



Presentation to the Finance Committee



Proposed
North Acton Fire/EMS Station

September 25, 2007



Presentation Outline



- ❑ Fire/EMS Science
- ❑ Fire/EMS Standards
- ❑ Medical and Fire Facts
- ❑ Empirical Evidence
- ❑ Problem Definition
- ❑ Successes and Challenges
- ❑ Reetz Study
- ❑ Proposed Solutions
- ❑ Conclusion



Today's Fire Service



- Is the practical application of:
 - Scientific and engineering principles
 - Rules (Codes and Standards)
 - Expert judgment

and is based on an understanding of the phenomena and effects of fire and of the reaction and behavior of people to fire



Today's Firefighter



- ❑ A fire fighter, by education, training and experience understands:
 - The nature and characteristics of fire and the mechanisms of fire
 - Spread and the control of fire and the associated products of combustion
 - How fires originate
 - Spread within and outside buildings/structures
 - How fires can be detected, controlled, and/or extinguished
 - And is able to anticipate the behavior of materials, structures, machines, apparatus, and processes as related to the protection of life, property and the environment from fire



Today's Emergency Medical Services



- Is the practical application of:
 - Science and medical principles
 - Rules (Codes and Standards)
 - Medical control & protocols
 - Extensive training
 - Expert judgment

and is based on an understanding of the injury or illness and the effects of on-site triage (early intervention/treatment) on a successful outcome



Today's Emergency Medical Technician



- An EMT, by education, training and experience understands:
 - The nature and characteristics of injuries and the mechanisms of treatment
 - Patient assessment skills
 - Patient removal and extrication techniques
 - Patient transport techniques
 - CPR/AED (Automatic External Defibrillation)



Today's Emergency Medical Technician



□ Medical Intervention Protocols:

1. To rapidly evaluate a patient's condition
2. To maintain airway, breathing, and circulation
3. To control external bleeding
4. To prevent shock
5. To prevent further injury by immobilizing potential spinal or other fractures
6. After stabilizing patient; To expedite safe and timely transport to appropriate medical facility







Fire and Emergency Medical Service Operation Standards



- Are Set by :
 - Department of Homeland Security
 - OSHA
 - EPA
 - Commonwealth of Massachusetts
- Are Based upon Science
 - Scientific Research Organizations
 - National Fire Protection Association (NFPA)
 - Insurance Service Organization (ISO)
 - National Institute for Occupational Safety and Health (NIOSH)



Deployment and Manning Standards



- ❑ Fire Response Times adopted by Department of Homeland Security
 - Turnout time 1 minute
 - Travel Time
 - ❑ 4-6 minutes or less for arrival of the first engine company
 - ❑ 8-10 minutes or less for arrival of all first alarm units



Deployment and Manning Standards



- ❑ EMS Response Standard adopted by Department of Homeland Security
 - Turnout time 1 minute
 - Travel Time
 - ❑ 4-6 minutes or less for arrival of a unit with first responder or higher level capability
 - ❑ 8-10 minutes or less for arrival of Paramedics



Deployment and Manning Standards



- ❑ Incident Requirements adopted by Department of Homeland Security
 - An Incident Commander
 - Minimum uninterrupted water supply of 400 gallons-per-minute
 - Two hand lines with a minimum 300 gpm flow with a minimum of two personnel on each line
 - One support person for each attack and back-up line
 - Minimum of one search and rescue team with minimum of two personnel



Deployment and Manning Standards



- ❑ Incident Requirements adopted by Department of Homeland Security -- Continued
 - Minimum of one ventilation team with a minimum of 2 personnel
 - An Initial Rapid Intervention Crew with a minimum of two personnel
 - Aerial equipment, if employed require a minimum of 2 personnel
 - Every engine and truck company to be staffed with 4 firefighters
 - ❑ Definition of "company" allows a company to respond in multiple vehicles



Deployment and Manning Standards



- ❑ Study of these standards necessitate a minimum level of fire ground staffing of 13 – 15, depending on circumstances
- ❑ Current staffing level is 7-10 per shift depending on circumstances



Medical Facts



- ❑ When deprived of oxygen, brain tissues will begin to die within 4-6 minutes
- ❑ For every minute of cardiac arrest the chance of survival decreases up to 10%

Response-time is critical!



Medical Facts



Oxygen Deprivation:

- ❑ Water Emergencies (NARA) (Lake Nagog)
- ❑ Bee Stings/Anaphylactic Shock (NARA)
- ❑ Stroke (The Inn at Robbins Brook)
- ❑ Spinal Cord Injuries (Triangle Farm on Pope Road)
- ❑ Asthma (participants in sports)



Fire Facts/Science



- ❑ Fire Doubles every minute
- ❑ According to multiple studies, extension of the fire beyond the room of origin begins approximately 6-8 minutes after ignition, and flashover of the room occurs within 10 minutes of ignition



Fire Facts/Science



Flashover – Occurs at the stage of a fire at which all surfaces and objects within a space have been heated to their ignition temperature, and flame breaks out almost at once over the surface of all objects in the space. Temperatures can peak at 2,000 degrees fahrenheit.

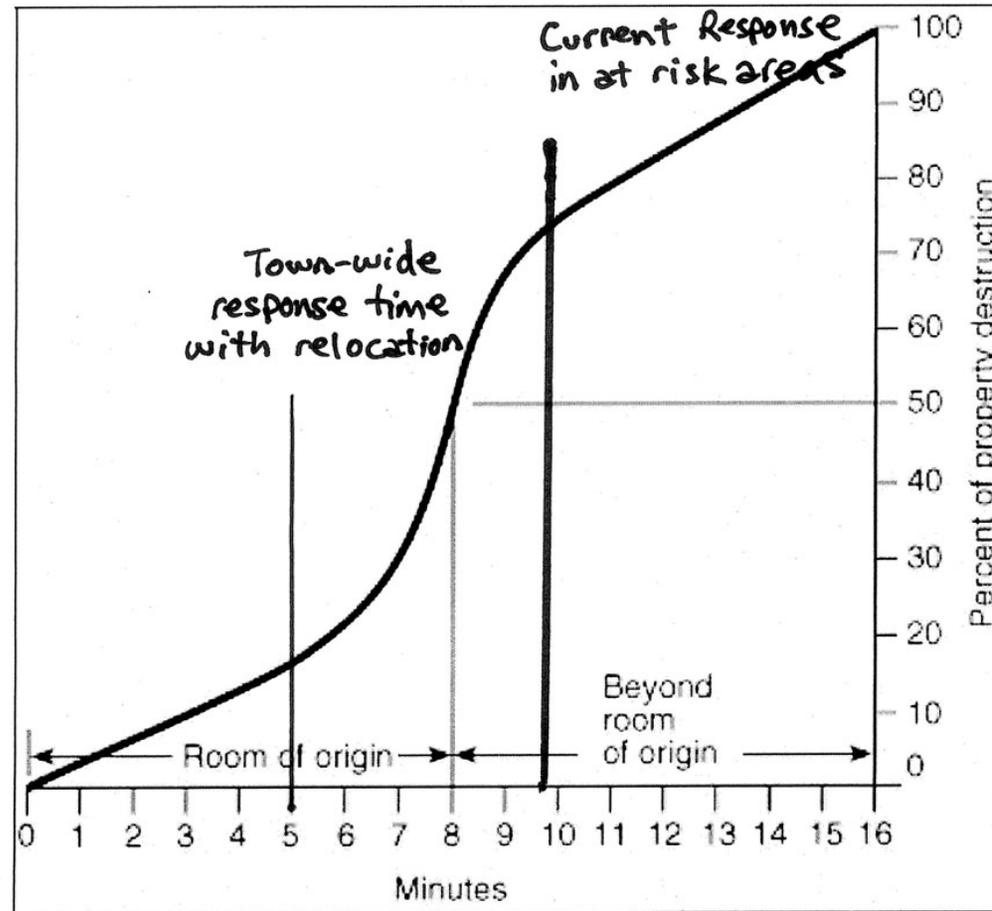


Example of a flashover





Fire Propagation Curve



Source: Fire Protection Handbook, 18th Ed., National Fire Protection Association



Sawmill Road





Sawmill Road





Sawmill Road





Sawmill Road





Sawmill Road



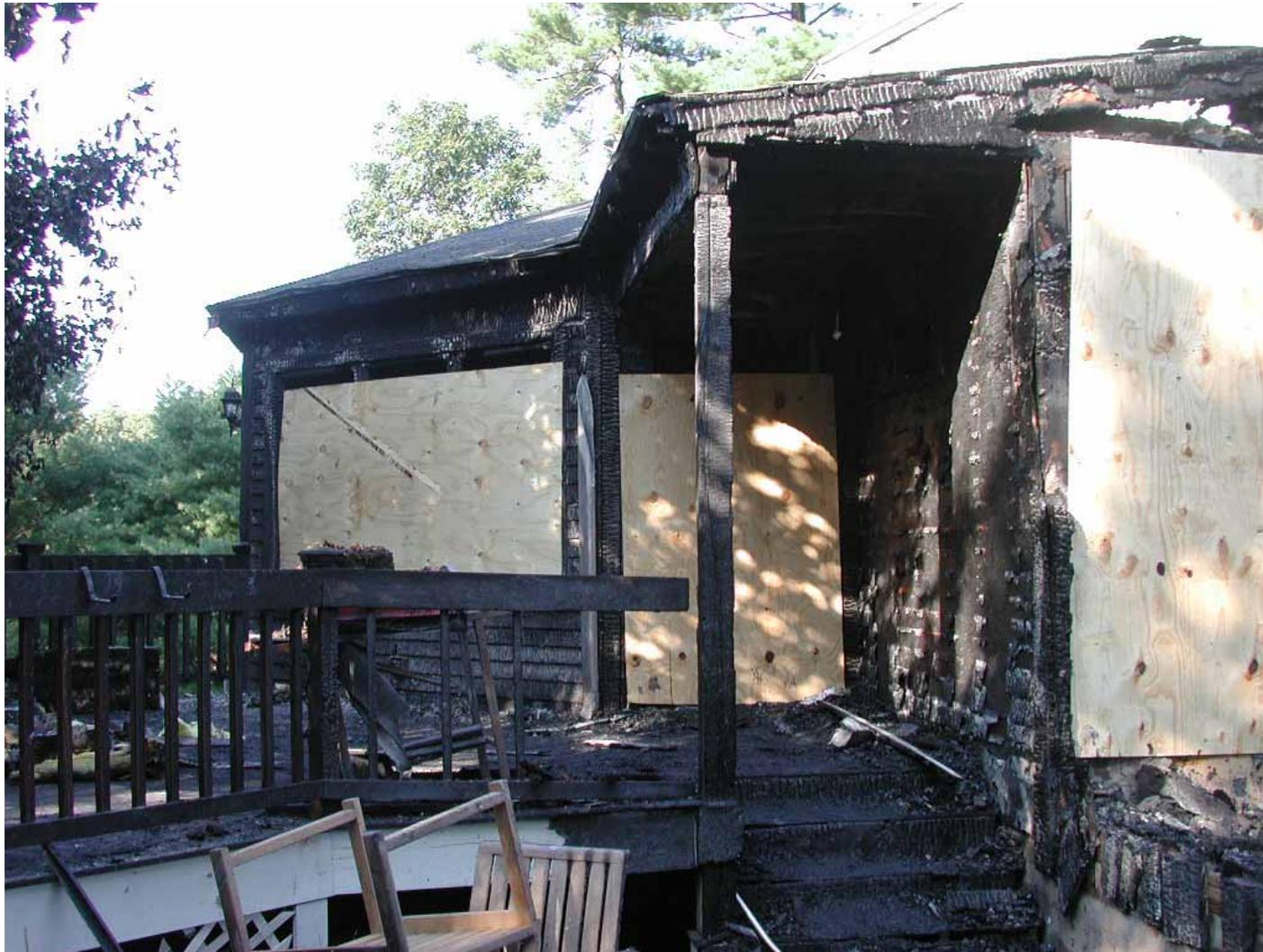


Sawmill Road





Sawmill Road





Sawmill Road





Sawmill Road





Empirical evidence that a problem exists



Sawmill Road Fire

- ❑ Delayed detection & notification
- ❑ Loss of family pet
- ❑ Building determined a total loss
- ❑ 2,500 cubic feet destroyed (est)
 - Fire Propagation Curve indicates the damage would have been approximately 50% less if we had arrived within minimum response standards.



Fire Facts/Science



Across the nation from 1986 through 2002, more than 4,000 people died in fires in which response time was greater than 6 minutes.

Source: Boston Globe



Problem Definition



- ❑ A 30% increase in team staffing is required to attain minimum staffing levels
- ❑ Run times to areas of North Acton are twice the minimum standard
 - Current station locations were set in the 1920s
- ❑ Fire apparatus not placed in correct geographical areas
- ❑ People and property are at risk due to non-compliance



Problem Definition



- ❑ 1920 population = 2,162 residents clustered around current fire station locations
- ❑ 2000 population = 20,331 residents – an increase of 940%
- ❑ Population segments of under 17 and over 60 are at the greatest risk. The 2000 census indicates over 40% of Acton's population is in these at risk age brackets
 - 11.8% older than 60 (2,398)
 - 28.6% younger than 17 (5,815)

-



Problem Definition



Demographics Shift

<u>Year</u>	<u>Residents Under 17 plus Over 61</u>
1989	4,663
2000	8,213



The Public Safety Need for the North Acton Fire/EMS Station



Examples of Current At Risk Properties

- ❑ Inn at Robbins Brook
- ❑ Nagog Shops & Restaurants
- ❑ Village of Nagog Woods
- ❑ Northbriar Neighborhood
- ❑ Robbins Mill
- ❑ New Avalon Project



New Acton Development

During the last 20 years



Development	Units
Avalon Development	360
Inn at Robbins Brook	184
Quail Ridge	177 (proposed 7/23/07)
Bellows Farm	115
Robbins Mill	90
Acorn Park	84
North Briar	60
The Arbors	58
Meyer Hill	35
North Acton Woods	23
Samantha Way	16
Marshall Path	16
Captain Handley	15
Total	1233

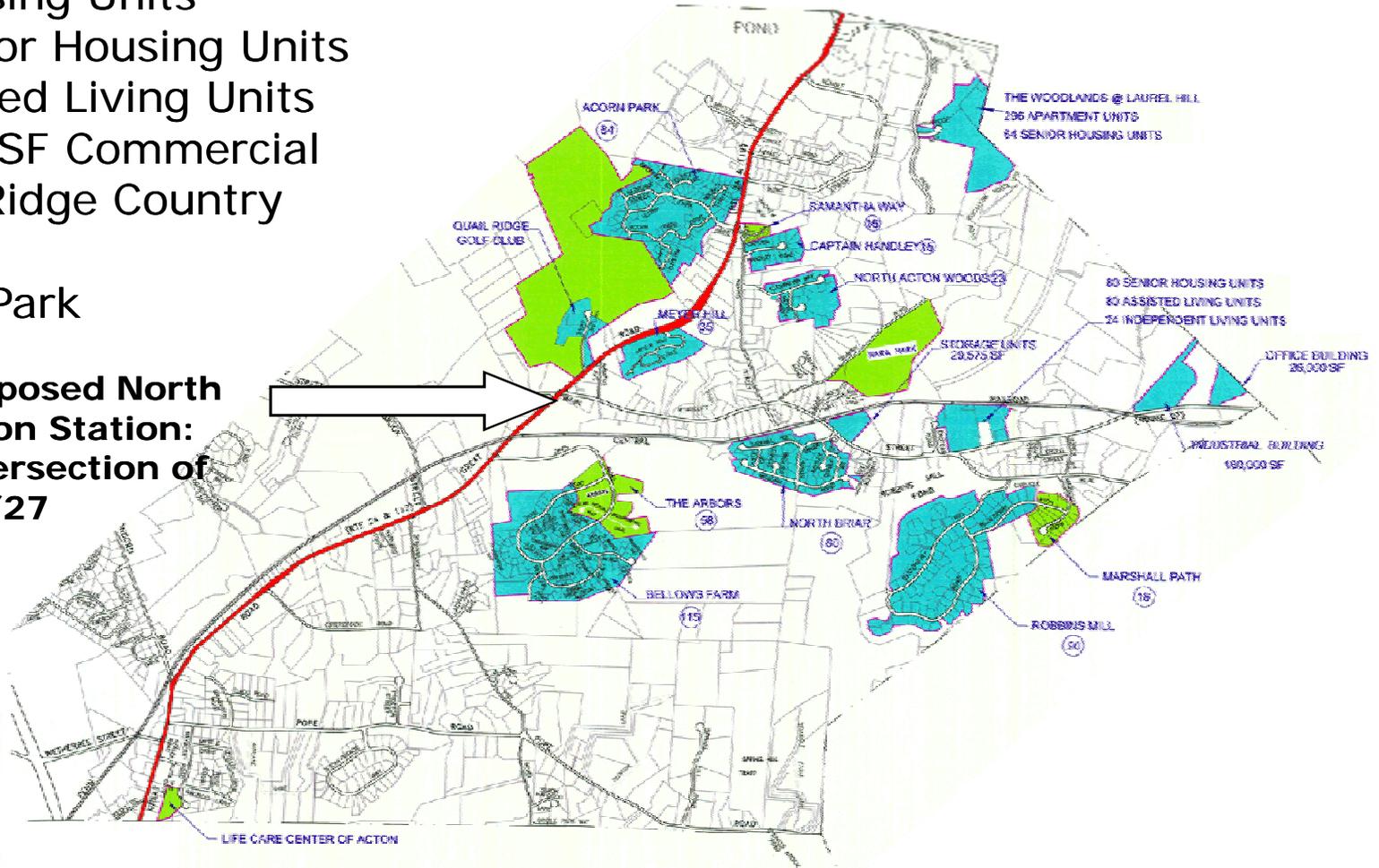


North Acton Development in the Last 20 + /- Years



- 808 Housing Units
- 345 Senior Housing Units
- 80 Assisted Living Units
- 235,575 SF Commercial
- + Quail Ridge Country Club
- + NARA Park

**Proposed North Acton Station:
Intersection of
2A/27**











































Fire Department Successes



- ❑ Adoption of state recommended commercial sprinkler ordinances for commercial and multiple occupancy residences
- ❑ Deployment of thermal imaging equipment
- ❑ Fire Prevention Programs
- ❑ Master fire alarm boxes



Fire Department Successes



- ❑ EMTs and medical equipment including defibrillators and oxygen on all engines
 - Provides compliance with minimum EMS response standards
- ❑ Paramedic Intervention from Emerson Hospital
 - Provides compliance with minimum EMS response standards
 - Program rescued from budget cuts at Emerson twice in the last decade by Town funds being sent to Emerson
- ❑ Med-flight facilities



Fire Department Successes



- April 2007 Annual Town Meeting Article 22A was unanimously approved for \$100,000 for 20% design of a new North Acton Fire Station
 - With understanding that Fall 2007 STM would be convened for final design approval and Spring 2008 ATM for construction monies
 - Fire Chief originally recommended funding full design at a cost of \$448,000



Fire Department Challenges



- ❑ Budget cuts since 1989
- ❑ State Legislation to require Residential Sprinklers in new construction – failed in committee on numerous occasions
- ❑ Town of Acton Residential Sprinkler By-law was defeated on advice of the Attorney General's Office – Subject matter is the sole purview of the state legislature
- ❑ Chaulk/AMR proposal to give the Town 2 ambulances at no cost rejected by citizens
- ❑ Consolidated Fire Station Proposal to put 4 men per piece of equipment rejected by citizens



Fire Department Challenges



- ❑ Funding cuts by Federal and State governments of fire education programs
- ❑ Reinstatement of Fire prevention/education officer requested and not funded on numerous occasions
- ❑ No implementation of Fire Station studies since 1980
- ❑ No funding for repairs of deteriorating fire stations built in the late 1950s and early 1960s



North Acton Fire Station



History

Needs Evaluated and Established

- 1970 – Town Building and
Land Acquisition Committee
- 1980 – Charles Evans & Associates Study
- 1996 – Joint Board Capital Committee
- 2000 – Bennett Associates Study
- 2001 – Reetz Study
- 2007 – Site Selection Committee report
issued



North Acton Fire Station



Introducing Mr. Jack Reetz who will brief FINCOM on Fire/EMS Response Task Force study performed in 2001



North Acton Fire Station



Reetz Study Goals

1. Study and Recommend an appropriate projected level of Fire/EMS response protection for the Town of Acton for the next 20 years
2. Develop and Cost a viable set of alternative Fire/EMS station location scenarios for consideration at a Town Meeting in 2002.



North Acton Fire Station



Reetz Study Goals

1. Construct a new 3-bay station at 2A/27.
2. Upon completion, close and relocate Central Station equipment and personnel to the new 2A/27 station.
3. Utilize Central as an interim facility while West and South Acton are temporarily closed for renovation.



Fire Chief's Proposed Solution: Costs Options in Priority order



- 1) Construct North Acton Fire Station with relocation of personnel and apparatus to NAFS - \$5-\$7 million or cumulative \$82 per year increase in single family tax bill
- 2) Option #1 plus add a second ambulance to either South or West Fire Stations without added personnel - \$200k or cumulative \$109 per year increase in single family tax bill
- 3) Option #2 plus add a second ambulance with 8 additional Firefighter/EMT's - \$648k per year, or cumulative \$198 per year increase in single family tax bill



Fire Chief's Proposed Solution with Costs



- 4) Option #3 plus add four (4) personnel to be deployed on each piece of first line apparatus – add 20 additional staff = \$1,120,000 per year or cumulative \$351 per year increase in single family tax bill
- 5) Option #4 plus add a ladder Truck w/o additional personnel = \$800k or cumulative \$461 per year increase in single family tax bill
- 6) Option #5 plus add four (4) fully manned stations (current minimum staffing) Existing Station renovations = \$9.4 million or cumulative \$590 per year increase in single family tax bill



Conclusion



- Based upon medical and fire science research, as Fire Chief, I delineated the minimum requirements to protect the people and property of this town in this presentation
- I urge you as advisors to Town Meeting to give very deliberate and careful consideration to these requirements as you go forward in planning for how best to meet the public safety needs of all Acton's citizens. I look forward to assisting you in any way I can in this endeavor, and I am available to answer any questions you may have along the way.



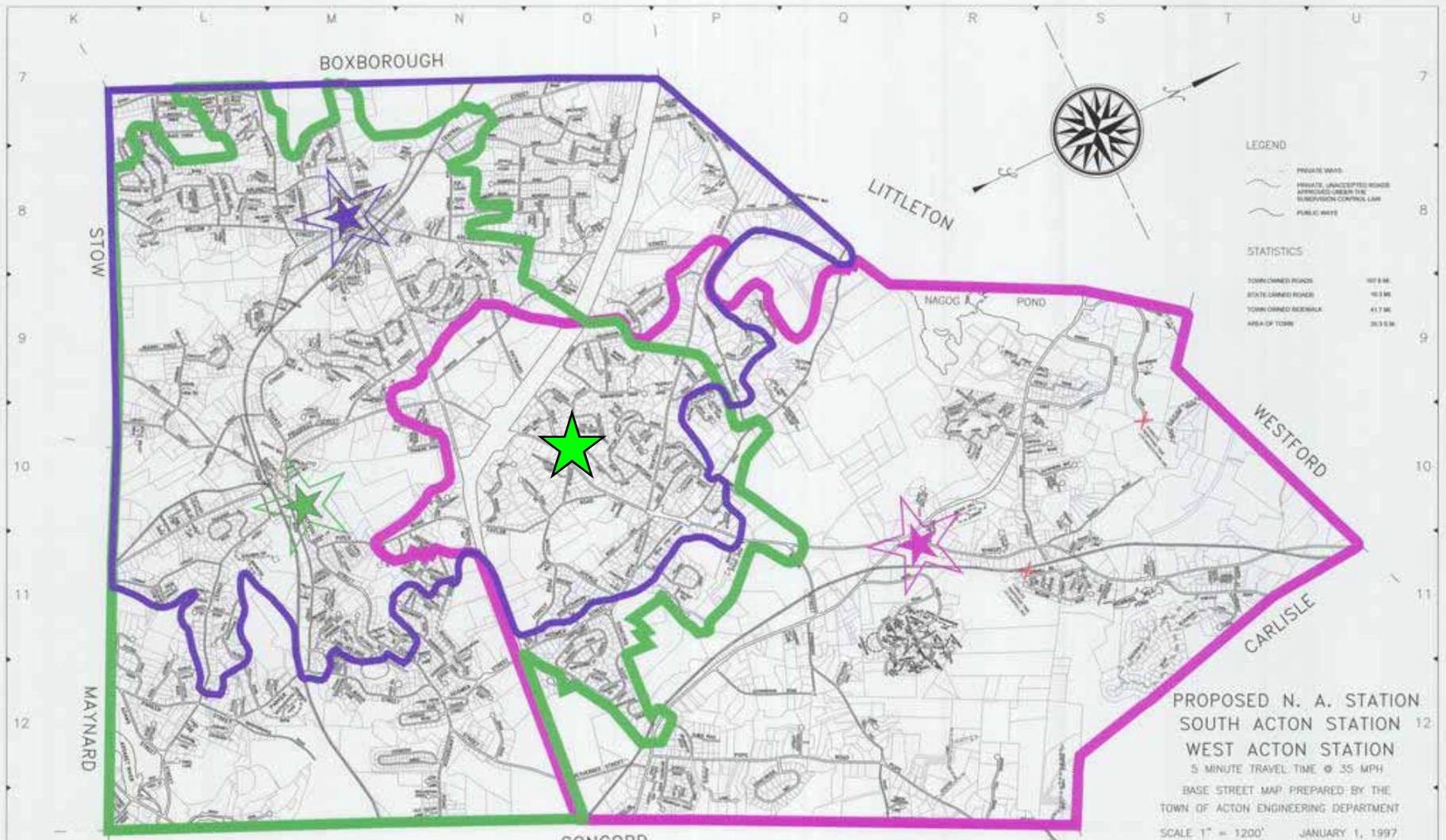


Additional Material





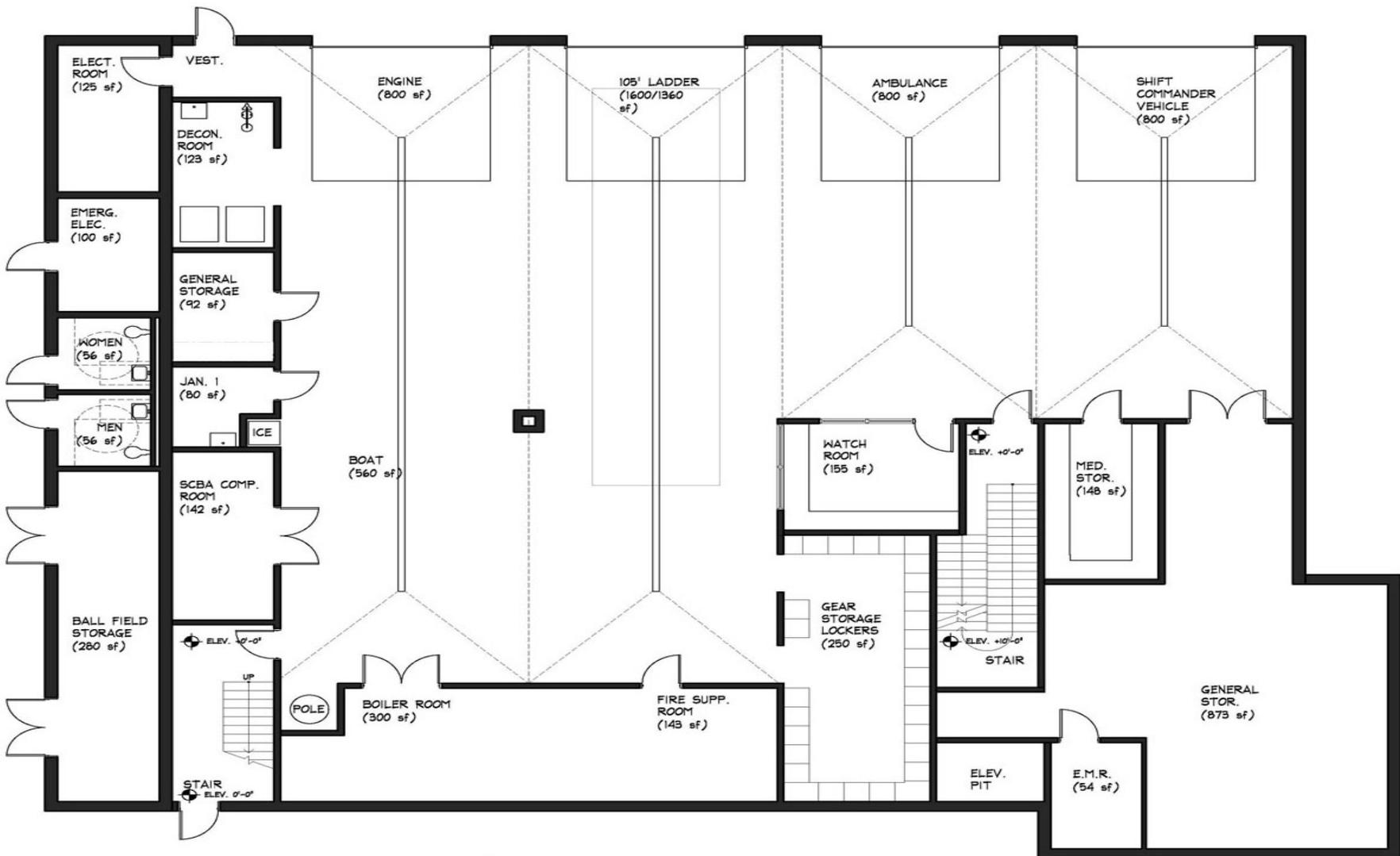
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The Public Safety Need for the North Acton Fire/EMS Station

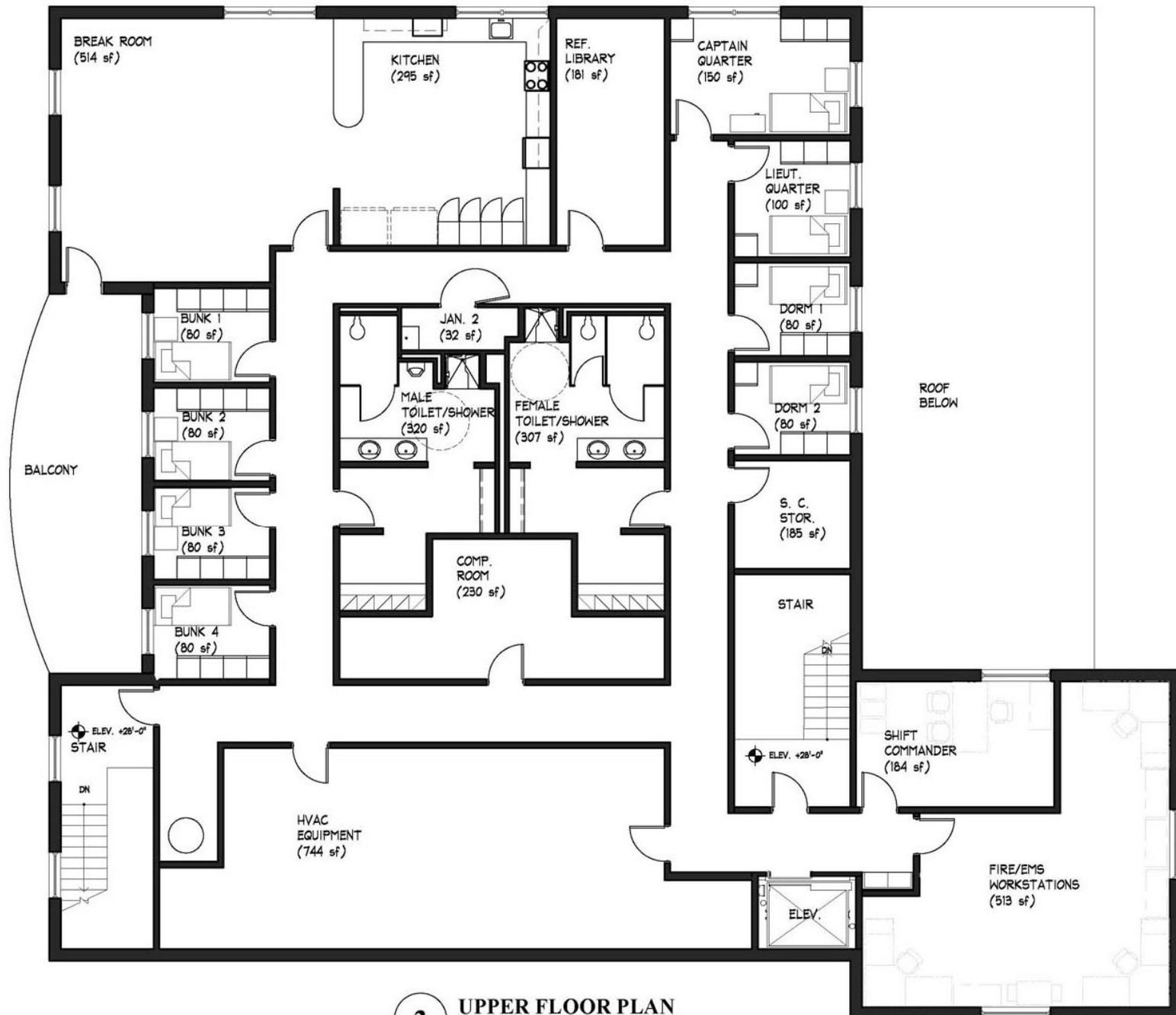




1 **LOWER LEVEL FLOOR PLAN**
 SCALE: 1/8" = 1'-0"



2 MAIN LEVEL FLOOR PLAN
 SCALE: 1/8" = 1'-0"



3 UPPER FLOOR PLAN
 SCALE: 1/8" = 1'-0"



Bills TE Everett has surgery for spinal injury

ORCHARD PARK, N.Y. (AP) —

The game was delayed for about 15 minutes, ... while doctors attended to the player.

September 23rd Boston Globe

(Dr.) Cappuccino ordered paramedics in the ambulance to immediately start running an IV with cold saline.

"It was less than 15 minutes after Everett hit the turf," (Dr.) Green said.



Triage, Treatment & Transport



Ambulance location question

- Engines carry the same lifesaving equipment as an ambulance.
- Ambulance should be on scene in 15 minutes or less.