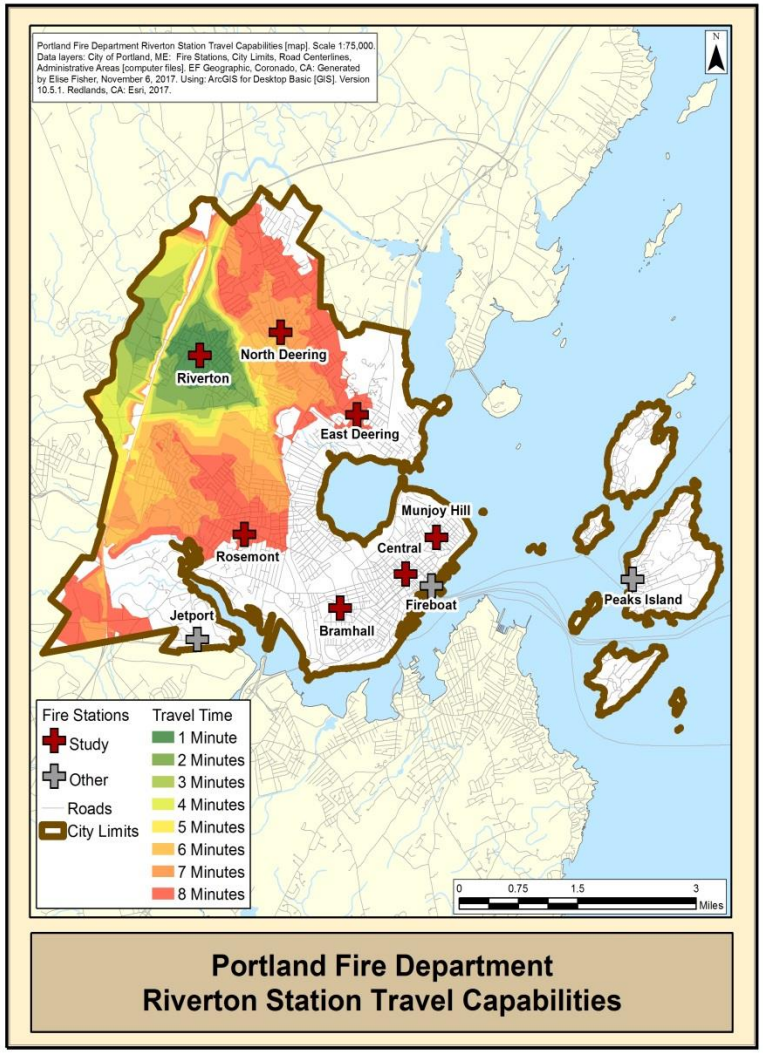
Map 44. North Deering Fire Station 8-Minute Response



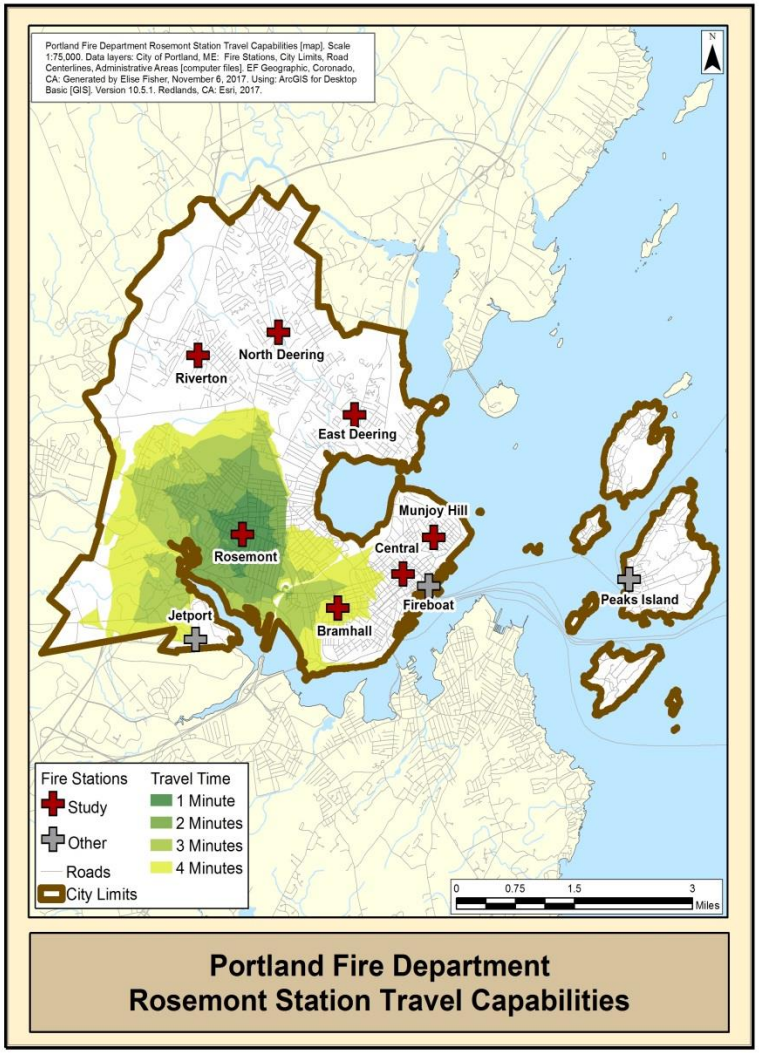
Map 45. Riverton Fire Station 4-Minute Response



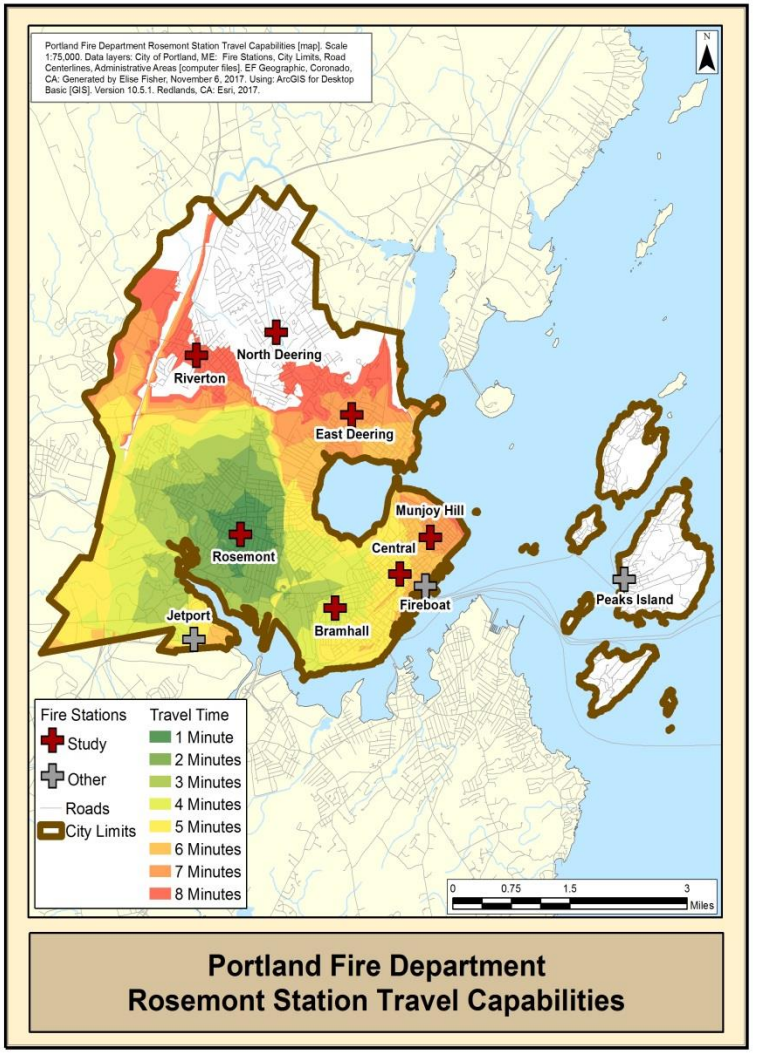
Map 46. Riverton Fire Station 8-Minute Response



Map 47. Rosemont Fire Station 4-Minute Response



Map 48. Rosemont Fire Station 8-Minute Response



MEMORANDUM

TO: City of Portland Health and Human Services and Public Safety Committee
FROM: Andy Downs, Chief Michael Sauschuck, Jessica Hanscombe, Anne Torregrossa
CC: Jon Jennings, City Manager
DATE: March 15, 2018
RE: Update on Sound Issues

Sound and noise in the City has been a significant concern for both this Committee and staff. We wanted to take an opportunity to update the Committee on steps that have already been taken to address noise concerns in the City, as well as projected goals for addressing noise moving forward.

Steps Taken

Staff has already taken the following steps to help reduce and address noise complaints throughout the City:

- Streamlining the noise complaint process to funnel all complaints through the Police Department. This has allowed a more uniform response to complaints and ensures that proper measurements are taken where appropriate.
- Ensuring that the Sound Oversight Committee reviews all noise complaints, not only those with a high enough reading to trigger an ordinance violation.
- Business Licensing staff is attending the Sound Oversight Committee meetings to answer questions about entertainment licensees and the City's licensing rules.
- The full City Council now receives notification of all entertainment licenses up for renewal to allow a Councilor to request that a particular license be brought back before the Council for review. This has led to the Council review and change one license, as well as changes to a second entertainment license that had been the source of complaints.
- Reducing the number of concerts and the number of back-to-back concerts on public property.
- Installing sound monitoring devices last summer, with phase two of that project planned for this summer.

Additionally, as the summer months approach, staff will be initiating an education campaign regarding outdoor speakers, and the ordinances that limit those speakers. Education will be targeted through NLOC, Sound Oversight Committee, mailings to entertainment license holders, and similar avenues. After that campaign, staff will be stepping up enforcement of existing ordinances (Section 17-17 and Chapter 25) that limit the use of unpermitted outdoor speakers.

Next Steps

There is still much work to be done with the City's sound contractor, Acentech, to digest what their findings might mean for crafting a new and more comprehensive sound ordinance.

Acentech has also sent some documentation (277 pages) on best practices from other municipalities, and staff will also be working to digest those and consider how they might fit into the regulatory scheme in Portland.

In connection with those recommendations, staff anticipates recommending changes to the entertainment licensing structure in Chapter 4 of the City Code. Currently there are approximately 120 entertainment license holders in the City. Some potential thoughts for changes are:

- Reworking available licenses to allow for one class of license for indoor entertainment, and one for outdoor entertainment.
- Subjecting outdoor entertainment to more strict scrutiny, including a requirement to provide a sound mitigation plan to be reviewed by a City representative.
- Alternative funding options for sound mitigation work.

The goal of these changes would be to allow a more thorough review of the sound impacts of any particular venue or event, especially where outdoor amplification will be used, as that seems to generate the most concerns.

Staff looks forward to working with the Committee to create a balance between maintaining the entertainment options that make the City vibrant and addressing the quality of life issues that can come with noise impacts.