City of Beacon, New York

Develop an Implementation Plan to Consolidate Beacon's Three Firehouses

Final Report

October 2014

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FINAL REPORT

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Develop an Implementation Plan to Consolidate Beacon's Three Firehouses

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FOREWORD

TriData is a division of System Planning Corporation (SPC) based in Arlington, Virginia. System Planning Corporation is a 150-employee defense and national security contractor specializing in high-level systems engineering and national security, and TriData specializes in local public safety issues.

Over the past 33 years, TriData has completed over 200 fire and EMS studies for communities of all sizes across the U.S. and Canada. In addition to this local government consulting, TriData undertakes research in a wide range of public safety issues. TriData is also noted for its research in fire safety on behalf of the United States Fire Administration (USFA), Department of Homeland Security (DHS), and other Federal and state agencies, as well as the private sector. TriData also conducts international research on emergency response topics and has conducted extensive research on effective fire prevention strategies in Europe and Asia as well as North America.

ACKNOWLEDGEMENTS

We wish to thank the staff of the Beacon Fire Department and other city contributors to this study. Without their assistance this project could not have been completed.

City Administrator Meredith Robson and Fire Chief Gary VanVoorhis, in particular, provided guidance on the study to ensure the project achieved the scope of work desired by the city. Ms. Robson and Chief VanVoorhis discussed openly the challenges of addressing the major issues related to this study. Their assistance and diligence in providing information and data and helping to coordinate our meetings with various city representatives was invaluable.

Following are the principle contributors to the study and the TriData project team.

Randy Casale	Mayor
Dennis Lahey	Assistant Chief
Tim Dexter	Lieutenant
Gary Simmonds	
Mike Merritt	IAFF Local 3490 Executive Board
Patrick Rose	
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EXECUTIVE SUMMARY

The City of Beacon sought proposals from qualified firms to conduct an independent analysis of the locations, facilities, conditions, and operations of the city's fire department stations to best optimize service through the development of an implementation plan to consolidate Beacon's three firehouses into a single facility. The goals of this study were to obtain information that will enable:

1. The City of Beacon to properly place its fire department facilities into one central location that will be the most effective and efficient in serving the needs of the citizens.
2. The Beacon City Council to make informed decisions for the prioritization and allocation of resources toward a centralized station in the most cost effective manner.

TriData, a division of System Panning Corporation located in Arlington, Virginia in association with Pacheco Ross Architects, PC (PRA) were selected to conduct this study. TriData has conducted technical research on fire and EMS related issues for over 32 years and has undertaken over 200 studies of this type, including studies of Rochester, Stamford, Waterbury, Pittsburgh, Washington, D.C., and Portland. On the national and Federal levels, TriData has previously worked closely with the U.S. Fire Administration to compile annual data and complete topical studies on current issues affecting fire and emergency medical response, and has performed system wide analyses for the U.S. Navy Fire and Emergency Services. PRA is an award winning Design and Project Management Firm dedicated exclusively to Emergency Response Facilities. PRA specializes in state-of-the-art designs, feasibility studies, renovations/additions, adaptive re-use, master planning, land acquisition, bond referendums, public awareness, budgeting, scheduling, LEED and sustainable design.

Scope of the Project

This study had eight basic and key objectives to conduct a comprehensive evaluation and analysis of the location, condition, operation and consolidation of the three existing stations into one centralized station.

1. Review and update the 2006 Mitchell study
2. Determine the best location for a new station
3. Determine if any of the existing fire stations can be modified to accommodate a central station.
4. Appraise the existing fire stations to determine resale value
5. Identify cost savings associated with station consolidation
6. Identify advantages of consolidation in the areas of operations, administration, response times, staffing, and recruitment and retention

7. Provide schematics, elevation details, cost estimates and nascent building issues which need to be addressed in terms of consolidation
8. A timeline for consolidation

Process

The process used for this project combined multiple research techniques, including on-site interviews, collecting and reviewing background information, and analyzing computer-aided dispatch (CAD) and incident data. We also toured the City of Beacon and visited all of the city's fire stations to assess the condition of stations, get a feel for the risks faced, the geography and in some cases challenging topography of the area, and to understand the unique response issues facing the Beacon Fire Department (BFD). During the tour we also scouted potential new station sites identified by fire department and city officials for viability of construction, coupled with enhanced response time probabilities.

Following our initial site visit and interviews we analyzed the incident data and conducted a series of tasks related to the assessment of station locations, response times, appraisals of existing properties, review of and consultation with the chief on station requirements and space use requirements and architectural reviews and analyses. We conducted a detailed and thorough inspection and walk-though of all existing stations. Throughout the project we maintained contact with the project coordinator.

To understand the architectural requirements and expectations of a consolidated facility now and into the foreseeable future, separate face-to-face meetings were conducted with the mayor, city administrator, fire chief, volunteer assistant fire chief, paid firefighters (members of the IAFF Local 3490), and the City of Beacon Building Department. As part of our site visit we performed in-depth observation of current response conditions and protocols but it also allowed for assessment of the condition, configuration and possibilities for re-use of the current stations and sites.

From these meetings and assessments, a preliminary Program and Space Use document were developed. The Program is a needs analysis integrated with a detailed operational assessment. The Space Use is a spreadsheet of probable size based on the Program. With the Program and Space Use analyses, PRA was able to quickly determine the various sites that would best serve the city and establish initial conceptual budgets.

Previous studies were reviewed to help create and inform the programming. The project team discovered significant overall size deviation. This large deviation necessitated an additional objective comparative size analysis. It is discussed in greater detail later in this summary.

The fire chief, a volunteer firefighter, and the architect visited a station of similar composition and operations. Feedback from this visit led to several Program and Space Use revisions.

Tours of every proposed site location were conducted. Several additional sites were identified and visited. Previously unconsidered sites (such as Verplanck/Cannon) were generated from the face-to-face meetings with stakeholders. Sites were ranked for appropriateness and further study. Draft results of the TriData *Population, Demand, Response Time, Workload and Station Location Analysis* were introduced into the design methodology at this point. Four sites were selected for conceptual site design development.

Preliminary conceptual site plan designs were used to evaluate the necessary space adjustments required for different design configurations such as single story or addition/renovation. This feedback loop is a dynamic process of refinement. With a completed Program, Space Use, existing building assessments, revised conceptual site plans, utility cost savings, and appraisal of existing facilities, conceptual budgets were developed for three of the four site plans.

Final recommendations for the optimal site and design are included at the end of this executive summary.

Station Location

The city of Beacon can certainly be covered from a single station location. It is uncommon for us to find cities that have completely perfect 4-minute coverage as is the case for Beacon at the moment with its three-station layout. This same level of coverage is achievable from a single station location, but none of the five selected sites quite pull it off. In all cases there are areas of Beacon that would see 5-minute instead of 4-minute travel times. Of the five options, the best option is the Cannon Practice Field. This provides excellent 4-minute coverage to all of the areas of highest population density and would only have slightly extended travel times to the very south of Beacon.

Fire Operations

We are proposing a 4 bay station with an approximately 22,000 square foot footprint. The new station will be able to sufficiently house the necessary units needed for efficient fire operations easily within the configuration of the new deployment model we recommend. This configuration offers several response models, which can create more viable emergency response provision. Each of the options we offer will include the end of responding to first alarm calls and structure fires in three separate apparatus with three separate drivers. It will also necessitate the end of the policy of having only career drivers and including into the response model volunteer drivers into the emergency response mix. Under this model volunteers will no longer respond directly to the scene unless otherwise directed. It is important to state that all potential volunteer drivers meet the same stringent standards and requirements that are met by career personnel to become drivers.

A better use of personnel in all of these scenarios would be to have all three on duty career firefighters respond on one engine with a driver and two firefighters as a complete response team/unit. The other approach would be a bit more innovative. It would involve replacing the current platform ladder, which is not a wise choice of apparatus for a city like Beacon and substituting it with a quint.

Architectural Analysis

It is PRA's professional opinion that none of the original fire stations are viable in their current configuration for use as modern fire facilities. Only the Lewis Tompkins Hose Station has enough site available for a credible addition, and this is only possible with the use of the privately owned lot west of St. Andrew's Episcopal Church being used for the new parking area. Lewis Tompkins Hose Station also suffers from a very shallow bedrock formation that would greatly increase the cost of any addition. The other sites are far too small for relevant renovation or expansion and do not support meaningful and cost effective land acquisition in any direction.

Facility Size – The proposed square footage is 22,500. There may be concern that the previously identified square footage is 63% larger than what is currently proposed, but we feel confident the new area is correct for a properly functioning combined facility in this community.

Sites – The three sites selected for best response times and as optimal construction sites (in order of their ultimate ranking) were:

- **Site 1 - Verplanck Avenue and Cannon Practice Field**, located on the corner of Verplanck Avenue and Matteawan Street. This relatively flat site is a city-owned property, portions of which are currently used by the school district as a practice field. An approximate area of 1.5 acres of this property closest to Verplanck Avenue was used for the conceptual layout. The track for the school would remain undisturbed in the design solution for this site.
- **Site 2 – Elks Club** located at Wolcott Avenue and Tioronda Avenue. This is a privately owned site and part of the Elks Club property. The Elks Club has expressed interest in selling a portion of their current site to the city for use as a fire station. The site is relatively flat at the southwest with an increasing downward slope towards the east.
- **Site 3 – Lewis Tompkins Hose Station** at South Avenue and Wolcott Avenue. This is the location of the current Lewis Tompkins Hose Station. It is a city-owned property with a severe slope, constricted width, and known issues with shallow rock formations.

Costs – Based on PRA's professional opinion, PRA recommends building a new 21,200 square foot single story fire station on the Verplanck Avenue and Cannon Practice Field site (Site 1). Total Hard and Soft Costs for this project are expected to be in the range of $6.86-$7.25 Million based on a spring 2015 construction start. Please see Appendix I, Conceptual Budgets, for a detailed explanation including additional reductions to this budget when factoring in the energy savings.

I. INTRODUCTION

Background

The City of Beacon lies in the southern part of Dutchess County, approximately 55 miles north of New York City (NYC), directly on the shores of the Hudson River. It is a primarily a bedroom community which has a bucolic feel, but also has a suburban, even urban persona as well. In recent years it has attracted NYC residents and as a result has a vibrant, burgeoning arts community attracted to and residing in the community. It also has generations of a long time resident community who form the core fabric of this well-established small city. Beacon has a population of approximately 15,000 residents in an area encompassing 4.7 square miles. The city is adjacent to the busy I-84 interstate corridor, has a major commuter rail station and freight train line, and sits on the eastern side of the very busy Newburgh-Beacon Bridge. The downtown area is bustling during the day time and there is a substantial nightlife in the city.

Beacon has a council-city administrator form of government, whereby the mayor serves as chairman of the city council and the city administrator takes care of the day-to-day operations. The city council has seven members including the mayor.

The City of Beacon is protected by a traditional combination department consisting of career and volunteer firefighters. The Beacon Fire Department has historically operated from the Lewis Tompkins Hose Station which acts as the functional ad hoc headquarters and two sub-stations known as Mase Hook and Ladder and Beacon Engine.[1] Lewis Tompkins Hose Station operates with an engine company; Mase Hook and Ladder Station operates with a platform ladder; and Beacon Engine Station operates with an engine company. One-man career crews operate all station companies. The volunteer corps of firefighters and mutual aid supplement these companies when there are structure fire calls. All three units (two engines and the platform ladder) respond to structure fires with each unit staffed with one firefighter. This configuration and response model is unique and in our experience quite rare. Staffing levels are constant without regard to time of day or day of week, and consist of 3 staffed slots per shift. All vacation, leave requires overtime per shift for backfill.

[1] Although Mase Hook and Ladder is listed on the city's official website as "headquarters", Lewis Thompkins Hose is the functional headquarters of the BFD. The fire chief conducts all fire department business from "Station 2".

II. POPULATION, DEMAND, RESPONSE TIME, WORKLOAD AND STATION LOCATION ANALYSIS

Population Growth and Development

The City of Beacon has had essentially the same population for the last 60 years. Figure 1 shows us actual population from 1950-2010. Although there was an eight percent decline in population from 14,012 in 1950 to 12,937 in 1980, there has been a rebound since that point. In the 2010 Census, Beacon had a population of 15,541. The Beacon Comprehensive Master Plan does not make any projections for population going forward.

Figure 1: Actual (solid) and Projected (dashed) Population, 1960-2030

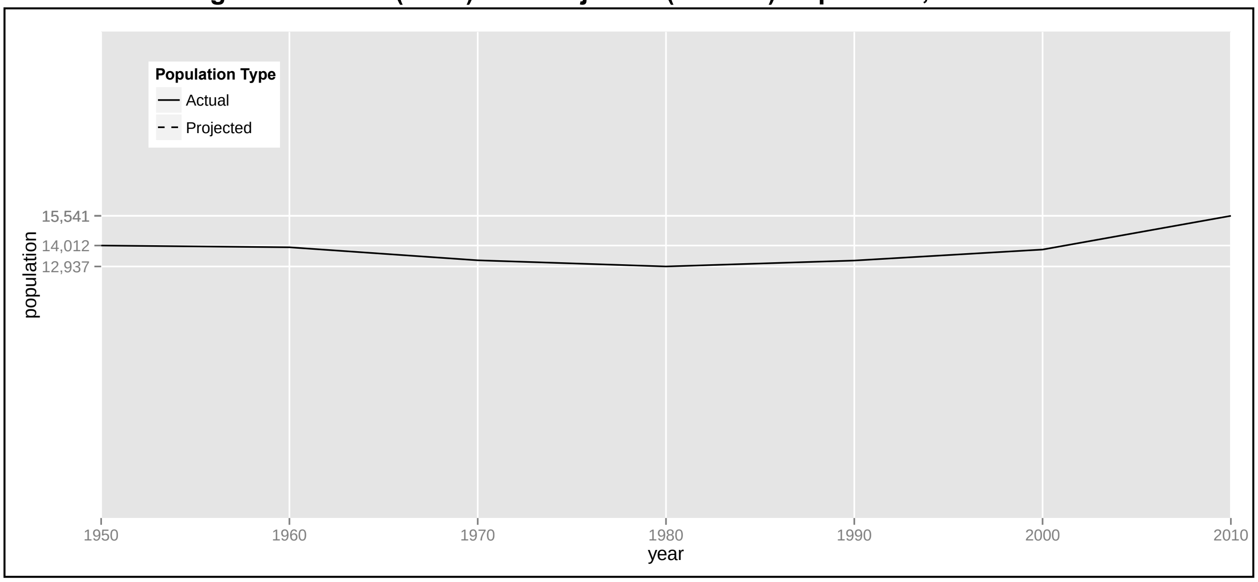
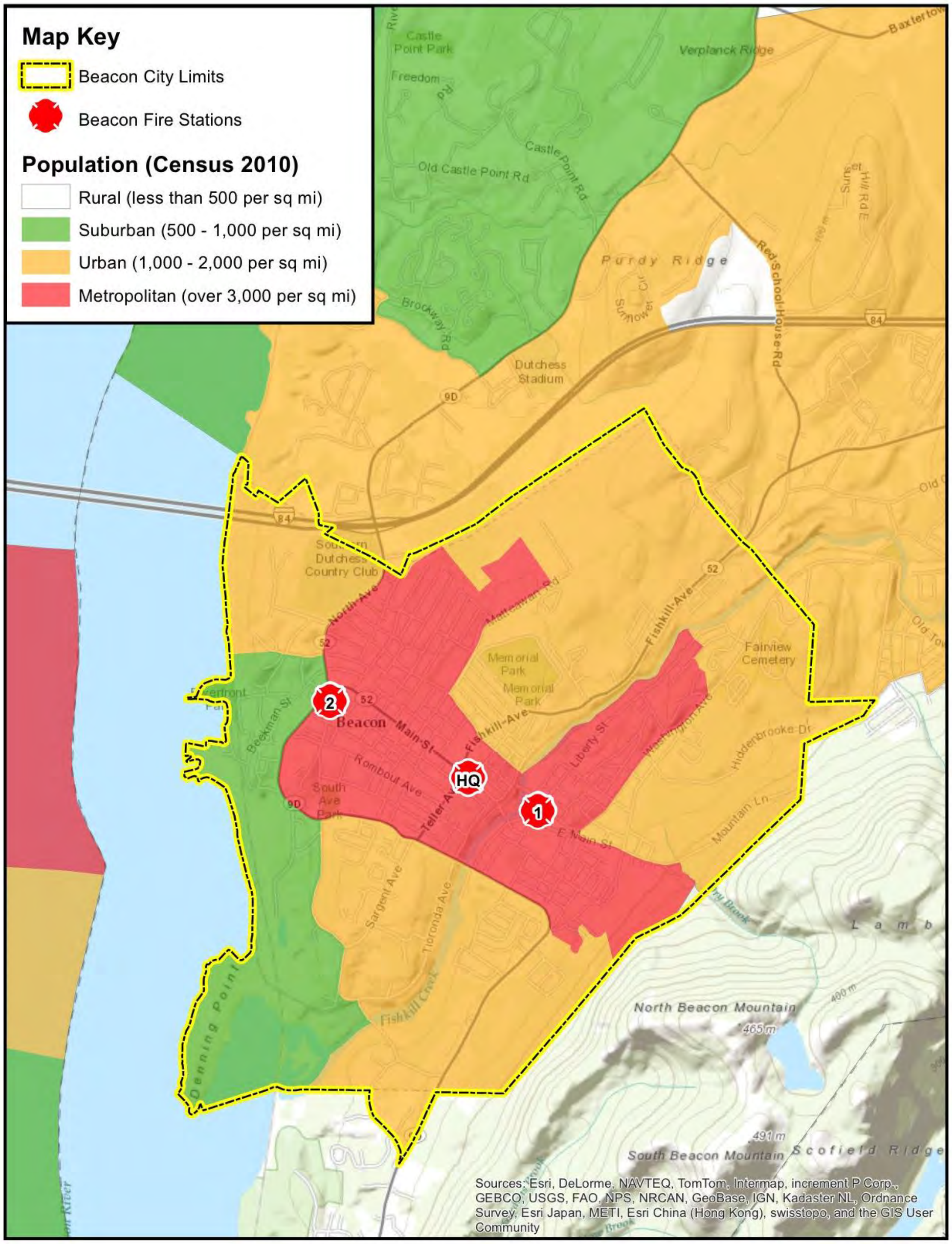


Figure 2 shows us the current population density (compiled using 2010 Census data). The map shows that Beacon has a combination of metropolitan[2], urban, and suburban areas. Most of the population density is centrally located within Beacon along Main Street and along Union Street. More suburban areas run along the waterfront.

[2] The term "metropolitan" is a bit misleading because a population density of 3,000 people per square mile is not the typically thought of as metropolitan, but this is how the National Fire Protection Association defines population density and makes response time recommendations accordingly.

Figure 2: Population Density, 2010 Census



Geospatial Mapping of Fire and EMS Demand

This section maps out fire and EMS incident densities using geographic information system (GIS) software. This allows us to pinpoint high-demand areas (or hotspots). This hotspot analysis was conducted using data from the Dutchess County dispatch center. Figure 3 shows fire incident density. The areas of higher incident density run exactly in line with the areas of higher population density. The only hotspots outside of the "metropolitan" population density are located on Tomkins Terrace and Hastings Drive. The EMS hotspot map shown in Figure 4 shows a very similar pattern to that of fire incidents. Notable is that there is a larger EMS incident hotspots in the Hastings Drive area. (See Appendix A for TriData's total incident forecasting methodology.

Figure 3: Fire Incident Density, 2013

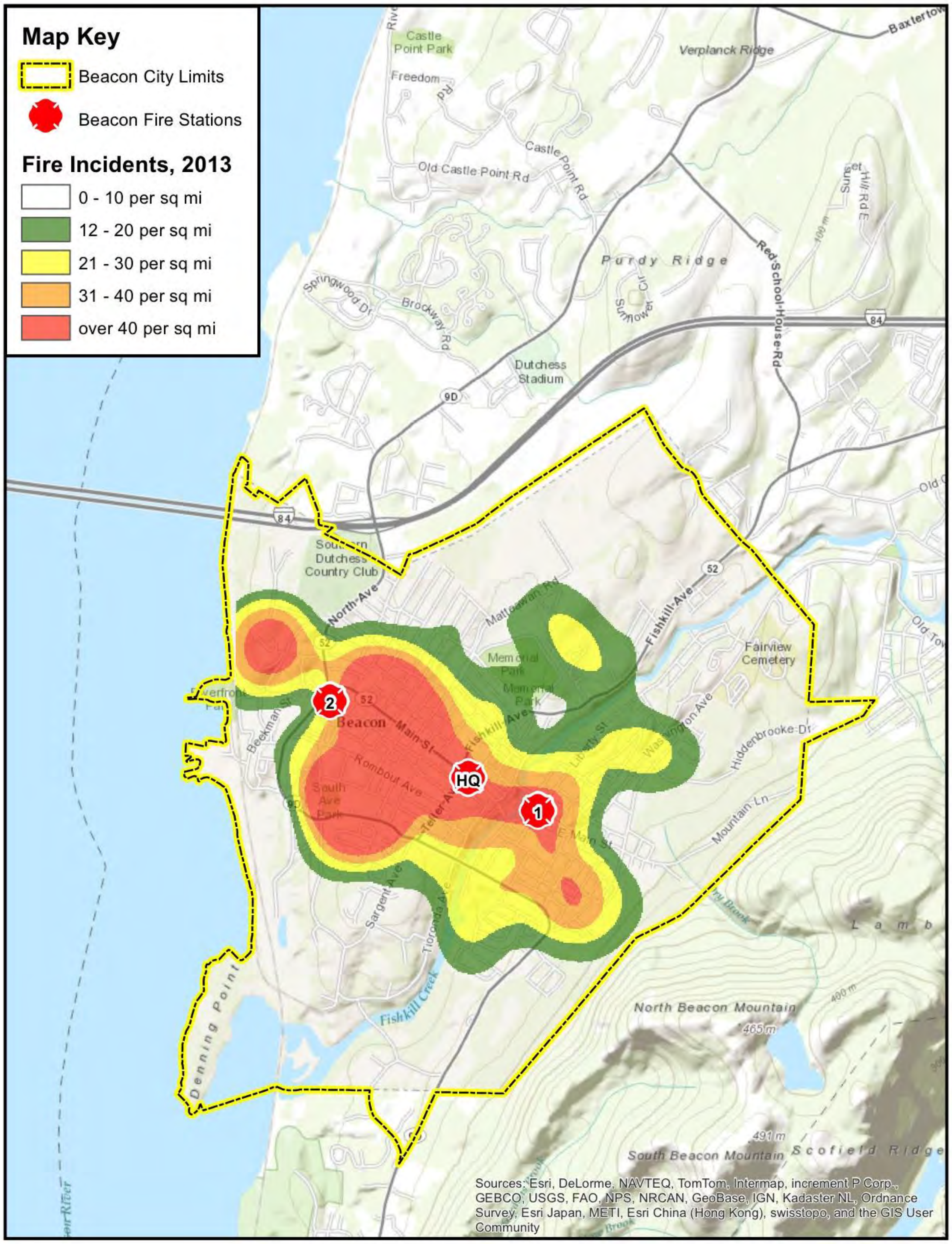
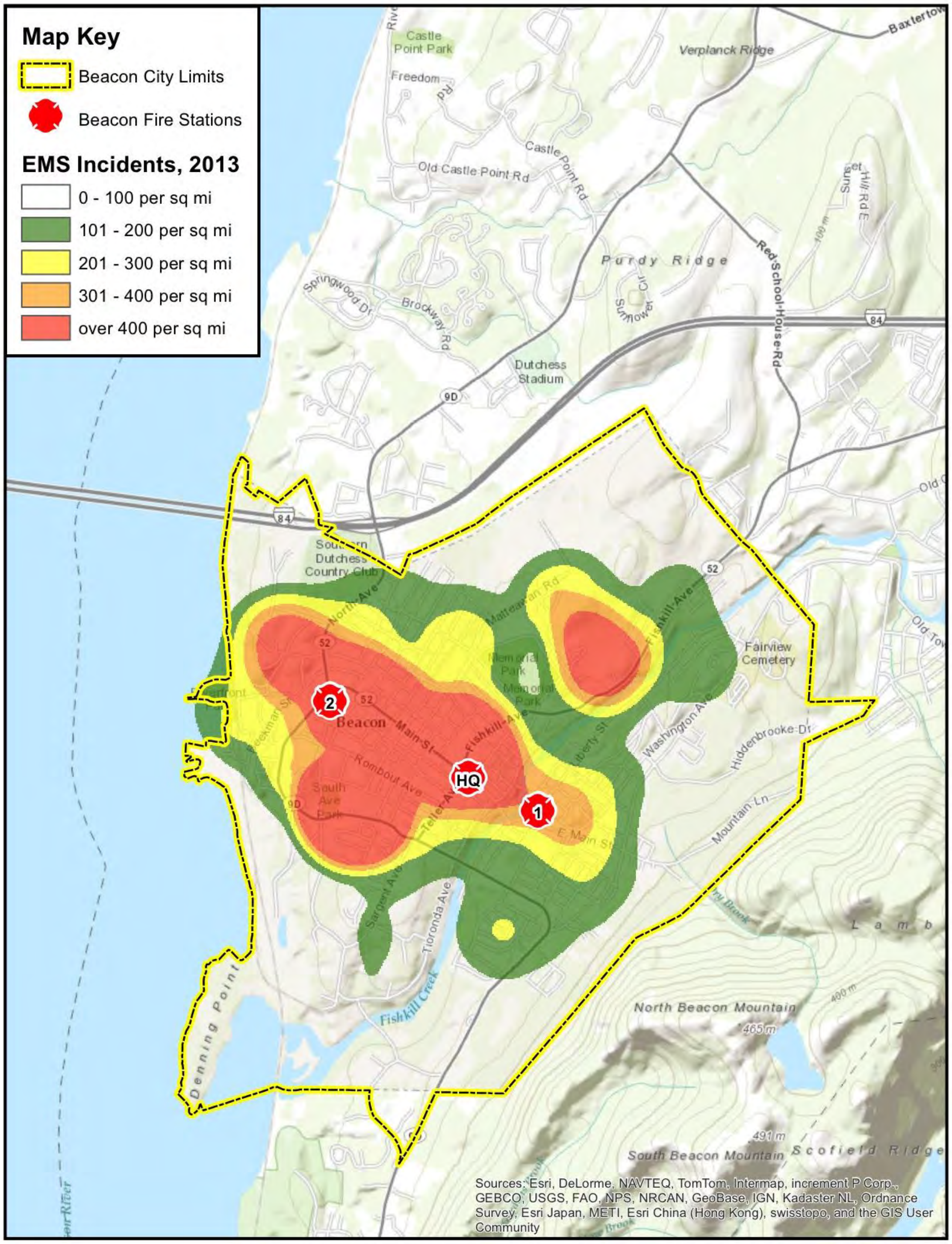


Figure 4: Emergency Medical Incident Density, 2013



Response Time Analysis

Response time is the most common performance measurement used by the fire service because it is understood by citizens, easy to compute, and useful in the evaluation of end results. Rapid response is also an aspect of service that citizens care about. Faster response to fires and other emergencies is obviously better, but there are no studies correlating specific decreases in time with numbers of lives or dollars saved. In place of true measures of outcome, response time is often used as a substitute.

How Response Time Is Analyzed – In this response-time analysis, we show average times, 80thpercentile times (meaning that a time standard was met 80% of the time), and 90thpercentile times. Although averages are commonly used in other fields to summarize results, average response times are used less frequently by the emergency-service industry because small numbers of very short or long response times and data errors can distort the results. We show the average response times because jurisdictions often want to know what their average times are, but fire departments should never gauge performance strictly on average response times.

The public is interested in how fast a system responds to most calls, which is better reflected in percentile/threshold times (how often the system responds within the established standard) than average times. More and more departments are adopting the 90th percentile for reporting response times because this measure is used by the NFPA, and because BFD is a combination department with career personnel as the primary response we use 1710 standards for our analysis. National Fire Protection Association 1710 sets these response goals for fire departments:

- Call-processing time under 60 seconds 90% of the time
- Turnout time under 60 seconds 90% of the time for EMS responses
- Turnout time under 80 seconds 90% of the time for fire responses
- Travel time under four minutes 90% of the time

Most fire departments claim to use NFPA 1710, but few are actually meeting the standard, especially with respect to travel time, which is the hardest to improve.

Meeting the 90thpercentile goal is not always the most efficient means for delivering emergency services. A system designed for 90% compliance allows only 10% of calls to have response times that exceed the goal. Although it is certainly possible to design a system with 90% compliance for all areas of a jurisdiction, it is usually not a cost-effective strategy. Urban areas close to several fire stations should have high compliance, but it does not always make sense to dictate such high compliance for suburban areas. National Fire Protection Association 1710 acknowledges that it would not make sense to apply the same goal times to rural areas.

A better approach, we believe, is to use 80% compliance as the response-time standard. There are several reasons for this. Departments that do not have rigorous data-quality controls will typically have more calls with incorrectly long response times than incorrectly short response times, making it difficult to achieve 90% compliance. An 80% compliance standard leaves room for some erroneous data. Almost no departments actually achieve 90% compliance with NFPA 1710. The CPSE Standards of Cover Manual uses 80th percentile times as a suggested performance criterion. In our response-time analysis, we used an adjusted standard that uses the NFPA 1710 time objectives, but measures response times at the 80th rather than the 90th percentile for the above reasons.

Our analysis of BFD response times included only incidents dispatched as an emergency. We eliminated service calls from the response-time analysis. We included only frontline pumping and aerial apparatus for fire incidents and only first-response-capable units for EMS calls. These criteria were applied to keep the analysis in line with the 1710 standard. For all time segments, we analyzed one year of data.

Call-Processing or Alarm-Handling Time – According to NFPA 1710, alarm-handling time is:

> "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."

National Fire Protection Association 1710 (4.1.2.3.3) specifies that:

> "the fire department shall establish a performance objective of having an alarm processing time of not more than 60 seconds for at least 90 percent of the alarms and not more than 90 seconds for at least 99 percent of the alarms, as specified by NFPA 1221."

Figure 5 and Table 1 show the calendar year 2013 call-processing times for the Beacon Fire Department by time of day and incident type. The 90^{th}percentile call-processing time for fire and special operations incidents was 5:40 (five minutes, 40 seconds). This call processing time is five times higher than what the standard dictates. Call-processing times for EMS incidents were slightly faster, with a 90^{th}percentile time of 4:27, which is still four times longer than the time called for by the standard and suggests an extremely significant dispatch-time issue. The red line in Figure 1 shows that when there are fewer incidents during the overnight hours (meaning the dispatch center is taking fewer 911 calls), there was no decrease in call-processing time. At all times of the day the call-processing times are unacceptably long.

The Dutchess County 911 communications center pointed out that there are several reasons for their long call-processing times. A high percentage of emergency calls are received from cell phones. With cell phone emergency calls it can take longer to locate the exact incident location and there is the chance of dropped calls that require callbacks. They also noted that they dispatch for 36 other agencies and, with only one radio frequency, they often have to prioritize what calls get dispatched first. Because of this prioritization, not all incidents are immediately dispatched. Finally, they pointed out that they do abide by the New York Minimum Standards Regarding Staffing of Public Safety Answering Points, which dictates that they answer 90% of incoming 911 calls within 10 seconds of connection. We reviewed this portion of the Rules and Regulation of the State of New York and note that it does not contain any specifications for total call-processing time (see Appendix J). For our analysis, we use the NFPA 1710 and NFPA 1221 standards for emergency communication center operations. There are other standards such as those put out by APCO International.[3]

The NFPA 1710 times are set so that with a call-processing time of 1:00, a turnout time of 1:00 (1:20 for fire responses), and a 4:00 travel time, a total response time of 6:00 is met (6:20 for fire responses). The reason for this approximately 6-minute total response time goal is that this is the time at which the chance of surviving cardiac arrest diminishes and the time at which a single-family dwelling typically reaches the flashover point. While these two call types are likely being prioritized at the dispatch center, and would hopefully have call-processing times that are significantly faster than those found in our analysis, the length of the call-processing times are still worrying. While not uncommon to see call-processing times over a minute and possibly pushing two-minutes, the call-processing times for Beacon are at the higher end of what we typically see in our studies. In our discussion with dispatch center staff, it came to light that the dispatch timestamp that we used for calculating the call-processing time is actually the time at which the CAD system provides the dispatch recommendations (based on the location and type of incident) rather than the time at which the units are actually dispatched. This would indicate that the call-processing times might be even longer than our analysis found.

It appears the dispatch center is trying to perform as effectively as possible given its current constraints. There are, however, some steps that can be taken for them to improve their performance. Having a single radio channel for dispatching is causing a bottleneck in the dispatch process requiring the dispatch center to prioritize what calls are dispatched. Currently, the communications center is providing both a verbal announcement and using a typical toning system to dispatch units (a time consuming sequence of tones that dispatches particular units and/or stations). There are more modern dispatch technologies that do not require the use of tones and allow for units to be immediately dispatched. There are several different providers of advanced dispatching technologies including a company called Locution Systems. Locution has a solution where an electronic voice provides a verbal dispatch at the moment that the location and incident type are entered into the CAD system.

[3] https://www.apcointl.org/standards.html

If more advanced alerting technologies are not a viable solution, perhaps the possibility exists to create additional radio channels and either split fire and EMS dispatch or split dispatch by geographic area. In order to manage additional channels, it may be necessary to hire additional dispatch center staff. While improving call-processing times may be an expensive endeavor, there are certainly ways of improving call-processing times. A call-processing time savings of even one minute for all agencies would be significantly less costly to achieve by improving alerting technology, adding radio channels, or hiring additional staff than by adding additional stations and units to make reductions in travel time.

Figure 5: Call-Processing Time by Hour of the Day, 2013

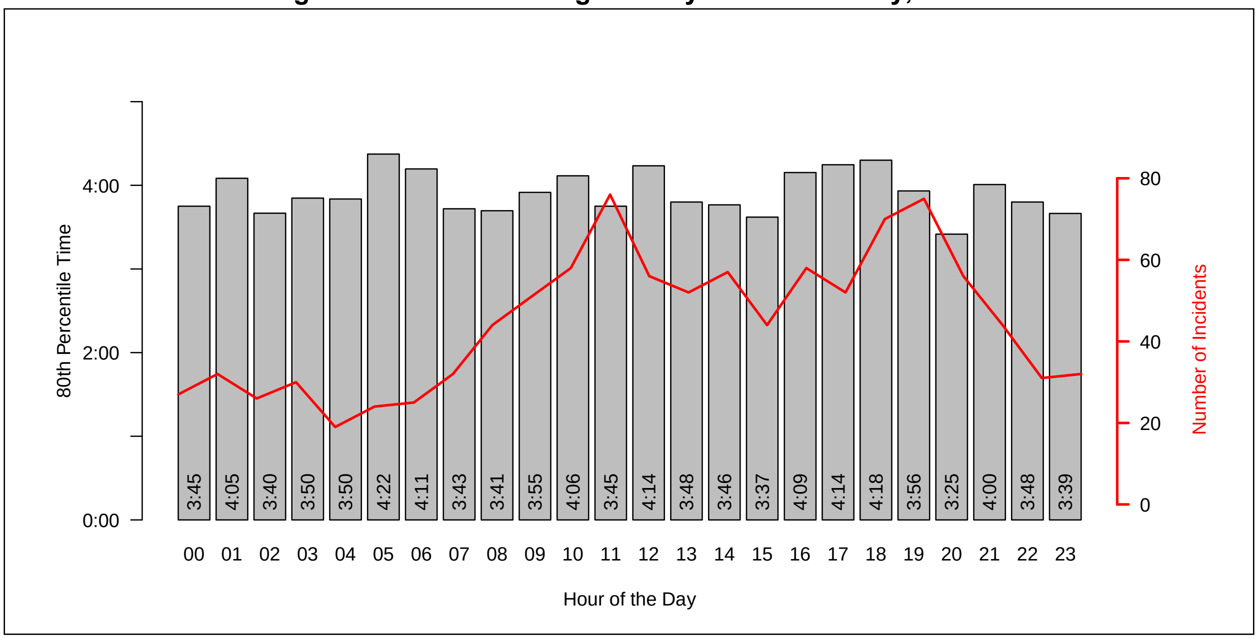


Table 1: Call-Processing Time by Incident Type, 2013

	Average	80th Percentile	90th Percentile
Emergency Medical Service	3:09	3:53	4:27
Fire & Special Operations	3:25	4:32	5:40
(all)	3:10	3:56	4:31

Turnout (or Reaction) Time – National Fire Protection Association 1710 defines turnout time as:

> "the time interval that begins when the emergency response facilities (ERFs) and emergency response units (ERUs) notification process begins by either an audible alarm or visual annunciation or both and ends at the beginning point of travel time." The standard specifies an "80 second turnout time for fire and special operations response and [a] 60 second turnout time for EMS response."

The analysis of Beacon's turnout times against the adjusted standard (NFPA 1710 time-segment objective at the 80th percentile level) showed relatively slow turnout times for all incident types. Figure 6 and Table 2 show the turnout times by time of day and incident type. For fire and special-operation responses, a turnout time of 2:04 is 44 seconds over the adjusted standard. For EMS responses, a turnout time of 2:03 is 63 seconds over the adjusted standard. Because EMS turnouts do not require the donning of turnout gear, they should be faster than fire turnouts, but they are only one second faster in Beacon. Both EMS and fire turnouts as analyzed are slower than they should be, but still in line with how most fire departments are performing. We were informed by BFD staff that they place particular emphasis on turnout time performance. What may be causing the discrepancy between their belief that they have faster turnout times than indicated by our analysis, is the fact that the dispatch timestamp possibly occurs prior to the units actually being dispatched. In the previous section it was discussed that the dispatch timestamp shows the time at which a dispatch recommendation was made by CAD and not the time at which the units were necessarily alerted. For this reason, the turnout time clock may often be running prior to the crew even knowing it. Consequently, turnout times are likely better than what our analysis shows.

Figure 6 shows that turnout times are almost a minute slower during the overnight hours. Improving overnight turnout times would help bring down the overall turnout time.

Figure 6: Turnout Time by Hour of the Day, 2013

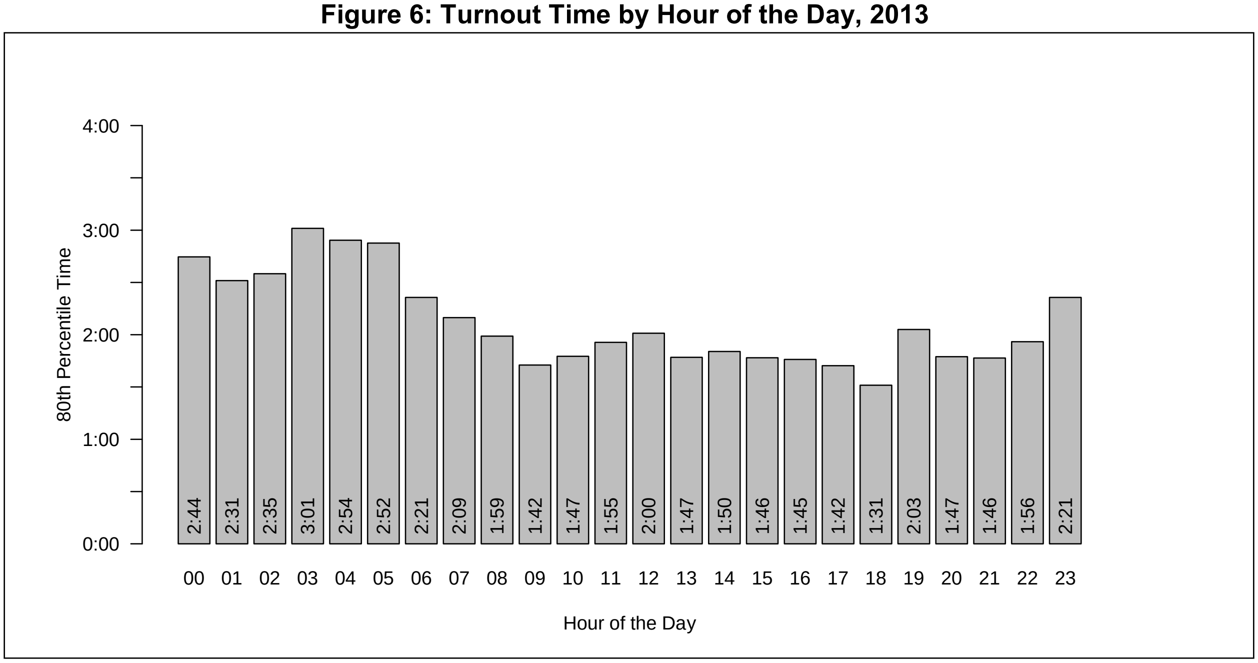


Table 2: Turnout Time by Incident Type, 2013

	Average	80th Percentile	90th Percentile
Emergency Medical Service	1:25	2:03	2:27
Fire & Special Operations	1:20	2:04	2:23
(all)	1:24	2:04	2:26

Travel Time by Hour of the Day and Incident Type – Travel time is the time interval that begins when a unit is en route to the emergency incident and ends when the unit arrives at the scene. Travel time is a function of geography, road conditions, traffic congestion, and the number and location of fire stations with respect to the location of incidents. National Fire Protection Association 1710 recommends:

> "240 seconds or less travel time for the arrival of the first arriving engine company at a fire suppression incident" and "240 seconds or less travel time for the arrival of a unit with first responder with automatic external defibrillator (AED) or higher level capability at an emergency medical incident."

The analysis of Beacon's travel times against the adjusted standard showed extremely good travel times for both fire and EMS incidents. Travel time for all emergency incidents was 3:05, which is almost a minute faster than the objective of four minutes. Travel times were 2:42 for EMS incidents and 3:07 for fire and special-operation incidents. Figure 7 shows travel time for the first-arriving unit by hour of the day and Table 3 shows the travel time by incident type. Travel time for the first-arriving unit varies throughout the day, but it does not appear that there is any particular trend. While very few fire departments actually meet the NFPA 1710 travel-time standard, BFD travel times are significantly under the standard.

Figure 7: Travel Time (First-Arriving Unit) by Hour of the Day, 2013

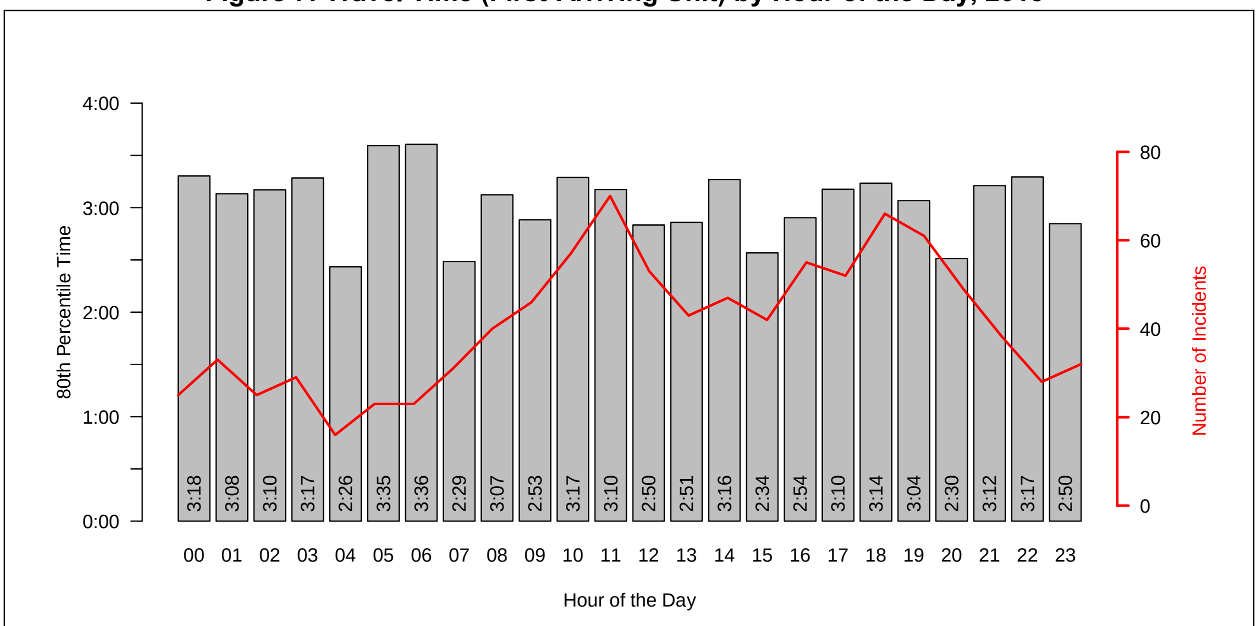


Table 3: Travel Time (First-Arriving Unit) by Incident Type, 2013

	Average	80th Percentile	90th Percentile
Emergency Medical Service	2:14	3:07	3:47
Fire & Special Operations	1:58	2:42	3:18
(all)	2:13	3:05	3:47

Total Response Time – Total response or reflex time is the most important time segment because it combines all of the previously analyzed time segments and is one of the measures by which the public evaluates the effectiveness of fire and EMS service. The NFPA describes total response time as including three phases: "(1) Phase One—Alarm Handling Time, (2) Phase Two—Turnout Time and Travel Time, and (3) Phase Three—Initiating Action/Intervention Time." Although NFPA 1710 does not provide an explicit objective for total response time, we added together the call-processing-time objective (1:00 for all call types), the turnout-time objective (1:00 for EMS incidents and 1:20 for fire and special-operations incidents), and the first-arriving-unit travel-time objective (4:00 for all call types). Adding up the individual NFPA 1710 time objectives, we can conclude that the total response time should be less than 6:00 for EMS incidents and less than 6:20 for fire and special-operations incidents.

The analysis of the BFD's total response times against the adjusted standard (sum of NFPA 1710 time objectives at the 80th percentile) showed poor total response times. Figure 8 shows the total response time for the first-arriving unit by hour of the day, and Table 4 shows the total response time for the first-arriving unit by incident type. The total response time for EMS incidents was 7:47, which is two minutes over the six-minute total-response-time objective. Fire and special-operations incidents had a response time of 7:59, which is also about 1.5 minutes over the 6:20 time objective.

The BFD has an unusual situation in that travel times are so fast, but slow dispatch times are resulting in an overall sub-par response time. If this is indeed the case, significant changes should be made to address the long dispatch times. (See Appendix B, Unit Availability vs. Response Time for TriData's methodology.)

Figure 8: Total Response Time (First-Arriving Unit) by Hour of the Day, 2013

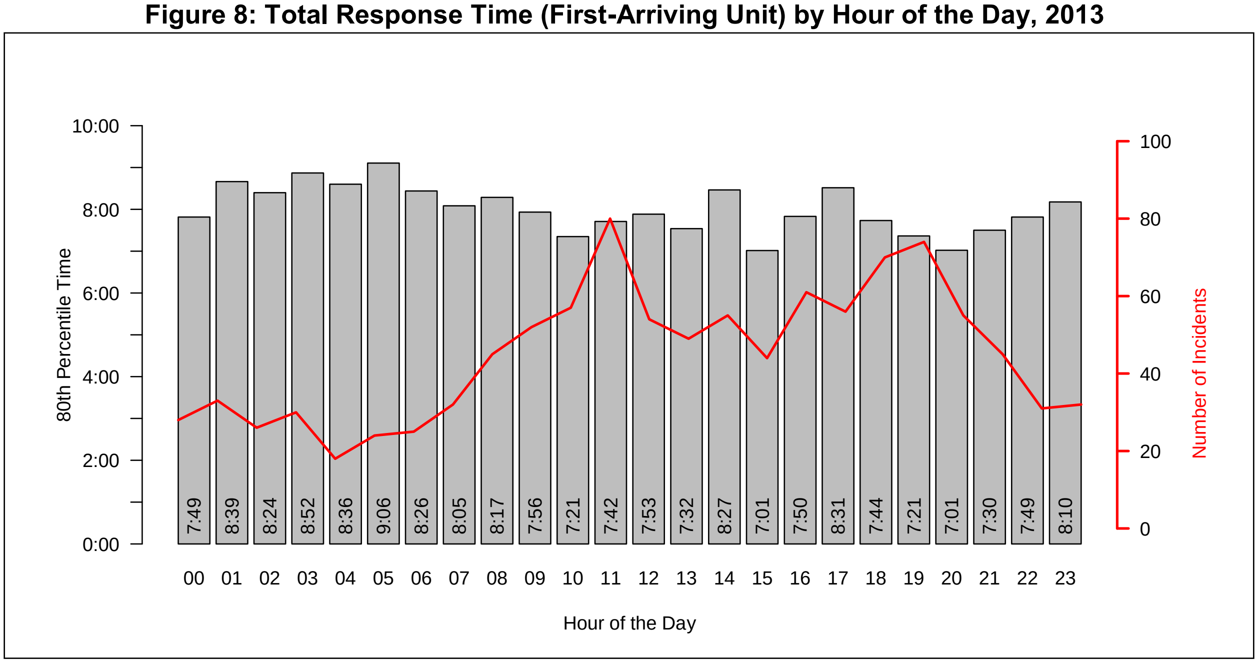


Table 4: Total Response Time (First-Arriving Unit) by Incident Type, 2013

	Average	80th Percentile	90th Percentile
Emergency Medical Service	6:42	7:59	8:53
Fire & Special Operations	6:25	7:48	8:53
(all)	6:41	7:57	8:54

Unit Workload Analysis

For this study we analyzed the call types and workload for each BFD unit. Unit workloads have an effect on response-time performance because as units become busier, they are unavailable more of the time. Figure 9 shows the actual time (unit hours) spent on calls for BFD units in 2013. This is a more precise way of measuring workload than number of calls. Table 5 provides additional workload statistics for each unit.

Figure 9: Workload by Unit and Incident Type, 2013

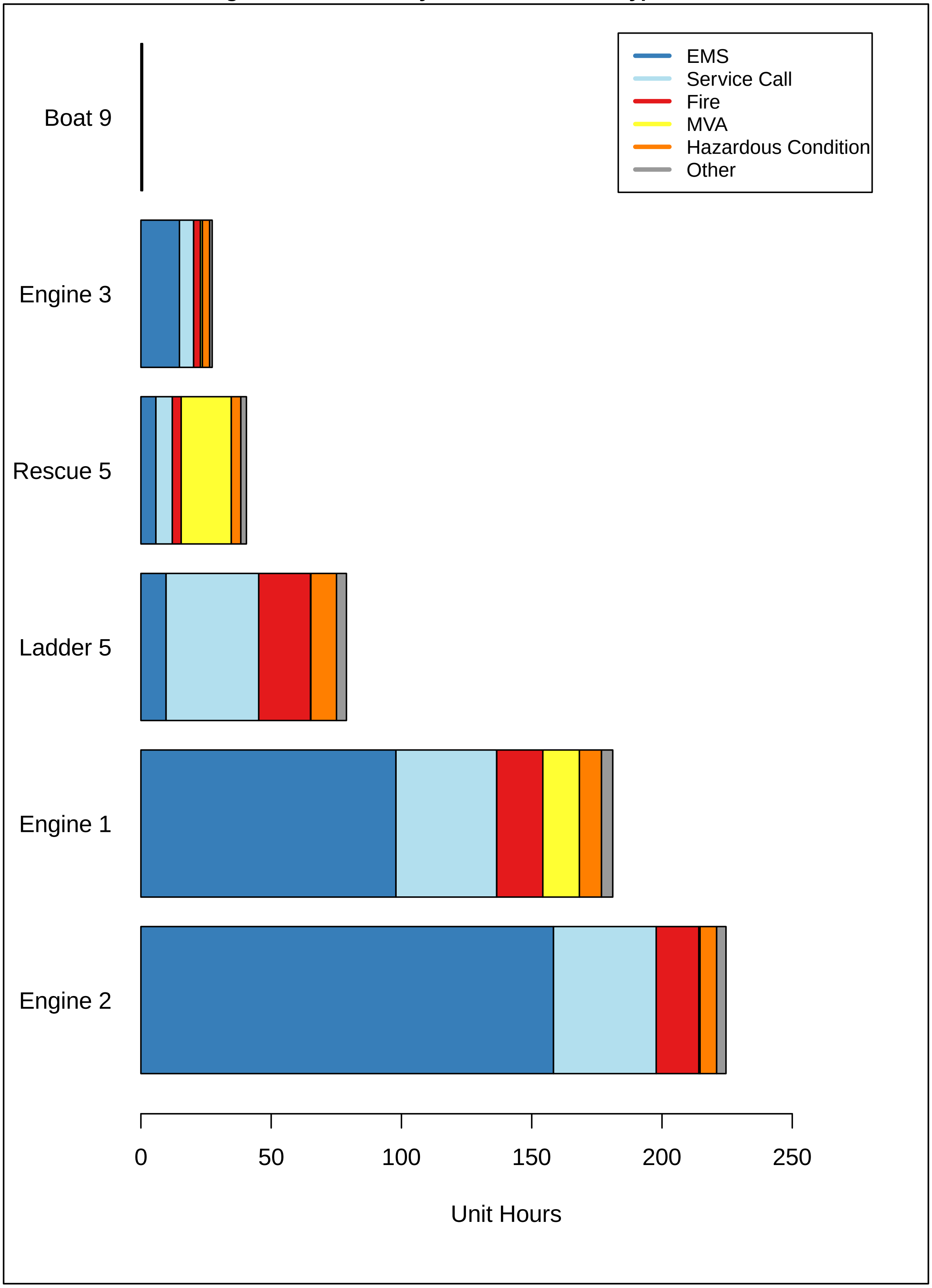


Table 5: Workload by Unit and Incident Type, 2013

	Total Runs	Runs per Day	Total Unit Hours	Unit Hours per Day	Unit Hours per Run
Boat 9	3	0.0	6	0.0	1.86
Engine 1	678	1.9	212	0.6	0.31
Engine 2	859	2.4	243	0.7	0.28
Engine 3	98	0.3	41	0.1	0.42
Ladder 5	310	0.9	92	0.3	0.30
Rescue 5	164	0.5	53	0.1	0.33
(average)	352	1.0	108	0.3	0.31

In terms of engines, there is a wide variety of workload. Engine 2 is the busiest with 859 annual calls and .7 hours of workload per day. Engine 3 is the least busy with 98 annual calls and only .1 hours of workload per day. Engine 1 falls in the middle with 678 annual calls and .6 hours of daily workload. Both the Ladder and Rescue are busier than Engine 3, but have fewer runs than either of the two other engines. Ladder 5 has 310 annual calls and Rescue 5 has 164 annual calls. However, run totals can be misleading at times. The ladder, despite having only about a third of the call volume of Engine 2, actually spends 30 percent more time per day on emergency calls. Boat 9 has three annual responses, with an average of 2 hours spent per response. (See Appendix C, Evaluating Unit Workloads, for an explanation of TriData's methodology.)

Station Location Analysis

This section presents an analysis of the coverage that is provided by the current Beacon Fire Department station locations and looks at whether the current arrangement of stations might be replaced by a new, centrally-located single station. This analysis was put together using geographic information system (GIS) software. Figure 10 shows the current location of all Beacon Fire Department stations, as well as the theoretical[4] travel time from each of the stations. Figure 11 shows the same information but also includes mutual aid fire departments that might respond into Beacon. Areas in dark green can theoretically be reached in four minutes, and areas in light green can be reached in six minutes.

With the current arrangement of three stations, the city is extremely well covered. Even without considering any mutual aid coverage, the entire city is covered within a 4-minute travel time. Of the mutual aid fire stations, only Glenham Fire Department appears to be able to make any particularly fast response into Beacon.

[4] Theoretical times are based on factors such as speed limits rather than on response-time data. However, they are reasonably close to actual response times.

Figure 10: Current Drive Time from Beacon Fire Department Stations

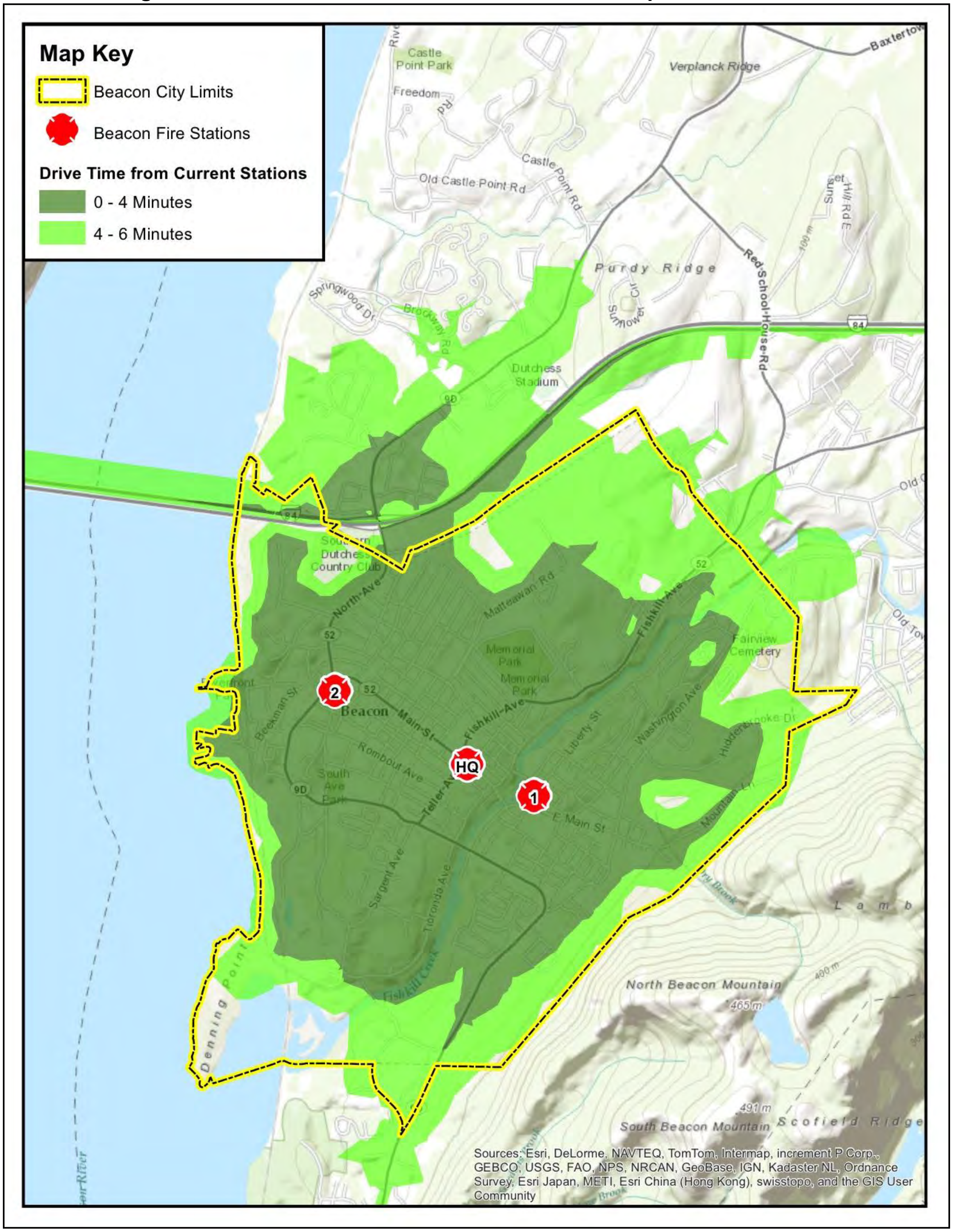
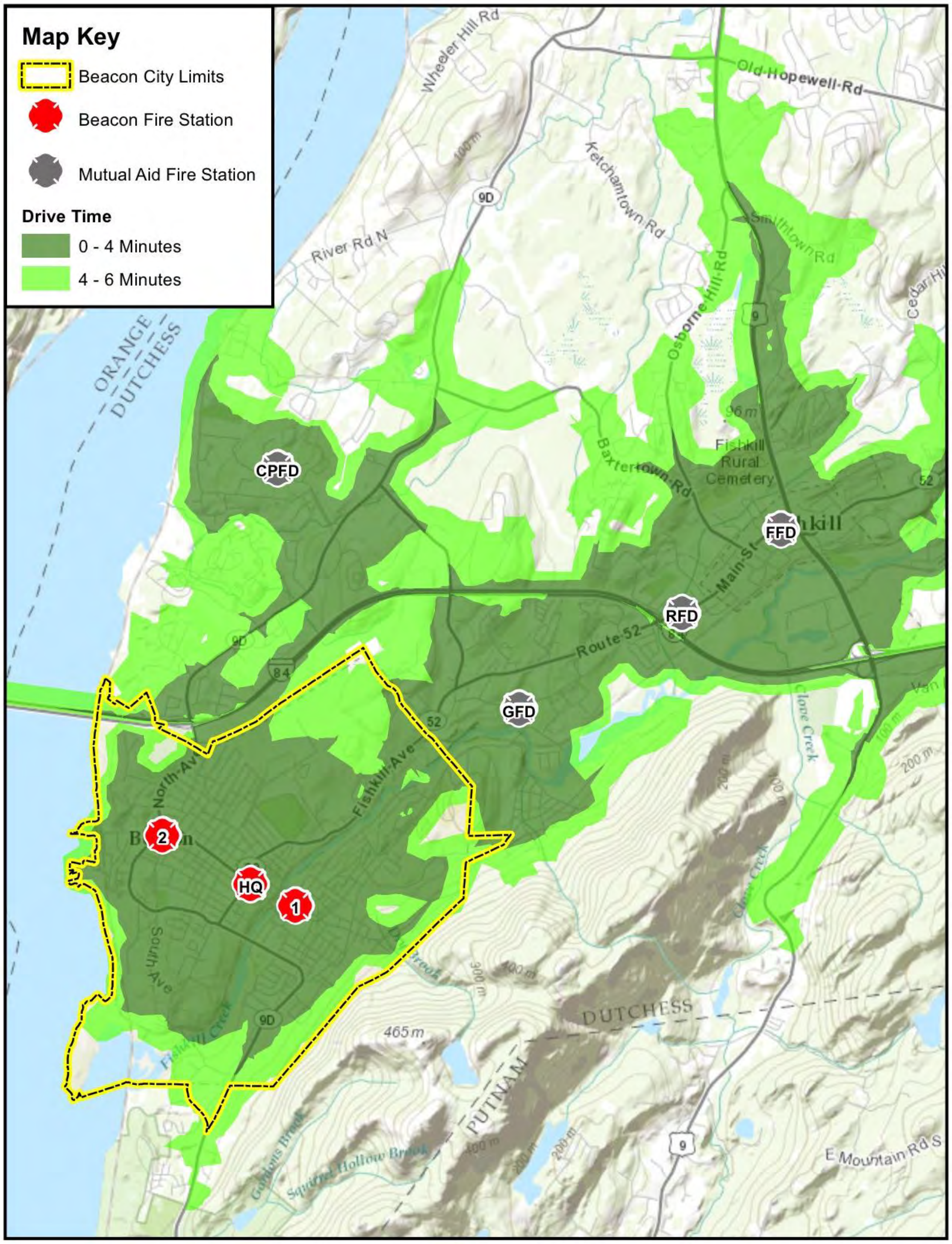


Figure 11: Current Drive Time from Beacon Stations and Mutual Aid Stations



Possible New Fire Station

The city is considering replacing the three current fire stations with a single, centrally-located station. Under consideration are five sites:

- Dog park
- Fishkill Avenue and Wilkes Street Park
- Sargent's School
- Elks Club
- Verplanck Avenue and Cannon Street Practice Field

These five sites are shown with 4- and 6-minute travel time coverage in Figure 12 through Figure 16. It appears that all four sites provide adequate coverage for the city from a single location, but some provide significantly better coverage than others. Additional evaluation of these sites is found in the following sections. There has also been consideration of consolidating into the current Lewis Tompkins Hose Station.

Dog Park Site (Figure 12) – The location is adequate, but slightly too far north. Although this location does provide some minimal coverage improvement for the very northeastern part of the city (where Fishkill Avenue meets the city limits), this slight gain in northeast coverage comes at the cost of having full coverage for the rest of the city. Many areas that are currently covered within 4 minutes would be covered within 6 minutes from this new station location.

Fishkill Avenue and Wilkes Street Park Site (Figure 13) – This location is just slightly better than the dog park site, but essentially suffers from the same problem. It is located too far northeast to provide optimum coverage for the entire city. Areas in the south of Beacon will see at least a minute longer response times than under the current arrangement of three stations.

Sargent's School Site (Figure 14) – This site has the opposite issue than that of the two previously considered sites; this site is located too far south to provide optimal coverage for all of Beacon, particularly the northwest corner. The area around Dutchess Country Club would see longer response times in the neighborhood of 5 minutes.

Elks Club Site (Figure 15) – This location is just slightly better than the Sargent's School site, but essentially suffers from the same problem. It is located too far south to provide optimum coverage for the entire city. Areas in the northwest of Beacon will have about 30 second longer response times than the recommended 4 minutes.

Verplanck Avenue and Cannon Street Practice Field Site (Figure 16) – Of the different sites under consideration, this is the best one. This possible station location is still a bit farther north than ideal, but does provide good coverage. There would be a slight degradation of response time to areas in the far south of Beacon.

Figure 12: Drive Time from Dog Park Site

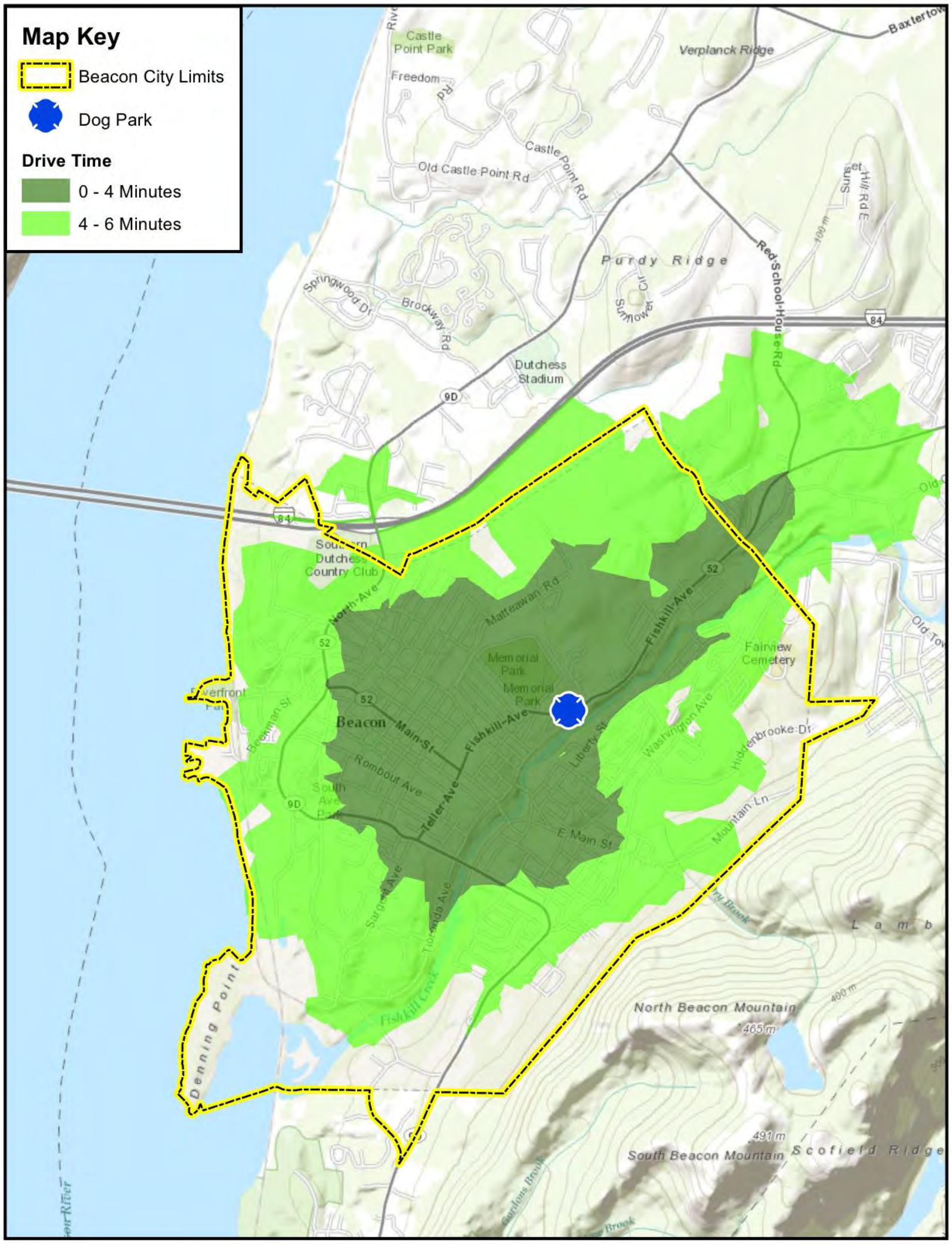


Figure 13: Drive Time from Fishkill Avenue and Wilkes Street Park Site

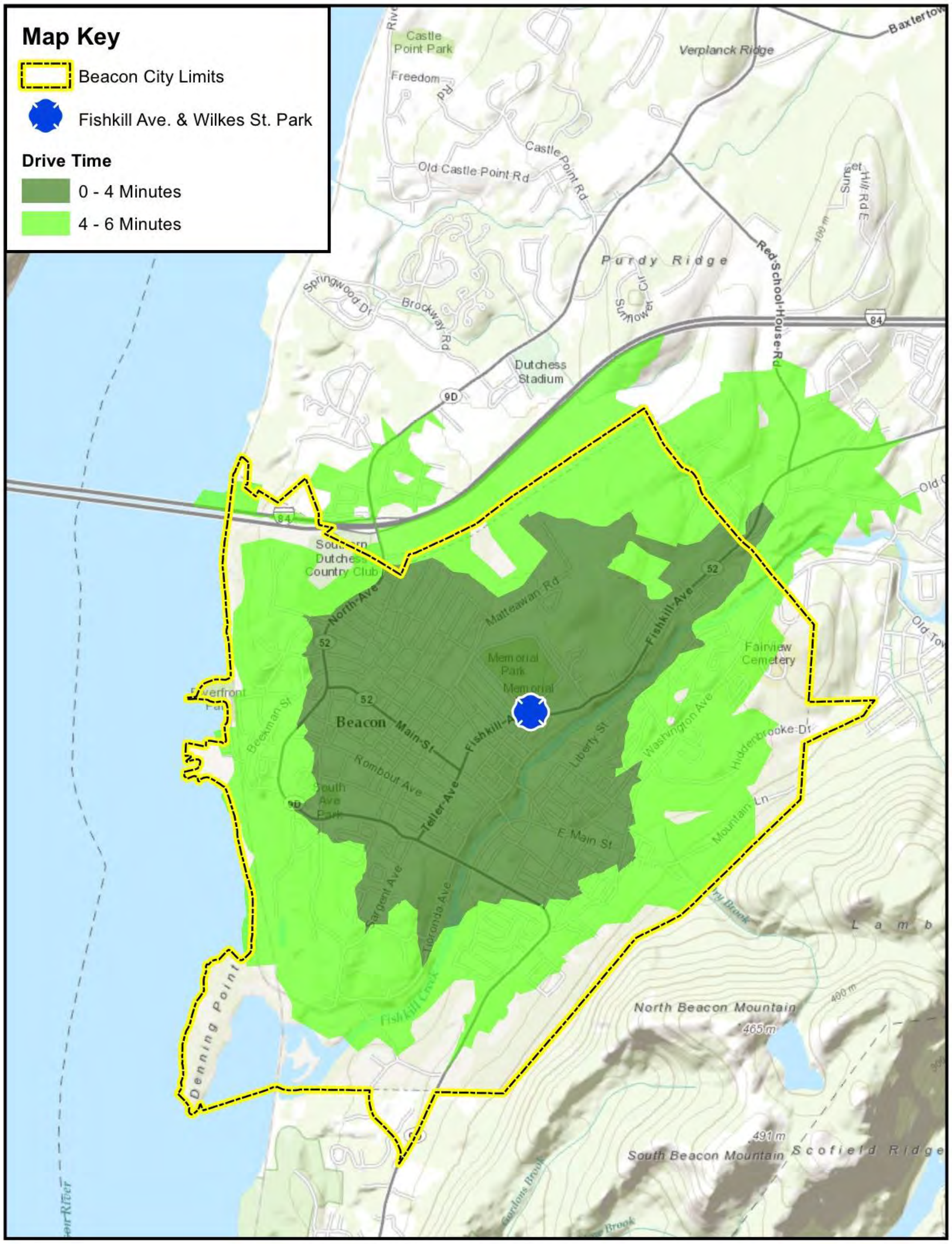


Figure 14: Drive Time from Sargent's School Site

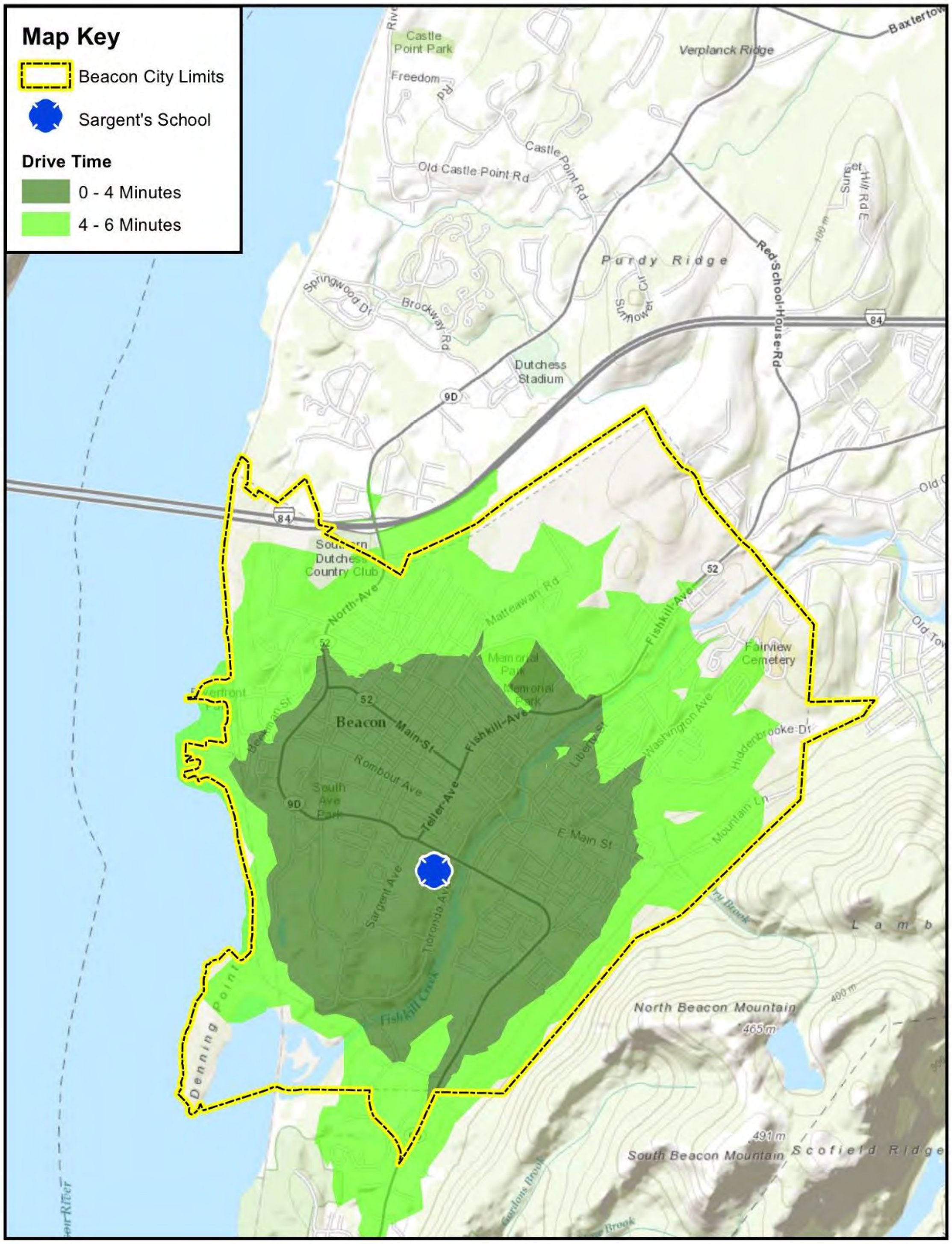


Figure 15: Drive Time from Elks Club Site

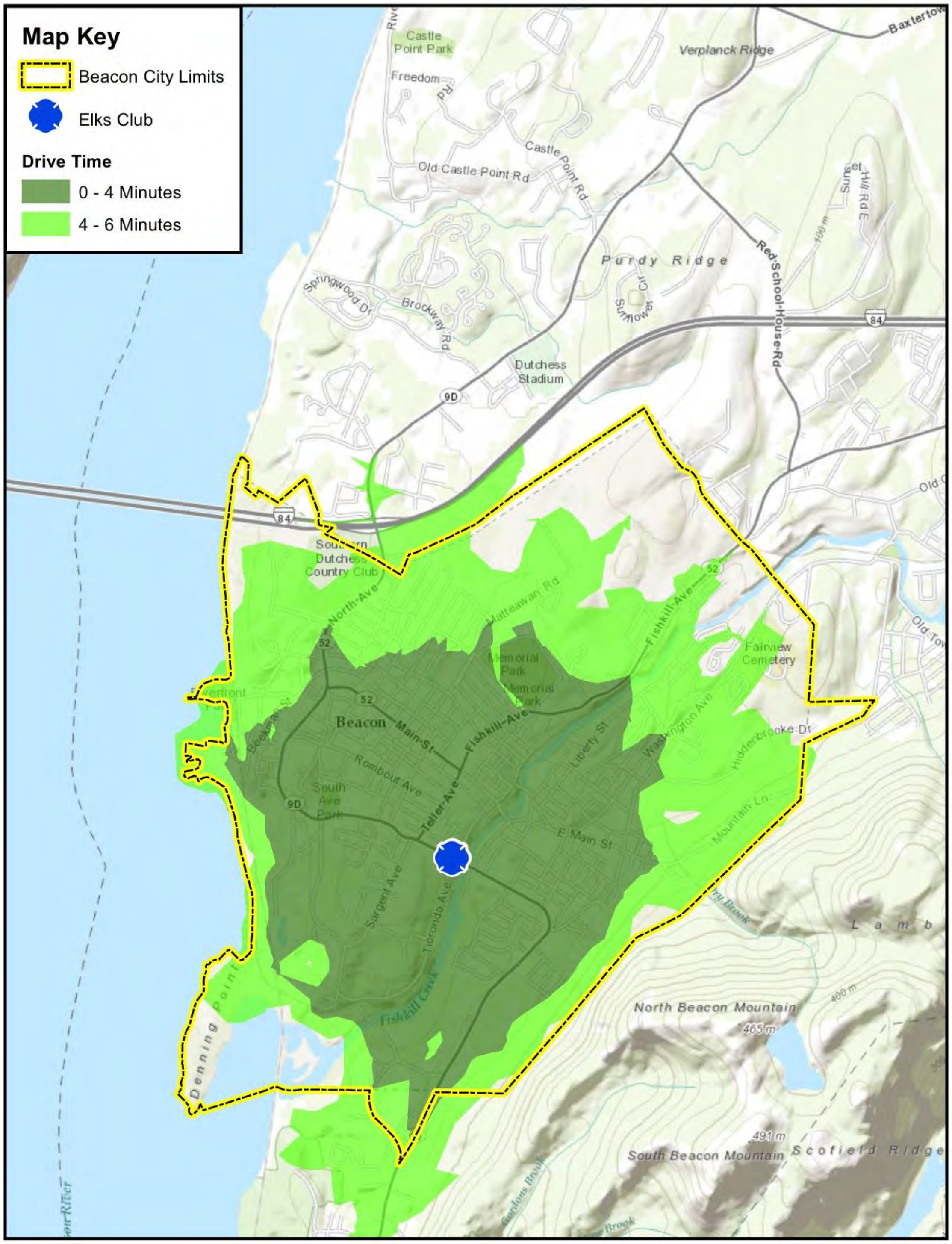


Figure 16: Drive Time from Verplanck Avenue and Cannon Street Practice Field Site

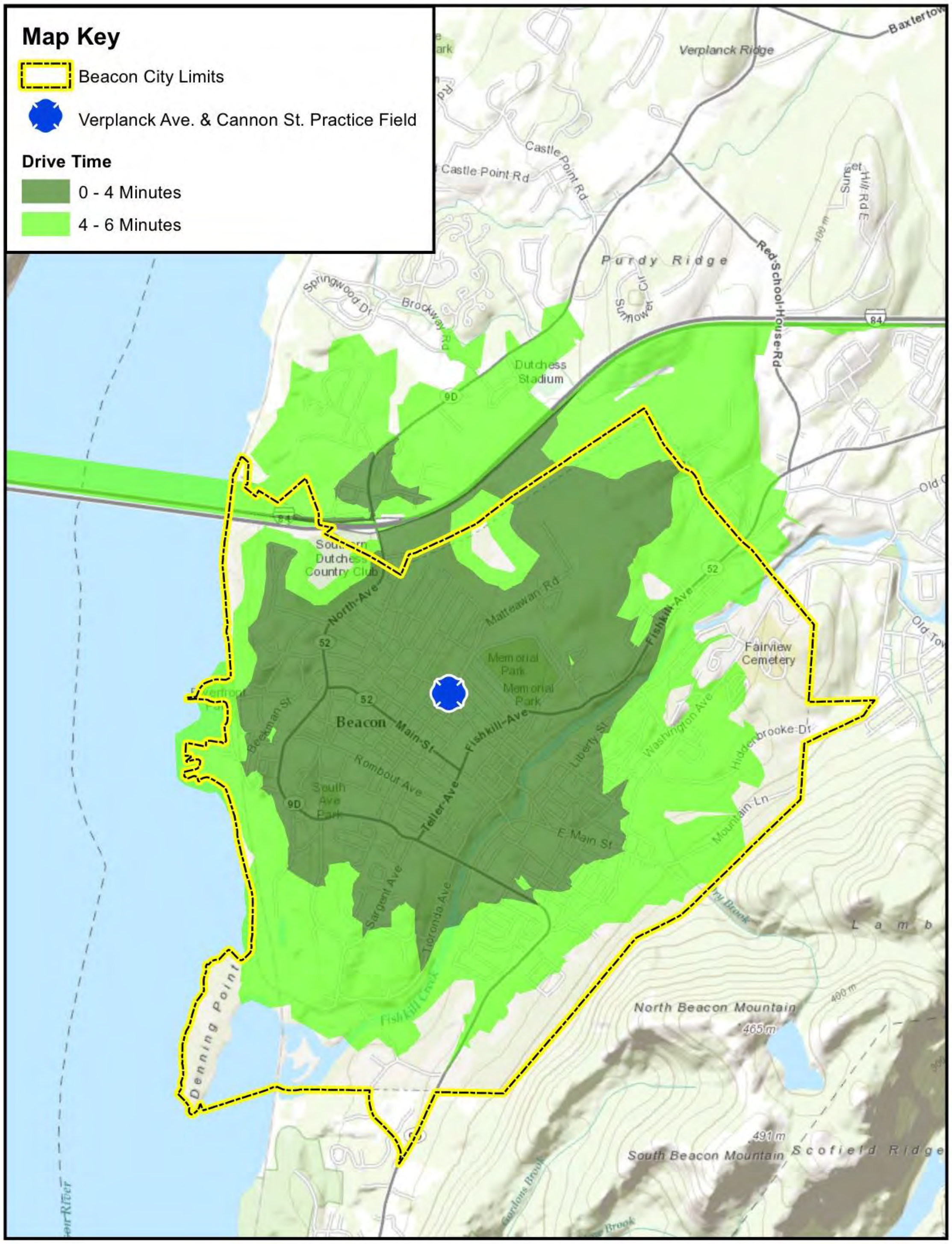
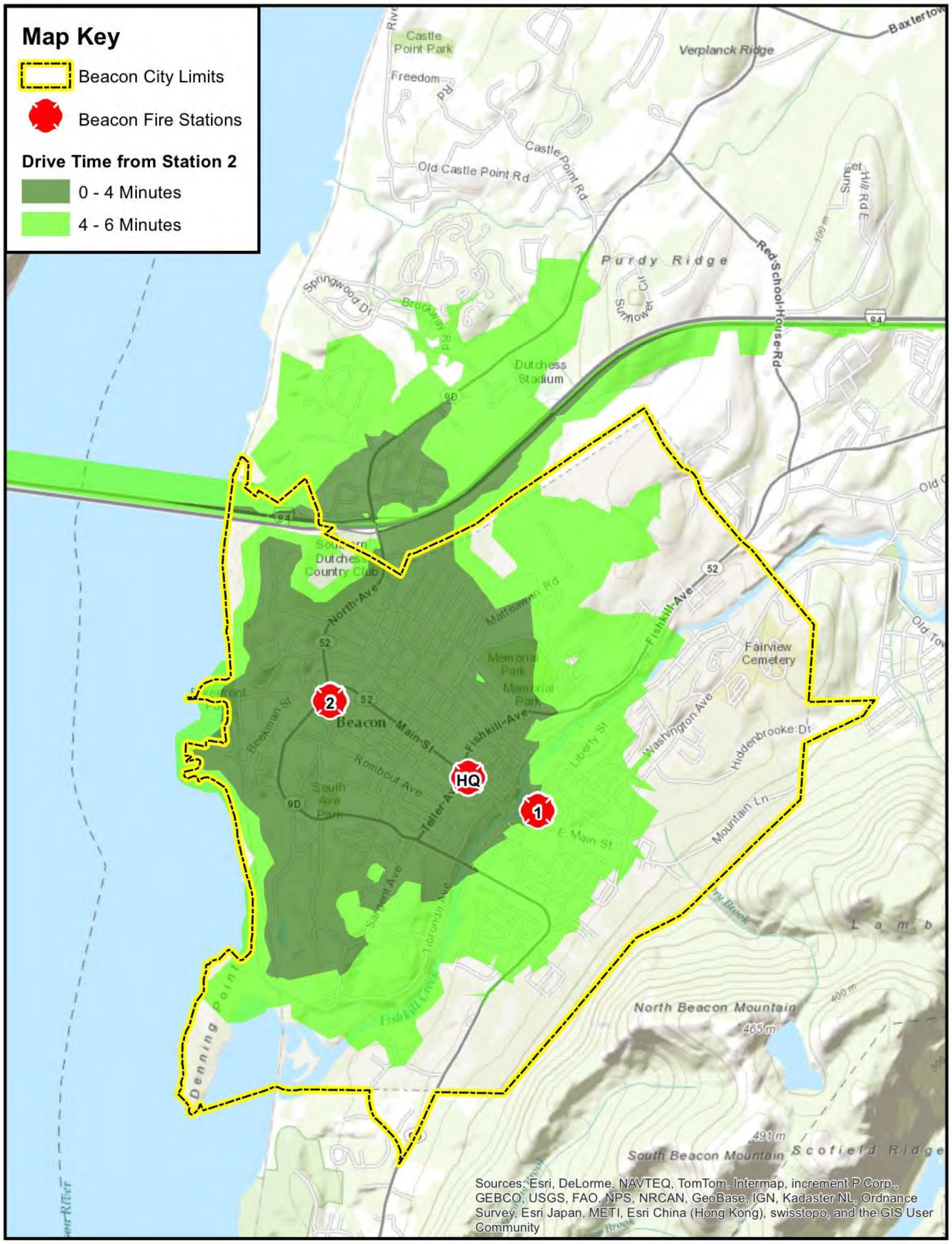


Figure 17: Drive Time from Lewis Tompkins Hose Station (Station 2)



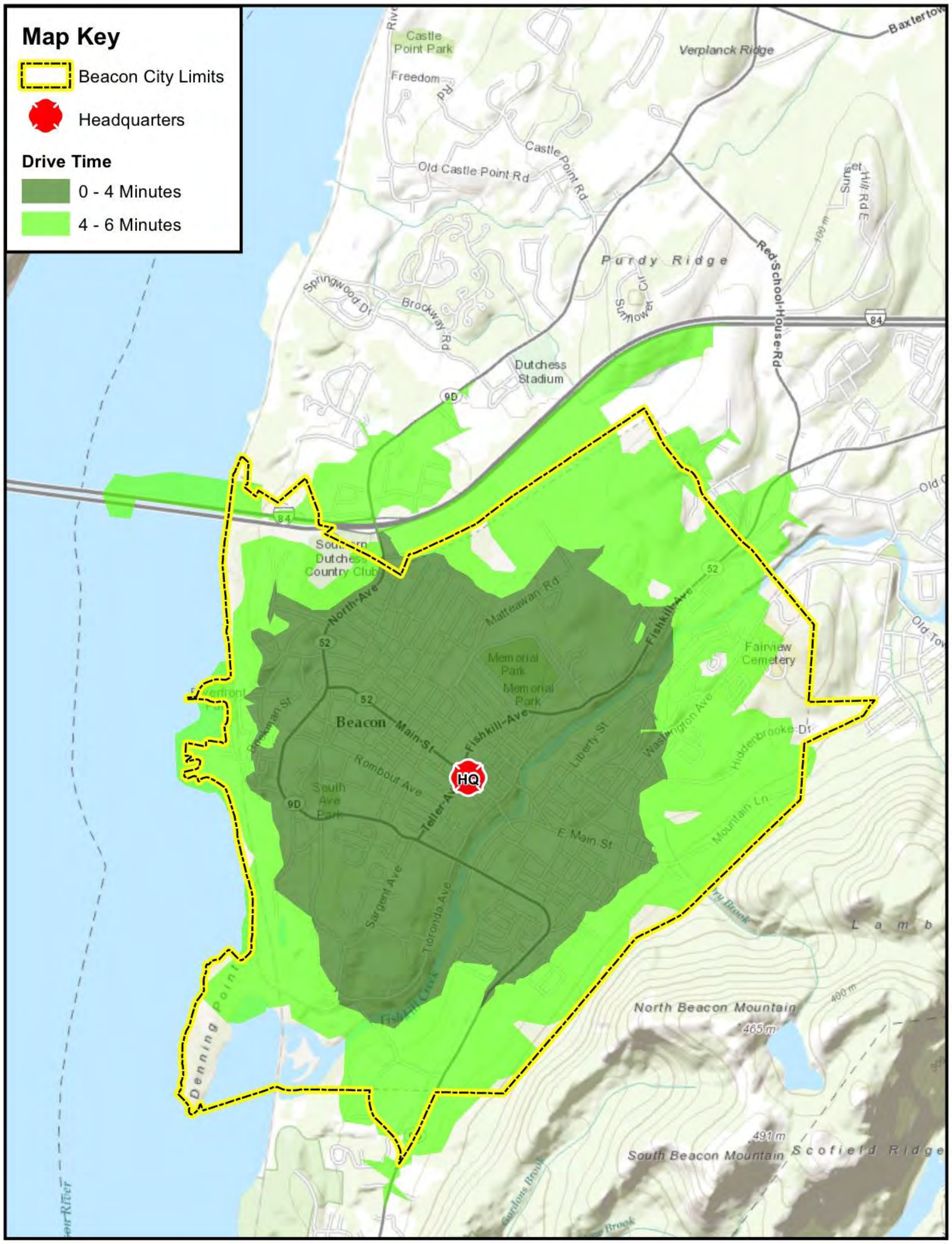
New Sites vs. Existing Stations

The City of Beacon can certainly be covered from a single station location. It is uncommon for us to find cities that have completely perfect 4-minute coverage, as is the case for Beacon at the moment with its three-station layout. This same level of coverage is achievable from a single station location, but none of the five selected sites can quite pull it off. In all cases there are areas of Beacon that would see 5-minute instead of 4-minute travel times. Of the five options, the best option is the Verplanck Avenue and Cannon Street Practice Field site. This provides excellent 4-minute coverage to all of the areas of highest population density and would only have slightly extended travel times to the very south of Beacon.

Figure 17 shows the response time from Lewis Tompkins Hose Station (Station 2) only. This particular location is not well suited for a single station because of its non-central location. The station is located too far west to provide good response times to the east side of the city. The other sites evaluated as potential locations for a single station are significantly better than this location. Furthermore, the longer than 6-minute response times to the northeast portion of the city, along Washington Avenue, make this an unworkable single station location. Rebuilding the current Lewis Tompkins Hose Station would necessitate continuing to respond from an additional satellite station.

The current Mase Hook and Ladder Station ("Headquarters") is better than any of the proposed locations from a response perspective, including the Cannon Street Practice Field site. Figure 18 shows the response time coverage from the Mase Hook and Ladder Station alone. This station provides nearly perfect 4-minute coverage to all areas of Beacon. However, this site is wholly unfeasible as a site for the construction of a new station. (See Appendix D for an explanation for TriData's performance measurement methodology.)

Figure 18: Drive Time from Mase Hook and Ladder Station (Headquarters)



Recommendation: Of the multiple sites proposed we have found with regard to factors such as response time, station location, demand and cost (see page 129) that the Verplank Ave. and Cannon Street site is the best site to build an new station on our priority list. We have also determined that the Elks Club site is the second best site and the Dog Park is the third best site.

III. FIRE OPERATIONS

Overview of Current System

Beacon Fire Department currently delivers service from three stations: Mase Hook and Ladder (Headquarters), Beacon Engine (Station 1), and Lewis Tompkins Hose (Station 2). Mase Hook and Ladder Station operates with a platform ladder; Beacon Engine Station operates with an engine company; and Lewis Tompkins Hose Station operates with an engine company.

Mase Hook and Ladder Station (Headquarters) – This station is listed in BFD nomenclature as "Headquarters" but it has not served in this capacity in about 8 to 10 years. Built in 1911 the firehouse is over 100 years old and has plenty of character. It has undergone several renovations over the years and is in surprisingly good shape. It is however woefully outdated. It houses a platform ladder that just barely fits into a station originally designed for horse and buggy fire response. Living conditions for the career firefighters stationed there are generally antiquated and not user friendly. There is also an atmosphere in the station of "ours and theirs" which is predicated on the fact that it is a volunteer station and that career members are just there. There is no common feeling of ownership; it is not contentious, but it is there. The platform ladder unit—while the project team did not witness it respond—must certainly be unwieldy in pulling out and backing in to the station. We also believe that a platform ladder is a poor operational choice for the City of Beacon (more on this later in the report). In short, we believe that Mase Hook and Ladder Station has outlived its long-standing usefulness. There was some discussion with the city officials we spoke with about selling the building for commercial purposes, which would require a significant investment for such a venture. Interestingly, Mase Hook and Ladder Station is undoubtedly in the best location for emergency response to all segments of the city, it is however completely unfeasible as a site for a new centralized station.

Figure 19: Mase Hook and Ladder Station

Beacon Engine Station (Station 1) – Beacon Engine is located on the west end of Main Street and the west side of the city. This station was built in 1889 and is 125 years old. It too has a great deal of character and old firehouse charm, but suffers from the same woeful out datedness as its counterpart Mase Hook and Ladder Station. In fact, overall it has many of the negative traits as Mase Hook and Ladder Station; poor living conditions; not user friendly; "our and theirs" atmosphere; tight quarters for the engine. Beacon Engine Station has also outlived its usefulness. There was also much discussion with the city officials about selling the building for commercial purposes. It too would require a significant investment for such a venture. Within the three station response model Beacon Engine Station is currently well placed, but is not a viable site for a new centralized station at all.

Figure 20: Beacon Engine Station

Lewis Tompkins Hose Station (Station 2) – Lewis Tompkins Hose Station serves as the functional ad hoc headquarters for the BFD. The fire chief's office is there and most of the administrative functions on both sides of the combination department volunteer and career are conducted from this station. The structure is the most modern of the three stations and is in good condition. It has the best living conditions for firefighters out of the three station, but still is only fair and design poor in being user friendly. There is adequate room for the apparatus housed there. The station is well placed for the current three station response model but may not be in the most optimal location for a single centralized station response.

Figure 21: Lewis Tompkins Hose Station

Station Values as Assets

An important part of this study was to have a professional appraisal performed of the existing city owned stations to explore possible offset of some of the costs associated with building a new consolidated station. The combined value of the stations is $1.38 million; $250,000 for Beacon Engine; $280,000 for Mase Hook and Ladder, and $850,000 for Lewis Tompkins Hose. (See Appendix E for the formal appraisal.)

Apparatus

Beacon Fire Department currently has 2 engines and 1 reserve engine, 1 platform ladder, 1 heavy rescue, and 2 command vehicles. There are no additional administrative and support vehicles and equipment. Table 6 shows the vehicles available.

Table 6: Beacon Fire Department Vehicles

Vehicle	Year	Description
Engine 33-11	2005	American LaFrance
Engine 33-12	1993	Sutphen
Platform Ladder 33-45	2005	American LaFrance
Rescue 33-55	2008	Pierce
Car 33-1	2004	Chevrolet Tahoe
Reserve Engine 33-13	1986	Pierce
Car 33-2	2002	Chevrolet Suburban

Staffing

Beacon Fire Department currently has 12 emergency service personnel shift positions. This shift complement is separated into four shifts (A, B, C and D), each with a roster of 3 personnel. Daily minimum staffing is 3 personnel, and overtime must be used if staffing goes below that threshold for any reason, vacation, sick leave etc. The individual shifts have no designated shift commander other than the fire chief. Shift personnel work a 24-hours on, 72-hours off work schedule. Volunteers are on call for emergency calls and have a membership roster of 50. Volunteer members do not perform regularly scheduled duty assignments. In a policy we find highly unusual, based on a collective bargaining proviso, only career personnel are mandated to drive all department apparatus. This is a curious staffing practice and policy, which is totally in contradiction conceptually to what a combination department should be and ultimately represent.

The fire chief and the career lieutenant who heads up the building and code enforcement department work a standard 40-hour weekly schedule and are on call for emergency calls. The chief has no support staff and performs all administrative duties himself. The career lieutenant has one support secretary and two Deputy Building Inspectors whom he supervises.

Under a new configuration with a centralized station this response model and deployment should undergo a complete revision. Currently, the weight of response necessitates that two engine companies and a truck company respond to all first alarm and structure fire calls, which is not unusual. One of the apparatus responding is a 100-foot platform ladder in a city that has one building which is nine stories high.

What is unique for a city the size of Beacon is that each responding apparatus has only one person (a driver) per unit operating those units. This is a practice fraught with risk and not within the realm of best practices. It is not efficient which in turn cuts down on its effectiveness. It unnecessarily creates wear and tear on expensive apparatus that over time will hasten their longevity and productive use. We understand that this response model is a direct result of having three stations strategically placed in the city. It only buttresses the argument for the need of a centralized one-station configuration/concept.

Response Guidelines – Beacon Fire Department uses a predesigned response procedure system for delivery of emergency services. This system is:

Weight of Response for Various Incident Types

1. EMS calls – One vehicle with one personnel plus the local private ALS unit
2. Public Service calls – One vehicle with one personnel
3. Motor Vehicle Accidents – Two vehicles (1 rescue and 1 engine) = 2-3 personnel depending on which station responds. There may also be additional units responding.

4. Hazmat calls – Typically two vehicles respond (1 rescue and 1 engine)
5. Alarm calls – Three vehicles respond (2 engines, 1 truck) = 3 personnel responding.
6. Structure fire calls – Three vehicles respond (2 pumpers and 1 platform), 1 incident commander (IC), 1 FAST/ladder company team from Fishkill Fire Department, and additional BFD volunteer members who respond directly to the scene = 8 (minimum) personnel responding with the fire chief (IC). For a working serious structure fire, area mutual aid volunteer companies are called out, as well as the career Castle Point Fire Department providing the option of additional personnel if necessary.
7. Special Rescue calls – Two vehicles respond (1 rescue and 1 engine).

Deployment

The TriData project team is proposing a four-bay station with an approximately 22,000 square foot footprint. The proposed new station will be able to house two engines, a reserve engine, a ladder or quint, a heavy rescue, and a chief's unit. This configuration offers several response models, which can create more viable emergency response provision. Each of the options we offer will include the end of responding to first alarm calls and structure fires in three separate apparatus with three separate drivers. It will also necessitate the end of the policy of having only career drivers and including in the new response model volunteer drivers into the emergency response mix. Under this model volunteers will no longer respond directly to the scene unless otherwise directed. It is important to state that all potential volunteer drivers meet the same stringent standards and requirements that are met by career personnel to become drivers.

Recommendation: The city should seriously consider renegotiating its contractual agreement with labor to amend its commitment to only have career personnel operate emergency apparatus in the BFD.

Recommendation: The BFD should begin a concerted training plan to train volunteer members as drivers of emergency apparatus. This training should meet the same standards and certification requirements as career drivers must meet. Most combination departments in the U.S. have both career and volunteer drivers. There are some combination departments that use only career drivers, but they are rare and are usually used as a contractual safeguard for labor.

A better use of personnel in all of these scenarios would be to have all three on duty career firefighters respond on one engine with a driver and two firefighters as part of the response team/unit. The other approach would be a bit more innovative. It would involve replacing the current platform ladder, which is not a wise choice of apparatus for a city like Beacon and substituting it with a quint. The final option is more in line with the unique nature and circumstances of the traditional BFD response model, which will reduce the units responding from three to two.

Option 1 (based on current deployment)

- First Alarm Assignments – One engine with three firefighters
- Structure Fires Assignments – One engine with three personnel to stage initial attack. One truck company from Fishkill Fire Department to act as a FAST team and provide truck duties as needed. BFD volunteers respond to central station and man/backfill an engine based on returning personnel. Standby for additional calls or respond to the scene based on situation.

  On all structure fires call back one career driver to man the current platform ladder.
- EMS Calls – Continue to send one engine, which can be cross-staffed from the three engine crew.
- Rescue Calls – Cross-staffed unit responds with one man rescue and two person engine.[5]

Option 2

- First Alarm Assignments – One engine with three firefighters with a cross-staffed fly car or rapid response vehicle (RRV) for EMS calls.
- Structure Fires Assignments – One engine responds with three personnel to stage initial attack. One truck company from Fishkill Fire Department to act as a FAST team and provide truck duties as needed. BFD volunteers respond to central station and man/backfill an engine based on returning personnel. Standby for additional calls or respond to the scene based on situation. Depending upon situation, certain pre-designated volunteers report directly to the scene in personal vehicles.
- EMS Calls – Cross-staffed fly car or RRV respond to all EMS calls and be on call and available as situation dictates to respond to structure fire calls.
- Rescue Calls – Same as Option 1.

Option 3

- First Alarm Assignments – 100-foot quint with three firefighters with a cross-staffed fly car or RRV for EMS calls.
- Structure Fires Assignments – 1 quint responds with three personnel to stage initial attack. One engine company from Fishkill Fire Department to act as a FAST team and provide backup engine duties as needed. BFD volunteers respond

[5] Rescue calls include motor vehicle accidents, trench rescues, high angle rescues, rapid water rescues , etc.

to central station and man/backfill an engine based on returning personnel. Standby for additional calls or respond to the scene based on situation. Depending upon situation certain pre-designated volunteers report directly to the scene in personal vehicles.

- EMS Calls – Cross-staffed fly car or RRV respond to all EMS calls and be on call and available as situation dictates to respond to structure fire calls.
- Rescue Calls – Same as Option 1 or respond with quint.

Option 4

- First Alarm Assignments – 100-foot quint with two firefighters and one engine staffed with one driver. Engine would respond to EMS calls and when cleared be available for first alarm assignments
- Structure Fire Assignments – 1 quint responds with two personnel and 1 engine responds with 1 driver. One engine company from Fishkill Fire Department to act as a FAST team and provide backup engine duties as needed. BFD volunteers respond to central station and man/backfill an engine based on returning personnel. Standby for additional calls or respond to the scene based on situation. Depending upon situation certain pre-designated volunteers report directly to the scene in personal vehicles.
- EMS Calls – Cross-staffed engine company respond to all EMS calls and be on call and available as situation dictates to respond to structure fire calls with two person quint.
- Rescue Calls – Same as Option 1 or respond with quint.

A new centralized station will make all of these options possible, which were not feasible before. Volunteers will now be able to store their PPEs in house, and both career and volunteer personnel will have more response options in general and turnout time and response times should improve.

Quints

The TriData project team supports the City of Beacon and BFD's decision to move to the use of a quint versus the current platform ladder. It is the optimal time to do so while contemplating the feasibility of a centralized one station concept. The use of a quint in the BFD, if used correctly, is a strong option for emergency response into the future. There are a number of issues associated with the transition into the use of a quint for departments used to the traditional engine/truck response that should be discussed.

Improving Versatility: Quints – The question of using quints creates a fair amount of debate. The decision to buy or not buy a quint has been a difficult and complex one for many jurisdictions, and it usually comes down to the discussion of two general principles: apparatus versatility and financial constraints.

There are many pros and cons to using quints. One of the main advantages is the versatility they provide. A quint is a combination fire apparatus that facilitates the performance of both engine and truck company fireground functions using one all-purpose apparatus. Because they comprise an aerial ladder, water source, hose, ground ladder, and pump, quints provide multi-functionality that the traditional pumper and ladder response cannot provide. When a quint pulls up to a working fire it has the capability to function as either type of fire apparatus depending upon the situation and can act as both in some situations if adequate manpower is available. As a result, quint production has begun to exceed standard ladder truck manufacturing and production.[6]

Training – The absence of proper operator and crew training will greatly limit the unit's effectiveness in the field. With the wrong leadership in training initiatives, there is the real possibility that the quint could become the equivalent of an overpriced engine or truck or, even worse, not have any unique use in BFD operations at all.

> A quint demands an operator who is able to size up the many and varied fireground needs…That takes fireground experience, and experience in engine and truck company operations…It is imperative that a quint operators train a quint crew in engine and truck company operations.[7]

Part of the training should also include the teaching of specific standard operating procedures that address when and how a quint is to be used in emergency operations. For example:

- If first due, the quint will function as an engine company.
- If second due, the quint will function as a truck company.
- If third due, the quint will function as a back-up truck.
- If fifth due, the quint will operate as an engine company.[8]

Training with should also be a top priority. In relation to the deployment and placement of the quint on the hills and narrow streets of Beacon, the quint officer must ensure that the crew and takes into consideration snow, ice, and other dangerous conditions when deploying of

[6] Loeb, Donald L., "It's still the same old story" Fire Chief Magazine, June 1, 2001

[7] Ibid, pg.3

[8] Rixner, Jake. "To buy (or not to buy) a Quint" Fire Engineering. April, 2001

stabilization jacks and placing the aerial device near parked cars, overhead wires, and trees. All of this should be covered in the scope of using a combination vehicle that could, at any time in the course of a call, be called upon to perform engine company evolutions, truck company operations, or both at the same time.

Recommendation: The City of Beacon and BFD should continue to pursue the use of quints in concert with its effort to build a centralized one-station fire/EMS operational model.

Organization and Management

Beacon Fire Department has a very small and simple administrative footprint, which basically begins and ends with the fire chief. BFD is structured in a fairly traditional combination fire service manner, but because it is so small in size has very few working parts other than an overly complex three station staffing and response model that could use a degree of simplification. A central single, combined station is certainly a viable, intelligent way to ameliorate the current trifurcation of services currently in play. The City of Beacon is to be highly commended for exploring this option in a thoughtful and disciplined approach. All BFD career members are members of IAFF Local 3490. The active volunteer membership numbers 50. Volunteers and career personnel virtually all stated that they get along well and have generally good communications and working relationships. Everyone appears to understand their roles in the mission of the department. There has also recently been an influx of younger volunteer members who embrace their roles. We believe that a new centralized station can improve this relationship and create an antidote to the "our and theirs" mentality.

The fire chief was hired a year ago in an effort to reconfigure the department in a new strong chief organizational structure, placing all factions of BFD's combination department under the auspices of one chief officer. Much of the positive change in the atmosphere in the fire stations can be attributed to his leadership. During our site visit we heard from various members of both career and volunteer members (including labor) that his leadership style and mission has translated into a more positive organizational structure and outlook for the organization. We also heard from the one volunteer mutual aid chief who agreed to meet with us that the consensus is that he has made a marked difference with defining and clarifying the role mutual aid partners play in the system. It also appears from the feedback we got from our site visit that he has improved volunteer and career relationships. He has also set up a training model that emphasizes career and volunteer personnel training together. His goal is to have volunteers trained to the same standard and level of career personnel. A new centralized station can only enhance this scenario.

Recruitment and Retention

Declining membership in the volunteer fire service is a problem that is facing both volunteer and combination departments equally nationwide. As a recent New York Times article states:

> "…the ranks of volunteers is dwindling. What was once an iconic part of American life is losing its allure in part because the work – some would say the calling- is a lot less fun than it used to be. …the number of volunteers has dropped by around 11 percent since the 1980s, while the number of career firefighters has grown more than 50 percent according to the NFPA. It's also harder to fit in volunteer work. Urbanization and the aging of the rural population are taking their toll as fewer young people are available to replace firefighters who retire. …local officials would like to new volunteer recruits. The stakes are particularly high because volunteers not only save lives but money – more than $139 billion annually for local governments according to the NFPA."[9]

These factors directly affect recruitment and more importantly create problems for retention. Fortunately, for the BFD there seems to be trend occurring that has attracted a strong coterie of young firefighters who are sticking around. These young volunteers are anxious to go to calls and anxious to train with their career counterparts. The fire chief has also been instrumental in encouraging these firefighters to be part of the system. The other good news is "New York State grant volunteer firefighters property tax abatements, income tax credits and $50,000 in death benefits if they die in the line of duty."[10]

These are all powerful incentives and if the BFD in concert with the administrative branch of the City of Beacon is not pursuing an aggressive recruitment and retention plan than they should be.

The addition of and the centralization of a new station will only attract and enhance new membership. It will add another attractive tool to the recruitment and retention tool box and for a number of reasons:

- It will consolidate operations into one location and create a sense of camaraderie and oneness in a combination system.
- It will facilitate and enhance training between the volunteer and career corps in a meaningful way and make it more efficient
- It will begin the process of changing the BFD response model and create more involvement of volunteer firefighters in fire operations

[9] A. Brown, I. Urbina. "The Disappearing Volunteer Firefighter", *The New York Times* (2014)

[10] Ibid

- It will attract new members and improve retention strategies
- It will create opportunities for volunteers to meet the same standards of training as their career counterparts

Recommendation: Based on a confluence of factors and to the increase efficiency and effectiveness the City of Beacon should continue to seriously consider the consolidation of stations into one centralized station and location and combine all current and future operational assets into the one station.

Recommendation: Based on the age and condition of the above stations and in concert with the proposed station consolidation in the long term the City of Beacon should seriously consider selling at the very least Mase Hook and Ladder and Beacon Engine Stations. The city should also seriously consider selling its most valuable asset, the Lewis Tompkins Hose Station. The sale of all of these valuable properties can help to partially offset the cost of building a new single consolidated station in creating a more cost efficient and operationally sound fire/EMS emergency delivery system.

IV. ARCHITECTURAL ANALYSIS

The architectural analysis, undertaken by Pacheco Ross Architects, P.C. (PRA), included evaluation of previous study information, assessment of the viability of the existing stations, development of a single condensed Program, creation of a unified Space Use document, conceptual budgeting, and conceptual site plan design. Pacheco Ross Architects added station location analysis to the scope of work to qualify optimal station siting. To reach its professional conclusions, PRA relied on its 20 years of dedicated fire station experience, objective comparisons using a proprietary database of facilities nationwide and direct comparison to similar departments/stations in New York. An example of this last point would be the energy analysis which evaluated expected utility savings possible with a new combined fire station in the City of Beacon. Use of a recently built station in New York State that represents nearly identical volunteer/paid composition, response call volume, geographic area, and proposed facility size allowed for a real-world experienced-based evaluation.

Existing Facilities Assessments

Pacheco Ross Architects (PRA) conducted a walk-through of the three existing fire stations: Lewis Tompkins Hose (Headquarters), Beacon Engine (Station 1), and Mase Hook and Ladder (Station 2). This was a physical assessment of the site, building envelope, interiors, structure, mechanical, electrical, plumbing and sprinkler (MEP), and basic life safety. (See Appendix F, Existing Building Assessments and Photographs.) The purpose was to supply enough information for PRA to provide a professional recommendation whether the buildings can continue to serve as fire stations or sustain selective demolition for renovation and/or addition(s). The assessment also informs the TriData project team and City of Beacon if the programmed requirements could be utilized in a cost-effective manner on an existing site or if a portion of an existing building can be used to meet some of the program. Pacheco Ross Architects' assessment also included review of existing drawings where available.

It is PRA's professional opinion that none of the original fire stations are viable in their current configuration for use as modern fire facilities (see also Site 4 sections . Only the Lewis Tompkins Hose Station has enough site available for a credible addition, and this is only possible with the use of the privately owned lot west of St. Andrew's Episcopal Church being used for the new parking area. Lewis Tompkins Hose Station also suffers from a very shallow bedrock formation that would greatly increase the cost of any addition. The other sites are far too small for relevant renovation or expansion and do not support logical. This is especially true at the Beacon station.

All stations are significantly undersized in their apparatus bays and bay support areas, including lack of space for apparatus and all other firematic and rescue operations. This space deficiency poses a safety concern due to proximity of apparatus to each other and to the structure. The Federal Emergency Management Agency (FEMA) advises a minimum 3-foot clearance around apparatus, which is not achievable in the existing stations. The lack of proper aprons are also a significant concern. Again, FEMA recommends a 60-foot apron which the Beacon Engine and Lewis Tompkins Hose stations are woefully short of and could never achieve. The lack of proper bay space limits apparatus that can be purchased, vehicle position, and deployment flexibility and mutual aid. Bays are too short and vehicle cabs cannot be tipped in place, requiring vehicles to be towed out of the bays to repair simple mechanical issues. Missing at the facilities are dedicated separate firematic support spaces outlined in the National Fire Protection Association (NFPA) 1581 *Standard on Fire Department Infection Control*. These spaces include disinfecting facilities, cleaning areas, storage areas, personal protective equipment (PPE) rooms, proper kitchens, disposal areas, and properly sized/configured sleeping areas. Many other similar deficiencies exist.

Building issues include outdated infrastructure and systems and the buildings do not meet the Americans with Disabilities Act (ADA) guidelines for accessibility or compliance. As public buildings they are classified as a Title II facility under Federal law. Any significant renovation and/or additions would trigger ADA compliance which would not be cost effective and would be extremely difficult to enact.

The Mase Hook and Ladder and Beacon Engine stations have problems associated with buildings that are a century old. Their construction and systems are antiquated, and their layouts of multiple stacked floors and single bay response are no longer appropriate for modern firematic response.

Facility Size

Correctly sizing the facility was a critical and delicate task. Differentiating between operational needs, individual wants and expectations of "what we used to have" is always essential when combining fire companies and fire stations. Previous studies had indicated that the size of a facility combining all three fire companies would be as large as 36,775 square feet. In PRA's experience, this size is substantially larger than would be needed for such a facility and greater than the Program and Space Use results that emerged from the meetings with stakeholders. PRA therefore objectively compared the results to a database of over 300 fire station facilities from across North America that have been built in the last five years. The results of that analysis showed that <u>no</u> combination facility was as large as 36,775 square feet, and furthermore the average combination fire station was 21,200 square feet. This compares very favorably to the 22,500 square feet arrived at in PRA's Program and Space Use for this study. For further analysis it should be noted that the average size of a standard paid or volunteer (non-combination) fire station in the same five year period was 16,700 square feet.

Combination Fire Station	
Original Report Square Footage	36,775
North American Average	21,200
Proposed Square Footage	**22,500**

There may be concern that the previously identified square footage is 63% larger than what is currently proposed, but we feel confident the new area is correct for a properly functioning combined facility in this community.

Please note that certain size adjustments were made to the proposed square footage based on specific configurations of individual sites. These can be found in Appendix G, Pacheco Ross Associates – Programming and Space Use of the report. The Programming and Space Use were based on an assumption of a two story building. Changing to a single story design where possible reduced the size due to elimination of stairways, elevator, and duplicated circulation and spaces. On the other hand, attempting to accommodate the Program on the existing Lewis Tompkins Hose Station site using and working around the existing multi-story building resulted in an increase in the square footage. Designs, budgets, and recommendations reflect these adjustments on a site-by-site basis.

Sites

The four sites selected for evaluation, in order of their ultimate ranking, (one being the best) were:

- **Site 1 - Verplanck Avenue and Cannon Practice Field**, located on the corner of Verplanck Avenue and Matteawan Street. This relatively flat site is a city-owned property, portions of which are currently used by the school district as a practice field. An approximate area of 1.5 acres of this property closest to Verplanck Avenue was used for the conceptual layout. The track for the school would remain undisturbed in the design solution for this site.
- **Site 2 – Elks Club** located at Wolcott Avenue and Tioronda Avenue. This is a privately owned site and part of the Elks Club property. The Elks Club has expressed interest in selling a portion of their current site to the city for use as a fire station. The site is relatively flat at the southwest with an increasing downward slope towards the east.
- **Site 3 – Lewis Tompkins Hose Station** located at South Avenue and Wolcott Avenue. This is the location of the current Lewis Tompkins Hose Station. It is a city-owned property with a severe slope, constricted width, and known issues with shallow rock formations.

- **Site 4 – Mase Hook and Ladder** located at 425 Main and Van Nydeck Avenue of existing Mase station.

Color plan layouts for all three sites can be found in Appendix H, Pacheco Ross Architects – Conceptual Design of this report. Also included in that appendix are boring logs showing the location of black sandstone and shale at Lewis Tompkins Hose Station.

Sites 1 and 2 were selected based on their identified beneficial response characteristics. Other previously considered sites such as the dog park site on Fishkill Avenue were eliminated due to their less than ideal impact on response times. The current Mase Hook and Ladder Station was identified as the best geographic response location. Unfortunately, this site, in the heart of built-up downtown, cannot possibly accommodate a facility adequate for the programmatic needs. Thus this site was eliminated. Detailed response analysis of the various sites can be found in chapter II, Population, Demand, Response Time, Workload and Station Location Analysis of this report.

Site 3 was evaluated to explore the feasibility of reusing one of the existing stations. Since Lewis Tompkins Hose Station is the newest and busiest station in the city, and the only site with the ability to accommodate a functional addition, this exercise was felt to be worthwhile. It is important to note that an addition/renovation on any fire station is problematic due to the issues related to uninterrupted response during construction. This site presents additional challenges due to its odd shape and terrain including the need to split the bays between upper and lower levels to achieve an operational apron. The existing building would almost certainly require significant structural upgrades in accordance with New York State Existing Building Code Sections 807 and 807.6. ADA accessibility improvements would be necessary as previously addressed above. Internal emergency response time would be impacted at this location due to the split bays, multi-story configuration and convoluted circulation required.

Site 4 was evaluated based on the favorable results of the station location analysis portion of this report. The current Mase station property as it sits, while optimal for response location, is insufficient for the programmatic needs of a combined facility. Design studies found that even the minimal program would not fit efficiently on the current Mase site. The most logical configuration would involve preserving the existing historic structure and building a multi-story addition with new bays responding southwest to Van Nydeck Ave. This footprint is shown in the conceptual design section found later in the report. It is evident from the image that even the minimal required bays would extend over adjacent property lines, eliminate all on-site parking (including that of the VFW) and result in an insufficient apron length. Internal emergency response time would be impacted at this location due to the multi-story nature of the required solution.

While eliminating portions (or all) of the adjacent VFW structure from Site 4 could allow an addition with adequate parking, access and perhaps apron, this option was soundly rejected as unreasonably detrimental to the historic fabric, community and neighbors. Alternatively, acquisition of the adjacent privately owned property to the southeast and demolition of its structures could allow an addition with parking. This option has been explored in previous reports and it was indicated to PRA that this adjacent property acquisition is neither realistic nor desirable. The response location benefits of Site 4 do not offset the severe challenges associated with locating the facility on this site. Therefore the site was eliminated from further consideration and budgeting.

Budgets

See Appendix I, Conceptual Budgets, for an explanation and in-depth analysis of the budgets for each of the site options. Costs include the offsetting credit for the sale of existing buildings as determined by an independent realtor. Potential energy savings of a combined building were incorporated as a line item in each of the budgets. These numbers were determined by comparing the city's gas and electric bills to a two year old renovation addition project of comparable size to the proposed facility in the same geographic area. The same months were compared and adjusted for slight regional cost differences. The department used as a comparison analog is nearly identical in career/volunteer composition, call volume, proposed systems and facility size. The energy savings of a combined facility is estimated to be approximately $8,250 per year. (See Conceptual Budget section for additional detail.)

The budget included in the Summary and Conclusions section below represents the lowest cost of all the conceptual designs considered. While not the only reason for our professional recommendation, it was a factor.

Summary and Conclusions

Based on PRA's professional opinion, PRA recommends building a new 21,200 square foot single story fire station on the Verplanck Avenue and Cannon Practice Field site (Site 1). Total Hard and Soft Costs for this project are expected to be in the range of $6.97-$7.42 Million based on a spring 2015 construction start. Please see Appendix I, Conceptual Budgets, for a detailed explanation including additional reductions to this budget when factoring in the energy savings.

If the City of Beacon chooses to follow PRA's recommendation to build a new facility on the Verplanck Avenue and Cannon Practice Field site (Site 1), the next step would be to obtain an architectural and engineering team to begin schematic design, detailed subsurface exploration of the site and required tasks such as the NYS SEQRA process. Construction of a facility of this type would be expected to take approximately 12-14 months. Occupancy would be possible in the summer of 2016.

Failure to act in this time frame will result in increased project costs due to continued construction escalation which is currently running at 4% per annum. If the economy improves significantly, historical data suggests that annual escalation could increase to as much as 8%-10% per annum. There are indications that this is already occurring in the Hudson Valley. Additionally, soft costs are subject to rise due to inflation, which is currently at 2% per year.

APPENDIX A: TOTAL INCIDENT FORECASTING METHOD

In statistics, linear regression is an approach to modeling the relationship between a dependent variable *y* and one or more independent variables denoted x_i. For our incident type trending, we are using year (x_1) and population (x_2) to predict incident type totals (*y*). We realize that time and population are not the only factors determining emergency services demand, so the model is not perfect for predicting the number of incidents. Linear regression is useful in that it shows trends, and trends are valuable for planning purposes.

For any model, it is necessary to say how statistically accurate it is, or what the confidence is in the estimates. For example, if we predict that there will be 1,000 emergency incidents ten years from now, we also have to state the confidence limits of that prediction. The confidence interval is a statistical plus/minus calculation. To continue with our example, we might say there will be 1,000 emergency incidents, plus or minus 100, with 95 percent likelihood it will be in that range. . This gives the reader both a prediction and a range within which we are fairly certain (95 percent certain) that the eventual number of incidents will fall.

The confidence intervals are the result of a statistical calculation that analyzes how accurately our prediction model represents the actual data. A good model will have a small plus-minus confidence interval. This often happens when the historical trend stays fairly steady from year to year; as a result, a multi-linear regression is able to make fairly accurate predictions for total incidents for at least several years into the future. The further into the future, the wider the confidence limits become.

Large confidence intervals occur when there are large incidence fluctuations from year to year that are inconsistent and cannot be accurately modeled with any of the independent variables (time and population). For instance, if the annual number of incidents fluctuates up 30 percent one year and down 30 percent the next, and then up 40 percent and down 5, the model cannot accurately predict the exact number of incidents for a given year. In that case, there would be a large confidence interval that essentially says we predict *y*, but the number could be much higher or much lower.

APPENDIX B: UNIT AVAILABILITY VS. RESPONSE TIME

Municipalities need to know whether their emergency-response system is meeting their current needs, and whether the system will continue to meet needs in the future. As urban areas experience growth and development, emergency calls increase and there is a gradual decrease in the ability of fire stations to provide a high level of emergency response. If no corrective action is taken, at some point response times will fall below acceptable standards. For the purpose of planning it is important to be able to predict the point at which this will occur—the point at which the number of calls will exceed a station's capacity—and to take corrective action ahead of time. The starting point of this assessment is to have a clear picture of an area's current performance.

The Center for Public Safety Excellence (CPSE) has devised a means of measuring a fire department's current performance and predicting a drop in the department's ability to respond to calls—in other words, to measure and predict the capacity of stations and areas. This method compares two factors:

1. Unit availability: How often the closest station (the intended closest unit) is available to handle a call
2. Performance: How often the travel time is within the desired response time

By comparing those two factors we can see what happens to response time when the intended closest unit is not available to respond to a call: other units have to respond from farther away, response time increases, and at some point it falls below the established performance standard. For the example below we will use a standard of arriving within four minutes 80% of the time.

Figure 1 shows how unit availability and response time can be plotted graphically to study their relationship. The horizontal **Unit Availability axis** shows how often the intended closest unit was available for service out of a period of 24 hours. If a station is available for 18 hours out of 24, it would have an availability of 75%. Various factors reduce any unit's availability: workload, inspections, training, maintaining equipment, and so on. Those factors reduce a station's performance.

The vertical **Performance Reliability axis** shows how often the unit arrives within the established time goal. The dotted line across the middle of the graph represents a performance standard of 80%, meaning in our example that a unit arrives within four minutes 80% of the time.

The graph below describes the performance of Station 8, the first-due station in the area.

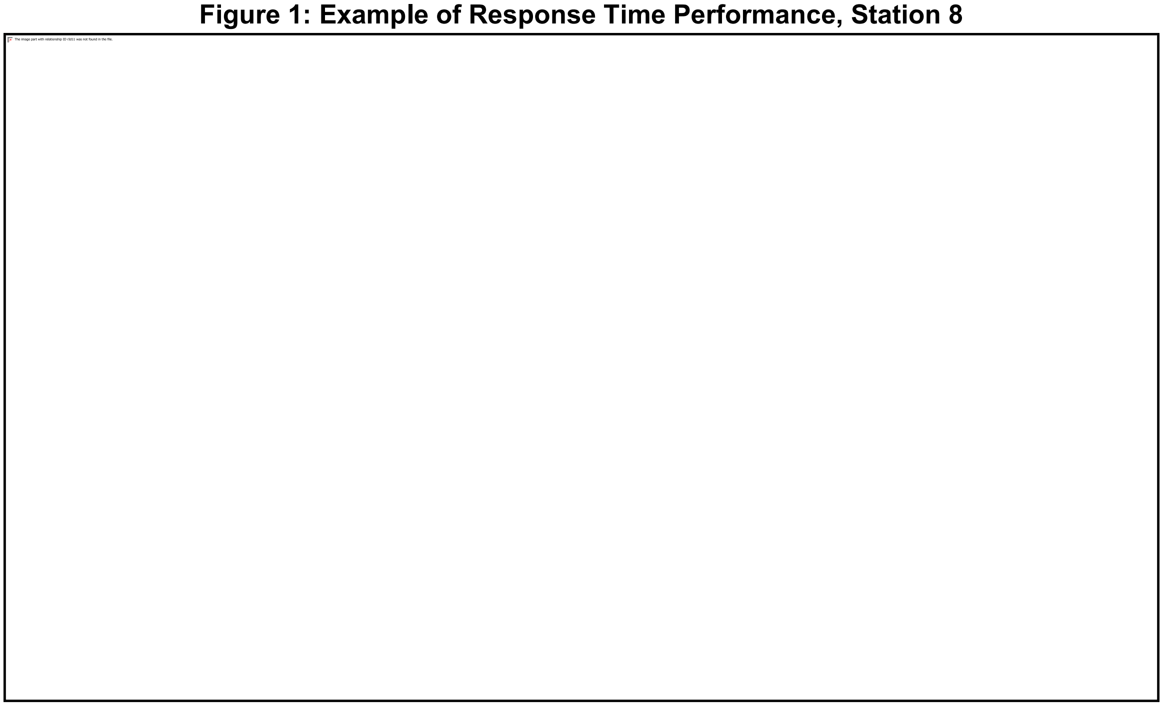
The square on the left side of the graph represents a theoretical condition of 100% availability for Station 8. It shows that if Station 8 were available 100% of the time, 24 hours a day, and able to respond to every call, it would achieve a compliance level of about 85%, meaning it would arrive within four minutes about 85% of the time. This is above (better than) the area's targeted performance standard.

But in fact Station 8 is only available about 80% of the time. The red dot represents the station's actual performance, which is a bit lower than it would be if it were available 100% of the time, but still above the performance standard. If the red dot were below the dotted line that would indicate that station was not currently meeting the performance standard.

What would happen if Station 8 were never available, meaning always busy with other calls and unable to respond to a new call? In that case other units from outside the area would need to respond to calls, and the result would be lower performance (increased response time). The square on the right side of the graph shows a theoretical zero availability for Station 8 and a performance of only about 67% for units outside the area that take up the slack. Units are arriving within four minutes only 67% of the time, which is below the performance goal of 80% because the emergency-response system is now stretched beyond its capacity.

The red line connecting these three data points shows how performance changes as unit availability declines. We can see that when the unit availability declines to 60%, the performance standard is barely met. Below 60% availability, the standard is no longer being met. Corrective action needs to be taken *before* the 60% availability level is reached, so it's important to know when this is going to occur.

Figure 1: Example of Response Time Performance, Station 8



The slope of the line reflects *workload sensitivity*, or how an area is impacted by an increase or decrease in calls. Areas that have multiple units available or several nearby fire stations that can cover calls are less impacted by an increase and calls. They have a low workload sensitivity. This would be shown on the graph by a nearly horizontal line—as availability declines, response time remains about the same.

In an area that has fewer units available and other stations are located farther away, an increase in calls will exceed the area's capacity to respond and response times by units outside the area will be excessive. This area is workload sensitive—heavily dependent on unit availability. This would appear on the graph as a line that slopes strongly downward.

If the square on the left side of the graph—representing 100% availability—falls below the 80% performance goal, this indicates a problem with fire station location. The station is not meeting its time-response goal even though it is always available, because it is too far away from calls. The unit is arriving late 20% of the time or more, indicating that it is not well located to reach all parts of its first-due area. This problem can be corrected by relocating the current station, building a new station, or—perhaps the best solution—reevaluating first-due boundaries to make sure that the most appropriate station is responding.

This system of graphing can be used to plan for future station locations by monitoring response trends over time and noting when response time, due to declining unit availability, is heading toward a point when action must be taken to avoid falling below the performance goal. If a station's current capacity is known, the graph can be used to calculate remaining capacity that is available while continuing to meet the performance goal.

APPENDIX C: EVALUATING UNIT WORKLOADS

The location of fire stations is only one factor in determining whether response-time goals will be achieved. The 'busyness' factor or workload is also important since units that are extremely busy may not be available for the next call, thus necessitating the response from a station further away. EMS workload is typically described as Unit Hour Utilization (UHU), which is discussed later in this section.

Through CAD systems, fire departments are able to keep detailed records about service times; these data are useful in determining the availability of a specific unit or station. Again, the concept of workload is not merely a count of how many calls to which a unit was dispatched. One unit can have fewer responses than another but remains on the scene longer on average (e.g. more working incidents, or a more distant hospital for EMS patients), and so has a greater workload. Evaluating workload is important when looking at the overlaps in coverage to an area that may be required to achieve the response time goals adopted by the county/department and is part of the CFAI self-assessment process. An analysis of workload also can indicate whether a new station should be built or new apparatus purchased—or if current stations should be closed or units moved.

A fire/EMS system must incorporate the necessary redundancies based on whether adjacent stations or units are likely to be available for emergency response. Below are general guidelines developed by TriData to show the level of redundancy (overlap) necessary to achieve response-time goals. These were developed based on many fire department studies we have undertaken.

1. **Very Low Workload (<500 responses/yr.)** – Simultaneous calls are infrequent and unit availability usually is assured. Stations/units can be spaced at the maximum distance possible to achieve stated travel time objectives established by the community.
2. **Low Workload (500–999 responses/yr.)** – Few calls will overlap and unit availability usually is assured. Stations/units can be spaced at the maximum distance possible to achieve stated travel time objectives established by the community.
3. **Moderate Workload (1,000–1,999 responses/yr.)** – Some overlap of calls will occur, usually at peak demand periods; however, stations/units are usually available. Stations/units must be located with marginal overlap to achieve stated travel time objectives established by the community.
4. **High Workload (2,000–2,999 responses/yr.)** – Additional overlap of calls will likely occur; however, stations/units will probably be available for emergency response. Stations/units must be located with significant overlap to achieve stated travel time objectives established by the community. This footprint usually achieves the best results

in terms of cost efficiency and effectiveness of service delivery. (Overlap can be achieved with additional stations or additional units in existing stations.)

5. **Very High Workload (3,000–3,999 responses/yr.)** – Overlapping calls occur daily, usually during peak demand periods, and working incidents are frequent. The closest station/unit may not be available, thus requiring the response of adjacent stations/units. Stations/units must be located with the significant overlap to achieve stated travel time objectives established by the community. (Overlap can be achieved with additional stations or additional units in existing stations.)
6. **Extremely High Workload (>4,000 responses/yr.)** – Overlapping calls may occur hourly, regardless of the time of day. The closest station/unit is likely to be unavailable thus requiring the response of adjacent stations/units. Frequent transfers or move-ups are required for the delivery system to meet demand. Stations/units must be located with redundancy (back-up units) to achieve stated travel time objectives established by the community. This footprint is usually found in very densely populated urban areas and is especially evident in EMS services located in urban areas with very high demand. (Overlap can be achieved with additional stations or additional units in existing stations.)

The 3,000–3,900 response level (*very high workload)* is the point at which units are often considered "busy" and their availability should be evaluated. This is a rough rule of thumb, not a fixed standard. At this point, response times often begin getting longer because of simultaneous call occurring in the same area.[1] As units become busier, the chances for overlap or simultaneous alarms increase, and second-due units begin to answer more calls. This causes a domino effect where unit B is dispatched to a call in unit A's area because unit A is already engaged, causing unit B to be unavailable for the next call in its own area. Unit C must then respond to unit B or unit A's area, and so forth.

Again, the 3,000-response threshold is just a rule of thumb. How much time a unit is unavailable due to being involved with another incident is better assessment of the impact of workloads on availability and response times. This is the second factor in workload, known as unit hour utilization (UHU).

Unit Hour Utilization

UHU is a calculation that estimates the amount of time a unit is occupied on emergency calls as a percentage of the total amount of hours a unit is staffed and available for response (a unit staffed full-time is available 8,760 hours per year). In other words, UHU measures the

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[1] A "first-due" 'area is a certain geographic area of the overall fire department response jurisdiction assigned to a particular fire station.

percentage of on-duty time consumed by emergency service field activities. A high UHU means lower availability for calls. Poor availability negatively impacts response times.

The specific formula used to calculate the UHU for each unit is:

$$\text{UHU} = \frac{\text{(number of calls) } x \text{ (average call duration in hours)}}{\text{8,760 (total hours in a year)}}$$

UHU measures the percent of a unit's time in service that is spent running calls. However, there is other productive time s *not* accounted for, such as for training, maintenance public education, and other preparedness-related functions. When units are not engaged in emergency response, it does not mean they are not working.

UHU is used more in relation to EMS units than fire suppression units; although, evaluation of UHUs is useful to different extents for both functions.

While there is consensus within the industry on the importance of utilization rates and how to measure them, the interpretation of how indicative utilization rates are of overall system efficiency is debatable. Most believe that a UHU between 35 and 45 percent for EMS is good for economic efficiency. (This is more common with private ambulance providers.) If a UHU is greater than 45 percent, units often are not available and response times suffer. If a UHU is below 35 percent, units may not be well utilized, but response times may be high too often. Many communities choose to aim for a UHU in the 15 to 25 percent range to balance productivity of a unit with good response times. If a unit has a UHU of 40 percent, it will not be available for the next call 40 percent of the time. This is, of course, an average over the course of the day.

In order to develop an effective resource deployment plan, units must be available to respond to incidents most of the time. No amount of resource placement planning will improve system-wide response times if the responding units are not available.

APPENDIX D: PERFORMANCE MEASUREMENT

Many fire departments measure their deployment performance based entirely on the NFPA 1710 standard. The problem with using this standard "carte-blanche" is that it assumes all areas need equal fire protection. Even if it were possible to provide truly equal fire protection, the reality is that urban, downtown areas have different fire protection needs than a more rural area. A sparsely populated and sparely structured area of the city, for instance, does not need three ladder trucks within an 8-minute reach; some urban, downtown areas do.

The 1710 standard is oriented towards achieving a 6-minute total response time, a time at which fires are likely to expand rapidly (flashover), and defibrillated cardiac arrest patients have a markedly lower chance of survival. National Fire Protection Association 1710 does not actually specify a total response time standard. Instead, it provides time and reliability standards for each of the time segments that comprise total response time (call-processing, turnout, and travel). For example, the standard specifies that for fires and special operations incidents, the first-arriving unit will have a travel time (time from the unit leaving the station to arrival at the emergency incident) of four-minutes 90 percent of the time. In this case, 4-minutes is the time standard, and 90 percent is the reliability standard. Although the NFPA 1710 standard is an excellent goal to work towards, few fire departments are able to completely meet the standard.

The standard is based on what is ideal and not necessarily what is realistic. For instance, to achieve a six-minute total response time, the original version of the standard specified a call-processing time of one minute, a turnout time of one minute, and a travel time of four minutes. It was subsequently realized that one-minute was not enough time for firefighters to get to their unit, don full turnout gear and leave the station. As a result, the 2010 version of the NFPA 1710 standard was revised to allow 80 seconds of turnout time for fire and special operations incidents.

Just as the standard itself was revised to reflect reality, it makes sense to consider whether the standard makes sense for all parts of the jurisdiction in its current form. Take for instance a rural, sparsely populated area. It may not be reasonable to expect a 4-minute travel time for 90 percent of incidents. The jurisdiction might consider specifying a 5-minute travel time for 70 percent of incidents to account for the area's rural character.

Appropriate performance levels should be based on the characteristics of individual planning areas. Response time and reliability goals should match a particular area's risk characteristics, not just conform to a one-size-fits-all standard. For this to occur, fire departments might depart from just using NFPA 1710 and ISO standards and instead move toward a data-driven process of analyzing risk and response, in our opinion. The UK after having been a model for standards of cover has completely dropped them nationally, in favor of locally made risk tradeoffs. Heavier investment in prevention might be considered vs. increasing suppression. We should try to develop the data on which to make such judgments.

Assessing Deployment Performance

Deployment decisions concerning fire station and apparatus locations should be an ongoing process based on periodic performance measurement. Because jurisdictional needs do change, the deployment change recommendations made in this study should be considered as a step in a continuing process. Going forward, the fire department needs to be regularly conducting neighborhood-level performance measurement for the process to be effective.

Police departments are decades ahead of most fire departments when it comes to analyzing data to drive operations. Most city and county police departments have several technical crime analysts who specialize in data analysis and mapping. Many fire departments should consider hiring a dedicated data analyst and begin to incorporate performance measurement into a regular (perhaps quarterly) review of deployment. The fire department culture, which is based on meeting standards, should reconsider its emphasis on static deployment (where unit locations and first-due areas rarely change) to one of dynamic deployment based on data-driven performance goals.

An excellent resource on how to measure performance and adapt deployment is the Center for Public Safety Excellence's (CPSE) Developing Standards of Cover Manual. One of the advanced, but effective techniques used by the manual is to measure the trade-off between unit availability (percentage of incidents where the correct (first due) unit handled the call) and response time performance (percentage of incidents below the response time goal).

Generally speaking, as the first-in correct unit for a particular area becomes less available (due to other calls, training, etc.), performance for that area decreases because units from other stations have to travel further to handle the call. How much of an impact reliability has on performance is largely dependent on how far away the nearest fire stations are. This type of analysis can be used to determine if a station needs an additional unit or might benefit from a first-due area adjustment. Fire departments should familiarize themselves with this performance measurement methodology and consider its use to gauge station and unit location performance.

Reporting Deployment Performance

After taking the time to establish deployment goals for each neighborhood or planning district and learning some of the more advanced CPSE analysis methodologies, the last step is to establish regular reporting mechanisms. We recommend that fire departments consider producing the following to types of reports:

Monthly Deployment Performance Report – This report should be distributed department-wide each month. Such a report serves several important functions. First, it provides information and data feedback to those entering incident data; getting a detailed report that shows workload by units and response time performance can provide firefighters the ability to gauge and challenge themselves to better performance (e.g. one engine crew that has had the slowest turnout time in the past few months makes it their goal to be in the top three engine companies for turnout time in the next reporting period). Also, putting out a monthly report provides an excellent error checking mechanism, as firefighters will be the first to notice and announce any problematic performance statistics. Finally, having somebody try and pull together some statistics with Excel for an annual report is asking for problems because you cannot truly be familiar with data only looked at once a year. Putting together monthly reports helps to ensure that the fire department is on top of its data collection and performance measurement.

Quarterly Report – While the monthly report can be fairly short and limited to some simple workload and response time results, we recommend a more in-depth quarterly report. The report should be set up so that department leaders can review deployment performance for the entire system and each individual planning district. The report should be set up to note performance changes/trends in specific planning areas so that fire department officials are in a good position to recommend near- and long-term deployment modifications. We strongly recommend that this annual performance measurement report reflect most of the analysis types found in the CPSE Standards of Cover Manual.

APPENDIX E: BEACON FIRE STATION APPRAISALS

CHRISTOPHER H. BOPP

Real Estate & Accounting

33 Henry Street, Beacon NY

(845)831-3739

May 21, 2014

Tridata Division
System Planning Corp.
Attn.: Paul Flippin
3601 Wilson Blvd.
Arlington, VA 22201

Dear Paul Flippin:

Please find enclosed pictures and property information regarding three City of Beacon Firehouses. Also enclosed are copies of my credentials for my Real Estate License and Appraisal Services. Please feel free to contact me with any questions

The information on each firehouse is as follows:

- Exhibit 1- Beacon Engine located at 57 E. Main Street, Beacon, NY 12508

- Exhibit 2- Mase Hook & Ladder located at 423-425 Main Street, Beacon, NY 12508

- Exhibit 3- Lewis Tompkins Hose located at 13 South Ave., Beacon, NY 12508

Sincerely,

Christopher H. Bopp
Real Estate Broker

Exhibit 1

Exhibit 2

Exhibit 3

Exhibit 1- Beacon Engine located at 57 E. Main Street, Beacon, NY 12508:

I have inspected the above referenced property on May 17, 2014. The property is located in a multi-use area. The parcel grid identification number is 130200-6054-38-186702-0000. The approximate sales value of the property in the current market is $ 250,000.00 as is.

ParcelAccess

TENTATIVE ROLL - 2014

Parcel Grid Identification #:
130200-6054-38-186702-0000
Municipality: City Of Beacon

Parcel Location
E 57 Main St

Owner Name on March 1
Beacon Engine Co #1 , *(P)*

Primary *(P)* Owner Mail Address
E 57 Main St
Beacon NY 125080000

Parcel Details

Size (acres):	49.5 X Irr.	Land Use Class:	(662) Community Services: Protection: Police and Fire Protection, Electrical Signal (Equipment and other facilities for fire, police, civil defense, etc.)
File Map:		Agri. Dist.:	(0)
File Lot #:		School District:	(130200) Beacon City School District
Split Town			

Assessment Information (Current)

Land:	Total:	County Taxable:	Town Taxable:	School Taxable:	Village Taxable:
$51000	$970000	$0	$0	$0	$0

.

Tax Code:	Roll Section:	Uniform %:	Full Market Value:
N: Non-Homestead	8	100	$ 970000

.

Tent. Roll:	Final. Roll:	Valuation:
5/1/2014	7/1/2014	7/1/2013

Last Sale/Transfer

Sales Price:	Sale Date:	Deed Book:	Deed Page:	Sale Condition:	No. Parcels:
$0	0	0408	0064	( )	0

Site Information:
Site Number: 1

Water Supply:	Sewer Type:	Desirability:	Zoning Code:	Used As:
(3) Comm/public	( )	( )	CB	(Z39) Fire station

.

Exemption Information:
Exemption: 26400

Name:	Amount:	Percent
Inc Vol Fire Co	$970000	0

.

This report was produced with ParcelAccess Internet on 5/19/114. Developed and maintained by OCIS - Dutchess County, NY.

Dutchess County, NY - Tax Map

ParcelAccess
Dutchess County, NY

Print date: 5/19/2014

Parcel Grid #: 130200006054003818670200000
Municipality: City Of Beacon

Exhibit 2- Mase Hook & Ladder located at 423-425 Main Street, Beacon, NY 12508:

I have inspected the property on May 17,2014. The property is located in a multi-mix area on 0.66 acres. The parcel grid identification number is 130200-6054-29-026773-0000. The approximate sales value of the property in this case is 280,000. 00

ParcelAccess

TENTATIVE ROLL - 2014

Parcel Grid Identification #:
130200-6054-29-026773-0000
Municipality: City Of Beacon

Parcel Location
423-425 Main St

Owner Name on March 1
City Of Beacon , *(P)*

Primary (P) Owner Mail Address
1 Municipal Plz
Beacon NY 125082526

Parcel Details

Size (acres):	0.66 Ac(c)	Land Use Class:	(464) Commercial: Banks and Office Buildings: Office Building
File Map:		Agri. Dist.:	(0)
File Lot #:		School District:	(130200) Beacon City School District
Split Town			

Assessment Information (Current)

Land:	Total:	County Taxable:	Town Taxable:	School Taxable:	Village Taxable:
$45000	$970000	$0	$0	$0	$0

Tax Code:	Roll Section:	Uniform %:	Full Market Value:
N: Non-Homestead	8	100	$ 970000

Tent. Roll:	Final. Roll:	Valuation:
5/1/2014	7/1/2014	7/1/2013

Last Sale/Transfer

Sales Price:	Sale Date:	Deed Book:	Deed Page:	Sale Condition:	No. Parcels:
$0	0	1031	0337	( )	0

Exemption Information:
Exemption: 13350

Name:	Amount:	Percent
CITY OWNED	$970000	0

This report was produced with ParcelAccess Internet on 5/19/114. Developed and maintained by OCIS - Dutchess County, NY.

Dutchess County, NY - Tax Map

ParcelAccess Dutchess County, NY

Print date: 5/19/2014

Parcel Grid #: 130200006054002902677300000

Municipality: City Of Beacon

Exhibit 3- Lewis Tompkins Hose located at 13 South Ave., Beacon, NY 12508:

I have inspected the property on May 17, 2014. The property is located in a commercial area on 0.66 acres. The parcel grid identification number is 130200-5954-26-725933-0000. The approximate sales value of the property in this case is $850,000.00

ParcelAccess

TENTATIVE ROLL - 2014

Parcel Grid Identification #:
130200-5954-26-725933-0000
Municipality: City Of Beacon

Parcel Location
13 South Ave

Owner Name on March 1
City Of Beacon , *(P)*

Primary *(P)* Owner Mail Address
1 Municipal Plz
Beacon NY 125082526

Parcel Details

Size (acres):	0.66 Ac (C)	Land Use Class:	(662) Community Services: Protection: Police and Fire Protection, Electrical Signal (Equipment and other facilities for fire, police, civil defense, etc.)
File Map:	CM86	Agri. Dist.:	(0)
File Lot #:	5277	School District:	(130200) Beacon City School District
Split Town			

Assessment Information (Current)

Land:	Total:	County Taxable:	Town Taxable:	School Taxable:	Village Taxable:
$87800	$1277500	$0	$0	$0	$0

.

Tax Code:	Roll Section:	Uniform %:	Full Market Value:
N: Non-Homestead	8	100	$ 1277500

.

Tent. Roll:	Final. Roll:	Valuation:
5/1/2014	7/1/2014	7/1/2013

Last Sale/Transfer

Sales Price:	Sale Date:	Deed Book:	Deed Page:	Sale Condition:	No. Parcels:
$0	0	1639	0058	( )	0

Site Information:

Site Number: 1

Water Supply:	Sewer Type:	Desirability:	Zoning Code:	Used As:
(3) Comm/public	(3) Comm/public	( )	RMF-0.8	(Z39) Fire station

.

Exemption Information:

Exemption: 26400

Name:	Amount:	Percent
Inc Vol Fire Co	$1277500	0

.

Dutchess County, NY - Tax Map

ParcelAccess Dutchess County, NY

Print date: 5/19/2014

Parcel Grid #: 130200005954002672593300000

Municipality: City Of Beacon

FOR OFFICE USE ONLY
Control No. 1032921
~~13336-16~~

State of New York
Department of State
DIVISION OF LICENSING SERVICES

UNIQUE ID NUMBER
37BO0734584

Be it known that, pursuant to the provisions of Article 12A of the Real Property Law

EFFECTIVE DATE

MO.	DAY	YR.
12	17	2013

EXPIRATION DATE

MO.	DAY	YR.
12	16	2015

CHRIS BOPP REAL ESTATE
33 HENRY ST POB 926
BEACON NY 12508

HAS BEEN DULY LICENSED TO TRANSACT
BUSINESS AS A REAL ESTATE BROKER
AND TO BE REPRESENTED BY
BOPP CHRISTOPHER H

In Witness Whereof, The Department of State has caused its official seal to be hereunto affixed.

CESAR A. PERALES
SECRETARY OF STATE

DOS-104 (Rev. 4/03)

DUTCHESS COMMUNITY COLLEGE

Office of Community Services

Certificate of Achievement

Awarded this day

JANUARY 22, 1981

To

CHRISTOPHER H. BOPP

In Recognition of Attendance and Participation in Dutchess Community College's

REAL ESTATE APPRAISAL

EDUCATION DEMOCRACY OF EXCELLENCE 1957

Assistant Dean, Community Services

Instructor or Program Coordinator

APPENDIX F: PACHECO ROSS ARCHITECTS – EXISTING BUILDING ASSESSMENTS AND PHOTOGRAPHS

Existing Building Assessments

- **Lewis Tompkins Hose**
- **Photos - Lewis Tompkins Hose**

- **Mase Hook and Ladder**
- **Photos - Mase Hook and Ladder**

- **Beacon Engine**
- **Photos - Beacon Engine**

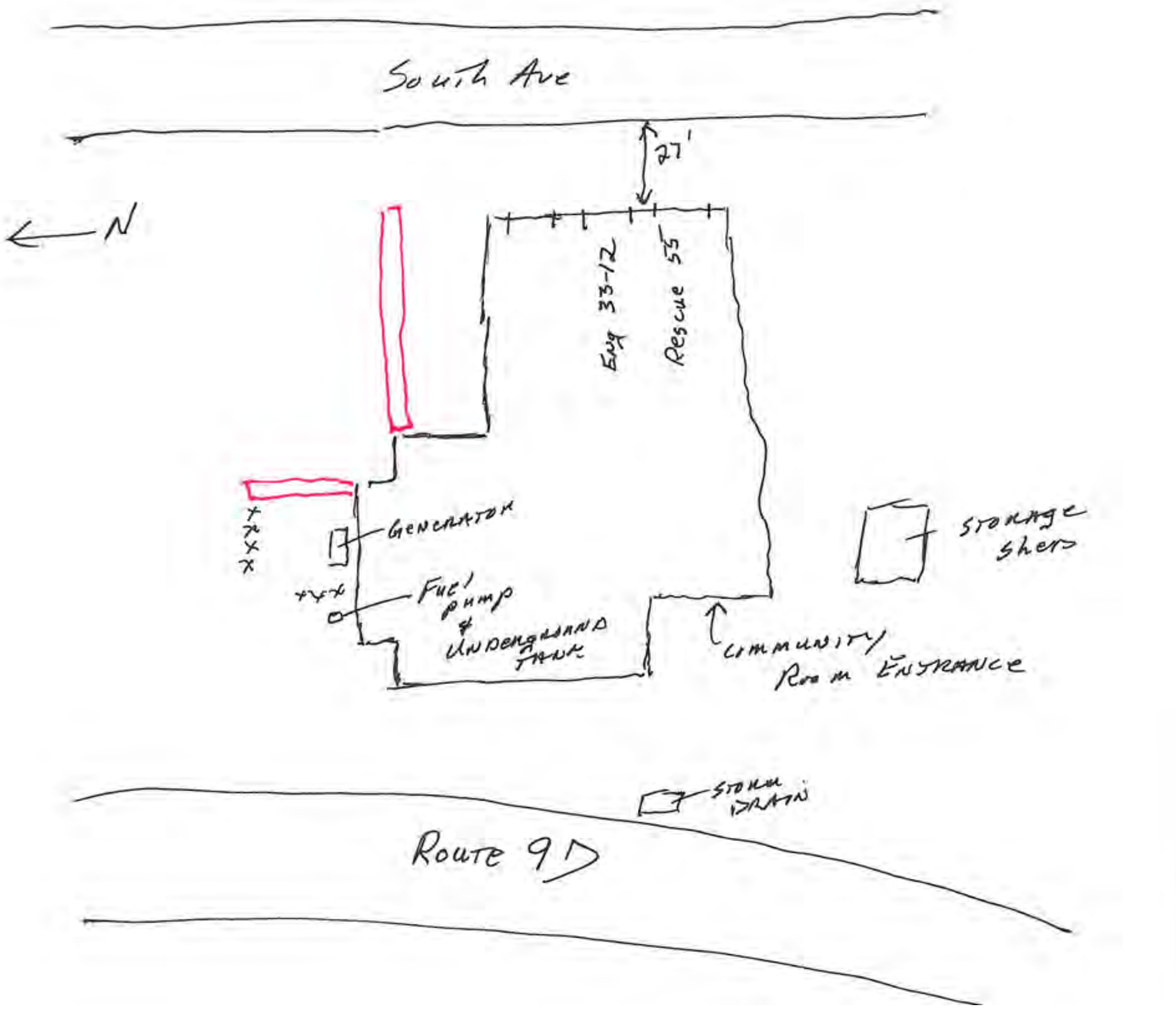
PACHECO ROSS ARCHITECTS, P.C.
EMERGENCY RESPONSE FACILITIES
DAVID J. PACHECO, AIA – CA, CT, DE, NJ, NY, NC, RI, VT, TN, TX
DENNIS A. ROSS, AIA – CO, CT, ME, MD, MA, MI, MO, PA, NH, NJ, NY, TN, VA

Date: 3/17/2014

Location: **Lewis Tompkins Hose Co, 13 South Ave, Beacon, NY**

By: __LLC___

Site Assessment



Legend:
G = Good
A = Average
P = Poor
X = Needs Replacement

Lot Size: ___________

North Adjacent Property: City of Beacon Welcome Center **Availability: Unknown**

East Adjacent Property: South Ave.

South Adjacent Property: Church Availability Large unpaved parking lot behind church is used by both the church and the fire station

West Adjacent Property: NYS Route 9D

Road Frontage:____

General Site Topography: Sloping South to North-Steep slope East to West

Accessibility: Poor due to steep slope

Fencing: N

Apparatus Bay Front Aprons:

Concrete: Y **Bollards: Y**

Conditions: A

G/C Only about 12" wide

Apparatus Bay Rear Aprons: N/A

Front Apron to Road

Asphalt: Y

Conditions: P

G/C Front apron is 27' long. During day shift engine from Station 1 backs up to apparatus bay door with training equipment – Ladder parks parallel to road (half in the road)

Light Duty Pavement Areas:

Asphalt

Condition: P X

G/C Pour on sloped North parking area, needs replacement at rear of building

Sidewalks: On property

Concrete

Condition: A

ADA Accessible Entrances # 1 Adequate: N

G/C Not by todays code

Lawns & Landscaping:

G/C Minimum lawn along South side of station

Firefighter Parking & Access:

# of Parking Spaces 14± # HDCP Zero

G/C Not striped, no nearby entrance for responders. Basically one way traffic thru parking lot from East to West.

Public Parking & Access:

# of Parking Spaces 2-3 # HDCP Zero

G/C Whatever is left over based on the number of FF vehicle parked at the time

Ingress/Egress Personal Vehicles (Discuss Separation)

G/C No separation

Ingress/Egress FFE

Traffic Control: N

Returning Apparatus: Back in from street

Existing Utilities

Storm Drainage:

Municipal: Y

Does all storm go to municipal system: Y

Roof Drainage: Internal drains to underground

Security

Site None

Building Access control

Site Recommendations for Renovations/Expansions

Existing site would accommodate a building footprint expansion of 100% if the parking lot behind the church is utilized

Acquisition of additional land to the North would permit minor expansion

Site is adequate to support renovation and modernization

Site deficiencies & budgetary opinions of construction costs

- **Property line on NW corner of building is within a couple of feet of the building.**
- **Severe slope makes construction difficult.**
- **Based on visual size of steel columns adding a 3rd story is not an option.**
- **Existing parking lot behind church may help in expansion on site.**
- **Existing station plans indicate there is rock very close to the surface.**

Date: **3/17/14**

Location: **Lewis Tompkins Hose Co, 13 South Ave, Beacon, NY**

By: **LLC**

Building Envelope

LEGEND:
G = Good
A = Average
P = Poor
X = Needs Replacement

Roofs: # of Different Roofs **Three**

Roof 1 Location: **High**

Flat

Type: **EPDM**

Drainage: **Roof Drains**

Drainage System Condition **A**

Roof Penetrations: **Y**

Curbs **Vents**

Condition: **A**

Parapets/Flashing

G/C **Access not available, photo from camera held high shows parapets to be in average condition**

G/C Roof #1 **Average**

Roof 2 Location: **Middle Roof**

Flat

Type: **EPDM**

General Condition: **A**

Drainage: **Internal** **Roof Drains**

Overflow Scuppers: **N**

Drainage System Condition: **A**

Roof Penetrations: **Y**

Curbs **Vents** **Skylight** **Roof Hatch**

Condition: **A**

Parapets/Flashing

G/C **Average – Flashing below EIFS is very short**

G/C Roof #2 **Average – walkway pads missing support steel for equipment screen is unpainted causing severe rusting on the support steel and the RTU**

Roof 3 Location: **Low Roof**

Flat

Type: **EPDM**

General Condition: **A**

Drainage: **Internal** **Roof Drains-One**

Overflow Scuppers: **N**

Drainage System Condition **A**

Roof Penetrations: **N**

Parapets/Flashing

G/C **Good**

G/C Roof #3 **Good**

Roof 4 Location: **Generator Enclosure Roof**

Sloped

Type: Shingle

General Condition: **P**

Drainage:

Direct to: **Ground**

Overflow Scuppers: **N/A**

Drainage System Condition **P**

G/C **Generator enclosure is not in very good condition**

Exterior Skin:

North Elevation: **Welcome Center side**

Type: **EIFS**

Sub-structure: **CMU in Apparatus Bays**

General Condition Exterior Skin **A-for its age**

Any Signs of Water Penetration: **Y**

G/C **Minor damaged spots, gas service penetration should be caulked, cracks along edges of main doors**

Control Joints – Lack of / Failed: **N**

Proper Flashing & Sealants: **Y**

Fascia:

G/C **Aluminum-Average condition, short fascia lengths**

Windows: **N**

Louvers: **Y**

Type: **Aluminum** **Fixed**

General Condition: **A**

G/C **Motorized damper**

Personnel Doors: **Y**

Type: **HM**

Accessories: **Weather-stripping** **Thresholds** **Sweeps**

Weather Tightness & Energy Efficiency: **A**

Doors Operate Properly: **Y**

G/C **Doors and Frames need repainting**

Overhead Doors: **N**

G/C North Elevation **Apparatus Bay man door frame rusting lower 3", uneven sidewalk, EIFS insulation thickness 1 ½"**

Exterior Skin:

East Elevation:

Type: **EIFS**

Sub-structure: **CMU at bays**

General Condition Exterior Skin: **A**

Any Signs of Water Penetration: **Y**

G/C **Cracks in the decorative joints above the main entrance and other decorative joints**

Control Joints – Lack of / Failed: **N**

Proper Flashing & Sealants: **Y**

Windows: **N**

Louvers: **N**

Personnel Doors: **Y**

Type: **HM**

Accessories: **Weather-stripping** **Thresholds** **Closure** **Sweeps** **Single pane wire glass**

Weather Tightness & Energy Efficiency: **P**

Doors Operate Properly: **Y** **No panic on doors**

Overhead Doors: **Y**

Type: **Insulated Panel**

Weather-stripping: **Y** Condition: **A**

Weather Tightness & Energy Efficiency: **P**

Exterior Skin:

South Elevation:

Type: **EIFS**

Sub-structure: **CMU at bays**

General Condition Exterior Skin: **A**

Any Signs of Water Penetration: **Y**

G/C **Cracks in EIFS – conduits to ground mounted RTU should be sealed at building envelope**

Control Joints – Lack of / Failed: **N**

Proper Flashing & Sealants: **N**

G/C **See note above**

Fascia:

G/C **Average**

Windows: **Y**

Type: **Vinyl Clad Wood**

Style: **Casement**

Glazing: **DBL**

Weather tightness & Energy Efficiency: **A – Interior wood deteriorating**

General Condition: **A**

Louvers: **Y – Gear dryer exhaust**

Type: **Aluminum**

General Condition: **A**

Personnel Doors: **N**

Overhead Doors: N

Exterior Skin:

West Elevation:

Type: **EIFS**

General Condition Exterior Skin **A** **P – major damage spots covered with plywood**

Any Signs of Water Penetration: **Y**

G/C **At damaged areas**

Control Joints – Lack of / Failed: **N**

Proper Flashing & Sealants: **N**

Fascia:

G/C **Good**

Windows: **Y**

Type: **Vinyl Clad Wood**

Style: **Casement**

Glazing: **DBL**

Weather tightness & Energy Efficiency: **A**

Screens: **Unknown**

General Condition: **A**

Louvers: **N**

Personnel Doors: **Y** N

Type: **Aluminum & Glass-Entrance to Community Room** **HM-Emergency Exit**

Accessories: **Weather-stripping** **Thresholds** **Closure** **Sweeps**

Weather Tightness & Energy Efficiency **P – single glazing**

Doors Operate Properly: **Y** N If N, Comment:_____________

G/C **Emergency Exit hollow metal double doors open okay but very difficult to close. Door do not open to grade, poor fit and cracks in EIFS at door frame**

Overhead Doors: **N**

G/C West Elevation **Cracks in EIFS below 2 south windows**

Insulation Levels and Energy Efficiency in Building Envelope:

G/C **1 ½" insulation with EIFS over**

Repair Recommendations in Envelope and Remedial Action to Prevent Continued Delay:

G/C **Fix all EIFS damaged areas, caulk all cracks and building penetrations that are not caulked. Check caulk at other penetrations.**

Date: **3/17/2014**

Location: **Lewis Tompkins Hose Co, 13 South Ave, Beacon, NY**

By: **Loren Compson**

Building Interior Evaluation

Legend:
G = Good
A = Average
P = Poor
X = Needs Replacement

Apparatus Bay

\# of Truck Bays **Three** Size of Doors **16'** x **14'-2"** # that are Drive Thru **zero**

\# of EMS Bays **Zero**

Adequate side clearance **N**

Adequate overheard clearance **Y**

Ceiling Construction: **Exposed Joist** **G**

Wall Construction: **CMU** **G**

Floor Construction: **Concrete** **A - P**

Floor Drainage: **Single Large Floor Drain**

Floors appear to pitch to drains: **Unknown**

Overhead Doors: Brand: **Unknown**

Thickness: **1"-1 1/4"** Type: **Insulated Sectional**

Gen Condition: **A**

Operator Condition (Visual): **A**

Controls: At Door **Yes passenger side**

Safety Edge: **Y**

Manual Operation: **Manual Push-Up**

Accessories: Drench/Eye Wash **N**

Air Reels **Y** Qty **One – Shop compressor of bay floor with 50'hose**

Power Drops **Y** Qty **Four**

Hose (not on reel) **Y** Qty **One**

Truck Fill **Y** Qty **Two**

Ceiling Fans **N**

Hose Dryers **Y** Qty **One**

Drinking Fountain **N**

Ice Maker **N**

Vehicle Exhaust: **None**

Lighting (General Adequacy): **G**

Night Lighting: **Y**

Gear Storage: **Yes rack between apparatus**

Hose Racks: **Y**

G/C App Bay **Only one man door exit**

Apparatus Bay Support

Radio Room: **Y**

View of Apron: **N** View into bays: **Y**

Proper Lighting: **Y**

Adjacent Bunkroom: **Y**

General Adequacy: **A** **P**

G/C **Small door to bay has been blocked off for additional counter space. 5 ceiling tiles displaced**

DeCon Room: Y **N**

DeCon Laundry: Y **N**

Residential Washer: **Y**

Residential Dryer: **Y**

G/C **For contaminated PPE**

Firematic Storage: **Metal wall cabinets in Apparatus Bay** Locked: **Y**

Work Rooms/General Storage: **Small area at end of one engine bay**

Toilet Rooms (Accessible from Apparatus Bays):

Quantity: **None**

General Traffic Flow in Apparatus Bay:**One bay is set up for training. Vehicles from other stations parked in from of bay doors during daytime and perpendicular to the bay doors along the street line blocking the sidewalk.**

Living/Office/General Areas

1st Floor

Bunkrooms:

Male Bunkrooms: QTY **One** with **One** Bunks Attached bath/shwr **Y**

General Condition of Bunkrooms: **A**

Floor Material: **VCT**

Access to Apparatus Bay: **Quick**

Bathrooms/Showers rooms: #1

X Male : **Two showers. Two urinals, two sinks, two toilets.**

General Condition: **A**

HDCP Accessible: **N**

Lockers: **N**

Day Lounge/Ready Room:

Size: **42** x **25**

Flooring: **CPT- TV Room** **VCT**

Contents: Chairs **Eight** TV **Yes** Pool Table **Yes** Ceiling Fan: **Yes** Kitchenette **Two burner electric stove top, under counter refrigerator, microwave**

General Condition: **P**

G/C **Bar area, pool table, TV Room off large room**

Training Room: **N**

G/C **Using one of the bays**

Exercise Room: **N**
Office Area: **Officers Room**

G/C **Two desks**

Uniform Closet Room: **Y**

G/C **GWB hard ceiling**

Elevator: **N**

Janitor Closets

G/C **Contains mop sink and electric**

Stairways & Corridors

G/C **Average condition; ice machine and storage under stair**

Doors & Door Hardware

Electronic Hardware: **Y** # of Exterior Doors **One**
# of Interior Doors **Zero**

Basement

Community Room

Coat Room **Chair and Table Storage** **Small Mechanical Room**

50'wx50'd

VCT

2x2SAC General Condition: **A-showing age**

Emergency Exit Doors – open well, do not close well

Kitchen
Ansul hood **QT Floor** **Refrigerator/Freezer** **2 bowl deep sink with drain boards**

Women's Room

Two sinks **Two Toilets** **CUH/EXH Fan**

Men's Room

Two sinks **Two Toilets** **Two Urinals**

Fallout Shelter Currently in building: **N**

Does the building lend itself to creating fallout shelter space: **N**

Is the building currently used as a public polling place: **Unknown**

Date: 3/17/14

Location: Lewis Tompkins Hose Co, 13 South Ave, Beacon, NY

Life Safety/Code/ADA Assessment/ Hazardous Materials/Asbestos

Site ADA

Walks: Inadequate curb drops at driveway and apron

Ramps: Need railing?

Entries:

North: N Reasons for Non-Compliance Kitchen door over ½" step up

South: N Reasons for Non-Compliance Condition of asphalt paving and slope of paving

East: Y Reasons for Non-Compliance By standards at time of construction

West No entrance

Parking: Slope exceeds ADA standards

Number of HDCP Spaces: One-not lined

Signage: Y

Comments: Diesel tank fill pipe located within 5' of louver above kitchen door-louver may be Ansul hood exhaust, pressure washer and rolling cart with meat slicer in front of electrical panels

List any obvious life safety site hazards:

____

____

____

Apparatus Bay

ADA: Inadequate clearance around apparatus

Life Safety: No vehicle specific exhaust system, two apparatus bay exhaust fans-manual operation; plan is to integrate them with alarm.

Egress: Only one exterior man door

OSHA: ____

All Other Rooms

ADA: Bathrooms non-compliant, no elevator

Life Safety: Community room emergency exit doors have dangerous large step down to asphalt pavement

Egress: 1st Floor both means of egress are located in the same general area

OSHA: ____

G/C: Underground diesel fuel tank – no tank monitoring. Probably original single wall tank.
Stairwell doors not rated and held open.

Date: **March 17, 2014**

Location: **Lewis Tompkins Hose Co, 13 South Ave, Beacon, NY**

By: **Loren Compson**

FIRE PROTECTION

1. System Type – FDC only, no sprinkler system

A. Standpipe ! Sprinkler ! Combination !

B. Sprinkler Classification - Light ! Ordinary ! Hazard !

C. Sub-Classification__________________

4" dedicated supply to two FDC on front of building

2. Service

A. City **4"**

B. Location **Front**

C. Entrance Size **4" to FDC only**

3. Alarm Valve type

A. Wet ! Dry ! Pre-action ! Combination !

B. Size(s) ____________________________

C. Fire Dept. Connection ! Size _________

D. Zone Flow Switches ________________

4. Sprinkler Head Types

Pendant	∀	Wet	!	Dry	!
Upright	!	Wet	!	Dry	∀
Sidewall	!	Wet	!	Dry	∀
Exterior	!	Wet	!	Dry	∀

5. Piping

A. Material____________________________

B. Inspectors Test ______________________

6. Compressor Size

A. Mfg.___________________ Model ___________

7. Hose Cabinet(s) (Reels)

A. No.______________________

B. Locations_________________

C. Length

100ft ∀ 150ft ∀ 200ft ∀

Date: **March 17, 2014**

Location: **Lewis Tompkins Hose Co, 13 South Ave, Beacon, NY**

By: **Loren Compson**

HEATING, VENTILATING & AIR CONDITIONING

1. Heating & Air Conditioning
   A. Central Equipment type

      1. Rooftop Units. _____
      2. Split system. _____
      3. Constant Volume. _____
      4. VAV _____
      5. Chilled Water. _____
      6. Heat Pump _____

   B. General Condition, MFg

      1. Rooftop Units **Poor-very rusty**
      2. Split System **None**
      3. Chilled Water ________________________________
      4. Heat Pump Type ______________________________

   C. Central Chiller

      A. MFG & Model ________________________________
      B. Quantity ________________________________
      C. Condition & Ancillary Equipment___________________

   D. Heating Equipment – Supplement

      A. Type
         Boiler ∀

Furnace
Heat Pump ∀

B. Boiler MFG & Model ____________________________
C. Furnace MFG & Model **Peerless**
D. Heat Pump MFG & Model_________________________

E. Heating Equipment Terminal Units.

A. Fin Tube Radiation **Yes**
B. Cabinet Heaters **Yes**
C. Unit Heaters _______________________________
D. Other _____________________________________
E. General Overall Condition & Control
1. Zone Valves__________________________
2 Zone Pumps__________________________
3 Primary Pumps _______________________

G. Controls

Type ________________________________
Pneumatic _______
Electric _______
DDC _______
Upgraded Digital Thermostats

H. General Overall Evaluation and System Notes:
Max BTU input per hour 840,000
BTU output per hour 672,000
4 main zones off boiler
4th feed has a feed off it that goes to 5 more zones

Date: **March 17, 2014**

Location: **Lewis Tompkins Hose Co, 13 South Ave, Beacon, NY**

By: **Loren Compson**

ELECTRICAL

1. Power

A. Service Size **800 amp**
B. Main Breaker Size ____
C. Voltage
  120/240, 1 _____

  120/208, 3 _____

D. Main Distribution Panel **#1 30 amp, #2 30 amp, #3 60 amp #4 60 amp, #5 100 amp, #6 100 amp, #7 200 amp, #8 200 amp, #9 400 amp**

E. Secondary Distribution Panels **Emergency distribution panel**
  Quantity ____

F. Conductors ____
  Size ____
  Number of wires ____
  Condition ____
F. Convenience Outlets
  Type ____
  GFI **None in kitchen, in men's room 1st floor bath/bunk bath/community room bath**
  Special____

2. Lighting

A. Type **Fluorescent** Switched **Yes** Breaker________________
B. Special ______________ Switched ___________ Breaker________________
C. Emergency **None**
D. Exit **Yes in basement, 1st floor only at Apparatus Bay exterior door and main entrance, none from Day room. Many exterior lights reported not working**
E. Exterior/Security____

Comments: OC in Bay; Only one smoke detector in Community Room-no others

Date: 3/17/14

Location: Lewis Tompkins Hose Co, 13 South Ave, Beacon, NY

By: Loren Compson

PLUMBING CHECK LIST

1. **Water Service**
   - A. Water Type City **X – 80psi water pressure with a PRV**
   - B. Service Entrance Size **2"? plus 4" for FDC**
   - C. RPZ (if installed) **None**
   - D. Water Meter Size **None**
   - E. Approx. Location **Thru floor of main electrical room in basement then into mechanical room**

2. **Sanitary System**
   - A. City **X**

3. **Storm Water**
   - A. No. of Roof drains ________
   - B. Size & Condition of Roof Leaders **N/A**
   - C. Combined w/Sanitary ________
   - D. Cleanouts (above floor) ________ Condition __________
   - E. Cleanouts (below floor) ________ Condition __________

4. **Number of Toilet Rooms**
   - A. Men's **Two; One-Basement, One-1st floor** ADA Compliant **No**
   - B. Ladies **One-Basement** ADA Compliant **No**
   - C. Unisex **One-Bunkroom** ADA Compliant **No**
   - D. Fixtures
     Total No. of Fixtures
     Lavs __________ Condition _____Type __________ ADA _____
     Urinals __________ Condition _____Type __________ ADA _____
     Water Closets _____ Condition _____Type __________ ADA _____
     Service Sinks _____ Condition _____Type __________
   - E. Water Cooler(s)
     Type ADA **No**
     Mfg. **Elkay** Model____________________

5. **Water Service Piping**
   A. Cold Water Piping Type __________ Insulated **Yes** Type _________
      Hot Water Piping Type __________ Insulated **Yes** Type _________
   B. Isolation Valves Mains _________ @ Fixtures ______________
   C. Isolation Valve Type ____

6. **Domestic Water Heater(s)**
   A. Quantity **One**
   B. Type Gas **X** Oil______ Electric______
   C Capacity **100 gallon**
   D Mfg. & Model No. **Bock**
   E. Relief Valve **Yes** Condition **Good**

General Overall Condition and Evaluation Notes:

Date: **March 17, 2014**

Location: **Lewis Tompkins Hose Co, 13 South Ave, Beacon, NY**

By: **Loren Compson**

FOUNDATION SYSTEM (Circle as appropriate)

Concrete

Basement? **Y**

Seepage? **N**

Interior Drain/ Pump? **N**

Settlement? **N**

Deterioration? **N**

Cracking? **N**

General Condition/Clarifications:____

Recommendations:____

SLAB-ON-GRADE

Joints? **N**

Settlement? **N**

Cracking? **Y** **Apparatus Bay – some cracking;Basement no evidence of cracking in VCT or tile floor**

Deterioration? **N**

FRAMING SYSTEM (Circle and identify level, location, etc.)

Roof **Apparatus Bay**

Joist System (Circle as appropriate)

Steel Beams-Apparatus Bay **Steel Joists**

Corrosion? **N** Warping? **N**

Buckling? **N** Deterioration? **N**

Cracking? **N** Sagging? **N**

Connection Type to Beam System: **Welds**

Clip Angles? **NA**

General Condition/Clarifications: **Apparatus Bay good**

Beam System (Circle as appropriate)

Steel Beams-Apparatus Bay

Corrosion? **N** Warping? **N**

Buckling? **N** Deterioration? **N**

Cracking? **N** Sagging? **N**

Connection Type to Column System: **Bolts**

Clip Angles? **NA**

Slab/Decking (Circle all that apply)

Metal Decking – Apparatus Bay Roof

Corrosion? **N** Warping? **N**

Buckling? **N** Deterioration? **N**

Cracking? **N** Sagging? **N**

General Condition/Clarifications: **Average**

Columns to Construction Below (Circle as appropriate)

Steel Columns – Apparatus Bay

Corrosion? **N**

Warping? **N**

Buckling? **N**

Deterioration? **N**

Cracking? **N**

Drifting? **N**

General Condition/Clarifications: **Average**

Bearing Walls (Circle as appropriate)

General Condition/Clarifications: **Apparatus bay in steel frame, remainder of station not visible**

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Web: www.pra-pc.com Voorheesville, NY 12186 Email: mail@pra-pc.com

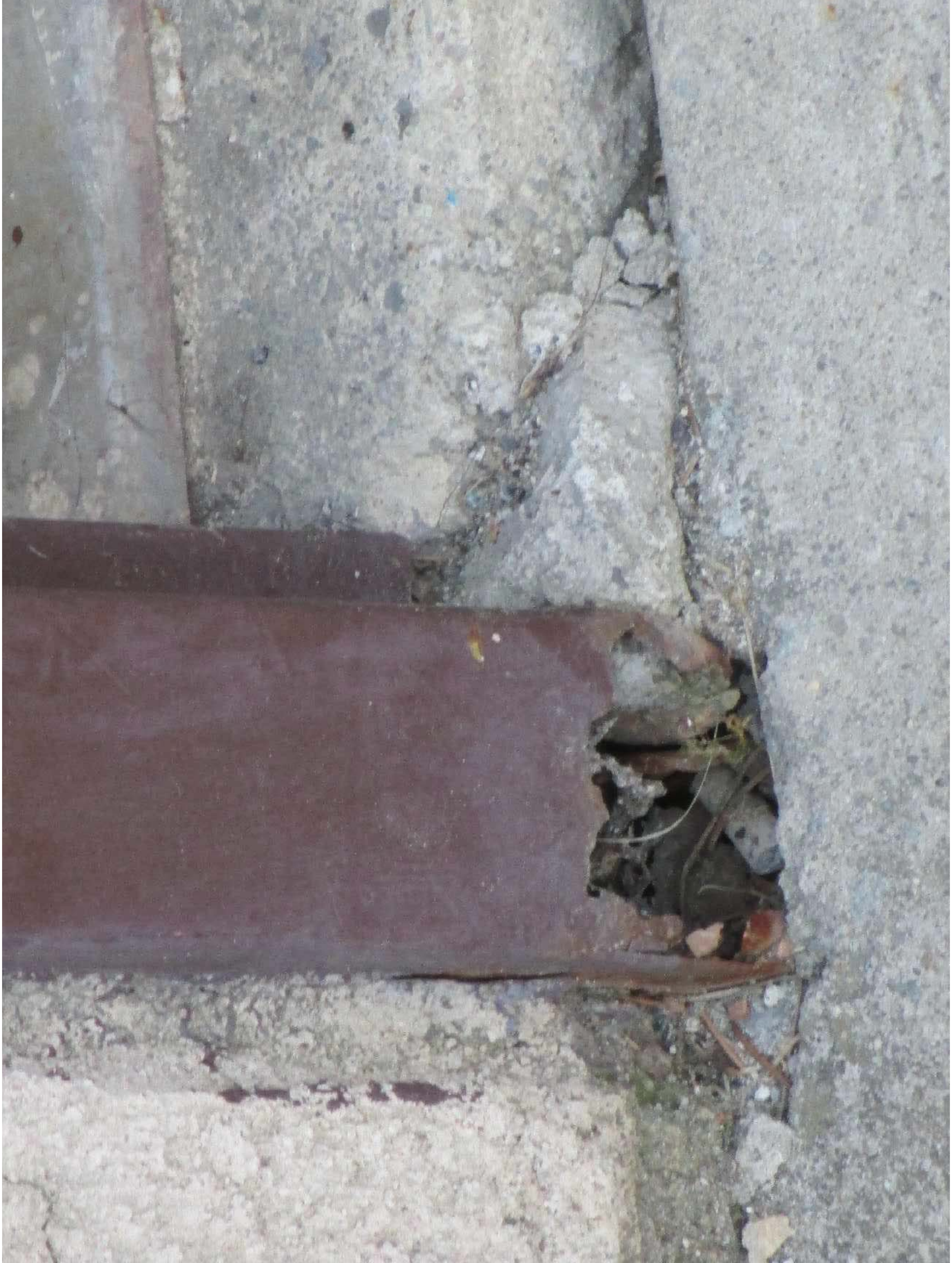

WARD


EXIT
1886
2011
In Memory of
Robert J. Cramer - 1958
Beacon F.D.
L.O.D.D.


VEEDER-ROOT


RESCUE 1
ENG 2
ENG. 3
PKINS HOSE CO. NO.1
E STATION NO.2


ENG.3




ENG. 9
CITY OF
BEACON
11


RESCUE 1
ENG 2
ENG. 3
CITY OF
BEACON
11


33 45
911

CITY OF
BEACON
11
4 5
CITY OF BEACON

Date: March 18, 2014

Location: Beacon Engine Co, 57 East Main St, Beacon, NY

By: Loren Compson

Site Assessment

Legend:
G = Good
A = Average
P = Poor
X = Needs Replacement

Lot Size: ___________

North Adjacent Property: **Main St.**

East Adjacent Property: **Residential**

South Adjacent Property: **Residential – 25'-30' lower in grade**

West Adjacent Property: **Residential** _

Road Frontage: **Basically the width of the building**

General Site Topography: **Steep slope from North to South**

Accessibility: **Poor**

Apparatus Bay Front Aprons:

Concrete: **Y** Bollards: **N**

Conditions: **P**

G/C **Concrete approximately 1' past overhead door. Extensive cracking.**

Front Apron to Road

Concrete: **Y**

Conditions: **A**

G/C **Basically sidewalk & curb cut**

Sidewalks:

Concrete

Condition: **A**

ADA Accessible Entrances #**Zero** Adequate: **N**

Lawns & Landscaping: **None**

Ingress/Egress FFE

Traffic Control: **N**

Returning Apparatus: **Back in from street**

Existing Utilities

Storm Drainage:

Municipal: **Y**

Does all storm go to municipal system: **Y**

Roof Drainage:

Downspouts to splash blocks

Downspouts to underground

Internal drains to underground

Internal drains to exterior splash blocks

Security

Site **Cameras**

Site Recommendations for Renovations/Expansions

Existing site would accommodate a building footprint expansion of **Zero**%

Site has too many strikes against it to support any modernization

Date: **March 18, 2014**

Location: **Beacon Engine Co, 57 East Main St, Beacon, NY**

By: **Loren Compson**

Building Envelope and Structure

Roofs: All roofs are in good condition.

Structural: The station structurally appears to be in good condition for its age.

Exterior Skin: Brick in average condition for its age.

Windows: Wood in poor condition both inside and out.

G/C: Signs of water penetration but may be from before new roofs were installed.

DAVID J. PACHECO, AIA – CA, CT, DE, NJ, NY, NC, RI, VT, TN, TX
DENNIS A. ROSS, AIA – CO, CT, ME, MD, MA, MI, MO, PA, NH, NJ, NY, TN, VA

Date: **March 18, 2014**

Location: **Beacon Engine Co, 57 East Main St, Beacon, NY**

By: ______________

Building Interior Evaluation

Legend:
G = Good
A = Average
P = Poor
X = Needs Replacement

Apparatus Bay

of Truck Bays **One** Size of Doors **10'H_ x _12'W** # that are Drive Thru **Zero**

Adequate side clearance **N**

Adequate overheard clearance **N**

Ceiling Construction: **Sheetrock** **A**

Wall Construction: Other: **Stucco**

Floor Construction: **Concrete** **A**

Floor Drainage: Other **Single Floor Drain** **A**

Floors appear to pitch to drains: **N**

Overhead Doors: Brand:____

Thickness: **1 ¼"** Type: **Sectional overhead**

Gen Condition: **P**

Operator Condition (Visual) : **P**

Controls: **At Door**

Safety Edge: **N**

Manual Operation: **Manual Push-Up**

Accessories: Drench/Eye Wash **N**

Air Reels **Y** Qty **One**

Power Drops **Y** Qty **One**

Hose **(Coiled on wall)** **Y** Qty **One**

Truck Fill **N**

Ceiling Fans **N**

Hose Dryers **Y** Qty **One**

Drinking Fountain **N**

Ice Maker **N**

Vehicle Exhaust:
Vehicle Specific

Type **Nederman**

Condition: **A**

Lighting (General Adequacy): **A**

Night Lighting: **N**

Gear Storage: **Career in a rack in dayroom and volunteer piled on floor in dayroom**

Hose Racks: **Y**

G/C App Bay **Lights come on with alarm**

Apparatus Bay Support

Radio Room: **Y**

View of Apron: **N** View into bays: **N**

Closed Circuit TV: **N**

Proper Lighting: **Y**

Adjacent Bunkroom: **N**

General Adequacy: **A**

DeCon Room: **N**

DeCon Laundry: Y **N**

Residential Washer: **Y**

Residential Dryer: **Y**

Firematic Storage: **Y** Locked: **N**

Condition **P**

G/C **Off corridor, also contains microwave and toaster oven for staff**

Work Rooms/General Storage: **Very limited storage**

Toilet Rooms (Accessible from Apparatus Bays):

Quantity: **Zero**

Living/Office/General Areas

Basement 1st Floor 2nd Floor 3rd Floor

Bunkrooms:

Average # of **one** Man overnighting at facility

Average # of **one** Man overnighting at facility

Male Bunkrooms: QTY **one** with **one** Bunks Attached bath/shwr **Y** N

General Condition of Bunkrooms: **P - cold in winter. Supplemental electric heater running**

Floor Material: **CPT**

Night Lighting: **N**

Access to Apparatus Bay: **Quick**

G/C **Basement – company bar, pool table, small kitchen, unisex bathroom, boiler room, walk-in cooler room**

Bathrooms/Showers/Locker rooms: #1 - **Male**

General Condition: **P**

HDCP Accessible: **N**

Lockers: **N**

Day Lounge/Ready Room:

Size: **25 x 20**

Flooring: **VCT**

Contents: Couches _____ Chairs ______ TV _____

Pool Table ______ Kitchenette ________ Other __________

General Condition: **A - P**

G/C **VCT in very poor condition**

Kitchen/Dining Area: **1st Floor**

Kitchen **None for career staff – appliances scattered around building**

Dining **in Day Lounge and a picnic table on large elevated deck**

Pantry: N

Dishwasher: **None**

Refrigerator: **very small refrigerator (dorm room size)**

Freezer: **None**

Stove: **None**

General Condition: **X**

2nd Floor – Kitchen, meeting room, banquet room, men's and women's bathrooms.

Kitchen/Dining Area:

Kitchen size **14'x16'** **For volunteer staff**

Dining

Kitchen: **Residential**

Pantry: **Y**

Dishwasher: **None**

Refrigerator: **Residential**

Exhaust Hood: **Commercial**

Ansul System: **Y**

Flooring: **QT**

General Condition: **A**

Training Room: **N**

G/C **Although 2nd floor could be used for classroom training.**

3rd Floor – Uniform storage and other storage rooms with VCT flooring in poor condition.

Exercise Room: **N**

Elevator: **N**

Storage Rooms/Janitor Closets, etc.

G/C **Old and run down**

Fallout Shelter Currently in building: **N**

Does the building lend itself to creating fallout shelter space: **N**

Is the building currently used as a public polling place: **N**

Date: **March 18,2014**

Location: **Beacon Engine Co, 57 East Main St, Beacon, NY**

By: **Loren Compson**

HEATING, VENTILATING & AIR CONDITIONING

1. Heating & Air Conditioning
   A. Central Equipment type

      1. AC **Residential window units**

   B. Heating Equipment – Supplement

      A. Type
         Boiler

      B. Boiler MFG & Model **Weil-McLain relatively new**


Standard Diary

Deficiency Re
MEMORANDUM-S
HARD SURFACE DISINFECTING WIPES
QUILL
QUILL
Spartan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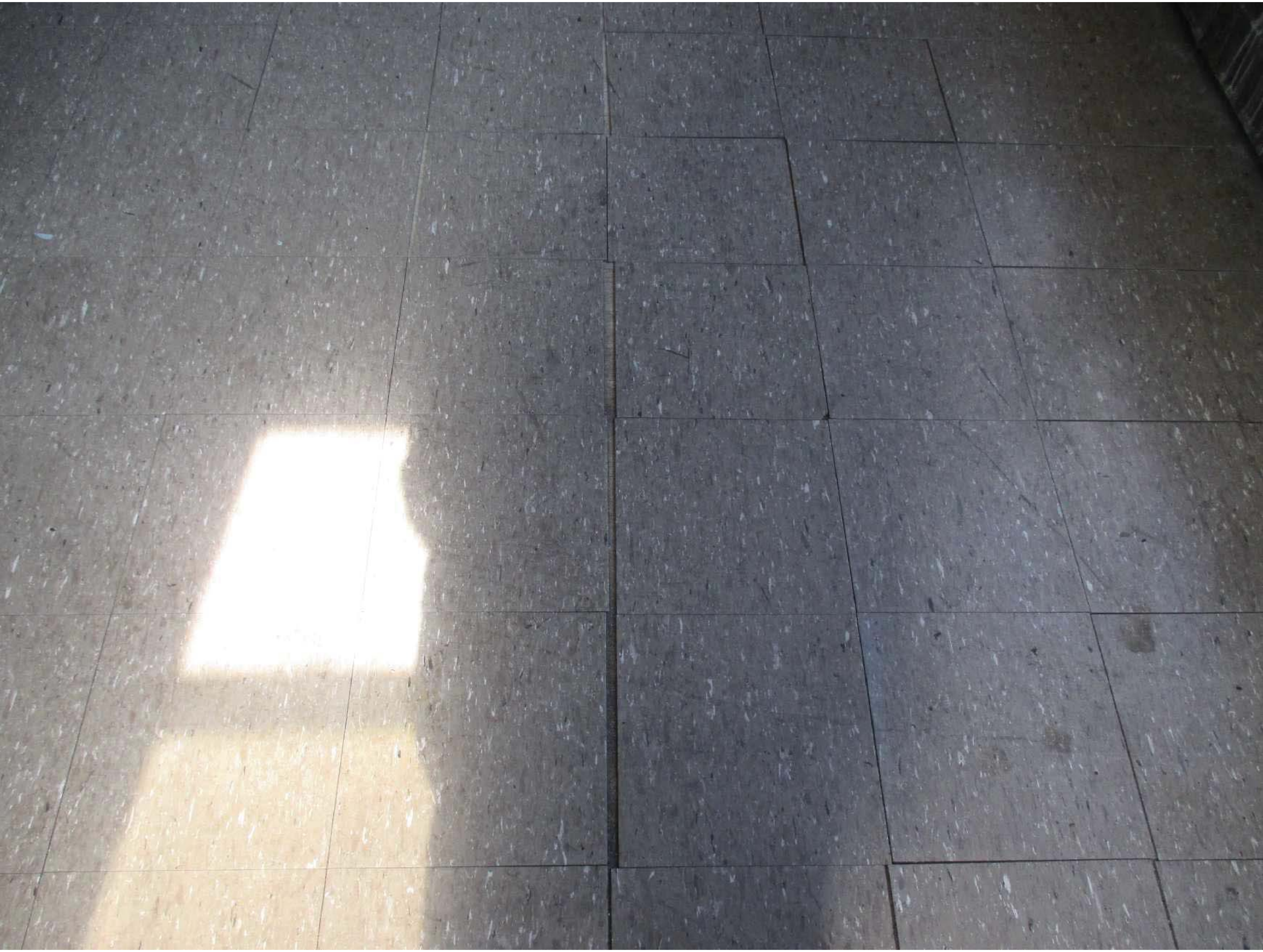
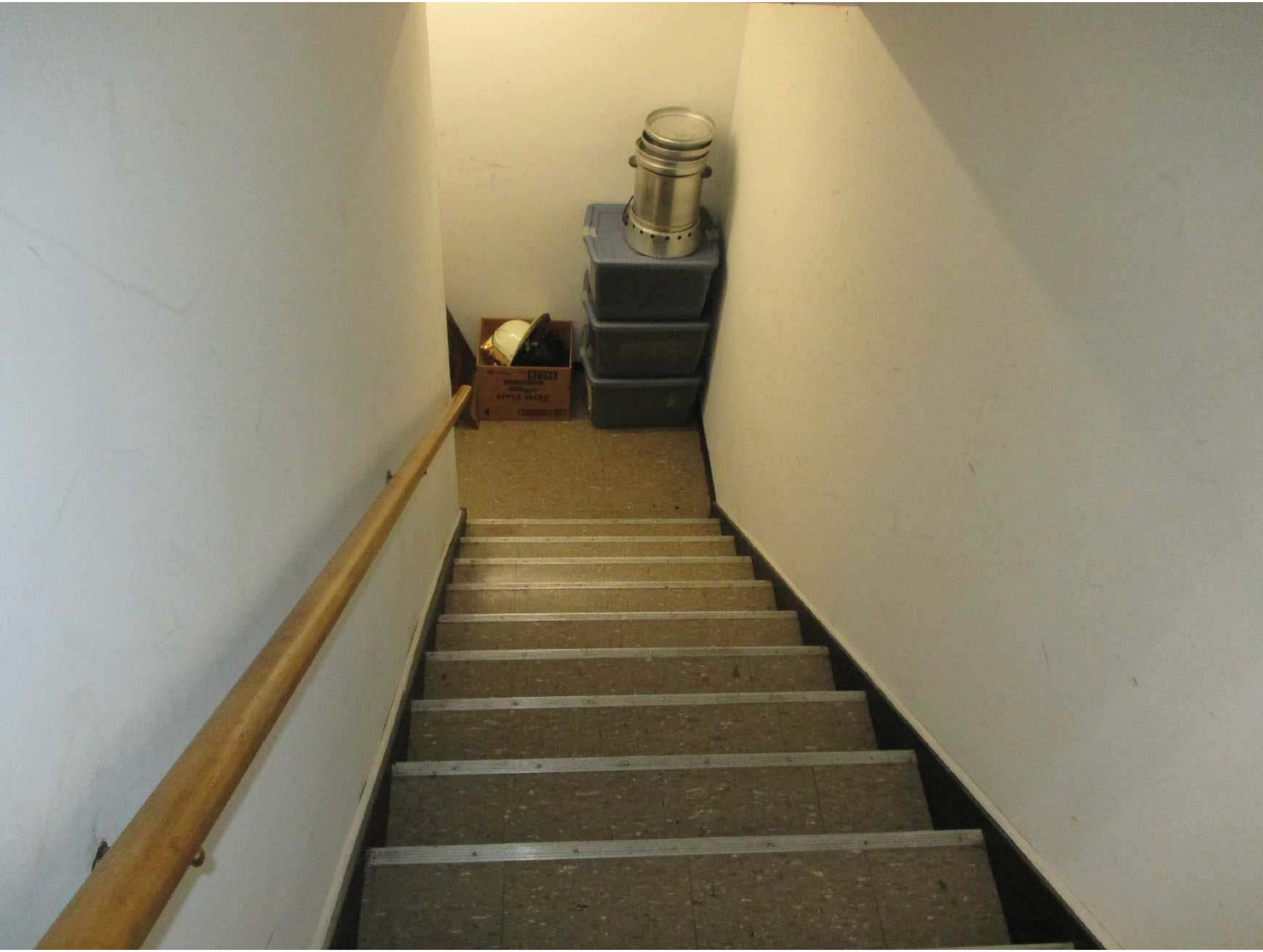
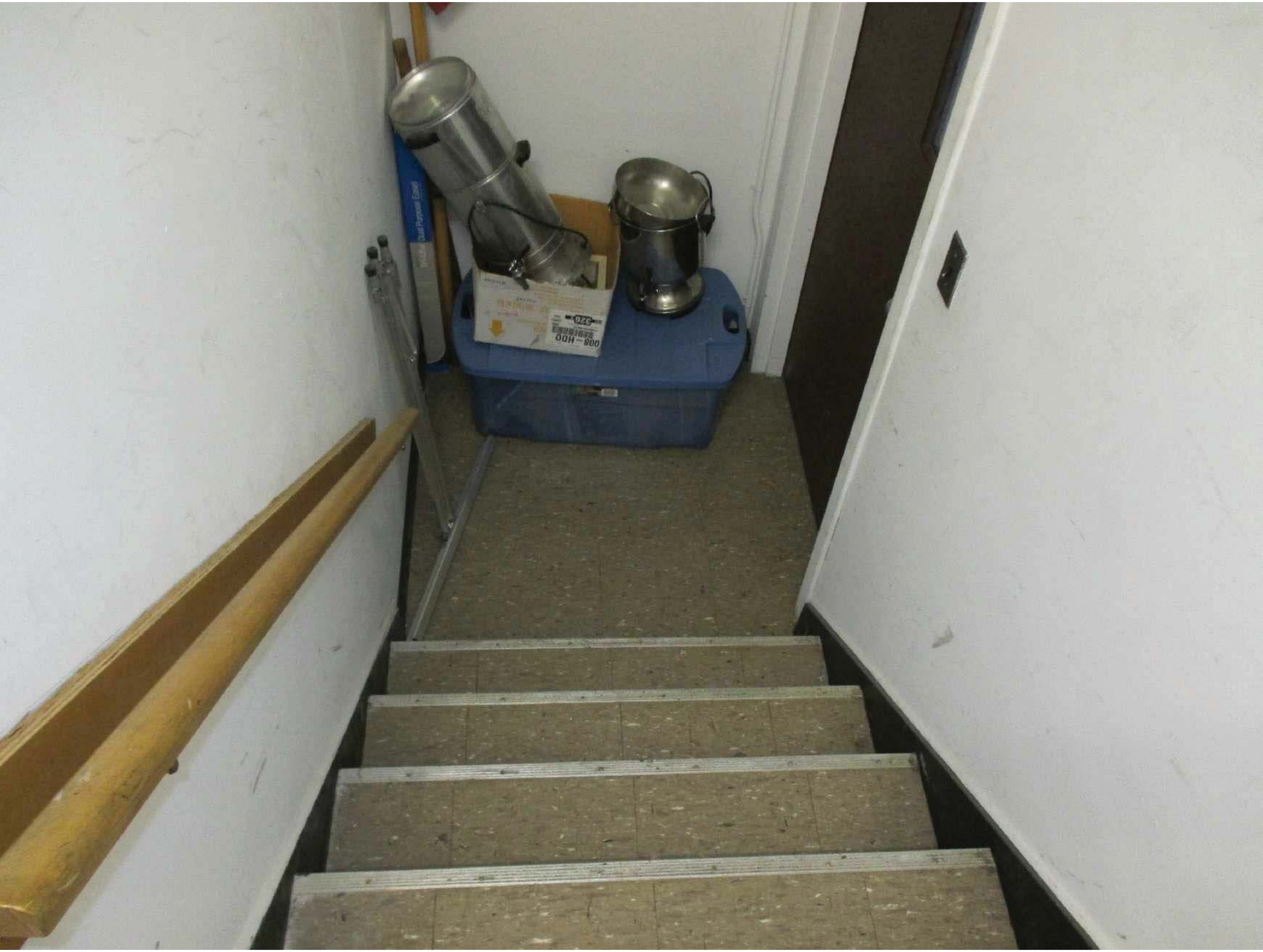





Dual Purpose Easel


BEACON ENGINE
FOUNDED AUG
100 YEARS
EFFICIENCY IN FIR


BEACON
BEACON

Date: **March 18, 2014**

Location: **Mase Hook & Ladder, 425 Main St, Beacon, NY**

By: **Loren Compson**

Site Assessment

Legend:
G = Good
A = Average
P = Poor
X = Needs Replacement

North Adjacent Property: **Main Street**

East Adjacent Property: **Office building (Beacon building)**

South Adjacent Property: **Street**

General Site Topography: **Slopes from North to South**

Apparatus Bay Rear Aprons:

Concrete **N** Bollards: **N**

Conditions: **A**

G/C **Asphalt from overhead door to street**

Rear Apron to Road

Concrete: **N** Bollards: **N**

Conditions: **A**

G/C **Car parking on East and West sides of rear apron**

Light Duty Pavement Areas: **Asphalt**

Condition: **A**

Sidewalks: **Concrete**

Condition: **A**

ADA Accessible Entrances # **Zero** Adequate: Y **N**

Lawns & Landscaping:

G/C **Very limited**

Ingress/Egress FFE & EMS

Traffic Control: **N**

Returning Apparatus: **Back in from street**

Existing Utilities

Storm Drainage:

Municipal: **Y**

Does all storm go to municipal system: **Y**

Security

Site **Cameras**

Site deficiencies & budgetary opinions of construction costs

To house one piece of apparatus this station is under-utilized. It is too old to consider modernizing. Station has no elevator or fire protection system. Station is not ADA accessible.

Date: **March 18, 2014**

Location: **Mase Hook & Ladder, 425 Main St., Beacon, NY**

By: **Loren Compson**

Building Envelope and Structure

Roofs: All roofs are in good condition.

Structural: The station structurally appears to be in good condition for its age.

Exterior Skin: Brick in average condition for its age.

Windows: Wood single pane poor thermal.

Building Insulation: Poor.

Date: **March 18, 2014**

Location: **Mase Hook & Ladder, 425 Main St, Beacon, NY**

By: **Loren Compson**

Building Interior Evaluation

Legend:
G = Good
A = Average
P = Poor
X = Needs Replacement

Apparatus Bay

of Truck Bays **One** Size of Doors **12’-2”W x 12’-0”H** # that are Drive Thru **Zero**

Adequate side clearance **N**

Adequate overheard clearance **N – bay is 50’, ladder is 48’**

Ceiling Construction: **Sheetrock – assumed over wood floor joists** **A**

Wall Construction: **Brick** **A – for its age**

Floor Construction: **Concrete** **A – redone in 1985 to accommodate ladder truck**

Floor Drainage: **Trench Drains** **G**

Floors appear to pitch to drains: **Y**

Overhead Doors: Brand: **Unknown**

Type: **Coiling overhead door**

Gen Condition: **P**

Operator Condition (Visual): **A**

Controls: **At Door**

Safety Edge: **N**

G/C **<u>Door size: 12’-2”w x 12’H, Truck is 10’-8”</u>**

Accessories:

Drench/Eye Wash **N**

Air Reels **N**

Power Drops (Reel) **Y** Qty **<u>One</u>**

Hose (No reel) **Y** Qty **<u>One</u>**

Truck Fill **N**

Ceiling Fans **N**

Hose Dryers **N**

Drinking Fountain **Y** Qty **<u>One</u>**

Ice Maker **N**

Vehicle Exhaust: **Vehicle Specific**

Lighting (General Adequacy): **A**

Gear Storage: **Y**

Hose Racks: **N**

Apparatus Bay Support

Radio Room: **Y**

View of Apron: **N** View into bays: **N**

Closed Circuit TV: **N**

Proper Lighting: **Y**

Adjacent Bunkroom: **N**

DeCon Room: N

DeCon Laundry: N

Commercial washer/extractor: **N**

Commercial Dryer: **N**

Residential Washer: **Y**

Residential Dryer: **Y**

Gear Dryers: **N**

G/C **Washer/Dryer located in basement**

Firematic Storage: **Y** Locked: **Y**

Condition **A**

G/C **Combination general storage and firematic in room off first floor corridor. Also, wood cabinets in bay**

Toilet Rooms (Accessible from Apparatus Bays): **Across corridor**

Quantity: **One** HDCP: **N**

Shower: **N – must go to third floor for shower**

General Condition: **A – for age**

General Traffic Flow in Apparatus Bay: **Tight**

Living/Office/General Areas

Basement **1st Floor** 2nd Floor 3rd Floor

Bunkrooms:

Average # of **One** Man overnighting at facility

Average # of **One** Man dayshift at facility

Male Bunkrooms: QTY **One** with **One** Bunks Attached bath/shwr **N**

Female Bunkrooms: QTY **Zero**

General Condition of Bunkrooms: A

Floor Material: **CPT** A

Access to Apparatus Bay: **Quick**

Bathrooms/Showers/Locker rooms: #1

Male

Quantity: **One** HDCP: **N**

Shower: **N – must go to third floor for shower**

General Condition: **A – for age**

Lockers: **N**

Bathrooms: **2nd Floor**

One Male

One- locked Female

General Condition: **A**

HDCP Accessible: **N**

Lockers: **N**

2nd Floor – not used by career fire fighters

Day Lounge/Ready Room:

Flooring: **VCT**

Contents: **Couches** **Chairs** **TV**

Pool Table

General Condition: **G** A P X

G/C **Folding partition between day room and pool table/kitchen area**

Kitchenette/Bar Area:

Kitchen: **Residential**

Pantry: **N**

Dishwasher: **N**

Refrigerator: **Y**

Freezer: **N**

Stove: **N**

Ice Maker: **Y**

Flooring: **VCT**

General Condition: **G**

Third Floor

Exercise Room: **Y**

G/C **Portion of third floor**

Meeting Room: **Y**

G/C **Could be used for training**

Elevator: **N**

Fallout Shelter Currently in building: **N**

Does the building lend itself to creating fallout shelter space: **N**

Is the building currently used as a public polling place: **N**

Date: **3/18/14**

Location: **Mase Hook & Ladder, 425 Main St, Beacon, NY**

Life Safety/Code/ADA Assessment/ Hazardous Materials/Asbestos

Site ADA

Entries:

North: **N** Reasons for Non-Compliance **Step up to door (front of building)**

South: **N** Reasons for Non-Compliance **Slope of asphalt parking lot**

Parking:

Number of HDCP Spaces: **Two**

Signage: **Y**

Building ADA

- There are several step ups and step downs on the first floor.
- Doors and hardware do not meet ADA requirements.
- Bathrooms are not accessible
- There is inadequate clearance in front and behind ladder truck.

Date: **March 18, 2014**

Location: **Mase Hook & Ladder, 425 Main St, Beacon, NY**

By: **Loren Compson**

PLUMBING CHECK LIST

1. Water Service
   A. Water Type **City**
   B. Service Entrance Size **¾”**
   C. RPZ (if installed) **None**
   D. Water Meter Size **None**

2. Sanitary System
   A. **City**

3. Storm Water
   A. **Roof drains**
   B. Size & Condition of Roof Leaders **Average**

4. Water Cooler(s) **in bay**
   ADA **N**

5. Water Service Piping
   A. Cold Water Piping Type **Copper** Insulated **Y**
   Hot Water Piping Type **Copper** Insulated **Y**

6. Domestic Water Heater(s)
   A. Quantity **One**
   B. Type **Electric**
   C Capacity **50 gal**
   D Mfg. & Model No. **Bradford White (New)**
   E. Relief Valve **Y** Condition **Good**

Date: **March 18, 2014**

Location: **Mase Hook & Ladder, 425 Main St, Beacon, NY**

By: **Loren Compson**

Structural Survey

MAIN STRUCTURAL SYSTEM (circle as appropriate)

Masonry Load Bearing

Wood Floor Beams & Floor

Corrosion? **NA**

Warping? **NA**

Buckling? **N**

Deterioration? **N**

Cracking? **N**

Drifting? **N**

General Condition/Clarifications: **Considering the age of the building – it appears to be in good overall structural condition**

EXTERIOR WALL SYSTEM (circle as appropriate)

Masonry Block w/Veneer

Brick with Brick Veneer

Foundation System combination of CMU and Brick

Settlement? **N**

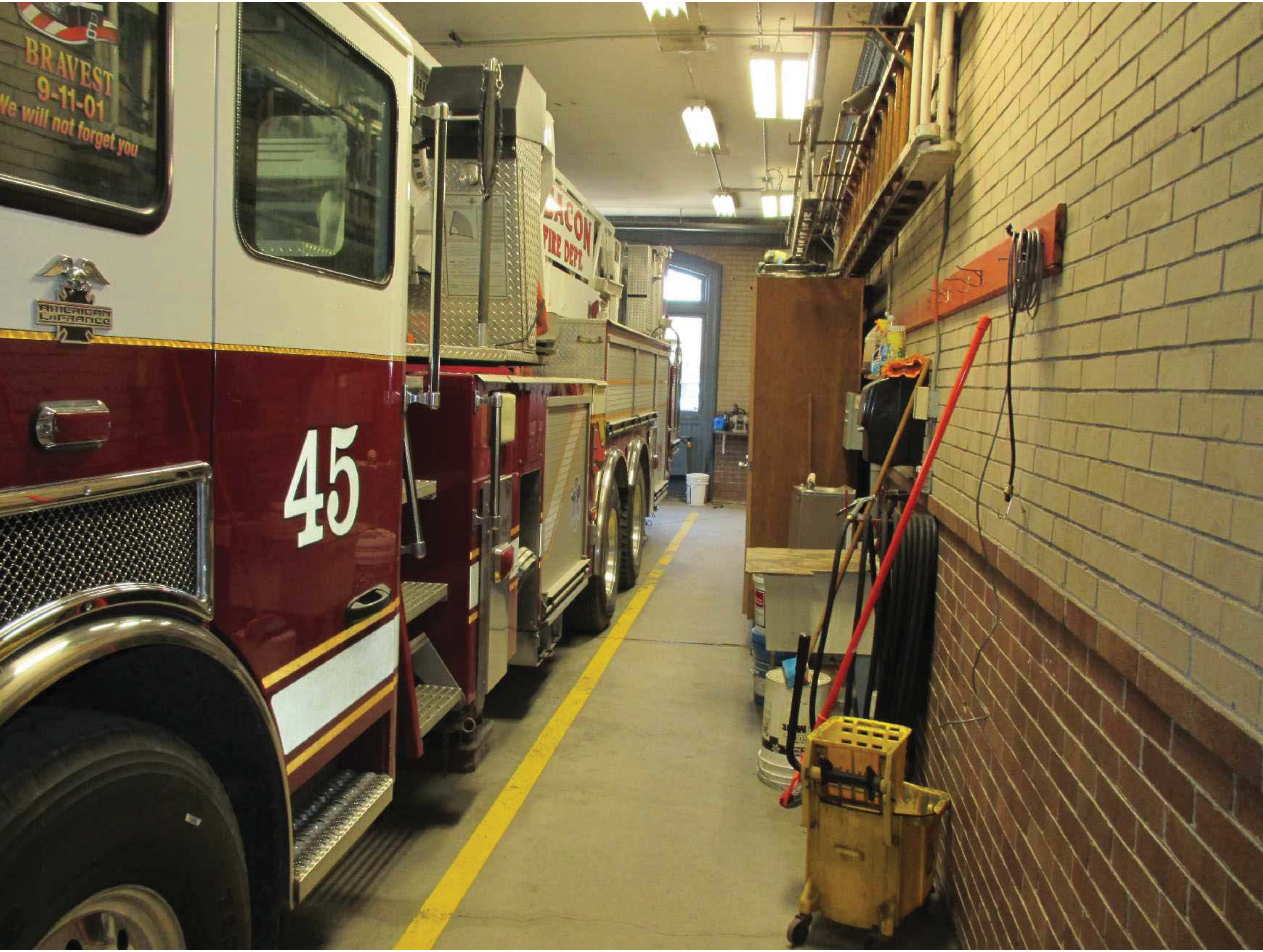
Deterioration? **N**

Cracking? **N**

General Condition/Clarifications: **Appears to be in good structural condition**

OTHER ITEMS:

Wood cornice/soffit has some deterioration and is in need of scraping and painting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We will not forget you
AMERICAN LaFRANCE
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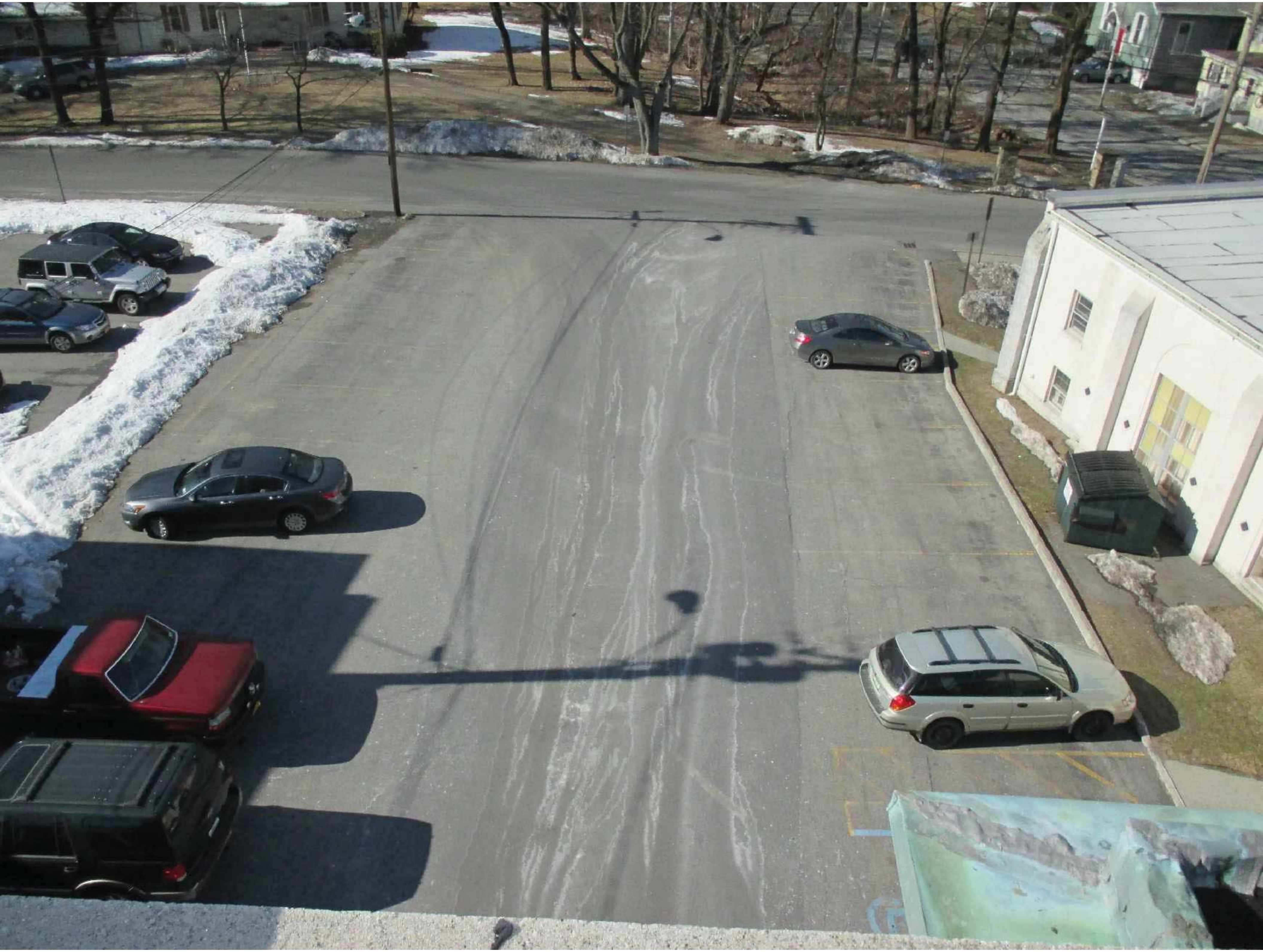

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45


1911
WILLARD H. MASE
HOOK & LADDER CO
No 1


1911
WILLARD H. MASE
HOOK & LADDER CO
No 1


BEACON
FIRE DEPT.

APPENDIX G: PACHECO ROSS ARCHITECTS – PROGRAMMING AND SPACE USE

Programming and Space Use

- **Condensed Consolidated Program**
- **Space Use Analysis**
- **Station Size Adjustments Based on Configuration**

CITY OF BEACON FIRE DEPARTMENT
CONDENSED CONSOLIDATED PROGRAM DOCUMENT
April 2014

In March 2014, Pacheco Ross Architects, P.C. (PRA) visited the three currently used fire station facilities in the City of Beacon and met individually with relevant stakeholders to gain insight on the specific composition, operations, limitations and needs related to a single shared fire station facility. The following program incorporates these views, draws on PRA's considerable firematic experience and integrates the best information of previous studies into a condensed consolidated document. The program outlines the operationally-based requirements of a combined facility specifically as they relate to the impact on size and cost. Information that is substantially duplicative of previous studies is not included. Codification of what is actually needed and **professionally recommended** based on extensive experience with similar facilities takes precedence over self-interest, wish-list, speculative, or subjective items. The program recommendations represent those believed to be in the best long-term interest of the citizens and firefighters of the City of Beacon.

Operations/Response

1 Apparatus Bays

- 1.1 Number of Front Line Vehicles:
  - 1.1.1 Engine (1)
  - 1.1.2 Engine (2)
  - 1.1.3 Ladder Truck
  - 1.1.4 Rescue
- 1.2 Other Vehicles:
  - 1.2.1 Reserve Engine
  - 1.2.2 Utility with Trailer
- 1.3 Future Possible Needs:
  - 1.3.1 Space for bay addition (not a current need)
- 1.4 Number of Vehicles: **6**
- 1.5 Total Number of Bays: **4**
  - 1.5.1 # of Double deep: **3**
  - 1.5.2 # of Single deep: **1**
- 1.6 Square Footage: **Should not need to exceed 6,000SF**

1.7 Mezzanine: **Yes**

1.7.1 Use: **Firematic and other storage. Training elements.**

1.7.2 Size: **Max. 960 SF**

1.8 Gear lockers: **12 (Career)** Future: **up to 40 total (28 part of bays)**

1.8.1 Location: **12 in separate room, remainder part of bay**

1.8.2 Size: **120 SF**

1.9 Support recesses off bays:

1.9.1 **Hose Storage Recess** Size: **58 SF**

1.9.2 **Hose Dryer Recess** Size: **24 SF**

1.9.3 **Compressor Recess** Size: **24 SF**

Firematic Support
(Adjacent to Apparatus Bays)

2 Integrated Training Tower

2.1 Use: **Stair, ladder, bailout, hose advancement, rope, rappelling, confined space and other training evolutions to be used in-house to minimize off-site and travel time and allow quicker response even if training.**

2.2 Size: **16'x16' first floor footprint. Two smaller upper levels. One at mezzanine and another at catwalk above.**

3 Firematic Storage Room

3.1 Use: **Locked and excess firematic equipment storage**

3.2 Size: **10'x12'**

4 EMS Storage

4.1 Use: **EMS supplies (truck restocking & bulk), spare backboards**

4.2 Size: **10'x12'**

5 Tool Room

5.1 Use: **Small room for tool storage and workbench. Light maintenance for vehicles and building. Apparatus primary maintenance is NOT performed in-house and this room does not need to be particularly large. Accommodate bench with vice, grinder, tools and tool chests.**

5.2 Size: **10'x12'**

6 DeCon/ Laundry

6.1 Clothes Washer: **Yes** Dryer: **Yes**

6.2 Gear Extractor: **Yes**

6.3 Low Temperature Gear Dryer: **Yes**

6.4 Red Bag: **Yes. Can be recess off bay.**

6.5 Holding tank: **No**

6.6 Sink(s): **Yes** Foot Pedal: **If Possible** Counters: **Yes**

6.7 Shower: **If Possible**

6.8 Backboard cleaning: **Rarely**

6.9 Size: **180 SF**

7 Air Room (SCBA)

7.1 **This need was indicated as a modest-sized room with workbench, limited bottle storage, and fill station. Should be large enough to accommodate current generation of combined compressor/fill stations (such as Bauer Unicus III). For now compressor can be in bays. Current unit is Eagle Air. Excessive bottle storage not necessary.**

7.2 Size: **12'x14'**

8 Oxygen Storage

8.1 Size: **10'x12' or 120 SF**

9 Watch Room

9.1 Use: **Communications and radio. CAD. General operations & SOP manuals, mapping, building paging, Weather Station base, CCTV and overall bay door operators. Rechargeable items (radios, flashlights, plectrons). Traffic control if applicable. Adjacent or in close proximity to Duty Crew Office.**

9.2 View control: **Yes**

9.3 Seating requirements: **2-3** File cabinets: **Yes**

9.4 Door operation: **Yes** Traffic control: **If Applicable** Outside Lighting: **Yes**
Bay lighting: **Yes** Internal paging system: **Yes**

9.5 Wall mounted items: **Yes**

9.6 Rechargeable items: **Yes**

9.7 Lockable storage: **Yes**

9.8 Size: **10'x12'**

10 Unisex ADA Rest Room for Apparatus Bay

10.1 Size: **65 SF**

11 Quartermaster

11.1 Use: **Official uniform and gear storage prior to distribution**

11.2 Size: **8'x12'**

Firefighter Spaces

12 Day Room/ Dining Room

12.1 Describe: **Combined Day Room and Dining Area close to apparatus bays and response pathways. Can include kitchenette for open-plan great-room style space. Shareable space for paid and volunteer firefighters for efficiency and camaraderie.**

12.1.1 Number of Seats/Type: **6-8**

13 Kitchenette

13.1 Describe: **Small Kitchen with full sized refrigerator, counter, residential style stove, microwave, coffee maker and double bowl sink. Ansul hood necessary. Can be part of Day/Dining if practical.**

13.2 Size: **144 SF**

14 Pantry

14.1 Describe: **3 Lockable pantry cabinets near or part of kitchenette**

14.2 Size: **20 SF**

15 Duty Crew Operations Office

15.1 Use: **Office and workstation space for on-duty personnel. NFIRS, PCR and other report preparation. Operations response organization and closeout. Assignments and apparatus status (in/out of service) boards. SOP, training and operations manuals. Lockable file cabinets. Tabletop work area. Printer.**

15.2 Workstations: **2-3**

15.3 Size: **12'x14'**

16 Bunk Rooms

16.1 Describe: **Four double bunks at NFPA minimum 60SF per bed. 4 doubles allows for any combination of Male and Female personnel for up to two simultaneous crews using common crew staffing levels. At current City of Beacon staffing, this arrangement allows for adequate sleeping space for volunteers in standby situations.**

16.2 Size: **120 SF each as per NFPA 1581**

17 Bathroom/ Changing Rooms with Showers

17.1 Describe: **Two unisex bathrooms with showers for bunk room area. Acts as private changing room to eliminate need for separate male and female locker rooms. Near lockers and bunk room.**

17.2 Size: **75 SF each**

18 Locker Area (Uniform)

18.1 Describe: **(14) - 18"x18" full height lockers & reqd. ADA bench for paid firefighters.**

18.2 Size: **9'-4" x 12'**

Volunteer Firefighters

19 Volunteer Room

19.1 Describe: **Space primarily for volunteer use, activities and recreation. Finished vanilla box by city. This includes painted gypsum wall board, rubber base, lay-in acoustical ceilings, floor covering, doors and hardware, fire-protection, basic lighting, electrical and plumbing. Furnishings, equipment, decorating and final finish are by volunteers.**

19.2 Size: **1,000 SF**

20 Beacon Engine Company Office

20.1 Describe: **Dedicated space for individual fire company to preserve their unique identity. Can be used for memorabilia, work space or other use as determined by each individual fire company.**

20.2 Size: **14'x15' (210 SF)**

21 Mase Hook & Ladder Company Office

21.1 Describe: **Dedicated space for individual fire company to preserve their unique identity. Can be used for memorabilia, work space or other use as determined by each individual fire company.**

21.2 Size: **14'x15' (210 SF)**

22 Tompkins Hose Company Office

22.1 Describe: **Dedicated space for individual fire company to preserve their unique identity. Can be used for memorabilia, work space or other use as determined by each individual fire company.**

22.2 Size: **14'x15' (210 SF)**

Shared Spaces

23 Exercise Room

23.1 Describe: **Space for *Health and Fitness Program* per NFPA 1500 and NFPA 1583. On-site exercise space and equipment for all paid and volunteer firefighters.**

23.2 Cardio: **Yes**

23.3 Free Weights: **Yes**

23.4 Universal/Weight Machine(s): **Yes**

23.5 Size: **550 SF (Approx. 19' x 29')**

23.6 Adjacencies/comments: **Near bathroom/locker/showers and adjacent response path if possible.**

24 Bathroom/Changing/Locker/Shower Room

24.1 Describe: **Two unisex bathrooms with shower and several lockers. Near exercise room for use as changing space. Also use as general area bathrooms.**

24.2 Size: **120 SF each**

25 Meeting Room

25.1 Describe: **Large meeting room for company meetings, fundraising events, municipal uses, NYS training events and possible community uses. Near public entrance and parking. Room divider for flexibility if allowed by budget.**

25.2 Seating: **100+**

25.3 Size: **1,600 SF (Approx. 32'x50')**

26 Meeting Room Storage

26.1 Describe: **Table and chair storage for meeting room. Direct access to meeting room.**

26.2 Size: **10' x 18'**

27 Kitchen

27.1 Describe: **Commercial style stainless steel kitchen for meeting room functions. Commercial stove, Ansul system, 3 sinks per health code, dishwasher, refrigerator, freezer, dish storage and center island.**

27.2 Size: **16' x 20'**

28 Pantry

28.1 Describe: **Locked pantry for dry goods, equipment and general kitchen storage.**

28.2 Size: **8' x 10'**

28.3 Comments: **Off Kitchen**

29 Bathrooms

29.1 Describe: **Primary bathrooms on public side of security for all uses. Male and female with fixtures as required by code.**

29.2 Size: **Total for Male and Female Combined = 18'x21'-6"**

Administration

30 Conference/Training Room

30.1 Seating: **Space that can be used as training room, conference space & small EOC.**

30.2 Seating: **Min 16 for training classroom arrangement. Min. 12 for conference**

30.3 Size: **17'x22'**

31 Conference Storage Room

31.1 Describe: **8'x10' room for A/V and table chair storage**

32 Chief's Office

32.1 Describe: **Standard Chief office with small personnel meeting/review area**

32.2 Size: **12'x14'**

32.3 Adjacencies/comments: **Near Public entrance if possible**

33 Chief's Bunk

33.1 Describe: **Bed, nightstand and wardrobe for standby and overnight events.**

33.2 Size: **60 SF per NFPA 1581**

33.3 Adjacencies/comments: **Part of Chief's Office**

34 Assistant Chiefs

34.1 Describe: **Shared Office near Chief**

34.2 Size: **168 SF**

35 Shared Office

35.1 Describe: **Office space available to be shared by all**

35.2 Furnishings: **3-4 workstations and individual lockable file drawers for specific uses (i.e. fire prevention, PIO, training officers, financial, etc.)**

35.3 Size: **12' x 14'**

36 Fire Prevention Storage

36.1 Describe: **Fire prevention supplies storage area.**

36.2 Size: **8'x10'**

36.3 Adjacencies/comments: **Flexible location.**

37 Work Space

37.1 Describe: **Shared administrative area near offices with countertop and cabinets, printer/copier, fax, paper-cutter, hole-punch, stapler, binding machine, supplies etc. Can be part of office circulation area.**

37.2 Size: **72 SF**

38 Record Storage

38.1 Describe: **Fire rated storage room for important records. Near offices.**

38.2 Size: **8'x12' or 10'x10'**

39 Network/IT

39.1 Size: **8'x10'**

39.2 Adjacencies/comments: **Central location to minimize data run lengths.**

Miscellaneous

40 Public Entry

40.1 Describe: **Public lobby with security separation from remainder of building. Near Meeting Room and Shared Bathrooms**

40.2 Size: **200 SF**

41 Egress Stairs

41.1 Describe: **2 sets of stairs for egress from second floor.**

41.2 Size: **Approximately 180 SF (9'x20') each per floor.**

42 Elevator

42.1 Size: **72 SF per floor**

42.2 Adjacencies/comments: **Must be on an accessible route**

43 Elevator Control Room

43.1 Describe: **machineroom-less traction elevator requires only small control room.**

43.2 Size: **2'-6" x 6'-0"**

44 Mechanical/Electrical Room

44.1 Describe: **Boilers, DHW, pumps, control systems, expansion tank, Main Disconnect, Automatic Transfer Switch (ATS), Main Distribution Panel (MDP), CT Cabinet, power panels, timeclocks, Demarc, etc.**

44.2 Size: **300 SF**

45 Janitor

45.1 Describe: **1-2 janitor closets**

45.2 Size: **5'x7' first floor & 5'x6' second floor**

46 Housekeeping

46.1 Describe: **1-2 closets for housekeeping supplies**

46.2 Size: **6'x8' first floor & 5'x8' second floor**

47 Uniform Storage

47.1 Describe: **Dress Uniform Storage**

47.2 Size: **160 SF**

Space Use Analysis

City of Beacon Fire Department

Combined Facility (3-Companies) April 2014 - Revised August 2014

Program Item #	Description	Area 1st Floor	Area 2nd Floor	Area All Floors
	Apparatus Bays			
1	4 - Double-Deep - 75' x 80'	6,000		6,000
	Subtotal - Apparatus Bays	**6,000**	**0**	**6,000**
	Firematic Support			
1.7	Mezzanine		960	960
1.8	Turnout Lockers 12 (rest are part of bays)	120		120
1.9.1	Hose Storage Recess (2-3 racks)	58		58
1.9.2	Hose Dryer Recess	24		24
1.9.3	Compressor Recess	24		24
2	Integrated Training Tower	256	280	536
3	Firematic Storage Room	120		120
4	EMS Storage	120		120
5	Tool Room	120		120
6	DeCon/Laundry	180		180
7	Air Room - SCBA	168		168
8	Oxygen Storage	80		80
9	Watch Room	120		120
10	Unisex ADA Rest Room for Bays	65		65
11	Quartermaster	100		100
	Subtotal - Firematic Support	**1,555**	**1,240**	**2,795**
	Firefighters			
12	Day Room/ Dining	450		450
13	Kitchenette	144		144
14	3 Lockable Pantry cabinets	20		20
15	Duty Crew Operations Office	168		168
16	4-Double Bunks at NFPA 60SF Minimum	480		480
17	2 Bathroom/Changing Rooms w/ shower (75SF ea.)	150		150
18	Locker Area	152		152
	Subtotal - Firefighters	**1,564**	**0**	**1,564**
	Volunteer Firefighters			
19	Volunteer Room	1000		1,000
20	Beacon Engine Company Office		210	210
21	Mase Company Office		210	210
22	Tompkins Company Office		210	210
	Subtotal - Bunking	**1,000**	**630**	**1,630**
	Shared Spaces			
23	Exercise Room	550		550
24	2 Bathrooms/Changing/Locker/Shower + bench (120SF ea.)	240		240
25	Meeting Room		1,600	1,600
26	Meeting Storage		180	180
27	Kitchen		320	320
28	Pantry		80	80
29	Bathrooms (Shared all functions)		387	387
	Subtotal - Bunking	**790**	**2,567**	**3,357**
	Administration			
30	Conference/Training Room		374	374
31	Conference Storage		80	80
32	Chief's Office		168	168
33	Chief's Bunk (off office) at NFPA 60SF Minimum		60	60
34	Assistant Chiefs (Shared)		168	168
35	Shared Office		168	168
36	Fire Prevention Storage		80	80
37	Work Space		72	72
38	Record Storage		100	100
39	Network/IT		80	80
	Subtotal - Administration	**0**	**1,350**	**1,350**
	Public/Mechanical/Service Spaces			
40	Public Entry	200		200
41	2 Egress Stairs	360	360	720
42	Elevator	72	72	144
43	Elevator Control Room (machineroom-less elevator)	15		15
44	Mechanical/Electrical Room	300		300
45	Janitor	35	30	65
46	Housekeeping	48	40	88
47	Uniform Storage	160		160
	Subtotal - Public/Mechanical Spaces	**1,190**	**502**	**1,692**
	Miscellaneous			
	12% Circulation (Does not apply to bays)	732	755	1,487
	11% Walls	1,411	775	2,186
	2% Allowance	285	156	441
	Subtotal - Miscellaneous	**2,428**	**1,686**	**4,114**
	Totals>>	**14,527**	**7,975**	**22,502**

City of Beacon Fire Department

Station Size Adjustments Based on Configuration

Fire Station Configuration	Size (Square Feet)	Comments
Single Story Bays with Two Story Admin/Living	**22,500**	Basis of Program & Space Use
Single Story Station	**21,200**	Savings for elimination of stairs, elevator, duplicate circulation and rooms such as janitor's closets.
Multi Story Addition to Existing Facility (Tompkins Hose)	**24,300**	Penalty for need to use and work around existing spaces, structure and site limitations. i.e. duplicate skip-stop elevator lobbies, split bay configuration, egress pathway extensions, etc. 8% Efficiency Penalty.

APPENDIX H: PACHECO ROSS ARCHITECTS – CONCEPTUAL DESIGN

Conceptual Design

- **Existing Site:**
  Verplanck Ave. & Cannon Practice Field
- **Conceptual Site Plan 1:**
  Verplanck Ave. & Cannon Practice Field

- **Existing Site: Elks Club**
- **Conceptual Site Plan 2: Elks Club**

- **Existing Site: Lewis Tompkins**
- **Conceptual Site Plan 3: Lewis Tompkins**

- **Existing Site: Mase Hook & Ladder**
- **Conceptual Site Plan 4: Mase Hook & Ladder**

PACHECO ROSS ARCHITECTS, P.C.
•EMERGENCY RESPONSE FACILITIES•

CITY OF BEACON FIRE DEPARTMENT

EXISTING SITE

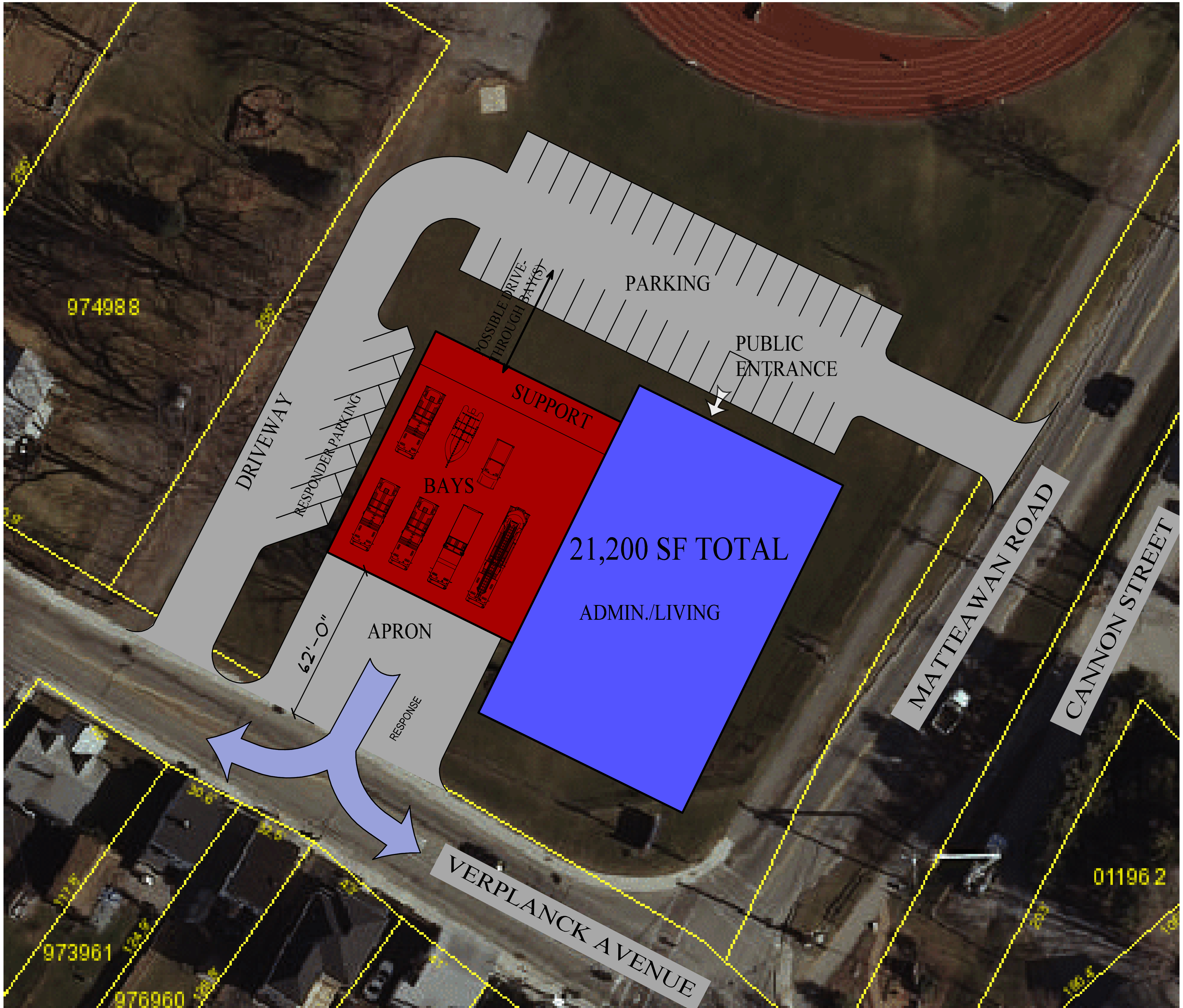
VERPLANCK AVE.
CANNON PRACTICE
FIELD SITE

N

0 10 20 40 FEET

SITE 1

2014



PACHECO ROSS ARCHITECTS, P.C.
•EMERGENCY RESPONSE FACILITIES•

CITY OF BEACON FIRE DEPARTMENT

CONCEPTUAL SITE LAYOUT

NEW 1-STORY FACILITY

VERPLANCK AVE.
CANNON PRACTICE FIELD SITE

N

0 10 20 40 FEET

SITE 1

2014

PACHECO ROSS ARCHITECTS, P.C.
•EMERGENCY RESPONSE FACILITIES•

CITY OF BEACON
FIRE DEPARTMENT

EXISTING
SITE

ELKS CLUB SITE

WOLCOTT AVENUE
TIORONDA AVENUE

N

0 10 20 40 FEET

SITE 2

2014

PACHECO ROSS ARCHITECTS, P.C.
•EMERGENCY RESPONSE FACILITIES•

CITY OF BEACON
FIRE DEPARTMENT

CONCEPTUAL
SITE LAYOUT

NEW 1-STORY
FACILITY

ELKS CLUB SITE

WOLCOTT AVENUE
TIORONDA AVENUE

N

0 10 20 40 FEET

SITE 2

2014

PACHECO ROSS ARCHITECTS, P.C.
•EMERGENCY RESPONSE FACILITIES•

CITY OF BEACON FIRE DEPARTMENT

EXISTING SITE

LEWIS TOMPKINS SITE

SOUTH AVENUE
WOLCOTT AVENUE

N

0 10 20 40 FEET

SITE 3

2014

PACHECO ROSS ARCHITECTS, P.C.
•EMERGENCY RESPONSE FACILITIES•

CITY OF BEACON FIRE DEPARTMENT

CONCEPTUAL SITE LAYOUT

ADDITION/ RENOVATION

LEWIS TOMPKINS SITE

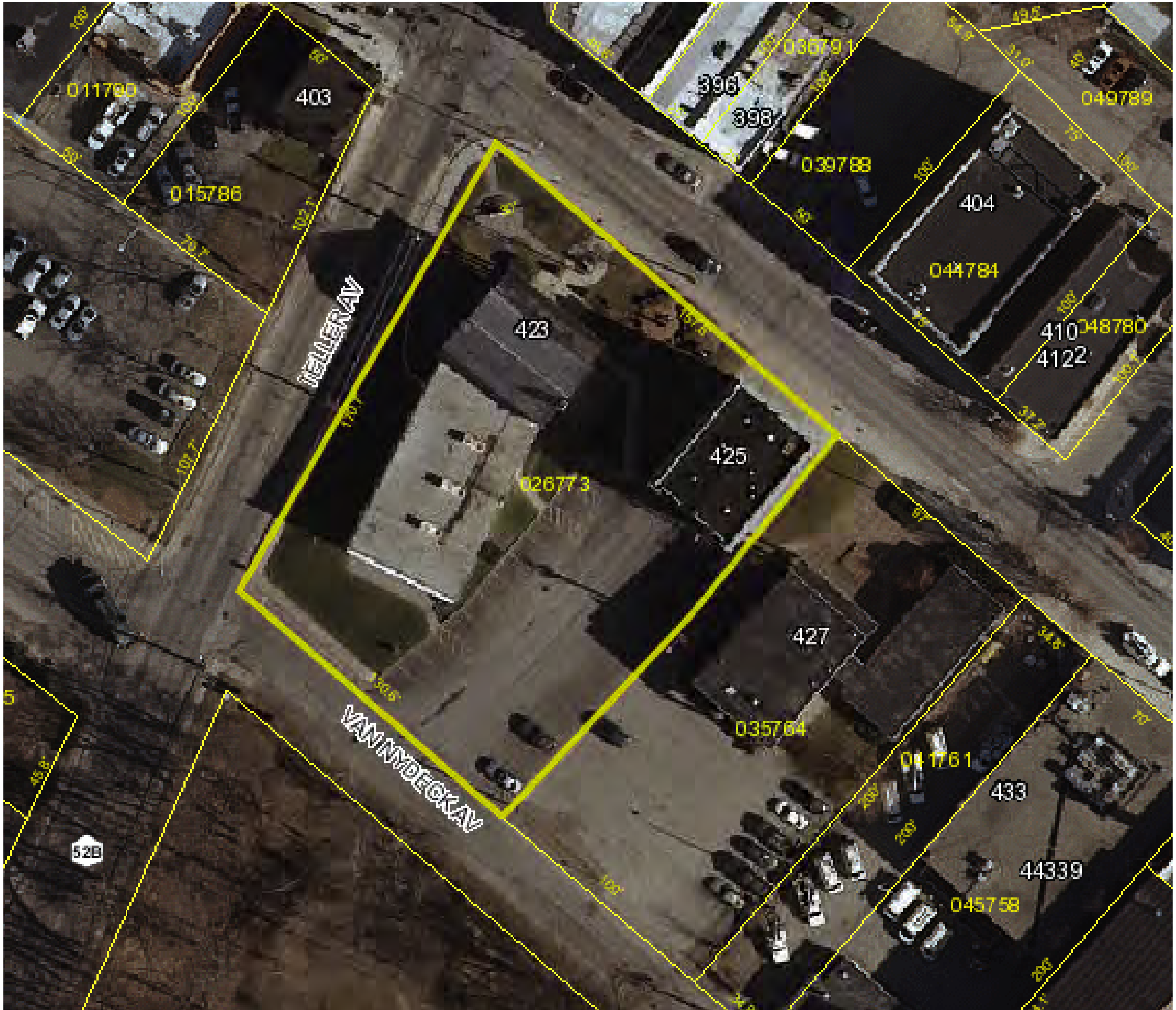
SOUTH AVENUE
WOLCOTT AVENUE

N

0 10 20 40 FEET

SITE 3

2014



PACHECO ROSS ARCHITECTS, P.C.
•EMERGENCY RESPONSE FACILITIES•

CITY OF BEACON FIRE DEPARTMENT

EXISTING SITE

MASE HOOK AND LADDER

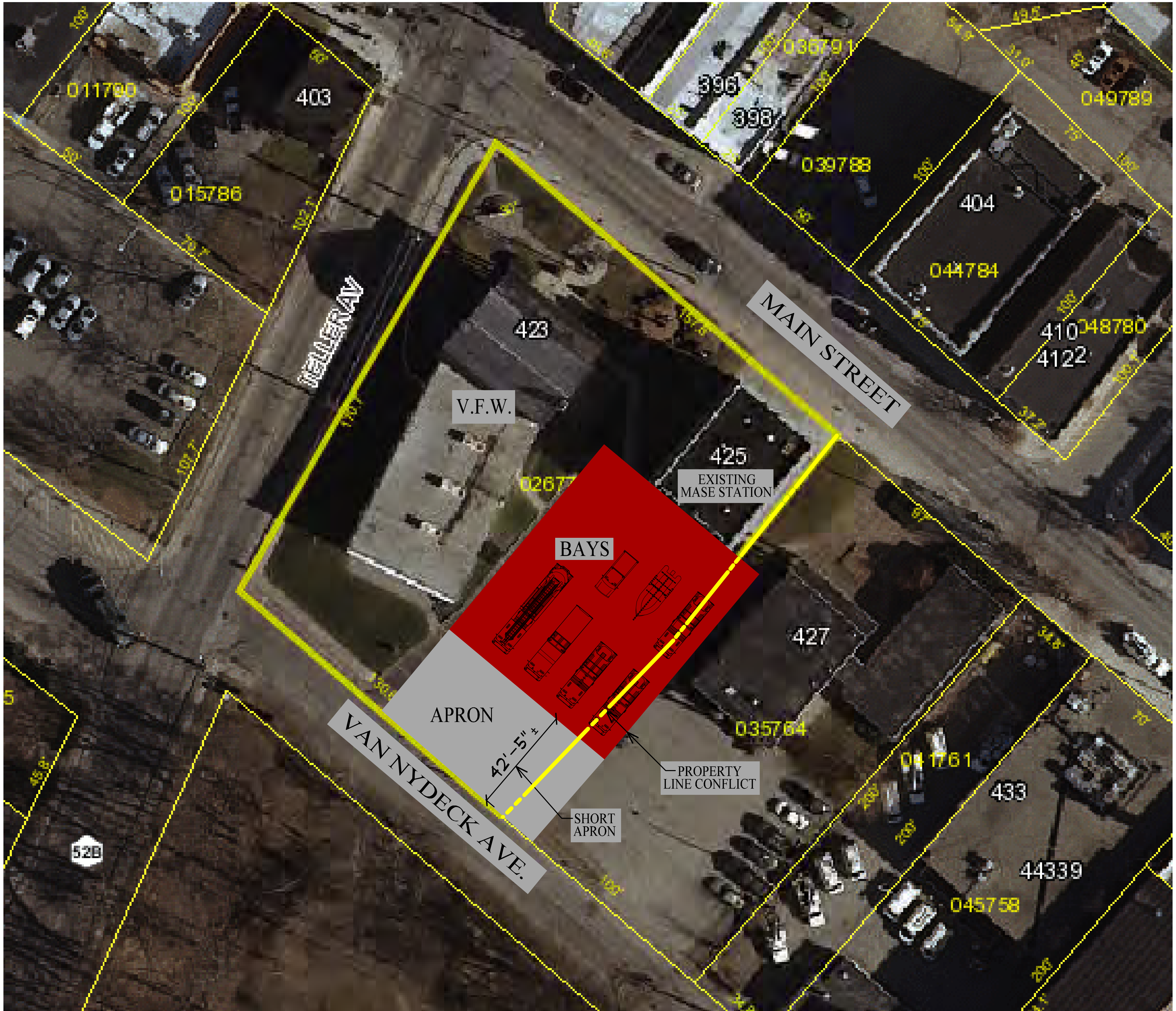
425 MAIN STREET

N

0 10 20 40 FEET

SITE 4

2014



PACHECO ROSS ARCHITECTS, P.C.
•EMERGENCY RESPONSE FACILITIES•

CITY OF BEACON FIRE DEPARTMENT

CONCEPTUAL SITE LAYOUT

MULTI-STORY ADDITION/ RENOVATION

MASE HOOK AND LADDER

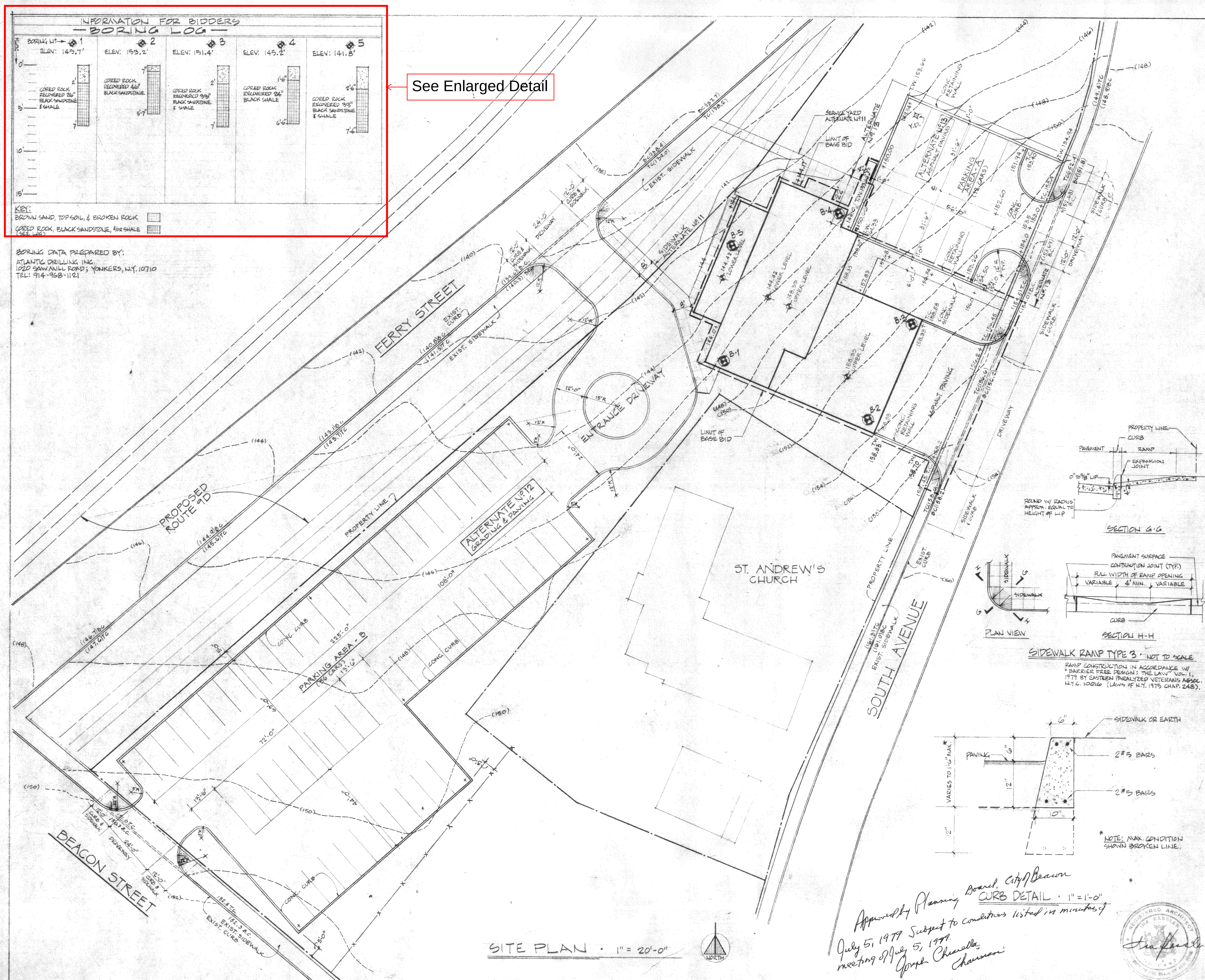
425 MAIN STREET

N

0 10 20 40 FEET

SITE 4

2014



LIST OF DRAWINGS

Number	Drawing Title
A-1	Site Plan
A-2	Lower Level Plan
A-3	Upper Level Plan
A-4	Roof Plan & Details
A-5	Elevations
A-6	Section
A-7	Wall Sections
A-8	Reflected Ceiling Plans
A-9	Stair Details & Miscellaneous Details
A-10	Schedules and Details
S-1	Foundation Plan & Details
S-2	Upper Tier Framing, Roof Framing Details
S-3	
HVAC-1	Lower Level Plan
HVAC-2	Upper Level Plan
P-1	Site Plan
P-2	Lower Level Plan
P-3	Upper Level Plan
E-1	Site Plan
E-2	Lower Level Plan - Power
E-3	Upper Level Plan - Power
E-4	Lower Level Plan - Lighting
E-5	Upper Level Plan - Lighting
E-6	Lower Level Plan - Communications
E-7	Upper Level Plan - Communications
E-8	Schedules & Riser Diagrams

LEGEND & SYMBOLS

- CONCRETE BLOCK
- EXTERIOR WALL SYSTEM
- METAL STUD & GYPSUM BOARD
- REINFORCED CONCRETE
- (154) EXISTING GRADES
- 142 NEW GRADES
- B-2 BORING LOCATION & NUMBER
- LIMIT OF BASE BID
- PROPERTY LINE
- TYPE 3 SIDEWALK RAMP (SEE DETAIL THIS DWG.)

ABBREVIATIONS

T.C.	TOP OF CURB
T.W.	TOP OF WALL
B.C.	BOTTOM OF CURB
GYP. BD.	GYPSUM BOARD
V.A.T.	VINYL ASBESTOS TILE
CLG.	CEILING
CER.	CERAMIC
ALUM.	ALUMINUM
MTL.	METAL
H.M.	HOLLOW METAL
Y.D.	YARD DRAIN
R.D.	ROOF DRAIN
D.F.	DRINKING FOUNTAIN

REV. Nº	DESCRIPTION	BY	DATE

REVISIONS

BEACON COMMUNITY DEVELOPMENT AGENCY
100 WOLCOTT AVENUE BEACON, NEW YORK

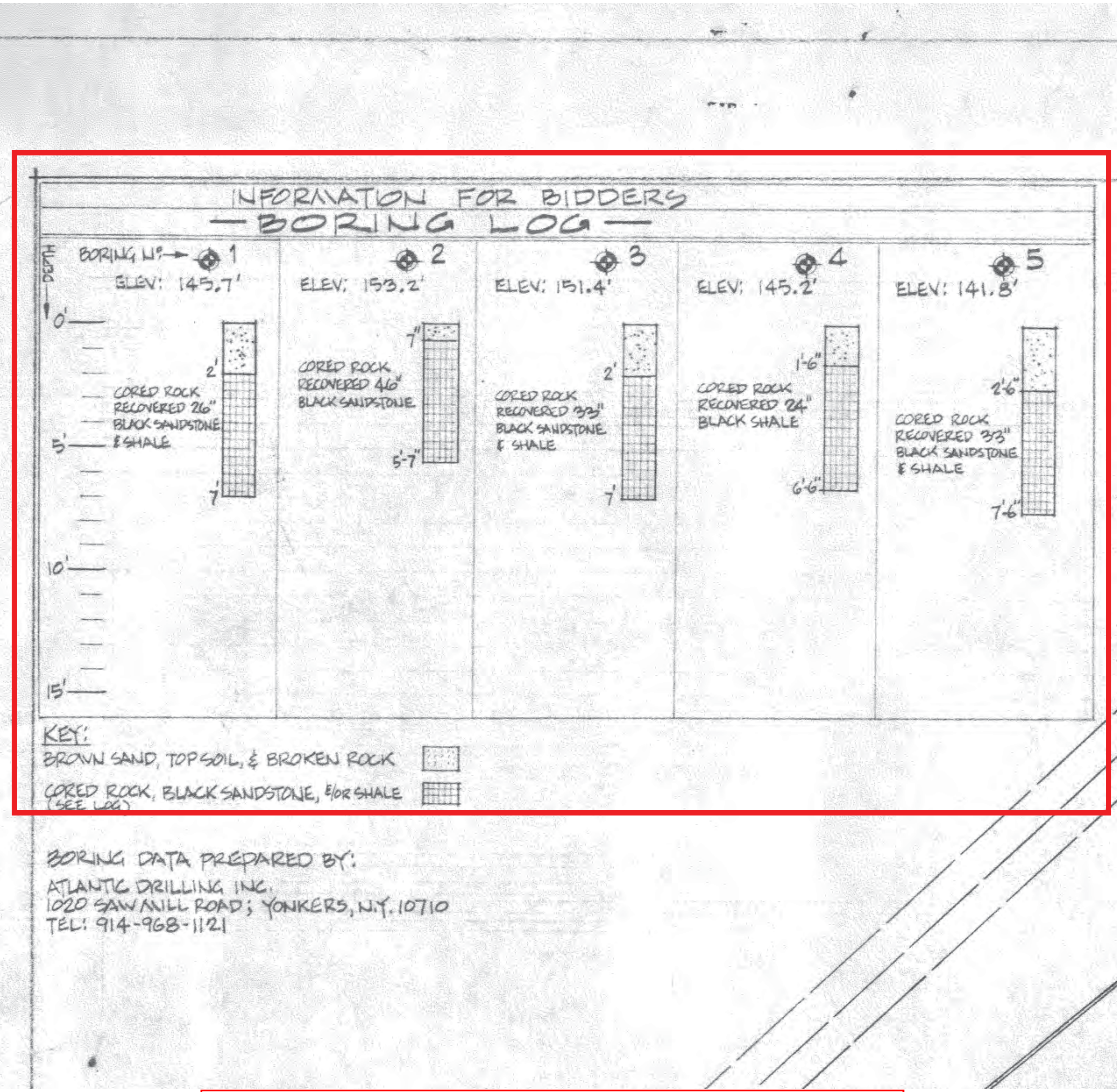
BEACON FIREHOUSE IMPROVEMENTS

TOMPKINS HOSE COMPANY
PROJECT Nº B77-HS-36-0101
SITE PLAN

the office of ira kessler architect
432 MAIN ST; BEACON, N.Y. 12508 (914)-831-7096

DRAWING NUMBER A·1

SCALE AS SHOWN | PROJECT NO 7702-C | DRAWN BY | DATE JUNE 1, 1979



Enlarged Detail from Tompkins Hose Company Site Plan June 1, 1979

APPENDIX I: PACHECO ROSS ARCHITECTS – CONCEPTUAL BUDGETS

Conceptual Budgets

- **Budget Overview**
- **Conceptual Budget: Verplanck Ave. & Cannon Practice Field Site**
- **Conceptual Budget: Elks Club Site**
- **Conceptual Budget: Lewis Tompkins Site**

City of Beacon Fire Department
Consolidated Station Budgeting
Beacon, NY
October, 2014

Budgets

Budgets were created for three options based on building locations and configurations. This allows a direct cost comparison for each design possibility. Used in conjunction with the response analysis, a professional opinion of the optimal solution can be made.

Numbers reflect project costs adjusted for the Beacon geographic area and current marketplace conditions. As a municipal project in New York State, the project is subject to the requirements of public bidding including wage rates and the Wicks Law. This is reflected in costs. Construction escalation is based on an assumed start date of Spring 2015. This date would allow the City time to hire a design team, appropriate budgets, acquire/prepare land, schedule staging, and finalize plans, bid specifications and a bidding time period.

In order to develop a meaningful set of budget guidelines, we must establish the criteria necessary for evaluation. Fire stations are high-use, public service buildings classified by the New York State Building Code as an **"essential facility"** and by FEMA as a **"critical facility"**. These designations trigger mandatory requirements for structural strengthening, extensive oversight and system protections that are significantly more rigorous than other building types. During natural or man-made emergencies, essential facilities such as fire stations need to remain open and operational in order to respond to and serve the population. Such requirements have an impact on cost.

The budgets assume a stand-alone fire station with all of the spaces described in the Program and Space Analysis. This facility will require apparatus bays and the specialized support spaces that serve the bays and emergency operations including an integrated active training tower. In addition to the building budget, the site budget takes into account cut/fill, utilities, drainage, parking, access, walks, drives, landscaping, site features and special conditions such as the need to remove significant amounts of bedrock at the Tompkins Hose site if used. Costs such as sales of existing properties and assumed land purchase price have been included as line items.

In the case of emergency service facilities, many specialty items are best considered as soft costs. For example, building contractors are not generally familiar with fume exhaust systems, gear lockers, extractors, etc. If these items are considered hard costs, contractor mark-ups may be extreme in order to cover labor costs, the costs for the use of a specialty subcontractor and add-ons for unknown conditions. It is generally more cost-effective to move these types of purchases and installation into a soft cost budget to avoid extreme overhead and mark-up. As such, specialty fire service items have been included in the soft cost portion of the budgets.

A description of the quality of materials and types of systems expected in a modern, low-maintenance, energy efficient, sustainable and long-lasting facility are outlined below and form the basis of the expected level of construction and finishes included in the conceptual budgeting. This is important to understand the nature of the end product. Budget includes architectural, structural, mechanical, electrical, plumbing, fire protection, specialty systems and site work.

Hard Costs vs. Soft Costs – **Hard Costs** are defined as the cost of materials and labor to construct a building. These costs include site work and built-in components of the building. Hard costs are sometimes referred to as "sticks and bricks". **Soft Costs** are any other project cost that is not a construction cost. Examples of soft costs may include professional design fees, topographic survey, geotechnical report, fixtures, furniture and equipment (FF&E), phones, security, data cabling, communications equipment, kitchen appliances, specialty firematic equipment (compressors, fume exhaust, lockers, radios etc.), land costs (if not City owned), traffic signalization, off-site costs, special inspection and testing, owner's project contingency and construction escalation. Temporary relocation expenses should also be included in soft costs if a facility must be built on an existing site to add to or replace a currently operational station. Hard and soft cost budgets for the facility are conceptual in nature since they are based on a space allocation of square footage (Programs and Space Analysis) and not on quantifiable construction plans and documents. Reasonable safety factors have been incorporated for this reason.

Building Materials and Systems Hard Costs – Hard costs shown in the budgets represent a building with a 50 – 75 year lifespan constructed from materials and systems that are of good commercial quality, durable, low-maintenance, energy efficient, befitting of municipal architecture with a minimum code construction of Type II-B (non-combustible). It is important to note that **all** groups interviewed indicated a desire for a functional building and not a "Taj Mahal." As such, care has been taken to budget based on an appropriately sized, operationally relevant, functional facility using standard off-the-shelf products and materials appropriate for a fire station.

The entire facility will have a structural steel frame with an exterior infill of masonry. Masonry includes brick and architectural concrete masonry units (CMU) on all the elevations. Interior bay support spaces are to be fabricated of common CMU. All bay and bay support spaces represent highly durable materials and finishes such as CMU, cement board, epoxy paint, metal doors, commercial grade hardware, concrete floors etc. Spaces are designed and built as part of a state-of-the-art emergency response facility. The apparatus bay floor slabs are 8" thick high strength concrete with a minimum 12" sub-base of engineered fill to handle the concentrated loads of modern apparatus. All other slabs on grade are 4" or 5" concrete with a 6" sub-base of engineered fill. Exact subsurface geotechnical conditions will affect the final designs of all foundations, piers, slabs and costs due to unusual or problematic conditions. Mezzanine and second floor slabs (if applicable) are concrete on metal deck supported by structural steel and/or load bearing walls. Bays are furnished with various levels of lighting, hose reels, electrical and air drops and well-insulated overhead doors. Apparatus bay slabs are sloped to trench drains are connected to an in-ground oil/water separator. Special epoxy floor coatings or colored polished concrete for slip-resistance ease of maintenance are assumed.

High levels of insulation are assumed to be employed throughout the facility including the foundation. Design measures to control air infiltration and moisture penetration are standard throughout. We assume the building will be environmentally responsible and energy efficient but not a formal LEED project. We have included practical cost-saving sustainable design initiatives into the budget.

Roofing materials consist of EPDM membrane and high-quality architectural shingles. Metal and solid core wood doors as well as heavy-duty commercial grade hardware, are employed. Windows are energy efficient low E, double pane glass with commercial grade metal frames with an anodized or "Kynar" coated exterior and metal or wood interior finish. Typical interiors include painted CMU or sheetrock; suspended acoustical ceilings; vinyl, ceramic, and quarry tile flooring; commercial cabinets; millwork; solid surfacing, wainscoting and carpet in specific areas. Bathrooms are ceramic tiled floor and walls with partitions, mirrors, counters, and accessories selected for durability, ease of maintenance, and aesthetics. Kitchens are designed for heavy use, durability and commercial grade kitchen equipment.

When completed, the building and site must meet applicable building codes and Americans with Disabilities Act (ADA) requirements. In addition, the facility should reflect the latest NFPA recommendations and other regulatory agency and governing regulations.

Infrastructure – Plumbing includes underground supply and waste output lines, commercial-grade bathroom and kitchen fixtures, commercial grade hose reels, hose bibs, air piping, trench drains or catch basins, an oil/water separator, grease trap, drench shower and a complete building sprinkler system. Boilers are tankless high-efficiency and water heaters are commercial grade. All hot- and cold-water piping is insulated and labeled with all interior piping made from copper. Exterior piping is either cast iron or PVC depending on building code requirements.

The heating system for the apparatus bays will be in-floor radiant utilizing high-efficiency tankless boilers. We propose a ductless Mitsubishi CITY MULTI VRFZ heating/Cooling system using environmentally friendly refrigerant as the HVAC system for the non-bay portions of the building. Miscellaneous cabinet heaters, fans, ductwork and complete temperature controls for a commercial building are included. All equipment is high efficiency and durable. The heating system and water heater will use natural gas as its fuel.

The electrical system includes an assumed 800 - 1,000 amp service sized to meet the actual demand. Included are a transfer switch, an exterior weather resistant generator, commercial quality interior and exterior lighting fixtures and all wiring and controls necessary for a modern facility. Additionally, spare conduits, extra panel capacity, and a complete fire alarm system are included. Empty conduit and boxes for telephone, cable and data are included. Also, boxes, conduits, raceways and trays are provided for all electrical high and low voltage systems.

Site Work Costs – The site is assumed to be a buildable site with no hazardous waste, soil or drainage problems. Excavation, clearing and grubbing, cut/fill, rough and fine grading are included. Clean fill and sub base are installed to rigorous requirements for placement and compaction for an essential facility.

Materials are heavy-duty asphalt for all apparatus drives, regular duty asphalt for automobiles, concrete walks and three to five foot wide concrete aprons at the bays with bollards installed at each bay door. Pipe, and basins or retention facilities are designed as required for drainage. Amenities such as signage, flagpoles, transformer, exterior building lights, seeding, and basic landscaping are included. Extension of utilities, site lighting, fire hydrants are included in the site development. Concrete pads for the exterior generator, HVAC equipment, dumpster and other miscellaneous pads, walks, etc. are included.

Cost Per Square Foot – Based on the above description, we can conceptually estimate probable hard cost per square foot (sq. ft.).

Contractor Information – There will be minimum of four prime contractors in accordance with NYS law. General Contractor, Electrical Contractor, Plumbing Contractor and Mechanical Contractor. All contractors must be fully bonded with both Material and Payment Bonds and carry all Client mandated insurance coverage. In addition the contractors and subcontractors must meet all minimum proficiency and other county/state requirements for commercial construction.

Other Factors – Winter conditions, costs for delays or other potential extraordinary costs are not assumed in any of the budgets.

Energy Cost Savings – As previously mentioned, the calculation of potential energy savings was based on real-world comparison to a recently built New York State fire station. This station acting as an analog represents nearly identical volunteer/paid composition, response call volume, geographic area, proposed facility size, and firefighter habits. It is felt a real-world comparison allows for a better expectation of actual dollar savings as opposed to sterile calculations in which assumptions and the interaction of complex systems are idealized.

The energy calculation methodology compared the energy usage of the existing three facilities against the fire station outlined above. The comparison station was specifically a significant addition/renovation to a mid-twentieth century facility to represent the situation of Beacon Site 3 (Tompkins Hose) where there is loss of efficiency for dealing with the existing structure and systems. It is reasonable to assume that Beacon Sites 1 and 2, as completely new buildings, could have even greater energy savings. In the interest of responsible budgeting, we have elected not to account for this potential additional savings.

The comparison looked at utility cost and usage for the same months over the previous year based in part on information provided by the City of Beacon. Numbers were adjusted to account for small differences. For example, the cost difference of the electricity supply charge at each location was adjusted by examining the data of the specific daily values of each utility. For instance, on July 12, 2013, one utility electrical supply charge may be $0.06924 per kWh while another is $0.06802 per kWh. These numbers were compared for data points in each month, then calculated to form an adjustment factor. Natural gas supply charges in dollars per 100 cubic feet of natural gas were adjusted similarly. There was a reduction to the savings based on the slightly larger size of the proposed Beacon facility. In addition, a comparison of heating and cooling degree days at base temperature 65 degrees F was made by examining the nearest reliable weather stations. An annual cost comparison was then conducted. This rounded adjusted value was approximately $11,000/year of savings.

A factor of safety was requested for this calculation. Therefore, a 25% additional reduction was made to bring the potential annual savings to $8,250/year. Over a twenty year period, without even factoring escalating energy costs and inflation, this would result in a savings of $165,000.

As with any future savings calculation, the number is greatly dependent on the quality of the building design, construction, specification of the proposed building systems, and occupant usage habits.

City of Beacon Fire Department

Conceptual Budgets Based on Location - October 2014

Verplanck Ave. Cannon Practice Field Site

Hard Costs

Description	Size SF	Cost per SF Range		Cost Range	
New 1 Story Design	21,200	$ 330.00	$ 345.00	$ 6,996,000.00	$ 7,314,000.00
Escalation to June 2015 Bid @ 4% per annum				$ 186,560.00	$ 195,040.00
			HARD COST TOTAL >	**$ 7,182,560.00**	**$ 7,509,040.00**

Soft Costs

Description	Cost Range	
Professional Fees for Engineering and Architecture	$ 405,000.00	$ 450,000.00
Required Testing Agency Services, Legal Fees, Insurance, Furnishings, Fixtures and Equipment, Firematic Specialty Items (fume exhaust, gear lockers, equipment), Computers, Door Access, Cameras and Security Systems, Approvals and Permits.	$ 400,000.00	$ 450,000.00
Owner's 5% Contingency During Construction	$ 359,128.00	$ 375,452.00
Land Purchase Price (N/A City Owned)	$ -	$ -
Temporary Facility/ Relocation Costs	$ 5,000.00	$ 15,000.00
SOFT COST SUBTOTAL >	**$ 1,169,128.00**	**$ 1,290,452.00**
Credit for Sale of Properties per Appraisals **		
- Beacon Engine	$ (250,000.00)	$ (250,000.00)
- Mase Hook & Ladder	$ (280,000.00)	$ (280,000.00)
- Lewis Tompkins Hose (N/A)	$ (850,000.00)	$ (850,000.00)
SOFT COST TOTAL >	**$ (210,872.00)**	**$ (89,548.00)**

HARD and SOFT COST TOTAL >	**$ 6,971,688.00**	**$ 7,419,492.00**
POTENTIAL ENERGY SAVINGS FIRST 20 YEARS >	**$ (165,000.00)**	**$ (165,000.00)**
TOTAL COST FACTORING ENERGY SAVINGS >	**$ 6,806,688.00**	**$ 7,254,492.00**

** Based on independent third party appraisals

City of Beacon Fire Department

Conceptual Budgets Based on Location - October 2014

Elks Club Site

Hard Costs

Description	Size SF	Cost per SF Range		Cost Range	
New 1 Story Design	21,200	$ 330.00	$ 345.00	$ 6,996,000.00	$ 7,314,000.00
Escalation to June 2015 Bid @ 4% per annum				$ 186,560.00	$ 195,040.00
			HARD COST TOTAL >	**$ 7,182,560.00**	**$ 7,509,040.00**

Soft Costs

Description	Cost Range	
Professional Fees for Engineering and Architecture	$ 410,000.00	$ 455,000.00
Required Testing Agency Services, Legal Fees, Insurance, Furnishings, Fixtures and Equipment, Firematic Specialty Items (fume exhaust, gear lockers, equipment), Computers, Door Access, Cameras and Security Systems, Approvals and Permits. Additional land aquisition and subdivision costs.	$ 410,000.00	$ 460,000.00
Owner's 5% Contingency During Construction	$ 359,128.00	$ 375,452.00
Land Purchase Price*	$ 75,000.00	$ 140,000.00
Temporary Facility/ Relocation Costs	$ 5,000.00	$ 15,000.00
SOFT COST SUBTOTAL >	**$ 1,259,128.00**	**$ 1,445,452.00**
Credit for Sale of Properties per Appraisals **		
- Beacon Engine	$ (250,000.00)	$ (250,000.00)
- Mase Hook & Ladder	$ (280,000.00)	$ (280,000.00)
- Lewis Tompkins Hose (N/A)	$ (850,000.00)	$ (850,000.00)
SOFT COST TOTAL >	**$ (120,872.00)**	**$ 65,452.00**

HARD and SOFT COST TOTAL >	**$ 7,061,688.00**	**$ 7,574,492.00**
POTENTIAL ENERGY SAVINGS FIRST 20 YEARS >	**$ (165,000.00)**	**$ (165,000.00)**
TOTAL COST FACTORING ENERGY SAVINGS >	**$ 6,896,688.00**	**$ 7,409,492.00**

* ESTIMATE - Actual information needed on any City discussions with the property owners

** Based on independent third party appraisals

City of Beacon Fire Department

Conceptual Budgets Based on Location - October 2014

Tompkins Hose Site Addition/Renovation (Existing Station)

Hard Costs

Description	Size SF	Cost per SF Range		Cost Range	
Renovate Existing	9,913	$ 214.00	$ 228.00	$ 2,121,382.00	$ 2,260,164.00
2 Story Addition	14,387	$ 340.00	$ 355.00	$ 4,891,580.00	$ 5,107,385.00
Rock Removal (Existing Shale and Black Sandstone)				$ 125,000.00	$ 150,000.00
Escalation to June 2015 Bid @ 4% per annum				$ 190,346.00	$ 200,468.00
			HARD COST TOTAL >	**$ 7,328,308.00**	**$ 7,718,017.00**

Soft Costs

Description	Cost Range	
Professional Fees for Engineering and Architecture	$ 435,000.00	$ 465,000.00
Required Testing Agency Services, Legal Fees, Insurance, Furnishings, Fixtures and Equipment, Firematic Specialty Items (fume exhaust, gear lockers, equipment), Computers, Door Access, Cameras and Security Systems, Approvals and Permits.	$ 410,000.00	$ 465,000.00
Owner's 5% Contingency During Construction	$ 366,415.00	$ 385,901.00
Land Purchase Price (N/A City Owned)	$ -	$ -
Temporary Facility/ Relocation Costs	$ 85,000.00	$ 120,000.00
SOFT COST SUBTOTAL >	**$ 1,296,415.00**	**$ 1,435,901.00**
Credit for Sale of Properties per Appraisals **		
- Beacon Engine	$ (250,000.00)	$ (250,000.00)
- Mase Hook & Ladder	$ (280,000.00)	$ (280,000.00)
- Lewis Tompkins Hose (N/A)	$ -	$ -
SOFT COST TOTAL >	**$ 766,415.00**	**$ 905,901.00**

HARD and SOFT COST TOTAL >	**$ 8,094,723.00**	**$ 8,623,918.00**
POTENTIAL ENERGY SAVINGS FIRST 20 YEARS >	**$ (165,000.00)**	**$ (165,000.00)**
TOTAL COST FACTORING ENERGY SAVINGS >	**$ 7,929,723.00**	**$ 8,458,918.00**

** Based on independent third party appraisals

APPENDIX J: 21 NYCRR PART 5202

21 NYCRR Part 5202

Minimum Standards Regarding Staffing of Public Safety Answering Points

(Statutory Authority: County Law §328)

§5202.1 Definitions | Top of the Page

(a) "PSAP" means Public Safety Answering Point, a site designated and operated by a governmental entity for the purpose of receiving emergency calls from customers of a wireless telephone service supplier.

(b) "W-911" means wireless 911

(c) "Call-taker/dispatcher" means any person employed by or in any local or state government agency either full or part-time whose duties include the answering of emergency telephone calls and/or the dispatching of emergency services personnel.

(d) "Certified" means having a formal program of related instruction and testing as provided either by a recognized organization or by the authority having jurisdiction over the PSAP.

(e) "Qualified" means that the employee has been properly trained and credentialed pursuant to all applicable laws and regulations.

§5202.2 Standards | Top of the Page

(a) All PSAPs shall be staffed twenty-four (24) hours a day, seven (7) days a week, by a minimum of two (2) qualified, certified call-takers/dispatchers.

(b) All PSAPs shall have staffing adequate to answer ninety percent (90%) of all incoming W-911 calls within ten seconds of connection.

(c) All W-911 requests shall be dispatched immediately, or as soon thereafter as possible within the practicalities of responding to other 911 calls, in accordance with the PSAP=s written policies and procedures for prioritizing service needs.

(d) All PSAPs shall have the following on file:

(1) a written job description for each job title staffed by the PSAP;

(2) a written procedure for the emergency recall of off-duty employees;

(3) a written procedure for quality control of services;

(4) a written policy and procedure for, or equivalent measures to assess, employee performance; and

(5) a written policy and procedure for the handling of customer complaints.

(e) All employees assigned to call-taker and/or dispatcher duties shall meet minimum training standards as required by the New York State 911 Board.

(f) All PSAPs shall have on file an organizational chart that is current and available to all personnel. The chart shall reflect the chain of command and lines of authority for communications within the PSAP and shall be organized in a hierarchy.

(g) All PSAPs shall have on file a written procedure that requires personnel to obey any lawful order of a superior transmitted by any duly authorized agent of that superior, regardless of rank involved, and which establishes procedures to be followed when a conflicting order or directive is received.

§5202.3 Variances | Top of the Page

(a) The Board shall have authority to grant variances from the strict provisions of this Part, upon application therefor and upon a showing of

(1) unnecessary hardship; and

(2) that an alternative measure or method to be adopted will meet the objectives of the standards.

(b) In granting such variance, the Board shall provide that such variance shall be for a stated period of time.

Appendix A
Reference Materials for Guidance in Staffing Standards | Top of the Page

A-1 The Math of Call Center Staffing, Penny Reynolds, ICCM Weekly (Aug. 8, 2002).

A-2 How Many do We Really Need? A Simple Solution for Determining Staffing, Jennifer Hagstrom, Ed.

(Sept. 2000).

A-3 Communications Center Staffing Formulas: Old Studies in a New Environment, APCO Int'l. Pub. Safety Commun., APCO Bulletin, Project (40) RETAINS, Yvonne Klees, Features Ed. (Mar. 2001).

A-4 Standard for Public Safety Communications Agencies, Commission on Accreditation for Law Enforcement Agencies.

A-5 Standard for Professional Qualifications for Public Safety Telecommunicator, National Fire Protection Agency 1061 (1996 ed.).

A-6 Public Safety Answering Point (PSAP) Accreditation Program, Program Standards Manual, New York State Sheriffs' Association.

A-7 Staffing formulas as may be provided by telephone service suppliers in the particular jurisdiction.