



BERTHA W. HENRY, County Administrator

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January 19, 2016

Fire Chief DiPetrillo, President
Fire Chiefs Assoc. of Broward County
Seminole Tribe of Florida
Fire Rescue Department
3105 North State Road 7
Hollywood, Florida 33021

Police Chief Dwayne Flournoy, President
Broward County Chiefs of Police Assoc.
City of Hallandale Beach
Hallandale Beach Police Department
400 S. Federal Highway
Hallandale Beach, Florida 33009

Subject: Follow-up from Meetings with Fire and Police Chiefs' Associations on Radio Project

Dear Chiefs:

Thank you for the meetings held on January 7th (Police Chiefs) and January 12th (Fire Chiefs) – both were well attended. Our goal with those meetings as well as other attempts for feedback outlined in the report was to receive input, provide clarity to the report's content and to allow each association to ask questions directly of the consultant and staff. Attached are the responses to your comments raised in your letter and/or discussed at the meetings. The two additional questions raised by the Police Chief's Association are also included. While we believe we have responded to all of the questions raised, please feel free to offer any other commentary that may have come up as you have had more time to consider the response.

To summarize, the recommended Phase II Public Safety Radio System will fully replace the legacy system with a modern digital radio system. The system is designed with redundancy and back-up capabilities which are notably absent in the legacy system. It will increase penetration into many of the highrise buildings to the east and other areas of the County, such as Alligator Alley. Noting there are no known systems that provide 100% coverage, alternatives to further enhance coverage were discussed, such as BDAs and WiFi applications with an understanding that testing will have to occur following system installation. The best solution will be pursued ensuring the greatest opportunity for improved coverage. Finally, the new system will provide for growth and interoperability with our neighboring counties, federal and state agencies,

There appear to be two outstanding issues: responsibility for replacing subscriber units; and maintenance of those units into the future. The report notes that certain units will have to be replaced and offered a ballpark estimate based on the inventory submitted to Broward County's Office of Regional Communications & Technology. Each participating municipality entered into an interlocal agreement many years ago which specifies the responsibilities the County and the municipality retain. You may recall my attendance at each of your associations nearly two years ago asking municipalities, if the opportunity exists, to delay any purchase of radios until the system is replaced. While the system design will accommodate any P25 compliant subscriber unit, there may be unique features that are proprietary to a specific company. We will not know that until the solicitation process is underway and/or concluded. To assist in that assessment, a step in the solicitation process will be added to allow vendors to display their products and allow for hands-on testing, where feasible.

Broward County Board of County Commissioners

Mark D. Bogen • Beam Furr • Dale V.C. Holness • Marty Kiar • Chip LaMarca • Stacy Ritter • Tim Ryan • Barbara Sharief • Lois Wexler
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Police Chief Dwayne Flournoy, President
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The specifications will require vendors to quote maintenance as an evaluation feature, including subscriber units. We are open to creating a coop or any other opportunity to buy in bulk and take advantage of discounts. I have also attached a copy of the PowerPoint presentation on the radio replacement project for your use, which has this and other information that may be of interest.

County staff will be following up with your associations regarding any additional information that has been requested. We look forward to working with you on this important system and answering any additional questions you may have on the radio replacement project. If you have any questions, please contact me or Alphonso Jefferson, Jr., Assistant County Administrator, at ajefferson@broward.org.

Thank you,


Bertha Henry
County Administrator

Attachments

cc: Mayor and Members of the Broward County Board of County Commissioners
Sheriff Scott Israel, Broward Sheriff's Office
Members of the Broward County Communications Committee
Alphonso Jefferson, Jr., Assistant County Administrator
Brett Bayag, Acting Director, Office of Regional Communications and Technology
Municipal Managers

COMMENTS AND RESPONSES

Comment #1 - County staff has come to a conclusion on what option will be recommended to the BOCC, without a concerted effort to gain the concurrence of the Police and Fire Chiefs Associations.

Response #1 – *The balance between improving the current system and fulfilling the needs of the users were considered when coming up with the recommendations to be presented to the County Commission. Once the report was finalized, the County scheduled a series of presentations to update stakeholder groups with project information, its recommended option, and any impacts on the user agencies. On each occasion, County staff requested user feedback and input with respect to all provided documentation.*

Comment #2 - “The operational baseline is subjective and establishes the perspective of first responders regarding the existing communications system”. The report notes these subjective comments but does little to address them.

Response #2 – *The body of the report has addressed the items identified in the operational baseline (Section 3.2.2) as well as comments received – either through in-person meetings or the web-survey – to the greatest extent possible. Additional detail can be provided if there are specific items of concern.*

Comment #3 - “Maintenance of the existing subscriber radios has been inconsistent.” The full report addresses this but does not address how the proposed system will be any different, nor does it address the practical implications.

Response #3 – *The report provides recommendations for a biannual subscriber maintenance program. The system solutions (current or future) will not inherently impact subscriber maintenance schedules. However, out of tune radios will impact radio performance, and thus user perception of the radio system, be it the existing system or the new system (page 79). The way subscriber unit maintenance is set up today, it is the user agencies’ responsibility to maintain their subscriber units. The Consultant was not asked to change that responsibility, though the County will be given tools to more readily identify the subscriber unit that is adversely affecting the system. As we agree that a uniform maintenance program for radios be established, proposers in the solicitation will be asked to provide pricing on such a program or alternatively one can be created locally on a cost recovery basis.*

Comment #4 - The subscriber radio maintenance presents an undefined financial burden at the subscriber level as well as some practical and logistical challenges. The MCP report indicates the system currently has 7,328 portable radios, 3,099 mobile radios, and an additional 3,000 to 4,000 radios programmed for interoperability. The total radio count is 13,427. As the proposal includes the elimination of Broward Schools from the system, this would reduce the number of radios to 11,043. Using the mandatory maintenance schedule proposed on MCP page 79, this would mandate that 5,500 radios be serviced annually or 21 radios per day year round. While the need is not disputed, it presents logistical challenges as well as undetermined fiscal impacts. There are also unknown impacts of mandating biannual service for radios that are used for interoperability and not within the control of police and fire chiefs within Broward County. The report does not address radio maintenance turnaround time and how the challenges with maintaining 3,100 mobile radios will be addressed.

Response #4 - *See response in #3. The recommendations are based on best practices for subscriber maintenance, especially in lieu of known system-impacting issues resulting from poorly maintained radios irrespective of the user.*

The radio system infrastructure, which is housed in hardened, stable, climate controlled facilities, is monitored 24/7 and PM'ed 4 times a year. Mobile and portable radios, which are subjected to greater use, abuse, vibration and temperature fluctuations should be PM'ed at least bi-annually.

Comment #5 - There is no mention of any assistance from Broward County in the form of a regional competitive bid to use for radio maintenance to bring lower overall system costs and assure that high quality maintenance is performed.

Response #5 - *See response in #3. Through the procurement process, the County will be soliciting a comprehensive maintenance program for the system. Optional pricing for subscriber maintenance is currently proposed in the bid specifications, will be secured with the primary system bid, and can be an alternative that agencies can utilize for radio maintenance.*

Comment #6 - The MCP Report does not discuss the benefit of Option 2 (P25 Phase 2 System) vs. Option 1 (P25 Phase 1 System). The benefit of a Phase 1 system is that it allows XTS/XTL subscriber radios to be used until the end of their lifespan. There is no cost savings presented, nor is there a cost projection for the offsetting infrastructure design, additional antennas and floor space that would be required. This lack of information makes it hard to do a cost/benefit analysis. Option 1 allows for migration onto the new system for those users who do not currently have phase 2 capable radios, and allows agencies to phase in Phase 2 compatible radios. Option 2 (the one County staff is prepared to recommend) includes a significant user and taxpayer impact in that all XTS/XTL radios must be replaced immediately. A total cost estimate, not just the Broward County costs, should have been provided to allow for an effective cost/benefit analysis. The report does not address the benefit of Option 2 over Option 1 in sufficient terms.

Response #6 - *The strengths and weaknesses of each alternative have been identified in the report for each of three options (pages 72-75). These strengths and weaknesses are also included in the PowerPoint presentation used in subsequent user group presentations. The estimates represent full costs (pages 80 to 85). Cost estimates are provided for Broward County in Section 5.4 (pages 80- 85) of the report. The impact on subscriber units in total was included in the assessment report. Subscriber unit cost projections – based on current estimates - were also calculated and included in the PowerPoint presentations made to the user groups.*

Comment #7 - The report provides an inventory report of agency radios, quantity and types. There appears to be inaccurate numbers for agency radios, and the City of Fort Lauderdale who accounts for a large number of radios is not included in the report. During a random verification of the MCP, data check of just three cities, it was noted that the radio inventory for Tamarac Fire, Lauderhill Fire, and Sunrise Police were all inaccurate. An accurate inventory is critical in trying to evaluate overall system costs.

Response #7 - *The report states (page 18) that the inventories are estimates. The quantities were based on the latest inventories submitted to ORCAT at the time of the study. Requests for updated inventory were made in user meetings held prior to drafting the report, but were not received. It is the responsibility of users to maintain and provide changes in inventories to the County in a timely manner. That said, the approach to system capacity calculations was very conservative to account for a significant amount of overhead that should accommodate any reasonable increases that may result from updated subscriber inventories. Updated per-agency cost estimates can be provided if requested and the user agency provides updated subscriber inventories.*

Comment #8 - There is some confusion as to who is paying for “The System” and the MCP Report seems to lose sight of the fact that any proposed solution has system costs beyond that of what Broward County has to pay. The proposed cost of the system is approximately \$40 million dollars. If the radio inventory table was correct, the proposed cost for the recommended option requires replacing an additional \$31 million dollars in subscriber radios. The total infrastructure price depicts only the direct cost to the County and does not include any of the subscriber’s costs. This cost also does not include the fire station alerting systems, and the alphanumeric pagers.

Response #8 - *The report focuses on costs for the replacement of the County systems consistent with the regional inter-local agreement. The impact to subscriber radios were considered in the assessment. The analysis included the costs of a P25 Phase I system and the comparative cost of prolonging the use of Phase I capable XTS/XTL subscribers. With the pending end of support for the XTS/XTL line, it was determined that the investment was better in Phase II system infrastructure that will have a prolonged use rather than additional costs for infrastructure to support the temporary usage of Phase I radios that will need to be replaced anyway. There will still be approximately two years before the new system is operational and subscribers will need to be available. As noted previously, the subscriber costs were subsequently calculated and presented in a PowerPoint developed for user group presentations. Pager programming costs are estimated at \$50 per unit. With an estimate of 500 total pagers across the County, the total estimated programming cost is \$25,000. The Fire Station Alerting system costs are yet to be determined and will depend on the selected solution based on the wide range of potential station equipment. The existing fire station alerting system will be able to run in parallel to the new system to allow departments a longer period to purchase compatible equipment.*

Comment #9 - The approach to redundancy and survivability is not well addressed. The approach seems to be reliant upon the use of some mobile assets which create time delays in their deployment. The ability to have instantaneous backup capabilities, even if limited to partial capabilities, is vital. An understanding by public safety officials as to what features and capabilities would be available while operating in a backup mode may help to allay concerns. Concerns exist over the use of the Regional Domestic Security Task Force Region 7 (RDSTF) 700 MHz system as a significant component as that asset is not owned/managed by Broward County and could be in active use for its primary mission (Pages 76-77). Public Safety requires a seamless “back-up system”, that will function with a flip of a switch. The proposed “back-up” system is a “disaster recovery” proposal. It appears when operating in a backup environment that field users would be limited to “in-street coverage”, but not “in-building coverage”. (Page 4) The MCP report discusses the use of the RDSTF Region 7 system build out as a back-up. Region 7 includes Palm Beach to Monroe County. The report does not seem to address the possibility of other systems’ plans to use RDSTF assets as their backup. The potential for other agencies to be utilizing the system when Broward County has a failure is possible. The report recommends; “resources to include transportable repeaters, gateways, cache radios and control station equipped workstations”. If the use of these transportable repeaters is the planned backup system, this takes a considerable amount of time to get in place, and only works if all of the needed staff members are in place 24/7, leaving the County without public safety radio communications for the considerable amount of time.

Response #9 – *The primary system is being designed with an extremely high level of redundancy, thus significantly reducing the chance of a complete system failure that would necessitate switching to alternative or backup systems. For the primary system control equipment, there are four levels of redundancy, including geographically separated controllers. The requirement is for redundant components at every level throughout the radio and microwave systems so that any component failure*

will not impact operation. The most likely service impacting failure would be limited to an individual radio site, and not the entire system.

Even with these high levels of redundancy, a significant investment is being made to backup capabilities. As a result of discussions between the County and MCP based on the contents of the report pertaining to Section 5.2 -Redundancy and Survivability (pages 76-78), the need for greater back-up capabilities was identified. This need has been addressed and the County is proposing an enhanced solution that includes a static backup system that will be operational 100% of the time in addition to the recommended mobile communications platform. This system is completely distinct from the RDSTF system so there is a guaranteed level of availability. There is also a conventional fixed backup component and a deployable backup solution.

The RDSTF 700 MHz system being procured by Broward County will be owned/managed by Broward County. As an interoperability asset, it is expected to be used for its primary mission in the same manner that we leverage the NPSPAC 800 MHz frequencies.

Comment #10 - The MCP report suggest that efforts be undertaken to establish inter-local agreements with Plantation and Coral Springs to serve as a component of the backup plan, however, the report does not contain an assessment of either system's capability to absorb the demands of the Broward County system.

Response #10 – In the report, these systems were identified as a component of the backup scenario, which includes a combination of the backup system, mobile communications platform, and conventional backup system. Acknowledging the challenges with this scenario including concerns not to overwhelm these systems, the report states (page 76) “In an ideal scenario, user agencies on the Broward County system could work out agreements with Fort Lauderdale, Plantation, and Coral Springs to allow access to those systems in the event of a failure to the Broward County system. These systems rely on separate radio sites and backhaul networks, and therefore would not necessarily be affected by events that could compromise the County system. Because of the limited capacity offered by the systems, however, the backup scenarios would require consolidation of Broward talkgroups so as not to overwhelm those systems.” It should be noted that significant design considerations have been included to improve primary system reliability and resiliency so as not to require access to the backup resources. The details are described in the previous question. For the overwhelming majority of failure scenarios, it is likely the failure would not impact all users on the system, but rather users operating in a specific area.

Comment #11 - There are concerns about the capacity on the proposed system. There is nothing in the MCP report that addresses any measurable capacity increases. As the future moves on, can the new proposed system handle additional technology? The proposed solution to capacity concerns seems centered on the removal of the Broward School District from the system. While this may create some “vacant space during parts of the weekdays, it does not provide any additional capacity.

Response #11 – The report identifies capacity increases for each of the options (pages 2 – 4). The number of channels for each option is based on Erlang C calculations which are used for calculating the number of channels required for trunking systems (pages 41-42). Based on a 1% Grade of Service calculations (the probability of a user being placed in a busy queue), the existing 27 talkpath system will support 3,475 active users at any given time. Currently, we estimate about 2,500 active users at current peak hours. The recommended 36 talkpath system will support 4,772 active users, representing a capacity increase of approximately 37 percent. These numbers represent a very conservative level

of user activity as many users today will be coming off of the system and directed to the Local Government Radio System.

Comment #12 - The MCP report does not address the severe lack of coverage presented during the various users' meetings. The proposal indicates that there are five towers being added. This does not appear to be the case; they are reconciling the three that Fort Lauderdale already has, taking the two receive only sites in Tamarac and Deerfield and upgrading them to transmit and receive sites. The proposal identifies the construction of a five-channel site along I-75 on Alligator Alley. While this may assist with coverage in a specific geographical area, it will not provide significant improvements outside of that area. While it is understood that Category 5 buildings are difficult to achieve signal penetration, concerns exist over the reliance on Bi-Directional Amplifiers (BDA) as the solution to coverage gaps and signal output issues.

Response #12 – The statement indicating that five towers are not being added is inaccurate. As a result of discussions between the County and MCP based on the content of the assessment report, the configuration being planned is for a 15 site system, which includes replacing the receive-only sites in Deerfield and Tamarac with transmit/receive sites, and five additional towers. The specification includes in-building coverage requirements for 24 dB for areas east of I95, and 20 dB for areas west of I95 to the Everglades. There are outdoor portable requirements over the Everglades, and mobile requirements over the ocean. This represents a significant improvement to in-building coverage countywide from the 15 dB to which the existing system is designed.

The report acknowledges and documents the users' concerns over the use of BDAs. The report also indicates (page 40) that the first solution is to evaluate areas where "these in-building coverage problems are concentrated" and make a determination if "it may be realistic to add a radio site or sites." The report continues to indicate BDAs are in essence a solution of last resort for coverage issues that persist after the new system is operational. Unfortunately, there is no silver bullet, however, there are operational procedures used by other agencies, such as moving to Simplex mode of operation, to address gaps and coverage concerns to the extent that technology and operations allow.

Comment #13 - It is presumed that the use of additional Bi-Directional Antennas (BDA) is a component of the proposed penetration solution. As the report indicates a lack of consistent maintenance as a performance issue, there is no explanation of how the privately owned BDAs would be maintained. Concerns over BDAs include their reliance on electricity (which is often turned off in fire situations.) Even if the reliability on BDA's is solid, any single BDA can cause an issue on the system at any given time, and there is no easy way to track or identify which one is causing the problem.

Response #13 – MCP is not recommending BDAs as primary component of the penetration solution. Rather, BDAs are in essence a solution of last resort if additional radio sites are not practical and penetration issues still persist once the new system is operational. From the discussions at the user group meetings, the users engaged in extensive discussion regarding coverage solutions and pros/cons of each. These discussions confirmed for the more experienced users and provided education to those that may not have previous understanding that regardless of how many radio sites are constructed, there will always be buildings that will not receive sufficient coverage from the terrestrial network. There is no financially feasible design that will cover every building. While the increased in-building penetration within the design will increase the number of buildings covered, properly designed, NFPA-compliant, BDAs will logically be needed for any buildings that are not adequately covered. Simplex operation, vehicular repeaters, and the deployable system are solutions that were discussed during the user group forums and are recommended as part of the full solution to be utilized in the absence of primary-system coverage from tower sites or BDAs.

Comment #14 - It appears that the individual groups within ORCAT are not communicating between CAD and Radio Groups. The CAD group, which is in the process of programming the new Motorola CAD, is planning to program specific features such as messaging to radios. The MCP report does not address this and confirm that sufficient capacity will be available.

Response #14 – All of the functional groups of ORCAT (CAD, Radio, 9-1-1 and Dispatch) communicate regularly to discuss projects and interface design. For example, the design will provide GPS capability for those agencies that choose to implement GPS-enabled subscriber equipment. The system has sufficient capacity to accommodate this application. While GPS was not specifically discussed in the assessment report, it has been part of internal discussions. Additionally, internal discussions between CAD and Radio, identified “messaging” as an option to enable now for use in the future radio system.

Comment #15 - Broward County just purchased a new Motorola CAD system. It would be beneficial to ensure that the radio system is Motorola to ensure all functionality of each system worked to its fullest. Both Coral Springs and Plantation recently purchased Motorola Radio Systems which are operating off of the hosted master site in Plantation. Motorola is the standard in South Florida, if the County chooses another brand; these agencies will not have easy access to the regional communications system for Joint Operations and Mutual Aid.

Response #15 –There is no dependency between CAD and Radio. Although these systems can be interfaced, they are completely independent systems. The report makes numerous references to current CAD interfaces that will need to be addressed by respondents to the RFP. As a result of discussions between the County and MCP, based on the assessment report the requirement is to procure a system that is a standards-based P25 compliant system that will support the Motorola subscriber radios operated by Coral Springs and Plantation regardless of the manufacturer selected. The County utilizes an open, competitive procurement process for an acquisition of this size. The system ultimately being purchased will allow the County to provide the greatest level of coverage, capacity, and features meeting its preestablished criteria.

Comment #16 - Concerns over “some of the vendor specific features you purchase may not be available on the replacement radio system infrastructure”. The impacts of such are not addressed and concerns exist as to whether features that we have today will no longer be available.

Response #16 – No features were identified on the existing system that would not be available within the procured system at this point. The majority of features desired by user agencies are subscriber related, which may or may not be vendor specific. The system will support any P25 compliant subscriber. To support data related features such as GPS, over the air rekeying (encryption), and over the air programming, the system is being procured to support P25 compliant data functionality. That being said, agencies should confirm specific features they are purchasing to ensure they will operate on any P25 compliant system, which would be consistent with the message that the County has been conveying for at least the last two years.

Comment #17 - “Control station connectivity between the County’s regional PSAPs and the Coral Springs system has not been configured”. There is no planned remedy of this within the MCP report. (Page 34)

Response #17 – The recommended system includes a Console Sub System Interface (CSSI) to the Coral Springs and Plantation PSAPs as well as Miami-Dade Police, Miami-Dade Fire, Palm Beach

County, Collier County, Cities of Miami Beach, Miami, and Hialeah. This connectivity will negate the need for control station connectivity, and offer improved capability and talkgroup capacity (page 55).

Comment #18 - “The operational baseline identifies input from system users regarding the performance of the existing system, as well as the needs for the new communications system.” Many concerns and desires were raised by users in the sessions, however, the concerns and desires were not addressed in any meaningful way, there is no clear methodology to determine if the requests are included, practical, cost effective, etc. (Page 8)

Response #18 – User issues were addressed within the report including solutions identified within the recommendation. Please identify any specific requests and we will identify how those solutions have been addressed.

Comment #19 - The MCP Report (Page 69) speaks of building a new paging system and the primary challenge is to find a solution that will allow users to continue to use their existing Apollo AL25 Gold Pagers. There is mention of being able to send the pagers back to the manufacture to operate on the new frequency range, yet no mention of who will be responsible for the costs.

Response #19 – Paging subscribers must meet the POCSAG standard in order to be compatible with the County’s infrastructure. The change in frequency should be able to be completed at the local service center.

Comment #20 - The MCP Report notes that neighboring Miami-Dade County is implementing a countywide P25 Phase 1 Harris System. This is partially true. There is no mention of Miami-Dade County using a split system. Law Enforcement is on the Harris P25 Phase 1 system, while Fire/EMS remains on their conventional Motorola UHF system (page 34-35). However, during the mutual aid interoperability interviews, it is noted that MDFR “does not use 800 MHz system for any situation where firefighters may be in a hazardous environment (day to day operations)” (Page 157)

Response #20 – It is understood that Miami-Dade Fire operates a conventional analog UHF system and is currently deploying dual-band UHF/700/800 MHz radios that will be capable of operating on the Broward system as they currently do. Interoperability is planned with the Miami-Dade Fire system via CSSI (Page 80).

Comment #21 - The MCP report outlines a number of deficiencies at fixed sites such as ineffective HVAC, insufficient floor space for expansion, lack of a standby generator. It is unclear if the cost for these improvements are included in the overall cost estimates.

Response #21 – These costs have been considered and included within the overall cost estimates.

Comment #22 - The MCP Report on Fire Station Alerting (Page 69-70) identifies the current Zetron Model 26/6 as still being serviceable with parts. If utilizing the existing equipment within the fire stations. MCP identifies that each fire station will have to have the control station radios reprogrammed. (There is no mention of who will be responsible for the reprogramming.) Page 71 contradicts Page 69-70, and states that the fire station alerting system will be replaced with a new system that offers improved reliability. (There is no mention of who will be responsible for the fire station costs)

Response #22 – The County will be responsible for the fixed equipment associated with the fire station alerting system, including the controller, CAD/console interface, and transmission network. Whereas the station equipment and programming will be the responsibility of each agency (page 145) as defined in the regional inter-local agreement. This information was discussed during user meetings, articulated in the report and included in the PowerPoint that was used for subsequent presentations. Solutions will be solicited that interface to existing lights/sirens/speakers. The procurement will include competitive pricing for the station equipment to provide agencies a purchasing vehicle and cost effective solution for the replacement of their station equipment.

Comment #23 - The interface with First Net is not defined within the MCP Report.

Response #23 - There is no P25 standard for a FirstNet interface available at this time. The FirstNet RFP being issued in 2016 may address this requirement. Please monitor <http://www.floridanet.gov/firstnet> for updates.

Comment #24 - There were a number of opportunities for users to provide their input MCP in the months leading up to their report. In fact, a substantial amount of feedback was provided by both fire/rescue and law enforcement professionals. Participants were asked to rate the level of importance of some items with rankings including such terms as absolute necessity, critical, useful for day to day operations, and nice to have. However, there was no 360-degree feedback process that took place to address the feedback and importance rankings. Users are left in the dark as to whether their concerns raised will be addressed, will not be addressed, are impractical, pose a security risk, or are simply too expensive. The below list includes some, but not all, of the concerns and requests made by fire rescue members:

Response #24 –The PowerPoint presentation for the follow up user group meeting presented the results and MCP requested feedback, agreement/disagreement with the rankings during or after the meeting. We would be happy to discuss all of the features and capabilities requested through the assessment process and identify how the feedback received was considered. We have provided detail regarding each of the features below and will address any others requested:

a. Coverage issues within high rise building and parking garages

Response – A countywide increase for in-building coverage has been identified, with a substantial increase for all areas east of I95, covering the majority of high rise buildings and parking structures. While this will not guarantee coverage within any specific structure, there will be a substantial increase in the overall number of structures covered.

b. The impacts of 30 or more new high rises in the next 5 years

Response – The coverage design is intended to improve coverage in dense structures countywide. County/City ordinances for in-building amplification systems in high rise buildings are generally good practice, especially for new construction. That being said, it is essential that these ordinances are structured in a way to ensure the amplification systems are properly designed and NFPA-compliant given the history with faulty BDAs in South Florida.

c. The difficulties and high risks of communications failures within schools and hospitals

Response – It is recognized that schools and hospitals present challenging RF environments, and simultaneously present prime targets for incidents requiring public safety response. With the dense construction of these buildings and the large number of walls that separate interior

rooms from the outside of the structure it may be impossible for any level of outdoor coverage to penetrate all buildings. The recommended coverage levels should provide an overall improvement to coverage within these structures. Coverage in each structure should be re-evaluated once the new system is operational to determine if a BDA is necessary. As an alternative solution, vendors are now implementing solutions that would enable radio communication via existing WiFi networks. Such solutions should be more defined at the time the system is operational, and may present an alternative to BDAs. County staff will provide additional outreach to the Broward School Board and Hospitals regarding communication challenges and possible solutions in these facilities.

d. Coverage on the open sea and open water

Response – There is a recommendation for mobile coverage on watercraft operating over the ocean. This requirement has been incorporated into the draft specifications.

e. Coverage in the western parts of the County, specifically along I-75 to the Broward/Collier County line.

Response - There is a recommendation for portable radio outdoor coverage throughout the western half of the county, including areas along I75/Alligator Alley to the Collier County line. This requirement has been incorporated into the draft specifications. Candidate tower sites have been identified.

f. Challenges with the effectiveness of BDAs

Response – It is understood that there have been recent issues with improperly designed BDAs, including BDAs that have disabled the entire system. Properly engineered and installed BDAs operate appropriately. The challenges and concerns are recognized and documented and while BDAs are not the preferred solution, sometimes they are the only solution for providing coverage in certain buildings. The goal is to minimize the requirement for BDAs to the greatest extent possible through in-building coverage level requirements.

g. The suggestion that users may want to consider portable repeaters for fire ground operations

Response – The use of portable repeaters was not discussed within the report. Vehicular repeaters provide a useful solution for relaying Simplex fire ground communications back to the trunking system.

h. Concerns about transmission quality when firefighters are using equipment that generates background sounds such as saws

Response – The issue of background noise often experienced in firefighting scenarios with digital radio systems is a long-studied issue. Since the inception of digital radio there have been significant improvements to vocoder technology and noise cancellation that have greatly improved the ability of firefighters to communicate via digital radio in noise environments. Manufacturers have researched the issue at length and each has made marked improvements in eliminating background noise susceptibility. This was also confirmed by some of the members at the Police Chief's Association's meeting.

i. Seamless use at the field level

Response – The primary goal of the system is to provide the optimal tool to allow first responders to operate their radio seamlessly and with improved effectiveness. For this reason, solutions have been focused on technology that does not require user intervention in order to operate.

j. Backup systems

Response – As previously mentioned, there have been significant considerations for improved redundancy in the primary system and backup systems. The draft specifications include a combination of a fixed trunked backup system, a fixed conventional backup system, and a deployable conventional backup system.

k. The desire for GPS capable portable radios for the fire service and the absolute need for GPS capabilities for law enforcement

Response – The specifications include data capabilities within the backup system to support GPS capabilities.

l. Paging system not effective for those who reside outside of Broward County

Response – The paging system should inherently provide some coverage outside the County, however it is not the intent of the system and was therefore not considered within the design. There are solutions available that send pages via text message that may be an appropriate solution. These solutions are being procured as part of the capabilities for the new paging system.

m. Inability to receive updated text messages to a pager

Response – The ability to send updated text messages is part of the capabilities of the CAD system. This feature is available and enabled in the current and future CAD.

n. Inability of Broward County to communicate directly with Plantation or Coral Springs

Response – The new system will support communications at a console level via a CSSI interface. At the subscriber level, all P25 compliant subscribers that will be required to operate on the Broward County system will provide the capability to be programmed on the Plantation and Coral Springs systems if those system administrators will allow. These cities have been at the table and are working very closely with the County.

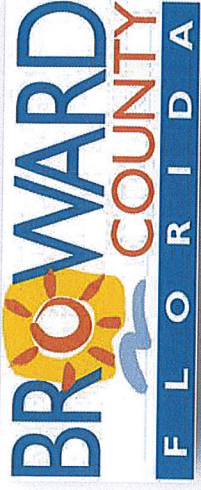
ADDITIONAL COMMENTS FROM THE POLICE CHIEF'S MEETING

Comment #25 – Video data capture and transfer. Is the new radio system robust with the bandwidth to accommodate video data capture and transfer?

Response #25 - *The new radio system is a voice based system. The radio system does not capture video. These features are being reviewed as part of the future items associated with the dispatch functions such as text to 911 and sending videos.*

Comment #26 – Are the Radio, CAD and 911 systems are all talking together?

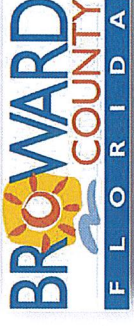
Response #26 - See Response #14. All of the functional groups of ORCAT (CAD, Radio, 911 and Dispatch) communicate regularly to discuss projects and interface design. For example, the design will provide GPS capability for those agencies that choose to implement GPS-enabled subscriber equipment. The system has sufficient capacity to accommodate this application. While GPS was not specifically discussed in the assessment report, it has been part of internal discussions. Additionally, "messaging" has been identified by ORCAT as an option to enable now for use in the future radio system.



**Broward County Public Safety Radio
System Replacement**

**Analysis by Mission Critical Partners
(Technical Consultant)**

COMPREHENSIVE RADIO ANALYSIS



2

- **County contracted with technical consultant Mission Critical Partners (MCP), to conduct, the following assessments on the existing systems:**
 - 800 MHz Motorola SmartZone trunked simulcast communications system (public safety radio system)
 - Microwave system
 - Fire station alerting system
 - Alphanumeric paging system

COMPREHENSIVE RADIO ANALYSIS

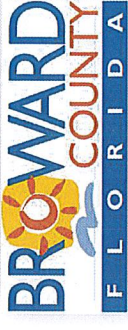


3

- **User group meetings occurred to provide feedback and information for the review**
 - Sheriff and Municipal Police Departments
 - BSO Fire Rescue and Municipal Fire Departments
 - Dispatch Communications staff
 - Broward County School Board

- **Additional mechanisms utilized to receive feedback**
 - Web survey
 - Focus group interview from the first responders agencies
 - Interviews with representatives from neighboring systems to gather interoperability requirements and determine pending system upgrade

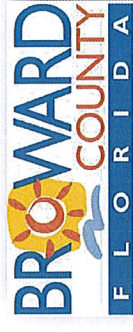
RADIO SYSTEM CURRENTLY UTILIZED



4

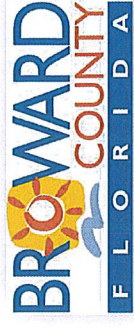
- **28-channel SmartZone 800MHz radio system operated through a Motorola Solutions Hosted Master Site**
 - Estimated 10,427 primary radios public safety/3000-4000 non-public safety radios with Broward County system access
 - Serves all public safety agencies in Broward County
 - Coral Springs, Fort Lauderdale, Hollywood and Plantation operate their own systems
 - 8 transmit/receive sites and 2 receive only sites
 - Includes several ancillary systems: microwave system, fire station alerting system, alphanumeric paging system
 - Serves as primary back-up for all other systems in the County in the event of major failures of those systems

SYSTEM WEAKNESSES



- Limited system upgrade options
- Diminishing manufacturer support, end of life issues
- Radio frequency interference issues
- System user capacity limits
- Inconsistent maintenance of subscriber radios
- Coverage gaps in areas of the County
- Coverage gap for in-building coverage in dense structures
- Gap in back-up system capabilities

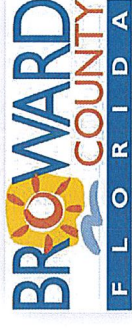
PROPOSED SOLUTION



6

- **Project 25 (P25) digital trunked Simulcast radio system**
- **Provide for redundancy in the system**
- **Replace alphanumeric paging system**
- **Replace IP-based microwave system**
- **Replace components of the fire station alerting system**
- **Infrastructure increase to 15 receive/transmit sites, including conversion of receive only sites to receive/transmit sites**
 - **Additional towers in Hollywood, Fort Lauderdale, Pompano Beach, North Lake, and a 5 channel multicast site along I-75/Everglades area**
- **New console systems to replace each existing dispatch position**
- **Repurpose frequencies prone to interference**
- **Back-up system capabilities**

RADIO REPLACEMENT OPTIONS



7

- **OPTION I**
 - 44-channel, 700/800 MHz P25 Phase I, Trunked Simulcast System (42 talk paths, 2 zones)
- **OPTION II**
 - 19-channel, 700 MHz P25 Phase II, Trunked Simulcast System (36 talk paths, 1 zone, dynamic)
 - The primary difference between Option II and Option I is that Option II would provide two talk paths for every one frequency
- **OPTION III**
 - 25 to 30-channel, 700/800 MHz P25 Hybrid (combination of Phase II and I) Trunked Simulcast System (Range: 28 phase II talk paths, 10 phase I talk paths to 36 phase II talk paths, 11 phase I talk paths, 1 zone, dynamic with 36 maximum talk paths at any point in time)

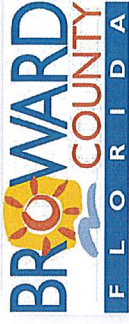
OPTION I



□ 44-channel P25 Phase I Simulcast System

Strengths	Weaknesses
Reuse of existing XTS/XTL subscriber units	Increased infrastructure cost for base stations
Flexibility to accommodate Phase I subscribers from interoperability agencies without risk to capacity	Required licensing or acquisition of 49 frequencies with 9 frequencies not yet identified.
Improved coverage through radio site addition	Increased space requirements for base stations
Improved capacity with two calls/zones through channel expansion up to 60 channels or 58 talk paths	Cutover would require channels from the existing system
Flexibility to use overhead capacity for data applications such as GPS, OTAP and OTAR	Roaming introduced to the system that requires additional base stations and tightly managed fleet mapping
Improved interoperability with other agencies migrating to P25 (Miami-Dade, Collier)	Cost of flash upgrading subscribers that have a short lifecycle, then new P25 Phase II subscribers will be required
Slightly improved coverage compared to Phase II design	Increase in loading of towers
Access to all channels during failsoft scenarios	

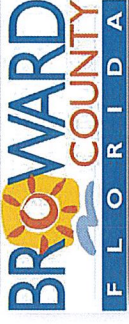
OPTION II



□ P25 Phase II Simulcast System

Strengths	Weaknesses
Reduced infrastructure cost for base stations	XTS/XTL series radios would need replacement
Approximately half the number of required frequencies	More limited backward compatibility with Phase I talkgroups
Ability to have backward compatibility with Phase I subscribers through use of dynamic base stations	Phase I talkgroups would occupy two resources instead of one
Improved coverage through radio site addition	Failsoft only would provide 19 channels, as compared with 37 in a Phase I design
Improved capacity through channel expansion from 27 to 36 talk paths	The number of Phase I capable talkgroups and users would need to be tightly controlled through administrative and operational policies to ensure capacity is maintained at designed levels
Flexibility to use overhead capacity for data applications such as GPS, OTAP and OTAR	
Improved interoperability with other agencies migrating to P25 (Miami-Dade, Collier)	
Reduced space requirements in equipment shelters	

OPTION III



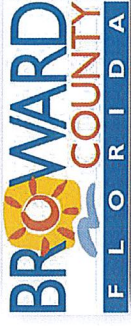
□ 25 to 30-channel Hybrid P25 Simulcast System (Combination of Phase II and I)

Strengths	Weaknesses
Allows extended use of Phase I subscribers by some user agencies and interoperability partners	Cost of flash upgrading subscribers that have a short lifecycle, then new P25 Phase II subscribers will be required
Balance between Phase I and Phase II options	Phase I talkgroups would occupy two resources instead of one
Infrastructure in place for second overlay system once Phase II conversion complete	Potential for minimally used channels after Phase II conversion is completed
Ability to have backward compatibility with Phase I subscribers through use of dynamic base stations Improved coverage through radio site addition	Increased infrastructure cost for base stations Cutover would require channels from the existing system
Improved capacity through channel expansion	Increase in loading of towers
Flexibility to use overhead capacity for data applications such as GPS, CIAP and CIAR	Increased space requirements for base stations
Improved interoperability with other agencies migrating to P25 (Miami-Dade, Collier)	Some XTS/XTL series radios would need replacement
The 6 to 11 additional channels available after complete Phase II transition can be repurposed for additional sites	Limited to 36 simultaneous talkpaths in a single zone configuration

MAJOR RECOMMENDATIONS

- All evaluated options would provide improved coverage through addition of radio sites
- Recommendations:
 - Increase/enhance the in-building coverage requirement for dense structures throughout the heavy built-up areas of the county
 - Replacement of Tamarac and Deerfield receive-only sites with full transmit/receive location on new towers
 - Additional towers are recommended in the Hollywood, Fort Lauderdale, Pompano Beach and North Lake areas
 - 5-Channel multicast site along Interstate 75 to provide improved coverage in the western half of the County over the Everglades
 - Back-up capabilities to support communications in the event primary system becomes impaired or overloaded
 - Execute agreements with independent system operators to allow access in the event the County system becomes impaired or overloaded

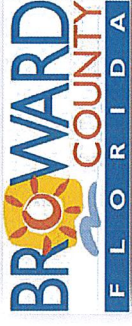
COUNTY'S PROJECTED COST ESTIMATES



Category	Option I	Option II	Option III (25 or 30 channels)
Site Equipment	\$29,709,000	\$19,692,000	\$22,234,000 - \$24,334,000
Microwave Network	\$3,200,000	\$3,200,000	\$3,200,000
Physical Infrastructure	\$4,900,000	\$4,900,000	\$4,900,000
Project Management, Engineering, and Implementation	\$12,287,925	\$9,032,400	\$9,858,550 - \$10,541,050
Contingency	\$1,890,450	\$1,389,600	\$1,516,700 - \$1,621,700
Back-Up Capabilities	\$2,417,800	\$2,417,800	\$2,417,800
Total	\$54,405,175	\$40,631,800	\$44,127,050 - \$47,014,550

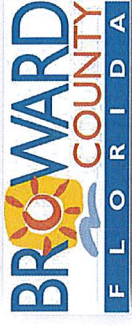
Cost estimates are inclusive of radio site electronics equipment, backhaul network, tower site facilities (i.e., tower and shelter modifications), paging system, fire station altering, vendor services and back-up capabilities.

REGIONAL INTERLOCAL AGREEMENT RESPONSIBILITIES



Category	County Responsibilities	City Responsibilities
Direct Subscribers	<ul style="list-style-type: none"> Connectivity to trunked radio system Radio system regional center dispatch consoles Voice logging for radio is the responsibility of the County when City is participating in the regional consolidated dispatch center 	<ul style="list-style-type: none"> Proper power, grounding, cabling, and HVAC for network closet and consoles Subscriber radios (portable and mobile) and accessories (antennas, batteries, mics, etc.) Provide annual preventive maintenance to subscriber radios Voice logging for radio is the responsibility of City when City is not participating in the regional consolidated dispatch center
Indirect Subscribers	<ul style="list-style-type: none"> Connectivity to trunked radio system Radio system regional center dispatch consoles Voice logging for radio is the responsibility of the County when City is participating in the regional consolidated dispatch center 	<ul style="list-style-type: none"> Radio interconnection with Hosted Master Site Proper power, grounding, cabling, and HVAC for network closet and consoles Subscriber radios (portable and mobile) and accessories (antennas, batteries, mics, etc.) Provide annual preventive maintenance to subscriber radios Voice logging for radio is the responsibility of City when City is not participating in the regional consolidated dispatch center
Fire Station Alerting System	<ul style="list-style-type: none"> Fire alerting network management Fire alerting core infrastructure, maintenance and services 	<ul style="list-style-type: none"> Proper Fire Station RF equipment, etc. Pagers for emergency alerts Subscriber radios (portable and mobile) Proper power, grounding, cabling, and HVAC for network closet and consoles Any communication medium other than the County's RF

REGIONAL AND MUNICIPALITIES SUBSCRIBER UNIT RESPONSIBILITIES



PROJECTED COST ESTIMATES

Category	Option I	Option II	Option III
Total	<p>\$11,124,300 initially plus \$16,880,400 for radio replacement over 5-7 years</p>	<p>\$28,004,700</p>	<p>\$19,493,100 to \$28,004,700 initially plus \$0 to \$8,511,600 for radio replacement over 5-7 years</p>

RECOMMENDED SOLUTION



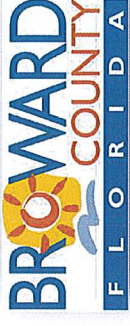
- **Option II - 19-channel, 700 MHz P25 Phase II, Trunked Simulcast System (36 talk paths, 1 zone, dynamic)**
 - The primary difference between Option II and Option I is that Option II would provide two talk paths for every one frequency

- **Back-up system capabilities to support the public safety radio system**

- **4-site 7-channel system (12 talk paths) providing portable outdoor coverage and some in-building coverage**

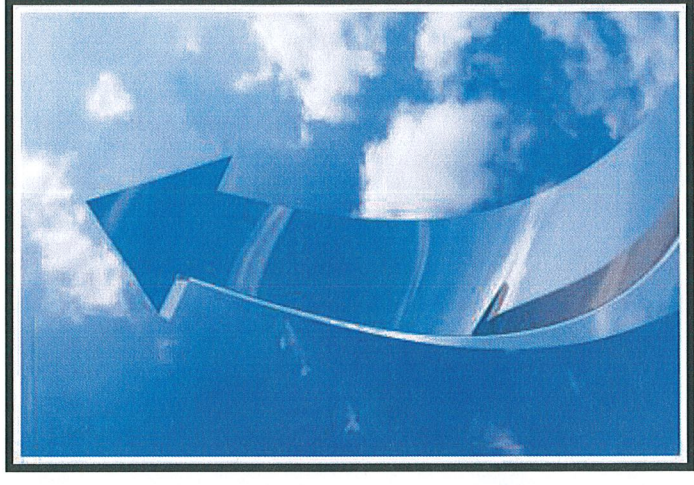
- **Communications trailer with deployable gateway and conventional repeaters**

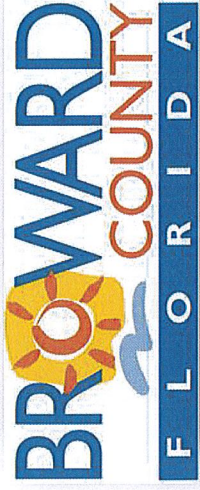
NEXT STEPS/TIMELINE



16

- Finalize cost estimates and information for regional and municipalities' responsibilities
- Finalize specifications for radio system replacement – December 2015
- Identify replacement radio system – March 2016
- Estimated implementation date – 2nd Quarter 2018





Broward County Public Safety Radio System Replacement

QUESTIONS AND ANSWERS