Organizational, Effectiveness, and Economic Study of a Fire Department Ambulance Service

MIDDLEBOROUGH, MASSACHUSETS

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1. INTRODUCTION AND EXECUTIVE SUMMARY

The Town of Middleborough retained the Matrix Consulting Group to conduct a study of the organization, effectiveness, and economy of developing a Town ambulance service. The RFP for this project came at the heels of an agreement between the Mashpee Wampanoag Indian Tribe and the Town for the development of a resort in the Northeastern area of the town. As a result, the Town is also interested in evaluating the impacts of the proposed development on the Middleborough Fire Department. The scope of work for the study included the following elements:

- Evaluation of the current resource needs of the Fire Department including the necessity of staffing the current north station.
- Evaluation of the feasibility and costs of implementing a Town run ambulance service.
- Analysis of the impact of the proposed resort on fire services in the Town including an assessment of resource needs to provide ambulance service in this area as well as potentially providing fire suppression services.
- Evaluation of all costs associated with each service delivery option.

In order to conduct this Study, the Matrix Consulting Group project team engaged in the following activities:

- Interviewed senior executive staff to understand financial and human resources issues facing the Town.
- Interviewed Department management including the current Interim Chief, labor representatives, and station Captains.
- Collected detailed data describing operations, workload, deployment, scheduling, use of leave, apparatus, station location, etc.

Collectively, these steps were intended to provide the project team with a full understanding of the current methods of service delivery by MFD, its operations and the

environment within which services are provided. This approach is further intended to ensure that all participants have had opportunities for input into the study process.

Executive Summary

The analysis presented in this report is extensive. This section highlights the main findings and recommendations contained within this report.

Section	Finding	Recommendation
3.1	Analysis of response time data and GIS analysis indicate that there are gaps in current response capabilities. The 90th percentile response time to calls for service within the Town is approximately 10 minutes, much higher than recommended by the project team.	The Town should consider staffing 2 firefighters at all times at the south and north stations. This will improve response times and provide additional support to on duty personnel for large incidents and concurrent calls for service. This would not impact the current call force.
3.3	The proposed resort is likely to have a significant impact on fire department workloads. Depending on the level of development and customer base, the project team estimates that fire department workloads will increase by 1 to 7 calls each day.	The Town should consider providing additional staff at the North station to service the proposed resort area. This would not impact the current call force.

Section	Finding	Recommendation
3.4	The Town has several options for providing additional services to the Town and the proposed resort. These include the following: Increase staffing to provide 24-hour response capabilities from the north, south, and central stations. Assign one civilian to dispatch duties in Fire (this would not impact current Police dispatch). Continue to provide current services (e.g. no ambulance service). The estimated cost of this option is $1.47 million. Increase staffing to provide 24-hour response capabilities from all stations and provide town ambulance services. The estimated cost of this option is $1 million. Increase staffing to provide 24-hour response capabilities from all stations and provide ambulance services to the Town and resort. The estimated cost of this option is $1.58 million. Increase staffing to provide 24-hour response capabilities from all stations, provide ambulance services to the Town and resort, and provide fire suppression services to the resort. The estimated cost is $2.65 million.	Current staffing levels and response times indicate that the Town of Middleborough should staff the north and south stations to increase service levels. The project team has recommended the addition of a civilian dispatcher (for Fire) as well as providing 2 on duty personnel for both the north and south stations. Consider consolidating dispatch in the future. The estimated cost of providing the recommended service levels (not considering the resort impacts) is $1.227 million. In addition, the Town continues to pay $250,000 annually to AMR. The estimated cost of providing recommended staffing and a town ambulance service is $1,000,310. As a result, it is more cost effective to run a town ambulance service to subsidize the costs of providing additional staffing for the north and south stations. If the Town wants to provide additional fire services cost effectively, a town ambulance service should be considered. The additional cost of providing ambulance service to the resort is $583,450. The additional cost of providing ambulance service and fire suppression services is approximately $1.65 million. This is the minimum cost that the Town should target for providing these services to the proposed resort.

The next chapter discusses the current state of the Middleborough Fire Department.

2. CURRENT STATE OF THE MIDDLEBOROUGH FIRE DEPARTMENT

This chapter of the report provides information on the current operating environment, organization and operations of the Middleborough Fire Department.

1. TOWN OF MIDDLEBOROUGH

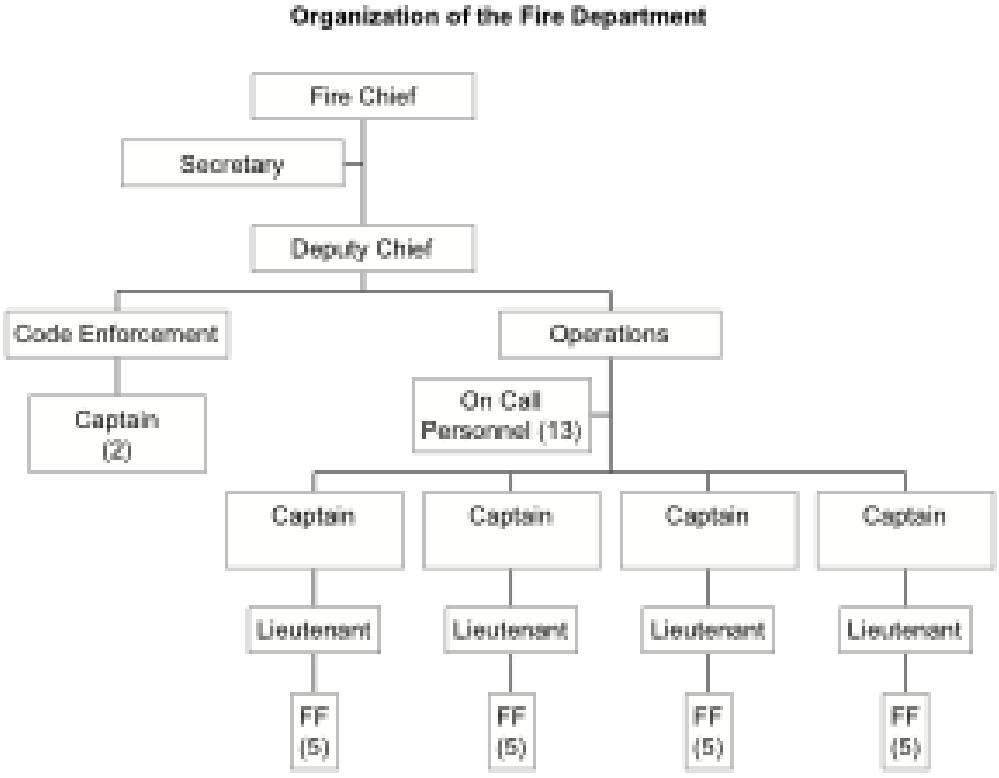
The Town of Middleborough is located in Plymouth County, Massachusetts and has an approximate population of 23,000. The Town is comprised of 72 square miles, resulting in a population density of roughly 319 persons per square mile. Since the 2000 census, the population is estimated to have grown approximately 3,000 residents (15%).

In 2007, the Mashpee Wampanoag Indian Tribe and the Town of Middleborough entered into an Intergovernmental Agreement to develop a resort in the Town. The resort is targeted to be operational in 2012. The Town anticipates that the 534-acre development will have a number of impacts on Town services, including fire and EMS services. To offset increased demands, the Mashpee Wampanoag Tribe has agreed that the resort would establish a Tribal fire department and would fund the costs of equipment and staffing. The Town and Tribe may also consider entering into an agreement for ambulance services.

The next section describes the organization and operation of the Middleborough Fire Department.

2. OVERALL ORGANIZATION OF THE FIRE DEPARTMENT

The Town receives fire, rescue, and first responder emergency medical services from the Middleborough Fire Department. The Department operates out of three (3) fire stations, and has a total employee compliment of 32 full-time sworn personnel, one (1) civilian, and 13 on-call firefighters. The chart, below, shows the overall organization of the Middleborough Fire Department:



As shown above, 28 sworn personnel are assigned to operations, a total of seven (7) per shift in addition to 13 on call personnel. Two Captains are assigned to code enforcement and fire prevention. Currently, the Fire Chief and Deputy Chief positions are vacant. The Fire Chief position is currently filled by the Middleborough Police Chief on acting basis – the Town is currently soliciting applications.

2. EMERGENCY OPERATIONS

(1) Personnel Deployment

The Middleborough Fire Department provides, fire, rescue, and fire responder EMS services to the Town of Middleborough from three fire stations. Depending on daily staffing, the Fire Department will staff a post within fire dispatch (at the central fire station), staff 4 to 5 personnel to cross staff emergency units at Central, and may also staff another firefighter at the south station. The table, below, shows the number of personnel deployed depending on personnel availability each day:

Daily Personnel Deployment by Staffing Level

Staffing Level	Central	South	North
7	5	2	-
6	5	1	-
5	5	-	-
4	4	-	-

As shown above, the Fire Department typically staffs 4 or 5 personnel at the central station (including 1 position assigned each shift to dispatch), as well as 1 or 2 personnel at the South station. The North station is not typically staffed by full-time personnel but may be staffed by call back personnel in the event of a large incident.

(2) Calls for Service

From July 1, 2007 to June 30th, 2008, the Fire Department handled over 2,500 calls for service. The tables, which follow, shows the number of calls for service responded to by time of day and day of week:

Middleborough Fire Department
July 1, 2007 to June 30, 2008 Calls for Service by Day of Week

Day	Number	Avg/Day
Sun	373	7.17
Mon	391	7.52
Tues	374	7.19
Wed	323	6.21
Thur	354	6.81
Fri	403	7.75
Sat	349	6.71

Middleborough Fire Department
July 1, 2007 to June 30, 2008 Calls for Service by Hour of Day

Hour	Number	Avg./Hour
0000	62	0.17
0100	49	0.13
0200	41	0.11
0300	31	0.08
0400	34	0.09
0500	48	0.13
0600	74	0.20
0700	101	0.28
0800	132	0.36
0900	135	0.37
1000	132	0.36
1100	152	0.42
1200	139	0.38
1300	152	0.42
1400	164	0.45
1500	170	0.47
1600	157	0.43
1700	158	0.43
1800	146	0.40
1900	116	0.32
2000	110	0.30
2100	108	0.30
2200	94	0.26
2300	73	0.20
Total	**2,578**	**7.06**

As shown above, the Fire Department handles approximately 7 calls each day. The busiest time of day is between the hours of 1100 to 1900 when calls for service average less than 0.5 calls an hour.

Depending on staffing, the Fire Department typically responds with one person on the squad to an EMS incident and four personnel respond to fire and rescue incidents. In addition, call personnel are toned out for all working fires and major incidents.

3. FIRE DEPARTMENT COSTS AND PERSONNEL FACTORS

The project team collected data from the Fire Department to document current costs of operations within the Town of Middleborough.

(1) Budget Expenditures

The table, which follows, shows the fire department's actual and budgeted expenditures for fiscal years 2006 through 2009:

Middleborough Fire Department
Actual and Budgeted Expenditures FY 06 to 09

Category	FY06 Expended	FY 07 Expended	FY 08 Approved	FY09 Fin Com	Change FY 06-09	% Change
Personnel	2,028,494	2,239,514	2,232,964	2,384,349	355,855	18%
Purchase of Services	97,773	105,093	96,975	97,975	202	0%
Consumable Supplies	28,316	28,195	27,625	28,625	309	1%
Other Charges and Expenses	3,995	2,953	2,500	2,500	(1,495)	-37%
Total Operating Expenses	**2,158,578**	**2,375,755**	**2,360,064**	**2,513,449**	**354,871**	**16%**

As shown above, the Fire Department's budget is expected to increase by approximately $350,000 or 16% over the four-year period to $2,513,449. Personnel expenses are the largest portion of the budget at $2,384,349. Personnel costs are increased by 18% over the four-year period.

(2) Personnel Costs

The table, below, shows the current pay plan in place for Fire Department personnel by rank and step:

Middleborough Fire Department

Current Salaries by Position and Step

Position	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year
Firefighter	$40,712	$41,933	$43,191	$44,487	$45,822	$47,197
Lieutenant	$54,276	$55,905	$57,582	$59,309	$61,088	$62,921
Captain	$72,359	$74,530	$76,766	$79,069	$81,441	$83,884

In addition to base pay, sworn personnel also receive incentive pay for education and certifications. The tables that follow show the annual costs of these incentives:

Middleborough Fire Department
Fire Science Incentive Pay

Fire Science Credits	Annual Pay
12	$624
18	$936
24	$1,248
30	$1,560
36	$1,872
42	$2,184
48	$2,496
54	$2,808
60	$3,120

Middleborough Fire Department
Incentive Pays

Education	Stipend as % of Pay
Associates	10%
Bachelors	15%
Masters	20%

Night Shift Differential	6% for 28 hrs/wk

First Responder AED Pay	1%
EMT Stipend	1%
Specialty Pay (3 or more)	2%

As shown above, sworn personnel receive can receive up to 27% additional pay for education, night differential (approximately 3%), and certification pays.

(3) Staff Availability

The final table, below, shows the number of hours / shifts provided to sworn personnel for various leaves. The project team documents this information in order to evaluate staffing needed to provide 24-hour coverage of emergency operations positions.

Middleborough Fire Department
Leave Hours Provided by Contract for Sworn Personnel

Leave Type	1 to 5 Years	5 to 10 Years
Vacation Accrual	96	144
Sick Accrual	216	216
Holiday Accrual	132	132
Personal Accrual	48	48
Total	492	540
Scheduled	2,184	2,184
Net Hours	1,692	1,644
Availability Rate	**77%**	**75%**

The hours shown above are based on an average shift of 12 hours (10 hour days and 14 hour nights). The table shows that a total of 492 hours of leave are provided by contract for personnel who have between 1 to 5 years of service, and 540 annual hours for personnel who have between 5 and 10 years of service. Based on 2,184 scheduled hours (42 hours / week x 52 weeks), the net availability rate is 77% for personnel with 1 to 5 years and 75% for personnel with 5 to 10 years. These figures are important for determining the total number of personnel needed to provide 24-hour services.

3. ANALYSIS OF SERVICE LEVEL OPTIONS

The purpose of this chapter is to evaluate various options for fire and EMS service delivery within the Town of Middleborough. A number of issues are addressed in this chapter including the following scenarios:

- Under current operating conditions, what are the resource needs of the Fire Department to provide fire, rescue, and first responder emergency medical services?
- With the development of the Mashpee Wampanoag Indian Tribe Resort, what is the impact to the Fire Department in terms of resource needs and costs?
- What are the costs and resource needs to provide a fire department based ambulance service? What is the impact of providing additional service to the resort?
- If the resort does not provide fire suppression and rescue services, what is the impact to the Fire Department?

This chapter is organized as follows: the first two sections evaluate current service levels and the potential impact of the proposed resort, the next section evaluates staffing and resources needs under several scenarios including the implementation of a Town ambulance service, finally the costs and benefits of various service level options are summarized.

1. ANALYSIS OF CURRENT SERVICE LEVELS

An important starting point in evaluating fire services is the establishment of service level objectives. Service levels objectives are a benchmark by which to assess gaps in current service provision and establish goals for service level enhancements. There is a growing national debate as to what the appropriate level of fire, rescue, and emergency medical service is for a community. Several organizations have

recommended service level targets for communities generally based on two concepts: fire growth behavior and cardiac arrest survivability. The table, below, summarizes some of the standards recommended by national organizations:

Source	Description	Comments
ISO	• Targets stations within 2.5 miles of every location. • Resources available to fight common types of fires. • Industrial / institutions may get their own ISO rating (independent of the local fire service). • No response time or other performance standards included.	• 2.5-mile response target is drawn from historical fire service delivery (horses could run for 2.5 miles pulling fire apparatus). • Factors such as water system, access to non-system water, etc., may be used to lower ISO ratings. • Does not impact EMS service delivery.
American Heart Association	• Initial (non-paramedic) response in less than 5 minutes from dispatch. • Paramedic response in less than 8 minutes.	• Recognizes the major impact of rapid intervention on survivability in cardiac cases. • Standard is often cited as the major planning component for EMS system, even though it does not reflect on the majority of EMS workload (non-cardiac care responses).
NFPA	• NFPA 1710 applies to full-time paid fire departments in urban/suburban communities. • On EMS, NFPA 1710 suggests a total response time of 6 minutes including the following elements: - 1 minute for dispatch processing 90% of the time. - 1 minute for fire department reflex time. - 4 minutes of drive time for first arriving unit. • On Fire, NFPA 1710 suggests a compliment of 15 personnel respond to the scene of a structure fire within 8 minutes of drive time and 10 minutes of total response time.	• Assumes consistent level of risk in communities. Does not account for differences in built-in fire protection, age of construction, or other risks. • Based on incidents with low probability but high-risk potential.

As shown above, there are several different standards for emergency medical and fire services. These standards are all based on different assessments of the value of various fire and emergency medical risks. The project team uses these standards as

targets only and as a tool to identify current service levels and develop specific goals for each community. We believe that each community must identify the relative value or cost / benefit of providing a targeted service level. These targets should be based on a thorough inventory of risks and hazards and the cost of mitigating these risks.

In the absence of locally defined service level targets, the project team utilized a range of response times to evaluate fire department response capabilities.

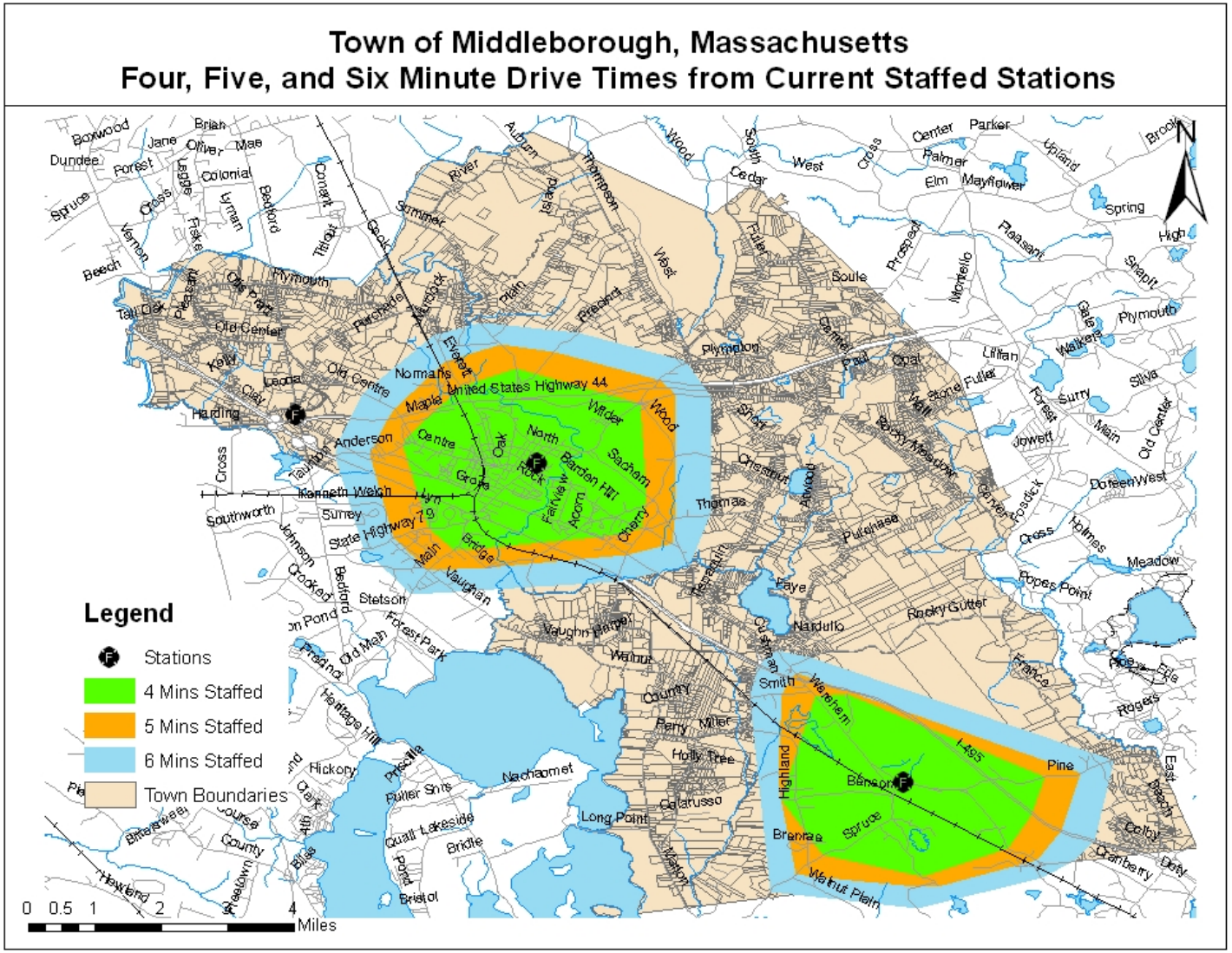
(1) GIS Analysis of Station Locations Indicates That There Are Gaps In Coverage Due to the Large Size of the Service Area and Lack of Staffing at the North Station.

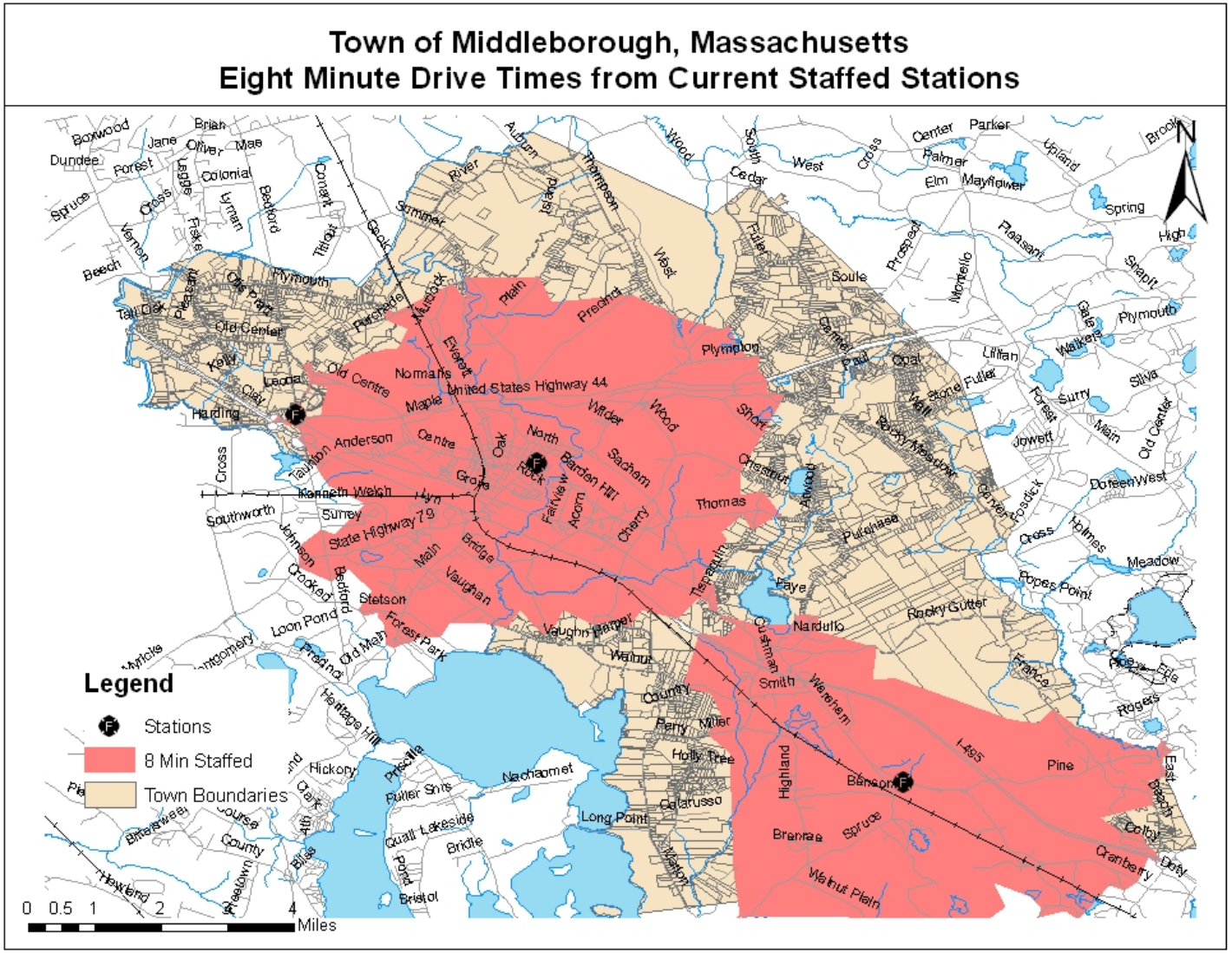
As a starting point for our analysis, the project team evaluated the fire department's ability to respond within various response time targets. Using GIS software, the project team created response time maps to illustrate the Department's ability to respond to various areas of the Town. The maps are based on drive time estimates from each station utilized by the Fire Department. The following should be noted about the response times maps developed by the project team:

- The response time maps show drive time from current staffed stations. Drive time represents the time between a unit going "en-route" to arrival on scene. Drive time does not include the time between receipt of a 911 call, dispatch, and prior to a unit going en-route (getting dressed in protective clothing, getting in the vehicle). Best practices recommend that these activities be performed in less than 2 minutes. As a result, total response time would include 2 additional minutes to the maps.

- The project team evaluated drive times from current staffed stations. As shown in the previous chapter, the Fire Department does not regularly staff the North stations with full-time personnel due to staff availability. Response times from all stations, assuming each station is staffed, are shown in a later section.

The maps, which follow, show four, five, six, and eight minute drive times from current staffed stations.


Town of Middleborough, Massachusetts
Four, Five, and Six Minute Drive Times from Current Staffed Stations
Legend
Stations
4 Mins Staffed
5 Mins Staffed
6 Mins Staffed
Town Boundaries
0 0.5 1 2 4
Miles
United States Highway 44
State Highway 79
I-495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Legend
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0 0.5 1 2 4
Miles
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State Highway 79
Normans
Old Centre
Plymouth
Plympton
Bedford
Wood
Wilder
Sachem
Barden Hill
Thomas
Nardullo
Rocky Gutter
Pulpit Rock
Nachaomet
Long Point
Quail Lakeside
Bridle
Bristol
Pond
Walnut Plain
Brentwood
Spruce
Cranberry
Pine
Highland
Benson
I-495
Wareham
Vaughn
Forest Park
Loon Pond
Stetson
Southworth
Kenneth Welch
Anderson
Harding
Leonard
Old Center
Fuller
Soule
Main
Spring
High
Meadow
Holmes
Cross
Rogers
Miller
Perry
Holly Tree
Cedarcrest
Hickory
Priscilla
Fuller Shirt
Heritage Hill
Old Main
Montgomery
Myrtle
Hawkins
Wheeler
Bliss
Clark
Bittersweet
County
Journal
Hayward
Tillson
Comart
Gould
Summer
Auburn
Thompson
Wood
South
West
Cedar
Cross
Center
Parker
Palmer
Elm
Mayflower
Upland
Brook
Pleasant
Prospect
Marcello
Snapit
Gale
Walkers
Lillian
Silva
Forest
Surry
Jowett
Old Center
Doreen West
Convent
Prospect
Holmes
Meadow
Popes Point
Faye
Rocky Gutter
Cushman
Smith
France
Rogers
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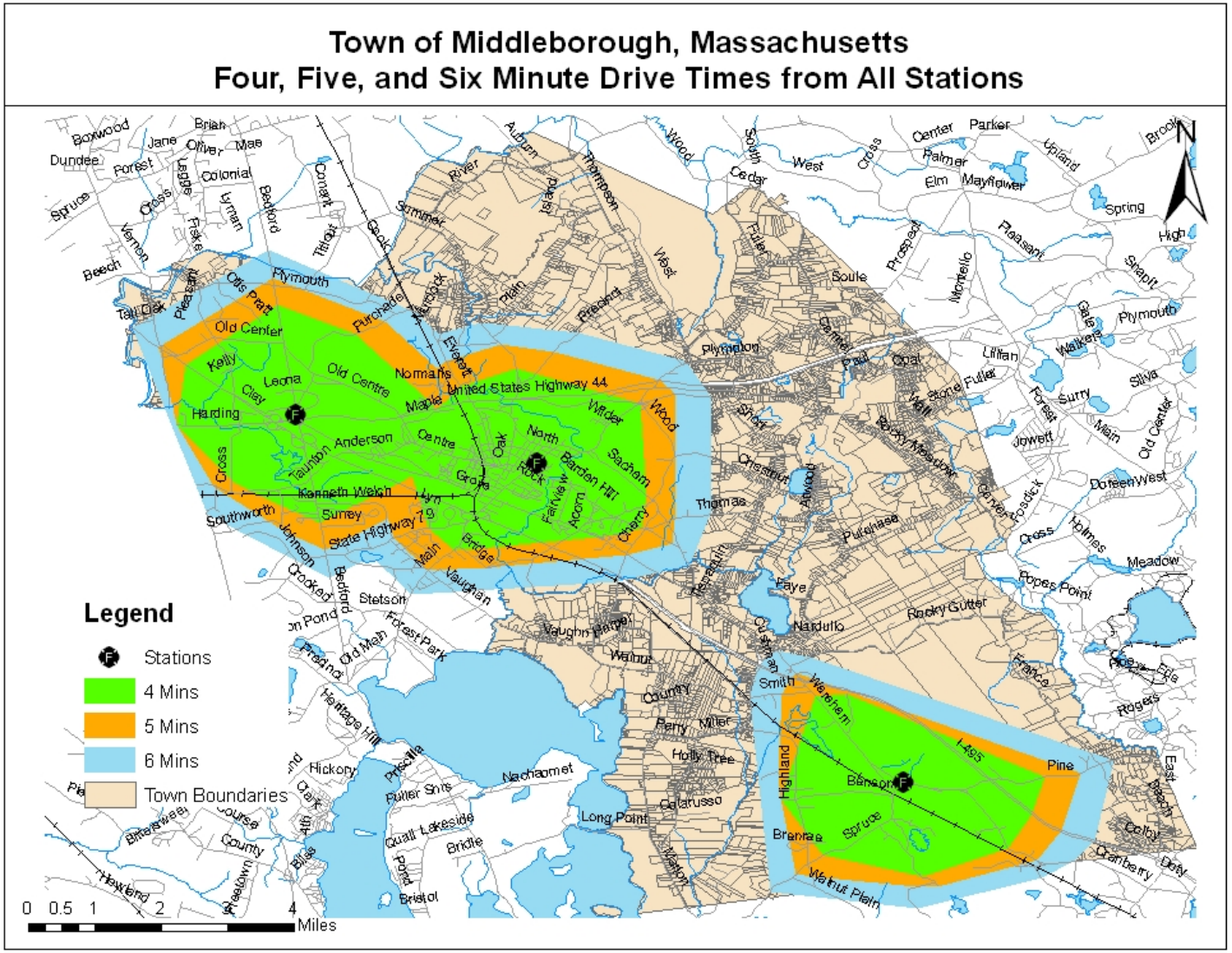
As shown above, there are a number of gaps in the current response capabilities at four minutes indicating that most of the central areas of the Town receive coverage. However, the northern, eastern, and areas between the central station and south station do not receive coverage, even under the five and six minute targets. Under the eight minutes target, which is used to gauge structure fire response capabilities, there are also gaps in response coverage. The map also shows that there is no station overlap (i.e. areas where more than one station can respond within eight minutes) from the current staffed stations. Given the limited number of personnel on duty each day, the Department relies on call firefighters, or recall of personnel, to provide an initial structure fire response (between 13 to 15 personnel).

As an illustration of the impact of staffing the northern station with full-time personnel, the project team developed maps, which show response coverage under the same targets. These maps are shown on the following pages.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Kelly
Clay
Maple
Oak
Grove
Rock
North
Barden Hill
Sacham
Wilder
Wood
Fairview
Acorn
Cherry
Bridge
Main
Vaughan
Thomas
Purchase
Nardullo
Faye
Rocky Gutter
Smith
Wareham
Pine
Barson
Highland
Brenna
Spruce
Walnut Plain
Long Point
Nachaomet
Quail Lakeside
Bridle
Bristol
Pond
Hickory
Priscilla
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Heritage Hill
Forest Park
Old Main
Stetson
Bedford
Crocked
Johnson
Walnut
Country
Perry
Miller
Holly Tree
Calarusso
Rogers
France
Ella
Cranberry
Doty
Beech
Colby
Meadow
Holmes
Doreen
West
Rocky Meadow
Chestnut
Atwood
Jewett
Forest
Surry
Main
Old Center
Silva
Walkers
Gale
Lillian
Stone Fuller
Hall
Shiloh
Plymton
Carmel
Paul
Coat
Soule
Prospect
Pleasant
Spring
High
Snapit
Plymouth
Upland
Brook
Center
Parker
Palmer
Elm
Mayflower
Cedar
West
Cross
South
Wood
Auburn
River
Thompson
Isley
Summer
Everett
Plain
Pleasant
Purchase
Ellis Pratt
Tall Oak
Pleasant
Vernon
Beech
Spruce
Dundee
Forest
Jane
Brian
Boxwood
Oliver
Mae
Colonial
Legge
Lyman
Fiske
Bedford
Cornant
Talbot
Gould
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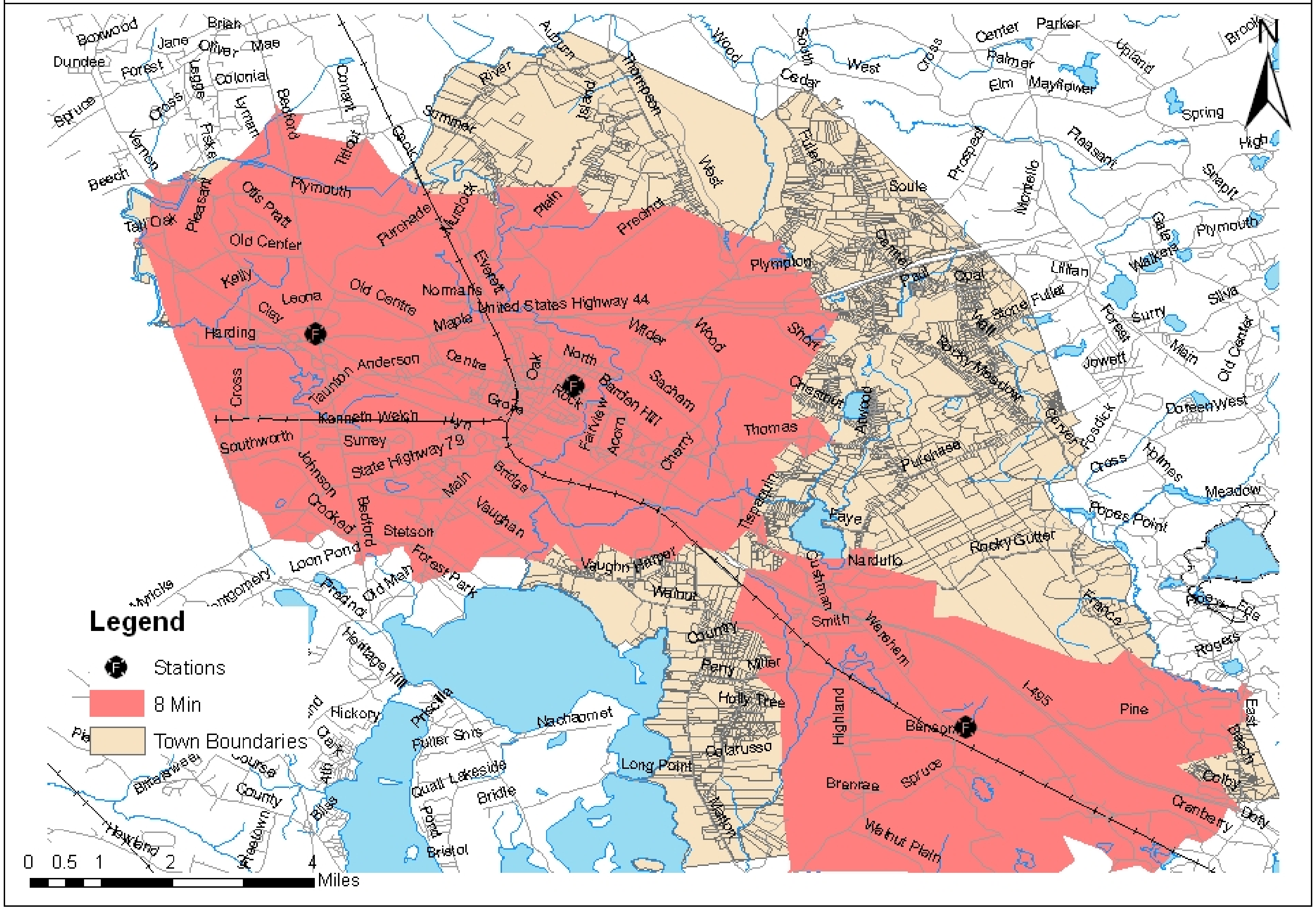
Crocked Pond

Town of Middleborough, Massachusetts
Eight Minute Drive Times from All Stations



As shown in the two maps, response capabilities under each response time target improve significantly when all three stations are staffed. Response capabilities on the northern side of the Town improve markedly. Additional staffing also provides for more effective coverage of the central areas of the Town when the personnel assigned to central are out on a call.

(2) Analysis of Response Time Data Indicates That The Department Delivers Extended Response Times on a Regular Basis.

The project team collected reports from the Fire Department's records management system (RMS) to document actual response time performance achieved by the Fire Department. The tables, that follow, show the percentage of calls responded to by the first and second arriving units, by time interval.

First Unit Arrival Time Analysis
From 7/1/2007 to 6/30/2008

Time Interval	Calls	Interval Percentage	Aggregate Percentage
1 Minute or less	104	4%	4%
1 to 2 Minutes	183	7%	11%
2 to 3 Minutes	373	15%	26%
3 to 4 Minutes	377	15%	42%
4 to 5 Minutes	294	12%	53%
5 to 6 Minutes	238	10%	63%
6 to 7 Minutes	212	8%	71%
7 to 8 Minutes	152	6%	77%
8 to 9 Minutes	121	5%	82%
9 to 10 Minutes	120	5%	87%
10 to 11 Minutes	92	4%	91%
11 to 12 Minutes	70	3%	94%
12 to 13 Minutes	66	3%	96%
13 to 14 Minutes	29	1%	97%
14 to 15 Minutes	18	1%	98%
15 to 16 Minutes	12	0%	99%
16 or more	36	1%	100%
Total	**2,497**	**100%**	

Second Unit Arrival Time Analysis
From 7/1/2007 to 6/30/2008

Time Interval	Calls	Interval Percentage	Aggregate Percentage
1 Minute or less	8	4%	4%
1 to 2 Minutes	20	9%	13%
2 to 3 Minutes	33	16%	29%
3 to 4 Minutes	37	18%	46%
4 to 5 Minutes	26	12%	59%
5 to 6 Minutes	27	13%	72%
6 to 7 Minutes	16	8%	79%
7 to 8 Minutes	8	4%	83%
8 to 9 Minutes	9	4%	87%
9 to 10 Minutes	6	3%	90%
10 to 11 Minutes	8	4%	94%
10 or more	13	6%	100%
Total	**211**	**100%**	

The following points summarize the information in the preceding tables:

- Response time data for the first unit arriving on scene indicates that the 90th percentile response time is approximately 10 minutes or less from dispatch. At the 80th percentile, first unit on scene response times are approximately 8 minutes or less. Overall, these response times are relatively long compared to other communities. Again, this is largely a function of the geography of the service area and the limited ability to respond from all stations due to staff availability.

- Response time data for the second arriving unit also typically arrives within 9 to 10 minutes, 90% of the time. Also note that the number of calls where a second unit responded was much smaller than those with 1 unit responding – 211 vs. 2,497.

Overall, response time data and GIS analysis indicates that the Town would benefit from additional staffing of the north station. Additional personnel would provide additional response coverage to the northern side of the Town and would provide additional resources for larger incidents such as structure fires, multi-casualty incidents, and other situations. The project team will incorporate these findings into our analysis and recommendations of each of the scenarios, discussed in later sections.

2. USE OF FIRE PERSONNEL TO STAFF THE FIRE DISPATCH FUNCTION IS NOT AN EFFECTIVE PRACTICE.

As described earlier, the Middleborough Fire Department assigns 5 personnel to the central station. One position is dedicated each day to provide emergency fire dispatching. 911 calls are routed through the Police Department and then forward to the Fire Department for dispatch. Emergency medical dispatch is forwarded to AMR.

Many public safety agencies around the country utilize civilian professional personnel for call taking and dispatch of police, fire, and emergency medical services. Emergency communications has become a specialized profession represented by a number of organizations including APCO (American Public Communications Organizations) and NENA (National Emergency Number Association) and several others. There are many benefits to using civilian personnel for dispatching including:

- Expanded training on a number of issues including telephone system, computer aid dispatching and records management systems (CAD/RMS), Geographic Information Systems (GIS / Automatic Vehicle Locator dispatching), etc.
- The ability to cross train personnel to dispatch multiple services including: law enforcement dispatching, fire dispatching, and emergency medical dispatching.
- The lower costs associated with utilizing civilian personnel compared to sworn officers.

In addition, many jurisdictions have combined law enforcement, fire, and emergency medical dispatching functions or regionalized these functions. Regionalization provides increased flexibility in using personnel for multiple functions, additional resources to handle peak hour workloads and large incidents, as well the ability to share the costs of maintaining capital equipment – phone systems, CAD/RMS, radio systems, etc.

Given the limited availability of fire personnel within the Town of Middleborough, the use of a firefighter for dispatching functions is not effective. This does not impact current Police dispatch operations. Consideration should be given to consolidation of these services within the Town and perhaps with other communities.

Recommendation: Discontinue the use of sworn firefighters to provide dispatching services. Hire civilian personnel to perform this function. Consider consolidation of law enforcement and fire dispatching as well as potential regionalization with Plymouth County.

3. THE PROPOSED RESORT IS LIKELY TO INCREASE FIRE DEPARTMENT WORKLOADS AND RESOURCES NEEDS.

The Mashpee Wampanoag Tribe and the Town of Middleborough have entered into an agreement for the development of a 240,000 square foot resort, retail area, and event center near route 44 and Plymouth Street. The development will include an 18 story hotels with 1,500 guest rooms, a 6,500 parking space, garage, and an 18-hole golf course (phase II). It is estimated that the development will cost approximately 1 billion to complete.

The proposed development will certainly have an impact on the Town of Middleborough. A town committee recently developed a report, which identified a number of concerns and potential impacts of the resort including: increased traffic, crime, environmental concerns, increased revenues, etc. The report also indicated that there would be additional demands placed on public safety services within the Town.

It is difficult to develop an accurate projection of the increase in Fire Department workloads due to the development of the resort. The potential workload increases will depend on a number of factors including: increases in traffic accidents and injuries due to the resort, increases in the number of medical calls, increases in rescue and hazard

calls at or resulting from the resort, and potential fire suppression incidents. The actual incidence of each of these areas is unknown. The actual increase in Fire Department workload was developed by the project team a sensitivity analysis based on estimated increased call for service demand due to the resort. Note that the number of vehicle accidents should remain relatively low given the fact that freeway routes (495 to 44) will be available for most trips, reducing surface road trip sand the number of intersections.

The table, that follows, shows the potential increase in call for service demand under several scenarios:

Potential Fire Department Calls for Service Due to Proposed Resort

Hour	Current Number	Avg./ Hour	10% Increase	25% Increase	50% Increase	75% Increase	100% Increase
0000	62	0.17	0.19	0.21	0.25	0.30	0.34
0100	49	0.13	0.15	0.17	0.20	0.23	0.27
0200	41	0.11	0.12	0.14	0.17	0.20	0.22
0300	31	0.08	0.09	0.11	0.13	0.15	0.17
0400	34	0.09	0.10	0.12	0.14	0.16	0.19
0500	48	0.13	0.14	0.16	0.20	0.23	0.26
0600	74	0.20	0.22	0.25	0.30	0.35	0.41
0700	101	0.28	0.30	0.35	0.42	0.48	0.55
0800	132	0.36	0.40	0.45	0.54	0.63	0.72
0900	135	0.37	0.41	0.46	0.55	0.65	0.74
1000	132	0.36	0.40	0.45	0.54	0.63	0.72
1100	152	0.42	0.46	0.52	0.62	0.73	0.83
1200	139	0.38	0.42	0.48	0.57	0.67	0.76
1300	152	0.42	0.46	0.52	0.62	0.73	0.83
1400	164	0.45	0.49	0.56	0.67	0.79	0.90
1500	170	0.47	0.51	0.58	0.70	0.82	0.93
1600	157	0.43	0.47	0.54	0.65	0.75	0.86
1700	158	0.43	0.48	0.54	0.65	0.76	0.87
1800	146	0.40	0.44	0.50	0.60	0.70	0.80
1900	116	0.32	0.35	0.40	0.48	0.56	0.64
2000	110	0.30	0.33	0.38	0.45	0.53	0.60
2100	108	0.30	0.33	0.37	0.44	0.52	0.59
2200	94	0.26	0.28	0.32	0.39	0.45	0.52
2300	73	0.20	0.22	0.25	0.30	0.35	0.40
Total	**2,578**	**7.06**	**7.77**	**8.83**	**10.59**	**12.36**	**14.13**

The following points summarize the information presented above:

- The current number of calls handled, on average, each day is approximately 7 calls each day. During the busiest hour, calls for service average less than 0.5 calls.

- Based on relatively modest increases in call for service workload – 10% and 25%, the Department can anticipate an increase of approximately 1 to 2.5 calls each day.

- Based on a relatively large increase in call for service workload – 50% to 75%, the Department can anticipate approximately 3.5 to 5 additional calls for service each day.

- Assuming a doubling of current call for service workload, the average daily workload increases to 14 calls. Under this scenario, average hourly demand is still below 1 call per hour.

As shown above, the impact of the resort will depend on many factors; however, sensitivity analysis indicates that workload could potentially increase by 1 to 7 calls each day.

4. ANALYSIS OF SERVICE LEVEL OPTIONS AND COSTS

This section presents the project team's analysis of resource needs under several scenarios including:

- Current resource needs based on current services and additional staffing needs at the north and south stations.

- Resource needs to staff the north and south stations full-time, and to implement a Town ambulance service.

- Resource needs to staff the north and south stations full-time, implement a Town ambulance service, and provide non-suppression services to the resort area.

- Additional resource needs to provide suppression services to the resort area.

For each scenario, the project team developed the following:

- Assumptions based on analysis of current service levels as well as resources needs for each additional service or service impact (i.e. the resort).

- The estimated number of personnel needed under each scenario to provide targeted service levels.

- The estimated operating and capital cost associated with each option.

The first section discusses resource needs based on current service provided by the Middleborough Fire Department.

(1) Costs and Resources to Provide Additional Staffing at North and South Stations – Enhanced Fire and First Response Services Throughout the Town Without Fire Based Ambulance Service.

In developing our staffing calculations, the project team relied on the following assumptions about service levels provided by the Town:

- The current approach to staffing the north and south stations is ineffective and unsafe. As shown in the previous sections, response times indicate that there are several gaps in the Fire Department's ability to provide rapid initial response to incidents. This is due to the geography of the service area as well as the lack of available staffing at the northern and southern stations.

- The current practice of deploying one (1) firefighter at the south station is neither safe nor effective. In order to provide effective and safe initial response to the majority of calls for service, the Department should staff a minimum of two (2) personnel each day at the northern and southern stations.

- Current Officer staffing should remain the same at 2 per shift. This provides an officer for the 3 person engine company and a duty officer who provide incident management for large incidents and supervises all stations – north, south, and central. Officer vacancies will continue to be handled using Firefighters acting out of classification.

- The Department should target the use of 4 personnel each day at the central station. This will provide the ability to respond to the densest area of Town with sufficient personnel to handle small fires and most rescue situations.

- Staffing deployed to each work group should be the same (i.e., total firefighter staffing should be evenly divisible into four groups).

Based on these assumptions, the project team developed the number of personnel needed to meet the minimum daily staffing plan and developed cost

estimates based on current salary and benefits costs. Note that these benefit costs include the cost of covering disability resulting from injuries sustained while on duty. The project team does not believe that the call volumes would result in substantially higher rates of employee injury than are already experienced in the Town.

The table, below, shows the total number of personnel needed by rank, station, and shift including costs for salaries and benefits.

Scenario 1: Staffing Needed to Provide Enhanced Non-Transport Services to Town With 4 at Central, 2 at South, 2 at North, and 1 Dispatcher per Shift

Station	Officer	FF EMT-B	Dispatcher*	Total
Central	2	2	1	5
North		2		2
South		2		2
Total Needed per Shift	2	6	1	9
Shifts	4	4	3	
Total All Shifts	**8**	**24**	**4**	**36**
Availability Rate	75%	78%	85%	
Number Needed (No OT)	**11**	**31**	**5**	**47**
Number Deployed to Cover Shifts	**8**	**32**	**5**	**45**
Current	8	20	0	28
Difference	0	(12)	(5)	(17)
Needed	0	12	5	17
New Position Costs	$85,213	$63,510	$50,400	
Total Costs by Rank	$-	$762,126	$252,000	**$1,014,126**

As shown above, providing four personnel at Central, 2 at South, and 2 at North would require a total of 45 personnel, an increase of 17 positions. The estimated additional personnel cost, including salaries and benefits is approximately $1 million annually. Shift deployment is evenly divisible into the four working groups. The project team did not increase the number of Officer positions, assuming that the shift vacancies would be covered using Firefighters working out of class. No Officers were assumed for the North and South stations at two-person staffing in those locations.

(2) Costs and Resources to Provide Additional Staffing at North and South Stations – Current Services With Ambulance Service

In developing our staffing calculations, the project team relied on the following conclusions about current service levels and estimated staffing needs to provide ambulance service:

- The current approach to staffing the north and south stations is ineffective. As shown in the previous sections, response times indicate that there are several gaps in the Fire Department's ability to provide rapid initial response to incidents. This is due to the geography of the service area as well as the lack of available staffing at the northern and southern stations.

- The current practice of staffing 1 firefighter at the south station is not effective. In order to provide effective, safety, initial response to the majority of calls for service, the Department should staff a minimum of 2 personnel each day at the northern and southern stations.

- The Department should target the use of 4 personnel each day at the central station. This will provide the ability to respond to the densest area of Town with sufficient personnel to handle small fires and most rescue situations.

- Current Officer staffing should remain the same at 2 per shift. This provides an officer for the 3 person engine company and a duty officer who provide incident management for large incidents and supervises all stations – north, south, and central. Officer vacancies on shift would be handled by Firefighters acting out of classification.

- Staffing deployed to each work group should be the same (i.e., total firefighter staffing should be evenly divisible into four groups).

- One ambulance (the current service provided by AMR) will be staffed twenty-four hours each day using the 4 personnel assigned to the central station. These personnel would cross-staff and engine or truck company and the ambulance unit.

- A back-up ambulance unit would be housed at the north station and backfilled as needed using on-duty personnel. One paramedic firefighter would be on-duty each day to provide back-up ALS service.

Based on these assumptions, the project team developed the number of personnel needed to meet the minimum daily staffing plan and developed cost estimates based on current salary and benefits costs.

The table, below, shows the total number of personnel needed by rank, station, and shift including costs for salaries and benefits.

Scenario 2: Staffing Needed to Provide Ambulance Services to Town with 4 at Central, 2 at South, 2 at North, and 1 Dispatcher per Shift

Station	Officer	FF EMT-B	FF EMT-P	Dispatcher*	Total
Central	2	1	1	1	5
North		1	1		2
South		2			2
Total Needed per Shift	2	4	2	1	9
Shifts	4	4	4	3	15
Total All Shifts	**8**	**16**	**8**	**4**	**36**
Availability Rate	75%	78%	78%	85%	
Number Needed	**11**	**21**	**10**	**5**	**47**
Number Deployed to Cover Shifts	**8**	**20**	**12**	**5**	**45**
Current	8	20	0	0	28
Difference	0	0	(12)	(5)	(17)
Needed	0	0	12	5	17
New Position Costs	$85,213	$63,510	$65,196	$50,400	
Total Costs by Rank	$-	$-	$782,355	$252,000	**$1,034,355**

As shown above, providing four personnel at Central, 2 at South, and 2 at North would require a total of 47 personnel, an increase of 17 positions. This includes 12 new firefighter paramedic positions, five of which can be converted from firefighter EMT-B positions. The estimated personnel cost, including salaries and benefits is approximately $1.034 million annually.

(3) Costs and Resources to Provide Ambulance Service and With Increased Workloads from Resort.

In developing our staffing calculations, the project team relied on the following conclusions about current service levels and estimated staffing needs to provide ambulance service to the Town and the proposed resort:

- The current approach to staffing the north and south stations is ineffective. As shown in the previous sections, response times indicate that there are several gaps in the Fire Department's ability to provide rapid initial response to incidents. This is due to the geography of the service area as well as the lack of available staffing at the northern and southern stations.

- The current practice of staffing 1 firefighter at the south station is not effective. In order to provide effective, safety, initial response to the majority of calls for service, the Department should staff a minimum of 2 personnel each day at the northern and southern stations.

- The Department should target the use of 4 personnel each day at the central station. This will provide the ability to respond to the densest area of Town with sufficient personnel to handle small fires and most rescue situations.

- One Officer will continue to be staffed at the central fire station and one officer will be moved to the north station to supervise the 4 person crew.

- Staffing deployed to each work group should be the same (i.e., total firefighter staffing should be evenly divisible into four groups).

- One ambulance (the current service provided by AMR) will be staffed twenty-four hours each day using the 4 personnel assigned to the central station. These personnel would cross-staff and engine or truck company and the ambulance unit.

- To accommodate increased EMS workload associated with the resort development, a second ambulance unit should be staffed twenty-four hours each day. This would provide one unit within the central Town area while another units was transporting a patient to the Town of Plymouth or other hospitals. This approach would also accommodate two simultaneous calls for service.

  The following table shows the staffing requirements under this scenario:

Scenario 3: Staffing Needed to Provide Ambulance Services to Town And Resort with 4 at Central, 2 at South, 4 at North, and 1 Dispatcher per Shift

Station	Officer	FF EMT-B	FF EMT-P	Dispatcher*	Total
Central	1	2	1	1	5
North	1	2	1		4
South	0	1	1		2
Total Needed per Shift	2	5	3		10
Shifts	4	4	4	3	
Total All Shifts	**8**	**20**	**12**	**4**	**44**
Availability Rate	75%	78%	78%	85%	
Number Needed	**11**	**26**	**15**	**5**	**57**
Number Deployed to Cover Shifts	**8**	**28**	**16**	**5**	**57**
Current	8	20	0	0	28
Difference	0	(8)	(16)	(5)	(29)
Needed	0	8	16	5	29
New Position Costs	$85,213	$63,510	$65,196	$50,400	
Total Costs by Rank	**$-**	**$508,084**	**$1,043,140**	**$252,000**	**$1,803,224**

As shown above, providing an additional full time ambulance to provide back-up due to additional workloads associated with the resort requires a total of 57 personnel. The additional cost of this scenario is $1.8 million, or approximately $700 thousand more than providing service to the Town only as first responders. This would require 29 additional personnel in the Department.

(4) Costs and Resources to Provide Ambulance Service and Fire Suppression Services to the Town and to the Resort Assuming no Tribal Fire Department.

In developing our staffing calculations, the project team relied on the following conclusions about current service levels, estimated staffing needs to provide ambulance service to the Town and the proposed resort, and staffing needs to provide fire suppression services to the resort:

- The current approach to staffing the north and south stations is ineffective. As shown in the previous sections, response times indicate that there are several

gaps in the Fire Department's ability to provide rapid initial response to incidents. This is due to the geography of the service area as well as the lack of available staffing at the northern and southern stations.

- The current practice of staffing 1 firefighter at the south station is not effective. In order to provide effective, safety, initial response to the majority of calls for service, the Department should staff a minimum of 2 personnel each day at the southern station.

- The Department should target the use of 4 personnel each day at the central station. This will provide the ability to respond to the densest area of Town with sufficient personnel to handle small fires and most rescue situations.

- One ambulance (the current service provided by AMR) will be staffed twenty-four hours each day using the 4 personnel assigned to the central station. These personnel would cross-staff and engine or truck company and the ambulance unit.

- To accommodate increased EMS workload associated with the resort development, a second ambulance unit should be staffed twenty-four hours each day. This would provide one unit within the central Town area while another units was transporting a patient to the Town of Plymouth or other hospitals. This approach would also accommodate two simultaneous calls for service.

- To provide fire suppression services to the resort, the Town should staff at minimum 6 personnel at the North station. This would provide one 3-person engine company and one 3-person ladder company to respond to the resort for structure fires. These personnel would also cross staff the second ambulance unit needed for EMS workloads.

- Personnel would be deployed across all four shifts evenly.

- Under this scenario, three officers are on duty each day to supervise the two engine companies at the north station and the one crew at the central station.

The table, below, shows the total staff needed under this scenario:

Scenario 4: Staffing Needed to Provide Ambulance and Suppression Services to Town And Resort with 4 at Central, 2 at South, 6 at North, and 1 Dispatcher per Shift

Station	Officer	FF EMT-B	FF EMT-P	Dispatcher*	Total
Central	1	2	1	1	5
North	2	2	2		6
South	0	1	1		2
Total Needed per Shift	3	5	4	1	13
Shifts	4	4	4	3	
Total All Shifts	**12**	**20**	**16**	**4**	**52**
Availability Rate	75%	78%	78%	85%	
Number Needed	**16**	**26**	**21**	**5**	**68**
Number Deployed to Cover Shifts	**16**	**28**	**20**	**5**	**69**
Current	8	20	0	0	28
Difference	(8)	(8)	(20)	(5)	(41)
Needed	8	8	20	5	41
New Position Costs	$85,213	$63,510	$65,196	$50,400	
Total Costs by Rank	**$681,707**	**$508,084**	**$1,303,925**	**$252,000**	**$2,745,715**

As shown above, this scenario requires a total of 69 personnel, an increase of 41 positions. This includes a total of 20 new firefighter paramedic positions, 8 new firefighter EMT-B positions, 8 new officer positions, and 5 new dispatcher positions. The estimated cost of this option is $2.75 million. Assuming that the 6 personnel assigned to the North station are used to cross staff the ambulance unit and provide service to both the Town and resort area, the estimated increase associated with additional services provided to the resort is $942 thousand more than providing fire suppression, rescue, and ambulance service to the Town without providing resources for the Resort.

5. ADDITIONAL COSTS ASSOCIATED WITH SERVICE LEVEL OPTIONS

The project team identified additional costs associated with providing additional services to the Town and the proposed resort.

(1) EMS Equipment and Supplies

In order to estimate the initial costs associated with starting a Town ambulance service, the project team collected information from neighboring fire departments. Some of the equipment costs may vary depending on the vendor and specifications of equipment (e.g. cardiac monitoring devices). In addition, some of the costs are on a per box or per item basis. The actual quantity needed will vary depending on desired stock on hand and actual utilization. However, these items will have a marginal impact on total initial supply and equipment costs.

Based on these data, the project team estimates that initial medical equipment and supply costs, per ambulance, will be approximately $46,000. It should be noted that approximately $42,000 of the costs are non-recurring costs. For example, a cardiac monitor should last several years before being replaced. However, $4,000 of the costs are recurring due to regular use and can be recovered through EMS billing.

(2) Vehicle and Licensing Fees

The project team researched the additional costs associated with purchasing each ambulance unit as well as licensing fees charged by the state of Massachusetts for operating an ALS ambulance service. Based on our research, the estimated cost of an ambulance is approximately $170,000 for a Type III Class V ambulance. In addition, the State charges $600 for an ALS license as well as a vehicle permit fee of $200 per vehicle.

For scenario number four, where the Town provides fire suppression services to the resort, the project team assumes that a ladder truck would be purchased. The

engine would come from the existing fleet of vehicles utilized by the Fire Department. The estimated cost of a quint (ladder truck with a pump) is $850,000.

(3) Training Costs

Developing a Town ambulance service will require training personnel to provide enhanced EMS services at the basic life support (BLS) or advanced life support (ALS) level. While the majority of current employees are certified at the EMT-B level, additional training would be needed to provide ALS services. In addition, under those scenarios that require a significant number of new personnel, additional EMT-B / FF employees will be needed. EMS certification requirements consist of classroom hours, field training, and testing. The time required, by certification, is shown below:

Training Requirements and Estimated Timeframe

Certification Requirements	Comment	Time Duration
EMT - Basic		
100 hours of classroom and field training	110 hours to 150 hours or more depending on individual sponsor requirements and student needs. Actual time inclusive of all education hours.	6 to 8 months
10 hours of hospital observation		
Exam & Competency		
EMT - Paramedic		
496 Didactic/Lab hours	Actual time with all education hours.	20 to 24 months
200hrs Field rotation		
220hrs ED/Triage/IV Team		
40hrs ICU or SICU / CCU		
20hrs OR/Anesthesia		
10hrs OB-GYN		
10hrs Psychiatric		
10hrs Pediatric		
Fire Academy		
16 Weeks	High potential to be placed on waiting list for future class	Unknown

The Town has several options with respect to meeting the training requirements for a Town run ambulance service:

- Train existing employees to provide paramedic level services for a Town run ambulance service. Under options that require additional EMT-B level personnel, provide existing employees with required training. This is the most expensive option as it requires "backfilling" an employees spot in emergency operations by using overtime. Twenty-four hour operations require that a minimum number of personnel are available on duty at all times. As a result, vacancies are typically covered using overtime. In addition, overtime may be worked by an employee whose base hourly rate is hiring than the employee in training.

- Hire new personnel and put them through fire academy and EMT-B or EMT-P training. This approach is less expensive than the first option since new employees are paid a lower hourly rate and overtime is not required to cover their spot. However, the project team estimates that EMT-B training costs approximately $725 and EMT-P training costs $6,650. In addition, there may be delays in getting a new employee enrolled in a local fire academy class.

- Hire new personnel who are already paramedics and training send them through the fire academy. This is probably the most cost effective approach. . Ideally, the Town should seek employees who already possess a paramedic license and or firefighter certification. However, it may be difficult to find someone who already has these certifications.

Overall, the Town has several options depending on the desired start date of the ambulance service. Ideally, the Town should try to hire employees who already possess some certification. However, it is likely that the Town will need to hire new employees and send them to either paramedic school or through the fire academy, or both. This may take up to two years.

In developing our cost estimates, the project team assumed a training cost of approximately $7,500 for additional EMS training per paramedic and $725 per EMT-B. Fire Academy training is provided by the state at no cost to municipalities.

(4) Medical Direction and Quality Assurance/Control

The Town would require a part-time medical director to develop emergency medical protocol for the Middleborough Fire Department as well as provide quality assurance and control. The project team estimates that these services would cost approximately $10,000 per year since they could be provided on a part-time basis.

(5) Insurance Costs

The project team estimates that additional insurance premiums associated with additional automobile liability and EMT malpractice and general liability coverage would be approximately $600 per ambulance and $225 per EMT.

(6) EMS Billing Charges

Based on the project team's experience with other regional EMS providers, the typical cost of providing EMS billing services is approximately $18 per invoice.

6. ESTIMATED REVENUES FROM EMS TRANSPORT

Section 4531 (b) (2) of the Balanced Budget Act (BBA) of 1997 added a new section 1834 (1) to the Social Security Act which mandates implementation of a national fee schedule for ambulance services furnished as a benefit under Medicare Part B. The fee schedule applies to all ambulance services, including volunteer, municipal, private, independent, and institutional providers, i.e., hospitals, critical access hospitals (except when it is the only ambulance service within 35 miles), and skilled nursing facilities. Section 1834 (l) also requires mandatory assignment for all ambulance services. Ambulance providers and suppliers must accept the Medicare allowed charge as payment in full and not bill or collect from the beneficiary any amount other than any unmet Part B deductible and the Part B coinsurance amounts.

Typically, private insurers follow federal reimbursement rates (set by Medicare) when determining how much they will pay for ambulance services. Medicare and Medicaid have established base charges adjusted for level of service provided (BLS, ALS, and ALS 2), type of transport (ground vs. air), region (cost adjustment factors by region of the United States), as well as service environment (rural vs. urban, transport distance, etc.). The new approach has changed the way in which ambulance service are billed significant. Previously, payments had to meet a "reasonableness" test and many services could be broken out separately. However, the current approach provides base rates for each service type.

The project team utilized the 2008 Ambulance Fee Schedule published by the Center for Medicaid and Medicare. The project team also utilized data from fire based EMS systems throughout the United States to estimate the number of transports, which require BLS, ALS, or ALS 2 services. The following points describe the differences in these service levels:

- The BLS assessment is defined as an evaluation of the patient in the following capacity:
  - Visual overview.
  - Primary assessment that includes temperature, pulse, respirations, blood pressure, and pulse oximetry reading.
  - Secondary assessment which is a focused head to toe assessment and includes the following components: mental status assessment to include eye contact, violence, posture, general appearance, and behavior to identify harm to self and others; a full body survey, chief complaint, onset and duration; the history of present illness, past medical history, and type of breath sounds.
  - A BLS intervention is a technique that can be performed by an EMT for a number of conditions. The following interventions are considered BLS

techniques/skills:

-- Opening airway and foreign body removal (finger sweep).

-- Upper airway suctioning.

-- Oropharyngeal/nasopharyngeal airway insertion.

-- Artificial ventilation with a bag-valve mask.

-- Cardiopulmonary resuscitation (CPR).

-- Automated External Defibrillator.

-- Physical restraints.

-- Crisis intervention.

-- Simple immobilization of specific extremity (e.g., boards, bandages, slings, commercial splints without traction, air splints).

-- Complex immobilization of specific extremity (e.g., use of traction splints, straightening fracture and reducing selected dislocations).

-- Assessment of oxygen saturation via pulse oximetry.

-- Oxygen therapy via nasal cannula or venti-mask.

-- Establishment of intravenous access only when additional training has been received.

-- Observation and documentation of self-administration by the patient of any prescribed medication or treatment modality.

- ALS assessment is defined as an evaluation of the patient by a paramedic or higher trained clinician (nurse, respiratory therapy, physician, etc.) to include the following:

  - Visual overview and vital signs as defined in the BLS assessment.

  - Primary assessment, which may include temperature, pulse, respirations, blood pressure, pulse oximetry reading, electrocardiogram interpretation and capnometry.

  - Secondary assessment as defined in the BLS assessment in addition to a

comprehensive assessment that includes review of systems and heart sounds.

- An ALS intervention is a technique that is performed by a paramedic or higher trained clinician for a number of conditions. The paramedic can perform all BLS interventions in addition to ALS interventions. The following interventions are considered ALS techniques/skills:

  -- Foreign body removal utilizing instrumentation.

  -- Oral/Tracheal intubation with or without pharmacological assistance, including confirmation of placement, securing of tube, monitoring of SpO2 with pulse oximetry and end-tidal CO2 detector monitor.

  -- Ventilatory assistance management via manual means or mechanical ventilator, Combitube, laryngeal mask airway, nasotracheal or endotracheal tube or CPAP.

  -- Surgical airway (cricothyrotomy).

  -- Chest decompression.

  -- Peripheral Venous Access/Venipuncture/glucose assessment.

  -- Intraosseous infusion.

  -- Medication administration when given via subcutaneous, intramuscular, intravenous, transcutaneous, central, rectal, oral/sublingual, nasal, inhaled, or endotracheal.

  -- Comprehensive ingestion/exposure management.

- Medicare reimburses at different rates for BLS and ALS care based on the provision of BLS or ALS interventions defined above. In addition, ALS 2 is a higher level of reimbursement and is further defined as “when medically necessary, the administration of at least three different medications and/or the provision of manual defibrillation/cardioversion, endotracheal intubation, central venous line cardiac pacing, chest decompression, surgical airway and/or intraosseous line.”

The following table shows the rates allowed for each service level previously described:

Estimated EMS Transport Rates - Middleborough

Service	Base Rate	Mileage Rate	Estimate (@10 miles/transport)	Total Charge	% of Transports
BLS Emergency (Supplies, No Mileage)	$370.46	$6.55	$65.50	$435.96	42%
ALS Emergency (Supplies, No Mileage)	$439.93	$6.55	$65.50	$505.43	56%
ALS 2 Emergency (Supplies, No Mileage)	$636.73	$6.55	$65.50	$702.23	2%
			Average Charge		**$480.19**

The project team next applied the average billing rate to the estimated number of transports. In addition, we estimated the additional transports associated with the resort and the estimated revenue (we used a 25% increase as a conservative figure so as to avoid the issue of potentially overstating the potential revenue).

Revenues:	Current	With Resort
Transports	1,306	1,633
Avg. Billing Rate	$480	$480
Subtotal	$627,128	$783,910
Billing Charge ($18/bill)	23,508	29,385
Net Recoverable	$603,620	$754,525
Revenue Under Various Collection Rates:		
50%	$301,810	$377,262
60%	$362,172	$452,715
70%	$422,534	$528,167

As shown above, the project team estimates that the Town would have approximately $603,620 in recoverable charges after adjusting for billing costs and based on current workloads. With the estimated increases in transport due to the resort, approximately $754,000 could be recoverable.

An important consideration in evaluating EMS revenues is the billing recovery rate (the amount actual paid as a percentage of billed amounts). They project team typically observes recovery rates around 50%. However, many EMS agencies charge in excess of the Medicare allowable rates in the hopes of recovering additional costs from

either private insurance or individuals. As a result, this rate may not be accurate due to the way in which we have estimated the average billing rate for Middleborough. In addition, the uninsured rate in each rate has a large impact on the ability to collect EMS charges. Based on 2007 census data, Massachusetts has an uninsured rate of less than 5%. As a result, the project team assumed a higher recovery rate of 70%. This results in estimated EMS revenues of $422,534 based on current workloads, and $528,167 with additional workloads associated with the resort.

7. SUMMARY OF COSTS AND BENEFITS

The project team summarized the costs and revenues associated with each service option. For each alternative, we calculated the on-going operating costs for personnel and equipment and supplies. For large capital items, such as ambulance units and the ladder truck, we amortized the cost over 5 years at an estimated rate of 6%.

The exhibit, on the following page, summarizes the marginal operating costs associated with each options discussed in the previous sections:

Summary of Service Option Costs and Revenues

Scenario	Operating Costs - Personnel	Operating Costs - Supplies	Operating Cost - Other (Insurance)	One Time Costs (Training & Licensing)	Amortized Capital Costs	Total Annual Costs	Revenues	Marginal Operating Costs
Enhanced Current Services, 4 at Central (+1 civilian dispatcher), 2 North, 2 South	$1,014,126		$12,700	$7,975		$1,034,801	$(250,000)	$1,284,801
Town Ambulance Service, 4 at Central (+1 civilian dispatcher), 2 North, 2 South	$1,034,355	$8,000	$14,350	$76,725	$100,656	$1,234,086	$422,534	$811,552
Town Ambulance Service with Casino, 4 at Central (+1 civilian dispatcher), 4 North, 2 South	$1,803,224	$8,000	$16,600	$126,800	$100,656	$2,055,280	$528,168	$1,527,112
Town Ambulance Service and fire service to Casino, 4 at Central (+1 civilian dispatcher), 6 North, 2 South	$2,745,715	$8,000	$19,075	$162,600	$302,443	$3,237,834	$528,168	$2,709,666

The following points summarize the information presented above:

- The first option, which includes adding additional staff to provide twenty-four hour staffing from the north and south stations has a net marginal cost of $1.284 million each year. Total annual costs, in excess of current operating expenditures, are $1.034 million. However, the Town also pays AMR approximately $250,000 annually for ambulance services. This is included as negative revenue since it is a payment for service.

- The second option, which provides for a Town ambulance service, 4 personnel at the central station (and 1 civilian dispatcher), 2 personnel at the north station, and 2 personnel at the south station, has a marginal cost of approximately $811 thousand in additional operating costs. This is based on service provided to the Town only, and does not include the impact of the proposed resort.

- The third option includes additional staffing at the north and south stations to provide ambulance services to the Town and the proposed resort. The estimated marginal cost of this option is approximately $1.53 million.

- The fourth option includes the staff and resources needed to provide fire, rescue, and ambulance service to the Town and the proposed resort. Total marginal operating costs are estimated to be $2.71 million annually. This includes amortization of capital costs for a new ladder truck.

Based on the preceding analysis, the project team makes the following recommendations regarding service level options available to the Town:

Recommendation: As previously discussed, current staffing levels and response times indicate that the Town of Middleborough should staff the north and south stations to increase service levels. The project team has recommended the addition of a civilian dispatcher as well as providing 2 on duty personnel for both the north and south stations. This should have no impact on the current call firefighting force.

Recommendation: If the Town wants to provide additional fire services cost effectively, a town ambulance service should be considered. This should have no impact on the current call firefighting force. The marginal cost of this approach is $473 thousand <u>less</u> than simply expanding the Fire Department's on-duty complement to cover all three stations with at least two personnel. This is a cost effective way of improving service delivery to the community while concurrently expanding on the utilization of personnel.

Recommendation: The additional cost of providing ambulance service to the resort is $583,450. The additional cost of providing ambulance service and fire suppression services is approximately $1.65 million. This is the minimum cost that the Town should target for providing these services to the proposed resort.