



Essex County

P25 Digital Conventional Multicast Radio System

Design Report

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Prepared for: Essex County Board of Supervisors
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Section 1. Executive Summary

1.1 Introduction

This project for the replacement of the Essex County Public Safety Radio System is a P25 Digital Conventional Multicast System based upon Motorola's ASTRO 25 VHF digital infrastructure. The major elements of the proposal provided by Motorola for the radio system is based upon a five (5) site configuration consisting of three digital conventional stations. As a part of this design, an Alcatel Lucent microwave network linking 9 or possibly 10 sites will be incorporated into the completed design. The system has been designed with the primary goal to meet a 95% Area reliability for mobile talk out.

The required sites for the system are Belfry, Mt. Defiance, Little Whiteface, Gore and Monkton. Each of the five transmitter sites will consist of three (3) Quantar base stations, antenna combining equipment, frequency reference and channel banks as necessary. The Essex County 911 Dispatch Center at Lewis has been designated as the system "Prime Site" and will house the major components of the proposed system.

Inherent within the Motorola proposal is the sale of 4 VHF frequency pairs which are free of Canadian Coordination. Given our location which is so close to the Canadian border, any frequency we obtain must be either free from the need for Canadian Coordination or must be subject to approval by the Canadians in order for us to use them within our system. Approval from the Canadians is a time consuming and difficult procedure, therefore the availability of these frequencies from Motorola has significantly improved the time frame for implementation of the system.

From an administrative point of view this project has been complicated by the decision to proceed based upon the use of the New York State Contract pricing for individual vendors if such pricing is available. Generally a project of this scope would go out to bid as a total package and we as County officials would be working with a single vendor contact. By making use of the State Contract I believe we are leveraging the lowest system cost possible but the drawback is a significant amount of additional coordination between the project vendors in terms of contracts and project oversight.

I want to relay to the Board that the vendors involved in this project have been participating on weekly phone conferences which often last one to two hours each call. All of the vendors have gone above and beyond particularly when you consider that we do not have signed contracts in place with most of them. They have proceeded in good faith and have devoted a tremendous amount of time and effort in order to get to the point that we are.

In terms of this report, I have put this together based in large part on my own

understanding of the project and will attempt to provide an overview of the technical aspects from a laymen point of view. It would be my intent to provide this report to the Board allowing for your review prior to a Board meeting in which we would be requesting a formal Project Bond resolution. At the Board meeting in which I would be requesting your support for the Bond resolution, I have requested the vendors be available to answer any technical questions which may be posed that I am unable to answer.

It is also important to understand that I feel we have gone as far as we can in terms of planning and reviewing the project scope without having a formal Bond resolution in place that would authorize expenditures of funding. Some of the technical questions are not possible to answer without paying someone to do actual testing. Just as an example, Alcatel Lucent has done preliminary Microwave Path Studies at no cost to us but those studies are not based upon actual field work. Until a contract and authorization for expenditures are in place we would not have the actual Microwave Path Surveys done.

1.2 Project Components

As noted above, this is a P25 Digital Conventional Multicast System based upon Motorola's ASTRO 25 VHF digital infrastructure. The overall project is really based upon a number of components from different vendors which have to work together as a final project and requires specific responsibilities some of which are assigned to vendors others which remain the Counties responsibility;

1.2.a Motorola Equipment (Major components only)

- Multicast Transmitter Site Equipment - these include the Base Stations, Combiners & Multicoupler, Cabinets, UPS Power Supply backups, and any necessary cabling and connectors.
- Astro-Tac 3000 Comparator - a comparator is a software driven device that acts as a system wide signal collector and distributor. It extracts the best signals from multiple sources and delivers it to single or multiple destinations.
- Monitor and Display Network Subsystems - these provide control of the channels and acts to identify them.
- Astro MCC 5500 - the MCC 5500 dispatch application controls radio, paging and telephone operations and allows for unique desktop configurations to meet individual dispatcher needs. Additionally, this console is part of the solution that integrates 9-1-1 with radio dispatch for a more integrated command and control operations.

1.2.b Alcatel-Lucent Equipment (Major components only)

- MDR-8000 Radios - The MDR-8000 is Alcatel-Lucent's premier digital microwave radio for long-haul, point-to-point wireless communications. With a common platform that supports virtually all frequency bands from 2-11 GHz, the MDR-8000 is designed for high-capacity backbone routes.
- DSX-1 Panels
- DC Power Systems
- Antenna Equipment
- TSM-8000 Fault Manager - The Alcatel-Lucent TSM-8000 is a graphically oriented element management system. It is scalable through software keys to support small, medium or large telecommunication networks. The TSM-8000 supports multiple users, multiple networks and multiple protocols. It automatically collects and stores alarm, status and performance data from the monitored transmission equipment.

1.2.c Feasibility Path Studies (Completed)

Alcatel-Lucent has performed these studies but it is important to understand, the studies are prepared using preliminary and unverified information provided by the County. Feasibility studies are prepared by Alcatel in order to form the baseline equipment and radio frequency systems design and budgetary estimates.

1.2.d Path Surveys (Awaiting Contracts and Bond Resolutions)

Formal microwave path surveys are conducted to determine or verify site coordinates, ground elevation, on-path obstructions, locations and heights, tower information and other parameters required to engineer the final design of a radio link. The County responsibilities related to the Path Surveys are as follows;

- Provide any documents relating to previous path calculations and frequency coordination.
- Provide Alcatel's surveyors with the locations of the proposed microwave sites.
- Arrange access for the surveyors by way of site access agreements with the owners of the sites.

- Provide existing tower description and information
- Provide site layouts including towers and antennas at proposed center lines.

1.2.e Path Design (Awaiting Contracts and Bond Resolutions)

Path designs are based upon the formal field survey data gathered by Alcatel's surveyors. Path Designs are considered final and the project can move to implementation stage based on the recommendations within the final design report. The County responsibilities related to the Path Design is;

- To select frequency bands and capacity requirements for each path. The County will have this information for Alcatel based upon the frequency purchase agreement with Motorola.

1.2.f Frequency Planning (Awaiting Contracts and Bond Resolutions)

Frequency planning services by Alcatel include frequency selection, prior coordination, interference case resolution, and FCC license application documentation preparation. Frequency planning includes frequency coordination data sheets, complete the Prior Coordination Notice and associated Supplemental documents under FCC Part 101.103(d) rules. Complete the FCC 601 license application. The County responsibility related to Frequency Planning is as follows;

- File the license applications with the FCC
- Payment of the FCC license fees.

1.2.g Project Management Alcatel & Motorola

Project Management within the overall project is defined separately under the scope of work for both of these vendors, but as the two vendors responsible for the bulk of the project build out with both having similar Management milestones I will identify these as follows;

Contract Design Review

- Review the operational requirements and the impact of those requirements on various equipment configurations.
- Establish a defined baseline for the system design and identify any special product requirements and their impact on system implementation.
- Review the System Design, Statement of Work, Project Schedule,

and Acceptance Test Plans, and update the contract documents accordingly.

- A Preliminary Project Schedule is included in this proposal, indicating civil work will be accomplished during 2009. Should the time frame required for civil work extend beyond 2009, a change order will need to be negotiated.
- Discuss the proposed Cut over Plan and methods to document a detailed procedure.
- Submit design documents to Essex County for approval. These documents form the basis of the system, which Motorola will manufacture, assemble, stage, and install.
- Prepare equipment layout plans for staging.
- Provide minimum acceptable performance specifications any leased lines required.
- Establish demarcation point to define the connection point between the Motorola supplied equipment and Essex County-supplied link(s) and external interfaces.
- Finalize site acquisition and development plan.
- Conduct (updated) site evaluations to capture site details of the system design and to determine site readiness after civil work is complete.
- Determine each site's ability to accommodate proposed equipment based upon physical capacity.
- If applicable, test existing equipment with which Motorola equipment will interface.
- Prepare Site Evaluation Report that summarizes findings of above-described site evaluations.

Essex County Responsibilities:

- Essex County's key project team participants attend the meeting.
- Make timely decisions, according to the Project Schedule.

- Frequency Licensing and Interference: As mandated by FCC, Essex County, as the licensee, has the ultimate responsibility for providing all required radio licensing or licensing modifications for the system prior to system staging. This responsibility includes paying for FCC licensing and frequency coordination fees.
- Provide the FCC “call sign” station identifier for each site prior to system staging.

Completion Criteria:

- Complete Design Documentation, which may include updated System Description, Equipment List, system drawings, or other documents applicable to the project.
- Incorporate any deviations from the proposed system into the contract documents accordingly.
- The system design is “frozen”, in preparation for subsequent project phases such as Order Processing and Manufacturing.
- A Change Order is executed in accordance with all material changes resulting from the Design Review to the contract.

Design Approval (Milestone)

- Essex County will be required to execute a Design Approval milestone document prior to the following Motorola steps.
 - ▶ Process Equipment List
 - ▶ Manufacture Motorola Fixed Network Equipment
 - ▶ Manufacture Non-Motorola Equipment
 - ▶ Ship equipment to the staging sites.
 - ▶ Stage the System
 - ▶ Perform Staging Acceptance Test Procedure
 - ▶ Ship Equipment to Field
- Install Microwave Subsystem
- Install Fixed Network Equipment
- Install Console
- Optimize System
- Do link Verification
- Training for users
- Perform R-56 Audit
- Perform Equipment Testing

- Perform Functional Testing
- Perform Coverage Testing
- Monitor for 30 Day Burn In Period
- Develop and implement Cut Over Plan
- Resolve any outstanding Punch List Items
- Transition to Service/Project Transition Certificate
- Finalize As Built Documentation

1.3 Project Vendors / Consultants

Motorola - State Contract Vendor

As discussed previously Motorola has proposed this project under the New York State OGS Contract PT63495. The 4 frequency pairs proposed as part of this project are not on State Contract but Motorola only sells these frequencies as part of a total system. Without purchasing the frequencies, and given our lack of useable frequencies the project would not be possible at this time. We have prepared and will put out an RFP for additional frequencies that meet our needs for any future build out and to verify if frequencies with Canadian Clearance are available on the open market.

Wells Communications - County's Current Radio System Vendor

Wells Communications is the County's current vendor of record of the maintenance of our current Radio System. As an Authorized Dealer for Motorola within this territory, Wells Communications will have a contractual relationship directly with Motorola for this project.

Alcatel Lucent - State Contract Vendor

Alcatel Lucent is the Microwave Vendor and is on the New York State OGS Contract PT59705.

Kimball Associates

Kimball Associates is working under the previous consulting contract and have agreed to act as the Clerk of the Works for the project.

Northwoods Engineering

Northwoods was contracted under the previous project resolution and is the firm performing geo-tech and structural analysis of the existing towers.

Jacqueline Murray, Murray Law Firm

Jacqueline Murray was the consultant selected based upon an RFP put out in late 2008. Jacqueline's responsibility is to arrange site agreements with the various owners of the tower sites as proposed and to oversee the permit applications.

Section 2. System Description

2.1 Tower Site Locations and Owners

| Location | Owners | Notes |
|--|-------------------------------|--|
| Belfry Mountain - Town of Moriah | Existing County-Owned Tower | Currently has Collocation, May require Tower Replacement or Modifications |
| Fort Ticonderoga - Mt. Defiance - Town of Ti | Fort Ti Association | Collocation on Existing Building, Landowner has similar agreement with Washington County. |
| Blue Mountain - Town of Indian Lake | NYSEG | Collocation and sharing of the Microwave proposed to NYSEG. Awaiting NYSEG decision. |
| Terry Mountain - Town of Peru | Hearst-Argyle Stations | Proposed Collocation on existing 1000' Tower. |
| Little White Face Mtn. - Town of North Elba | Olympic Regional Dev. Author. | This site will require a new tower, ORDA has been contacted and has indicated it may not require any license or rent because Tower is for a public purpose. |
| Gore Mountain - Town of North Creek | Barton Mines | Collocation on existing tower. Currently have a lease agreement will only need an amendment to lease. |
| Monkton - Town of Monkton, VT. | Wendland Comm | Have met with the owner and an Entry & Testing agreement is in place. Owner has indicated a willingness to enter into a long term lease arrangement. A draft proposal has been provided to owner. Existing 160 Ft. Tower (subject to extension, retrofitting or replacement) |
| Verizon Lewis - Town of Lewis | Verizon | Existing 79' Tower extendable to 99'. Provides shot to the County's Public Safety Building. A Verizon Collocation application has been submitted to Verizon. |
| Wells Hill | County Owned | Existing 20' County Owned Tower would need to be replaced with a +/- 60 foot tower. |

Tower Site Path/Footprint Description

The path based upon the proposed tower sites is as follows;

- From Monkton, Vt., we would shoot to Terry Mountain, to Mt. Defiance and to Wells Hill. Monkton and Mt. Defiance are two of the Motorola Radio Transmission Sites.

- From Terry Mountain we have proposed riding NYSEG's microwave thru Mt. Morris in Tupper Lake back to Blue Mountain in the Town of Indian Lake.
- From Blue Mountain we would shoot to Gore Mountain in North Creek. This shot provides the coverage for the southern end of Essex County. Gore Mountain is a Motorola Radio Transmission Site.
- From Belfry we would shoot back to Wells Hill, Belfry is a Motorola Radio Transmission Site.
- From Little Whiteface we would shoot back to Terry Mountain. Little Whiteface is a Motorola Radio Transmission Site.

2.2 Tower Site Descriptions

2.2.a Belfry Mountain

Belfry Mountain is located in the eastern portion of the County near I-87 and currently provides coverage to portions of the Northway and the Town of Moriah. Belfry is currently the main transmit and receive site for our radio communications. A single microwave link connects this site to Wells Hill. The access road is an unimproved dirt road requiring a four wheel drive vehicle.

Problems associated with this site include equipment grounding below industry standards, the current shelter which is 18'x24' has little or no room for expansion and may require a new shelter building. The current transmission tower is a 199' and is heavily loaded. It may be that some of the load on the tower can be removed, but it is likely that this site will require a new tower. The transmission line surge and suppression is inconsistent. Climate control within the shelter is wall mounted A/C unit and is in poor condition.

The generator at this site has a new 40kw generator installed.

2.2.b Gore Mountain

This is the Barton Mines Tower located in the Town of North Creek in Warren County. We currently have a lease agreement with the Barton Mines for some of our low band equipment now. The only requirement will be an amendment to the current lease. We are looking for a co-location agreement on an existing tower.

We will need a new shelter and generator on this site.

2.2.c Wells Hill

Wells Hill is located in the Town of Lewis on property leased by the County from NYCO Minerals. The County Attorney recently completed new lease agreements with NYCO and for a co-location agreement with NYSEG. Currently the site is a relay point connecting Belfry Mountain by a microwave link, and to Elizabethtown by leased T1 lines. The site has commercial power with a propane generator.

There is a small self supporting tower (20') which is insufficient in strength and height. The on site shelter has some room for additional equipment but may require a new shelter. The access road is a gravel road accessible by four wheel drive and is maintained by the County DPW. The site fencing, ice bridge and grounding system is not sufficient.

This site will require a new tower, which we have the right under the lease agreement with NYCO to build up to 90', pending APA approvals.

2.2.d Little Whiteface Mountain

Little Whiteface is the lower peak of Whiteface Mountain. Located on the premises of the Whiteface Mountain Ski resort. The site is accessible by chair lift year round. Currently there is a single base station located in an operating booth for the chair lift. Although not originally planned as a site in the Kimball report this has become a viable site.

In discussions with ORDA they are amendable to the County using this site, provided we have our own shelter with a 35-40' mast. This site will also need a generator, ice bridge, and fencing.

2.2.e Monkton

Monkton is located on Hogback Mountain in Monkton Vermont. This is a privately owned site and access is available year round by gravel road. There are two towers located on the site the larger self supporting tower (155') is the one we are looking at. There is commercial power on site but we will need a back up generator. There is a storage building approximately 14x24' on site but if a new tower is needed at may be that we will need a new shelter. Ultimately that will have to be decided based upon the discussion with the owner. There has been a preliminary discussion with the owner and possible lease arrangements are being looked at. An agreement authorizing us to enter the site and conduct testing has been signed by the parties, however until the bonding resolution is completed and civil engineering agreed to we are held up on any final agreements as it relates to this site.

This site is important in the overall plan based on the ability to shoot into three directions at once. Monkton to Terry, Monkton to Defiance and Monkton to Verizon in Lewis.

2.2.f Mount Defiance

Mount Defiance is located in the southeast corner of the County near the Town of Ticonderoga. The site is owned by Fort Ticonderoga. There is no tower at the site, the antennas are mounted to the roof of a stone building. This site currently has commercial power and is backed up by diesel generator, but will need a new generator.

The site is in a 50x50' fenced area located at the peak of Mt. Defiance. The site is accessible by gravel road and the access road is gated. The shelter is 28'x12.9' with a 19'x14' equipment room. It is air conditioned and in good shape.

2.2.g Terry Mountain

Terry Mountain is located in the Town of Peru in Clinton County. The proposal is for co-location on the existing 1000' tower owned by Hearst-Argyle Stations (WPTZ Channel 5.) This tower was channel 5's analog transmission site which has been converted to digital. There is a shelter on site but it is full so we would need a new shelter and generator. We have had preliminary discussions with the owners. They indicated they have a similar agreement with Clinton County which they would most likely be willing to extend to us.

2.2.h Blue Mountain

Blue Mountain is located in the Town of Indian Lake in Hamilton County. This site is part of the proposal to ride NYSEG's microwave from Terry Mountain thru Mount Morris and then on to Blue Mountain. Given the current load on the 210' NYSEG tower we would be looking at tower modifications at this location as opposed to a new tower, but the tower is considered in excellent condition.

It would require a shelter but there is commercial power to the site with generator backup. There is an unimproved road to the site, and access is by all terrain vehicle only. As part of this proposal to ride NYSEG's microwave we would need to address a need for a generator at the Mount Morris site.

2.2.i Verizon Lewis

This is a new recently approved and constructed tower by Verizon for cell coverage in the Adirondack Park. The existing 79' tower has been approved under APA extendable to 99'. We have had preliminary

discussions with Verizon regarding the use of this tower. We are awaiting response from them but it looks promising at this point.

This site becomes important because it is the link we need to get us from Wells Hill back to the Public Safety Building. With this shot it appears we can hit it from roof top installation on our building, or a shorter tower on site. It also eliminates the hard wire T1 lines from Wells Hill to the Public Safety facility.

This site will require Tower modifications, a shelter and a generator.

2.2.j Public Safety Building Lewis

This is our Dispatch center in the Public Safety Building. We will need either a 40' tower or a roof top dish, there seems to be an issue with two many dishes located at the same level on our I beam for roof mounts, so a ground tower may be a better alternative.

2.2.k Permit Requirements

All of the sites except the Monkton site are under APA jurisdiction. Local government notice forms have been sent out to all of the local supervisors detailing immunity from local zoning. The Town of Johnsbury has asked for an explanation of our basis for claiming immunity from local zoning, and the same has been provided to them by Jacqueline Murray our site consultant.

The Monkton site will be under Vermont Act 250 permit requirements. Jacqueline Murray has had discussion with the owner regarding this process. For the Little White Face site, no local government notice form is necessary because it is on state administrative lands. We need to draft a proposal for ORDA to review.

The APA staff is aware of the project and is awaiting general permit applications which are pending due to Civil work requirements. It is necessary for us to have the project bond resolution in place so that we can proceed with RFP's for the Civil work.

2.3 Tower Site Co-Location Arrangements

This proposal is based in large part on the principle of co location using existing sites. The advantage of this is important as it relates to permit approvals thru the APA and from a costs advantage. Even in the cases where we have to build a new tower, the co location comes into play for other users of the site which may want to locate on a tower which we have constructed. If an agreement can be reached with NYSEG to ride their microwave from Terry Mountain to Blue Mountain this would produce significant

savings in terms of the cost of build out for the Southern end of Essex County because it produces a microwave shot to Gore Mountain.

The co-location at the Verizon site in Lewis as noted above is another important development within the process that was not within the early planning. The ability to shoot from Wells Hill to the Verizon site and then back to our Public Safety Building eliminates a critical fail point in the system in terms of the hard lines running to Wells Hill now.

2.4 Microwave Frequency Reviews

2.4.a Frequency Purchase

Part of the proposal from Motorola to Essex County was for the purchase of four (4) VHF Spectrum Frequency pairs. Motorola has frequency which they only sell to entities purchasing a new Microwave System from them. In our case building a High Band Radio System would not be possible without having these frequencies available.

The pricing from Motorola includes legal fees to transfer the license from Motorola to Essex County. The pricing does not include licensing of any other frequencies other than these four. The County has an ongoing contract with APCO for coordination and filing with the FCC for other possible frequencies.

2.4.b Frequency Licensing Issues

An ongoing issue for us in terms of locating available frequencies is what is referred Line A. The definition of Line A is from Section 90.7 contained in the revised Technical Annex to the agreement between the United States and Canada on the "Coordination and Use of Radio Frequencies Above 30 Megacycles per Second", signed at Ottawa on June 16 and 24, 1965.

Basically this agreement between the US and Canada requires all use of frequencies above this line has to be approved by the Canadians prior to the FCC licensing it. Our system would be operating above Line A, therefore requires Canadian clearance, or you need frequencies which are already approved to be free from Canadian clearance.

The frequencies Motorola has proposed for sale to us is free from the Canadian clearance requirements which makes them more valuable and enables us to proceed with system design.

2.4.c Other Frequency Availability

We do have some local high band frequencies available which are currently being reviewed by APCO for possible filing with the FCC. However, it is

important to understand that a frequency which is approved in one location within the County may not be FCC acceptable at higher wattage. At lower wattage the signals would not interfere but once you increase the wattage you start to impact other already approved FCC frequencies.

We understand the frequencies from Motorola are sufficient enough to plan and implement a County wide system, but ultimately we would want to obtain as many frequencies as could to allow for expanded capabilities. We have prepared a Request for Proposal which we will put out on the street for any other high band frequencies which may be available in the market place.

2.5 Paging and Mobile Radio Design

2.5.a Low Band vs High Band

In terms of paging the issue of low band vs. high band has been one of the most controversial parts of the project proposal. I believe it is fair to say all of us would prefer high band paging but a number of issues related to implementing high band has led us to recommend to the Board that we continue using low band (with enhancements of additional sites) for the paging.

Problems associated with implementing high band paging within Essex County;

- *Lack of available frequencies* - Essex County would have to license a new, countywide VHF paging channel. The issue of a lack of available spectrum and the difficulties of obtaining frequencies was discussed in Section 2.4.c.
- *Number of transmit sites* - Coverage studies have shown that 15 transmit sites would not provide adequate coverage at VHF for paging. Ideally, for paging systems to cover a wide area like the county, a series of transmitters are activated at the same time in a simulcast system. Simulcast would require that sites be no farther apart than approximately 15 miles. Motorola's engineer's had determined that it would require at least 22 sites to simulcast. Identifying and acquiring this many sites will be a time consuming process. (Alphanumeric paging will require simulcast operation)
- *Connectivity* - Once sites have been identified, there needs to be connectivity between all the sites and the Public Safety Building in Lewis. Microwave links, leased T1 lines or a combination of both would need to be designed and installed.
- *Pricing* - I requested that Motorola provide a Budgetary Proposal for VHF Simulcast Paging. The proposal was based on twenty two

simulcast transmit sites. The proposal included twenty two base station repeaters but did not provide any pricing for microwave connectivity or leased T1 circuits nor did it include any cost for frequencies. The budgetary pricing was set at \$3.4 million to \$3.9 million with an additional estimate of \$500,000.00 for 1000 pager units. This was simply too cost prohibitive to include within this project.

Addressing concerns related to the continued use of low band for paging:

- *Low Band Interference* - It is certainly true that low band interference is an issue which everyone experiences when using their current low band mobile radios. However, it is important to understand that paging frequencies do not receive interference at the same level that low band mobile radios do. The paging channel is not used the same as a two-way mobile radio channel. Pagers are muted and don't receive transmissions until they receive the proper set of tones, then the receiver is un-muted and a voice announcement is heard.

Pagers are receive only devices worn on the belt that have internal antennas and are less likely to pick up skip interference or ambient noise. Conversely, mobile radios in vehicles have roof mounted antennas that will more likely receive skip and ambient noise interference.

The perception that low band doesn't work well may be based on the experience of users of mobile radios that need to talk back to base stations. Because low band is more susceptible to interference and ambient noise, the mobile radio user needs a stronger signal to "break through" the ambient noise and the interference that the low band base station receiver is subjected to. Since paging is only one way, transmitting from base to paging receiver, interference is not as severe a problem.

- *Poor Coverage* - Currently, the County transmits low band paging from the following sites: Belfry, Palmer Hill, and Gore Mountain. Wells Communications estimates that 60% of the County is covered with this configuration. This project would add Little Whiteface, Monkton, and Mount Defiance sites to the Belfry and Gore sites.

The coverage maps that have been run, show a marked improvement in coverage based upon the new configuration. We

will also employ a "sequential paging" format. Sequential paging means that all of the transmitters will send out the same message, one after another based on a dispatcher's selection of which department they are toning out. This means the page will be sent out "county wide".

- **Availability of Low Band Equipment** - The concern is that low band equipment will become obsolete. It is true that many of the major communications equipment manufacturers no longer offer low band equipment. These have been business decisions, not decisions based on the viability of low band or any FCC regulatory action.

In the 2008 Specs Guide of Radio Resource magazine, there are a half dozen manufacturers that offer low band base station equipment, including Daniels Electronics, Midland and RF Technologies. Many more offer low band mobile and portable radios, like Motorola, Kenwood, Midland and Vertex.

Business decisions have driven manufacturers to produce digital radios that are the future of communications for public safety agencies. Many Counties in NYS still use low band for their paging infrastructure, such as Rensselaer County, Jefferson County, Saratoga County, and Columbia County.

- In summary, enhancing the current low band paging system is a cost effective solution that will enable us to move forward with this project. It would be wise to consider High Band VHF alphanumeric paging as "Phase II" project, but that would be driven by the ability to obtain the additional sites and frequencies.

2.5.b Current Mobile Radio/Base Station Replacement Plan

Another issue of concern within this project is regarding the replacement plan for the mobile radios/base stations which are currently dispersed throughout the Fire Departments, Rescue Squads, and Police Departments. At this point I am not attempted to decide for the Board how the final determination regarding the replacement plan works out. What I did do, was to request of Don Jaquish our Emergency Service Director to give me an inventory of the equipment out in the field. This was not intended to be a wish list for the departments but rather a look at what is currently being deployed so that an estimate of the cost could be within this proposal in the event the Board made the determination to absorb such cost.

| LOCATION: | COUNT: |
|----------------------------|------------|
| Fire Departments Mobiles | 136 |
| Fire House Bases | 24 |
| Fire Officers Radios | 72 |
| County Coordinators Radios | 17 |
| EMS Squads Radios | 51 |
| Sheriff's Radios | 12 |
| County DPW Radios | 63 |
| Land Fill Operators Radios | 10 |
| Ticonderoga Police Radios | 6 |
| Lake Placid Police Radios | 6 |
| Moriah Police Radios | 3 |
| TOTALS | 400 |

Cost Estimate which will be covered within Section 3.7, but is based upon the following;

The cost per unit as described above would be approximately \$2,800.00. This includes an antenna and coaxial cable, it would not include labor to install. The estimate for labor cost is based upon the NYS Contract price of \$147.00 per hour. We are estimating five hours for install of fire apparatus and heavy equipment and three hours for personal vehicle and police cruisers. The break down for these costs are contained in Section 3.7.

Section 3. Project Costs

3.1 Motorola Communications Pricing

The pricing for this section regarding Motorola Communications is based upon a proposed contract. The pricing is based upon Motorola's NYS OGS Contract PT62495 and is as follows;

Radio Equipment Estimate Table

| Base System Pricing Summary | Cost: |
|---|-----------------------|
| Motorola Communications Fixed Network Equipment | \$876,710.00 |
| Motorola Services (includes engineering, installation, project management, etc) | \$976,976.00 |
| Motorola VHF Spectrum (4 frequency pairs) | \$495,600.00 |
| TOTALS | \$2,349,286.00 |

3.2 Alcatel - Lucent Project Pricing

The pricing within this section is based upon Alcatel-Lucent NYS OGS Contract PT59705. This proposal is based upon the assumption that we are unable to get an agreement with NYSEG for their microwave ride from Terry Mountain to Blue Mountain. In speaking with Alcatel, they indicated I should remove \$400, 000.00 from this quote if we are able to get an agreement with NYSEG.

Microwave Estimate Table

| Base System Pricing Summary | Cost: |
|---|-----------------------|
| MDR-8000 Radios | \$457,193.00 |
| DSX-1 Panels | \$9,986.00 |
| DC Power Systems | \$61,456.00 |
| Antenna Equipment | \$222,472.00 |
| TSM-8000 Fault Manager | \$40,720.00 |
| Transmission Engineering Services | \$62,033.00 |
| Installation Services | \$472,420.00 |
| Engineering Services | \$18,002.00 |
| Onsite Training | \$33,600.00 |
| Radio Spare Modules MDR-8000 | \$22,280.00 |
| DC Power Systems Spares | \$698.00 |
| TSM-8000 Spares | \$8,320.00 |
| Estimated Credit Adjustment for Terry to Blue Mt. (NYSEG) | (\$400,000.00) |
| TOTALS | \$1,009,180.00 |

3.3 Microwave Tower Estimates

Estimates within this section are based upon either Tower modifications or Tower replacement.

Tower Estimate Table

| Location | Description | Estimated Cost: |
|-----------------|--|------------------------|
| Belfry Mountain | Replace existing 199' tower due to the current amount of equipment located on the tower. | \$200,000.00 |
| Blue Mountain | Modifications to NYSEG 210' Tower if required to meet loading requirements. | \$75,000.00 |

| | | |
|--------------------------------|--|---------------------|
| Little White Face | Requires a 35 to 40' antenna mast attached to the existing stone building. | \$10,000.00 |
| Monkton | Replace existing 155' tower due to the current amount of equipment located on the tower. The owner may want to absorb this cost, but if he does than we would be expected to pay a higher lease fee. | \$200,000.00 |
| Verizon - Lewis | Verizon is permitted (APA) to add 20' to the existing 79' tower. If we are able to obtain an agreement with them, Verizon would add the 20' at our cost, they would occupy the 99' level, we would take their current 79' level. | \$25,000.00 |
| Wells Hill | Due to the load requirements the existing 20' tower would need to be replaced with a 50' to 60' tower. | \$60,000.00 |
| Public Safety Building - Lewis | Would require a 35' to 40' mast antenna attached to the building. If APA permit is difficult to obtain then we may have to use roof mounted. | \$10,000.00 |
| TOTALS | | \$580,000.00 |

3.4 Shelter Estimates

The shelter estimates are impacted by the ability to get to the site. The more difficult the site is to get to with heavy trucks and equipment the higher the estimated cost for the shelters needs to be.

Ideally a prefab building which could be transported to the site and set on a slab or foundation. An example of these shelters are Motorola's Standard Building which includes completely designed systems for generator, UPS, Automatic Transfer Switch, HVAC, power distribution, grounding and electrical distribution for the selected equipment configuration. As a result, the MSB enclosure provides a complete solution for equipment requirements of the communications system. The MSB equipment enclosure design meets the Motorola's R56 quality standards and the equipment layout follows the recommended equipment installation standards. The site equipment, power, grounding, receptacles, surge suppression etc. has been pre-planned with location of Motorola equipment in mind.

Lacking the ability to use a prefab building then, a modular building is often used, which is prefab 4' panels which are broken down and delivery to the site. The initial cost of these is less, but the labor involved in setting them up and the doing the appropriate wiring significantly raises the cost.

The third option is to do stick built on site, which is even lower in terms of material

costs but the labor is of course much higher.

When considering these estimates for these buildings it may appear that the cost of these are higher than what should reasonably be expected for a 10'x12'. However it is important to understand what is contained within these building is what is driving the costs, combined with the difficulties associated with the site locations. The following is what is considered standard to a MSB enclosure;

STANDARD FEATURES FOR MSB ENCLOSURE

- SIZED FOR: 4 racks with up to (8) 100W base stations with (2) MW radios
- BUILDING SIZE: Outside: 10'0" L x 11'8" W x 10'6" H, Inside: 10'8"W x 9'6"L x 9'1"H Interior clear
- FLOOR LOAD: 300 psf., Roof load: 150 psf., Walls: 150 mph
- EXTERIOR WALLS, ROOF: Concrete 2 hr. fire rated, Ballistics tested for UL-752
- INSULATION: Walls: R-11, Ceiling: R-19
- DOOR: (1) 36 " X 7'0"with dead bolt, anti-pick plate, door bumper & "T" tie back.
- ELECTRICAL SERVICE: 120/240/200A 1 phase.
- SERVICE DISCONNECT SECONDARY SURGE ARRESTOR: (1) Type 2 Transient Voltage Surge Suppression, MOV
- MAIN PANEL SURGE ARRESTOR (1) Type 1A Transient Voltage Surge Suppressor, SAD with MOV
- MAIN LOAD CENTER: (1) 200A Main breaker, 30 circuits
- EXTERIOR OUTLETS: (2) 20A GFI duplex mounted between the air conditioners and (1) by door.
- SERVICE OUTLETS: (5) 20A 120V duplex outlets
- INTERIOR LIGHTING: Ceiling: (6) 4 ft., 2 bulb, 40W with X2 tubes, fluorescent,
- EMERGENCY LIGHTING: (1) Twin bulb with battery EXIT sign located

over doorway.

- EXTERIOR LIGHTING: Security: (1) 100W incandescent with photo-cell on switch.
- UPS LOAD CENTERS: (1) 200A Load centers, 40 circuits each with (40) 20A branch breakers.
- FNE OUTLETS: (1) 8 ft. Wiremold raceways containing (40) simplex outlets each mounted under cable ladder.
- ALARMS: Smoke, Power Fail, High/Low temp, intrusion, Gen, ATS and UPS alarms on dry terminal 66 block with amphenol connector
- AIR-CONDITIONING: (2) 20KBTU HVAC units or equivalent with integrated 5 kW heater strips
- INTERIOR PERIMETER GROUND: #2 Bare stranded copper with each end lugged to the master ground bar
- GROUND BUSS BAR: (1) kit includes 2 connected ground bars with insulators and copper straps to exterior ground.
- FNE GROUND BUSS: #2 stranded green copper cable jacketed mounted to the cable ladder
- ALL GROUNDING MEETS OR EXCEEDS MOTOROLA's R56 SPECIFICATIONS.
- CABLE LADDER: 24" wide cable ladder, gold chromate over equipment racks to cable entrance.
- CABLE ENTRY: (1) 12-port panel with caps and (2) 3" PVC sleeve cast in concrete for Telco entry.
- FIRE PROTECTION: (1) each Wall mounted 20lb. ABC and 10lb. CO2 extinguishers and fire monitoring system
- AUTOMATIC TRANSFER SWITCH: 200 amp, 2 pole, 240 volt
- U.P.S.: (1) 10KVA/7.5KW UPS with external by-pass switch with 6 minute battery back-up
- WARRANTY - 10 year structural and 2 year overall from shipment.

Shelter Estimate Table

| Location | Description | Estimated Cost: |
|-------------------|--------------------|------------------------|
| Belfry Mountain | New MSB Shelter | \$85,000.00 |
| Blue Moutain | New MSB Shelter. | \$85,000.00 |
| Little White Face | Prefab Building | \$70,000.00 |
| Monkton | New MSB Shelter. | \$85,000.00 |
| Verizon - Lewis | New MSB Shelter. | \$85,000.00 |
| Gore Mountain | Stick Built | \$65,000.00 |
| Terry Mountain | New MSB Shelter. | \$85,000.00 |
| TOTALS | | \$560,000.00 |

3.5 Generator Estimates

Which generator we select for the site is also driven in part by the ability to get to the site. In our case the choice is really between a diesel generator vs a propane generator. We generally have a need for the 20 to 25 kw generator to supply our backup needs. This is somewhat dependent on the amount of equipment planned for the site.

Industrial Grade Diesel generators have some advantages in that they are typically classified as more durable, more fuel efficient, and longer lived than gas or propane. There are some distinct advantages of a diesel engine over a gasoline engine. Most have to do with the RPM the unit runs at, diesels have more torque, they are better suited to run at lower RPMs. Diesel generators are more expensive to purchase, but when you start approaching the longer hours of use, they become much cheaper to operate. The drawbacks to diesel generators has more to do with the fuel itself in that it has a limited use. When storing bulk quantities of diesel fuel, you have to make sure you are going to use it within a 2 year period. Diesel fuel can be affected by bacteria, and needs to be cut with kerosene in the winter months.

Propane generators are easier to maintain, the propane fuel has an indefinite shelf life, and storage is usually a 500 to 1000 gallon propane tank. Most propane distributors will automatically check and refuel the tank, provided they have access to the site. Propane burns very cleanly and leaves little or no carbon deposits in an engine. The drawback is given the cold temps at these sites additional storage is required and there is no way for us to fill the tanks ourselves, whereas with a diesel generator we could truck or haul fuel to the site with off road equipment.

Given that the final determination regarding site access has not been fully determined I have chosen to use an average price for a 20 to 25 kw generator in some cases it may be less if it is a propane and more if it is a diesel. Additionally at these sites a fairly significant amount of work needs to be done to provide grounding for the equipment

and the generators, which I have included at a cost of \$5,000.00 per site.

Generator Estimate Table

| Location | Description | Estimated Cost: |
|-------------------|-------------------------------|------------------------|
| Blue Mountain | 25 kw Generator and Grounding | \$35,000.00 |
| Little White Face | 25 kw Generator and Grounding | \$35,000.00 |
| Monkton | 25 kw Generator and Grounding | \$35,000.00 |
| Verizon - Lewis | 25 kw Generator and Grounding | \$35,000.00 |
| Wells Hill | 25 kw Generator and Grounding | \$35,000.00 |
| Terry Mountain | 25 kw Generator and Grounding | \$35,000.00 |
| Gore Mountain | 25 kw Generator and Grounding | \$35,000.00 |
| Mt. Defiance | 25 kw Generator and Grounding | \$35,000.00 |
| Mt. Morris | 25 kw Generator and Grounding | \$35,000.00 |
| TOTALS | | \$315,000.00 |

3.6 Site Engineering & Preparation Estimates

Determining an estimate for the Civil Engineering has been a more difficult assign for me because this is something we will need to go out to bid on. Unlike the Motorola Radio and Alcatel proposals which were based upon known NYS OGS contract pricing.

In discussions with the vendors involved in the project it is important to understand that this part of the proposal contains a significant amount of work. Also involved within the site work is a cost associated with getting materials to the sites. Some of the sites we may be able to drive a heavy truck to for deliveries, others may require alternative ways such as helicopter deliveries which will drive our costs.

The following items are part of what will be required as it relates to the site Civil Engineering and the Site Preparation work;

SITE ENGINEERING

- Prepare site construction drawings, showing the layout of various new and existing site components.
- Conduct site walks to collect pertinent information from the sites (e.g., location of Telco, power, existing facilities etc.).
- Perform a boundary and topographic survey for the property on which the communication site is located or will be located.

- Prepare a lease exhibit sketch of the site to communicate to the property owner the proposed lease space and planned development at the particular site location.
- Prepare record drawings of the site showing the as-built information
- Perform construction staking around the site to establish reference points for proposed construction
- Conduct construction inspection of foundation steel prior to pour, materials testing of concrete and field density tests of backfill to ensure quality construction.
- Check tower erection for plumbness, linearity and alignment after installation.
- Perform inspection of the site and the work performed by the Contractor to document that the site is built in accordance with the "Site Plans" and document any deviations or violations.
- Research permit requirements (building, utility, construction and FAA permits) for the construction of the proposed site, and determine if the permits are required. If a permit is required, the Motorola shall obtain the necessary permit forms and complete the necessary information on behalf of the customer.
- Submit the completed application forms, to the local jurisdiction and apply for applicable permits.
- Prepare site construction drawings, showing the layout of various new and existing site components.
- Conduct construction inspection of foundation steel prior to pour, materials testing of concrete and field density tests of backfill to ensure quality construction

SITE PREPARATION

- Obtain the permits such as electrical, building and construction permits, and any inspections that may need to be coordinated with the local authorities to complete site development work.
- One time mobilization costs for the construction crews.

- Provide minimal grading in a 15'x30' compound around each of guy anchors to allow anchor installation.

The following tables represent estimates based upon the conditions known at the sites. The estimates were arrived at based upon the idea that sites requiring installation of a new tower, shelter and generator would be require higher civil work engineering and preparation, therefore higher associated costs. Lacking actual contract bids, these estimates are based upon percentage comparisons to the equipment / material costs.

Site Work Estimate Table

| Location | Equipment/Materials | Estimated Civil Cost: |
|--------------------------------|---|------------------------------|
| Belfry Mountain | New 199' Tower, & Shelter | \$350,000.00 |
| Blue Mountain | Tower Modifications, Shelter & Generator | \$250,000.00 |
| Little White Face | 40' Antenna Mast, Shelter, Generator | \$150,000.00 |
| Monkton | New 160' Tower, Shelter, Generator | \$375,000.00 |
| Verizon - Lewis | 20' Tower Modifications, Shelter, Generator | \$175,000.00 |
| Wells Hill | New 60' Tower, Generator | \$125,000.00 |
| Public Safety Building - Lewis | New 40 Mast Antenna | \$10,000.00 |
| Terry Mountain | Shelter, Generator | \$140,000.00 |
| Gore Mountain | Shelter, Generator (Difficult Access) | \$160,000.00 |
| Defiance | Generator | \$25,000.00 |
| Mt. Morris | Generator | \$25,000.00 |
| TOTALS | | \$1,785,000.00 |

3.7 Mobiles, Base Stations Estimates

As discussed in Section 2.5b, the cost per unit would be approximately \$2,800.00. This includes an antenna and coaxial cable, it would not include labor to install. In terms of the base station units, this is based on using a mobile unit with an Astron Power Supply and a Maxrad Base Station Antenna which would increase the cost by \$400.00 per unit.

The estimate for labor cost is based upon the NYS Contract price of \$147.00 per hour. We are estimating five hours for install of fire apparatus and heavy equipment and three hours for personal vehicle and police cruisers.

Mobiles Estimate Table

| LOCATION: | COUNT: | COST PER UNIT | TOTAL |
|--------------------------|---------------|----------------------|--------------|
| Fire Departments Mobiles | 136 | \$2,800.00 | \$380,800.00 |

| | | | |
|---|------------|------------|-----------------------|
| Fire House Bases w/Power Supply & Ant. | 24 | \$3,200.00 | \$76,800.00 |
| Fire Officers Radios | 72 | \$2,800.00 | \$201,600.00 |
| County Coordinators Radios | 17 | \$2,800.00 | \$47,600.00 |
| EMS Squads Radios | 51 | \$2,800.00 | \$142,800.00 |
| Sheriff's Radios | 12 | \$2,800.00 | \$33,600.00 |
| County DPW Radios | 63 | \$2,800.00 | \$176,400.00 |
| Land Fill Operators Radios | 10 | \$2,800.00 | \$28,000.00 |
| Ticonderoga Police Radios | 6 | \$2,800.00 | \$16,800.00 |
| Lake Placid Police Radios | 6 | \$2,800.00 | \$16,800.00 |
| Moriah Police Radios | 3 | \$2,800.00 | \$8,400.00 |
| Hours of Labor for Fire, Ambulance Etc. | 226 | \$735.00 | \$166,110.00 |
| Hours of Labor for Cars, Cruisers | 174 | \$441.00 | \$76,734.00 |
| TOTALS | 400 | | \$1,372,444.00 |

3.8 Low Band Paging Estimate

As discussed in Section 2.5 Low Band vs High Band, and given the consensus that for this project low band paging is the best alternative given the lack of available sites, frequencies and costs, the following represents an estimate for implementing low band paging;

Low Band Paging Estimate Table

| DESCRIPTION | COUNT | COST PER UNIT | TOTAL |
|---------------------------------------|-------|---------------|-------------|
| Low Band 250 Watt Paging Base Station | 4 | \$18,000.00 | \$72,000.00 |
| Dual Bay LB Antenna | 4 | \$1,800.00 | \$7,200.00 |
| LDF 4-50A ½ Heliax | 600 | \$5.00 | \$3,000.00 |
| LDF 4-50 Connectors | 8 | \$40.00 | \$320.00 |
| Crossover Antenna Mounts | 20 | \$55.00 | \$1,100.00 |
| LMR400 Coax Cable | 50 | \$2.00 | \$100.00 |
| LMR400 Connectors | 8 | \$20.00 | \$160.00 |
| ½" Ground Kit | 8 | \$35.00 | \$280.00 |
| Polyphaser Lightning Protection | 4 | \$100.00 | \$400.00 |
| Installation Charges per site | 4 | \$7,500.00 | \$30,000.00 |
| Spare Transmitter Chassis | 1 | \$2,000.00 | \$2,000.00 |
| System Regulator Spare | 1 | \$1,500.00 | \$1,500.00 |

| | | | |
|--------------------------------|---|------------|---------------------|
| Audio Controller Spare | 1 | \$1,000.00 | \$1,000.00 |
| Power Supply Spare | 1 | \$1,600.00 | \$1,600.00 |
| Power Amp Spare | 1 | \$3,500.00 | \$3,500.00 |
| Misc Cable, Grounding Hardware | 4 | \$700.00 | \$2,800.00 |
| One Year Field Maintenance | 4 | \$1,200.00 | \$4,800.00 |
| TOTALS | | | \$131,760.00 |

3.9 Other Consulting Fees

The estimates within this section are based upon the contracts that the Board previously approved and for the most part where funded under previous resolution funds. It is anticipated that we will need additional services from these consultants based upon the change to the project scope.

Consultant's Estimate Table

| Consultant | Previous Contract Amount | Estimated Additional Cost: |
|---|--------------------------|----------------------------|
| Northwoods Engineering | \$49,305.00 | \$25,000.00 |
| Murray Law Firm | \$25,000.00 | \$25,000.00 |
| APCO International (Frequency Coordinators) | \$8,374.00 | \$10,000.00 |
| Kimball Associates | \$390,670.00 | Undetermined |
| TOTALS | | \$60,000.00 |

3.10 Summary of Project Estimates

The following is a summary table of the various estimates with a contingent amount included.

Summary of the Estimate Tables

| Project Components | Estimated Costs |
|--------------------------------------|-----------------|
| Radio Equipment | \$2,349,286.00 |
| Microwave | \$1,009,180.00 |
| Towers and Modifications | \$580,000.00 |
| Shelters | \$560,000.00 |
| Generators | \$315,000.00 |
| Site Work | \$1,785,000.00 |
| Mobiles (Town Fire Departments, Etc) | \$1,372,444.00 |

| | |
|------------------------|-----------------------|
| Low Band Paging | \$131,760.00 |
| Consultants | \$60,000.00 |
| SUBTOTALS | \$8,162,670.00 |
| CONTINGENCY 12% | \$987,920.00 |
| TOTALS | \$9,150,590.00 |

3.11 Lease Agreements

Lease agreements in terms of costs are not part of the construction estimates but they are something which will become post construction yearly costs. We have not entered into specific agreements other than the Wells Hill Site with NYCO and Barton Mines. However, typically the cost to lease tower and site space can run anywhere from \$1,200.00 per month to \$3,000.00 depending upon who owns the tower, and if you are using their shelters or backup generators, etc.

The following is a quick review of how many lease agreements we should expect to see upon the completion of this project;

Belfry Mountain - is a county owned site requiring no lease agreements. However the possibility exist that if we replace our Tower we may be able to lease space to other users as an offset to our overall leasing costs.

Mt. Defiance - is owned by the Fort Ticonderoga Association and we will need to have a lease agreement on this site. The owners have indicated that they are agreeable and that they have a current agreement with Washington County which they would be willing to extend similar terms to us.

Blue Mountain - is owned by NYSEG and we will need to have a lease agreement with them. In terms of NYSEG we are trying to work out an agreement to ride their microwave from Terry Mt. thru Mt. Morris on to Blue Mountain. We may have associated costs for sharing this link which is not known at this point.

Terry Mountain - is owned by Hearst-Argyle Stations (WPTZ Channel 5) and we will need a lease agreement for this site as well. They have indicated they are agreeable and that they have a similar agreement with Clinton County which they would be willing to extend similar terms to us.

Little White Face Mt. - is owned by the Olympic Regional Development Authority and because this would be a public use we would not need to pay leasing at this site.

Gore Mountain - is owned by Barton Mines who we currently have lease

agreements with on this site. This will require a lease amendment.

Monkton - is owned by Wendland Communications which will require a lease agreement. The real issue with this site is based on the final agreement with the owner as to who builds the tower, us or the owner. The final lease amount will be more if the owner builds the tower, and less if we build, but we would have to spend \$200,000.00 on the actual tower construction.

Verizon Lewis - is owned by Verizon and needs a tower modification which Verizon will do but we have to pay the expense. We will have a lease cost associated with this site.

Wells Hill - the land is owned by NYCO and the Tower is owned by the County. We have a lease agreement of \$2000.00 per month but receive \$500.00 as an offset based upon NYSEG currently on our tower.

If we assume we will have seven lease agreements based upon these sites at an average cost of \$2000.00 per month then we would have \$168,000.00 per year in leasing costs. This would not be taking into consideration any leasing agreement from other users which may need space on our towers, such other agreements would offset our overall leasing cost.

3.12 Post Project Maintenance Agreements

Another factor to the project is the post project maintenance agreements that will be necessary *after the first year* of the operation. This is difficult for me to determine but Warren County upgraded their Radio System in 2004, and the pricing they received from their actual bid documents showed a yearly cost of \$36,300.00 per year for Radio and Microwave. Until I am able to get actual bids on this service I would only consider this as a reference number.

Section 4. Other Issues

4.1 Frequently Asked Questions

Question: With all of the Economic Stimulus Funding that is currently being considered how does that impact this project?

Answer: This project has been submitted to the State as one of the primary projects for funding under the Stimulus Funding, but in the 180 day start time frame. As of the date of this report we do know that the state has assigned this project for consideration under the NYS Office of Technology. Other than that we have not received any indication from OFT how we start the application process.

Question: If there is a possibility of funding under the Stimulus should we be proceeding with the bonding of this project now ?

Answer: This question was asked by a number of different County officials at the recent NYSAC conference in Albany to the State representatives working on the stimulus projects. More specifically we asked, if having bonding in place would somehow exclude our projects from consideration. It was pointed out to state officials that in order to be “shovel ready” we needed to have bonding done. We were specifically told that it would not impact us to have our bonding in place.

Question: Is it likely we will have any funding available under the Stimulus for this project?

Answer: Most all of us are wondering how much funding will actually make it to the North Country particularly when you consider how much has been asked for by the different entities within Essex County alone. The recently released list of project from the state has 878 pages of request from across the state. Specifically, within Essex County, 77 projects have been requested totaling nearly \$266 Million.

The good news in this case is that of the 77 Essex County projects only 6 of those have been assigned to OFT. As may be aware, the funding has been divided into specific categories so it appears in this categories we do not have as much competition as some of the other categories.

Question: How does this project effect the local fire, police and rescue squads in Essex County?

Answer: Ultimately this will be answered by the Board but in terms of the project planning enough funding has been included within the estimate to cover the initial conversion for the these entities.

Question: If the County was to purchase mobile radios would the County replace all mobiles that the department currently has in service?

Answer: An inventory of the existing mobile radios within the departments has been done (see Section 3.7) and for the purposes of this estimate those replacement costs have been included.

Question: What happens if a department has it's own equipment and doesn't need

it replaced as of now?

Answer: In fairness to those department which may have already invested in new equipment, it would be my recommendation that the County replace those when it proves necessary down the road without cost to the local departments.

Question: Will the County provide a base station to each department?

Answer: The plan is to replace the base stations where needed if such replacement is needed for County operations and/or backup needs.

Question: Who would pay for the maintenance / repair of the mobile radios?

Answer: For the equipment purchased by the County we would accept the responsibility for those costs.

Question: Would current equipment such as headsets, PA's, air pack radios, etc be compatible with the new mobile/portable radios?

Answer: Yes it is expected that the new equipment will be compatible with most of the current equipment in the field.

Question: Who would be the supplier of the proposed radio equipment?

Answer: As noted in Section 3.1 all of the radio equipment is under NYS OGS contract with Motorola as the vendor.

Question: If the County Board agrees to pay for the cost of these items isn't that going to significantly impact the County Budget?

Answer: Based upon the \$10 million in project bonds, this equal approximately \$700,000 in bond payments for the County over 25 year bonding period and yes it will impact the County budget. However, the County has maintained a \$2.00 per thousand tax rate for the past 5 straight years. During that period of time the Towns tax rates have continued to increase with some Towns pushing close to \$9.00 per thousand for combined Town & Highway tax rates.

It is my feeling that the County could better absorb the cost of this without pushing the expenses of this down to the smaller tax bases within the Towns.

Question: What is the frequency plan for communication between trucks, fire ground and paging?

Answer: For Fire Trucks to the County Dispatch, for County Dispatch to the Fire Trucks and for Fire Trucks to Fire Trucks we will use the County wide digital system on the High Band VHF frequency which will be picked up by the closest tower and re broadcast County wide.

Fire Ground will be based on simplex analog frequencies and are limited to Truck to Truck communications.

Paging as talked about in Section 2.5.a will be on enhanced County Wide low band.

Question: What is the plan for high band fire ground channels?

Answer: One of the new channels being purchased from Motorola can be used as a fire ground channel. Other low power mobile channels can be licensed for use as fire ground. Frequency licensing is less of a problem when the power levels are low enough. As you increase power you increase the likelihood of interference issues with the FCC licensing process.

Question: With high band frequencies requiring narrow banding is that also true of the low band frequencies?

Answer: No, only frequencies above 136 MHz are required to be narrow banded.

Question: Are Highway Departments included within this project for their radio needs?

Answer: In order to include highways we would require another set of frequencies which we presently do not have available. The County is currently putting out bid documents for frequencies on the street to see if there are any other high band frequencies available. It is important to understand as discussed in Section 2.4.b frequencies may be available but the real key is if those frequencies are free from Canadian clearance.

Question: Will this system provide coverage for all parts of the County without dead zones?

Answer: It is important to understand this proposal is based upon design work “on paper.” Until the project reaches the point of actual systems testing we are not able to determine where we might encounter dead zones. However, based upon all of the design work to date the coverage will be significantly enhanced. As problem coverage areas are determined then we may need to consider repeaters or other such system changes to address the problem.

Question: If the funding for this project is approved what is the time frame for construction?

Answer: The intent is to begin the project as soon as the contracts with the Vendors can be signed. Vendor contracts have not been signed as of this date because as a County we can't enter into contractual agreements without the funding source provided for by the Board.

There is specific steps which need to be address before construction can begin even if contracts with vendors are signed. Specifically we have to have lease agreements with site owners which allow us to access the sites for work to proceed. Most importantly we will have to have Adirondack Park Agency (APA) Permits in place prior to any work beginning.

Actual construction time after all of the permits are in place is expected to be a two year process.

Question: Everyone know how hard it is to get APA permits, won't this hold up the process for a long time?

Answer: We are not expecting the permit process with the agency to be to difficult. We have had preliminary discussion with the agency regarding this and they understand the importance of this project in terms of public safety.

It is also important to understand that of the 10 sites which we will need the agency to review under this project all of them currently have Radio Communication towers and equipment located on them. Under this project we are not proposing any new site locations for agency consideration.

The tower construction proposed under this project are either modifications to existing towers or replacement of existing towers. The heights proposed are nearly identical to the heights of existing

towers on site.

It is also important to understand this is probably the first permit the agency will have to consider which is related strictly to “Public Safety.” Inherent within this is the public pressure to not cause unnecessary risk to public safety.

Question: How will the construction of this project impact our current radio communications?

Answer: Given that this is a change from Low Band to High Band, the existing Low Band system can continue to function during the entire transition period to the new system.

Section 5. Conclusion

What this report is and what it is not.

This report is a document put together by myself as the County Manager and is intended to provide “*detailed general information*” from my understanding of the project. It is not intended to be a technical document. I could have included specific design reports of frequencies, path studies and a whole host of other technical documents which have been provided to us by the experts, but I don’t believe they are helpful in understanding how the project is ultimately going to be done. For anyone seeking specific technical data, then I can have one of the experts who have been working on the project address those questions directly.

As someone who served previously as a board member, I believe for projects of this size to be approved by any board there needs to be a certain level of trust that the people who asked to be in charge understand what the project requires. In my opinion this project has simply been delayed too long based in part on that lack of trust.

My hope is this report serves the dual purpose of providing an understanding of the project and to restore that lack of trust. The benefits of this project is that Essex County will be replacing an obsolete and unreliable system with a new state of art digital system with improved reliability, which is something we as public officials have an obligation to do.

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