

- Identified deficiencies in the radio coverage for the Fire Department
- May 2021 presented two proposals to the Town Council. VHF and 800 Mhz. Town council approved the 800 Mhz
- November 2021 – received our programmed portable radios from Nashua
- December 2021 – new Mobile radios installed in all vehicles.
- February 2022 – first visited the Whitetail Verizon site for suitability
- March 2022 – Met with Verizon at Whitetail site
- March 2022 – Install of new equipment at the PD for 800 Mhz system
- April 2022 – Field testing and acceptance of new 800 Mhz system with Motorola
- June 2022 – Whitetail site was chosen. Confirmed with Comm Dev that the new tower would not need to go before Zoning
- April 2023 – Conducted Customer Design Review with Motorola for equipment for our new site. This secured our pricing for the project. Motorola was anticipating 30% increase.
- July 2023 – received first sublease from Verizon to utilize Whitetail. The sublease was sent to Town attorneys.
- September 2023 – Amended agreement was sent to Verizon. No communication since agreement was sent.
- October 13 – Contacted NH Emergency Services and Communications Director Mark Doyle to get connected with someone at Verizon. I spoke to the SWIC (Statewide Interoperability Coordinator) for Verizon and a contact at Verizon on conference call to try to move the agreement forward. I have reached out once again to tell them that our Town attorney still has not heard anything from Verizon. Verizon will not let us on the site until we have a signed agreement.

Anytime we are utilizing the 800 Mhz, we are only relying on Nashua’s site location at Kessler Farms.

Fire began using the 800 Mhz system March 24, 2023. Initially had some success with improving communications however with vegetation growth and the large amount of rain, the coverage for 800 Mhz diminished.

Police did not switch over to 800 yet. We have utilized the 800 talk groups for events and certain calls (Maple Ridge barricaded subject, etc) with great success. It depends on where you are located.

What needs to happen once we have a signed agreement (from Bill Mansfield):

- Hire Project Manager/Engineering fire
- have construction drawings drawn up,
- possibly have FAA Certification completed and filed,
- Once you receive FAA Approval
- have the site staked out,
- Acquire Building Permits
- have soil testing completed,
- select a tower vendor, Valmont is a preferred vendor

have the tower and foundation designed by the tower company,

have the designs reviewed by "TEP".

Order Tower

Select a Contractor for the Site Work, (needs to be a Verizon Approved contractor)

Select a Foundation Provider

Order rebar as per tower design

Begin site work (Digging the foundation hole)

Set up rebar

Pour Foundation

Have core testing done (During pour, 7 days, 14 days, 21 days and 28 days.)

Wait for test results

Ground the Tower

Backfill and compact Foundation

Compaction Test

Stack Tower

Continue with Electrical and Grounding to new Building

Site Inspection/Tower Inspection

Construction Completion Letter

Set up and begin installing equipment for the Town and Verizon

Install antenna brackets

Install antennas and cable

Complete project.



TOWN COUNCIL – AGENDA REQUEST FORM

THIS FORM WILL BECOME PART OF THE BACKGROUND INFORMATION USED BY THE COUNCIL AND PUBLIC

Please submit Agenda Request Form, **including back up information, 8 days prior** to the requested meeting date. **Public Hearing requests must be submitted 20 days prior to requested meeting date to meet publication deadlines** (exceptions may be authorized by the Town Manager, Chairman/Vice Chair).

MEETING INFORMATION

Date Submitted: May 21, 2021
 Submitted by: Town Manager Paul Micali
 Department: General Government
 Speakers: Paul Micali

Date of Meeting: **May 27, 2021**
 Time Required: 20 minutes
 Background Info. Supplied: Yes: No:

CATEGORY OF BUSINESS (PLEASE PLACE AN "X" IN THE APPROPRIATE BOX)

Appointment:	<input type="checkbox"/>	Recognition/Resignation/Retirement:	<input type="checkbox"/>
Public Hearing:	<input type="checkbox"/>	Old Business:	<input type="checkbox"/>
New Business:	<input checked="" type="checkbox"/>	Consent Agenda:	<input type="checkbox"/>
Nonpublic:	<input type="checkbox"/>	Other:	<input type="checkbox"/>

TITLE OF ITEM

Communications Equipment Upgrade Presentation

DESCRIPTION OF ITEM

Town Council to be presented with a proposal to upgrade our communications systems to an 800 MHZ system to achieve a 95% emergency coverage for the Town of Merrimack.

REFERENCE (IF KNOWN)

RSA: _____ Warrant Article: _____
 Charter Article: _____ Town Meeting: _____
 Other: _____ N/A

EQUIPMENT REQUIRED (PLEASE PLACE AN "X" IN THE APPROPRIATE BOX)

Projector:	<input type="checkbox"/>	Grant Requirements:	<input type="checkbox"/>
Easel:	<input type="checkbox"/>	Joint Meeting:	<input type="checkbox"/>
Special Seating:	<input type="checkbox"/>	Other:	<input type="checkbox"/>
Laptop:	<input type="checkbox"/>	None:	<input type="checkbox"/>

CONTACT INFORMATION

Name: Paul Micali Address: 6 Baboosic Lake Road
 Phone Number: 424-2331 Email Address: pmicali@merrimacknh.gov

APPROVAL

Town Manager: Yes No: Chair/Vice Chair: Yes No:

Hold for Meeting Date: _____

Communication Upgrade

Background:

As you are aware, the Fire and Police Departments have been working on determining solutions to the radio communications concerns that have been identified. Below is a chronological summary of what has been accomplished thus far toward improving our radio infrastructure.

8/2020 Meetings began with Fire and Police Administration, Town Manager and Assistant Town Manager to discuss communications issues and potential solutions.

8/2020 The outside vendors involved in the project include the radio equipment manufacturer, Motorola, as well as two independent sales and service vendors. Ossipee Mountain Electronics (OME) and Two Way Communications are both NH-based businesses that sell, install and service Motorola radio equipment in the region.

8/2020 Ossipee Mountain Electronics (OME) came to Merrimack Fire and performed evaluation and routine maintenance on all vehicle radios to ensure all were operating properly and not contributing to the problem. Minor repair needs were identified and corrected. Funding has been requested in the operating budget to ensure this routine maintenance is completed annually.

8/2020 Two Way Communications worked with Lieutenant Shawn Farrell and others to complete a coverage study using our existing equipment and prepare a proposed solution to reach approximately 95% coverage throughout Merrimack. This plan was for an **analog** system and was reviewed by all parties involved. Cost was estimated to be \$700,000 or more. (See 12/2020 below for update to **digital** plan)

9/2020 OME presented a coverage study based on a **digital** system with a proposed solution to reach approximately 95% coverage throughout Merrimack. This plan was also reviewed by all parties. The cost of this plan was estimated around \$450,000 to \$500,000.

9/2020 Motorola would not guarantee 95% coverage and there would be additional cost not included in the prices above. When we got the final estimates for the VHF system it was for \$1,050,313 to be all inclusive.

10/2020 The plans presented by the two vendors both involve the addition of transmit/receive antenna sites at strategic locations throughout Merrimack, as well as converting our current analog radio service to operate on a digital signal.

10/2020 Although the proposed solutions from OME and Two Way Communications share the same goal of achieving 95% radio coverage, there are significant differences in the methods used to achieve this goal. Time was spent in this period to review and discuss the pros and cons of both plans in an attempt to determine which would be the most effective means to achieve the desired results.

11/2020 OME relocated the antenna at Fire Station 3 to the proper location in an attempt to improve service in that area. No significant improvement was noted; however, there was no charge for this service.

12/2020 Fire and Police Administration met with Paul Micali to review where we are in the process and what information is still needed. It was determined we would meet again with OME to discuss and refine their upgrade plan. The possibility of completing the process in two phases to reduce the financial impact was discussed.

12/2020 Chief Levesque conferred with OME to discuss the needed revisions to the upgrade plan.

- 12/2020 We received the update from Two Way Communications for a digital system.
- 01/2021 Fire and Police representatives met again with OME and a specialist from Motorola. During this meeting refinements were recommended to the upgrade plan, as well as a review of the coverage study to ensure it will meet our needs. OME is expected to return with the updated plan within a week to ten days.
- 01/2021 Assistant Chief Harris met with the communications supervisor from the City of Nashua to get an outsider's expert opinion on the upgrade plan. Based on this consultation, we have conducted an additional set of tests using the 800MHz band and an antenna tower in north Nashua. Preliminary results from this testing are extremely positive. Moving to this band may provide a very workable solution at a lower cost.
- 02/2021 Based on the successful testing done on Nashua's 800MHz system, Motorola was instructed to complete a computerized coverage study for us to operate on an 800MHz radio system using Nashua towers as well as the tower on Hutchinson Road in town. Also requested was a quote for the equipment upgrades needed for us to transition to an 800MHz system.
- 02/2021 Chief Levesque received two proposals from Motorola: one for upgrades to our VHF system and one for the transition to the 800MHz system. Both quotes are over a million dollars, including system upgrades and new radio equipment. Motorola will only guarantee 95% coverage on the 800MHz system, not the VHF system because the VHF antennae will be below the level of the trees based on the current proposal.
- 02/2021 Chief Levesque and Chief Duke discussed the two proposals amongst our staffs and with each other and agreed that transitioning to the 800MHz system is the best choice for our communications system. Chief Levesque emailed the quotes and our recommendation to Eileen and Paul Micali.
- 02/2021 In the coming weeks we will meet with the Motorola rep and the communications supervisor from Nashua to ensure the plan and quote includes all the needed equipment and excludes anything unnecessary. We will also need to determine if there will be costs from the City of Nashua for us to share their radio system.
- 03/201 Submitted request for \$1.4 million for Community Project Funding to the Office of Congressman Chris Pappas through the Transportation and Infrastructure Committee.
- 04/2021 Received finalized costing from Motorola on the 800MHZ.
- 5/2021 Will be conducting a second test with the 800MHZ now that foliage has begun and to get final coverage maps.

In addition to this work on the communications infrastructure, the Fire and Police Administrations have met regularly to discuss dispatching procedural errors, omissions and concerns as they have occurred. These meetings have enabled the Police Administration to provide timely feedback and corrections to the Dispatching staff when needed. The Fire Department has also committed to providing a comprehensive guide/policy manual for Fire Department communications. This manual is intended to provide the Dispatch center with a clear understanding of the Fire Department's communications needs and expectations. (Note: With a new CAD/RMS/Dispatch software package and a new Dispatch supervisor coming on board, it did not make sense to invest significant time and effort into a manual that will be obsolete very shortly. In the interim, we have been having regular meetings between PD and FD administration to discuss our needs, and the PD administration has encouraged us to meet directly with the new Dispatch supervisor to provide guidance as well.)

Also, the Fire and Police Administrations had been working together to complete the installation of the back-up dispatch consoles at the Fire Station. Although this upgrade will not directly improve the coverage or effectiveness of the day to day communications, it is an important project. The back-up consoles will provide redundancy in our communications system in the event of an emergency or system failure at the Police Station, as well as providing a means for separating Fire and Police Dispatch during extremely high volume situations, such as major storms, natural disasters or other major emergencies. This console installation project had been on hold for too long, and getting it completed is a significant upgrade to our overall communications system, in addition to finalizing a project on which the Town has invested a significant amount of money. This project is now fully completed and operational.

Where we stand:

In 2017-18, the Town undertook a \$610,000 upgrade. This upgrade was to replace the infrastructure that was at the end of life. This was not to upgrade the coverage. Over the last several years we have looked into several options. To include installing simulcast system, higher radio towers plus installing new towers throughout the town. We were told that Motorola would not guarantee 95% coverage.

While meeting with Nashua to see if we could install an antenna on the Kessler Farm Tower, the City of Nashua mentioned that the Town could join their 800MHZ system. Assistant Chief Harris then proceeded to test to see if that was a possibility. The test results were very promising. The City of Nashua allowing us to join their system made it more affordable for Merrimack to get an 800MHZ system. The Town of Merrimack could likely never afford a 800MHZ system on its own. The cost would be in excess of \$4 million dollars.

Benefits of 800MHZ system:

Most large communities use 800 MHz because it transmits inside buildings. It is very important to be able to communicate while inside these buildings for a number of reasons. The major concern is not being able to effectively communicate during a critical incident which could lead to tragic outcomes. On numerous occasions the Fire Department has had trouble communicating between engine and firefighters inside. If there is an emergency and the firefighter cannot call out, it could lead to serious injury or worse. It is important that when Fire is on an emergency scene that they can communicate with each other. Also, in some buildings in town, even with digital signal, Police can't get radio out of these buildings.

We will be bringing forward an amendment to the Town Code to now require an amplifier be installed to help with communications in newer buildings, but this will not solve the problem in some of the Town's older buildings.

Another benefit is that if we switch, NH first responders would all be on the same radio system to increase interoperability between all communities and it would increase our interoperability between the two largest cities in N.H. that we border.

Currently, we have a proposal from Motorola for the 800MHZ broken down into two segments: Radios and Infrastructure.

Radios:

The radio portion of the communication upgrade is approximately \$531,942. This includes upgrade to all the radios throughout Police and Fire, to include the radios in the vehicles. The majority of this purchase is for the Police Department.

PD	
Portables	\$ 305,799.95
Mobles	\$ 143,278.94
Install/Programming	\$ 15,381.35
PD TOTAL	\$ 464,460.24
FD	
Mobles	\$ 111,402.08
Install/Programming	\$ 17,732.60
FD TOTAL	\$ 129,134.68
RADIO TOTAL	\$ 593,594.92
Discount	\$ (61,652.69)
Discounted Radio Total	\$ 531,942.23

The radios that the Fire Department purchased in 2018 can be reprogrammed since we purchased dual band radios.

Regardless of whether or not we move forward with this project, the purchase of these radios will not be wasted since we will be purchasing dual band radios. Additionally, we will need to upgrade the radios in the fire apparatus no matter what.

Infrastructure:

The second component is infrastructure. There are two options when it comes to the infrastructure section.

The first option is to upgrade the dispatch center to be able to utilize the 800MHZ system through Nashua at a cost of \$153,050.

CORE Upgrade/LIC.	\$ 62,300.00
Installation/ST, PM, Install, Project	\$ 90,750.00
TOTAL UPGRADE/INT.	\$ 153,050.00

The second option, if needed, would be to upgrade the Hutchinson Tower. This cost would be \$572,125.70. (725,175.70 is the cost with both options included [see below] – \$153,050 [from option 1])

TOTAL RF	\$425,005.70
CORE Upgrade	\$62,300.00
Microwave	\$95,420.00
TOTAL	\$582,725.70
Installation/Includes Installation, System Integration, Engineering, Staging and Motorola Project Management	\$ 142,450.00
TOTAL RF	\$725,175.70

In addition to the cost for the infrastructure upgrade, we would also have to upgrade the building which houses the equipment. This upgrade is estimated to be \$125,000, bringing the total cost for option 2 to \$697,125.70.

Recurring cost:

When switching over to the 800MHZ system we will have some yearly recurring costs:

Total recurring annual cost - \$68,079 (Payments to City of Nashua)

- System Upgrade Agreement (SUAI). Currently approximately \$27,642. We never had SUAI previously which is common for agencies our size; however, whenever you upgrade you need to purchase all previous system core upgrades. This cost would ensure the latest software is installed and will save money down the road. (This fee only applies after the first year)
- Annual Preventive Maintenance, Security Upgrade Services (SUS) and Technical Support Agreements with Motorola. \$9,237 (This fee only applies after the first year)
- User fee for utilizing its infrastructure - \$20 per month per radio on the system (130 radios @ \$20.00 per month. \$2,600 a month or \$31,200 annually).
- Any overtime costs associated with the use of City of Nashua Radio Communications personnel. There are no anticipated overtime costs, as most work would be performed during normal business hours.

Recommendation:

Both the Police Chief and Fire Chief agree that switching to an 800 MHz radio system would alleviate most, if not all, of the radio coverage issues. It is important to note that the 800 MHz is a much narrower bandwidth which allows it to penetrate into large structures. Both departments have radio coverage issues while trying to transmit inside of large structures. Radio testing was conducted using Nashua's 800 MHz portables and proved that the radio signal worked inside our trouble spots. The radios were transmitting off a single radio tower located at Kessler's Farm in Nashua. Motorola's proposal is to add a single site in Merrimack at the Hutchinson water tower, which would only increase coverage. Motorola guarantees coverage with the 800 MHz trunked system while it would not guarantee the VHF system because all sites are not above tree level. Multiple radio towers would need to be erected in order to achieve to appropriate elevation gains for the VHF system to be guaranteed by Motorola.

We are recommending Option 1 at this time: purchasing the radios and upgrading the dispatch center. We feel that we will then evaluate the system over the next several months and see if we will need to also proceed with option 2, the upgrading of Hutchinson Tower.

Total Cost of Project and Funding:

The before mentioned cost total for option 1 (purchasing the radios and upgrading the dispatch center) is \$684,992, before any rebates or trade-in allowances. In addition, if we need to have a relay tower in Merrimack (option 2), this would be an additional cost of \$697,125, for a total project cost of \$1,382,117.

However, we will have to upgrade the radios in the Fire Department (\$129,135) regardless.

By moving forward with option 1, this will afford us the time to make sure this is the best solution for Merrimack. As previously mentioned, the radios purchase will not be in vain since we need them anyway.

We are still waiting on a final number for the trade-in allowance on police radios. Once I get that number I would deduct it from the equipment cost. I am looking to fund most of the \$684,992 through the savings we have in the Police and Fire Departments, as well as the savings from Health Insurance throughout town departments.

Potential Additional Cost:

The Town of Merrimack Communications Center is currently staffed with a minimum of two dispatchers on day shift (7 a.m. to 3 p.m.) and second shift (3 p.m. to 11 p.m.), and one dispatcher on third shift (11 p.m. to 7 a.m.). We utilize a part-time dispatcher on Fridays and Saturdays on third shift to increase the staffing to two dispatchers. Monday through Friday there is an Assistant Communications Supervisor that works 8 a.m. to 4 p.m. in addition to the two dispatchers.

Dispatchers are responsible for both Police and Fire communications. They are responsible for handling all phone calls and radio communications along with answering any walk in complaints in the lobby. As you can imagine, the center can be very busy with phones ringing, radio transmissions, officers asking for items in house, and the window lobby. Our communications staff is great and performs well dealing with difficult tasks; however, I believe there is a way to improve communications to ensure that radio transmissions are not missed or misunderstood.

One solution is to ensure that we have two dispatchers on each shift, seven days a week. This would fill a void that we have experienced during the overnight shift when there is a critical incident such as a structure fire, serious motor vehicle accident, or police critical incident. These incidents are more difficult for one dispatcher to handle by themselves. If we continue to utilize our part-time dispatcher on Friday and Saturday overnight shift, we would only need one additional dispatcher to accomplish this solution. The fully loaded cost of a dispatcher is \$74,850.78.

Future Consideration:

Ideally, we would operate with three dispatchers on second shift similar to the day shift during the week. The extra dispatcher would be focused on being a call taker thereby allowing the other dispatchers to focus on the radio communications for fire and police. They would also be able to answer the lobby window. This works well during day shift during the week. We would continue to operate with two dispatchers on day shift Saturday and Sunday, which is usually a slower shift with telephone calls and call volume. In order to accomplish staffing three dispatchers on second shift, seven days a week, we would need to hire an additional two dispatchers for a total cost of \$149,701.56.