FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/15
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 28 Initial Attack Apparatus
replacing light rescue & brush truck with multi-use ~~vehicle~~

2. Form of Acquisition (check appropriate) 2015
Purchase

3. Number of Units Requested 1

4. Cost

		Per Unit
Purchase price or annual rental	$	199,000
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

5. Purpose of Expenditure (check appropriate)

- ■ Schedule replacement
- ☐ Present equipment obsolete
- ☐ Replace worn-out equipment
- ☐ Reduce personnel time
- ■ Expanded service
- ☐ New operation
- ☐ Increased safety
- ☐ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Continue to service and maintain

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

____	Months per year	Estimat
____	Weeks per year	life in
____	Days per week	2
____	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Pick up truck with utility body (R2)	Ford-F250	1990	08-13, $6,645	$2,475.46
B. PU truck with 200 gal tank & pump (F2)	Chevy K30	1985	08-13, $4,580	$3,362.12
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/15
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 27 2015
Lease Payment #4

2. Form of Acquisition (check appropriate)
Lease/Purchase

3. Number of Units Requested 1

5. Purpose of Expenditure (check appropriate)

- ☐ Schedule replacement
- ☐ Present equipment obsolete
- ■ Replace worn-out equipment
- ☐ Reduce personnel time
- ■ Expanded service
- ☐ New operation
- ☐ Increased safety
- ■ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
N/A Lease payment for replaced vehicle

4. Cost

		Per Unit
Purchase price or annual rental	$	89,906
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	2
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Heavy Rescue Truck	International	1987	08-12, $12,700	$0.00
B.				
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/15
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 27 2016
Lease Payment #5

2. Form of Acquisition (check appropriate)
Lease/Purchase

3. Number of Units Requested 1

5. Purpose of Expenditure (check appropriate)

- ☐ Schedule replacement
- ☐ Present equipment obsolete
- ■ Replace worn-out equipment
- ☐ Reduce personnel time
- ■ Expanded service
- ☐ New operation
- ☐ Increased safety
- ■ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
N/A Lease payment for replaced vehicle

4. Cost

		Per Unit
Purchase price or annual rental	$	89,906
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	2
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Heavy Rescue Truck	International	1987	08-12, $12,700	$0.00
B.				
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM C

CAPITAL IMPROVEMENT PROGRAM DETAILED PROJECT DESCRIPTIO

(May be filled out by CIP Committee to summarize Project Information)

A. IDENTIFICATION & CODING INFORMATION

1. Date: 4/15/2014

2. Project Name: Heavy Rescue Replacement

3. Program:

4. Department: Fire & Emergency

B. EXPENDITURE SCHEDULE (000'S)

Cost Elements	$ Total	Thru FY	Est. FY	Total 6 Years	Year 1 FY 2015	Year 2 FY	Year 3 FY	Year 4 FY	Year 5 FY	Year 6 FY 2020
1. Planning Design & Supervision										
2. Land										
3. Site Improvements & Utilities										
4. Construction										
5. Furniture & Equipment		2016	2012	432,600	100,000	89,906	89,906	89,906	89,906	0
6. Total										

C. FUNDING SCHEDULES (000'S)

GO Bonds:

State Aid:

General Fund:

Capital Reserve:

Grant Funding:

D. DESCRIPTION & JUSTIFICATION

Replacement of Heavy Rescue truck due to frame failure

E. ANNUAL OPERATING BUDGET IMPACT (000'S)

Program Costs: Staff

Other

Facility Costs: Maint.

Other

Debt Service

Total Costs

Other Revenue or Cost Savings

F. MAP Reference Code:

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/17
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 30
Tanker, Replacement of Pumper (E2) Lease Payment#1

2. Form of Acquisition (check appropriate) 2016
Lease/Purchase

3. Number of Units Requested 1

4. Cost **$390,000**

		Per Unit
Purchase price or annual rental	$	82,700.00
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

5. Purpose of Expenditure (check appropriate)

- ■ Schedule replacement
- ☐ Present equipment obsolete
- ☐ Replace worn-out equipment
- ☐ Reduce personnel time
- ■ Expanded service
- ☐ New operation
- ☐ Increased safety
- ■ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Continue to service and maintain

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	2
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Pumper 1,000 gal./1250 GPM	Ford/Farrar	1981	08-13, $14,665	$889.14
B.				
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/17
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 30
Tanker, Replacement of Pumper (E2) Lease Payment#2

2. Form of Acquisition (check appropriate) 2017
Lease/Purchase

3. Number of Units Requested 1

4. Cost **$390,000**

		Per Unit
Purchase price or annual rental	$	82,700.00
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

5. Purpose of Expenditure (check appropriate)

- ■ Schedule replacement
- ☐ Present equipment obsolete
- ☐ Replace worn-out equipment
- ☐ Reduce personnel time
- ■ Expanded service
- ☐ New operation
- ☐ Increased safety
- ■ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Continue to service and maintain

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	2
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Pumper 1,000 gal./1250 GPM	Ford/Farrar	1981	08-13, $14,665	$889.14
B.				
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/17
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 30
Tanker, Replacement of Pumper (E2) Lease Payment#3

2. Form of Acquisition (check appropriate)
Lease/Purchase 2018

3. Number of Units Requested 1

4. Cost **$390,000**

		Per Unit
Purchase price or annual rental	$	82,700.00
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

5. Purpose of Expenditure (check appropriate)

- ■ Schedule replacement
- ☐ Present equipment obsolete
- ☐ Replace worn-out equipment
- ☐ Reduce personnel time
- ■ Expanded service
- ☐ New operation
- ☐ Increased safety
- ■ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Continue to service and maintain

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	2
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Pumper 1,000 gal./1250 GPM	Ford/Farrar	1981	08-13, $14,665	$889.14
B.				
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/17
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 30
Tanker, Replacement of Pumper (E2) Lease ~~Payment#4~~ 2019 + 1 2020

2. Form of Acquisition (check appropriate)
Lease/Purchase

3. Number of Units Requested

5. Purpose of Expenditure (check appropriate)

- ■ Schedule replacement
- ☐ Present equipment obsolete
- ☐ Replace worn-out equipment
- ☐ Reduce personnel time
- ■ Expanded service
- ☐ New operation
- ☐ Increased safety
- ■ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Continue to service and maintain

4. Cost **$390,000**

		Per Unit
Purchase price or annual rental	$	82,700.00
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	2
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Pumper 1,000 gal./1250 GPM	Ford/Farrar	1981	08-13, $14,665	$889.14
B.				
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR RENTAL

Department & Activity	Fire Department	Date Prepared	4/17/2014
Contact Person	Chief Bengtson	Phone Number	476-5658

1. Project Title & Reference No. 31 Replacement of Chief's Command Vehicle

2. Form of Acquisition (check appropriate)
Purchase

2017

3. Number of Units Requested
1

4. Cost $48643

		Per Unit	Total
Purchase price or annual rental	$	34,343	
Plus: Installation or other costs	$	14300	
Less: Trade-in or other discount	$		
Net purchase cost or annual rental	$	48643	

5. Purpose of Expenditure (check appropriate)

- [x] Schedule replacement
- [ ] Present equipment obsolete
- [ ] Replace worn-out equipment
- [ ] Reduce personnel time
- [ ] Expanded service
- [ ] New operation
- [ ] Increased safety
- [ ] Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Continue to service and maintain

6. Number of Similar Items in Inventory 0

7. Estimated Use of Requested Item(s)

	Months per year	Estimated useful
	Weeks per year	life in years
	Days per week	10
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns	Prior Year's Rental Costs
A. SUV, 8 cylinder, gasoline	Ford Expedition	2007	08-13, $8,474	$4,341.00	
B.					
C.					
D.					
E.					

9. Recommended Disposition of Replacement Item(s)

- [ ] Possible used by other agencies
- [x] Trade-in
- [x] Sale

10. Sumitting Authority

Submitted by: David Bengtson Date: 4/11/2013

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/17
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 32
2500-gallon Tanker to replace Engine 3

2. Form of Acquisition (check appropriate) 2018
Purchase

3. Number of Units Requested 1

4. Cost $413,500

		Per Unit
Purchase price or annual rental	$	413,500
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

5. Purpose of Expenditure (check appropriate)

- ■ Schedule replacement
- ☐ Present equipment obsolete
- ☐ Replace worn-out equipment
- ☐ Reduce personnel time
- ■ Expanded service
- ☐ New operation
- ☐ Increased safety
- ■ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Continue to service and maintain

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	2
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
B. 1,00 gal/1250 GPM Pumper	KME	1993	08-13, $69,136	$2,388.00
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/15
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 29 Initial Attack Apparatus
replacing light rescue with multi-use vehicle

2. Form of Acquisition (check appropriate) 2019
Purchase

3. Number of Units Requested 1

4. Cost

		Per Unit
Purchase price or annual rental	$	199,000
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

5. Purpose of Expenditure (check appropriate)

- ■ Schedule replacement
- ☐ Present equipment obsolete
- ☐ Replace worn-out equipment
- ☐ Reduce personnel time
- ■ Expanded service
- ☐ New operation
- ☐ Increased safety
- ☐ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Continue to service and maintain

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	2
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Light Rescue-EMS (Rescue 3)	Chevy-Suburban	2004	08-13, $6,645	$1,525.00
B.				
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/17
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. 33- Replacement of Self Contained Breathing Apparatus

2. Form of Acquisition (check appropriate)
Purchase 2019

3. Number of Units Requested 25

4. Cost $170,125

		Per Unit
Purchase price or annual rental	$	170,125
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

5. Purpose of Expenditure (check appropriate)

- ■ Schedule replacement
- ☐ Present equipment obsolete
- ■ Replace worn-out equipment
- ☐ Reduce personnel time
- ☐ Expanded service
- ☐ New operation
- ■ Increased safety
- ☐ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Continue to service and maintain

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	1
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Scott	Nx-G2	2005	08-13 $5545	$1,537.00
B.				
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved

FORM B

CAPITAL PROJECT REQUEST FOR EQUIPMENT PURCHASE OR MAJOR R

Department & Activity	Fire Department	**Date Prepared**	4/17
Contact Person	Chief Bengtson	**Phone Number**	476-

1. Project Title & Reference No. XX- Replacement of Apparatus Mobile Radios

2. Form of Acquisition (check appropriate)
Purchase

3. Number of Units Requested 26 (2020)

5. Purpose of Expenditure (check appropriate)

- ☐ Schedule replacement
- ■ Present equipment obsolete
- ☐ Replace worn-out equipment
- ☐ Reduce personnel time
- ☐ Expanded service
- ☐ New operation
- ☐ Increased safety
- ☐ Improve proceedures, records, etc.

5a. Describe Alternatives Considered:
Motorola has discontinued these radios and parts

4. Cost $89,440

		Per Unit
Purchase price or annual rental	$	3,440
Plus: Installation or other costs	$	
Less: Trade-in or other discount	$	
Net purchase cost or annual rental	$	

6. Number of Similar Items in Inventory

7. Estimated Use of Requested Item(s)

	Months per year	Estimat
	Weeks per year	life in
	Days per week	7-10
	Hours per day	

8. Replaced Item(s)

Item	Make	Age	Maint Costs	Prior Year's Breakdowns
A. Motorola	Spectra	2005	$832.00	$513.00
B.				
C.				
D.				
E.				

9. Recommended Disposition of Replacement Item(s)

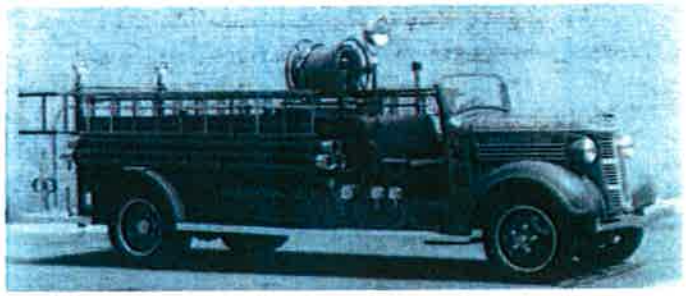
☐ Possible used by other agencies ☐ Trade-in ■ Sale

10. Sumitting Authority

Submitted by: David Bengtson Date:

Position: Fire Chief

11. Reserved



TOWN OF MOULTONBOROUGH

FIRE APPRARATUS NEEDS ANALYSIS

PLANNING FOR AND PROTECING THE FUTURE

Prepared by Fire Chief David Bengtson

November 11, 2013

This page left intentionally blank

Table of Contents

1. Overview

In a continuing effort to ensure that the fire department fleet meets our needs in accordance with fire service best practices. The overall purpose of this analysis is to determine what apparatus is needed and develop a master plan for the replacement of all structural firefighting apparatus on a logical, programmed basis with emphasis on the number, type and style of apparatus that should be considered for purchase by the fire department in the near future. Primary consideration is being given to structural fire apparatus as those apparatus factor into the Town's ISO Public Protection Class for calculating fire insurance rates. Other apparatus and equipment needs will be prioritized based on statistical data of the Department's National Fire Incident Reporting System (NFIRS). In addition, recommendations will be offered to advance and improve the tactical capabilities of the department and its water supply apparatus.

2. Town Demographics & Fire Department Resources

The town of Moultonborough is located in central New Hampshire in the "Lakes Region" at the northern most end of Lake Winnipesaukee. The town is approximately 75 square miles of which 15 square miles are inland water area. The town is traversed by NH DOT routes 25, 109 and 171. Moultonboro Neck Road and Bean Roads are major thoroughfares in the community. The Town's population in the 2011census was estimated to be 4,029. Its seasonal population is estimated to be 24,000+. Moultonborough has 4,919 housing units, with the highest concentrations being located on the east side of town in the Balmoral and Suissevale developments followed by the residential camp summer camp and campgrounds on Moultonboro Neck and the Lake Kanasatka area. The community is largely a vacation destination with many second or summer homes. Some of these homes are dispersed among the 40 plus islands located on Lee Pond, Squam Lake and Lake Winnipesaukee. (See Appendix A)

Moultonborough Fire Rescue is a combination department with a fulltime fire chief and two-fulltime firefighter/Emergency Medical Technicians and a call staff of 38 firefighters and EMT's. The department responds out of two locations, the Public Safety Building at 1035 Whittier Highway and the Moultonboro Neck Fire Station located at 948 Moultonboro Neck Road. The Department's emergency medical response capabilities are supplemented by the contracted service of Stewart's Ambulance Service to provide advance life support and transport services. The Department responds to emergency incidents using four Pumper engines, one heavy rescue, and two first response EMS vehicles, three boats, two snowmobiles, one forestry truck, one reserve utility engine, one utility pick-up truck and an ATV. In addition to these eight pieces of fire apparatus, the department also maintains a command vehicle for use by the fire chief.

Moultonborough Fire Rescue is the primary emergency response agency for the Town and a member of the Lakes Region Mutual Fire Aid system. The Department has averaged 748 incident responses annually since 2001. A very small percentage of the department's first due response area is covered with ten pressurized fire hydrants that are owned by a private water company and a private community water system. The majority of the towns housing units and most all of the new housing and commercial

developments are beyond the limits of those pressurized water systems. The remainder of the town's firefighting water resources consists of 58 dry fire hydrants and 13 cisterns of varying capacities.

These water resources, such as dry hydrant and cisterns, used by department pumpers as a source of water supply for firefighting, are typically located in or at the entrance to subdivisions and help to provide some of the water that is required for structural fire protection. These resources, while very helpful, do not reduce the need for the fire department to provide sufficient mobile water supply apparatus for the protection of the community. The Town of Moultonborough does not currently have any water supply apparatus (tankers with tank capacities of 2,500 gallons or more) in its fleet and relies on mutual aid tankers from Meredith, Holderness, Tamworth and Tuftonboro, all of which are fifteen minutes or more away.

The Insurance Services Office (ISO) lists Moultonborough as having a (PPC) Public Protection Class 9-10 rating. This low rating was largely due primarily to a lack of sufficient water supply and the number of buildings being more than 1,000 feet from a fire hydrant, 40% of a PPC rating is based on water supply and distribution.

Over the course of the last few months, the staff of fire department conducted a field survey of the apparatus of the Moultonborough Fire Department. In addition, most all of the response areas within the town were visited to obtain information relative to points of access for fire apparatus, review topography and road conditions, review major buildings and target hazards as well as considerations for the current fire department operations and standard operating procedures.

3. Fleet Inventory

Pumpers

NFPA 1901 defines a pumper aka an engine as ***3.3.141 Pumper.*** *Fire apparatus with a permanently mounted fire pump of at least 750 gpm (3000 L/min) capacity, water tank, and hose body whose primary purpose is to combat structural and associated fires.* Moultonborough has four apparatus that meet this definition.

Engine 1

Engine 1 is a 2007 HME/Ahrens-Fox with a 2,000 gallon per minute pump, Compressed Air Foam System (CAFS) and a 1,000-gallon water tank. It carries 1,000 feet of 4-inch diameter hose (LDH), ground and roof ladders, assorted hand tools. The apparatus is a custom cab apparatus and has a seating capacity of six firefighters. This apparatus is house at the Public Safety Building.

Engine 2

Engine 2 is a 1981 Ford/Farrar with a 1,000 gallon per minute pump and 1,000-gallon water tank. It carries 1,000 feet of 4-inch diameter hose (LDH), ground and roof ladders, assorted hand tools. The apparatus is a commercial cab apparatus and has a seating

capacity of three firefighters. This apparatus is housed at the Moultonboro Neck Fire Station.

Engine 3

Engine 3 is a 1993 KME/International with a 1,000 gallon per minute pump and 1,000-gallon water tank. It carries 1,000 feet of 4-inch diameter hose (LDH), 35-foot ground and roof ladders, assorted hand tools. The apparatus is a commercial cab apparatus and has a seating capacity of three firefighters. This apparatus is housed at the Moultonboro Neck Fire Station.

Engine 4

Engine 4 is a 2004 HME/Central States with a 1,250 gallon per minute pump, Class A and Class B foam cells and a 1,000-gallon water tank. It carries 1,000 feet of 4-inch diameter hose (LDH), ground and roof ladders, assorted hand tools. The apparatus is a custom cab apparatus and has a seating capacity of five firefighters. This apparatus is house at the Public Safety Building.

Rescue Apparatus

Rescue apparatus in the Moultonborough Fire Rescue Department are classified into two categories, heavy and light. A "Heavy Rescue" unit has the seating capacity for six personnel and carries everything that may be used on a technical rescue. Extrication equipment, struts, cribbing, pneumatic air bags, water and ice rescue equipment, suits, ropes, rope rescue equipment, patient packaging (stokes baskets) hazardous materials response suits and mitigation materials. A "Light Rescue" is primarily for first response to emergency medical incidents; it has the seating capacity for 2-3 personnel and carries cardiac monitor defibrillators, suctions units, backboards, traction and immobilization equipment, oxygen, bandaging materials and emergency medical equipment and supplies.

Rescue 1

2012 HME with a transverse compartment rescue body, 60 gallon Compressed Air Foam System (CAFS), 210,000 lumen light tower, 35 KW PTO generator, Hurst Jaws of Life, O-Cutters, Combination Tools, Rope Rescue, Water and Ice Rescue tools and equipment, Hazardous Materials absorbent pads and booms, hand and pneumatic tools, cribbing, struts, portable lighting and assorted tools. The apparatus is a custom cab apparatus and has a seating capacity of six firefighters. This apparatus is house at the Public Safety Building.

Rescue 2

1990 Ford F250 with a utility body. This unit carries basic first response emergency medical equipment and supplies, such as First-In medical bag, oxygen, cardiac monitor defibrillator, portable suction unit, backboards. The apparatus is a commercial cab

apparatus and has a seating capacity of three firefighters. This apparatus is housed at the Moultonboro Neck Fire Station. Rescue 2 is a "Light Rescue"

Rescue 3

2004 Chevrolet Suburban. This unit carries basic first response emergency medical equipment and supplies, including the First-In medical bag, oxygen, cardiac monitor defibrillator, portable suction unit, backboards. Rescue 3 is a "Light Rescue" The apparatus is a commercial cab apparatus and has a seating capacity of three firefighters. This apparatus is housed at the Public Safety Building.

Wildland Fire Apparatus

NFPA 1906 defines a Wildland Fire Apparatus as *Fire apparatus designed for fighting wildland fires that is equipped with a pump having a capacity normally between 30 gpm and 500 gpm, a water tank, limited hose and equipment, and pump-and-roll capability.*

Moultonborough's wildland fire apparatus would be classified as a Class B wildland engine. It is a pick-up truck with a flatbed and slip-on tank and pump; it is designed to combat fires with low to moderate intensity with low to moderate rates of spread. The 200-gallon tank and BB4 pump meet the needs of a fast response engine, providing a good power to weight ratio and maneuverability. The pump provides moderate lift capability and the tank supports the departments multi-mission needs. A crew of 2-3 people with minimal training is needed to operate the apparatus.

Forestry 2

1986 K30 Chevrolet, four-wheel drive flatbed with dual rear wheels, 200-gallon water tank, BB4 pump, Class A foam cell and forestry tools for a 10-person crew. The apparatus is a commercial cab apparatus and has a seating capacity of three firefighters. This apparatus is housed at the Moultonboro Neck fire station.

Utility Apparatus

Utility apparatus are designed or adapted for general use and may have a multitude of capabilities. Moultonborough's fleet includes two vehicles that are used for utility purposes.

Utility 1

The current vehicle is a 2001 GMC pick-up that was transferred to the Fire Department from the Highway Department in 2012. It was converted to a flatbed with toolboxes; the conversion cost was $15,600. It has no firefighting capabilities and is used solely for support operations. It is used to bring additional resources and equipment to the emergency scenes, pick up hose, and carry out routine daily inspections and transportation to training activities. This apparatus is house at the Public Safety Building.

Utility 2

Utility 2 is a 1987 Ford/Emergency-One with a 1,000 gallon per minute pump and 800-gallon water tank. It carries assorted hand tools. The apparatus is a commercial cab apparatus and has a seating capacity of two firefighters. This piece of apparatus is used as a reserve engine or back up when other front line apparatus are out of service; either short or long term. Such was the case when the heavy rescue was removed from service due to structural defects to the frame. This apparatus is house at the Public Safety Building.

Chief's vehicle

This vehicle is a 2007 Ford Expedition. A four-wheel drive SUV type vehicle has been outfitted with a slide-out tray in the rear cargo compartment. Its primary use is for transporting the fire chief and command and control activities.

Boats

Moultonborough currently has three boats in its inventory. Only one is designed for firefighting and rescue capabilities.

Boat 1

A 2012, 26-foot Eastern with a 1,000-gallon per minute pump, four pre-plumbed 2-1/" discharges, a 1,000 gpm Akron GP monitor, crew capacity of six and passenger capacity of six. This boat is kept in the water a Lee's Mills from ice-out to late November.

Boat 2

A 16-foot Wahoo (a facsimile of a Boston Whaler) sport/utility boat with shallow draft and un-sinkability makes a good platform for rescue operation and transporting personnel to islands, it has a maximum capacity of 7 persons or 1,650 lbs. This is also the primary response unit for Squam Lake, Lake Kanasatka, and Lee Pond. This boat is kept at the Moultonboro Neck Station on a trailer. This boat was donated to the Fire Department by Camp Robindel.

Boat 3

16-foot, flat-bottom Jon boat, 3-person capacity, used for accessing small ponds, kept on trailer at Moultonboro Neck Fire Station. This boat was donated to the Fire Department by a resident.

Off-Road and All-Terrain Vehicles

2006 Ski-Doo Skandic 550F Super Wide Track, 2-person capacity, used to tow Sno-bulance. Primary uses for emergency responses on lakes and snow mobile trails. Purchase

by Warrant Article in 2006. This unit is kept at the Public Safety Building on a trailer with the Sno-bulance.

1980's Ski-Doo, a donated snowmobile, kept at Moultonboro Neck Fire Station on trailer with rescue sled.

1988 Polaris 454, an ATV donated by resident, used for hiking trail rescue operations, assisting the Police Dept. and forestry incidents. This unit is kept at the Public Safety Building on a trailer.

4. Fire Apparatus Fleet Analysis

The Moultonborough Fire Department currently operates eleven (11) vehicles from two fire stations. These include four engines, one reserve engine, two light rescue/EMS vehicles, one heavy rescue truck, one utility pick up, one chief's vehicle and one brush unit. The department can currently ride 40 personnel safely in seated, enclosed positions on the engine, utility, forestry and rescue apparatus. The fleet of structural firefighting apparatus includes four engines, one reserve engine. The combined pumping capacity of all units is 6500 gpm with a total water tank supply of 4800 gallons on five (5) units. The Department fireboat, Boat 1 is also considered part of the structural firefighting apparatus. The boat is equipped with a 1,000-gpm pump and no water tank. The fireboat was designed to provide fire protection to the island properties, a priority that was identified in the 2008 Master Plan.

At this time Engines 1 and 4 are equipped with a four door enclosed cabs capable of seating six (6) personnel. Other than Rescue 1, a rescue vehicle; which can accommodate six (6) personnel, the other remaining seven pieces of apparatus can only safely carry two (2) or three (3) personnel on each unit due to the size of the cab.

The present fleet of structural firefighting apparatus is in generally good condition. However Engine 2, a 1981 Ford/Farrar, which had a body refurbishment in 1997 and Engine 3, a 1993 Freightliner/KME pumper that has just had the frame rails replaced in the end of 2012. Both Engine 2 and Engine 3 are twenty or more years old, while they both remain in our front line of fire attack apparatus, they are often assigned to supporting roles, such as water supply on the fireground. Fire apparatus is generally replaced after twenty (20) years of first line service and may be utilized as a reserve or spare unit for an additional three to five years, depending upon age, use, condition. As was the case with Utility Engine 2 (formerly Engine 1), which the Fire Department was allowed to keep in the fleet by the Select Board after it failed to receive an acceptable bid in the surplus equipment auction. Available technology in the fire apparatus industry is such that units that are older than twenty years are not current with modern designs with respect to safety devices, electronic interlocks and fire pump controls.

The National Fire Protection Association, which is responsible for developing the standards for fire apparatus, now revises and updates the 1901 Fire Apparatus Standard every three years, rather than on the conventional five-year cycle in order to keep pace with technology and the

component manufactures in these areas. Significant changes were made in the 1991 edition of the standard that affected fire fighter safety and apparatus operational characteristics.

At the time of this needs assessment, the fire department has no explicit program for the replacement of their apparatus, a general guide is supplied each year during budget review to the Town Administrator, Board of Selectmen and Advisory Budget Committee. The Select Board ultimately decides which capital items will be included in the Town Warrant. In recent years, the Town Administrator, working with the Fire Chief has increased the contribution to the Capital Reserve Funds for Firefighting Equipment. The present fleet of four structural firefighting vehicles ranges in age from 1981 to 2007 with an average vehicle age of 17.25 years. The Town has only purchased only one structural firefighting apparatus over the past six years and having two units over twenty years of age. Developing a plan to replace units on a twenty-year cycle and still provide for sufficient time in between each purchase to allow for the budgetary and financial constraints of the town to address these required capital expenditures will be difficult.

Overall, the fire department takes good care of their apparatus using a combination of fire department members to conduct periodic apparatus checks and a local vendor that performs preventative maintenance work and annual pumper service tests. During fiscal years 2011 and 2012 the department spent on average approximately $27,946.98 dollars of budgeted monies on apparatus maintenance. Given the size of the present fleet, this money is well spent to insure the operational readiness of the units and to keep each apparatus properly maintained. This maintenance work must continue on an annual basis to insure that each piece of apparatus will last the required time before it is scheduled for replacement.

Each piece of apparatus has been carefully analyzed for its condition and maintenance features, with projected replacement dates, based on NFPA 1901, Annex D given for each unit. These dates reflect the year in which the replacement unit should be delivered and placed into service by the fire department. Recognizing that most fire apparatus takes approximately eight to twelve months to produce once the unit goes under contract, adequate research and planning must be provided to insure that the apparatus is delivered and placed into service on a timely basis.

5. Fleet Review and Evaluation

This analysis was performed to determine the fire apparatus needed to enable the Fire Department to provide the Town with adequate fire protection commensurate with the best practices of the fire service, to set forth a master plan that will improve the firefighting capabilities of the fire department and account for the changes in the development of the community and the challenges presented by these changes in construction and materials. The recommendations provided recognize the existing strengths and weaknesses for the fire department as well as fire protection requirements of the occupancies of the community. In addressing these concerns there will be a reduction of the number of vehicles in the fleet, an increase in "water of wheels" of the fleet. New additions to the fleet will add vehicles that can serve multiple purposes and provide better access to all areas of the town.

Engine 1:

This structural firefighting apparatus is a 2007 HME/Ahrens-Fox with an 1871 Series custom cab configuration and a compressed air foam System (CAFS). The apparatus is equipped with a Hale model Qmax single stage 2000-gpm pump, 1,000 gallon water tank and is powered by a Cummings diesel engine with an Allison automatic transmission. The pumper is built on a 207 inch wheelbase with an overall length of 387 inches and carries 1,000 feet of 4.00-inch supply line in a hose bed above the water tank. The body is fabricated of stainless steel and is in good condition for its age. At the time of the field survey, the apparatus had only 15,917 road miles and 904 engine hours accumulated. The pumper is capable of seating six firefighters. This apparatus is house at the Public Safety Building and it primary role is to respond as the first due unit on all structural fires from the main fire station. Engine 1 is in good condition, but has some corrosion developing around the fenderette. This issue will be addressed through warranty and routine maintenance procedures.

Recommendation:

Under the guidelines listed in NFPA 1901 Annex D this apparatus should be replaced after twenty-five years of service. Engine 1 should be replaced in 2031. Replace with similar cab & chassis configuration, 2,000 GPM pump CAFS and/1,000 gallon water tank.

Engine 2:

This structural firefighting apparatus is a 1981 Ford LN-8000 chassis with bodywork by Farrar and is equipped with a Waterous CMYR 1000 two-stage 1000 gpm pump with a 1000-gallon water tank. The unit is powered by a Caterpillar diesel engine with an Allison automatic transmission and has a galvanneal steel body. The cab can carry three personnel in a seated enclosed position. This apparatus had a fire body (compartments and paint) refurbishment in March of 1997 by Dingee Machine of Cornish, NH. The pumper carries three pre-connected attack lines, deck gun and 1000 feet of four inch hose in a single bed, together with the normal compliment of hand tools and ground ladders. At the time of the field survey, the apparatus had 40,444 road miles and 2516 engine hours accumulated. This pumper primarily responds as the second due piece of equipment from the Neck station on all fires. The pumper is in good condition for its age and is built on a 194-inch wheelbase with an overall length of 308 inches. In 2013, the Department had to repair the hinge mechanisms on the fire body compartment due to a design flaw that allowed the doors to separate from the hinges, a problem of dissimilar metals used in construction a common problem for apparatus building during that time.
Under the guidelines listed in NFPA 1901 Annex D this apparatus should have been replaced after twenty-five years of service. This apparatus is currently scheduled in the CIPC Capital Equipment Plan to be replaced in 2016 when the unit will be thirty-five years of age.

Recommendation:

The replacement for Engine 2 should be programmed for an NFPA 1901 compliant mobile water supply apparatus with a conventional cab & chassis and a minimum of a 2,500-gallon water tank.

Engine 3

This structural firefighting apparatus is a 1993 International FL-80 cab and chassis with a fire body by KME and is equipped with a Hale QSG 125-2 single stage 1250-gpm pump and a 1000-gallon water tank. The unit is powered by a Caterpillar diesel engine with an Allison automatic transmission and has a Galvanneal steel body. The cab can carry three personnel in a seated enclosed position. At the time of the field survey, the apparatus had 33,530 road miles and 2205 engine hours accumulated. This pumper responds as the first due piece of equipment from the Neck station on all structure fires and as a primary piece for all chimney fires through town because of the 35-foot ladder carried on this apparatus. The pumper is in overall good condition for its age and is built on a 179-inch wheelbase with an overall length of 306 inches.

This apparatus had a complete frame rail replacement is December of 2012 by Coastal Truck & Auto Body of Portsmouth, NH. The frame rail replacement was required after a routine inspection in July of 2011 found cracks in the frame. NH Administrative Rule Saf- C 3221.06 (a) states "A vehicle shall be rejected if the frame or other structural components are broken, cracked or rusted to a degree that affects the safety of the vehicle." After discussions with the Board of Selectmen, it was decided to pursue a frame rail replacement versus replacement of the apparatus. Inspection of the apparatus finds it is exhibiting signs of corrosion developing under the hinges on the driver's side high side compartments and there is damage to the passenger's side rear tailboard. These issues do not affect operational readiness of the vehicle and these areas will need to be addressed as future budget items as they are out of the scope of routine maintenance. This vehicle has potential for some resale value due to the replacement on the frame rails in 2012.

Recommendation:

The replacement for Engine 3 should be programmed for an NFPA 1901 compliant mobile water supply apparatus with a conventional cab & chassis and a minimum of a 2,500-gallon water tank.

Engine 4:

This structural firefighting apparatus is a 2002 HME 1871 Series custom cab and chassis with a Central States fire body. The four-door cab pumper that is equipped with a Waterous CS 1250 gpm pump, 1000-gallon water tank and 40-gallon Class B foam tank. The apparatus is powered by a Detroit Diesel 8V-92TA engine through and Allison automatic transmission. At the time of the survey, the apparatus had 26,356 road miles and 457 engine-operating hours. This apparatus is built on a 204-inch wheelbase with an overall length of 399 inches with a stainless steel body. This unit is in mainly good condition. Inspection of the apparatus finds it is exhibiting signs of corrosion developing under the paint around the cab rear windows and fenderette areas. These issues do not affect operational readiness of the vehicle and these areas will need to be addressed as future budget items as they are out of the scope of routine maintenance.

This apparatus runs as the second due unit from the main station on all structure fires, motor vehicle fires and is the primary mutual aid apparatus. The engine can carry six personnel in a seated, enclosed position. The engine carries three preconnected attack lines, 1000 feet of 4.00" supply line and a full compliment of engine company equipment. Under the guidelines listed in NFPA 1901 Annex D this apparatus should be replaced after twenty-five years of service. Engine 4 is slated for replacement in 2027.

Recommendation:

Replace with similar cab & chassis configuration, 2,000 GPM pump CAFS and/1,000 gallon water tank.

Boat 1:

This structural firefighting boat is a 2012, 26-foot Eastern fireboat. The boat is equipped with a Darley 1,000 gpm pump. The boat is powered by two, 150 horsepower Honda four-cycle outboard motors. This unit is in excellent condition. This apparatus runs as the first due unit from the Town Docks at Lee's Mills on all island structure fires, boat fires and most EMS incidents in the Moultonborough Bay response area. The boat can carry six personnel in an enclosed cabin, as well as multiple patients. The boat carries pre-connected attack lines, and a master stream device that is pre-plumbed.

Recommendation:

This apparatus should be replaced after thirty years of service in 2042, but periodic evaluation of its physical condition and drive systems will determine its actual service life.

Rescue 1:

This rescue apparatus is a 2012 HME rescue truck built on a HME 1871 Series cab and chassis. The rescue body is constructed of stainless steel with transverse compartments and slide-out trays and tool boards. This apparatus carries an assortment of hydraulic rescue tools, power saws, hand tools, air bags, cribbing, spare SCBA bottles, water rescue gear and salvage equipment. The equipment is generally well arranged and stored on the apparatus.

Rescue 1 is also outfitted with a 35 KW PTO driven generator, roof mounted light tower and 9000-pound variable mounted winch. The apparatus can carry six personnel in the cab. The rescue truck has a 199-inch wheelbase with an overall length of 373 inches. At the time of the field survey, the truck had 1,993 road miles and 118 engine hours accumulated. Rescue 1 responds as the third due apparatus from the main station on structural fires and first due on all vehicle accidents.

Recommendation:

This unit is scheduled for replacement in 2037 when the rescue will be 25 years old. The service life for the rescue truck could be extended, provided the mechanical condition of the vehicle

allows. The fire department should begin a needs assessment for replacement planning of this apparatus in 2030 to determine the technical rescue requirements of the community.

Rescue 2:

This vehicle is a 1990 Ford F-250 HD-XL cab and chassis powered by a 7.3-liter diesel. The rescue body is Reading steel service style body. Rescue 2 is a "Light Rescue." This apparatus carries basic first response emergency medical equipment and supplies, First-In medical bag, oxygen, cardiac monitor defibrillator, portable suction unit, backboards. The apparatus is a commercial cab apparatus and has a seating capacity of three firefighters. This apparatus is housed at the Moultonboro Neck Fire Station and is the primary response unit for all medical incidents in the Moultonboro Neck response district. In 2013, the Department had to replace the glow plug, a fuel tank and a voltage regulator, other than these repairs, the unit is in good condition, the service body is in very good condition for its age and the equipment on this truck is well arranged. The truck has accumulated 21,225 road miles.

Recommendation:

Replace with an initial attack apparatus or mini pumper with a 1500 GPM pump, CAFS and 400-gallon water tank. This type of vehicle is small agile and provides superior multi-function capability of fire suppression and EMS.

Rescue 3:

This unit is a 2004 Chevrolet Suburban K1500; Rescue 3 is a "Light Rescue". The vehicle is a sport utility vehicle that has been outfitted with a slide-out tray in the cargo compartment for medical equipment. It carries basic first response emergency medical equipment and supplies, first-in medical bag, oxygen, cardiac monitor defibrillator, portable suction unit, backboards. It has a seating capacity of three firefighters. This apparatus is housed at the Public Safety Building and is the primary response unit for all medical incidents in the "Central Station" response district. The unit is in fair condition with the motor being replaced in December 2009 with a remanufactured motor. The body is in fair to poor condition, the left rear quarter panel has rusted through and there is varying amounts of rust developing on all fenders, doors and lower body panels. The truck has accumulated 84,012 road miles.

Recommendation:

Replace with an initial attack apparatus or mini pumper with a 1500 GPM pump, CAFS and 400-gallon water tank. This type of vehicle is small agile and provides superior multi-function capability of fire suppression and EMS.

Forestry 2:

This unit is a 1986 Chevrolet K30 model pick up with a flat bed. The pump is rated at 35 gpm and the unit carries a 200-gallon water tank. This unit is equipped with forestry hose, Indian

tanks and assorted brush fire gear. The unit is in fair condition with the transmission being replaced and carburetor overhauled in early 2013. The flat bed body is in very good condition for its age and the equipment on this brush truck is well arranged. The truck has accumulated 111,614 road miles.

This brush unit should continue to be utilized by the fire department with no specific replacement date. Due to the large number of major capital expenditures that will have to be undertaken during the next five to ten years to acquire replacement apparatus for Engine 2 and Engine 3, the replacement for this brush truck should occur after these major pieces of apparatus are acquired. The brush truck could be replaced at some point when no other units are scheduled for replacement.

Recommendation:

The following items are offered to improve the safety and operations of Forestry 2:

1. Intersection warning lights should be installed at the front of the unit in accordance with NFPA 1901.

2. Rear warning lights should be installed on the apparatus in accordance with NFPA 1901.

3. A reflective white stripe should be installed around the perimeter of the apparatus in compliance with NFPA 1901.

Upon the replacement of Rescue 2 and Rescue 3, this vehicle shall be deleted from the fleet. Wildland fire responses shall be handled by either Rescue 2 or Rescue 3.

Utility 1

The current vehicle is a 2001 GMC pick-up that was transferred to the Fire Department from the Highway Department in 2012 for conversion. The Fire Department added a flatbed with toolboxes; the conversion cost was $15,600. This vehicle has no firefighting capabilities and sole use is for support operations. It is used to bring additional resources and equipment to the emergency scenes, pick up hose, routine daily inspections and transportation to training activities. The truck has accumulated 131,203 road miles.

Recommendation:

Replace when scheduled with a Super Duty type, extended cab, dual rear wheeled, four wheel drive, minimum one ton, pick-up cab and chassis. To enable the fire department to be able tow the fireboat. The truck should be equipped with a snow plow to allow for snow removal for access to dry hydrants.

Utility 2

Utility 2 is a 1987 Ford/Emergency-One with a 1,000 gallon per minute pump and 800-gallon water tank. It carries assorted hand tools. The apparatus is a commercial cab apparatus and has a seating capacity of two firefighters. This piece of apparatus is used as a reserve engine or back up when other front line apparatus are out of service; either short or long term such was the case when the heavy rescue was removed from service due to structural defects to the frame. This apparatus is house at the Public Safety Building. The truck has accumulated 29,828 road miles.

Recommendation:

Maintain vehicle a reserve until annual cost of maintenance exceeds $3000 as stipulated by Select Board or sell as surplus equipment upon replacement of Rescue 2 or Rescue 3 with a mini pumper.

Chief's Vehicle

This vehicle is a 2007 Ford Expedition. A four-wheel drive SUV type vehicle has been outfitted with a slide-out tray in the rear cargo compartment. Its primary use is for transporting the fire chief and command and control activities. This vehicle has accumulated 86,302 road miles.

Recommendation:

Replace with similar vehicle, with a diesel power plant if available.

6. Apparatus Needs and Recommendations

The focus of this analysis was to determine what apparatus is needed by the fire department to protect the lives and property of the residents and property owners in the most effective manner. The evaluation looked at Moultonborough's NFIRS statistics, which indicate that the majority of the incidents responded to by the fire department, are EMS related. Currently the department uses to "light rescue" vehicles to respond to EMS incidents, these vehicles are almost solely used for EMS and have no firefighting capabilities. The majority property being protected in Moultonborough is made up of single-family housing units, at 4,666 units; this represents ninety-five percent of all housing units in the community. These homes are spread out over fifty-seven square miles of Moultonborough's seventy-five square miles; a majority is located on or adjacent to the shorelines of the multiple water bodies that lay within the boundaries of the town. Improvement of the Department's mobile water supply capabilities (water on wheels) should be a priority; this should provide some improvement in the Town's ISO Public Protection Class rating and may yield some reduction in insurance rates to some town residents.

Mobile Water Supply Apparatus

Mobile water supply apparatus, also known as tankers or tenders are vehicles designed primarily for transporting (pick up, transporting and delivering) water to emergency scenes to be applied by other apparatus. Moultonborough currently has no tankers in its fleet. It is reliant upon its mutual aid towns of Meredith, Holderness, Tuftonboro and Tamworth for tankers of 2,500-gallon capacities or greater. Moultonborough's suppression capability; an expression of how much fire-fighting power that can be put into action when there is a fire is 4,000 gallons of water. The water tank capacities of Moultonborough's four pumpers are 1,000-gallons each. The International building Code (IBC), International Fire Code (IFC), the International Wildland-Urban Interface Code (IWUIC), NFPA 1142, the Standard on Water Supplies for Suburban and Rural Fire Fighting and the ISO Guide for Determining Needed Fire Flow all specify that the minimum required fire flow and flow duration for buildings up 3,600 square feet in protected areas without adequate water and reliable water systems shall be 1,500 gallons per minute for a two hour duration. According to figures provided by Vision Appraisal; the average home size in Moultonborough is approximately 1,641 square feet. Based on the "water on wheels" that fire department currently possesses, it has the suppression capability to sustain water flow for three minutes and twelve seconds, if all the apparatus arrived at the same time.

Recommendation:

It is recommended that the Department replace Engines 2 and 3; with two, 2,500-gallon tankers compliant with the current editions of NFPA 1901, Standard for Automotive Fire Apparatus, Chapter 7 Mobile Water Supply Fire Apparatus and Annex C, Mobile Water Supply Apparatus of NFPA 1142, Standard on Water Supplies for Suburban and Rural Fire Fighting. These tankers should be constructed on commercial cab and chassis to help control the cost. The apparatus should be designed with filling and dumping capacities of at least 1,000 gallons per minute. Large diameter direct tank fills on the rear and dump valves located on both side and the rear of the truck shall be employed. One tanker should be stationed in each fire station. Moultonborough possesses most of the needed components needed to improve its ISO Public Protection Classification rating. Having an approved E-911 reporting system, an approved Communications and Dispatching center in the Lakes Region Mutual Fire Aid dispatching, a trained combination fire department, staffed during the day and adequate call resources at night, a reasonable distribution of fire stations with the use of automatic aid from mutual aid fire companies. The only area in which the department comes up deficient is in regards to water supply systems and the amount of available water needed to suppress fires. Acquisition of these tanker apparatus would greatly improve the suppression capability of the Department and should yield an improve ISO PPC rating. (See Appendix B)

Multi-Function Vehicles

A review of the NFIR's data show that there is a need for the department to maintain first response emergency medical service with transportation and advanced life support services being provided by a contracted ambulance service. This is being accomplished now by the use of two "light rescue" vehicles.

Recommendation:

It is recommended that the Department replace these apparatus with two multi-function apparatus in the form of initial attack apparatus also known as mini-pumpers. The initial attack apparatus configuration feature pumps from 750-1500 gpm, CAFS and water tanks from 300-500 gallons. The size and mobility of these units make them able to handle both fire and EMS incidents, particularly with the two man full-time staffing during the daytime shifts. Firefighters out on EMS incidents would not have to return the station to pick up a truck to respond to a fire incident as they do now. The smaller size makes them better able to access water supplies in the majority of the shoreline areas.

Implementing use of the initial attack apparatus or mini-pumpers can reduce the Department's fleet and theoretically its maintenance costs by the elimination of Forestry 2, Utility 2 and combining the functions of these apparatus with the functions of Rescue 2 and Rescue 3 into two vehicles, one stationed at each fire station. Acquisition of two mini-pumpers would also increase the Department's suppression capability. (See Appendix C)

Repurposing of Vehicles

In 2013 the Fire Department took possession of a 3/4-ton pick-up truck from the Highway Department. The truck was converted to a utility truck with a flatbed body, toolboxes and emergency lighting for a cost of $15,600. The value of the vehicle with approximately 121,000 mile was $6,847 (KBB). While this truck in its present condition should provide 3-5 years of use, barring any major mechanical issues, it is recommended that the Town not transfer any vehicles to the Fire Department that would require modifications that exceed more than 50% of the Kelly Blue Book value (KBB).

Recommendation:

Discontinue the practice of accepting donations or hand me downs and trying to make them fit the needs of the department. Employ the "right tool for the job" concept; plan, design and purchase apparatus to meet the hazards and daily needs of the department.

Light Vehicles

Recommendation:

It is recommended that light, non-diesel vehicles such as the Chief's vehicle be replaced at 100,000 miles or after ten years. A review of both fire and police SUV's found that these vehicles have a high occurrence of lower body panel deterioration, which can shorten the vehicles expected useable lifespan.

7. Equipment Review and Evaluation

The Moultonborough Fire Department has sufficient tools and equipment on each apparatus to perform the necessary functions on the fire ground or at the scene of an emergency. The equipment on each piece of apparatus is generally well laid out and positioned in mounting brackets to allow for rapid deployment of the tools at the scene of the incident.

Following are some recommendations that should be adopted and implemented within the fire department as soon as possible to insure that the condition and readiness of all equipment maintained by the department:

1. All fire hose should continue to be tested annually in accordance with NFPA 1962. Records should be kept on these tests and all repairs completed on each length of hose. This testing item is worth 50 points with ISO when conducted on an annual basis.

2. All ground ladders should continue to be inspected and tested in accordance with NFPA 1932 on an annual basis. Complete records should be maintained by the department on all tests and repair work, whether the work in completed by department members or an outside vendor. This item is worth 50 points with ISO when conducted on an annual basis.

3. All engine company apparatus should continue to be service tested annually with complete records kept on all tests and maintenance work. This item is worth 100 points with ISO when conducted on an annual basis.

8. Summary

From an overall perspective, the Moultonborough Fire Department operates a minimum number of engines and special apparatus to protect the community. Due to the topography of Moultonborough with the lack of sufficient hydrant or cistern protection in many areas of the

community, this creates a requirement for additional water supply apparatus. The fire department has done a creditable job to provide adequate fire protection to the community with the existing fleet. It is of considerable concern that the trend of tearing down smaller cottages and replacing them with larger dwellings in areas of limited access, coupled with sporadic commercial development along the Route 25 has increased the fire flow needs of the town. The Department needs to adjust to meet these increased fire flow buildings and plan its apparatus to meet those needs. Reliance upon mutual aid will not fulfill this need due to extended response times. The Department needs the resources to begin and sustain operations until mutual aid resources arrive on scene. It does not have that capability at this time.

While the Insurance Service Office would recommend a ladder truck for the community, the fire department at this time has such a great need for new tanker (water supply) apparatus, the cost of a new aerial ladder truck is simply beyond the financial resources of the town. At some point in the future, the department may wish to consider the acquisition of a good used piece of aerial apparatus. However the equipment carried by Engine 3 partially offsets some of the ISO requirements. When the next two replacement units can be designed to carry longer ground ladders, this again will improve the department's ladder company operations.

The fire department should continue to proceed with all of their present maintenance and testing procedures as well as documents all of the results of this important work. An apparatus replacement program based on NFPA 11, Annex D should be employed by the Department and should be adopted and implemented in cooperation with Board of Selectmen and Capital Improvement Planning Committee of the Town of Moultonborough as soon as practical. (See Appendix D)

To account for growth patterns of the town, changes in water sources, changes in apparatus and best practices, it is recommended that an updated analysis be performed by the town every ten years. This survey will act as check to make sure that any apparatus contain therein fit with the overall long-term plan of the town and the fire department and meets all the national requirements such as ISO and the N.F.P.A.

Respectfully,

David Bengtson
Chief of the Department

Town of Moultonborough
Fire Apparatus Needs Analysis

PLANNING FOR AND **PROTECTING THE FUTURE**

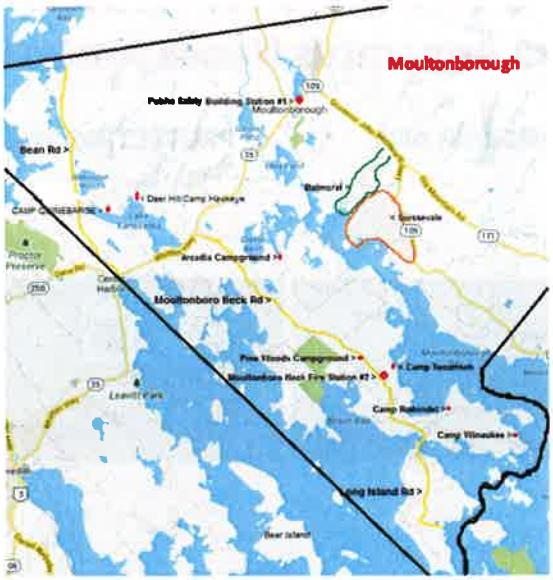
OVERVIEW

NEEDS ASSESSMENT

DEVELOP PLAN FOR REPLACEMENT OF APPARATUS BASED ON:

1. IMPROVING ISO PUBLIC PROTECTION CLASS RATING (FIRE INSURANCE)
2. MATCHING THE NEEDS OF THE COMMUNITY BASED ON HISTORICAL DATA

Town Demographics & Fire Department Resources



Appendix A

TOWN DEMOGRAPHICS & FIRE DEPARTMENT RESOURCES

- 75 SQUARE MILES WITH 15 SQUARE MILES OF INLAND WATERBODIES
- STATE ROAD ROUTES 25, 109, 171 AND BEAN AND MOULTONBORO NECK ROADS
- POPULATIONS OF 4,209 YEAR ROUND AND 25,000-PLUS SEASOBAL
- 4,919 HOUSING UNITS
- 2 CAMPGROUNDS
- 5 COMMERCIAL YOUTH SUMMER CAMPS
- 4 MAJOR WATERBODIES

TOWN DEMOGRAPHICS & FIRE DEPARTMENT RESOURCES

- COMBINATION FIRE DEPARTMENT (PAID/CALL)
- FIRE CHIEF, TWO FULLTIME FF/EMT'S & 38 CALL FF/EMT'S
- 748 INCIDENTS ANNUALLY
- TWO FIRE STATIONS
- 8 APPARATUS (4 PUMPERS), NO TANKERS
- 58 DRY HYDRANTS, 13 CISTERNS
- ISO PPC RATING 9/10 (HIGHER FIRE INSURANCE COSTS)

FLEET INVENTORY

Pumpers ENGINES 1,2,3 AND 4

NFPA 1901 defines a pumper aka an engine as ***3.3.141 Pumper.*** *Fire apparatus with a permanently mounted fire pump of at least 750 gpm (3000 L/min) capacity, water tank, and hose body whose primary purpose is to combat structural and associated fires.* Moultonborough has four apparatus that meet this definition.

FLEET INVENTORY

Rescue Apparatus RESCUE'S 1,2 AND 3

Rescue apparatus in the Moultonborough Fire Rescue Department are classified into two categories, heavy and light.

"Heavy Rescue" is a unit that has the seating capacity for six personnel and carries everything that may be used on a technical rescue, e.g. Jaw of Life.

"Light Rescue" is primarily for first response to emergency medical incidents; it has the seating capacity for 2-3 personnel and carries cardiac monitor defibrillators, suctions units, backboards, traction and immobilization equipment, oxygen, bandaging materials and emergency medical equipment and supplies.

FLEET INVENTORY

Wildland Fire Apparatus FORESTRY 2

NFPA 1906 defines a Wildland Fire Apparatus as *Fire apparatus designed for fighting wildland fires that is equipped with a pump having a capacity normally between 30 gpm and 500 gpm, a water tank, limited hose and equipment, and pump-and-roll capability.*

Moultonborough's wildland fire apparatus would be classified as a Class B wildland engine. It is a pick-up truck with a flatbed and slip-on tank and pump; it is designed to combat fires with low to moderate intensity with low to moderate rates of spread. The 200-gallon tank and BB4 pump meet the needs of a fast response engine, providing a good power to weight ratio and maneuverability. The pump provides moderate lift capability and the tank supports the departments multi-mission needs. A crew of 2-3 people with minimal training is needed to operate the apparatus.

FLEET INVENTORY

Utility Apparatus UTILITY 1,2 AND CHIEF'S SUV

Utility apparatus are designed or adapted for general use and may have a multitude of capabilities. Moultonborough's fleet includes two vehicles that are used for utility purposes.

FLEET INVENTORY

Boats

Moultonborough currently has three boats in its inventory. Only one is designed for firefighting and rescue capabilities.

Boat 1

A 2012, 26-foot Eastern with a 1,000-gallon per minute pump, four pre-plumbed 2-1/" discharges, a 1,000 gpm Akron GP monitor, crew capacity of six and passenger capacity of six. This boat is kept in the water a Lee's Mills from ice-out to late November.

Boat 2

A 16-foot , Boston Whaler-style sport/utility boat with shallow draft and un-sink ability makes a good platform for rescue operation and transporting personnel to islands, This boat was donated to the Fire Department by Camp Robindel.

Boat 3

16-foot, flat-bottom Jon boat, This boat was donated to the Fire Department by a resident.

FLEET INVENTORY

Off-Road and All-Terrain Vehicles

2006 Ski-Doo Skandic 550F Super Wide Track, 2-person capacity, used to tow Sno-bulance. Primary uses for emergency responses on lakes and snow mobile trails. Purchase by Warrant Article in 2006. This unit is kept at the Public Safety Building on a trailer with the Sno-bulance.

1980's Ski-Doo, a donated snowmobile and trailer with rescue sled.

1988 Polaris 454, an ATV donated by resident, used for hiking trail rescue operations, assisting the Police Dept. and forestry incidents. This unit is kept at the Public Safety Building on a trailer.

Fire Fleet Analysis

The present fleet of structural firefighting apparatus is in generally good condition.

$29,000 Annual vehicle maintenance program

Two pumpers are 20 or more years old, supporting roles, such as water supply on the fireground.

Engine 2, a 32 year old Ford/Farrar, which had a body refurbishment in 1997

Engine 3, a 20 year old Freightliner/KME pumper that has just had the frame rails replaced in the end of 2012.

Fire Fleet Analysis

No explicit program for the replacement of fire apparatus exists

Annually a general guide is supplied each year during budget review to the Town Administrator, Board of Selectmen and Advisory Budget Committee. The Select Board ultimately decides which capital items will be included in the Town Warrant.

increased the contribution to the Capital Reserve Funds for Firefighting Equipment.

Fire apparatus should be replaced after twenty (20) years of first line service.

Fleet Review & Evaluation

Fire Departments Apparatus Should:

- Provide fire suppression capabilities equal to the risk
- Provide the right apparatus for the job

This accomplished by:

- Increasing the "Water on Wheels" capability
- Using Multi function apparatus

What We Have & What We Need

Engine 1: 2007 HME, 2000 gpm pump with CAFS and 1000-gallon water tank.
Recommendation: replace in 2031 with similar unit

Engine 2: 1981 Ford/Farrar, 1000 gpm pump and 1000-gallon water tank.
Recommendation: replace in with 2500-gallon tanker on a commercial cab and chassis. Increase the "water on wheels" by 1500 gallons

Engine 3: 1993 Freightliner/KME, 1250 gpm pump and 1000-gallon water tank.
Recommendation: replace with 2500-gallon tanker on a commercial cab and chassis. Increase the "water on wheels" by 1500 gallons

What We Have & What We Need

Engine 4: 2001 HME/Central States, 1250 gpm pump with 1000-gallon water tank.
Recommendation: replace in 2027 with 2000 gpm pump with CAFS and 1000-gallon water tank

Boat 1: 2012, 26-foot Eastern fireboat with 1000 gpm pump.
Recommendation: replace after thirty years of service in 2042. Periodic inspection of physical condition and propulsion systems will determine actual service life.

What We Have & What We Need

Rescue 1: 2012 HME, 35 kilowatt generator, 200,000 lumen light tower, hydraulic rescue tools (Jaws of Life)

Recommendation: replace in 2037 when rescue will be 25 years old. Service life could be extended, needs assessment for this apparatus should begin in 2030 and replacement should be need driven.

Rescue's 2 & 3: Light Rescue's (Pick-up & SUV) initial response medical equipment.

Recommendation: Replace both units with mini pumpers with a 1500 GPM pump, CAFS and 400-gallon water tank. This type of vehicle is small agile and provides superior multi-function capability of fire suppression and EMS. Increase life span of vehicles.

What We Have & What We Need

Forestry 2:

1986 Chevrolet K30 model pick up with a flat bed. The pump is rated at 35 gpm and the unit carries a 200-gallon water tank. The flat bed body is in very good condition for its age and the equipment on this brush truck is well arranged. The truck has accumulated 111,614 road miles.

Recommendation: Upon the replacement of Rescue 2 and Rescue 3, this vehicle shall be deleted from the fleet. Wildland fire responses shall be handled by either Rescue 2 or Rescue 3.

What We Have & What We Need

Utility 1

The current vehicle is a 2001 GMC pick-up that was transferred to the Fire Department from the Highway Department in 2012 and convert for Fire Dept. This vehicle has no firefighting capabilities and sole use is for support operations. It is used to bring additional resources and equipment to the emergency scenes, pick up hose, routine daily inspections and transportation to training activities. The truck has accumulated 131,203 road miles.

Recommendation:

Replace when scheduled with a Super Duty type, extended cab, dual rear wheeled, four wheel drive, minimum one ton, pick-up cab and chassis. To enable the fire department to be able tow the fireboat. The truck should be equipped with a snow plow to allow for snow removal for access to dry hydrants.

Improving our "Water on Wheels" and ISO PPC Rating

Mobile Water Supply Apparatus

Mobile water supply apparatus, also known as tankers or tenders are vehicles designed primarily for transporting (pick up, transporting and delivering) water to emergency scenes to be applied by other apparatus. Moultonborough currently has no tankers in its fleet. It is reliant upon its mutual aid towns of Meredith, Holderness, Tuftonboro and Tamworth for tankers of 2,500-gallon capacities or greater.

Recommendation:

It is recommended that the Department replace Engines 2 and 3; with two, 2,500-gallon tankers. Improve the towns fire protection water resources by adding cisterns and dry hydrants. Request a ISO PPC Evaluation.

2,500 Gallon Tanker

MATCHING THE NEEDS OF THE COMMUNITY BASED ON HISTORICAL DATA

Multi-Function Vehicles

A review of the NFIR's data show that there is a need for the department to maintain first response emergency medical service with transportation and advanced life support services being provided by a contracted ambulance service. This is being accomplished now by the use of two "light rescue" vehicles.

Recommendation:

It is recommended that the Department replace these apparatus with two multi-function apparatus in the form of a mini-pumper. The mini-pumper configuration feature pumps from 750-1500 gpm, CAFS and water tanks from 300-500. The size and mobility of these units make them able to handle both fire and EMS incidents, particularly with the two man full-time staffing during the daytime shifts. Firefighters out on EMS incidents would not have to return the station to pick up a truck to respond to a fire incident as they do now. The smaller size makes them better able to access water supplies in the majority of the shoreline areas.

Implementing use of the mini-pumpers can reduce the Department's fleet and theoretically its maintenance costs by the elimination of Forestry 2, Utility 2 and combining the functions of these apparatus with the functions of Rescue 2 and Rescue 3 into two vehicles, one stationed at each fire station. Acquisition of two mini-pumpers would also increase the Department's suppression capability.

Initial Attack Apparatus

Overlapping Incidents

- 2009 5% of 769 Incidents
- 2010 8% of 804 Incidents
- 2011 9% of 931 Incidents
- 2012 10% of 887 Incidents
- 2013 9% of 811 Incidents

- 2009-2013 8% of 4,202 Incidents

Repurposing of Vehicles

In 2013 the Fire Department took possession of a 3/4-ton pick-up truck from the Highway Department. The truck was converted to a utility truck with a flatbed body, toolboxes and emergency lighting for a cost of $15,600. The value of the vehicle with approximately 121,000 mile was $6,847 (KBB). While this truck in its present condition should provide 3-5 years of use, barring any major mechanical issues, it is recommended that the Town not transfer any vehicles to the Fire Department that would require modifications that exceed more than 50% of the Kelly Blue Book value (KBB).

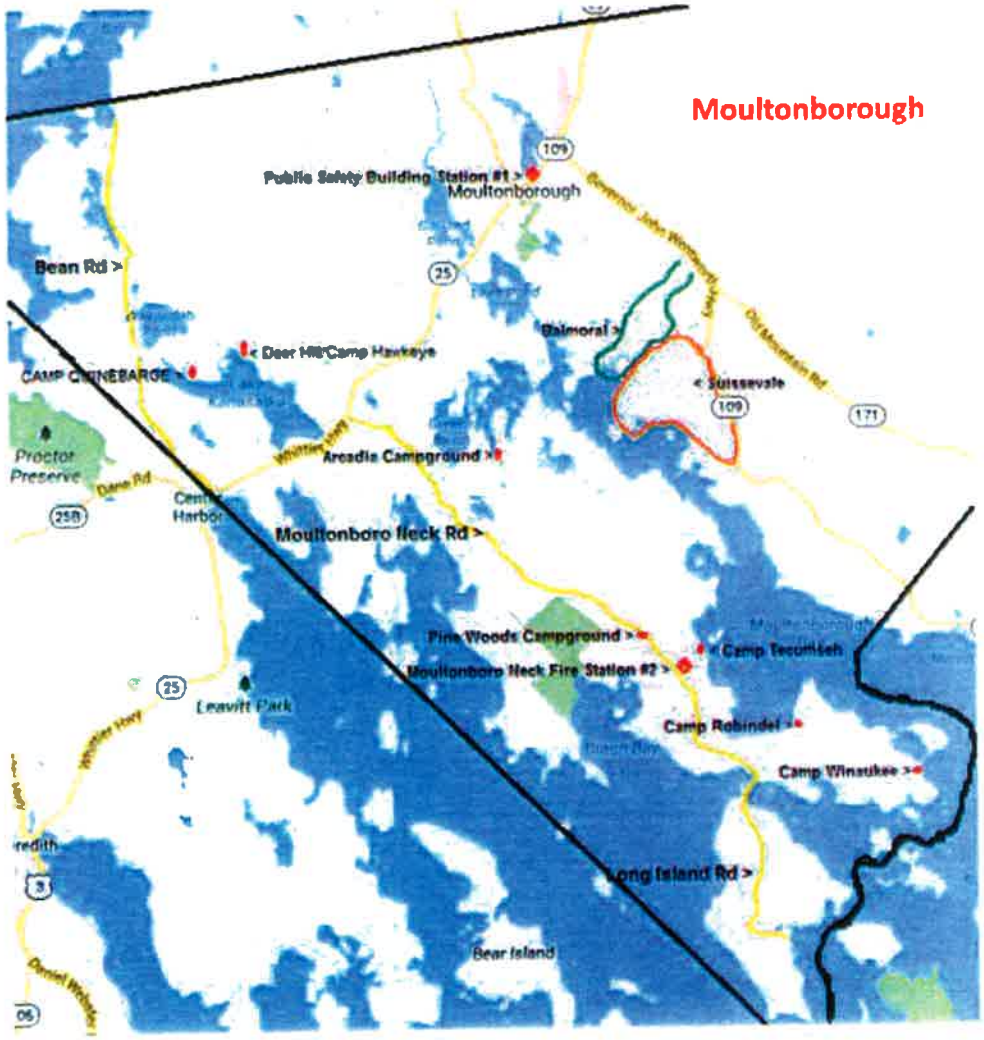
Recommendation:

Discontinue the practice of accepting donations or hand me downs and trying to make them fit the needs of the department. Employ the "right tool for the job" concept; plan, design and purchase apparatus to meet the hazards and daily needs of the department.

The Bottom Line

- Establish a definitive apparatus replacement schedule
- Revise Fire Department Capital Plan to match schedule
- Purchase two mobile water supply apparatus
- Purchase two initial attack/multi-function apparatus
- Stop re-purposing vehicles
- Conduct periodic needs assessments every 5-10 years
- Obtain a ISO Public Protection Class Rating Review

Town Demographics & Fire Department Resources



Appendix A

Mobile Water Supply Apparatus- A vehicle designed primarily for transporting (pickup, transporting, and delivering) water to fire emergency scenes to be applied by other vehicles or pumping equipment.

Dry-Side Tanker

These apparatus are typically designed to carry additional equipment and hose loads.

Barnstead, NH. 2012, 3,000-gallon tank, 750 GPM pump, $353,000. The Town of Sandwich authorized a $380,000 purchase of a similar unit in the 2013 Town Warrant.

Elliptical Tankers

Elliptical tankers are generally less costly; however there is a trade off in a loss of compartment and hose bed space.

Woodbridge, CT. 2,500-gallon tank, 1,000 GPM pump. Low bid awarded $299,859 in January 2013.

Initial Attack Apparatus- NFPA defines this as fire apparatus with a fire pump of at least 250 gpm (1000 L/min) capacities, water tank, and hose body whose primary purpose is to initiate a fire suppression attack on structural, vehicular, or vegetation fires, and to support associated fire department operations.

INITIAL ATTACK FIRE APPARATUS

Initial attack fire apparatus as defined in NFPA 1901 is fire apparatus with a permanently mounted fire pump of at least 250-gpm capacity, water tank, and hose body whose primary purpose is to initiate a fire suppression attack on structural, vehicular, or vegetation fires and to support associated fire department operations. As can be seen from the definition, these types of apparatus can vary dramatically according to the department's intended use

Cab and Chassis Designs

Normally, most initial attack fire apparatus are constructed on commercial-style chassis. In the past, the major problem associated with this type of apparatus was designing a unit and not exceeding the limited gross vehicle weight rating (GVWR) of the suitable commercial chassis available. However, the available choices of commercial chassis have improved substantially. The major commercial chassis manufacturers now offer chassis with both two-door and four-door cabs in the GVWR range that more closely meet the needs of initial attack apparatus. However, it is still very important to match the chassis payload capacity to the design of the apparatus. A vast majority of initial attack fire apparatus are built on four-wheel-drive chassis.

Pumps

Initial attack fire apparatus can have fire pumps with a minimum of 250-gpm capacities, but many have larger fire pumps. Some rural departments use this style vehicle to supply water from drafting sites since this style apparatus may have greater accessibility to rural water supplies than full-sized pumpers.

Departments that use initial attack apparatus for pump-and-roll type operations such as brush fires may consider separate engine-driven pumps. This allows constant pumping operations independent of the vehicle ground speed.

One of the more recent enhancements is the addition of compressed air foam systems (CAFS). They are used for initial attack on structure fires or brush fires. Several manufacturers are building packaged CAFS matched to fire pumps that work well for initial attack apparatus. Compressed air foam gives the limited amount of water normally carried on initial attack apparatus much greater fire suppression potential for both structural and brush fire operations. Some recognized authorities of foam systems claim that compressed air foam will increase efficiency of water as much as four times. This will allow a rig with a 300-gallon water tank to have the suppression potential of 1,200 gallons of plain water.

Water Tanks

NFPA 1901 requires a minimum capacity water tank of 200 gallons on an initial attack apparatus. In many cases, larger capacity tanks are provided when the chassis GVWR can accommodate the additional weight. The capacity and location of the water tank are critical factors in the balance and axle loading of the apparatus. Overloaded axles will affect both on-road and off-road performance and safety.

Body Construction and Compartmentation

Weight is a major issue on this style apparatus, which promotes use of aluminum or plastic composite material bodies. Compartmentation is generally limited on initial attack apparatus because of the reduced size of the bodies. If there are special requirements for specific sized compartments for larger equipment and appliances, it should be noted early in the apparatus design

Hose Storage

The hose use on initial attack fire apparatus is similar in function to the use on pumpers. However, the required hose capacity for supply hose, 10 cu. ft., is one-third of the requirement for pumpers. Initial attack apparatus usually work in conjunction with other full-sized pumpers and rely on their ability to carry additional quantities of hose and equipment.

Initial attack fire apparatus are still required to have a minimum of two preconnected hose beds, with each having a minimum of 3.5 cu. ft. capacity. As with all apparatus, establish minimum requirements up front when designing initial attack apparatus since options and capabilities will be limited in their construction.

NFPA 1911, *Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus*, 2012 Edition

Annex D Guidelines For First Line And Reserve Fire Apparatus
Annex D Guidelines for First-Line and Reserve Fire Apparatus
This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

D.1 General. To maximize fire fighter capabilities and minimize risk of injuries, it is important that fire apparatus be equipped with the latest safety features and operating capabilities. In the last 10 to 15 years, much progress has been made in upgrading functional capabilities and improving the safety features of fire apparatus. Apparatus manufactured prior to 1991 usually included only a few of the safety upgrades required by the 1991 and subsequent editions of the NFPA fire department apparatus standards or the equivalent Underwriters' Laboratories of Canada (ULC) standards. Because the changes, upgrades, and fine tuning to NFPA 1901, ***Standard for Automotive Fire Apparatus***, since 1991 have been truly significant, especially in the area of safety, fire departments should seriously consider the value (or risk) to fire fighters of keeping pre-1991 fire apparatus in first-line service.
The 1991 edition of the NFPA fire department apparatus standards included, among other provisions, requirements for fully enclosed driving and riding areas, auxiliary braking systems, reflective striping, improved warning lights, and prohibition of roof-mounted audible warning devices. The minimum tip load for an aerial ladder was set at 250 lb (114 kg), and other requirements, such as a minimum rail height, were added to make the aerial ladder safer for fire fighters to use. The 1991 editions have been recognized as the benchmark from which improved and safer fire apparatus have evolved. It is recommended that only apparatus that were designed and manufactured to meet the 1991 or later editions of the NFPA fire apparatus standards, or apparatus that have been refurbished in accordance with NFPA 1912, ***Standard for Fire Apparatus Refurbishing***, to meet the 1991 or later editions of the NFPA fire apparatus standards, be permitted to operate in first-line service. This will ensure that, while the apparatus might not totally comply with the current edition of the automotive fire apparatus standards, many of the improvements and upgrades required by the standards since 1991 are available to the fire fighters who use the apparatus.
It is recommended that apparatus manufactured prior to 1991 that is less than 25 years old, that has been properly maintained, and that is still in serviceable condition should be placed in reserve status and upgraded to incorporate as many features as possible of the post-1991 fire apparatus ***(see Section D.3)***. Apparatus that was not manufactured to the applicable NFPA fire apparatus standards or that is over 25 years old should be replaced.

D.2 How the Standards Have Changed. It is a generally accepted fact that fire apparatus, like all types of mechanical devices, have a finite life. The length of that life depends on many factors, including vehicle mileage and engine hours, quality of the preventative maintenance program, quality of the driver training program, whether the fire apparatus was used within the design parameters, whether the apparatus was manufactured on a custom or commercial chassis, quality of workmanship by the original manufacturer, quality of the components used, and availability of replacement parts, to name a few. In the fire service, there are fire apparatus with 8 to 10 years of service that are simply worn out. There are also fire apparatus that were manufactured with quality components, that have had excellent maintenance, and that have responded to a minimum number of incidents that are still in serviceable condition after 20 years. Most would agree that the care of fire apparatus while being used and the quality and timeliness of maintenance are perhaps the most significant factors in determining how well a fire apparatus ages.
Prior to 1991, the single fire department apparatus standard was NFPA 1901. It was basically a "reactive standard." If something worked well in field use for a few years, it might have been suggested for inclusion in NFPA 1901. It was a very basic standard. In the late 1980s, the Technical Committee on Fire Department Apparatus decided to become proactive and to greatly enhance the value of the standard for the fire service. Task groups were appointed to develop reasonable requirements for the various components that made up a fire apparatus, and a safety task group was charged with looking at issues across the board that would improve the safety of fire fighters who use the apparatus.
The completely revised 1991 edition of NFPA fire department apparatus standards was the result of these efforts and the full committee's strong desire to make the automotive fire apparatus standards not only more safety oriented but also more user friendly. In 1991, four standards were issued: NFPA 1901, ***Standard for Automotive Fire Apparatus***; NFPA 1902, ***Standard for Initial Attack Fire Apparatus***; NFPA 1903, ***Standard for Mobile Water Supply Fire Apparatus***; and NFPA 1904, ***Standard for Aerial Ladder and Elevating Platform Fire Apparatus***.
Contained within the 1991 editions of the fire department apparatus standards were requirements for such items as increased battery capacity to ensure starting under most conditions, intersection lights for increased visibility, removal of all roof-mounted audible warning devices to reduce hearing problems, a flashing light in the cab to warn if a cab or body door is open, a backup alarm, an automatic transmission to make it easier to drive (unless the purchaser has a specific reason for a manual transmission), fully enclosed riding areas with reduced noise (dBA) levels to keep crew members safe and informed, seats and seat belts for all crew members riding on the apparatus, fail-safe door handles so the sleeve of a coat does not inadvertently catch a handle and open a door, and signs requiring everyone to be seated and belted.
In the pump area, the standard specified that 3 in. (75 mm) or larger valves be "slow close," that caps on intakes and discharge outlets be tested to 500 psi (3400 kPa), that an intake relief valve be provided to help manage incoming pressure, that 30-degree sweep elbows be provided on the discharges to eliminate hose kinking, and that all 3 in. (75 mm) and larger discharges be eliminated from the pump panel to reduce the possibility of injuries to the pump operator.
Fire apparatus equipped with electronic or electric engine throttle controls were required to include an interlock system to prevent engine speed advancement, unless the chassis transmission is in neutral with the parking brake engaged or unless the parking brake is engaged, the fire pump is engaged, and the chassis transmission is in the correct pumping gear.
In the body area, the minimum step surface size and load-carrying capabilities were increased, handrails were required to be slip resistant, and reflective striping was required on all four sides of the apparatus. Electrical system requirements for line voltage systems were added to include the use of listed components that were grounded.
Many requirements were added to increase the operating capabilities of all aerial devices. For aerial ladders, the minimum design strength of the rungs was increased, a height requirement for the handrails was specified, a minimum load-carrying requirement for folding steps was specified, and the aerial ladder had to have a minimum carrying capacity of 250 lb (114 kg) at the tip when the aerial ladder is at zero degrees elevation and maximum extension. Where a water tower is equipped with a ladder, the same requirements that applied to an aerial ladder were required of the ladder on the water tower.
The carrying capacity of elevating platforms at zero degrees elevation and maximum extension was raised to 750 lb (340 kg). Elevating platforms were also required to have handrails, breathing air available in the platform (with low-air warning capability) for at least two fire fighters, and a water curtain cooling system under the platform.

All aerial devices had to be capable of supporting a static load of one and one-half times their rated capacity in any position. A requirement for a stabilizer movement alarm and reflective striping with warning lights was added. Interlocks to prevent inadvertent movement to an unsupported side and to prevent raising the aerial device prior to the stabilizers being deployed were specified. One hundred percent nondestructive tests (NDT) became a requirement. All these requirements were included in the 1991 editions of the NFPA fire department apparatus standards.
In 1996, the four fire department apparatus standards (NFPA 1901, NFPA 1902, NFPA 1903, and NFPA 1904) were recombined into a single standard that was designated as NFPA 1901, *Standard for Automotive Fire Apparatus*. This edition further enhanced the safety and operating characteristics of all the apparatus.
The 1999 edition included chapters on quints and mobile foam apparatus, further defined slip resistance of stepping and walking surfaces, required better mounting of equipment in the driving and crew compartments, required predelivery testing of foam systems, and specified that fill stations for breathing air cylinders be designed to totally contain a rupturing cylinder.
The 2003 edition continued to refine the requirements in the driving and crew riding areas with increased head height requirements at seating positions and additional requirements for storage of SCBAs in seat backs, both aimed at reducing fire fighter injuries. The test protocol for slip resistance of standing and walking surfaces was better defined. There was a general cleanup of the requirements throughout the document to enhance the operational usefulness of the apparatus.

D.3 Upgrading Fire Apparatus. Any apparatus, whether in first-line or reserve service, should be upgraded in accordance with NFPA 1912 as necessary to ensure that the following features are included as a minimum:

- (1)
  Fully enclosed seating is provided for all members riding on the fire apparatus.
- (2)
  Warning lights meet or exceed the current standard.
- (3)
  Reflective striping meets or exceeds the current standard.
- (4)
  Slip resistance of walking surfaces and handrails meets the current standard.
- (5)
  A low-voltage electrical system load manager is installed if the total connected load exceeds the alternator output.
- (6)
  The alternator output is capable of meeting the total continuous load on the low-voltage electrical system.
- (7)
  Where the gross vehicle weight rating (GVWR) is 36,000 lb (16,000 kg) or more, an auxiliary braking system is installed and operating correctly.
- (8)
  Ground and step lighting meets or exceeds the current standard.
- (9)
  Noise levels in the driving and crew compartment(s) meet the current standard, or appropriate hearing protection is provided.
- (10)
  All horns and sirens are relocated to a position as low and as far forward as possible.
- (11)
  Seat belts are available for every seat and are new or in serviceable condition.
- (12)
  Signs are present stating no riding on open areas.
- (13)
  A pump shift indicator system is present and working properly for vehicles equipped with an automatic chassis transmission.
- (14)
  For vehicles equipped with electronic or electric engine throttle controls, an interlock system is present and working properly to prevent engine speed advancement at the operator's panel, unless the chassis transmission is in neutral with the parking brake engaged; or unless the parking brake is engaged, the fire pump is engaged, and the chassis transmission is in pumping gear.
- (15)
  All loose equipment in the driving and crew areas is securely mounted to prevent its movement in case of an accident.

D.4 Proper Maintenance of Fire Apparatus. In addition to needed upgrades to older fire apparatus, it is imperative that all fire apparatus be checked and maintained regularly to ensure that they will be reliable and safe to use. The manufacturer's instructions should always be followed when maintaining the fire apparatus. Special attention should be paid to ensure that the following conditions exist, as they are particularly critical

to maintaining a reliable unit:

- (1)
  Engine belts, fuel lines, and filters have been replaced in accordance with the manufacturers' maintenance schedule(s).
- (2)
  Brakes, brake lines, and wheel seals have been replaced or serviced in accordance with the manufacturers' maintenance schedule.
- (3)
  Tires and suspension are in serviceable condition, and tires are not more than 7 years old.
- (4)
  The radiator has been serviced in accordance with the manufacturer's maintenance schedule, and all cooling system hose are new or in serviceable condition.
- (5)
  The alternator output meets its rating.
- (6)
  A complete weight analysis shows the fire apparatus is not over individual axle or total gross vehicle weight ratings.
- (7)
  The fire pump meets or exceeds its original pump rating.
- (8)
  The water tank and baffles are not corroded or distorted.
- (9)
  If equipped with an aerial device, a complete test to original specifications has been conducted and certified by a certified testing laboratory.
- (10)
  If so equipped, the generator and line voltage accessories have been tested and meet the current standard.

D.5 Refurbishing or Replacing Fire Apparatus. Fire department administrators and fire chiefs should exercise special care when evaluating the cost of refurbishing or updating an apparatus versus the cost of a new fire apparatus. Apparatus that are refurbished should comply with the requirements of NFPA 1912. A thorough cost-benefit analysis of the value of upgrading or refurbishing a fire apparatus should be conducted. In many instances, it will be found that refurbishing costs will greatly exceed the current value of similar apparatus. Experience has also shown that refurbishing a fire apparatus that is over 20 years old, other than to paint or repair the apparatus, is a very poor investment.
Some factors to consider and evaluate when considering whether to refurbish or replace a fire apparatus include the following:

- (1)
  What is the true condition of the existing apparatus? Has it been in a major accident, or has something else happened to it that would make spending significant money on it ill advised?
- (2)
  Does the current apparatus meet the program needs of the area it is serving? Is it designed for the way the fire department operates today and is expected to operate into the foreseeable future, or is the apparatus functionally obsolete? Can it carry everything that is needed to do the job without being overloaded?
- (3)
  If the apparatus is refurbished, will it provide the level of safety and operational capability of a new fire apparatus? Remember, in many cases, refurbishing does not mean increasing the GVWR, so it is not possible to add a larger water tank or additional foam agent tanks or to carry massive amounts of additional equipment. Enclosing personnel riding areas might add enough weight to the chassis that existing equipment loads need to be reduced to avoid overloading the chassis. An aerial ladder that does not have a 250 lb (114 kg) tip load rating at zero degrees elevation and maximum extension cannot be made stronger.
- (4)
  What is the anticipated cost per year to operate the apparatus if it were refurbished, and what would the cost per year be for a new apparatus? Do not forget insurance costs, downtime costs, maintenance costs, depreciation, reliability, and the safety of the users and the public. At what rate are those costs rising each year? Are parts still readily available for all the components on the apparatus? A refurbished 15-year-old apparatus still has 15-year-old parts in it. How long could the fire department operate without the apparatus if it suddenly needed major repairs?
- (5)

Is there a current trade-in value that will be gone tomorrow? Most apparatus over 12 years old have little trade-in value. Are there creative financing plans or leasing options that can provide a new fire apparatus for little more than the cost of refurbishing or maintaining an older apparatus?

D.6 Conclusion. A fire apparatus is an emergency vehicle that must be relied on to transport fire fighters safely to and from an incident and to operate reliably and properly to support the mission of the fire department. A piece of fire apparatus that breaks down at any time during an emergency operation not only compromises the success of the operation but might jeopardize the safety of the fire fighters relying on that apparatus to support their role in the operation. An old, worn out, or poorly maintained fire apparatus has no role in providing emergency services to a community.

Now Then Comparison of Appendix C: Town of Moultonborough Fire Department Fleet (2011)

Type	ID#	Make/Model	Cycle	2011 replacement Cost*	ARC	ARC	2013 Replacement Cost	Cycle
Utility	1	GMC 3/4 Ton 4x4 ^	10	$15,000.00	$1,500.00	$2,515.20	$25,152.00	10
Rescue	1	HME	30	$450,000.00	$15,000.00	$15,000.00	$450,000.00	30
Engine	1	HME	25	$425,000.00	$17,000.00	$18,000.00	$450,000.00	25
Engine	2	Ford	25	$350,000.00	$14,000.00	$15,200.00	$380,000.00	25
Engine	3	Freightliner	25	$350,000.00	$14,000.00	$15,200.00	$380,000.00	25
Engine	4	HME	25	$425,000.00	$17,000.00	$18,000.00	$450,000.00	25
Car	1	Ford Expedition	10	$45,000.00	$4,500.00	$3,999.60	$39,996.00	10
Boat	1	Eastern	25	$182,500.00	$7,300.00	$7,300.00	$182,500.00	25
Rescue	2	Ford F250 4x4 (1)	10	$70,000.00	$7,000.00	$9,090.91	$200,000.00	22
Forestry	2	Chevrolet 1-Ton 4x4 (1)	10	$25,000.00	$2,500.00	$0.00	$0.00	0
Rescue	3	Chevrolet Suburban 4x4 (2)	10	$55,000.00	$5,500.00	$9,090.91	$200,000.00	22
Utility	2	International E-One AWD (2)	30	$250,000.00	$0.00	$0.00	$0.00	0
				$2,642,500.00	$105,300	$113,396.62	$2,757,648.00	

Note: (1) Replace w/1500 gpm Initial Attack Apparatus/MiniPumper; Compressed Air Foam; Cabinetry and Associated Equipment
(2) Replace w/1500 gpm Initial Attack Apparatus/ MiniPumper; Compressed Air Foam; Cabinetry and Associated Equipment

* This figure is a rough estimate of the 2011 replacement cost of the currently projected replacement vehicle, which may or may not be the same as the current vehicle. This figure is just for the purpose of this report and should not be construed as an accurate figure for future purchase to be compared to.
** This number is based on current projections, not necessarily the equipment's originally projected useful live.
***This truck was replaced in 2007 by an HME custom pumper. The old truck was offered at surplus equipment auction, but failed to get a sufficient bid. The Select Board has authorized the Fire Dept. to retain the vehicle with a annual $3,000 maintennace cap.
^ These trucks can be replaced for significantly less than the cost of buying a new truck by transferring trucks from the DPW fleet, assuming that the fleet is kept on schedule. Otherwise, these replacement would each cost $55,000.