Planning Guide

for

Public Safety Answering Point (PSAP) Consolidation

submitted to

County of Sussex, New Jersey

March 2010 ©

L. Robert Kimball & Associates

TABLE OF CONTENTS

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1. EXECUTIVE SUMMARY

L.R. Kimball (Kimball) respectively submits this Planning Guide for Public Safety Answering Point (PSAP) Consolidation to the County of Sussex, New Jersey (County). In February 2009, the County commissioned Kimball to expand upon previous consolidation studies completed at the state and local level to develop guidance and support for the planning and implementation of a countywide consolidated PSAP. Kimball developed this planning guide by working closely with Telecommunications Working Group (TWG) representatives, reviewing the statistics and data gathered in March 2009, and discussing technology needs with appropriate stakeholders and technical support staff.

Kimball augmented the information gathered during March 2009 with extensive meetings and conference calls during and following the week of December 14, 2009.

The planning and implementation items that require specific attention and action by the County and stakeholders are detailed within titled sections of this report. All are critically important to the success of consolidation of PSAPs in Sussex County.

1.1 GOVERNANCE

Kimball recommends developing the consolidated PSAP as a County department; this is the most cost effective and efficient means to provide the necessary structure. This option provides significant cost efficiencies as the infrastructure and capabilities are in place to provide the administrative and support services to a department serving countywide needs.

Kimball recommends utilizing the authority of the Board of Chosen Freeholders, through the County Administrator, to direct, manage and guide the consolidated PSAP. This authority should be augmented by operational and policy oversight from discipline-specific work groups.

Kimball recommends maintaining the current planning and project management, the existing TWG, for the countywide consolidated PSAP.

1.2 COSTS, FUNDING AND GRANTS

Comparing individual improvement costs to the development costs of a single consolidated PSAP illustrates the cost efficiencies and potential cost savings of consolidation. Kimball cautions that comparing these costs is not a true “apples-to-apples” assessment as many benefits associated with consolidation cannot be achieved by maintaining multiple PSAPs.

	Number of Positions	IP-enabled 9-1-1 Telephone	Admin Phone System	Radio Dispatch Control System	Network & Connectivity Costs	CAD	Logger	Facility	Ergonomic Dispatch Furniture	Total Cost
Total Individual PSAP Improvements Costs	17	$1,020,000	$66,000	$2,040,000	$241,830	$1,530,000	$180,000	$11,070,000	$255,000	$16,402,830
Consolidated PSAP	12	$740,000	$11,000	$1,440,000	$24,000	$1,080,000	$90,000	$7,195,312	$180,000	$11,072,719 *
Potential Cost Savings		**$280,000**	**$55,000**	**$600,000**	**$217,830**	**$450,000**	**$90,000**	**$3,874,688**	**$75,000**	**$5,330,111**

*The Consolidated PSAP total cost includes a 5 percent contingency and escalation to midpoint of construction of $312,407.

For Sussex County, it is prudent to begin planning how to fund and develop the consolidated PSAP and County Emergency Operations Center (EOC) as Internet Protocol (IP)-capable through upgrading, replacing or adding appropriate technology. To house and protect this technology and the PSAP and Office of Emergency Management (OEM) staff, an appropriately hardened facility is needed. This facility must be of sufficient capability and capacity to support public safety emergency communications, response and recovery countywide for the next ten to twenty years.

The estimated capital outlay to construct a new facility to house a countywide consolidated PSAP and co-locate the County OEM is $7,195,312, which does not include architectural fees, utilities and technology.[1]. A preliminary programming exercise[2] projected the costs to construct a 13,300 square foot facility. Formal programming will determine the actual facility size and thus affect the estimates provided in this guide. As with all County-managed debt incurred on behalf of the municipalities, the repayment of this debt will be equitably dispersed among all municipalities. The repayment distribution will be based on equalized property tax valuations.

[1] See Section *7 Costs and Funding* for an inclusive cost analysis.
[2] The preliminary programming exercise follows the appendices.

An additional capital investment is necessary to adequately equip the new consolidated PSAP with modern systems, software, equipment and hardware. Based on Kimball's current experience supporting procurement of this technology, an estimated total cost is $3,565,000.

Transition costs will involve staffing and project management costs before the PSAP becomes fully operational.

Operational costs commence once the consolidated PSAP begins operations and include salaries, benefits, support staff, training and a capital replacement fund to provide future funding toward capital improvement plans. Due to the infrastructure and support mechanisms already in place within the County, and as a natural companion to the recommendation that the consolidated PSAP be created as an autonomous County department, the ongoing operational costs would be the County's responsibility and be funded via municipal tax revenues.

One benefit of consolidating law enforcement communications and fire/emergency medical services (EMS) communications is increased access to and eligibility for grant monies. Many current and anticipated funding opportunities are based on interoperability, data sharing and multi-agency center needs as opposed to single entity, stand-alone centers. The opportunities are aimed at providing funding and support to consolidate and reduce single entity centers and interconnect services that allow for the interoperability necessary to support communications of all types at all levels.

1.3 FACILITY

The current facilities that house the six PSAPs do not appear to be of size and capacity, or have the expansion potential, to house a countywide consolidated PSAP and EOC. Sussex County citizens and response agencies are best served by a new facility constructed using industry standards and best practices.

Co-locating a countywide consolidated PSAP and a County EOC will save construction costs through shared spaces, systems and equipment, and utilities. Service efficiencies will be gained from the co-location of these services and improved coordination can be realized among the response and recovery agencies countywide.

In December, TWG representatives, Kimball and a public safety specialist architect reviewed three prospective locations under consideration for a future consolidated PSAP:

- Juvenile Detention Center (JDC), Frankford Township
- Sussex County Community College (SCCC), Newton NJ
- Wheatsworth Road, Hardyston Township

The JDC site was deemed most viable due to the ease of access, proximity to other County facilities and the potential infrastructure and cost efficiencies for infrastructure connections.

1.4 9-1-1 TELEPHONY

The Office of Emergency Telecommunications Services (OETS) has established default/alternate routing paths that are intended to provide backup layers/levels to each PSAP in Sussex County. Each PSAP receives alternative/default routed 9-1-1 calls from other PSAPs in Sussex County in a 'round robin' configuration. The greatest issue from this routing configuration is the real danger of routing 9-1-1 to and through multiple PSAPs only to have them returned to the original overloaded PSAP.

Critical issues exist in the current backup routing plans for each PSAP. The inability to process routed calls via computer aided dispatch (CAD) or to dispatch the calls is extremely dangerous. The alternate PSAPs can only identify where the call should be processed; the only available option is to transfer the calls back to the original PSAP. This 'bounce-back' call routing process is a significant threat to life and property countywide. Re-configuring the countywide 9-1-1 network in support of consolidated operations with appropriate backup routing plans will correct the current configuration and alleviate the points of failure.

An ideal time to upgrade the telephony equipment to IP-based technology is in concert with the consolidation PSAP effort. While the i3 standards that comprise Next Generation 9-1-1 (NG9-1-1) have not been released, preparing for NG9-1-1 with an IP-based solution is the first step in that direction.

1.5 RADIO SYSTEMS

Shared radio systems can improve coverage, capacity, and interoperability. Shared interoperable communications systems also allow public safety agencies to acquire advanced communications technologies that would otherwise be cost prohibitive.

It may be possible to design a countywide shared conventional very high frequency (VHF) High Band radio system by pooling the existing VHF High Band licenses and using simulcast technology. A conventional analog VHF system could be upgraded to P25[3] digital technology as funding permits.

A countywide trunked system would provide coverage and capacity to meet the County's need and provide for growth.

Understanding the funding limitations, decisions and the amount of time it will take to fully realize a countywide radio system, Kimball recommends an interim solution that requires the current radio systems to be interconnected to the planned consolidated PSAP. The County will need to determine the most cost effective method to access each radio system from the new consolidated PSAP.

A tower structure will be required at or near the consolidated PSAP. Connectivity to existing repeaters and remote transceivers through the use of radio frequency (RF) control stations and ultra high frequency (UHF) link radios will require numerous antennas. The least expensive solution for antenna installation would be a tower co-located at the PSAP, which could provide power and backup power. Until the location of the consolidated PSAP is selected, it is not possible to determine whether space and other

[3] P25 is a set of standards for digital radio communications for use by public safety agencies that will enable the agencies to communicate with other agencies (federal, state, local) and mutual aid during critical incidents.

environmental conditions would permit building a tower at the PSAP; however, the two viable evaluated sites (JDC and SCCC) each appear to have adequate space for a tower.

Constructing a freestanding 180 foot tower would cost approximately $175,000. As there would be some reuse of existing control stations, it is difficult to specify the exact number of new RF control stations required. Budgeting $50,000 for RF control stations and antennas systems for the control stations and UHF links would be reasonable.

Microwave can provide a cost effective solution to providing the capacity required to support multi-channel radio systems, such as a trunked radio system. Microwave can also provide the stable connectivity to support multi-site simulcast technology.

As the County moves to a consolidated PSAP, it is likely that, for the foreseeable future, the ownership and maintenance of the radio infrastructure will remain the responsibility of the various licensees. This should be clarified in a radio system control agreement for the consolidated PSAP. Kimball recommends the County assume the connectivity costs to ensure technological consistency and to establish clear responsibilities for radio resource maintenance.

1.6 COMPUTER AIDED DISPATCH (CAD)

During the technology planning phase of the County's consolidation effort, a thorough review of the functions, features and performance of the CAD system will determine if the current CAD system will support a consolidated operation.

Negotiations with the current CAD vendor will determine the cost per console to upgrade and merge the existing licenses. An estimated upgrading cost is not attainable at this time as there are too many variables within existing systems, features and functionality. Such an upgrade will most likely be less costly than purchasing a new CAD system.

If a new CAD system is required, an estimated budgetary cost is estimated to be $1,080,000.

1.7 STAFFING

The anticipated capacity of the consolidated PSAP will require multiple layers of management to properly address the vital components needed to provide service to the community.

Kimball recommends hiring a communications director/manager with substantial experience directing/managing a full service consolidated PSAP. The director/manager can then begin identifying necessary administrative positions and develop an appropriate qualification and hiring process for the operational staff positions.

Kimball recommends the County consider hiring technical support staff that would report to consolidated PSAP management, be knowledgeable of and responsible for all facets of the PSAP operation, and be available 24/7 through an on-call schedule.

Kimball calculated the minimum projected staff needed in a countywide consolidated PSAP to be 51. This projection represents no less than 22 staff certified as call takers, 17 certified as law enforcement dispatchers, 6 certified as fire and EMS dispatchers, and 6 operations supervisors. These are the full time equivalent (FTE) employees needed to staff up to four call take positions, three law enforcement dispatch positions, two fire/EMS dispatch positions and one supervisor position 24 hours a day. The existing staff of the participating agencies can be expected to fill at least 90 to 95 percent of the necessary personnel in the consolidated PSAP. Kimball recommends creating a professional development path through certification at varying levels of skills, title, and pay.

If operations were to consolidate under the current workload and call statistics, ten fully equipped console positions would be staffed, four of which would be available for call taking 24 hours a day to meet the projected and anticipated call volume. Together, 12 fully/partially equipped console positions, which include 2 for training, are needed, with space to increase to 14.

1.8 OPERATIONS

Currently, 9-1-1 emergency calls are initially processed through one of six PSAPs. At times multiple call transfers are necessary to complete a multi-agency, multi-jurisdictional response. The impact of this call processing methodology is not only detrimental to the caller, but to the responders.

Kimball recommends a combined duty floor operation staffed by multiple levels of cross-trained staff. A call processing flow is recommended that facilitates appropriate and free interaction and coordination among disciplines. Consolidating operations can potentially decrease response time due to a true call taker and dispatcher environment, more accurate caller location identification, better coordination of resources and direct access to mutual aid.

The consolidated model will improve the service provided to callers by potentially reducing the overall response times and the number of times a caller is queried, by reducing the multiple points of failure, and by creating, in essence, one geographic response area.

During incident command situations and long-term and/or large-scale events, the ability to quickly coordinate responses and shared resources with OEM will be greatly enhanced in a consolidated PSAP with the appropriate training, protocols and up-to-date reference material readily available.

Many non-emergency/administrative functions are handled by the existing PSAPs. Functions that are not relative to the processing of 9-1-1 calls will continue to be handled at the local level by the agency or municipality. During the planning phase, all jurisdictions will need to evaluate and determine how best to handle non-emergency/administrative needs, both common and unique.

The anticipated new capabilities and services from NG9-1-1 will impact PSAPs. The impact will be felt by PSAP leaders and frontline operational staff. Determinations will be needed on how to develop or alter PSAP policies, procedures, protocols and training to accommodate NG9-1-1 capabilities and services. The human factor must be considered throughout so that staff is well prepared for new or altered protocols and methods for locating callers, routing information, new equipment, services, functions and features.

1.9 BACKUP CAPABILITIES

Through interviews with OEM and County staff, Kimball ascertained that Sussex County plans to work with Warren County on developing a backup plan in which Warren County's consolidated PSAP provides backup to Sussex County's anticipated consolidated PSAP. As a short term backup plan, this is appropriate as Warren and Sussex Counties have similar demographics. Unfortunately, the similar demographics and workload will make it difficult for Warren County to operate as a long term backup to Sussex County; this will also make it difficult for Sussex County to backup Warren County long term. Utilizing Warren County as a long term backup to Sussex County may not be feasible due to similar workload and capacity. The concept of maintaining one of the larger PSAPs as an overflow/training/special operations site can augment any short- or long-term plan. Neither option will sustain Sussex County long term. Consideration will need to be given to substantial long-term backup planning and should be included in the planning phase of consolidation.

1.10 NEXT STEPS

To advance towards consolidation, the County and participating PSAPs should maintain the current momentum by progressing directly into the planning and implementation phases. The success of this phase and its individual components will have a direct impact on the success of the consolidation initiative.

1. Determine direction of the Board of Chosen Freeholders and obtain commitment from all stakeholders to proceed with the planning phase. Coinciding with commitments, site selection should occur.

2. Hire a manager/director. The County, TWG and User-specific Work Groups should work together in the hiring process to name a director who will assist in accomplishing the operational objectives of consolidation.

3. Task A - Develop transition and migration plans in alignment with construction schedules.

   Task B - Identify a suitable backup / alternate site and plan as soon as practical. Backup plans should include several layers of contingency planning.

   Task C - Converge and develop common policies and procedures, and protocols in support of the new consolidated operation. Training and Quality Assurance/Quality Control (QA/QC) programs should be developed in conjunction with this effort.

4. Hire a deputy director to begin working with the director.

5. Task A - Develop and implement two-phase hiring process that will identify qualified employees from participating PSAPs and identify qualified candidates from external hiring pools to fill available positions. Pay and benefits equalization within the County's classification and benefits system should be addressed for transitioning employees.

   Task B - Continue filling remaining administrative, management and support positions.

Task C - Begin implementation of new technology.

Task D - Train employees on new systems and protocols.

6. Task A - Adjust and implement final migration plans as facility occupancy is allowed and systems installation and cutover dates can be confidently projected.

   Task B - Direct transition from the individual PSAPs into the consolidated PSAP.

Due to the magnitude of undertaking a multiple PSAP consolidation, the County should consider using experienced, professional third-party assistance during the planning and implementation phases.

2. REPORT SUMMARIZATION

In February 2009, the County commissioned Kimball to expand upon previous consolidation studies completed at the state and local level to develop guidance and support for the planning and implementation of a countywide consolidated PSAP. Kimball sent a project manager and team to Sussex County in March 2009 to gather data and statistics, inventory and assess technology, and observe operations. From this effort a final report was delivered to the County in October 2009. Unfortunately, the work was unsatisfactory and lacked integration to the original scope, failing to provide direction and guidance for County staff toward consolidation. In November 2009, the County met with Kimball executives and allowed Kimball to deploy a second team to take corrective actions.

The information gathered during March 2009 was augmented by extensive meetings and conference calls during and following the week of December 14, 2009. Working with the local experts represented in the TWG and the County Administrator, Kimball was able to redefine the scope to meet the current needs of the County and stakeholders.

Kimball developed this planning guide by working closely with the TWG, reviewing the statistics and data gathered in March 2009, and discussing technology needs with appropriate stakeholders and technical support staff. Kimball used a phased approach and process to develop the guide in sections, allowing the County representatives to review and provide feedback quickly. As the process moved forward, revisions were made as needed. The resulting planning guide meets the expectations of the TWG, County staff and key stakeholders.

The planning and implementation items that require specification attention and action by the County and stakeholders are detailed within titled sections of this report. All are critically important to the success of consolidation in Sussex County.

2.1 GOVERNANCE

The success of any PSAP consolidation begins with the development of an appropriate governance structure. The ability of all affected stakeholders to have input to the consolidation process and, where appropriate, into the operational and administrative oversight of the resulting organization is vital to the success of the re-configuration.

The most cost effective method for the County will be to organize the consolidated PSAP as a County department. As a County department the consolidated PSAP can take advantage of established, neutral and well-regulated services. It is also important to identify the consolidated PSAP as autonomous from daily operational oversight from specific law enforcement, fire or EMS entities. This sense of autonomy will create and sustain proper purpose, direction and neutrality.

The Board of Chosen Freeholders, as the County's governing body, sets policy and provides direction for program priorities and the allocation of resources. The County Administrator has the responsibility to implement the policy directives as set forth by the Freeholders. Kimball recommends utilizing the authority of the Board of Chosen Freeholders, through the County Administrator, to direct, manage and guide the consolidated PSAP. This authority should be augmented by operational and policy oversight

from discipline-specific work groups. These work groups should be established to represent agencies to be served by the consolidated PSAP and to provide the following support: guidance on overall strategic direction, setting overall parameters, providing high-level guidance and status review, and assisting the director/manager and municipalities in decision-making.

The PSAP director/manager will be a department head reporting directly to the County Administrator. To properly address the vital components needed to provide service to the community, the consolidated PSAP will require several layers of management, which may include: technical support, QA/QC, training coordinator/supervisor, operations/shift supervisors, training officers/assistant supervisors and a Terminal Agency Coordinator (TAC).

2.2 COSTS AND FUNDING

OETS funds and provides the network, mapping and contribution to the salary of the County 9-1-1 Coordinator position. In Sussex County, the cost to operate the six PSAPs is the responsibility of the individual municipalities. The municipalities also bear all capital and operational costs, including facilities and related costs, systems and equipment, and personnel-related costs. The County does not provide operational funds to the existing PSAPs. The County does fund the Sheriff's Office public safety dispatch point (PSDP) and County OEM.

The table below contains the total budget and contract fee information as provided by each PSAP.

PSAP	2009 Budget including Contract Fees[1]
Andover	$505,530
Hardyston	$314,000
Hopatcong	$901,898
Newton	$1,180,508
Sparta	$1,268,774
Vernon	$692,411
Total	**$4,863,121**

[1] Byram and Stanhope recently transitioned services to Sparta Township. This transition shifted the contract fees from Hopatcong to Sparta.

Current known and estimated PSAP costs, when compiled, form the basis for cost projections to individually improve equipment, systems and operations in preparation for NG9-1-1. The resulting individual costs projections can be compared to the cost at the county level to implement a countywide consolidated IP-enabled PSAP. Comparing individual improvement costs to the development costs of a single consolidated PSAP illustrates the cost efficiencies and potential cost savings of consolidation. This information will assist stakeholders in planning and budgeting for NG preparations. Kimball cautions that comparing these costs is not a true "apples-to-apples" comparison as many benefits associated with consolidation cannot be achieved by maintaining multiple PSAPs.

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Individual PSAPs	Number of Positions	IP-enabled 9-1-1 Telephone	Admin Phone System	Radio Dispatch Control System	Network & Connectivity Costs	CAD	Logger	Facility	Ergonomic Dispatch Furniture	Total Cost
Andover	2	$120,000	$11,000	$240,000	$44,300	$180,000	$30,000	$1,640,000	$30,000	$2,295,300
Hardyston	2	$120,000	$11,000	$240,000	$44,330	$180,000	$30,000	$1,640,000	$30,000	$2,295,330
Hopatcong	2	$120,000	$11,000	$240,000	$44,300	$180,000	$30,000	$1,640,000	$30,000	$2,295,300
Newton	3	$180,000	$11,000	$360,000	$44,300	$270,000	$30,000	$2,050,000	$45,000	$2,990,300
Sparta	6	$360,000	$11,000	$720,000	$20,300	$540,000	$30,000	$2,460,000	$90,000	$4,231,300
Vernon	2	$120,000	$11,000	$240,000	$44,300	$180,000	$30,000	$1,640,000	$30,000	$2,295,300
Total		$1,020,000	$66,000	$2,040,000	$241,830	$1,530,000	$180,000	$11,070,000	$255,000	$16,402,830
Consolidated PSAP	12	$740,000	$11,000	$1,440,000	$24,000	$1,080,000	$90,000	$7,195,312	$180,000	$11,072,719 *
Potential Cost Savings		**$280,000**	**$55,000**	**$600,000**	**$217,830**	**$450,000**	**$90,000**	**$3,874,688**	**$75,000**	**$5,330,111**

*The Consolidated PSAP total cost includes a 5 percent contingency and escalation to midpoint of construction of $312,407.

See Section *7.2 Cost Comparison* for supporting information and descriptions of what these costs specifically represent.

In concert with establishing governance for a consolidated PSAP and County EOC is determining how the effort will be funded. Three prime funding areas need to be addressed in planning a consolidation: temporary capital costs, transition costs, and ongoing operational costs.

Capital costs may include land acquisition, and facility programming, design and construction. Other consolidation capital costs to be considered include start-up costs associated with equipping the primary site and the alternate/backup site with built-in redundancy.

The estimated capital outlay to construct a new facility to house a countywide consolidated PSAP and co-locate the County OEM is $7,195,312. This estimate is based on a preliminary programming exercise, which follows appendices, that projects costs to construct a 13,300 square foot facility at $410 per square foot. As with all County-managed debt incurred on behalf of the municipalities, the repayment of this debt will be equitably dispersed among all municipalities. The repayment distribution will be based on equalized property tax valuations.

An additional capital investment is necessary to adequately equip the new consolidated PSAP with modern systems, software, equipment and hardware. Based on Kimball's current experience in supporting procurement of this technology, an estimated total cost is $3,565,000. Approximately $2,000,000 may be attainable through existing technology grants. Aside from requesting additional grant funding, two other options exist for funding the remaining estimated $1,565,000. Option 1 is to fund the technology improvements within the same capital plan as offered for the facility capital outlay. Option 2 is to equitably distribute a one-time technology improvement cost among all municipalities.

Transition costs will involve staffing and project management costs before the PSAP becomes fully operational. These costs may include initial personnel costs to hire a director/manager and other administrative staff, training and equipping staff, planning services and project management, and the physical move of personnel following hiring, training and acclimation periods. The County may bear transition costs to cover early hiring of high-level staff and project management services. The participating agencies could bear their respective personnel costs (including necessary overtime) for the initial consolidation-related staff training prior to the cutover date. This arrangement will provide a distinct start/stop point for financial responsibility of the oncoming staff.

Operational costs commence once the consolidated PSAP begins operations and include salaries, benefits, support staff, training and employee-specific equipment and supplies (uniforms, headsets, etc.), system/equipment maintenance, other indirect costs, and a capital replacement fund to provide future funding toward capital improvement plans, such as lifecycle replacement of systems and equipment, NG9-1-1 upgrades, and building upkeep and improvements. Due to the infrastructure and support mechanisms already in place within the County, and as a natural companion to the recommendation that the consolidated PSAP by created as an autonomous County department, the ongoing operational costs would be the County's responsibility and be funded via municipal tax revenues.

2.3 GRANT FUNDING

One benefit of consolidating law enforcement communications and fire/EMS communications is increased access to and eligibility for grant monies. Many current and anticipated funding opportunities are based on interoperability, data sharing and multi-agency center needs as opposed to single entity, stand-alone centers. The greatest grant opportunities will come from establishing partnerships and mutually supportive relationships with neighboring jurisdictions and state and federal agencies/entities, which could lead to future regionalization.

Opportunities for grant monies can come from the Department of Homeland Security for federal programs, regionalization, data sharing and interoperability and the PSIC grant program. Consolidation is the ultimate interoperability effort. Through consolidation, Sussex County can continue to be

fundamentally important to the region by supporting and potentially further qualifying the region for interoperability grants.

Future funding opportunities can accompany converging networks into a system-of–systems, commonly referred to as NG9-1-1. The goal for a next generation emergency services network is the ability to communicate from "any device, anywhere, anytime."

A next generation system-of-systems in a consolidated environment has the potential to dramatically support and improve homeland security in the region and can increase revenue opportunities. The technology trends and increase in how location-based services are and can be used to enhance public safety-related services, including the ability to obtain data and images from the public, provides an opportunity for the County to improve service delivery, reduce operating costs and create new revenue opportunities. Funding opportunities that directly support these advancements include the National Telecommunications and Information Administration/Department of Transportation (NTIA/DOT)-supported Enhanced 9-1-1 (E9-1-1) Act that supports voice over IP (VoIP) and wireless upgrades to PSAPs with an initial grant round of $250,000,000. Interoperability grants, such as the data interoperability component of the current PSIC grant program provides the lion's share of funding to the Urban Area Security Initiative (UASI) regions. Sussex County may be able to benefit from the New York/New Jersey UASI through potential additions to the statewide voice and data Emergency Services IP network (ESInet). Using the existing state systems will provide cost savings on infrastructure. Future state initiatives may also expand into Sussex County. This prospective funding will support many of the initiatives that include data interoperability components.

The County OEM staff submitted a grant application for the Federal Emergency Management Agency (FEMA) FY2010 EOC Grant Program. The FEMA EOC grant program "…provides funding for the construction or renovation of a state, local or tribal governments' principal EOC." The fact that Sussex County does not currently have a county EOC may also improve chances of an award.

The American Recovery and Reinvestment Act (ARRA) of 2009 is intended to stimulate demand for broadband, growth and jobs. Within this grant program are components that specify improvements to public safety communication systems as part of state, region or local broadband access and networks. The key to a successful award of these funds is creativity through unique partnerships that are beneficial to the community(s) served, specifically where job creation is a goal.

Opportunities exist to jointly apply for funding with federal agencies/organizations; DOT; hospitals and health care providers; school boards; recovery agencies, such as the local American Red Cross; public utilities and public/private partnerships. A myriad of networks currently exist in the County that should be viewed as opportunities to find ways to share networks. These opportunities can be developed into applications for broadband grants.

Additional Department of Homeland Security Grant opportunities are the Metropolitan Medical Response System (MMRS) Program and the Interoperable Emergency Communications Grant Program (IECGP). Both programs are viable methods of obtaining funds to further interoperable voice and data communications.

Legislative provision (earmarks) for funding all or a portion of the capital costs may be possible, but there is no assurance that a specific amount will be awarded, and developing the relationships with state representatives may take years.

2.4 FACILITY

The current facilities that house the six PSAPs do not appear to be of size and capacity, or have expansion capabilities, to house a countywide consolidated PSAP and EOC. To move forward with consolidation, a new facility will be necessary or an existing suitable building of sufficient size would have to be located and renovated. Any existing facility would need an in-depth analysis to determine what, if any, renovations would be needed and to estimate the associated costs for those renovations. While initially renovation seems like the less expensive path, it can be more expensive than new construction. Renovation costs can be high when attempting to bring an existing older building up to current codes required for a modern hardened facility.

TWG representatives, Kimball and a public safety specialist architect reviewed three prospective sites for a future consolidated PSAP: Juvenile Detention Center (JDC), Frankford Township; Sussex County Community College (SCCC), Newton NJ; and Wheatsworth Road, Hardyston Township. The JDC site was deemed most viable due to the ease of access, proximity to other County facilities and the potential infrastructure and cost efficiencies for infrastructure connections.

The site evaluation report and sketch site plans follow the appendices.

Kimball and architect Tim Lisle of Jacobs Wyper Architects conducted a preliminary programming exercise with County and TWG representatives to determine the approximate sized facility and a projected budgetary cost. Projecting accurate new facility costs requires a much higher level of detail and planning; however, broad budgetary numbers can be developed to be used as a planning starting point for the County.

To determine the budgetary numbers below, Kimball combined industry best practices, average construction costs per square foot, and the preliminary programming[4] of the facility. The budgetary construction cost of a ~13,300 square foot facility to house the PSAP and County EOC is approximately $7,195,312. This figure does not include architectural fees, utilities and technology. As with any planning estimate, costs will need to be adjusted once a complete and in-depth space programming study is completed and other decisions regarding amenities and number of work positions are made.

2.5 9-1-1 TELEPHONY

2.5.1 Current 9-1-1 Backup Routing Plans

Critical issues exist in the current backup routing plans for each PSAP. OETS has default/alternate routing paths intended to provide backup layers/levels to each PSAP in Sussex County. The plans also contain a ten-digit alternate number that was disconnected approximately four years ago. Each PSAP receives alternative/default routed 9-1-1 calls from other PSAPs in Sussex County in a 'round robin' configuration. This configuration is dangerous as calls received by an alternate PSAP cannot be processed. For the most part, the alternate PSAP is unable to log (via CAD) or dispatch the calls for service, which is extremely dangerous. The greater issue from this routing configuration is the real danger of routing 9-1-1 to and through multiple PSAPs only to have them returned to the original

[4] The preliminary programming exercise follows the appendices.

overloaded PSAP. This 'bounce-back' call routing process is a significant threat to life and property countywide.

The most critical time this issue will emerge is during periods of man-made or natural events when the PSAPs are overwhelmed. In 2000, flooding and landslides in Sussex County took out 9-1-1 access to several PSAPs. 9-1-1 calls were fielded by other PSAPs in the county and relayed back via ten-digit lines and dispatched via portable. This is not the time for the system to fail. This alone should be a driving force for pursuing consolidation. Man-made or natural catastrophic events will most likely create an overflow, but mutual aid agreements and appropriate and updated alternate routing plans should be in place to properly address these infrequent or rare occasions.

2.5.2 9-1-1 Network

The consolidated PSAP will allow for the significant reduction of 9-1-1 trunks from each tandem. Currently each PSAP has two trunks from each tandem; while only one trunk may be needed, Verizon recommends two so there is a backup. This diversity is important for a small PSAP, but will not be needed if consolidation occurs. The consolidated PSAP will be provisioned with more than two trunks from a tandem.

The six PSAPs all utilize KML 9-1-1 equipment; installation of the equipment occurred in 2004. As the systems and PCs have been in use for five years, now is the time to explore upgrading or replacing the systems with an IP-based technology to prepare for NG9-1-1. The i3 standards that comprise NG9-1-1 have not been released, but an IP-based solution is the first step in that direction. Some view this as an i3-ready interim solution that will allow PSAPs to connect directly to ESInet services once ESInets are in place at the county or state level. Investing in an IP-based solution will also allow integration with an ESInet without additional investment in interfacing hardware and will aid in the system support of the i3 standards when released.

NG9-1-1, when available, will allow the general public to make a 9-1-1 call from any wired, wireless or IP-based device (wireless phones; short message service (SMS); video; text messaging from personal digital assistants (PDAs), Blackberrys, etc; telematics, such as On-Star; and medical devices) and allow the emergency services community to take advantage of advanced call delivery and other functions through new internetworking technologies based on open standards. Callers will route automatically, based on location, to the correct PSAP. NG9-1-1 will also allow additional paths to send data flow downstream to CAD, EOCs, hospitals and other supporting sites.

2.6 RADIO SYSTEMS

Just as service efficiency and effectiveness are enhanced by consolidating PSAP resources, consolidating radio resources improves communications efficiency and effectiveness. Shared radio systems can improve coverage, capacity, and interoperability. Shared interoperable communications systems also allow public safety agencies to acquire advanced communications technologies that would otherwise be cost prohibitive.

The County's terrain and location present challenges for designing and implementing public safety radio systems. The mountainous terrain is an impediment to providing wide area coverage from tower sites.

The proximity to the urban centers of New York City and Philadelphia results in serious constraints on available frequencies to expand existing systems. In addition to licensing constraints, existing frequencies may not be suitable for use in trunked radio systems because of co-channel interference. Consolidating existing licenses for use in a shared system would provide a pool of frequencies upon which to build a shared VHF High Band system. However, modifying these licenses will still require coordination to be licensed at new sites, which may present obstacles. The existing VHF High Band frequencies may not be suitable for use in a trunked radio system.

It may be possible to design a countywide shared conventional VHF High Band radio system by pooling the existing VHF High Band licenses and using simulcast technology. A conventional analog VHF system could be upgraded to P25 digital technology as funding permits. Any conventional system solution would have to be assessed to determine whether it would meet existing and future capacity needs.

A countywide trunked system would provide coverage and capacity to meet the County's need and provide for growth. A recent development that might provide the County with another option for developing a countywide P25 trunked radio system is the construction of a P25 700 MHz trunked radio system in the Newark UASI area in northern New Jersey. This shared interoperable radio system is being funded by the federal Public Safety Interoperable Communications (PSIC) grant program and is being constructed for use by local agencies with the expectation that agencies can use the system's master site to build out local systems and enhance coverage to meet local requirements. Building a countywide trunked radio system using the UASI system master site could save the County a large expense and may assist in developing a strategy for a phased build-out in the county. Since the 700MHz system is an overlay of the existing New Jersey State Police radio system, there are sites that service Sussex County. Potentially three ridge-level sites on the Morris and Sussex Counties border may provide coverage to all or part of Sussex County, or can be built out, or have sites added to, to provide coverage.

Understanding the funding limitations, decisions and the amount of time it will take to fully realize a countywide radio system, Kimball recommends an interim solution that requires the current radio systems to be interconnected to the planned consolidated PSAP, which means that connectivity to these radio resources will have to be re-routed. The County will need to determine the most cost effective method to access each radio system from the new consolidated PSAP.

To fully realize all cost and service efficiencies, operational and systems consolidation should include the Sheriff's Office. If the Sheriff's Office remains a standalone dispatch point beyond the cutover of the consolidated PSAP, then the primary Sheriff's dispatch channel and the County Prosecutor's repeater can be accessed by RF control station. If access to other County radio resources is required, tie lines would have to be installed to the transceiver sites or to the Dispatch Center.

2.6.1 Tower Requirement

A tower structure will be required at or near the consolidated PSAP. The height and type of tower to be constructed depend on the planned use of the tower. Connectivity to existing repeaters and remote transceivers through the use of RF control stations and UHF link radios will require numerous antennas. The least expensive solution for antenna installation would be a tower co-located at the PSAP, which could provide power and backup power.

Until the location of the consolidated PSAP is selected, it is not possible to determine whether space and other environmental conditions would permit building a tower at the PSAP; however, the two evaluated sites (JDC and SCCC) each appear to have adequate space for a tower. If a tower cannot be constructed immediately adjacent to the consolidated PSAP, connectivity from the PSAP to the tower will be required. A remote tower location might require a microwave, fiber optic, or T1 link from the PSAP to the tower.

Microwave connectivity to a network of tower sites would be desirable. A tower at the PSAP may need to support one or more microwave antennas (dishes) in the future. Depending on the location of the consolidated PSAP, this tower might be used as a transmitter site for a countywide radio system. These factors, as well as the ground elevation and terrain, would need to be considered when determining how large a tower to construct at the PSAP.

Given the uncertainties associated with future tower usage, Kimball recommends a 180 foot tower as a benchmark for budgetary purposes. A 180 foot tower would not require Federal Communications Commission (FCC) tower registration and Federal Aviation Administration (FAA) approval. A 180 foot tower should accommodate the necessary control station/UHF link antennas and most microwave applications.

Constructing a freestanding 180 foot tower would cost approximately $175,000. A tower constructed at a remote location would require site development costs and the need for a shelter and backup generator. These additional costs would depend on the location and distance from the consolidated PSAP.

2.6.2 UHF RF Links

It may be possible to move the existing equipment from the current PSAPs to the consolidated PSAP. Maintaining radio service during the transition would need to be considered. Depending on the condition of the existing antennas, it may be desirable to install new antennas.

2.6.3 RF Control Stations

As with the UHF link radios, it may be possible to move the existing equipment to the consolidated PSAP. However, since the existing PSAPs are located at police departments, these police agencies will probably wish to keep at least one RF control station at their respective location to access their own radio system.

Kimball estimates that approximately 20 RF control stations would be required to connect to existing radio systems in the county. A standalone RF control station at each console position would be desirable; this would provide backup to the console. As there would be some reuse of existing control stations, it is difficult to specify the exact number of new RF control stations required. For budgetary purposes, each control station costs approximately $1,200. Budgeting $50,000 for RF control stations and antennas systems for the control stations and UHF links would be reasonable.

Given the number of repeaters that must be accessed by RF control stations at the consolidated PSAP, it would be desirable to reduce the number of control station antennas on the PSAP's tower by sharing antennas.

2.6.4 Radio Resource Ownership and Maintenance

Under existing arrangements with the six PSAPs, the radio resources are owned by local governments and public safety agencies. Most of the infrastructure is owned by the licensees. That is, the non-leased towers, water tank structures, repeaters and base stations are owned and maintained by townships and boroughs. In some cases, individual public safety agencies may own repeaters and base stations.

As the County moves to a consolidated PSAP, it is likely that, for the foreseeable future, the ownership and maintenance of the radio infrastructure will remain the responsibility of the various licensees. This should be clarified in a radio system control agreement. The responsibility for the costs of establishing connectivity to the existing radio resources should also be addressed. Kimball recommends the County assume the connectivity costs to ensure technological consistency and to establish clear responsibilities for radio resource maintenance.

2.6.5 Radio Dispatch Channels

Stakeholders recognized that in a consolidated PSAP it would be desirable to structure radio dispatch channels to ensure that dispatchers could effectively manage the radio resources. Too many individual radio channels require dispatchers to listen to multiple channels; this can cause a risk that responders on different channels vie for the dispatcher's attention at the same time. In the future radio zones might be established within the county to effectively partition radio communications.

2.6.6 Microwave Connectivity

As the County looks toward the various options for developing a countywide radio system and the need for connectivity among radio towers, a microwave backbone should be considered. Microwave can provide a cost effective solution to providing the capacity required to support multi-channel radio systems, such as a trunked radio system. Microwave can also provide the stable connectivity to support multi-site simulcast technology. Microwave connectivity might also be desirable between the new consolidated PSAP and any backup PSAP.

2.6.7 Countywide Simulcast Paging System

Kimball reviewed the design for a countywide VHF simulcast paging system submitted to the County. The proposed multi-site simulcast tone and voice paging system should address many of the County's paging problems. It would be highly desirable if the paging system could be designed in conjunction with a countywide radio system so that the same tower sites would be used and a microwave backbone could be shared by the voice radio system and the paging system.

2.7 COMPUTER AIDED DISPATCH (CAD)

In a PSAP, the CAD system assists call take and dispatch personnel in handling, prioritizing, routing, controlling and dispatching calls and emergency services personnel. In a consolidated PSAP, the selected CAD system must accommodate multiple jurisdictions and agencies, numerous call types and provide interfaces to other jurisdictions; local sub-systems (mapping, mobile data, E9-1-1, fire station alerting,

paging, etc.); state and federal databases, including the New Jersey State Criminal Information Center (SCIC), National Crime Information Center (NCIC), and the National Law Enforcement Telecommunications System (NLETS); and various third-party software providers, such as police and fire/rescue records management systems (RMS). The CAD needs to be sized appropriately to meet existing and future performance criteria and to provide sufficient on-line incident history.

In Sussex County, the six PSAPs use various versions of Enforsys CAD. Based on discussions with the TWG, the PSAPs appear to be satisfied with the existing CAD solution.

2.7.1 Consolidated PSAP CAD Needs

To address the needs of the PSAP and served agencies, the desired CAD functions, features and performance should be defined and documented, and a review of the current CAD system's capabilities and capacity conducted.

Kimball understands that the county police chiefs are working toward upgrading the Enforsys RMS versions countywide to better facilitate data interoperability. This foresight provides an opportunity to upgrade the Enforsys CAD software versions and eventually merge the CAD applications into a single system to serve a consolidated PSAP.

During the technology planning phase of the County's consolidation effort, a thorough review of the functions, features and performance of the CAD system will determine if the Enforsys CAD system will support a consolidated operation.

To ensure end user acceptance of a consolidated PSAP, Kimball strongly recommends that any existing CAD functionality is not lost once the consolidated PSAP is brought on-line; this includes inquiry, reporting and view incident capabilities.

Kimball recommends engaging in conversation with Enforsys about their current or future capability to support a countywide multi-jurisdictional, multi-agency PSAP. A cost benefit to engaging Enforsys in discussions toward a consolidated CAD solution is the potential to purchase software upgrades and system migration support off an existing contract(s). Another approach may be to include CAD feature and function discussions in conjunction with the county police chiefs' data interoperability plans to seek funding to bring all county law enforcement agencies to the same version of Enforsys RMS and to interconnect the RMS systems. A joint effort to upgrade CAD/RMS countywide may help those seeking uniform RMS and the consolidated PSAP's need for a robust CAD system. Opportunities for grant-funding a CAD/RMS upgrade/replacement may arise through any future plans to further regionalize data interoperability, such as approaching neighboring counties or other levels of government response (state, federal) for data sharing opportunities.

The life cycle of a CAD system is three to five years; as such, Kimball recommends holding conversations with Enforsys to determine their direction and capabilities toward potentially supporting a consolidated PSAP. When a new CAD system is necessary, plans should include discussions and specifications that support anticipated NG functions.

Should Enforsys be unable to fully support a countywide multi-jurisdictional, multi-agency consolidated PSAP, an existing Enforsys contract cannot be used or does not provide significant cost benefits or a new

Enforsys contract cannot be successfully negotiated, Kimball recommends the County procure a new CAD system using a full competitive request for proposal (RFP) selection and procurement process. Negotiations with Enforsys will determine the cost per console to upgrade and merge the existing licenses. An estimated upgrading cost for Enforsys is not attainable at this time as there are too many variables within existing systems, features and functionality. Such an upgrade will most likely be less costly than purchasing a new CAD system.

If a new CAD system is required, an estimated budgetary cost is $90,000 per position. The total new system cost will depend on the number of positions at the consolidated PSAP and at the backup site. Using the projected number of positions in a consolidated PSAP of 12, which includes supervisor and training positions, the cost of a new CAD system for a primary consolidated PSAP is estimated to be $1,080,000.

The costs associated with preparation for upgrading or replacing a CAD system to accommodate multiple interfaces that may be necessary in an IP-based PSAP environment cannot be quantified at this juncture. The current cost estimates are projected to provide the PSAP with the most current CAD technology available. Less functionality and/or features may mean less cost. Future upgrades to or plans to replace the current system can be considered and planned for once the capabilities and capacity are known and tested.

2.7.2 NG9-1-1 Impact on CAD

The focus of preparing for NG9-1-1 is the development of standards for receiving emergency requests from IP-based communications devices into 9-1-1 systems. Once this is accomplished, the focus will be on processing the information through a CAD system. Future CAD interfaces necessary to support public and responder expectations do not yet exist in mainstream available (off-the-shelf) CAD systems. At best, these interfaces only exist in test products or as separate software applications requiring separate PCs for monitoring.

The NG9-1-1 impact on CAD and RMS will be profound. The role of nerve center and information traffic routing currently managed by the CAD system will exponentially increase as information, routing methods, public expectation and technological advancements in communications devices change and grow. With or without final standards in place for NG9-1-1, any expansion capabilities within a CAD system will be customized to individual agencies. In the future, PSAPs will be able to choose the applications and information to receive based on population, trends and public expectations. With each decision made toward NG9-1-1 IP-based systems for routing and processing calls, the same consideration should be placed on improving the CAD component (call processing and handling of information). It is imperative that all incoming NG9-1-1 data be routed to the CAD system to avoid fragmentation and loss of incident information.

2.7.3 Backup Site CAD Needs

In a countywide consolidated PSAP, the County will need a backup site should the PSAP experience a service interruption or need to be evacuated. The future backup plans for Sussex County involve a partnership and mutual aid agreement with neighboring Warren County. Regardless of the physical location of a backup site, a backup CAD server should be installed at the alternate site and sufficient connectivity put in place so that real time data can be transferred back and forth, and be installed at a mutually agreed upon alternate site within the county limits that will be shielded from whatever service

interruption the primary server may experience. A current PSAP could be used as a secondary backup or training site and house backup equipment. If possible, any existing or future county network (fiber, microwave) should be used for connectivity; if not, leased lines could be necessary, requiring additional and possibly significant monthly recurring costs.

2.7.4 RMS

While an RMS is not a PSAP function, it is vital that substantial advance planning and coordination occur to assure that appropriate interfaces exist and are available in order for a CAD to transfer incident data and/or provide a central repository for local systems to pull their specific incident data. Failure for a new or upgraded system to do so will adversely affect the agencies' administrative and supervisory operations. Such complications will detract from the overall acceptance of the consolidation project if they are not addressed and ultimately supported. If possible, it is always advantageous to have all the agencies utilizing the same RMS system and for that application to be a module of the same CAD system.

2.8 STAFFING

2.8.1 Management and Support Staff

The anticipated capacity of the consolidated PSAP will require multiple layers of management to properly address the vital components needed to provide service to the community. The management staff role in the planning, implementation and transition phases should be significant toward policies and procedures development, budget planning and personnel-based operations (training and protocols). Management staff should include the following positions:

- Director/manager
- Assistant/deputy director
- Administrative assistant
- TAC Officer
- QA Coordinator
- Training Coordinator

The QA and Training Coordinator positions and TAC responsibilities could be combined in one or more positions. The QA and Training Coordinator positions could be tasked with developing and maintaining agency policies and procedures and in the future can be jointly tasked with coordinating Commission on Accreditation of Law Enforcement Agencies (CALEA) certification preparedness.

Kimball recommends that the County, with input from the User Work Groups, conduct selection processes to locate and hire a communications director/manager with substantial experience directing/managing a full service consolidated PSAP; ideally, the director/manager will contribute to the planning and implementation phase of consolidation. Once hired, the director/manager can work with the County, with input from the User Work Groups, to begin identifying necessary administrative positions and to develop an appropriate qualification and hiring process for the operational staff positions.

2.8.2 Technical Support Staff

Systems administration and technical support for the CAD, 9-1-1 telephony, radio systems and other ancillary equipment/systems is vital in a consolidated PSAP environment and maintaining these systems in peak operating condition is a full time responsibility. Kimball recommends the County consider hiring technical support staff that would report to consolidated PSAP management, be knowledgeable of and responsible for all facets of the PSAP operation, and be available 24/7 through an on-call schedule.

2.8.3 Operational Staff

To provide efficient service to the public and local emergency services, PSAPs must ensure that an adequate number of qualified staff is on duty at all times. Service quality can diminish when this does not occur and the short- and long-term effects on staff often lead to staffing issues, overworked personnel and attrition increases.

Determining appropriate staffing levels for a PSAP is a complex process involving mathematical calculations based on quantifiable workload, such as 9-1-1 and administrative call volume and number of dispatch positions, and operational knowledge and experience to account for real but less quantifiable needs, such as shift management and oversight. The process is described in detail in Section *12.3 Operational Staff*.

2.8.4 Call Volume

Call volume is the prime factor in determining the number of trunks and workstations needed to handle a PSAP's projected workload.

The table below illustrates the average 9-1-1 call volume countywide.

9-1-1 Wireline and Wireless Calls [1]	
	Average for Past 3 Years
Andover	3,090
Hardyston	3,280
Hopatcong	3,999
Newton	11,078
Sparta	8,850
Vernon	9,037
Total Annual Call Volume	**39,334**

[1] 9-1-1 call data provided by OETS

To determine a valid estimate of non-emergency/administrative calls countywide, Kimball used known ratios from Warren County and eight counties/cities from recent consolidation/staffing studies. Based on these ratios, the estimated average number of non-emergency/administrative calls annually is 168,815.

To meet N.J.A.C. 17:24-2.3[5], staffing calculations are based on the standard to answer 95 percent of 9-1-1 calls within 10 seconds, which will require staffing 4 call taker workstations 24 hours a day.

Based on Kimball's experience with call statistics, managing consolidated centers and consolidation planning projects, the County can expect the non-emergency/administrative incoming and outgoing call volumes to decline once full consolidation is realized. This is due in part to the participating agencies retaining some of the agency-specific non-emergency and administrative functions at their respective offices and to automation of some services or shifting of responsibilities to more appropriate staff outside the emergency response operation.

2.8.5 Staffing Projections

The minimum projected staff needed in a consolidated PSAP is 51. This projection represents no less than 22 staff certified as call takers, 17 certified as law enforcement dispatchers, 6 certified as fire and EMS dispatchers, and 6 operations supervisors. These are the FTE employees needed to staff up to four call take positions, three law enforcement dispatch positions, two fire/EMS dispatch positions and one supervisor position 24 hours a day.

Countywide, the six PSAPs employ 75 operational staff: 37 full time and 38 part-time. The existing staff of the participating agencies can be expected to fill at least 90 to 95 percent of the positions in the consolidated PSAP. Through attrition and qualification procedures, the possibility exists that several staff members will not transition to the new consolidated PSAP. A hiring process will be necessary to fill any additional staff positions.

2.8.6 Shift Supervisors

Public safety best practices require 24/7 supervision. To supervise the average shift of nine or ten staff daily, Kimball recommends the assignment of one dedicated supervisor, or assistant supervisor, to each shift in order to comply with recommended/best practices as set forth by the National Fire Protection Association (NFPA) and the Department of Homeland Security as detailed in Section *12.3.5 Shift Supervisors*. A supervisory staff of 6 FTEs can cover the supervisor position 24 hours a day.

2.8.7 Workstations

The total call volume and the projected staff needed to handle this volume determine how many consoles should be dedicated to call taking in a countywide consolidated operation. Four consoles should be available for call taking 24 hours a day to meet the projected and anticipated call volume.

Kimball estimates that the consolidated PSAP will need approximately 51 FTE employees to process the total call volume and workload. This figure accommodates maintaining individual law enforcement radio channel monitoring for the largest volume agencies, Sparta and Newton. One shared channel can handle the remaining law enforcement agencies' incident volume. The incident volume for fire and EMS calls for service can be handled by one dispatcher with an assistant assigned from the cross-trained call takers or an assistant supervisor providing support during working fire and other incident command scenarios. The number of channels requiring direct monitoring may be reconfigured if the consolidated radio systems or

[5] Public Safety Answering Points: Staffing and Equipment Requirements and Operational Standards

future countywide radio system is arranged for zone dispatching.[6] The projected staffing estimate accommodates other duties that could be performed, such as placing outgoing calls in support of operations; some level of records management (e.g. SCIC/NCIC record keeping) within the center; training assignments; and monitoring of alarms, televised news and weather, and other status systems.
Currently, 17 call taker/dispatch console positions are staffed countywide. If operations were to consolidate under the current workload and call statistics, ten fully equipped console positions would be staffed: four call taker, three law enforcement dispatch, two fire/EMS dispatch and one supervisor. Two future console spaces should be included on the operations floor, which could be used for overflow during critical incidents, special operations, or training; if needed a power shift could be staffed at these consoles. Two training consoles should be located off the operations floor and could be partially to fully equipped based on need and funding. Together, 12 fully/partially equipped console positions, which include 2 for training, are needed, with space to increase to 14.

The chart below summarizes projected staffing levels and console positions.

Staffing			**Console Positions**	
Certified FTEs Needed	**Number**		**Workstations Needed**	**Number**
Call Takers	22		Call Taker	4
Police Dispatchers	17		Police Dispatch	3
Fire/EMS Dispatchers	6		Fire/EMS Dispatch	2
Supervisors	6		Supervisor	1
Total	51		**Total**	10
			Training (off operations floor)	2
			Total	12
			Allowance for future growth, training consoles, or overflow	2
			Total w/allowance	14

A re-evaluation of available statistical call volume and data should be performed every three to six months during the planning and implementation phases of consolidation to ensure accuracy in staffing projections.

2.8.8 Career Path Development

To balance the needs of the consolidated PSAP with those of the projected staff and provide both career development and opportunities for those proficient in one or more roles, Kimball recommends creating a professional development path through certification at varying levels of skills, title, and pay.

[6] A zoned dispatch configuration may follow geographically-based zones or population based zones. For example, the County could be divided into four zones. Or, heavy traffic areas such as a heavily populated city/town may constitute a single zone. As indicated in *Staffing Projections* a radio traffic study is needed to determine load and adequate monitoring configuration.

Within the individual discipline paths, training officer certifications and supervisory skills can be developed. A skilled, confident and participatory staff benefits the PSAP through staff buy-in/support and loyalty, self-reliance, professionalism, external recognition and internal pride, trust from served agencies and responders, and most importantly, increased retention, which means a return on investment.

2.8.9 NG9-1-1 Impact on Staffing

The impending NG9-1-1 technologies and services will have a profound impact on PSAP operations; in turn the technical and operational changes will impact staffing, which could mean a staff increase or decrease based on how the technology is developed and configured. There will be an increase in the data that call takers will need to process and route appropriately and more complicated systems to use and/or monitor. Other potential changes could come from monitoring and coordinating event information, such as photos, streaming video, appropriate handling of automatic crash notification and accompanying medical information. In preparation, employees will require increased and/or different training.

2.9 OPERATIONS

The recommended operational methodology in a countywide consolidated PSAP is a combined duty floor operation staffed by multiple levels of cross-trained staff. Kimball recommends a call processing flow that facilitates appropriate and free interaction and coordination among disciplines.

Ideally, a countywide consolidated PSAP will be configured operationally to have an area equipped and assigned for call taking, with a supervisor position centrally located on the communications floor with equal vantage points and access to the dispatching areas. Law enforcement dispatching will be equipped and assigned to one side of this core and fire/EMS to the other. With tools, such as CAD, intra-communications/messaging, and resource monitors, available for communication and coordination of resources, the dispatch areas will be better able to jointly respond to all priority levels.

2.9.1 Call Handling Process and Review

Policies and procedures will define the entire call flow process. Based on the current and future needs of Sussex County, Kimball recommends the process outlined below.

1. Certified call takers answer and document calls for service and provide emergency medical dispatch (EMD).
2. The receiving dispatchers notify and assign calls to units/apparatus.
3. The same dispatchers monitor responding units/apparatus
4. The same dispatchers receive, relay, and document all information exchanged among other dispatchers/call takers, units/responders, and other service providers.
5. If further information or documentation is necessary after the call is closed, the dispatcher or call taker is capable of performing updates.
6. Within 30 days of call conclusion, random/assigned QA is performed

7. Where needed follow-up training/re-training and adjustments to policy and procedures are conducted

2.9.1.1 Current Call Flow and Dispatch Methodology

Currently, 9-1-1 emergency calls are initially processed through one of six PSAPs. At times multiple call transfers are necessary to complete a multi-agency, multi-jurisdictional response.

Querying a caller more than once wastes valuable time and possibly causes caller confusion and frustration. Transferring an emergency call more than once is contrary to public safety best practices wherein the telecommunicator originally receiving the call should remain in communication with the caller. Transferring calls numerous times has inherent multiple points of failure, such as the phone network, the disparate systems and equipment, the possibility of the receiving agency being busy, and human error. This call processing methodology is not only detrimental to the caller, but to responders. In some instances the safety of the emergency responder is at risk, and time is of the essence for both the responders and the public.

2.9.1.2 Consolidated Call Processing and Dispatch Methodology

All Sussex County PSAPs will benefit from more effective call processing and the resulting potential decrease in response times. N.J.A.C. 17:24-2.2 *PSAP: Required and Recommended Staffing* states "Each PSAP shall, at all times, be staffed with the number of call-takers necessary to permit the PSAP to answer all calls within 10 seconds, except that during the average busiest hour 10 percent of the calls may be answered within 20 seconds." This requirement coincides with public safety best practices and standards, such as the National Emergency Number Association (NENA) Call Answering Standard/Model Recommendation, NENA 56-005 and NFPA operating procedure standards.

A true call taker and dispatcher system allows call takers to be on line with the caller, obtaining vital information for responders, while the dispatcher sends units. The call information is sent via CAD to the appropriate dispatcher(s) for radio dispatch. The call taker remains on line with the caller, gathering further information important to response and mitigation of the incident, and entering it into CAD; the dispatcher can view the information and relay it to the field units. This model will improve the service provided to callers by potentially reducing the overall response times and the number of times a caller is queried, by reducing the multiple points of failure, and by creating essentially one geographic response area.

Intervention protocols administered during call taking can be time intensive. In a consolidated environment, however, the call delivery time via CAD to the respective dispatcher(s) is not delayed by this process. Time savings is realized through eliminating the separate call processes.

The unit/apparatus initial dispatch response overall will be reduced by having the call available for dispatch simultaneously and potentially all necessary responders, law enforcement, fire and EMS, dispatched immediately. A medical call is often the highest priority call taken, and as such, every effort for the fastest response should be made. Responders from all disciplines can be dispatched and receive additional information while en route to a call for service.

Proximity, standardized protocols and unified systems create expedient and successful handling of every call. There are no opportunities to lose a call in a transfer, or miss vital information in re-questioning the

caller two or three times. There is the benefit of enhanced responder safety by providing information sooner, more completely, accurately and in real-time for all responders.

A reduction in the number of call takers and dispatchers handling the call, plus the elimination of transfers between different PSAPs with differing protocols and equipment equals faster overall response time and saves lives. Consolidated operations will bring about increased efficiencies and coordination of communications and emergency response services.

2.9.2 Administrative Call Handling

One of the commonly voiced concerns from participating agencies is the desire to maintain the quality of service levels currently provided. In many of the public safety agencies, the emergency call taking and dispatching functions are a small percentage of their roles. Particularly in the smaller agencies, the dispatcher is the agency's initial point of contact and is usually the municipality's only after-hours contact. The dispatchers perform as switchboard operators assisting callers with locating individuals and services within the agency and municipality served. They also provide a myriad of municipal services unique to their respective locality and are able to direct or transfer callers to outside municipalities and/or services.

In a consolidated environment and if the function is in direct support of 9-1-1, some of these services may continue without noticeable interruption. These needs may be accommodated through established protocol, training and technology.

The existing PSAPs handle many non-emergency/administrative functions. Those not relative to the processing of 9-1-1 calls will continue to be handled at the local level by the agency or municipality. During the planning phase, all jurisdictions will need to evaluate and determine how best to handle non-emergency/administrative needs, both common and unique.

Individual municipal and agency needs must be considered carefully in the planning phase, and there are many variations possible for the consolidated PSAP to meet most public safety-related administrative call needs.

2.9.3 Coordination of Resources

During incident command situations and long-term and/or large-scale events, the ability to quickly coordinate responses and shared resources with OEM will be greatly enhanced in a consolidated PSAP with the appropriate training, protocols and up-to-date reference material readily available.

Coordination of resources also applies to mutual aid. With all Sussex County agencies dispatched by a consolidated PSAP, mutual aid will be coordinated through one location. This will decrease response times as dispatchers will be able to better anticipate the needs of responders and be better prepared to meet those needs upon request. The processes for accessing mutual aid beyond County jurisdictions will be improved and better coordinated through standardizing protocols, enabled interoperability, and data sharing beyond the consolidated PSAP.

2.9.4 NG9-1-1 Impact on Operations

The operational impact of NG9-1-1 will come from the anticipated new capabilities and services. The impact will be felt by PSAP leaders and frontline operational staff. The User Work Groups and PSAP management will have to work closely to determine how to develop or alter PSAP policies, procedures, protocols and training to accommodate NG9-1-1 capabilities and services. The human factor must be considered so staff is well-prepared for new or altered protocols and methods for locating callers, routing information, new equipment, services, functions and features.

The impact on call taking will be the increased complexity of the call taking process due to multi-media data. Attention to system configuration and appropriate training with the call taker in mind will control and minimize this impact. The call taking function will expand from locating wireline and wireless callers to processing real-time multi-media information. IP-based systems will be expected to manage complex and increased data; however, the human component will need the training and skills to recognize and process calls from numerous communication devices, delivery methods and caller location determination. Policy and training will need to focus on giving staff the direction, knowledge and decision-making skills needed to determine what information should be relayed to dispatchers and responders. Policy will also drive how supportive or supplemental information (e.g. automatic crash notification data or patient allergies to certain medications) will be used, processed and stored or relayed.

Records management will be impacted by the variety of new information and formats, audio, video, text, photos, streaming video and data, which will require storage and archiving.

2.9.5 NG9-1-1 Impact on Training

Technology-based educational requirements for PSAP staff in an IP-enabled environment will include geographic information system (GIS)-based directories of authorized organizations and resources, and expanded training for systems and features, such as Master Street Address Guide (MSAG), mapping, logger, CAD and IP-based customer premise equipment (CPE).

Operations-based educational requirements for PSAP staff in an IP-enabled environment will include understanding basic call routing, transport, interoperability and security (access control/identity management for implementation of information sharing polices) and application layers supporting interoperability between diverse networks.

2.9.6 NG9-1-1 Impact on Operational Methodology

Aside from the changes anticipated in processing calls, relaying and storing records, and developing and conducting training, there are areas that will impact the overall operational methodology in a NG environment. Additional response agencies (local, regional, state and federal) will require building relationships. The served population will be re-defined as geographic boundaries expand or become less relevant to call routing. With the expansion of voice and data interoperability, the emergency management and other coordinated response level roles (government, hospitals) will expand and become more integrated with PSAP first response capabilities, functions and features.

Post-September 11th and Katrina, other forms and levels of fall back planning are necessary for survival of the local PSAP.

2.9.7 Workstation Configuration

The number of systems and amount of information monitored and directed per position and person will require a review of how systems are configured, integrated or interfaced. This will also drive where and how many monitors will be placed at each workstation. The functional capacity of the operations staff must be considered when determining what and how many systems an individual or group of individuals will be required to monitor, the workload generated by the monitored systems, and the ability of management to adequately provide supervision and perform QA/QC on the resulting performance.

2.10 BACKUP CAPABILITIES

The current backup/disaster plans for Sussex County PSAPs follow a default routing plan for 9-1-1 calls. Each PSAP has up to three alternate routing paths that automatically route 9-1-1 calls should the original destination PSAP not have the ability accept calls due to trunks being overwhelmed or out of service. This backup method does not serve Sussex County public agencies and citizens well. The limits to data and voice interoperability between the existing PSAPs prevent this backup configuration from becoming a full backup plan for Sussex County.

2.10.1 Short Term Backup

Sussex County plans to work with Warren County on developing a backup plan in which Warren County's consolidated PSAP provides backup to Sussex County's anticipated consolidated PSAP. As a short term backup plan, this is appropriate as Warren and Sussex Counties have similar demographics; however, the similar demographics and workload will make it difficult for Warren County to operate as a long term backup to Sussex County and for Sussex County to backup Warren County long term. Sussex County's anticipated workload will double the workload for Warren County. With operational modifications to both counties, providing backup for hours, days or a few weeks may be possible.

In addition to expanding any existing mutual aid agreements, the County must address technical issues. The Counties can work with Verizon to form a disaster plan for routing 9-1-1 calls. Radio system connectivity will prove more difficult as Sussex County's disparate radio systems will need to be interconnected to initially support a countywide consolidated PSAP while future plans are formed to build out a countywide radio system. For Warren County and/or staff from Sussex County relocated to Warren to fully backup Sussex County, there must be a reliable interconnection from the Warren PSAP into the Sussex County interconnected system-of-systems and the future countywide system. Data interoperability is also necessary to prevent loss of information and to best support coordination of resources for response and recovery regardless of the incident type or size.

The agreement with Warren County should allow Sussex County to reciprocate services by backing up Warren County. This will require voice and data interoperability with and among the Warren County voice (radio and 9-1-1 trunking) and data systems.

This high level conceptual plan can be used to begin revising and updating the Sussex County Emergency Operations Plan (EOP), mutual aid agreement/s, technology and operations toward a complete and specific plan.

Another short term backup option may be to maintain one of the larger equipped existing PSAPs (e.g. Sparta) as an overflow/training/special operations site. While this will not provide full backup capabilities or capacity, it could supplement other backup plans. This supplemental site could provide support during incidents that do not require evacuating the primary PSAP.

2.10.2 Long term Backup

Utilizing Warren County as a long term backup to Sussex County may not be feasible due to similar workload and capacity. The concept of maintaining one of the larger PSAPs as an overflow/training/special operations site can augment any short- or long-term plan. Neither option will sustain Sussex County long term. In the current configuration and future consolidated model, a catastrophic manmade or natural event could leave Sussex County without a PSAP(s) for months while recovery efforts occur.

Factors for long term backup planning will include where and how to restore and sustain 9-1-1 service. Studying options for long term backup plans should be included in the planning phase of consolidation.

2.10.3 NG9-1-1 Impact on Backup Planning

NG9-1-1 will alter the way that response and recovery and backup planning in general will be carried out. Self-healing networks, removing roadblocks to routing 9-1-1 calls, and provisioning dispatch services from backup sites external to geographical coverage areas will improve and enhance the ability to recover primary or initiate backup operations. IP-enabled networks will increase reliability and disaster recovery of voice (9-1-1, radio) and data (real time information sharing) delivery networks. With the lifting of service area restrictions, 9-1-1 calls will be able to be processed and dispatched via routing and transfers across the state and across state boundaries with location information intact.

2.11 NEXT STEPS

To advance towards consolidation, the County and participating PSAPs should maintain the current momentum by progressing directly into the planning and implementation phases. The success of this phase and its individual components will have a direct impact on the success of the consolidation initiative.

1. Determine direction of the Board of Chosen Freeholders and obtain commitment from all stakeholders to proceed with the planning phase. Coinciding with commitments, site selection should occur.

2. Hire a manager/director. The County, TWG and User-specific Work Groups should work together in the hiring process to name a director who will assist in accomplishing the operational objectives of consolidation.

3. Task A - Develop transition and migration plans in alignment with construction schedules.

   Task B - Identify a suitable backup / alternate site and plan as soon as practical. Backup plans should include several layers of contingency planning.

Task C - Converge and develop common policies and procedures, and protocols in support of the new consolidated operation. Training and QA/QC programs should be developed in conjunction with this effort.

4. Hire a deputy director to begin working with the director.

5. Task A - Develop and implement two-phase hiring process that will identify qualified employees from participating PSAPs and identify qualified candidates from external hiring pools to fill available positions. Pay and benefits equalization within the County's classification and benefits system should be addressed for transitioning employees.

   Task B - Continue filling remaining administrative, management and support positions.

   Task C - Begin implementation of new technology.

   Task D - Train employees on new systems and protocols.

6. Task A - Adjust and implement final migration plans as facility occupancy is allowed and systems installation and cutover dates can be confidently projected.

   Task B - Direct transition from the individual PSAPs into the consolidated PSAP.

Due to the magnitude of undertaking a multiple PSAP consolidation, the County should consider using experienced, professional third-party assistance during the planning and implementation phases. Outsourcing planning, implementation, and technical transition management frees the board and PSAP management to concentrate on developing policies, budgets, and personnel, all of which are critical to the success of consolidation.

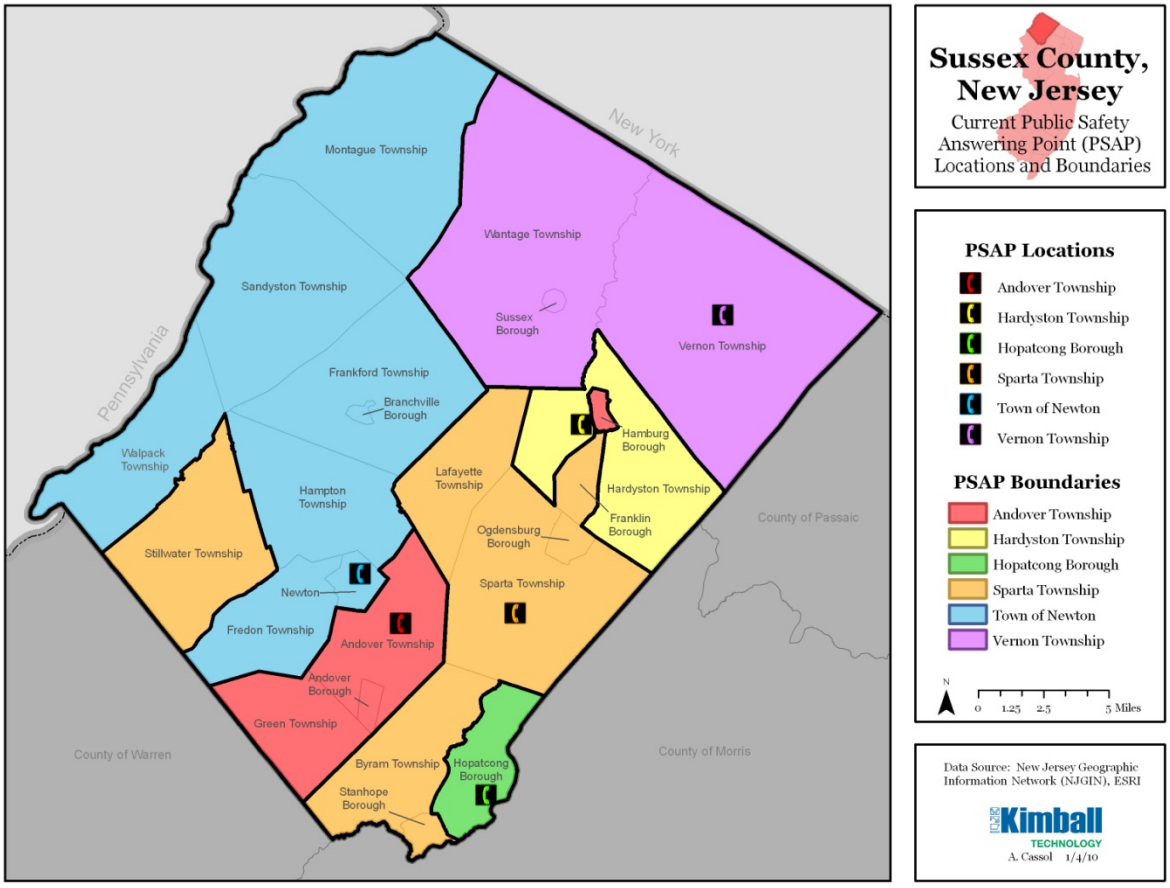
3. BACKGROUND

The County of Sussex (Sussex County), the northernmost county in the state of New Jersey, is part of the New York Metropolitan Statistical Area. Pike County, Pennsylvania; Orange County, New York; and Passaic, Morris, and Warren Counties, New Jersey border Sussex County to the northwest, northeast, east, south and southwest, respectively.

The county, with a population exceeding 152,000, has a total area of 536 square miles, of which 521 square miles is land and 15 square miles is water.

The County of Sussex is governed by a Board of Chosen Freeholders whose responsibilities include public safety and emergency management.

Six PSAPs serve twenty-four incorporated municipalities within the county.



The PSAPs receive automatic number identification/automatic location identification (ANI/ALI) information for all 9-1-1 wireline calls. For 9-1-1 wireless calls, PSAPs receive the caller's wireless

number and location information from the respective wireless service provider. The Sussex County Sheriff's Office serves as a PSDP and does not receive emergency calls placed to 9-1-1.

The PSAPs receive 9-1-1 and non-emergency calls for the municipalities they serve. Wireless 9-1-1 calls received from outside the service area are transferred to the appropriate jurisdiction. The PSAPs provide backup capabilities for each other for call answering during times of overflow or issues with equipment. It is important to note that calls that "roll over" to an alternate PSAP are transferred back to the original PSAP as resources do not exist to allow the alternate PSAP to handle the call and forward the information and/or dispatch responders.

The six PSAPs, which operate under their respective police departments, provide emergency services and dispatch for public safety agencies within the county. The Hardyston Township (Hardyston) PSAP dispatches the Hardyston Police Department, Hardyston Fire Department and Hardyston First Aid Squad. The Hopatcong Borough (Hopatcong) PSAP dispatches the Hopatcong Police Department, Hopatcong Fire Department and Hopatcong Ambulance Service.

While the Hardyston and Hopatcong PSAPs dispatch only their respective municipality, the remaining PSAPs. Andover Township (Andover), Sparta Township (Sparta), Town of Newton (Newton) and Vernon Township (Vernon), dispatch for 18 different municipalities (37 separate agencies) in addition to their own.

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Public Safety Answering Point (PSAP)			
Andover	**Sparta**	**Vernon**	**Newton**
Police Departments			
Andover	Sparta	Vernon	Newton
Hamburg Borough	Byram Township		
	Franklin Borough		
	Ogdensburg Borough		
	Stanhope Borough		
	Stillwater Township		
Fire Departments / EMS / First Aid Squads			
Andover Fire Department	Sparta Fire Department	Vernon Fire Department	Newton Fire Department
Andover Borough Fire Department	Sparta Ambulance Service	Vernon Ambulance Squad	Newton First Aid Rescue Squad
Green Township Fire Department	Byram Township Fire Department	Sussex Borough Fire Department	Branchville Borough Fire Department
Hamburg Fire and EMS	Franklin Fire Department	Sussex FD First Aid Squad	Blue Ridge Rescue Squad (Branchville Borough, Frankford Township, Montague Township and Sandyston Township)
Lakeland Emergency Squad (Andover Township and Andover Borough)	Lafayette Township Fire Department	Wantage Township Fire Department	Frankford Township Fire Department and First Responders
Allamuchy-Green First Aid Squad (Green Township)	Lafayette Emergency Squad	Wantage First Aid Squad	Fredon Township Fire Department
	Ogdensburg Borough Fire Department		Fredon Township EMS
	Ogdensburg First Aid Squad		Hampton Township Fire Department
	Stanhope Borough Fire Department		Hampton First Aid Squad
	Stillwater Township Fire Department		Montague Township Fire Department
	Stillwater Emergency Rescue Squad		Sandyston Township Fire Department
	Lakeland Emergency Squad (Byram Township)		Walpack Township EMS (Mutual Aid from Warren County)
	Stanhope-Netcong American Legion Ambulance (Stanhope Borough)		
	Wallkill Valley First Aid Squad (Franklin Borough)		

Each PSAP charges a fee to the user municipalities, excluding their own, for which they dispatch. Some PSAPs charge a per capita by population fee, while others charge a fee based on calls for service. Fees collected offset the overall service costs for each PSAP.

There is no separation of duties for call takers/dispatchers in the county; each call taker/dispatcher answers calls for service and dispatches emergency service personnel. The number of CAD/radio console positions, shifts, and coverage varies by PSAP.

The table below illustrates the compiled information.

PSAP	Number of Authorized Call Taker/Dispatchers	Number of Console Positions	Hours per Shift	Coverage during Day Shift	Coverage during Evening Shift	Coverage during Night Shift
Andover	5 FT 10 PT	2	12	1	1.3*	1
Hardyston	4 FT 6 PT	2	12	1	1	1
Hopatcong	7 FT 5PT	2	12**	2	2	1.5
Newton	7 FT 10 PT	3	8	2	2	2
Sparta	8 FT 5 PT	6	12	2	2	2
Vernon	6 FT 2 PT	2	8	2	2	1
Total	**37 FT 38 PT**	**17**		**10**	**10.3**	**8.5**

*Andover has a Thursday and Friday 12P-12A shift
**Shifts are 12 hours in combination with one eight-hour shift during a two-week payroll cycle.

Answering incoming calls for service and dispatching emergency personnel are the primary responsibilities of a PSAP. Maintaining accurate information on these responsibilities assists in determining personnel needs for PSAPs. In some PSAPs, the call takers/dispatchers perform additional duties, including greeting the public at a walk-up window, monitoring prisoners via closed circuit television, monitoring security cameras in municipal buildings, changing back-up recorder tapes, and record keeping.

4. CONSOLIDATION AND NEXT GENERATION 9-1-1 (NG9-1-1) STUDIES REVIEW

The State of New Jersey and the County conducted previous studies that directly address consolidation at the county and municipal levels. The summaries of four significant studies conducted within the past decade echo the benefits of consolidation, including highly desirable cost and service efficiencies.

4.1 2000 RCC CONSULTANTS, INC. NEW JERSEY STATE STUDY

The New Jersey State Study was commissioned in 2000 by the 9-1-1 Commission to provide guidance at the state level on how to address a necessary change in 9-1-1 infrastructure, technological advances and public expectation. The study focused on wireless 9-1-1, number portability, forced changes in network components and an increase in the number of providers. One paragraph forecasts the advent of IP-based telephony as becoming popular and that it will become "…meaningful to public safety call management…"[7] The study addressed funding and the role of the OETS, and operational and technological issues at state and local levels.

Within the study are specific references to the benefits of consolidating or sharing services to reduce the overall configuration of PSAPs. Though these comments primarily focus on the cost to upgrade/change out the 9-1-1 infrastructure, valid points are made regarding the operational/service improvements that will result from consolidation.

4.2 2006 RUTGERS NEW JERSEY 9-1-1 CONSOLIDATION STUDY

The Rutgers New Jersey 9-1-1 Consolidation Study was commissioned by OETS to provide guidance on how to address the ever increasing cost of providing 9-1-1 network, infrastructure, equipment and systems, and operations at the state and local levels. In general, the study found "…a strong connection between operational efficiency and PSAPs' workload."[8]

The study noted five specific findings, all of which are potential benefits to consolidating PSAPs/dispatch centers:

- Improved service and public safety
- Economies of scale in the cost to handle 9-1-1 calls
- Improved efficiency through lower workload or call volume
- Cost savings potential for state and local governments

[7] http://www.state.nj.us/911/rccreport.html *The Next Generation of E9-1-1 Services: Implications for the Future, A Situation Analysis and Assessment,* RCC Consultants, Inc., August 30, 2000
[8] John J. Heldrich Center for Workforce Development *New Jersey 9-1-1 Consolidation Study Saving Lives, Increasing Value: Opportunities and Strategies for Consolidating New Jersey's 9-1-1 Emergency Services*, October 2006

- Financial incentives encourage consolidation

The study provided the recommendations below:

- Encourage consolidation of PSAPs and dispatch centers
- Establish a grant program(s) to incentivize consolidation
- Provide training assistance grants
- Develop 9-1-1 standards for staffing, equipment, facilities, governance and accountability
- Provide education and support for local officials toward consolidation
- Establish minimum staffing level of two certified staff around the clock

4.3 2007 RCC CONSULTANTS, INC. COMMUNICATIONS CONSOLIDATION FEASIBILITY STUDY

Sussex County commissioned a consolidation feasibility study that was delivered in July 2007. Unlike the studies summarized above, this study was specific to Sussex County. Study objectives were to explore potential cost savings that could be derived from reducing the number of duplicate systems, equipment, facilities, network and staff. RCC provided cost comparisons and projections. RCC was to compare and recommend configurations and number of PSAPs countywide. RCC's recommendation was to consolidate into a single countywide PSAP. A roadmap or implementation plan was not part of the scope.

4.4 2007 RCC CONSULTANTS, INC. FREQUENCY PROPAGATION STUDY

To accompany the 2007 RCC consolidation study, Sussex County commissioned an RF Coverage Study to provide a propagation/coverage analysis of the County's public safety radio systems. Anecdotal information revealed that incomplete data from some PSAPs prevented a complete and accurate countywide coverage analysis. RCC included data from the participating PSAPs and provided coverage maps from the limited data. A roadmap or implementation plan for supporting PSAP consolidation with an interconnection of existing radio systems or a direction for planning a countywide radio system was not provided.

5. NEXT GENERATION 9-1-1 (NG9-1-1) AND PUBLIC SAFETY ANSWERING POINT (PSAP) CONSOLIDATION

NENA defines NG9-1-1 as the "…next evolutionary step in the development of the 9-1-1 emergency communications system…"[9] This next step is an inter-networked, private, managed IP system-of-systems, an ESInet, which is shared by all agencies involved in any emergency. Instead of dedicated and separate circuits carrying voice and limited data across small fixed bandwidth, packetized voice and data travels larger fixed bandwidth serially/in sequence. To PSAPS this means the antiquated 9-1-1 network is replaced or augmented by a network with the capacity to accept and deliver much more than telephone voice to/from a PSAP. Using IP-enabled/capable networks and systems will allow all forms of communication, such as text, SMS, video, photos, automatic crash notification (ACN), medical information and more, to reach the PSAP and be forwarded to responding units, hospitals, EOCs, Emergency Management Agencies (EMAs), etc.

The RCC 2000 NJ OETS 9-1-1 study was not alone in forecasting the impending effects of IP-telephony on public safety. Over the past decade, many reports, studies, whitepapers and articles have been written on the subject. Public expectation that a 9-1-1 caller can be located via any communications device, anytime and anywhere, is becoming reality. IP-enabled devices are impacting the public safety communications industry in ways only imagined ten years ago. Entertainment media depicts high-tech tools used by public safety agencies, while news media reports on the critical state of 9-1-1 across the nation. These are conflicting accounts no doubt; however, there is truth on each side. Technology to do many of the fictionalized activities seen in movies and on television does exist, but it is rare that these technologies are attainable/affordable to the majority of PSAPs or public safety agencies, and critical problems in our nation's 9-1-1 system do exist, including lack of funding, technology, operational requirements and training standards or certifications.

Public safety insiders understand that NG9-1-1 is not the answer to every problem or issue within the nationwide 9-1-1 system. It is, however, the direction in which 9-1-1 must move. Public expectation and ever-progressing communications technology are driving public safety communications toward IP-enabled/capable PSAPs, systems and equipment. IP-enabled/capable networks have been built and used by financial institutions and government entities worldwide for some time. The public safety community has not been part of global technology changes for many reasons. Limitations exist in the current infrastructure/network and in funding; there is often a lack of political support or will. Perhaps most importantly is the requirement that the infrastructure/network, equipment and systems meet public safety reliability requirements. To meet public safety reliability requirements, standards must exist and NG9-1-1 standards are still being established. The U.S. DOT's Research and Innovative Technology Administration (RITA)[10] is working with a large group of stakeholders through the NG9-1-1 System Initiative to develop such standards. While numerous documents, including a Concept of Operations and NG9-1-1 System Description and Requirements, have been published and a proof of concept demonstration was held in the fall of 2008, NG9-1-1 standards are still in their infancy.

While 9-1-1 systems and networks are being designed and built, and standards established, PSAPs will examine how to transition to an IP-enabled/capable network and system. As technology and standards progress, PSAPs will need to build out or connect to IP networks, or acquire the technology to accept and process various types of communication. Funding these initiatives will be extremely difficult as there is

[9] NENA Master Glossary of 9-1-1 Terminology, NENA-00-001Version 11, May 16, 2008
[10] http://www.its.dot.gov/ng911/index.htm

no surcharge/tax on devices that communicate outside the wireline and wireless 9-1-1 system. Some states and local governments that fund the existing 9-1-1 networks and systems are seeking ways to create cost efficiencies and savings by streamlining networks and reducing the number of individual points that must be reached.

The State of New Jersey, which funds and provides the 9-1-1 network statewide, has already taken legislative steps to incentivize and require consolidation.[11] Consolidating PSAPs is an effective way to reduce duplication within systems and costs, and therefore prepare for NG9-1-1. Depth of staff, training and management, and pooled resources will help ease local PSAPs into the increasingly technical and operationally diverse world of IP-based functions and services. The operational impact of NG9-1-1 will require changes to internal protocols and skill sets, and will require more intense oversight and coordination among applications and interconnected systems. As side effects of NG9-1-1 upgrades, funding, technology and human resource requirements may push local, small or individual PSAPs beyond their ability to support 9-1-1 locally.

Consolidating PSAPs better prepares Sussex County for NG9-1-1 and aids in meeting legislative and funding requirements set forth by the State of New Jersey. Locally (county, regions), consolidation will allow public safety agencies to continue to provide localized response and recovery, while realizing cost and service efficiencies. Consolidation will also improve voice and data interoperability across all levels of government (local, county, region, state and national) during response and recovery events.

[11] P.L. 2007, Chapter 56

6. GOVERNANCE

Governance refers to establishing a shared vision and a collaborative decision-making process supporting interoperability efforts to improve communication, coordination, and cooperation across jurisdictions[12]. Developing an appropriate governance structure for a consolidated PSAP is critical to enabling the center's director/manager to effectively manage center resources and provide the best possible service to user agencies and the community.

The consolidation of emergency communications should be a collaborative effort between public safety response agencies and municipalities. A business model approach of service provider and customer agencies will result in equal and optimal service to all user agencies.

When combining services, it is important to realize the center's director/manager must utilize PSAP resources to address the needs of all user agencies equitably. While this balance is achievable, the governance structure can positively or negatively impact the ability of the center's management to maintain the balance for the long term.

The balance of representation and authority is a negotiation point for the planning phase for any governance structure or organization. This balance must be established between the supporting entity and participating municipalities and other jurisdictions. Any governing structure must clearly establish the authorities and responsibilities of all parties to avoid and/or address political and user agency control issues. This effort should ultimately result in the establishment of a consolidated PSAP that is a full partner with other public safety agencies, rather than a subordinate of the agencies.

In pursuit of balanced representation, the Sussex County Board of Chosen Freeholders passed a Resolution in January 2008[13] establishing a 9-1-1 Working Group (heretofore known as the Telecommunications Working Group, TWG). This group was tasked with guiding a countywide effort to reduce six individual PSAPs into one consolidated PSAP. This course is driven by the State of New Jersey funding requirements[14] as established through the OETS and the 9-1-1 Commission. The TWG has been successful in advancing the concept of consolidation, researching and forming committees to address technical and operational issues. The TWG and other stakeholders visited numerous consolidated PSAPs and reviewed their governance models. The TWG found that the support and governance structure, and the user working group model are consistent across the state.

Kimball agrees with the findings of the TWG and reviewed the Sussex County history of consolidation planning, the existing county government structure and the laws and administrative codes that establish what form of governance can be developed for newly formed public service entities. From this effort, Kimball determined that the Sussex County Board of Chosen Freeholders, through the County Administrator, must serve as the executive board over the PSAP. The Board of Chosen Freeholders, as the County's governing body, sets policy and provides direction for program priorities and the allocation of resources. The County Administrator has the responsibility to implement the policy directives as set forth by the Freeholders.[15] The formation of discipline-specific User Work Groups will best meet the needs of the response agencies in providing a method of directing operational oversight and providing

[12] U.S. Department of Homeland Security; March 2007.
[13] Refer to References for Resolution
[14] N.J.S.A. 52:17C-1 and N.J.A.C. 17:24; Refer to References
[15] http://www.sussex.nj.us/Cit-e-Access/Mayor/?TID=7&TPID=590

input to the consolidated PSAP. The following sections detail how the authority, roles and responsibilities will play out in the governance formation for a newly consolidated PSAP in Sussex County.

6.1 GOVERNANCE AND SUPPORT STRUCTURE

The consolidated PSAP will require a backbone structure to support services, such as payroll and other human resource support needs. The support structure also provides services such as facilities maintenance, budget/finance, legal, risk management and procurement.

While there are several options for provisioning these support services, the most cost effective method for the County will be to organize the consolidated PSAP as a County department. As a County department the consolidated PSAP can take advantage of established, neutral and well-regulated services. This method does create administrative dependency, but allows the PSAP a greater sense of autonomy compared to organizing under the authority of a Board/Committee or one or more of the served agencies.

Another option is the formation of a joint meeting authority. New Jersey Public Law, known as the Consolidated Municipal Service Act of 1952, holds that "[t]he governing bodies of any two or more municipalities or counties…may enter into a joint contract…for the formation of a joint meeting for the joint operation of any public services…which any such local unit is empowered to operate."[16]. This option is typically used in forming taxing districts, such as public utilities services, and for public services that involve multiple counties. For the purposes of consolidating PSAPs in Sussex County, the establishment of a joint meeting authority would be cumbersome and costly. The membership as stated in P.L. 1952 is comprised of voting members (no more than three) from each of the participating localities. Given that there are 24 municipalities in Sussex County, the sheer size of a joint meeting board could reach 72 members. While a joint meeting has the authority to acquire and construct public improvements and services, the costs are then apportioned among the participating local units.

Support Structure Recommendation: The joint meeting authority is detailed, multi-layered and top heavy, and could cause decision-making processes to be lengthy and unwieldy. Kimball does not recommend this governance model for Sussex County's consolidated PSAP.

Kimball recommends developing the consolidated PSAP as a County department; this is the most cost effective and efficient means to provide the necessary structure. This option provides significant cost efficiencies as the infrastructure and capabilities are in place to provide the administrative and support services to a department serving countywide needs.

[16] Consolidated Municipal Service Act P.L. 1952 (40:48B-2) Authority to enter into contract for joint operation of public services, improvements, facilities, etc. AND NJ P.L. 1973, c.208 (C.40:8A-4) Interlocal Services Act

6.2 DISCIPLINE-SPECIFIC USER WORK GROUPS

The County Administrator directs, manages, and/or guides the County's administrative departments, divisions, and agencies[17]. This authority provides consistent county policies and appropriate oversight of the PSAP staff as employees of the County. To augment the authority of the Board of Chosen Freeholders and the County Administrator, and to provide operational guidance to the PSAP, discipline-specific work groups should be formed. These work groups should be established to represent each agency to be served by the consolidated PSAP. Four work groups will individually represent the public safety response and recovery providers in Sussex County as follows:

- Law enforcement
- Fire
- EMS/Rescue
- OEM

The working groups would be comprised of high-level stakeholders, such as police and fire chiefs, EMS and OEM Directors. Kimball recommends maintaining a limited number of members (approximately ten members) per working group to avoid problems with coordination and decision-making processes that typically occur in larger groups. Appointment or assignment to these groups should be determined by existing county associations, such as the Sussex County Chiefs of Police Association, the Sussex County Fire Chiefs Association, the Sussex County EMS Captain's Meeting and the Sussex County Municipal Emergency Management Meeting. These groups will provide operational oversight via policy input to the PSAP director/manager via working group liaisons. To promote effective communication, Kimball recommends one liaison per working group. The liaisons should be elected from the group membership for a pre-determined term. In addition to policy input, the working groups can provide support to the PSAP Director for:

- Guidance on overall strategic direction
- Setting overall parameters
- Providing high-level guidance and status review
- Assisting the director/manager and municipalities in decision-making

The discipline-specific working groups do not take the place of or usurp the authority of the Board of Chosen Freeholders and the County Administrator, but augment that authority with valuable and necessary input toward establishing and operating the consolidated PSAP. The working groups should contribute to the PSAP Director's control over operational protocols within the structure of the supporting entity's policies.

With the County established as the supporting and governance entity, the working groups will conduct their proceedings under the established policies of the County as well as under the newly established operational protocols/policies of the consolidated PSAP. These new policies must be approved by the working groups and must not conflict with existing County policies, except where differences are necessary to conduct consolidated PSAP business in the interest of public and responder safety.

[17] http://www.sussex.nj.us

As the consolidated PSAP would be a County department (staff and director will be County employees), it would be the County's administrative responsibility to provide pay, benefits and policies under which the PSAP would be managed. This organizational structure allows the PSAP director/manager to use the existing County pay and classification system and benefits, personnel policy and procedural authority and liability coverage in managing the staff. I n all operational policies and procedures the working groups will be the authority to which the director/manager defers. The staff in turn will report to the director/manager.

During the planning phase, the Board of Chosen Freeholders, through the County Administrator, and working groups should establish where the final decision and liability will lie for specific issues; this will alleviate delays and liability issues once the consolidation process and operations have begun. The line between operational procedure and County policy/procedure should be interpreted the same by both the Board of Chosen Freeholders, through the County Administrator, and the working groups.

The importance of well-defined direction for the working groups and complete and up-to-date procedural guidelines for PSAP operations are absolutely critical to the establishment of authority and chain of command. A clearly defined chain of command is an essential component in the operation of any public safety agency.

With the County administration and working groups roles defined, and the internal agency organizational structure determined[18], it is important to identify the consolidated PSAP as autonomous from daily operational oversight from specific law enforcement, fire or EMS entities. This sense of autonomy will create and sustain proper purpose, direction and neutrality.

The limitation to this model could come from the lack of cooperation or compromise from any one entity. This limitation will not cause consolidation to fail, but could create road blocks to the overall vision and purpose.

Provision of Oversight and Operational Guidance Recommendation: Kimball recommends utilizing the authority of the Board of Chosen Freeholders, through the County Administrator, to direct, manage and guide the consolidated PSAP. This authority should be augmented by operational and policy oversight from discipline-specific work groups.

6.3 TELECOMMUNICATIONS WORKING GROUP (TWG)

Several studies and years of consensus building among potential participants led the County to the collective decision to pursue a consolidated PSAP. The TWG was formed in response to the foresight of interested municipalities, agencies and stakeholders, as well as state funding requirements for reducing the number of PSAPs in each county in New Jersey. The TWG is comprised of agency/jurisdictional and municipal representatives, including the County Administrator. The TWG is directing all aspects of developing this planning guide and will continue to direct and guide the planning phase.

The working group composition provides a balance of representation reflective of the participating municipalities and agencies in Sussex County. This balance maintains the cross-disciplinary nature of the

[18] See Section *12.1 Management and Support Staff*

consolidated PSAP's mission, both in concept and in operations. Having the County Administrator or designee on this committee provides an important link to County government services. The working group configuration could be expanded to include other public safety agency heads; however, Kimball cautions that a larger voting membership may create problems with coordination and decision-making.

Planning Entity Recommendation: Kimball recommends maintaining the current planning and project management (the existing TWG) for the countywide consolidated PSAP.

6.4 MOVING FORWARD

Kimball recommends that the existing TWG continue to function as the planning committee to work out a proposal that details the governance and organizational structure. The Board of Chosen Freeholders, through the County Administrator, will be responsible for the management and governance of the countywide consolidated PSAP. Discipline-specific work groups should be formed to provide operational direction and policy input. Each work group should limit their membership to approximately ten members and elect/appoint a liaison for communicating with the PSAP director/manager.

6.5 PUBLIC SAFETY ANSWERING POINT (PSAP) MANAGEMENT STRUCTURE

The Board of Chosen Freeholders, through the County Administrator, is responsible for the management and governance of the PSAP. The PSAP director/manager will be a department head reporting directly to the County Administrator who is the management agent for the Freeholders. To properly address the vital components needed to provide service to the community, the consolidated PSAP will require several layers of management. During the planning phase and beginning months of the newly consolidated operation, the director/manager should measure and determine the need to develop each of the suggested administrative positions or to combine duties based on workload. An assistant/deputy director may be needed to assist with human resource issues and oversee the administration and operations.

An administrative assistant will be needed to support the administrative positions and assist in managing the anticipated flow of administrative paperwork, submissions, document formation, and filing.

Other management levels may include:

- Technical support and systems administration for CAD, CPE and radio, and ancillary systems/equipment
- QA/QC to oversee the QA program, logging system and requests
- Training coordinator/supervisor
- Operations/shift supervisors
- Training officers/assistant supervisors – these positions can be developed from operational staff following consolidation
- TAC sworn officer - an agreement should be executed giving PSAP management access to NCIC and SCIC for purposes of supporting the law enforcement user agencies

7. COSTS AND FUNDING

7.1 CURRENT FUNDING AND COSTS

The New Jersey Office of Information Technology (OIT) 9-1-1 Commission oversees the planning, design and implementation of the statewide emergency E9-1-1 system[19]. The plan, design, implementation and coordination of the statewide system are the responsibility of the OIT 9-1-1 Commission's OETS[20]. OETS oversees and provisions, via local exchange carriers (LECs), the statewide 9-1-1 infrastructure that includes tandems/switches, fiber and copper lines, central offices, 9-1-1 selective routing and all network components. This service, as funded by OETS, is delivered to the PSAP demarcation point, which is the point in the PSAP building/facility where the 9-1-1 network circuits/trunks are handed off to the inside plant (internal systems and circuits).

OETS funds and provides the network, mapping and contribution to the salary of the County 9-1-1 Coordinator position. [21] These OETS funds are derived from E9-1-1 and wireless 9-1-1 surcharges remitted to the state from the LECs, Competitive Local Exchange Carriers (CLECs) and Commercial Radio Mobile Service (CMRS), commonly known as wireless service providers.

In Sussex County, the cost to operate the six PSAPs is the responsibility of the individual municipalities. The individual PSAPs fund their operations through general revenue; four of the six PSAPs supplement their budgets with contract fees for call taking and dispatching services to municipalities that do not operate a PSAP. All internal 9-1-1 cabling, systems and equipment located inside the PSAP are funded by the respective municipalities served by the PSAP. The municipalities also bear all capital and operational costs, including facilities and related costs, systems and equipment, and personnel-related costs.

In March 2009, each PSAP provided Kimball with personnel costs, operational costs, and contract fees. Most PSAP-specific facility and utilities costs were not available. Detailed budgetary information is often limited for PSAPs that are part of a law enforcement, fire or EMS department; embedded costs, which may include facility construction/renovation, maintenance and upkeep, utilities, benefits, uniforms, training and recruiting, are often difficult to extract from the parent agency's budget.

The table below contains the budget and contract fee information as provided by each PSAP.

[19] http://www.state.nj.us/911/resource/statute/index.html
[20] ibid
[21] N.J.A.C. 17:24-6.4 Funding for 9-1-1 Coordinator

PSAP	2009 Personnel Budget	2009 Operating Budget	Municipality (if applicable)	2009 Contract Fee (if applicable)	Total
Andover	$388,450	$18,155	Andover Borough	$7,651	$505,530
			Green Township	$37,931	
			Hamburg Borough	$53,343	
			Total	$98,925	
Hardyston	$270,000	$44,000			$314,000
Hopatcong	$849,998	$51,900			$901,898
Newton	$798,681	$152,611	Branchville Borough	$13,208	$1,180,508
			Frankford Township	$69,056	
			Fredon Township	$29,328	
			Hampton Township	$53,872	
			Montague Township	$43,160	
			Sandyston Township	$16,952	
			Walpack Township	$3,640	
			Total	$229,216	
Sparta	$763,000	$60,000	Byram Township[1]	$160,918	$1,268,774
			Franklin Borough	$69,500	
			Lafayette Township	$31,050	
			Ogdensburg Borough	$41,100	
			Stanhope Borough[1]	$86,206	
			Stillwater Township	$57,000	
			Total	$445,774	
Vernon	$589,158	$17,200	Sussex Borough	$16,053	$692,411
			Wantage Township	$70,000	
			Total	$86,053	
Total	$3,659,287	$343,866		$859,968	$4,863,121

[1] Byram and Stanhope recently transitioned services to Sparta Township. This transition shifted the contract fees, which remain the same, from Hopatcong to Sparta.

The County does not provide operational funds to the existing PSAPs. The County does fund the Sheriff's Office PSDP and County OEM. Although the Sheriff's Office PSDP does not take or dispatch 9-1-1 calls, they are an essential component of the County's public safety response and recovery and, as such, should be included in consolidation planning. The Sheriff's Office is responsible for emergency management, court security, corrections, fire marshal and fire coordinator's office and supports all other municipal law enforcement agencies. The County funds the Sheriff's Office and all other county-provided services via tax revenues.

7.2 COST COMPARISON

An exact comparison of costs per agency against costs for a consolidated PSAP is difficult without full audits and requires estimating costs. Current known and estimated PSAP costs, when compiled, form the basis for cost projections to individually improve equipment, systems and operations in preparation for NG9-1-1. The resulting individual costs projections can then be compared to the cost at the county level to implement a countywide consolidated IP-enabled PSAP. Comparing individual improvement costs to the development costs of a single consolidated PSAP illustrates the cost efficiencies and potential cost savings of consolidation. This information will assist stakeholders in planning and budgeting for NG preparations. Kimball cautions that comparing these costs is not a true "apples-to-apples" comparison as many benefits associated with consolidation cannot be achieved by maintaining multiple PSAPs.

Individual PSAPs	Number of Positions	IP-enabled 9-1-1 Telephone	Admin Phone System	Radio Dispatch Control System	Network & Connectivity Costs	CAD	Logger	Facility	Ergonomic Dispatch Furniture	Total Cost
Andover	2	$120,000	$11,000	$240,000	$44,300	$180,000	$30,000	$1,640,000	$30,000	$2,295,300
Hardyston	2	$120,000	$11,000	$240,000	$44,330	$180,000	$30,000	$1,640,000	$30,000	$2,295,330
Hopatcong	2	$120,000	$11,000	$240,000	$44,300	$180,000	$30,000	$1,640,000	$30,000	$2,295,300
Newton	3	$180,000	$11,000	$360,000	$44,300	$270,000	$30,000	$2,050,000	$45,000	$2,990,300
Sparta	6	$360,000	$11,000	$720,000	$20,300	$540,000	$30,000	$2,460,000	$90,000	$4,231,300
Vernon	2	$120,000	$11,000	$240,000	$44,300	$180,000	$30,000	$1,640,000	$30,000	$2,295,300
Total		$1,020,000	$66,000	$2,040,000	$241,830	$1,530,000	$180,000	$11,070,000	$255,000	$16,402,830
Consolidated PSAP	12	$740,000	$11,000	$1,440,000	$24,000	$1,080,000	$90,000	$7,195,312	$180,000	$11,072,719 *
Potential Cost Savings		**$280,000**	**$55,000**	**$600,000**	**$217,830**	**$450,000**	**$90,000**	**$3,874,688**	**$75,000**	**$5,330,111**

*The Consolidated PSAP total cost includes a 5 percent contingency and escalation to midpoint of construction of $312,407.

7.2.1 IP-enabled 9-1-1 Telephone

The projected 9-1-1 telephone system costs for the PSAPs are based on the assumption that PSAPs will need to upgrade/replace their 9-1-1 telephone system to an IP-enabled system in the near future. The current estimate is approximately $60,000 per position, which includes backroom equipment and installation. Kimball assumes no change in the number of 9-1-1 trunks, ALI links and associated costs. Existing 9-1-1 trunk and ALI costs are not included in this estimate.

Kimball projected the consolidated PSAP costs using the same $60,000 per position estimate, plus costs for installing 12 9-1-1 trunks and ALI links.

While an IP-enabled system is necessary to prepare for NG9-1-1, the existing 9-1-1 network and trunking (CAMA[22] trunks) will remain as it is now for some time. The CAMA trunks will eventually be replaced by SIP[23] trunking. SIP trunking is provisioned via a circuit that carries up to 24 trunks. These circuits cost approximately $500 a month. ALI and other data will be delivered via the SIP trunking method eliminating the monthly ALI costs.

7.2.2 Administrative Phone System

If the PSAPs required an upgrade/replacement of their existing administrative phone systems, the average cost per PSAP would be $11,000 for a 15-20 multi-line key system. Recurring costs not reflected above include the monthly service cost of approximately $900 for 20 lines and an annual maintenance charge of $900.

Should the existing PSAPs choose a Centrex system from the local phone company, the monthly service costs would be $65 per phone, which equates to $1,300 a month for 20 phones. The installation charge would be approximately $2,500. If each PSAP needed to replace actual phone sets, the cost would be $90 per phone. There is a monthly charge of approximately $640 for the administrative lines for the ANI/ALI controllers. These lines are for the ring down, non-emergency lines and outgoing lines.

These costs also apply to a consolidated PSAP; however, only one system and set of phones and services is required. Kimball projected the consolidated PSAP cost as $11,000.

7.2.3 Radio

If Sussex County constructs a countywide shared radio system using digital P25 trunked technology, there will be a need to use compatible radio consoles in order to have full feature direct access to the radio system. The P25 trunking console interface standard has not yet been developed. As a result, consoles are still a proprietary interface with a vendor's P25 trunked radio system. For example, the proposal from Motorola for a countywide UHF P25 trunked radio system included 11 new Motorola consoles for the County's PSAPs. To have the full range of console features to access and control the Motorola system would require purchasing Motorola consoles. For this reason, it would be desirable to coordinate any

[22] Centralized Automatic Message Accounting (CAMA) A type of in-band analog transmission protocol that transmits telephone number via multi-frequency encoding. Originally designed for billing purposes. *NENA Master Glossary of 9-1-1 Terminology NENA-00-001Version 11, May 16, 2008*

[23] Session Initiation Protocol (SIP) An IETF defined protocol (RFC3261) that defines a method for establishing multimedia sessions over the Internet. Used as the call signaling protocol in VoIP, i2 and i3. *NENA Master Glossary of 9-1-1 Terminology NENA-00-001Version 11, May 16, 2008*

procurement of new radio consoles for consolidated PSAP with implementation of a countywide shared radio system.

Radio consoles compatible with a particular vendor's P25 trunked radio system will probably be more expensive than a radio console system that only has to interface with conventional radio systems and RF control stations. For budgetary purposes when estimating console costs for a P25 trunked radio system, Kimball would use cost estimates of $75,000 for the console electronics (backroom equipment) and $120,000 per console workstation with necessary console furniture.

A shared countywide P25 trunked radio system could be constructed under the existing PSAP configuration, with an assumed cost of $120,000 per console position. The radio consoles at each PSAP could be connected by T1 leased lines to the radio system's console electronics. Assuming the console electronics for a P25 trunked radio system were located at one of the existing PSAPs, five T1 lines would be required to connect the consoles at the other five PSAPs. Not reflected above is a $400 per month estimate for each T1 line, which represents a $24,000 annual expense.

Kimball projected the consolidated PSAP costs using the same $120,000 per console position.

7.2.4 Network and Connectivity

The cost estimates for network and connectivity represent annual recurring costs for T1[24] lines used for data transport and radio tie-lines. One PSAP would most likely be equipped as the central radio management system and would not incur connectivity costs. To illustrate this configuration, Sparta was used to show the cost difference.

7.2.5 CAD

If a new CAD system is required in each PSAP to allow data interoperability and to provide future NG-related features, an estimated budgetary cost is $90,000 per position.

Kimball projected the consolidated PSAP costs using the same $90,000 per position, which includes ten on the operations floor and two for training. .

7.2.6 Logger

The projected upgrade/replacement costs for IP logging recorders for each PSAP is based on an estimated number of channels, ports and positions. Based on the size of the existing PSAPs, each could be individually served by a 32-channel system, which costs approximately $30,000 including installation.

In a consolidated PSAP, a 64-channel IP logging recorder system should be of capacity to support logging by position, channel and trunk. A state-of-the-art system currently costs approximately $90,000.

[24] The T1 (or T-1) carrier is the most commonly used digital transmission service in the United States, Canada, and Japan. In these countries, it consists of 24 separate channels…T1 lines originally used copper wire but now also include optical and wireless media….It is common for an Internet access provider to be connected to the Internet as a point-of-presence (POP) on a T1 line owned by a major telephone network…*NENA Master Glossary of 9-1-1 Terminology NENA-00-001Version 11, May 16, 2008*

7.2.7 Facility

The estimates provided for the PSAPs represent the cost of new construction should the existing PSAPs desire or need to construct new hardened facilities. Based on the current number of workstations in each PSAP, the estimates follow a cost formula of $410 per square foot for construction. Each PSAP that currently has two workstations was projected as a 4,000 square foot replacement facility. Newton was projected as a 5,000 square foot replacement facility and Sparta was projected as a 6,000 square foot replacement facility.

The consolidated PSAP facility estimate is based on a preliminary programming exercise that projected the total square feet (SF) for a new PSAP and EOC with associated support offices and space. The estimated total cost is $7,195,312, which includes construction, design, permits and other costs, but does not include technology.

To separately view potential investments in the EOC portion of the initiative, Kimball developed a separate cost analysis for use by OEM staff in the current round of FEMA FY2010 EOC Grant program applications. (See Section *7.5.1 PSAP Construction/Renovation Funding* for further details.) The facility cost directly supporting the EOC portion of the planned facility is approximately $3,246,005, which is an associated percentage of the total consolidated PSAP cost based on 6,000 SF of the planned facility.

7.2.8 Furniture

If the PSAPs were to replace their dispatch furniture consoles with new ergonomic dispatch consoles, the estimated cost is $15,000 per console.

Kimball projected the consolidated PSAP costs using the same $15,000 per position.

7.3 CONSOLIDATED PUBLIC SAFETY ANSWERING POINT (PSAP) FUNDING OPTIONS

No statutes exist that specifically address funding the replacement of the current statewide 9-1-1 system with a statewide ESInet in support of anticipated NG9-1-1 requirements. With the issuance of minimum funding standards[25], the State took preliminary steps to reduce the number of PSAPs in each county. This appears as an intentional step toward streamlining the current 9-1-1 network statewide to enhance the ability of the State to eventually build upon existing or planned ESInets. Though no plans are confirmed, counties may see a future state-level effort to provide ESInet capabilities in answer to the public's expectation that 9-1-1 will someday be able to respond to emergency requests from any communication device.

Understanding that there is no indication that the current statewide 9-1-1 funding method will change in the future, Sussex County should continue to develop cost and service efficiencies that will provide cost savings to the County as they prepare for NG9-1-1. For Sussex County, it is prudent to begin planning how to fund and develop the consolidated PSAP and County EOC as IP-capable through upgrading, replacing or adding appropriate technology. To house and protect this technology and the PSAP and OEM staff, an appropriately hardened facility is needed. This facility must be of sufficient capability and

[25] NJSA 52:17C-1 and NJAC 17:24-1

capacity to support public safety emergency communications, response and recovery countywide for the next ten to twenty years.

In concert with establishing governance for a consolidated PSAP and County EOC is determining how the effort will be funded. Three prime funding areas need to be addressed in planning a consolidation: temporary capital and transition costs, and ongoing operational costs.

7.3.1 Funding Capital Costs

For the consolidation of public safety communications and the co-location of OEM, addressing space needs creates capital costs through facility renovation or new construction. Capital costs may include land acquisition, and facility programming, design and construction.

Other consolidation capital costs to be considered include start-up costs associated with equipping the primary site and the alternate/backup site with built-in redundancy. This includes CAD for multi-agency use; radio dispatch console system and connectivity; radio system reconfiguration; ergonomic dispatch console furnishings and equipment; in-building circuitry; grounding; HVAC; electrical; cable pathways; and cabling for radio, 9-1-1 telephone equipment (CPE), local area network (LAN) and future networks, systems networking and connections needs (9-1-1 and other phone lines, radio, CAD, NCIC).

The estimated capital outlay to construct a new facility to house a countywide consolidated PSAP and co-locate the County OEM is $7,195,312. This estimate is based on a preliminary programming exercise, which follows the appendices, that projects costs to construct a 13,300 square foot facility at $410 per square foot. Formal programming will determine the actual facility size and thus affect the estimates provided in this guide.

If the consolidated PSAP is to be a County department, the County will incur and manage relevant debt on behalf of the countywide PSAP and the served municipalities. An estimated capital investment of up to $7,195,312 includes design, permits, construction, and other costs, such as site infrastructure and furniture.

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The schedule below illustrates how debt incurred to fund the construction of a countywide consolidated PSAP is amortized over a 15 year period.

# of Years	Year	$7,195,312 Principal	4.00%	Total Principal plus Interest		Principal Remaining
1	2011	479,000.00	$287,812.48	$766,812.48		6,716,312.00
2	2012	479,000.00	$268,652.48	$747,652.48		6,237,312.00
3	2013	479,000.00	$249,492.48	$728,492.48		5,758,312.00
4	2014	479,000.00	$230,332.48	$709,332.48		5,279,312.00
5	2015	479,000.00	$211,172.48	$690,172.48		4,800,312.00
6	2016	479,000.00	$192,012.48	$671,012.48		4,321,312.00
7	2017	479,000.00	$172,852.48	$651,852.48		3,842,312.00
8	2018	479,000.00	$153,692.48	$632,692.48		3,363,312.00
9	2019	479,000.00	$134,532.48	$613,532.48		2,884,312.00
10	2020	479,000.00	$115,372.48	$594,372.48		2,405,312.00
11	2021	479,000.00	$96,212.48	$575,212.48		1,926,312.00
12	2022	479,000.00	$77,052.48	$556,052.48		1,447,312.00
13	2023	479,000.00	$57,892.48	$536,892.48		968,312.00
14	2024	479,000.00	$38,732.48	$517,732.48		489,312.00
15	2025	489,312.00	$19,572.48	$508,884.48		0
		7,195,312.00	2,305,387.00	9,500,699.20		

As with all County-managed debt incurred on behalf of the municipalities, the repayment of this debt will be equitably dispersed among all municipalities. The repayment distribution will be based on equalized property tax valuations.

An additional capital investment is necessary to adequately equip the new consolidated PSAP with modern systems, software, equipment and hardware. Based on Kimball's current experience in supporting procurement of this technology, an estimated total cost is $3,565,000. This figure represents the cost to procure and install an IP-enabled 9-1-1 telephone system, an administrative phone system, a radio dispatch control system, network and connectivity for data and radio, a CAD system, a logger, and ergonomic dispatch furniture consoles.

Anecdotal information from County staff revealed that approximately $2,000,000 may be attainable through existing technology grants[26]. Aside from requesting additional grant funding, two other options exist for funding the remaining estimated $1,565,000. Option 1 is to fund the technology improvements within the same capital plan as offered for the facility capital outlay. Option 2 is to equitably distribute a one-time technology improvement cost among all municipalities. For example, if technology grants cannot be obtained to cover the estimated remaining cost of $1,565,000, this amount could be distributed among the 24 municipalities. Individual costs could be divided evenly or be based on equalized property tax valuations.

[26] See Section 7.5 *Grant Opportunities*

7.3.2 Funding Transition Costs

Transition costs will involve staffing and project management costs before the PSAP becomes fully operational. These costs may include initial personnel costs to hire a director/manager and other administrative staff, training and equipping staff, planning services and project management, and the physical move of personnel following hiring, training and acclimation periods. The County may bear transition costs to cover early hiring of high-level staff and project management services. The participating agencies could bear their respective personnel costs (including necessary overtime) for the initial consolidation-related staff training prior to the cutover date. This arrangement will provide a distinct start/stop point for financial responsibility of the oncoming staff.

7.3.3 Funding Operation Costs

Operational costs commence once the consolidated PSAP begins operations and include salaries, benefits, support staff, training and employee-specific equipment and supplies (uniforms, headsets, etc.), system/equipment maintenance, other indirect costs, and a capital replacement fund to provide future funding toward capital improvement plans, such as lifecycle replacement of systems and equipment, NG9-1-1 upgrades, and building upkeep and improvements. Due to the infrastructure and support mechanisms already in place within the County, and as a natural companion to the recommendation that the consolidated PSAP by created as an autonomous County department, the ongoing operational costs would be the County's responsibility and be funded via municipal tax revenues.

Prior to making key decisions regarding management and operations staff counts, facility size and location, and equipment and systems procurement and upkeep, it is difficult to project estimated operations costs. Based on the projected size and potential workload of a countywide consolidated PSAP in Sussex County, an estimated operational budget range of $4,000,000 to $5,000,000 is expected. Appendix A contains specific estimates per municipality for projected operational budgets of $4,000,000 and $5,000,000, as well as the debt service estimates for a facility and equipment. The operational budgets may fall anywhere within the $4,000,000 to $5,000,000 range, which may change the estimates per municipality.

7.4 GRANT FUNDING

New Jersey statute *9-1-1 Emergency Telecommunication System, NJAC 17:24-2.5 PSAP: formation* and regulation for *Statewide 9-1-1 Enhanced Emergency Telephone System 52:17C1-16 (52:17C-7. Public safety answering points)* state "…the formation of PSAPs that serve groups of municipalities is encouraged in the interest of reducing costs and increasing the efficiency of administration." One benefit of consolidating law enforcement communications and fire/EMS communications is increased access to and eligibility for grant monies. Many current and anticipated funding opportunities are based on interoperability, data sharing and multi-agency center needs as opposed to single entity, stand-alone centers. The opportunities are aimed at providing funding and support to consolidate and reduce single entity centers and interconnect services that allow for the interoperability necessary to support communications of all types at all levels.

The greatest grant opportunities will come from establishing partnerships and mutually supportive relationships with neighboring jurisdictions and state and federal agencies/entities, which could lead to

future regionalization. Fostering partnerships should increase the potential for grant funding. The cost of not participating in these opportunities is immeasurable, but apparent during recent and past manmade or natural disasters. Regionalization, interoperability and expansions in many service areas will provide the optimum service to the regional population and will benefit neighboring jurisdictions, state and federal response levels through better communication and coordination during normal service levels and in times of crisis.

Focusing on expanding interoperability and preparing for NG9-1-1, with a clear vision of gaining efficiencies and interoperability between local, state and federal communications, as well as facilitating the National Incident Management System (NIMS), the National Response Framework and other homeland security measures, will give the County an advantage in pursuing federal funding, earmarks and other grant opportunities.

Opportunities for grant monies can come from the Department of Homeland Security for federal programs, regionalization, data sharing and interoperability and the PSIC grant program. Consolidation is the ultimate interoperability effort. When multiple public safety agencies are served by the same staff, telephony, voice systems and other automated systems, true interoperability is implemented. Through consolidation, Sussex County can continue to be fundamentally important to the region by supporting and potentially further qualifying the region for interoperability grants.

There are future funding opportunities that can accompany converging networks into a system-of–systems, commonly referred to as NG9-1-1. The goal for a next generation emergency services network is the ability to communicate from "any device, anywhere, anytime." This broad statement sets the vision for allowing an emergency event to be captured no matter the circumstance. A next generation system is the foundation for:

- Improved natural disaster management
- Full support of new communications and information technology
- Use and enhancement of increasingly available sources
- Broadband network with flexible, robust, reliable access
- Improved accessibility and increased compatibility

A next generation system-of-systems in a consolidated environment has the potential to dramatically support and improve homeland security in the region and can increase revenue opportunities in areas of VoIP applications, ACN, telematics, tracking devices and other location-based services. The technology trends and increase in how location-based services are and can be used to enhance public safety-related services, including the ability to obtain data and images from the public, provides an opportunity for the County to improve service delivery, reduce operating costs and create new revenue opportunities. Funding opportunities that directly support these advancements include the NTIA/DOT-supported E9-1-1 Act that supports VoIP and wireless upgrades to PSAPs with an initial grant round of $250,000,000. (The sale of the 700 MHz band is projected to net $42.5 billion.) Interoperability grants, such as the data interoperability component of the current PSIC grant program provides the lion's share of funding to the UASI regions. Sussex County may be able to benefit from the New York/New Jersey UASI through potential additions to the statewide voice and data ESInet. Using the existing state systems will provide cost savings on infrastructure. Future state initiatives may also expand into Sussex County. This prospective funding will support many of the initiatives that include data interoperability components.

7.5 GRANT OPPORTUNITIES

7.5.1 PSAP Construction/Renovation Funding

The County OEM staff submitted a grant application for the FEMA FY2010 EOC Grant Program. The FEMA EOC grant program "…provides funding for the construction or renovation of a state, local or tribal governments' principal EOC." The NJ-designated state administrative agency (SAA) administers the awarded funds. FY2009 and FY2008 applications by the County OEM did not result in grant awards. For the FY2010 submission, in an effort to improve the chances of award, the County included the EOC floor plan and cost estimate provided by Kimball. The fact that Sussex County does not currently have a county EOC may also improve chances of an award. Though no specific reason is known for the past declined applications, it is thought by County staff that the County's location just outside of the UASI region and politics may have played a part. If the County is not awarded in the FY2010 round, efforts to apply each year funding is offered and to enhance the application should continue

7.5.2 New Jersey Higher Education Capital Improvement Fund Act, Title 9A, Chapter 12

One site evaluated as a potential location for a countywide consolidated PSAP was the SCCC campus. If this site is selected, capital improvement funds could be applied for through the Higher Education Capital Improvement Fund Act.[27] Precedence has been set by a neighboring county that benefited from this act by locating the county EOC inside a college campus structure. The funding criteria applicable to the Sussex County initiative states "[u]se the funds for renewal or renovation of instructional, laboratory, communication, research, and administrative facilities..."[28] The SCCC is funded by the County and as such will benefit from a partnership in pursuit of these funds. An option for consideration by the County and the SCCC is to plan a facility that can also house and meet campus security needs. This facility could also greatly enhance any communications-based curriculum offered now or in the future by the SCCC. The consolidated PSAP could contain an active laboratory for public safety telecommunications training for county staff and SCCC students.

7.5.3 American Recovery and Reinvestment Act

The ARRA[29] of 2009 is intended to stimulate demand for broadband, growth and jobs. Within this grant program are components that specify improvements to public safety communication systems as part of state, region or local broadband access and networks. The key to a successful award of these funds is creativity through unique partnerships that are beneficial to the community(s) served, specifically where job creation is a goal.

Opportunities exist to jointly apply for funding with federal agencies/organizations; DOT; hospitals and health care providers; school boards; recovery agencies, such as the local American Red Cross; public utilities and public/private partnerships. A myriad of networks currently exist in the County that should be viewed as opportunities to find ways to share networks. These opportunities can be developed into applications for broadband grants. Existing and planned public safety networks and infrastructure can be leveraged with other networks and infrastructure located in Sussex County to apply for funds to expand and enhance the networks and infrastructure, with specific benefit to public safety uses.

[27] http://www.michie.com/newjersey/lpext.dll
[28] § 9A:12-1.4. Funding criteria
[29] http://www.recovery.gov/Opportunities/Pages/Grants.aspx

7.5.4 Association of Public-Safety Communications Officials – International (APCO) Public Safety Foundation of America (PSFA)

The PSFA grant program[30] funds planning and coordination, strategic initiatives, PSAP equipment and technology and education. In order to apply for these grant funds, the application must be submitted by one of the following:

- APCO International Committees and Approved Project Groups and Task Forces
- APCO Partner Organizations (non-profit only)
- APCO Subsidiary Organizations and Parent

Before engaging the APCO state chapter in discussions regarding potential funding application, the County must have a clear plan pertaining to the project type for which funding is sought, such as implementing a countywide consolidated PSAP or technology and equipment.

7.5.5 Other Opportunities

Additional Department of Homeland Security Grant opportunities that Sussex County staff are already familiar with and have no doubt applied for or have received funding from are the MMRS Program[31] and the IECGP[32]. The MMRS is for the "…integration of emergency management, health and medical systems into a coordinated response to mass casualty incidents caused by any hazard." The IECGP is to "…improve interoperable emergency communications, including communications in collective response to natural disasters, acts of terrorism and other man-made disasters." Both programs are viable methods of obtaining funds to further interoperable voice and data communications.

7.6 LEGISLATIVE PROVISIONS (EARMARKS)

Legislative provision for funding all or a portion of the capital costs may be possible if Sussex County Freeholders or representatives are able to build a relationship(s) with one or more state representatives. This method may take years to develop and may not yield positive results. There is no assurance that a specific amount will be awarded. Typically, these provisions are for projects that exceed $500,000 and awards may only constitute a portion of the requested amount. Requirements stipulate that no other funding source be available or sought while pursuing these provisions.

7.7 ADDITIONAL FUNDING SOURCES

Funding from other services, such as monitoring services for partnerships with DOT, local hospitals and/or backup support for neighboring jurisdictions, are possible sources of additional revenue. Specialized services provided on a local or regional level, such as call taking/dispatching support for special events, can be offered by consolidated PSAP staff on a fee basis. Smaller revenue amounts can be realized through other fee-based services, such as producing tapes of recorded calls or dispatches for use

[30] http://www.psfa.us/Grantseekers.html
[31] http://www.dhs.gov/xlibrary/assets/grant-program-overview-fy2010.pdf
[32] ibid

in investigations and in court cases. Fees may be waived for internal law enforcement and fire / EMS requests / complaints and assigned only to external investigations or evidentiary uses. Alarm fees may also be a small benefit to the consolidated PSAP if a percentage of the collected fees are distributed to the operational budget.

7.8 FUNDING OUTLOOK

While non-revenue-producing operating expenses are ultimately borne by taxpayers, discovering revenue opportunities that will grow and evolve with advancing technologies and provisioning the cost of these services is a challenge of all local governments. Shared service models are prevalent among public safety agencies, though often the most resisted. The County is positioned to recognize cost efficiencies and increase quality of service through consolidating the services currently delivered by the existing PSAPs.

8. FACILITY

In March 2009, Kimball personnel visited the six PSAPs to inventory equipment and systems, and review the available space for expansion potential to accommodate a countywide PSAP and EOC.[33] Based on information gleaned from these site visits and the age, condition and capacity of each facility, Kimball determined that the current facilities that house the six PSAPs do not appear to be of size and capacity, or expansion, to house a countywide consolidated PSAP and EOC. The space and technology needs of a modern consolidated PSAP and County EOC for Sussex County citizens and response agencies is best served in a new facility constructed using industry standards and best practices.

Planning a consolidated countywide PSAP to be co-located with a County EOC will save construction costs through use of shared spaces, systems and equipment, and utilities. Service efficiencies will be gained from the co-location of these services and improved coordination can be realized among the response and recovery agencies countywide.

While the current PSAPs are well-suited for individual agency needs, the site visits and high-level assessments determined that conditions in some of the PSAPs are contrary to current emergency PSAP standards and best practices. Observations indicated the following exist in some of the PSAPs:

- 9-1-1 consoles and administrative offices supported by multiple equipment rooms located in different areas of the building.[34]
- Equipment mounting and clearances below industry standards.
- Limited or non-existent cable management.
- Operations areas furnished with minimal emphasis on the necessary durability and ergonomics for a 24-hour operation.
- Heating, ventilation, and air conditioning (HVAC) systems not dedicated to the operations area and/or telecommunication equipment spaces; equipment may be part of the same system servicing the entire building. May have problematic or insufficient HVAC systems.
- Existing facilities' physical layouts and adjacencies dictated by the confines of the spaces provided.[35]
- Minimal or lacing amenities for the PSAP staff, such as kitchen facilities, food storage, break rooms, lockers, and/or quiet rooms.

To move forward with consolidation planning, a new facility will be necessary or an existing suitable building of sufficient size would have to be located and renovated. Any existing facility would need an in-depth analysis to determine what, if any, renovations would be needed and what those renovations would actually involve, and to estimate the associated costs for those renovations. While initially renovation seems like the less expensive path to follow, in reality it can be more expensive than new construction. Renovation costs can be high when attempting to bring an existing older building up to current codes required for a modern hardened facility.

[33] Refer to Appendices B through G for synopses of the current conditions.
[34] Industry standards and best practices recommend a centralized common equipment room used to house critical communications equipment.
[35] Size and configuration of most small centers may seem appropriate for their current intended use and budget; however small centers can become quickly overloaded in the midst of a large-scale event.

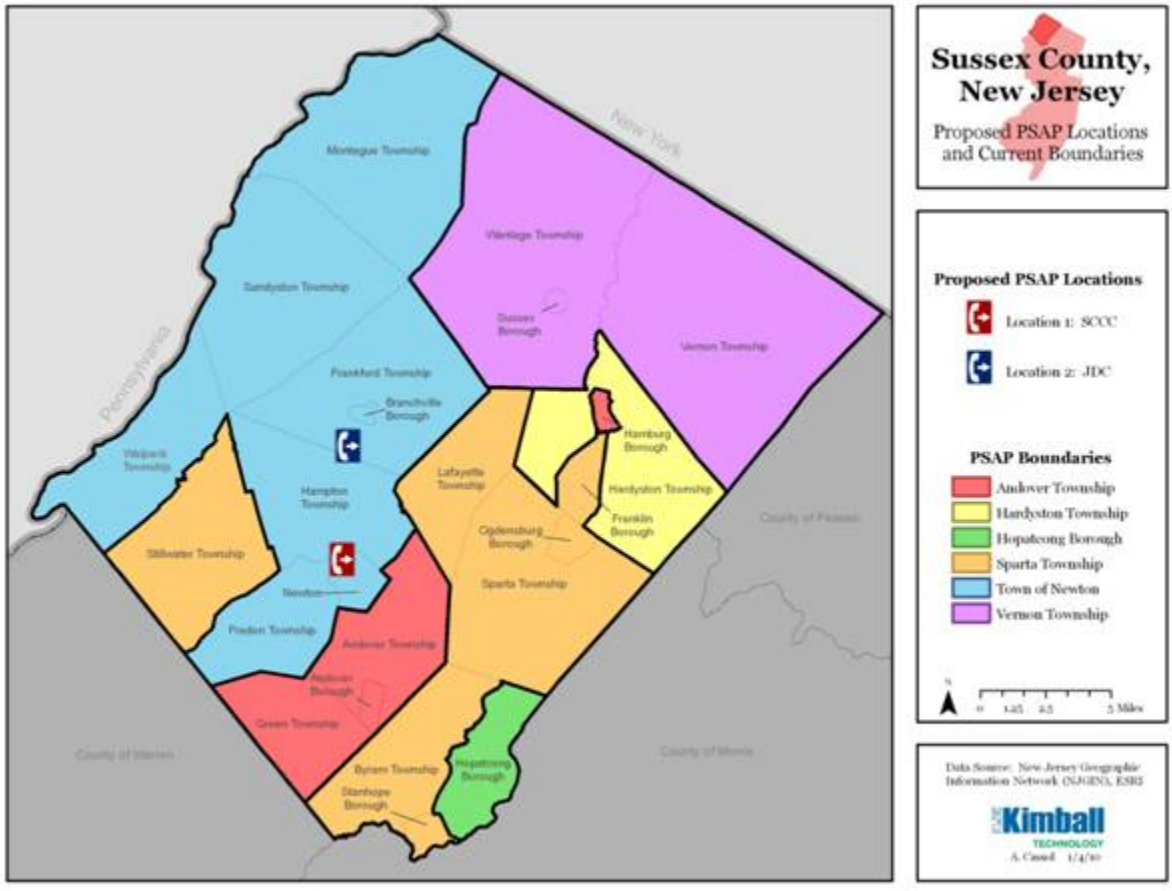
8.1 SITE SELECTION

On December 16, 2009, TWG representatives Keith Armstrong, John Drake and Skip Danielson accompanied Kimball and sub-consultant architect Tim Lisle of Jacobs Wyper Architects on site visits to three prospective locations under consideration for a future consolidated PSAP. The sites are:

- Juvenile Detention Center (JDC), Frankford Township
- Sussex County Community College (SCCC), Newton NJ
- Wheatsworth Road, Hardyston Township

A site evaluation report, prepared by Architect Tim Lisle, determined that the JDC and SCCC are viable sites for a proposed consolidated PSAP. The evaluation report provides support for excluding the Wheatsworth Road site from further consideration as it "does not provide the necessary land area and security stand-off dimensions required for proper planning of a new consolidated PSAP."

The map below illustrates the locations of the two viable sites.



The JDC site was deemed most viable due to the ease of access, proximity to other County facilities and the potential infrastructure and cost efficiencies for infrastructure connections. Alternately, the SCCC site may be better suited for EOC operations due to the proximity to county government offices.

The site evaluation report and sketch site plans for the JDC and SCCC sites follow the appendices.

8.2 FACILITY COSTS

On December 18, 2009, Kimball and architect Tim Lisle of Jacobs Wyper Architects, a sub-consultant of Kimball, conducted a preliminary programming exercise to determine the approximate sized facility. This information also provides a projected budgetary cost for the facility. Projecting accurate costs for a new facility requires a much higher level of detail and planning than is within the scope of this project. However, broad budgetary numbers can be developed to be used as a planning starting point for the County.

To determine the budgetary numbers below, Kimball combined industry best practices, average construction costs per square foot, and the preliminary programming[36] of the facility. By combining these criteria with 20-year growth projections and ten recommended console workstations, an overall estimate for building size and cost can be calculated. The budgetary construction cost of a new countywide consolidated PSAP for Sussex County is approximately $7,195,312. This figure represents a preliminary estimate for a ~13,300 square foot facility to house the PSAP and County EOC and does not include architectural fees, utilities and technology.[37] This estimate includes minimal site development and the general base building; it does not include site acquisition and improvement costs, if needed. As with any planning estimate, costs will need to be adjusted once a complete and in-depth space programming study is completed and other decisions regarding amenities and number of work positions are made.

8.3 NEW FACILITY PLANNING—BEST PRACTICES

An overview follows of industry best practices for planning an emergency PSAP and EOC that should be considered if the County proceeds with construction of a new facility or significant renovations to an existing building.

The design of a space intended to support 24/7/365 operation must meet the needs of a modern PSAP and EOC. Of great importance is the comfort and safety of the employees and the capacity of the space to address the County's current needs, as well as the needs for the next ten to twenty years. A hardened design is desired and intended to allow this operation to continue when the surrounding community is affected by power outages, severe weather events, manmade and/or natural disasters; in essence, to be the last building standing. Understandably, there are compromises and decisions required to accommodate limitations in funding, vision and even, at times, politics. The effort and attention given to the design of new a facility, and specifically to the allocation of the communications space and support areas by the facility occupants, will determine the capacity and life span of the structure, service and, ultimately, the organization.

[36] The preliminary programming exercise follows the appendices.
[37] See Section *7 Costs and Funding* for an inclusive cost analysis.

The industry standards cited and used to guide the design input and technology best practices recommended throughout this report include the OETS Statewide 9-1-1 Enhanced Emergency Telephone System requirements, NFPA Section 1221, CALEA, NENA, and APCO. These standards-setting entities also provide standards and guidance in the operations and technical aspects of a modern emergency PSAP. Kimball's experiences and lessons learned from previous emergency PSAP programming and design efforts provide application perspective on the impact of each of these standards. The National Electrical Safety Code (NESC); the latest edition of NFPA 70, National Electrical Code (NEC); American National Standards Institute/Telecommunications Industry Association/Electronic Industries Alliance (ANSI/TIA/EIA) standards; the BICSI Telecommunications Distribution Method Manual (BICSI-TDMM); and Motorola R56 Standards and Guidelines for Communication Sites impact the electrical and cable infrastructure. The Institute of Electrical and Electronic Engineers' (IEEE) standards impact electrical, grounding and communications systems design.

Additional consideration must be given to codes adopted by the local jurisdictional authority. For example, if the County follows the most recent version of the International Building Code (IBC), specific criteria must be followed to ensure the stability and integrity of buildings identified as critical facilities.

8.3.1 Design Options and Spatial Requirements

Several design options support the operational concept for a consolidated organization or a co-located services organization. Space requirements are dependent on which option decision-makers choose. Space requirements for a consolidated PSAP are less than that of a co-located facility. In emergency communications operations, the number of workstations drives the floor and adjacency needs. Industry standards[38] provide direction in determining the amount of space required to properly support emergency communications within a range of SF based on the organizational and operational model. The number of required workstations is developed by first reviewing the future operations of the PSAP and determining the number of personnel required for the workload. The quantity of positions is then determined to support the required staff. Training needs and future expansion must also be taken into consideration.

Programming based on the concept of a consolidated organization provides a range of available SF on a per console basis. To adequately support the current workload in a consolidated environment, ten workstations are needed. An additional space allotment on the main floor should be given to accommodate two future consoles.

The number of workstations projected for an operation is used in combination with the amount of SF per position to project the total work area of the emergency PSAP floor.

As in the preliminary programming exercise, consideration must be given to providing space for areas such as administrative offices, a training room, a kitchen, locker space, storage, hallways and bathroom facilities. Detailed key aspects related to the call center and supporting elements follow.

8.3.1.1 Call Center Workstations

Within the allotted space, each position can require up to 175 SF of floor space per workstation and work area on the operations floor. The 175 SF represents the individual footprint of a position as normally fitting within a 10-foot by 10-foot area (100 SF) with the remaining 75 SF representing the necessary areas surrounding the furniture footprint, such as pathways, open areas, doorway access and clearance

[38] NFPA 110 and 1221, IEEE, Motorola R56, NENA, APCO

allowance in compliance with the Americans with Disabilities Act (ADA). This preliminary spatial allocation number is generally used for planning and can fluctuate with various room configurations and/or system furniture solutions.

Additional space is necessary to accommodate the following adjacencies:

- Pathways
- Chair and personal space
- Open areas
- Doorways access
- Clearance allowance in compliance with ADA
- File cabinets
- Paper/Form storage
- Resource materials
- Other office equipment requiring immediate access

Appendix H contains a diagram of a generic or typical ergonomic dispatch workstation, followed by a fixture schedule identifying the various systems and equipment normally installed at the workstation.

8.3.1.2 Equipment Rooms

An allowance of 25 SF is standard to accommodate the footprint of each enclosed equipment cabinet or rack with a minimum three-foot clearance around. This also includes aisle-ways, accommodations for doors and room shapes/sizes, clearance for wall-mounted equipment, fire suppression and cabling infrastructure.

8.3.2 Infrastructure

Appropriate infrastructure design for the operations area, adjacencies and equipment rooms will have a significant and critical impact on the operational capabilities of the PSAP and, therefore, requires industry-specific standards application.[39] A separate sealed HVAC is necessary to sustain both air quality in the center and continued operation during short- or long-term power failure. Sufficient power for the center must be ensured and a quality generator capable of powering the center for extended periods of time will be needed. A sufficient uninterruptible power supply (UPS) solution will be necessary to avoid the loss of any equipment and systems.

8.3.3 Utilities

Separate service entrances and redundancy are desired in support of emergency communications. Utilities to this area must be secured. Multiple source points and use of underground lines should secure power, voice and data cable entrances. Multiple source points of gas lines and water should also be considered. Creating or extending service modes/infrastructure into or through unsecured areas of the facility or external grounds may also create opportunities for points of failure or targets. For example, designing a secure enclosed area for a generator, but leaving fuel tanks in an unsecured/non-enclosed area, compromises the security of the facility.

[39] NFPA, Motorola R56, IEEE

8.3.4 Security

Security will need to be included in new facility planning. The main entry doors should have security cameras for reviewing access and egress. All external doors should have a swipe card security system for entry to the building. This will allow all employees ease of access and will provide the capability to record when doors are opened and by whom. Doors should be allowed to be opened from the inside without a card to allow visitors egress without assistance. Though the 24/7 operation of the emergency communications center requires monitoring and remote control of the security system, the primary responsibility of monitoring and controlling access to the building during normal business hours should be accommodated elsewhere in the facility. The PSAP, however, should maintain direct control over access and egress of the PSAP area.

A fence should be constructed around the perimeter of the facility for added security. This includes an entry gate to the parking lot. This gate should operate with a swipe card system and have an intercom system allowing visitors to speak with an employee and request entry to the facility. Appropriate lighting of all parking areas, entrances and pathways is required to provide safe arrival and departure for the communications staff on all shifts. Dedicated close proximity and secure parking is desired to enhance the security provided for PSAP employees.

Security levels will need to be established for the facility as a whole and where additional hardening is deemed necessary, such as the PSAP and equipment rooms. Internal doors needing restricted access could utilize the swipe card system and could be programmed to allow access to management-level employees only.

8.3.5 Acoustics

PSAP walls should be covered with an acoustic tile that will serve to prevent sound from reverberating throughout the room. Finish materials and building configuration should be designed to absorb ambient noise.

8.3.6 Lighting

PSAP lighting should consist of indirect and/or task lighting. Dimmers or multiple switches should be used to provide different light levels for different shifts. This will provide a more pleasing work environment and will help to reduce computer screen glare.

8.3.7 Floor

A new facility should have a raised computer floor installed in the PSAP and the equipment room(s) if possible. The computer floor will need to be a minimum of eight inches higher than the existing floor and is typically comprised of two-foot square floor panels. The floor panels can be purchased with static dissipative carpet or other sound reduction material/coating on the topside for use in the PSAP. This will allow for a much quieter operation in this area. The equipment room panels should be static dissipative, but not carpeted.

8.3.8 Cable Infrastructure

Cable trays should be placed under the raised floors in the PSAP and the equipment room. Cable trays will allow all cabling to be strategically routed from equipment to their termination point. An organized cabling system allows for future access for move, add or change activity. Consideration should be given to color-coding the different cables (radio, telephone, CAD network, admin network, etc.) and/or labeling each cable every few feet to facilitate troubleshooting and repair. Proper grounding of all equipment is critical and should be per Motorola R56 specifications or equivalent. Overhead feeds from equipment rooms that require transition to the floor cable trays should follow the same requirements for placement. User outlets should be coordinated with furniture layout.

8.3.9 HVAC

The PSAP will need dedicated and redundant HVAC systems that will maintain a near-constant temperature and humidity level in the operations room and the 9-1-1 equipment rooms. This will increase the life cycle of all electronic components and lessen the chance of a system failure due to lightning or static electricity.

8.3.10 Fire Suppression

A double interlock dry pre-action fire suppression system should be used in areas where mission critical equipment is located. This system type is designed to minimize the likelihood of water leakage in the equipment rooms by keeping the piping in that room sealed from the main supply until activation. The remaining facility will need to be properly sprinkler protected for fire suppression as required by code.

8.3.11 Power

A UPS should be installed that will support all computer, telephony and electrical equipment in the event of a power disruption. A generator that can support all essential equipment in the event of an electrical power interruption should enhance this.

8.3.12 Other Services

Power, water and communications service providers should be contacted as early as possible in the planning process. Confirming the availability of the appropriate level of a specific utility and explaining the increased service needs due to increased use, redundancy, diversity and backup system requirements will allow adequate time for utility planning, preparation and installation.

8.3.13 Traffic Study

A formal traffic study should be conducted to gauge the area's current traffic flow and the impact the impending center's staff transportation activity will have on it; this will assist in determining additional traffic signage, signaling requirements and site (driveway) entry point options consistent with the respective DOT's associated policies.

8.3.14 Ductbanks

Ductbanks will be required for communications and electrical service. Separate trenches are preferred, but are not always practical. Industry guidelines and Kimball experts recommend that electrical conduits

and telecom conduits maintain a minimum separation of 36 inches when co-located in the same trench. Ductbanks should be encased in concrete throughout their entire length. At transition points where ductbanks terminate at the base of respective utility poles, and cables are routed from underground to aerial facilities, the communication trunk cables and electrical power feeder cables should be encased with U-Guard up the side of the pole. The U-Guard should extend into the conduit; no cable sheath should be exposed. Industry guidelines and Kimball experts recommend that this facility employ diverse path routing for both the electrical feed and the communication trunk cabling. This will require communications and power to each have two separate ductbanks, each routed to opposite sides of the site's perimeter.

The optimum power configuration includes two appropriately sized UPS units fed from two separate power grids. To provide the highest level of redundancy, each grid transformer feeds to one of two UPS units; each UPS is capable of supporting 100 percent of the power load and backing the other up in the event one should fail.

The optimum communication configuration is comprised of two groups of trunk cables with each group routed through separate communication ductbanks. The trunks are then extended to separate end central offices. Each trunk group should be capable of managing 100 percent of the communication circuits and be configured to automatically route circuits from one trunk group to the other in the event one trunk group goes into a fail or overload condition.

8.3.15 Other Requirements

Equipment room layout requirements are addressed by all affected parties such as the designers, contractors, service providers and vendors. Prior to installation, the following questions must be addressed:

- Will racks and/or cabinets be used?
- How will voice cables terminate—backboard or rack?
- How are data cables for the automated systems terminated? On which racks?
- What will go in each rack—power and HVAC system requirements, cross connections to adjacencies?
- Is tie cabling needed for mobile unit parking location and connection or a tower shelter?
- What are the demarcations requirements regarding rack space, backboard space, power, OSP conduits quantity and site perimeter termination point?
- How many antenna cable conduits to rooftop and/or tower for public safety radio and amateur radio (RACES) are needed?

Facility design should include an outlet floor plan that provides for the following:

- Outlet composition to include cable quantity and type for voice, data, cable television (CATV), radio, 9-1-1 telephony, private branch exchange (PBX) or IP circuits for administrative phone system, CAD and LAN for the center and also standard administrative outlets
- Outlet locations inside each room including the support, administrative and management area of the building need to be considered; access off the communications area floor for the various

technologies such as telephone management information system (MIS), CAD and digital recorder remote playback and monitoring will be needed

- Floor box locations
- Optional or future components
    - Overhead projection locations (overhead projector links for presentation input)
    - Video panel locations
    - Wall clocks
    - Message board locations

Audio-Visual design considerations should include video distribution and input/output requirements (e.g., switching and matrix equipment).

Additional operational issues, equipment or systems to consider include:

- Video monitoring (on-site closed-circuit television (CCTV) camera system)
- Security monitoring (electronic security and access control)
- Interoperability patch (NAWAS, Local Help and National Call channel monitors)
- Municipal alarm monitoring (government buildings, schools, banks, etc.)
- Emergency notification system (e.g. Reverse 9-1-1)
- Traffic signal liaison and/or DOT video feeds
- Animal control
- Warrant service
- NCIC/SCIC
- Parking enforcement
- Vehicle towing/impound, vehicle identification number (VIN) assistance
- Emergency management systems
- Homeland security
- Radio site/system manager
- Portable backup radios
- Master clock time display
- Network printers
- Fax machine

8.3.16 System Training Room

The consolidated PSAP and County EOC will need to construct an area to provide training for new employees. Call takers and dispatchers must master a wide range of interpersonal and technical skills and must perform their functions in a high-stress mission critical mode. There is an ongoing need for call takers and dispatchers to maintain their existing proficiency and skills. A well-equipped systems training room or area will provide the required training environment and equipment to carry out this critical training away from the operations floor and from the distractions found inside a 'live' PSAP.

Kimball recommends a dedicated systems training room or area with the following elements:

- One or two position system training room or area
- Positions should be identical to the consoles on the operations floor and should be equipped with CAD, phone and radio to support training and live calls

Training area can be used for new employee training and ongoing existing employee training, incident overflow during high periods of call activity (severe weather) and can be staffed with additional call takers or dispatchers for special operations, EOC activations and other activities, and to monitor employee activity and perform quality assurance.

9. 9-1-1 TELEPHONY

The six PSAPs all utilize KML 9-1-1 equipment; installation of the equipment occurred in 2004. As the systems and PCs have been in use for five years, now is the time to explore upgrading or replacing the systems with an IP-based technology.

OETS has established default/alternate routing paths that are intended to provide backup layers/levels to each PSAP in Sussex County. Each PSAP receives alternative/default routed 9-1-1 calls from other PSAPs in Sussex County in a 'round robin' configuration. This configuration presents a problem as calls received by an alternate PSAP cannot be processed. For the most part, the alternate PSAP is unable to log (via CAD) or dispatch the calls for service. The operational impact and the dangers of this pseudo-backup plan are detailed below. Descriptions of the current backup plans for each PSAP follow.

The Andover PSAP, located at 145 Lake Iliff Road in Newton, currently has two call taker positions. The Andover PSAP has the Newton PSAP as their first alternate backup. OETS lists the second alternate backup number as 973-697-4751; the Hardyston Police Department used this number in the 1990s. This number has not been in service since approximately 2005. This leaves the Andover PSAP with only one alternate routing/backup level. The Newton PSAP is not able to process calls routed from the Andover PSAP and must transfer the calls back to Andover, creating further congestion, delayed response and the potential for lost calls. The Andover PSAP is the third alternate backup for the Hardyston PSAP, the second alternate backup for the Hopatcong PSAP, and the second alternate backup for the Newton PSAP.

The Hardyston PSAP, located at 149 Wheatsworth Road in Hardyston, currently has two call taker positions. The Hardyston PSAP has the Vernon PSAP as their first alternate backup, the Sparta PSAP as their second alternate backup and the Andover PSAP as their third alternate backup. OETS lists the fourth alternate backup number as 973-697-4751. As mentioned previously, this number has not been in service since approximately 2005. The number formerly routed to Hardyston, which would make Hardyston its own fourth level backup. The PSAPs in Vernon, Sparta and Andover are not able to process calls routed from the Hardyston PSAP and must transfer the calls back to Hardyston, creating further congestion, delayed response and the potential for lost calls. The Hardyston PSAP is the first alternate backup for the Vernon PSAP.

The Hopatcong PSAP, located at 111 River Styx Road in Hopatcong, currently has two call taker positions. The Hopatcong PSAP has the Sparta PSAP as their first alternate backup and the Andover PSAP as their second alternate backup. OETS lists the third alternate backup number as 973-697-4751. This number has not been in service since approximately 2005. The PSAPs in Sparta and Andover are not able to process calls routed from the Hopatcong PSAP and must transfer the calls back to Hopatcong, creating further congestion, delayed response and the potential for lost calls. The Hopatcong PSAP is the first alternate backup for the Sparta PSAP.

The Newton PSAP, located at 39 Trinity Street in Newton, currently has three call taker positions. The Newton PSAP has the Sparta PSAP as their first alternate backup and the Andover PSAP as their second alternate backup. OETS lists the third alternate backup number as 973-697-4751. This number has not been in service since approximately 2005. The PSAPs in Sparta and Andover are not able to process calls routed from the Newton PSAP and must transfer the calls back to Newton, creating further congestion, delayed response and the potential for lost calls. The Newton PSAP is the first alternate backup for the Andover PSAP, the second alternate backup for the Sparta PSAP, and the second alternate backup for the Vernon PSAP.

The Sparta PSAP, located at 65 Main Street in Sparta, currently has six call taker positions. The Sparta PSAP has the Hopatcong PSAP as their first alternate backup and the Newton PSAP as their second alternate backup. The Sparta PSAP uses 973-383-5544 as their third alternate backup; the number is a ten-digit number for the Andover PSAP. The PSAPs in Hopatcong, Newton and Andover are not able to process calls routed from the Sparta PSAP and must transfer the calls back to Sparta, creating further congestion, delayed response and the potential for lost calls. The Sparta PSAP is the second alternate backup for the Hardyston PSAP, the first alternate backup for the Hopatcong PSAP, and the third alternate backup for the Newton PSAP.

The Vernon PSAP, located at 21 Church Street in Vernon, currently has two call taker positions. The Vernon PSAP has the Hardyston PSAP as their first alternate backup and the Newton PSAP as their second alternate backup. The Vernon PSAP uses 973-383-5544 as their third alternate backup; the number is a ten-digit number for the Andover PSAP. The PSAPs in Hardyston, Newton and Andover are not able to process calls routed from the Vernon PSAP and must transfer the calls back to Vernon, creating further congestion, delayed response and the potential for lost calls. The Vernon PSAP is the first alternate backup for the Hardyston PSAP.

Each PSAP has two 9-1-1 trunks from the New Brunswick Tandem and two 9-1-1 trunks from the Madison Tandem. Verizon provides the 9-1-1 trunks for all PSAPs. Each PSAP appears to have little or no backroom equipment.

The KML 911 equipment was installed in 2004, approximately. The equipment is no longer under contract with the manufacturer for maintenance; the individual PSAPs provide all service, including parts. The equipment is designed to work with the DMS Central Offices. The call taker positions at each PSAP have a control box that connects to the DMS Central Office and a serial connection to the PC workstation in addition to the handset/headset. ALI links connect to the PC workstations. The control box has buttons that allow the call takers to go ready/not ready and make set busy. The KML software in the PC logs into the automatic call distribution (ACD) system in the DMS Central Office, enabling calls to be sent to the respective positions.

9.1 STREAMLINING THE 9-1-1 NETWORK

With the current network configurations in place and the six PSAPs backing each other up, this is, in concept, a good technical environment for proceeding with a consolidation plan. The issues identified above and the impact, which is expounded upon below, must be corrected before the physical migration of PSAP staff and operations into a consolidated PSAP. After the consolidated PSAP is built and operationally ready to receive traffic, new 9-1-1 trunks would have been installed with dictated test numbers at the facility that will allow 9-1-1 calls to this new trunk group. As individual PSAPs transition to the new facility, their respective alternate PSAPs could handle incoming calls during the time it takes to complete their transition. Verizon could then switch the emergency service numbers (ESNs) for the respective agency to the new trunk group. Switching ESNs will not cause in-progress 9-1-1 calls to be lost and will provide an easy back out plan should one would be needed for any reason. After the ESN switch, the first new calls would be delivered to the consolidated PSAP.

It may not be feasible to alter the backup plans in a manner that will allow alternate PSAPs to fully process the routed calls. If the current backup situation remains, the recommendation would be to transition one PSAP per day, which allows any problems to be corrected before the next PSAP is cutover. For site cutover, the night shift could be held over while the day shift reports to the consolidated PSAP. After the morning busy period, Verizon would redirect the 9-1-1 traffic from the PSAP to the new ESNs so that no in-progress calls would be lost. The next 9-1-1 call would be delivered to the consolidated PSAP. After the transition is complete and no problems are detected, the night shift is released and any reference materials can be moved to the consolidated PSAP, completing the transition.

The consolidated PSAP will allow for the significant reduction of 9-1-1 trunks from each tandem. Currently each PSAP has two trunks from each tandem; while only one trunk may be needed, Verizon recommends two so there is a backup. This diversity is important for a small PSAP, but will not be needed if consolidation occurs. The consolidated PSAP will be provisioned with more than two trunks from a tandem.

9.2 CURRENT BACKUP PLAN

Critical issues exist in the current backup routing plans for each PSAP. Kimball understands that this or a similarly configured plan has been in place since the mid 1980s. The plans also contain a ten-digit alternate number that was disconnected approximately four years ago. The concept of the PSAPs providing backup to each other is commendable. The inability to process routed calls via CAD or to dispatch the calls is extremely dangerous. The alternate PSAPs can only identify where the call should be processed; the only available option is to transfer the calls back to the original PSAP. This 'bounce-back' call routing process is a significant threat to life and property countywide.

The most critical time this issue will emerge is during periods of man-made or natural events when the PSAPs are overwhelmed. In 2000, flooding and landslides in Sussex County took out 9-1-1 access to several PSAPs. 9-1-1 calls were fielded by other PSAPs in the county and relayed back via ten-digit lines and dispatched via portable. This is not the time for the system to fail. This alone should be a driving force for pursuing consolidation. A consolidated center with an appropriate number of trunks can be self-supporting. Warren County, New Jersey is a prime example. Anecdotal information indicates that Warren County, with the day-to-day call volume fluctuation, has never experienced an overflow call situation. Man-made or natural catastrophic events will most likely create an overflow, but mutual aid agreements and appropriate and updated alternate routing plans should be in place to properly address these infrequent or rare occasions.

9.3 NEXT GENERATION 9-1-1 (NG9-1-1) PREPARATIONS

With the consolidation PSAP effort, this is an ideal time to upgrade the equipment to IP-based technology to prepare for NG9-1-1. The i3 standards that comprise NG9-1-1 have not been released, but an IP-based solution is the first step in that direction. Some view this as an i3-ready interim solution that will allow PSAPs to connect directly to ESInet services once ESInets are in place at the county or state level. Investing in an IP-based solution will also allow integration with an ESInet without additional investment in interfacing hardware and will aid in the system support of the i3 standards when released.

NG9-1-1, when available, will allow the general public to make a 9-1-1 call from any wired, wireless or IP-based device and allow the emergency services community to take advantage of advanced call delivery and other functions through new internetworking technologies based on open standards. This will allow originating calls from more devices and services, such as wireless phones; SMS; video; text messaging from PDAs, Blackberrys, etc; telematics, such as On-Star; and medical devices.

Callers will route automatically, based on location, to the correct PSAP. NG9-1-1 will also allow additional paths to send data flow downstream to CAD, EOCs, hospitals and other supporting sites.

10. RADIO SYSTEMS

Just as service efficiency and effectiveness are enhanced by consolidating PSAP resources, consolidating radio resources improves communications efficiency and effectiveness. Shared radio systems can improve coverage, capacity, and interoperability. Shared interoperable communications systems also allow public safety agencies to acquire advanced communications technologies that would otherwise be cost prohibitive.

Several initiatives have been undertaken by the County to explore options for developing a countywide shared public safety communications system. In 2007, RCC Consultants provided the County with propagation studies for mobile coverage for existing tower sites in the county. RF Design and Integration, Inc. provided the County with a design for a countywide VHF simulcast paging system. In 2008, Motorola, Inc. provided a proposal for a countywide UHF P25 (digital) trunked radio system.

The County's terrain and location present challenges for designing and implementing public safety radio systems. The mountainous terrain is an impediment to providing wide area coverage from tower sites. The proximity to the urban centers of New York City and Philadelphia results in serious constraints on available frequencies to expand existing systems. In addition to licensing constraints, existing frequencies may not be suitable for use in trunked radio systems because of co-channel interference.

Much of the County's radio public safety communications is currently on VHF Low Band (30-50 MHz). While VHF Low Band has the greatest propagation, it is gradually being abandoned by public safety agencies because of the problems inherent with VHF Low Band spectrum. These include excessive noise and "skip" interference. There has been a steady decrease in the availability of VHF Low Band equipment. When developing shared systems, it is important to note that VHF Low Band spectrum usage is gradually decreasing.

RCC's composite maps indicated that existing tower sites, when including the Sheriff's Sunrise Mountain site, provide VHF High Band (150-170 MHz) coverage for nearly the entire county. Since the RCC coverage studies were conducted for mobile coverage, any system requiring portable coverage would require additional coverage studies. The RCC propagation maps were produced using a delivered audio quality (DAQ) standard of 3.0 on a 5.0 scale and 90 percent coverage reliability. A typical public safety coverage requirement for a new system would be a DAQ of 3.4 and 95 percent coverage reliability. The coverage areas depicted by the RCC maps are, therefore, greater than would be predicted using the typical public safety coverage criteria. While the VHF High Band would provide good coverage from existing towers in the county, it does have limitations that must be understood by the County. It will be extremely difficult to acquire new frequencies to expand the capacity of any VHF High Band system.

Consolidating existing licenses for use in a shared system would provide a pool of frequencies upon which to build a shared VHF High Band system. However, modifying these licenses will still require coordination to be licensed at new sites, which may present obstacles. The existing VHF High Band frequencies may not be suitable for use in a trunked radio system. In a trunked radio system, a continuous tone controlled squelch system (CTCSS) cannot be used to eliminate co-channel interference.

It may be possible to design a countywide shared conventional VHF High Band radio system by pooling the existing VHF High Band licenses and using simulcast technology. A conventional analog VHF system could be upgraded to P25 digital technology as funding permits. Any conventional system

solution would have to be assessed to determine whether it would meet existing and future capacity needs.

The Motorola proposal for a countywide trunked system would provide coverage and capacity to meet the County's need and provide for growth. A recent development that might provide the County with another option for developing a countywide P25 trunked radio system is the construction of a P25 700 MHz trunked radio system in the Newark UASI area in northern New Jersey. This shared interoperable radio system is being funded by the federal PSIC grant program and is being constructed for use by local agencies with the expectation that agencies can use the system's master site to build out local systems and enhance coverage to meet local requirements. Building a countywide trunked radio system using the UASI system master site could save the County a large expense and may assist in developing a strategy for a phased build-out in the county. Local use build-out of the P25 700MHz trunked radio system is occurring in other areas, such as West Orange Township, New Jersey, that border the designated UASI area. West Orange is building out two sites that will tie into the 700 MHz system and will provide mobile and portable coverage throughout the township. Since the 700MHz system is an overlay of the existing New Jersey State Police radio system, there are sites that service Sussex County. Potentially three ridge-level sites on the Morris and Sussex Counties border may provide mobile coverage to all or part of Sussex County, or can be built out, or have sites added to, to provide mobile and portable coverage.

Developing a countywide shared interoperable radio system will improve public safety communications and provide efficiencies for a consolidated PSAP. Achieving this goal will require the County to provide leadership and funding.

Understanding the funding limitations, decisions and the amount of time it will take to fully realize a countywide radio system, Kimball recommends an interim solution that requires the current radio systems to be interconnected to the planned consolidated PSAP.

While the scope of this project does not include a complete assessment of Sussex County's public safety radio systems, an understanding of both the existing systems and the County's vision for the future of its radio systems will impact decisions about connectivity investments and console procurement. For each PSAP, Kimball reviewed and identified the current radio system to which connectivity must be established and the existing connectivity method. Until the consolidated PSAP's location is established, it is not possible to recommend the most cost effective solution for accessing each radio resource.

10.1 RADIO SYSTEM CONTROL AND CONNECTIVITY

The existing PSAPs in Sussex County access local radio systems using various connectivity methods. These include direct local control of a transmitter/receiver (transceiver), RF link from the PSAP to transmitters and receivers, RF control stations from the PSAP to repeater base stations, and dedicated leased lines to transmitters and receivers. The existing connectivity methods in most, if not all, cases were selected because they were deemed the most cost effective means of connecting the PSAP to the radio resource.

With the consolidation of the six existing PSAPs to a new centralized location in the county, connectivity to these radio resources will have to be re-routed. The County will need to determine the most cost effective method to access each radio system from the new consolidated PSAP. No microwave network

connects the County's various tower sites. Sparta is currently installing microwave links from their major transmitter sites to the Sparta PSAP.

10.1.1 Sparta PSAP

10.1.1.1 Radio Resources

The Sparta PSAP accesses the radio resources identified below.

1. **Sparta Police Dispatch** (Sparta Police, Franklin Borough Police, Ogdensburg Borough Police, Byram Township Police, Stanhope Borough Police, and Stillwater Township Police)
    a. VHF High Band repeater at Morning Star site (KZR693)
    b. VHF control station from PSAP to Morning Star
    c. Receiver at Morning Star and remote receivers at Stillwater 1606, Woodport Road, Triple Crown, Stanhope Musconetcong Water Tank, and Millcreek Road sites connected by UHF RF links to Morning Star; Byram Indian Spring remote receiver connected by tie line; voting comparator at Morning Star
2. **Sparta Police2**
    a. VHF High Band transceiver at PSAP (KZR693)
    b. Direct control at PSAP
3. **Sparta EMS Dispatch**
    a. VHF High Band repeater at Millcreek Road site (WPFQ901)
    b. VHF control station from PSAP to Millcreek Road
    c. Receiver at Millcreek Road and remote receivers at Alpine Trail, Kroghs Lane, and Triple Crown sites connected by UHF RF links to Millcreek Road; voting comparator at Millcreek Road
    d. VHF High Band back-up repeater at Sussex Mills site uses different CTCSS tones and access is by RF control station from PSAP to back-up repeater
4. **Sparta Fire Dispatch**
    a. VHF High Band repeater at Alpine Trail site (WPNU751)
    b. VHF control station from PSAP to Alpine Trail
    c. Receiver at Alpine Trail and remote receivers at Millcreek Road, Kroghs Lane, Woodport Road, and Triple Crown sites connected by UHF RF links to Alpine Trail; voting comparator at Alpine Trail
    d. VHF High Band back-up repeater at Sussex Mills site uses different CTCSS tones and RF control station from PSAP to back-up repeater
5. **Sparta Township Department of Public Works Repeater**
    a. VHF High Band repeater at Sussex Mills site **(**KCP547)
    b. RF control station at PSAP to repeater
6. **County Fire**
    a. VHF Low Band transceiver at Stillwater 1606 site (KNRW518)
    b. UHF RF link from PSAP to Stillwater 1606
    c. VHF Low Band transceiver at Triple Crown site (WPNU751)
    d. 2-wire tie line from PSAP to Triple Crown
    e. VHF Low Band transceiver at Byram Indian Spring site
    f. 4-wire tie line from PSAP to Byram Indian Spring
    g. Voter comparator for receivers at PSAP
7. **JEMS 1**

a. VHF High Band transceiver at Stillwater 1606 site (WQHT666)
b. UHF link from PSAP to Stillwater 1606
c. VHF High Band transceiver at Morning Star site
d. UHF RF link from PSAP to Morning Star
e. VHF transceiver at Byram Indian Spring site
f. 4-wire tie line from PSAP to Byram Indian Spring
g. Voter comparator for receivers at PSAP

8. **SPEN1**
   a. VHF High Band transceiver at Morning Star site (KZR693)
   b. 2-wire tie line from PSAP to Morning Star
9. **Franklin Police 4** (portable channel)
   a. VHF High Band repeater at Franklin Police Department, 46 Main Street (WPTY660)
   b. RF control station from PSAP to Franklin Police repeater
10. **Stanhope Netcong EMS and Byram and Stanhope Public Works Departments**
    a. VHF Low Band transceiver at Byram Indian Spring site
    b. Tie line from PSAP to Byram Indian Spring

10.1.1.2 Required Connectivity

The radio systems accessed by the Sparta PSAP are the most complex in the county due to the number of sites and the remote receivers used.

In discussion with the County, it was suggested that some sites can easily be redirected to a consolidated PSAP in the Newton area by moving the UHF RF radios used for the link to the respective sites. The Stillwater 1606 site is actually closer to Newton than Sparta.

It was also suggested that, with a consolidated PSAP, it might be possible to eliminate one or more of the VHF Low Band fire and EMS base stations as some overlap in coverage.

Each Sparta site should be evaluated individually to determine the most cost effective manner of connecting to the new PSAP. Rather than attempting to route all existing sites to the new PSAP, the implementation of microwave to connect Sparta's major sites to the existing PSAP may favor providing leased line (T1) connection or a microwave link between the Sparta Police Department and the consolidated PSAP. This may be the simplest way to have the consolidated PSAP operational with the Sparta radio systems.

10.1.2 Newton PSAP

10.1.2.1 Radio Resources

The Newton PSAP accesses the radio resources identified below.

1. **Newton Police Dispatch**
   a. VHF High Band repeater at High Street Water Tank (KEF288)
   b. Tie line from PSAP to High Street Water Tank
   c. Receiver at High Street Water Tank and remote receivers at Goodale, Hampton, and another site connected by tie lines to PSAP; voting comparator at PSAP
2. **Newton Police 2 Tactical**
   a. VHF High Band transceiver at High Street Water Tank (KEF288)

   b. Tie line from PSAP to High Street Water Tank
3. **Newton Fire Dispatch** (Newton PSAP dispatches Newton Fire only; Andover PSAP dispatches Andover Township and Borough, and Green Township Fire Departments; shared VHF repeater)
   a. VHF High Band repeater at Goodale Road site (WQDM238; IG license)
   b. RF control station at PSAP to Goodale Road
   c. Simulcast with County Fire 1(46.10 MHz)
4. **County Fire 1 and 2**
   a. VHF Low Band transceiver at High Street Water Tank (WNYW825)
   b. Tie line from PSAP to High Street Water Tank
5. **County Fire 1 and 2**
   a. VHF Low Band transceiver at Sunrise Mountain **(**KLP844)
   b. UHF link from PSAP to Sunrise Mountain
6. **EMS JEMS1**
   a. VHF High Band transceiver at Newton Hospital
   b. Tie line from PSAP to Newton Hospital
7. **Blue Ridge Rescue Squad**
   a. VHF Low Band transceivers at Harmony Trail (47.66 MHz) and Acropolis Trail (47.50 MHz) (KLO302)
   b. UHF RF Link from PSAP to linked sites
8. **Newton Department of Public Works**
   a. VHF High Band transceiver at PSAP
   b. Direct control at PSAP
9. **SPEN1**
   a. VHF High Band transceiver at PSAP
   b. Direct control at PSAP
10. **Hampton Township Fire**
   a. VHF High Band repeater at Rt. 519 **(**WQAX338)
   b. RF control station from PSAP to Rt. 519

10.1.2.2 Required Connectivity

The radio systems accessed by the Newton PSAP are the easiest to re-route to a PSAP in the Newton area. Newton uses leased tie lines, RF control stations and UHF RF links. Their RF links require only roof-mounted antennas. The radio equipment at the Newton PSAP could be re-located to the consolidated PSAP.

10.1.3 Andover PSAP

10.1.3.1 Radio Resources

The Andover PSAP accesses the radio resources identified below.

1. **Andover Township Police Dispatch**
   a. VHF High Band repeater at Goodale Road (KYU566)
   b. RF control station from PSAP to Goodale Road
2. **Andover Township Police 2**
   a. VHF High Band transceiver at Goodale Road (KYU566)
   b. Tie line from PSAP to Goodale Road

3. **Andover Fire Dispatch** (Andover Township PSAP dispatches Andover Township and Borough, and Green Township Fire Departments; Newton PSAP dispatches Newton Fire only; shared VHF repeater)
    a. VHF High Band repeater at Goodale Road site (WQDM238; IG license)
    b. RF control station at PSAP to Goodale Road
    c. Simulcast with County Fire 1(46.10 MHz)
4. **Hamburg Borough Police**
    a. VHF High Band repeater at Summit and Bank Street Water Tank (WPGI659)
    b. RF control station from PSAP to Summit and Bank Street Water Tank
5. **County Fire 1**
    a. VHF Low Band transceiver at Goodale Road (KBY807)
    b. Tie line from PSAP to Goodale Road
    c. Simulcast with Newton Fire (Andover Township and Borough, and Green Township Fire Departments) VHF High Band repeater at Goodale Road
6. **County Fire 1**
    a. VHF Low Band transceiver at Hamburg Borough Fire Station (WPNV232)
    b. Tie line from PSAP to Hamburg Borough Fire Station
7. **EMS JEMS1**
    a. VHF High Band transceiver at Goodale Road (KYU566)
    b. Tie line from PSAP to Goodale Road
8. **Andover Township Department of Public Works**
    a. VHF High Band transceiver at Goodale Road
    b. Tie line from PSAP to Goodale Road
9. **SPEN1**
    a. VHF High Band transceiver at PSAP
    b. Direct control at PSAP

10.1.3.2 Required Connectivity

The Andover PSAP connectivity to the Newton Fire Dispatch repeater (refer to Newton #4) at Goodale Road duplicates the connectivity of the Newton PSAP. Consolidating to one PSAP would require no additional connectivity for these transmitters. The RF control station and tie lines required for the Hamburg Police radio systems could be moved to a consolidated PSAP in the Newton area. Because Hamburg is geographically closer to Newton or Frankford Township, the connectivity costs should not be any greater than the existing costs. Tie lines would be necessary from the consolidated PSAP to the base stations at Goodale Road for Andover Police 2, Andover Township Department of Public Works, and JEM1. If access to the SPEN1 base stations at the Andover Police Department is required, a tie line would be necessary to this location.

10.1.4 Hardyston PSAP

10.1.4.1 Radio Resources

The Hardyston PSAP accesses the radio resources identified below.

1. **Hardyston Township Fire South**
    a. VHF High Band repeater at Vernon Stockholm Road (KNEN690)

   b. RF control station from PSAP to Vernon Stockholm Road (Same frequency and CTCSS tones as Fire North site; repeater is manually switched on if Sand Pond unit loses power; owned by the fire department)

2. **Hardyston Township Fire North**
   a. VHF High Band repeater at Sand Pond Road (KNEN690)
   b. RF control station from PSAP to Sand Pond Road (same frequency and CTCSS tones as Fire South site; owned by fire department)
3. **Hardyston Township Police**
   a. VHF High Band repeater at Sand Pond Road (WNDY962)
   b. RF control station from PSAP to Sand Pond Road
4. **Hardyston EMS (shared with Public Works)**
   a. VHF High Band repeater at Sand Pond Road (WPCJ497)
   b. RF control station from PSAP to Sand Pond Road
5. **County Fire 1**
   a. VHF Low Band transceiver at Sand Pond Road (owned by fire department) (KNWN690)
   b. UHF RF link from PSAP to Sand Pond Road
6. **SPEN1**
   a. VHF High Band transceiver at Sand Pond Road (WNDY962)
   b. UHF RF link from PSAP to Sand Pond Road

10.1.4.2 Required Connectivity

It appears that all radio resources are accessed by RF control stations or UHF RF links. The repeaters and base stations are located at two sites—Sand Pond Road (aka Hamburg Mountain) and Vernon Stockholm Road. If the same RF connectivity could be achieved from either of the proposed consolidated PSAP locations, establishing connectivity would only require moving RF control stations and UHF radios to the new consolidated PSAP. Testing would be necessary to verify this.

10.1.5 Hopatcong PSAP

10.1.5.1 Radio Resources

The Hopatcong PSAP accesses the radio resources identified below.

1. **Hopatcong Police**
   a. VHF High Band repeater at Musconetcong Road Water Tank (WNKJ359)
   b. RF control station from PSAP to Musconetcong Road Water Rank
   c. Receivers at Musconetcong Road Water Tank and Byram Indian Spring site; voter at Musconetcong Road Water Tank
2. **County Fire 1**
   a. VHF Low Band transceivers at Musconetcong Road Water Tank (KUJ537)
   b. UHF link to Musconetcong Road Water Tank
3. **Hopatcong JEMS1**
   a. VHF High Band transceiver at Musconetcong Road Water Tank (WPMC486)
   b. Tie line from PSAP to Musconetcong Road Water Tank
4. **SPEN1**
   a. VHF High Band transceiver at PSAP
   b. Direct control at PSAP
5. **Hopatcong Public Works Department**

a. VHF Low Band transceiver at PSAP (KUL917)
b. Direct control at PSAP

6. **SPEN4**
   a. VHF High Band transceiver at PSAP
   b. Direct control at PSAP

10.1.5.2 Required Connectivity

Connectivity to access the Hopatcong PSAP's radio resources requires links to the Musconetcong Road Water Tank and the Hopatcong Police Department. It is not clear whether each existing SPEN1 base station in the county would have to be connected to the new consolidated PSAP or whether sufficient coverage could be achieved from fewer stations. Testing would need to be conducted to ensure that RF links from the consolidated PSAP to the Musconetcong Road Water Tank would be effective. Tie lines would be needed to connect to the JEM1 base station and the SPEN1 and SPEN4 transceivers.

10.1.6 Vernon PSAP

10.1.6.1 Radio Resources

The Vernon PSAP accesses the radio resources identified below. Not all Vernon radio resources were available for inclusion in this guide.

1. **Vernon Township Police**
   a. UHF repeaters at Mountain Trail and Lakeside Drive (WQBZ928)
   b. RF control station from PSAP to repeaters
2. **Vernon Fire and EMS** (MOTOTRBO®; proprietary digital) (WQGN627)
   a. UHF repeaters at Lakeside Drive and Mountain Trail GE Americana Microwave Tower
   b. RF control station from PSAP to repeaters
3. **Vernon Township Pubic Works**
   a. VHF High Band repeater at Mondamin Road Water Tower (WNDD419)
   b. PSAP to Mondamin Road Water Tower (incomplete data)
4. **Vernon EMS**
   a. VHF Low Band transceiver located at Mondamin Road Highlands Lakes Water Tank (WQIF802)
   b. Tie line from PSAP to transceiver
5. **Vernon Fire County Fire 1 and County Fire 2**
   a. VHF Low Band transceiver County Fire 1 at Mountain Trail GE Americana Microwave Tower (WNUK822)
   b. Tie line from PSAP to transceiver
   c. VHF Low Band transceiver County Fire 2 at Mountain Trail GE Americana Microwave Tower (WNUK822)
   d. Tie line from PSAP to transceiver
6. **SPEN1**
   a. VHF High Band transceiver at tower across the street from PSAP at Public Works Tower (KNCS839)
   b. Direct control at PSAP
7. **Wantage EMS**
   a. VHF High Band repeaters at Lake Panorama Section and Lakeside Drive (WPVR575)

b. RF control station from PSAP to repeaters
c. Voter at Lake Panorama site

10.1.7 Sussex County Sheriff's Dispatch Center

10.1.7.1 Radio Resources

The Sheriff's Dispatch Center dispatches for a number of County services, including the Sheriff's Department, County Prosecutor, Fire Marshal, the Office of Emergency Management, Medical Examiner, and County public works/roads/facilities. Not all Sheriff's Office radio resources were available for inclusion in this guide.

1. **Sussex County Sheriff**
   a. VHF Digital High Band repeater at Sunrise Mountain (WNYT790)
   b. RF control station from Dispatch Center to repeater
   c. Three remote receivers: Montague Township Municipal Building, Netcong State Police Barrack, and County Road Garage, Rt. 517, Vernon
   d. Remote receivers connected by tie line to voter at PSAP
2. **Sussex County Sheriff's Jail**
   a. VHF High Band transceiver at 39 High Street (WPIV410)
   b. Direct control at PSAP
3. **Sussex County Sheriff's Courthouse Security**
   a. VHF Digital High Band transceiver at 39 High Street (WPEM831)
   b. Dispatch control at PSAP
4. **Sussex County Prosecutor's Office**
   a. VHF High Band repeater at Sunrise Mountain, separate location from Sheriff's repeater (KXC854)
   b. RF control station from Dispatch Center to repeater at Sunrise Mountain
5. **Sussex County Road Department**
   a. VHF Low Band transceiver at County Administration Building, Rt. 206 Newton
   b. Remote control by tie line from Dispatch Center to County Administration Building
6. **County Fire**
   a. VHF Low Band transceivers at 127 Morris Turnpike and Plotts Road
   b. Tie line (unknown number)

10.1.7.2 Required Connectivity

To fully realize all cost and service efficiencies, operational and systems consolidation should include the Sheriff's Office. In order for the Sheriff's Dispatch Center to be included in this effort, Kimball understands that the Sheriff's Office workload will need to assessed and incorporated into the statistical findings with the other participating agencies. If the Sheriff's Office remains a standalone dispatch point beyond the cutover of the consolidated PSAP, then the primary Sheriff's dispatch channel and the County Prosecutor's repeater can be accessed by RF control station. If access to other County radio resources is required, tie lines would have to be installed to the transceiver sites or to the Dispatch Center.

10.2 CONSOLIDATED PUBLIC SAFETY ANSWERING POINT (PSAP) TOWER REQUIREMENT

A tower structure will be required at or near the consolidated PSAP. Connectivity to existing repeaters and remote transceivers through the use of RF control stations and UHF link radios will require numerous antennas. The least expensive solution for antenna installation would be a tower co-located at the PSAP, which could provide power and backup power.

Until the location of the consolidated PSAP is selected, it is not possible to determine whether space and other environmental conditions would permit building a tower at the PSAP; however, the two evaluated sites (SCCC and JDC) each appear to have adequate space for a tower. If a tower cannot be constructed immediately adjacent to the consolidated PSAP, connectivity from the PSAP to the tower will be required. A remote tower location might require a microwave, fiber optic, or T1 link from the PSAP to the tower.

The height and type of tower to be constructed at a new facility depend on the planned use of the tower. Currently, the existing PSAPs have only relatively small, light duty towers ranging from 25 feet to 80 feet. Vernon Township and Newton only have roof-mounted antennas. If the existing RF control stations and UHF link antennas are consolidated on a single tower, there will be a substantial number of antennas. For proper functioning, vertical separation will be required in some cases. Some transmitters and receivers may share antennas, but the UHF links will typically require individual yagi (directional) antennas. In addition to accommodating the required antenna loading, the tower should permit antennas to be mounted above surrounding obstructions, e.g., building tops and trees.

The stakeholders expressed a vision for a countywide shared radio system with connectivity provided by a microwave backbone. Microwave connectivity to a network of tower sites would be desirable. A tower at the PSAP may need to support one or more microwave antennas (dishes) in the future. Depending on the location of the consolidated PSAP, this tower might be used as a transmitter site for a countywide radio system. These factors, as well as the ground elevation and terrain, would need to be considered when determining how large a tower to construct at the PSAP.

Given the uncertainties associated with future tower usage, Kimball recommends a 180 foot tower as a benchmark for budgetary purposes. A 180 foot tower would not require FCC tower registration and FAA approval. A 180 foot tower should accommodate the necessary control station/UHF link antennas and most microwave applications.

10.3 COSTS

10.3.1 Tower, Shelter, and Generator

Constructing a freestanding 180 foot tower would cost approximately $175,000. A tower constructed at a remote location would require site development costs and the need for a shelter and backup generator. These additional costs would depend on the location and distance from the consolidated PSAP.

10.3.2 Tie Lines

Approximately 15 landline or tie line connections, both 2-wire and 4-wire, exist from the current PSAPs to radio sites. Most, if not all, of these lines will have to be re-routed to the consolidated PSAP. There

will be an increased cost for many of these tie lines due to distance and rate structures used by telephone companies when dedicated connections must cross Central Office boundaries. When the consolidated PSAP location is selected, the cost increase for tie lines can be specifically determined.

10.3.3 UHF RF Links

UHF RF links typically consist of AC-powered mobile radios using small directional antennas (yagi) at each site. It may be possible to move the existing equipment from the current PSAPs to the consolidated PSAP. Maintaining radio service during the transition would need to be considered. Depending on the condition of the existing antennas, it may be desirable to install new antennas. Several UHF links to the same tower site might also be able to share yagi antennas.

10.3.4 RF Control Stations

As with the UHF link radios, the RF control stations are AC-powered mobile radios that, in most cases, use standard omni-directional or yagi antennas at the PSAP. These radios access the repeater base station in the same manner as do the mobile and portable radios on the particular radio system. As with the UHF link radios, it may be possible to move the existing equipment to the consolidated PSAP. However, since the existing PSAPs are located at police departments, these police agencies will probably wish to keep at least one RF control station at their respective location to access their own radio system. Therefore, it should not be assumed that the need for radio equipment at the consolidated PSAP will be met by moving equipment from the existing PSAPs.

Based on a review of the repeater base stations currently accessed by the six PSAPs, Kimball estimates that approximately 20 RF control stations would be required to connect to existing radio systems in the county. A standalone RF control station at each console position would be desirable; this would provide backup to the console. The control stations would need to be a mix of VHF Low Band, VHF High Band and UHF. As there would be some reuse of existing control stations, it is difficult to specify the exact number of new RF control stations required. For budgetary purposes, each control station costs approximately $1,200. Budgeting $50,000 for RF control stations and antennas systems for the control stations and UHF links would be reasonable.

Given the number of repeaters that must be accessed by RF control stations at the consolidated PSAP, it would be desirable to reduce the number of control station antennas on the PSAP's tower by sharing antennas. This can be accomplished through the use of one or more control station combiners. Because this technology can greatly reduce a control station's effective radiated power (ERP), the use of control station combiners requires careful engineering to ensure sufficient power to communicate with each repeater.

10.4 RADIO RESOURCE OWNERSHIP AND MAINTENANCE

Under existing arrangements with the six PSAPs, the radio resources are owned by local governments and public safety agencies. Most of the infrastructure is owned by the licensees. That is, the non-leased towers, water tank structures, repeaters and base stations are owned and maintained by townships and boroughs. In some cases, individual public safety agencies may own repeaters and base stations.

As the County moves to a consolidated PSAP, it is likely that, for the foreseeable future, the ownership and maintenance of the radio infrastructure will remain the responsibility of the various licensees. This should be clarified in a radio system control agreement for the consolidated PSAP. The responsibility for the costs of establishing connectivity to the existing radio resources should also be addressed as part of the radio system control agreement. Kimball recommends the County assume the connectivity costs to ensure technological consistency and to establish clear responsibilities for radio resource maintenance.

10.5 RADIO DISPATCH CHANNELS

Stakeholders recognized that in a consolidated PSAP it would be desirable to structure radio dispatch channels to ensure that dispatchers could effectively manage the radio resources. Too many individual radio channels require dispatchers to listen to multiple channels; this can cause a risk that responders on different channels vie for the dispatcher's attention at the same time. It was suggested in the future that radio zones might be established within the county to effectively partition radio communications.

10.6 MICROWAVE CONNECTIVITY

As the County looks toward the various options for developing a countywide radio system and the need for connectivity among radio towers, a microwave backbone should be considered. The use of microwave links to access existing radio resources requires line-of-sight propagation between the sites being linked. Microwave can provide a cost effective solution to providing the capacity required to support multi-channel radio systems, such as a trunked radio system. Microwave can also provide the stable connectivity to support multi-site simulcast technology. Microwave connectivity might also be desirable between the new consolidated PSAP and any backup PSAP. It was suggested that a microwave link between the consolidated PSAP and the Sparta PSAP might be considered to link to Sparta's existing radio resources. A microwave link to the Sparta PSAP would allow the Sparta facility to become part of the County's backup plan.

10.7 COUNTYWIDE SIMULCAST PAGING SYSTEM

Kimball reviewed the design for a countywide VHF simulcast paging system submitted to the County by RF Design and Integration, Inc. The proposed multi-site simulcast tone and voice paging system should address many of the County's paging problems. It would be highly desirable if the paging system could be designed in conjunction with a countywide radio system so that the same tower sites would be used and a microwave backbone could be shared by the voice radio system and the paging system.

11. COMPUTER AIDED DISPATCH (CAD)

In a PSAP, the CAD system assists call take and dispatch personnel in handling, prioritizing, routing, controlling and dispatching calls for service and emergency services personnel. In any consolidated PSAP model, the selected CAD system must accommodate multiple jurisdictions and agencies, numerous call types and provide interfaces to other jurisdictions; local sub-systems, (mapping, mobile data, E9-1-1, fire station alerting, paging, etc.); state and federal databases, including SCIC, NCIC, and NLETS; and various third-party software providers, such as police and fire/rescue RMS. The selected system needs to be sized appropriately to meet existing and future performance criteria and to provide sufficient on-line incident history.

In Sussex County, the six PSAPs use various versions of the Enforsys CAD solution. There are no known substantial, technical or unworkable roadblocks to an anticipated single consolidated PSAP model regarding CAD, mapping, mobile data and other CAD interfaces. Based on discussions with the telecommunications working group members, the PSAPs appear to be satisfied with the existing CAD solution.

11.1 CONSOLIDATED PUBLIC SAFETY ANSWERING POINT (PSAP) COMPUTER AIDED DISPATCH (CAD) NEEDS

In a consolidated PSAP, multiple jurisdictions and agencies must be supported in an uncomplicated manner by a CAD system specifically designed for this purpose. To address the needs of the PSAP and served agencies, the desired CAD functions, features and performance should be defined and documented. Once these requirements are documented, a review of the current CAD system's capabilities and capacity should be conducted.

Kimball understands that the county police chiefs are working toward upgrading the Enforsys RMS versions countywide to better facilitate data interoperability. This foresight provides an opportunity to upgrade the Enforsys CAD software versions and eventually merge the CAD applications into a single system to serve a consolidated PSAP.

During the technology planning phase of the County's consolidation effort, a thorough review of the functions, features and performance of the CAD system will determine if the Enforsys CAD system will support a consolidated operation.

To assist with this determination, the table below lists interfaces that must be supported by a multi-jurisdictional, multi-agency-capable CAD system. While the County may choose not to implement all interfaces immediately, it is Kimball's experience that it is more cost effective to include most, if not all, in an initial CAD procurement or upgrade rather than adding them at a later date. Any new or upgraded technology, such as CAD/RMS and mobile data, that expands the technology and functionality at the local level will make the concept of consolidation more appealing to local agencies, administrators, elected officials and stakeholders.

Required Interfaces for Consolidated CAD
E9-1-1
Alphanumeric Paging
Automatic Vehicle Location (AVL)
Call Taker/Dispatcher Mapping
EMD
NCIC/NLETS/SCIC
Fire Mobile Computers
Fire Station Alerting
Fire/EMS RMS
Master Clock
Mobile Mapping
Police Mobile Data Terminals (MDTs)
Police Field Reporting
Police RMS
Radio System – Push-to-Talk/Emergency
Rip & Run or Fax
Telecommunications Device for the Deaf/Teletypewriter (TDD/TTY)
Wireless E9-1-1 Phase II Mapping

To ensure end user acceptance of a consolidated PSAP, Kimball strongly recommends that any existing CAD functionality is not lost once the consolidated PSAP is brought on-line; this includes inquiry, reporting and view incident capabilities.

Enforsys is a Tier 2 CAD product that may be able to provide a viable CAD solution for a countywide consolidated PSAP in Sussex County. Kimball recommends building upon the existing relationship by engaging in conversation with Enforsys about their current or future capability to support a countywide multi-jurisdictional, multi-agency PSAP. Another approach may be to include CAD feature and function discussions in conjunction with the county police chiefs' data interoperability plans to seek funding to bring all county law enforcement agencies to the same version of Enforsys RMS and to interconnect the RMS systems. A joint effort to upgrade CAD/RMS countywide may help those seeking uniform RMS as well as the consolidated PSAP's need for a robust CAD system. More opportunities for grant-funding a CAD/RMS upgrade/replacement may also arise through any future plans to further regionalize data interoperability, such as approaching neighboring counties or other levels of government response (state, federal) for data sharing opportunities. A cost benefit to engaging Enforsys in discussions toward a consolidated CAD solution is the potential to purchase software upgrades and system migration support off an existing contract(s).

As guidance in securing a CAD solution through Enforsys for a consolidated PSAP, the County will need to ensure that, at a minimum:

- Enforsys designs and prices a hardware solution that provides either fault tolerant or high availability back room equipment. The system should be designed to take advantage of existing current fail-over and other backup technologies that enable continued operation notwithstanding single or multiple component failure.
- The most recent software version is provided.
- Any specialized customization or unique requirements that may have been provided in existing contracts and/or needs to be provided in a new contract for the consolidated PSAP are identified.
- Functional specifications are identified and developed; Enforsys addresses each feature by stating whether or not their system is compliant. This is the only means to ensure that the software will provide the functionality the consolidated PSAP requires.
- Existing interfaces and those needed are identified.
- The system capacity exists or is added to ensure all systems run reliably.
- An existing maintenance contract is renegotiated or a new maintenance contract is negotiated.

Should Enforsys be unable to fully support a countywide multi-jurisdictional, multi-agency consolidated PSAP, an existing Enforsys contract cannot be used or does not provide significant cost benefits or a new Enforsys contract cannot be successfully negotiated, Kimball recommends the County procure a new CAD system using a full competitive RFP selection and procurement process. A new system should provide fault tolerant or high level of availability, security, and reliability. The system should be designed to take advantage of current fail-over and other backup technologies that enable continued operation notwithstanding single or multiple component failure. The RFP process should include development of:

- A thorough needs assessment document, with input solicited from the existing PSAPs and the end users
- Functional specifications
- Evaluation and recommendation criteria
- A full competitive RFP document

11.2 NEXT GENERATION 9-1-1 (NG9-1-1) IMPACT ON COMPUTER AIDED DISPATCH (CAD)

The future of PSAP technology is widely referred to as NG9-1-1. The focus of preparing for NG9-1-1 is the development of standards for receiving emergency requests from IP-based communications devices into 9-1-1 systems. The drive to develop IP-based 9-1-1 systems is at the forefront of the standards development and testing processes by the US DOT and their NG partners; individual vendors are also striving to meet public expectation and form the basis for the yet-to-be-completed delivery standards. In an IP environment, an accurate and sophisticated GIS is the bridge from call routing to call processing. Locating an emergency incident, regardless of the device used to report it, is a main focus of NG development industry-wide. Once this is accomplished, the focus will be on processing the information through a CAD system.

Typically, CAD systems/products are not on the cutting edge of technology, particularly in the NG9-1-1 arena. Larger more robust systems (Tier 1), built to support the massive workload of heavily populated areas, down to the smaller single agency systems (Tier 3) focus on call processing and service records

based on location information and call event types. Many interfaces are available and in use for interconnecting CAD systems to 9-1-1 telephony systems, radios, loggers and others. Known and available interfaces used today include:

- ALI dump from wireline and wireless calls
- VoIP call location data, also provided to CAD via ALI dump
- Aerial photographs (Pictometry) accessed by CAD interface from GIS records
- Building blueprints accessed by CAD interface from GIS records
- Automated EMD protocols (e.g. ProQA)
- Auto-tone or auto-paging upon dispatch of units within CAD [application programming interface (API)]
- Standard operating procedures or guidelines (SOP/SOG) interface to database built into CAD or accessed, tied to event type entry

Future CAD interfaces necessary to support public and responder expectations (NG9-1-1) do not yet exist in mainstream available (off-the-shelf) CAD systems. At best, these interfaces only exist in test products or as separate software applications requiring separate PCs for monitoring. Examples include:

- Photos from cellular callers
- Streaming video from various communications devices
- ACN – automated (directly to the PSAP) versus forwarded by private call centers (OnStar)
- Medical information to be passed through to trauma centers

The potential information that could be available to a PSAP must be processed, stored, routed and used for appropriately addressing emergency incidents. The final destination for much of this data is an RMS. CAD/RMS vendors must be aware and actively engaged in investigating how best to accommodate the influx of information and the various formats.

Future call routing may allow direct CAD input of emergency incidents, bypassing the traditional 9-1-1 system. Broadband and IP-based communications devices may not require the 9-1-1 system to route calls to the appropriate PSAP. Regardless of the call routing method, one challenge for the CAD and 9-1-1 industry is how to route the information to the appropriate destination. Traditional voice dispatch is already supplemented by mobile data terminals in response units. Routing information to other public safety and public services organizations and response and recovery entities will be expected as systems and processes become more sophisticated. It is also important to note that, much like voice recordings currently captured in the PSAP, future data elements (pictures, text messages, etc.) can take on evidentiary importance and must have an ironclad chain of evidence mechanism in place to satisfy legal requirements.

The NG9-1-1 impact on CAD and RMS will be profound. The role of nerve center and information traffic routing currently managed by the CAD system will exponentially increase as information, routing methods, public expectation and technological advancements in communications devices change and grow. With or without final standards in place for NG9-1-1, any expansion capabilities within a CAD system will be customized to individual agencies. In the future, PSAPs will be able to choose the applications and information to receive based on population, trends and public expectations. For example, a high number of traffic accidents may drive the need to be able to process ACN data. Large or multiple college communities in a response area may prompt the need to be able to process text messages. With each decision made toward NG9-1-1 IP-based systems for routing and processing calls, the same

consideration should be placed on improving the CAD component (call processing and handling of information). It is imperative that all incoming NG9-1-1 data be routed to the CAD system to avoid fragmentation and loss of incident information.

11.3 BACKUP SITE COMPUTER AIDED DISPATCH (CAD) NEEDS

In a countywide consolidated PSAP, the County will need a backup site should the PSAP experience a service interruption or need to be evacuated. The future backup plans for Sussex County involve a partnership and mutual aid agreement with neighboring Warren County. Regardless of the physical location of a backup site, a backup CAD server should be installed at the alternate site and sufficient connectivity put in place so that real time data can be transferred back and forth, and be installed at a mutually agreed upon alternate site within the county limits that will be shielded from whatever service interruption the primary server may experience. A current PSAP could be used as a secondary backup or training site and house backup equipment. If possible, any existing or future county network (fiber, microwave) should be used for connectivity. If not, leased lines could be necessary, requiring additional and possibly significant monthly recurring costs.

11.4 RECORDS MANAGEMENT SYSTEM (RMS)

While an RMS is not a PSAP function, it is vital that substantial advance planning and coordination occur to assure that appropriate interfaces exist and are available in order for a CAD to transfer incident data and/or provide a central repository for local systems to pull their specific incident data. Failure for a new or upgraded system to do so will adversely affect the agencies' administrative and supervisory operations. Such complications will detract from the overall acceptance of the consolidation project if they are not addressed and ultimately supported. If possible, it is always advantageous to have all the agencies utilizing the same RMS system and for that application to be a module of the same CAD system.

11.5 COMPUTER AIDED DISPATCH (CAD) COSTS

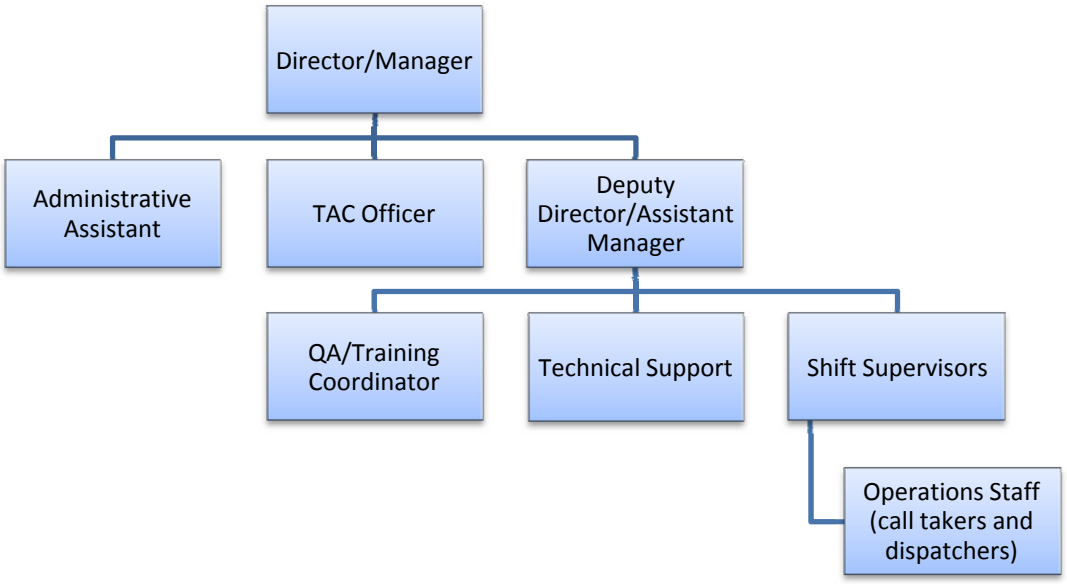
Negotiations with Enforsys will determine the cost per console to upgrade and merge the existing licenses. An estimated upgrading cost for Enforsys is not attainable at this time as there are too many variables within existing systems, features and functionality. Such an upgrade will most likely be less costly than purchasing a new CAD system.

If a new CAD system is required, an estimated budgetary cost is $90,000 per position. Kimball's experience working with multiple CAD vendors and Kimball technical staff's prior experience as CAD vendors are the basis for this amount. The total new system cost will depend on the number of positions at the consolidated PSAP and at the backup site. Using the projected number of positions in a consolidated PSAP of 12, which includes supervisor and training positions, the cost of a new CAD system for a primary consolidated PSAP is estimated to be $1,080,000.

The costs associated with preparation for upgrading or replacing a CAD system to accommodate multiple interfaces that may be necessary in an IP-based PSAP environment cannot be quantified at this juncture. The current cost estimates are projected to provide the PSAP with the most current CAD technology available. Less functionality and/or features may mean less cost. Future upgrades to or plans to replace the current system can be considered and planned for once the capabilities and capacity are known and tested.

The life cycle of a CAD system is three to five years; as such, Kimball recommends holding conversations with Enforsys to determine their direction and capabilities toward potentially supporting a consolidated PSAP. When a new CAD system is necessary, plans should include discussions and specifications that support anticipated NG functions.

12. STAFFING



12.1 MANAGEMENT AND SUPPORT STAFF

The anticipated capacity of the consolidated PSAP will require multiple layers of management to properly address the vital components needed to provide service to the community. The management staff role in the planning, implementation and transition phases should be significant toward policies and procedures development, budget planning and personnel-based operations (training and protocols). Management staff should include the following positions:

- Director/manager with overall responsibility for the consolidated PSAP, to include budget, personnel and operations
- Assistant/deputy director to focus on human resource issues and assist with the oversight of administration and operations
- Administrative assistant to support PSAP management and assist in managing the flow of administrative paperwork, submissions, document formation, and general records management
- TAC Officer responsible for agency and non-agency records entered, altered and maintained as required by the Federal Bureau of Investigation (FBI) in NCIC, and as required by NJ State Police in SCIC (*This role and responsibility could be assigned to the consolidated PSAP director/manager through an executed memorandum of understanding [MOU]*).
- QA Coordinator to coordinate the QA/QC Program (*A formal QA program allows the agency to review calls, provide feedback, and ensure compliance to best practices. This ensures a high measure of quality service to the public and public safety responders. In addition, this position can manage requests for and preparation of recordings for court and inter/intra-agency investigations.)*

- Training Coordinator to manage entry level, remedial and in-service training programs (*This position may be used to support the consolidated PSAP and emergency management training needs.*)

The QA and Training Coordinator positions and TAC responsibilities could be combined in one or more positions. The QA and Training Coordinator positions could be tasked with developing and maintaining agency policies and procedures and in the future can be jointly tasked with coordinating CALEA certification preparedness.

Kimball recommends that the County, with input from the User Work Groups, conduct selection processes to locate and hire a communications director/manager with substantial experience directing/managing a full service consolidated PSAP; ideally, the director/manager will contribute to the planning and implementation phase of consolidation. Once this position is in place the director/manager can work with the County, with input from the User Work Groups, to begin identifying necessary administrative positions and to develop an appropriate qualification and hiring process for the operational staff positions.

12.2 TECHNICAL SUPPORT STAFF

Systems administration and technical support for the CAD, 9-1-1 telephony, radio systems and other ancillary equipment/systems is vital in a consolidated PSAP environment. These systems allow the call takers/dispatchers and responders to provide services critical to the public. Maintaining these systems in peak operating condition is a full time responsibility. Problems encountered with phones, radios and computers may require immediate response from a technician. Kimball recommends the County consider hiring technical support staff that would report to consolidated PSAP management, be knowledgeable of and responsible for all facets of the PSAP operation, and be available 24/7 through an on-call schedule.

12.3 OPERATIONAL STAFF

To provide efficient service to the public and local emergency services, PSAPs must ensure that an adequate number of qualified staff is on duty at all times. When this does not occur, service quality can diminish and the short- and long-term effects on staff often lead to staffing issues, overworked personnel and attrition increases.

Determining appropriate staffing levels for a PSAP is a complex process that involves a combination of mathematical calculations based on a quantifiable workload, such as 9-1-1 and administrative call volume and number of dispatch positions, and operational knowledge and experience to account for real but less quantifiable needs, such as shift management and oversight.

To assess current staffing and predict future consolidation expansion needs, Kimball used tools designed to estimate staffing levels, such as Erlang C[40] and APCO's Project RETAINS (Responsive Efforts to Address Integral Needs in Staffing)[41], combined with data sets and experiences from:

- Wireline and wireless 9-1-1 call volume data gathered from OETS accounting
- Workload data and service call counts derived from completed PSAP surveys
- Kimball staff experiences and expertise as represented in staffing studies, consolidation studies, PSAP management and consolidation experience
- Public safety practices, including Kimball-customized formulas based on APCO Project RETAINS and Erlang C

12.3.1 Erlang C Calculator

The Erlang C calculator is a standard tool in the public safety industry used to assist PSAPs in determining call taker staffing needs. This tool simplifies the complicated calculations required to predict and analyze performance. The calculator can be used to answer such questions as how many call taker positions are needed, how many calls can be handled, and how many trunks are needed. As the tool relates to recommending the number of positions needed, variables, such as the calls received per hour, average call duration, average answer delay and required answering performance goal, are needed for the calculation.

Once the number of call taker positions is determined, the actual number of employees is determined using Project RETAINS.

12.3.2 Project RETAINS

APCO's Project RETAINS is a nationally recognized program and tool developed to assist public safety communication centers with staffing issues. The program tools are designed to assist communication center managers, human resource and budget personnel, and local elected officials in addressing the challenges associated with hiring and retaining qualified personnel for the critical positions required in a PSAP. Project RETAINS utilizes formulas and provides processes that estimate staffing needs by looking at factors such as the available hours employees can work, turnover rates, coverage hours, and call volume. The results can then be compared with current staffing levels.

To ensure adequate staffing levels, Project RETAINS uses the local methodology to identify the number of call takers necessary to answer 9-1-1 calls and incoming ten-digit telephone lines. These calls must be answered in an acceptable manner, within acceptable call answering and call processing times. This same methodology allows for the identification of the number of qualified on-duty dispatchers.

12.3.3 Call Volume

The six PSAPs were asked to provide annual 9-1-1 and incoming and outgoing ten-digit emergency and non-emergency calls volumes. Most agencies do not have call counting software and could not provide phone statistics for incoming or outgoing ten-digit emergency and non-emergency calls.

[40] Formula used to determine the number of agents needed to staff a call center for a specified desired probability of queuing.
[41] http://www.apcointl.org/about/9-1-1/retains/

The table below illustrates the average 9-1-1 call volume countywide.

9-1-1 Wireline and Wireless Calls [1]	
	Average for Past 3 Years
Andover	3,090
Hardyston	3,280
Hopatcong	3,999
Newton	11,078
Sparta	8,850
Vernon	9,037
Total Annual Call Volume	**39,334**

[1] 9-1-1 call data provided by OETS

Call volume is the prime factor in determining the number of trunks and workstations needed to handle a PSAP's projected workload. OETS tracks ALI dips and is able to provide an accurate count of the wireline and wireless 9-1-1 calls received countywide. Determining the number of non-emergency/administrative calls countywide is more difficult. In the original data gathering effort in March 2009, surveys distributed among the PSAPs revealed only the Sparta PSAP had the benefit of call counting software. The Hardyston PSAP tracked non-emergency/administrative calls by using a three-month count to estimate an annual call volume. Kimball cannot estimate a countywide average and/or a common ratio of non-emergency/administrative calls to countywide 9-1-1 calls based on the counts from Sparta and Hardyston as the two PSAPs have dissimilar ratios.

To determine a valid estimate of non-emergency/administrative calls countywide, Kimball used known ratios from Warren County and eight counties/cities[42] from recent consolidation/staffing studies. Based on these ratios, the estimated average number of non-emergency/administrative calls annually is 168,815. To meet N.J.A.C. 17:24-2.3[43], staffing calculations are based on the standard to answer 95 percent of 9-1-1 calls within 10 seconds, which will require staffing 4 call taker workstations 24 hours a day,

Based on Kimball's experience with call statistics, managing consolidated centers and consolidation planning projects, the County can expect the non-emergency/administrative incoming and outgoing call volumes to decline once full consolidation is realized. This is due in part to the participating agencies retaining some of the agency-specific non-emergency and administrative functions at their respective offices and to automation of some services or shifting of responsibilities to more appropriate staff outside the emergency response operation.

[42] Alexandria VA, Columbia Co FL, Grapevine TX, Guilford Co NC, Mitchell Co NC, Weber Co UT, Winchester WV, Columbia Co FL
[43] Public Safety Answering Points: Staffing and Equipment Requirements and Operational Standards

12.3.4 Staffing Projections

Only the number of call takers required to adequately staff a consolidated center can be accurately determined using the APCO and Erlang C calculations. Kimball customized the formulas to calculate the estimated number of dispatchers and supervisors needed. There is not yet a calculation/formula to more accurately determine the number of dispatchers needed based on workload. However, radio traffic/usage studies can be conducted to determine the level of use or available airtime of a channel/frequency. This type of study can assist a communications center in determining the number of channels needed to support operations, but does not directly provide the number of dispatchers needed to staff the channels.

Countywide, the six PSAPs employ 75 operational staff: 37 full time and 38 part-time. Based on Erlang C calculations and the Project RETAINS formula, the minimum projected staff needed in a consolidated PSAP is 51. This projection represents no less than 22 staff certified as call takers, 17 certified as law enforcement dispatchers, 6 certified as fire and EMS dispatchers, and 6 operations supervisors. These are the FTE employees needed to staff up to four call take positions, three law enforcement dispatch positions, two fire/EMS dispatch positions and one supervisor position 24 hours a day.

Conditions and options may be present that will require adjusting the staff projections.

- If more than three law enforcement dispatch positions require 24/7 monitoring, additional staff will be needed.
- Appropriately qualified senior staff can be trained and compensated to fill in for absent supervisors.
- Certified part time staff can be used to augment the operations staff as needed during training, identified high call volume periods, special events and ongoing high priority incidents that deplete the full time staff capacity.
- The addition of at least one assistant supervisor or senior dispatcher per shift will augment the operations supervisors' ability to properly oversee the staff, and will enhance the ability to maintain training and certification levels, and manage personnel issues.

The existing staff of the participating agencies can be expected to fill at least 90 to 95 percent of the necessary personnel in the consolidated PSAP. Through attrition and qualification procedures, the possibility exists that several staff members will not transition to the new consolidated PSAP. A hiring process will be necessary to fill any additional staff positions.

12.3.5 Shift Supervisors

Public safety best practices require 24/7 supervision. To supervise the average shift of nine or ten staff daily, Kimball recommends a strong supervisory presence of one operations/floor supervisor per shift dedicated to shift operations in the PSAP. A supervisory staff of 6 FTEs can cover the supervisor position 24 hours a day.

The NFPA has developed codes, standards, and recommended practices through a process approved by ANSI. The Technical Committee on Public Emergency Service Communication prepared the latest edition of NFPA 1221, "Standard for the Installation, Maintenance, and Use of Emergency Services Communications Systems" (Edition 2010). Chapter 7 of sets forth the standards for PSAP operations. Section 1 of Chapter 7 addresses management.

NFPA 1221, 7.1.3* states, "At least one supervisor shall be on duty and available when more than two telecommunicators are on duty."

NFPA 1221, 7.1.4* states, "The supervisor shall be assigned to the operations room when there are more than three telecommunicators on duty."

Annex A of NFPA 1221 provides further explanation. A.7.1.3 states, "The supervisor position(s) in the communications center should be provided in addition to the telecommunicator(s) position(s). These supervisory personnel are intended to be available for problem solving."

The "Standards for Public Safety Communications Agencies" (SPSCA), established jointly by CALEA and APCO, does not specifically address staffing or supervision in a PSAP. However, both sets of standards reference utilizing 'Incident Command System' (ICS) protocols. (CALEA Standard 46.1.2 and SPSCA Standard 7.1.2 are mandatory for accreditation.)

The Department of Homeland Security, coordinating with federal, state and local governments has established NIMS. ICS falls under the 'Command and Management' element of NIMS. ICS represents best practices and is the standard for emergency management across the country. ICS requires a supervisor when there are between three and seven persons performing similar functions. (The optimal span of control is five.) A manageable span of control allows supervisors to supervise and control their subordinates, while allowing for efficient communications between all parties.

While NFPA standards and ICS require dedicated supervisory personnel, there are in-house considerations as well. A consolidated PSAP will have greater geographic boundaries and agency responsibilities and a dedicated supervisor assigned to each shift:

- Provides coordination and direction during major emergency incidents, i.e., severe weather, high profile incidents, wildfires
- Is available for problem solving
- Is a single point of contact for subscriber agencies
- Is readily able to identify areas for growth among subordinates
- Allows for formalized development of career paths
- Has the ability to document employees' performance for annual/periodic reviews
- Provides a more narrow scope of supervision when implementing new policies and procedures
- Provides more supervision for diversified, complex tasks
- Is able to stay current with technological changes/advancements
- Provides guidance to new employees who have less training and experience
- Provides greater knowledge of laws, procedures, and administrative processes
- Is able to focus on the operations of the center as a whole and not have split responsibilities with a dispatch position
- Is able to focus on customer service to public, subscriber agencies
- Allows for improved communications with management, subordinates, and subscriber agencies
- Spends more time with subordinates individually, on a daily basis

- Allows for operational efficiency
- Is able to identify areas for remedial training, counseling or discipline, when appropriate
- Is able to address issues upon occurrence, not after the fact
- Is able to set priorities
- Allows for delegation of tasks/responsibilities

Kimball recommends the assignment of one dedicated supervisor, or assistant supervisor, to each shift in order to comply with recommended/best practices as set forth by the NFPA and the Department of Homeland Security.

Selection and placement of the supervisory staff should first be attempted through existing qualified staff. If an internal process does not provide qualified individuals, an external hiring process will be needed.

12.4 WORKSTATIONS

The total call volume and the projected staff needed to handle this volume are used to determine how many consoles should be dedicated to call taking in a countywide consolidated operation. Four consoles should be available for call taking 24 hours a day to meet the projected and anticipated call volume.

Using the tools described earlier, Kimball estimates that the consolidated PSAP will need approximately 51 FTE employees to process the total call volume and workload. This figure accommodates maintaining individual law enforcement radio channel monitoring for the largest volume agencies, Sparta and Newton. The remaining law enforcement agencies' incident volume can be handled by one dispatcher on a shared channel. The incident volume for fire and EMS calls for service can be handled by one dispatcher with an assistant assigned from the cross-trained call takers or an assistant supervisor providing support during working fire and other incident command scenarios. The number of channels requiring direct monitoring may be reconfigured if the consolidated radio systems or future countywide radio system is arranged for zone dispatching.[44] The projected staffing estimate accommodates other duties that could be performed in the consolidated operation, such as placing outgoing calls in support of operations; some level of records management (e.g. SCIC/NCIC record keeping) within the center; training assignments; and monitoring of alarms, televised news and weather, and other status systems.

Currently, 17 call taker/dispatch console positions are staffed countywide. If operations were to consolidate under the current workload and call statistics, ten fully equipped console positions would be staffed. These console positions represent four call taker, three law enforcement dispatch, two fire/EMS dispatch and one supervisory console. For facility sizing purposes, space for two future consoles should be included on the operations floor, which could be used for overflow calls during incidents, special operations, and training; if needed a power shift could be staffed at these consoles. Two training consoles should be located off the operations floor and could be partially to fully equipped based on need and

[44] A zoned dispatch configuration may follow geographically-based zones or population based zones. For example, the County could be divided into four zones. Or, heavy traffic areas such as a heavily populated city/town may constitute a single zone. As indicated in *Staffing Projections* a radio traffic study is needed to determine load and adequate monitoring configuration.

funding. Together, 12 fully/partially equipped console positions, which include 2 for training, are needed, with space to increase to 14.

The chart below summarizes projected staffing levels and necessary console positions.

Staffing			Console Positions	
Certified FTEs Needed	**Number**		**Workstations Needed**	**Number**
Call Takers	22		Call Taker	4
Police Dispatchers	17		Police Dispatch	3
Fire/EMS Dispatchers	6		Fire/EMS Dispatch	2
Supervisors	6		Supervisor	1
Total	51		**Total**	10
			Training (off operations floor)	2
			Total	12
			Allowance for future growth, training consoles, or overflow	2
			Total w/allowance	14

A re-evaluation of available statistical call volume and data should be performed every three to six months during the planning and implementation phases of consolidation to ensure accuracy in staffing projections. Following consolidation, monitoring performance and call volumes via an MIS that counts calls will provide more accurate data to be used to adjust and address staffing needs in a real-time manner.

12.5 CAREER PATH DEVELOPMENT

Existing PSAP employees are great resources for staffing the new consolidated PSAP. To balance the needs of the consolidated PSAP with those of the projected staff and provide both career development and opportunities for those proficient in one or more roles, Kimball recommends creating a professional development path through certification at varying levels of skills, title, and pay. The progressive certifications do not have to follow the sample path below.

- Employees may begin with training and certification toward a base level call taker and EMD certification.
- Employees may progress to a second level certification as a call taker and dispatcher in one discipline (e.g., fire).
- Employees may progress to a third level certification as a call taker, fire dispatcher, and one additional discipline (e.g., police).

- The ultimate progression is certification as a senior dispatcher capable of all disciplines: call taker with EMD, fire, police, and EMS dispatching. Senior dispatcher skills sets should/may also include certification, title and pay as training officers.
- Additional certifications should equate to additional pay levels.

Within the individual disciplines paths training officer certifications and supervisory skills can be developed. A skilled, confident and participatory staff benefits the PSAP through staff buy-in/support and loyalty, self-reliance, professionalism, external recognition and internal pride, trust from served agencies and responders, and most importantly, increased retention, which means a return on investment.

12.6 NEXT GENERATION 9-1-1 (NG9-1-1) IMPACT ON STAFFING

The impending NG9-1-1 technologies and services will have a profound impact on PSAP operations. In turn the technical and operational changes will impact staffing; there will be an increase in the data that call takers will need to process and route appropriately and more complicated systems to use and/or monitor. In preparation for NG9-1-1, employees will require increased and/or different training. For example, basic call taking skills, such as determining the location of an emergency, may soon require more than confirming ALI information from one source. Other potential changes could come from monitoring and coordinating event information, such as photos, streaming video, appropriate handling of automatic crash notification and accompanying medical information. NG9-1-1 could mean a staff increase or decrease based on how the technology is developed and configured.

13. OPERATIONS

The recommended operational methodology in a countywide consolidated PSAP is a combined duty floor operation staffed by multiple levels of cross-trained staff. A call processing flow is recommended that facilitates appropriate and free interaction and coordination among disciplines. To generate an effective call processing flow, the operational floor arrangement must allow open communications and supervision.

A combined duty floor operation begins with establishing areas of concentrated activity, which serves several purposes.

- Similar and dependent services are managed in and by a group responsive setting, such as grouping by call taker, law enforcement dispatching, and fire/EMS dispatching.
- Supervision and coordination of resources are focused in one area of the communications floor.
- The ability to isolate and protect other areas during high priority and long-term incidents enables normal activity to continue and alleviates unrelated background noise.
- Resources not provided electronically are easier to maintain and keep deskbound.

Ideally, a countywide consolidated PSAP will be configured operationally to have an area equipped and assigned for call taking, with a supervisor position centrally placed on the communications floor with equal vantage points and access to the dispatching areas. Law enforcement dispatching will be equipped and assigned to one side of this core and fire/EMS to the other. With tools, such as CAD, intra-communications/messaging, and resource monitors, available for communication and coordination of resources, the law enforcement and fire/EMS dispatch areas will be better able to jointly respond to all priority levels. Other floor configurations can affect the same or similar communication and supervisory paths and can be explored during the programming phase of planning.

13.1 CALL HANDLING PROCESS AND REVIEW

Policies and procedures will define the entire call flow process from off-hook through follow-up. Based on the current and future needs of Sussex County, Kimball recommends the process outlined below.

1. Certified call takers answer and document calls for service in a fully functional customized CAD system that routes calls to the appropriate dispatchers. The same call takers provide EMD when needed and other information as appropriate based on call type.
2. Based on pre-established priority assignments sourced to the nature of the event and response type, the receiving dispatchers notify and assign calls to units/apparatus.
3. The same dispatchers monitor responding units/apparatus for status changes and requests for further information or services.
4. The same dispatchers receive, relay, and document all information exchanged among other dispatchers/call takers, units/responders, and other service providers. The call for service is cross-referenced to other calls, when and where appropriate, and closed with appropriate disposition documentation.

5. If further information or documentation is necessary after the call is closed, the dispatcher or call taker is capable of performing updates.
6. Within 30 days of call conclusion, random/assigned QA is performed by a QA coordinator/supervisor.
7. Follow-up training/re-training where needed is conducted and documented; follow-up adjustments to policy and procedures are conducted, where needed, as a result of QA review.

13.1.1 Current Call Flow and Dispatch Methodology

Currently, 9-1-1 emergency calls are initially processed through one of six PSAPs. At times multiple call transfers are necessary to complete a multi-agency, multi-jurisdictional response.

The querying of a caller more than once wastes valuable time and is a possible cause for caller confusion and frustration. The transferring of an emergency call more than once is contrary to public safety best practices wherein the telecommunicator originally receiving the call should remain in communication with the caller. The transferring of calls numerous times has inherent multiple points of failure such as the phone network, the disparate systems and equipment, the possibility of the receiving agency being busy, and human error. The impact of this call processing methodology is not only detrimental to the caller, but to the responders. In some instances the safety of the emergency responder is at risk, and time is of the essence for both the responders and the public they serve. Each law enforcement, fire, and EMS agency has a duty to respond in a timely manner based upon the nature of the emergency and the requirements of certifying and assessing organizations such as CALEA, the Insurance Services Office (ISO), NFPA, and the Commission of Fire Accreditation International (CFAI).

13.1.2 Consolidated Call Processing and Dispatch Methodology

All Sussex County PSAPs will benefit from more effective call processing and the resulting potential decrease in response times. N.J.A.C. 17:24-2.2 *PSAP: Required and Recommended Staffing* states "Each PSAP shall, at all times, be staffed with the number of call-takers necessary to permit the PSAP to answer all calls within 10 seconds, except that during the average busiest hour 10 percent of the calls may be answered within 20 seconds." This requirement coincides with public safety best practices and standards, such as NENA Call Answering Standard/Model Recommendation, NENA 56-005 and NFPA operating procedure standards.

NENA 56-005 states "[n]inety percent (90%) of all 9-1-1 calls arriving at the Public Safety Answering Point (PSAP) shall be answered within ten seconds during the busy hour (the hour each day with the greatest call volume, as defined in the NENA Master Glossary 00-001). Ninety-five (95%) of all 9-1-1 calls should be answered within twenty (20) seconds." NENA also states that these times are to be met during the busy hour (the hour each day with the greatest call volume).

NFPA 1221, Section 7 states "[n]inety-five percent of alarms[45] received on emergency lines shall be answered within 15 seconds, and 99 percent of alarms shall be answered within 40 seconds" and "[n]inety percent of emergency alarm processing shall be completed within 60 seconds, and 99 percent of alarm processing shall be completed within 90 seconds." NFPA does not address police call processing and dispatching. Crimes in progress or medical calls may require the call taker to be on line with the caller

[45] NFPA 1221 defines an alarm as "a signal or message from a person or device indicating the existence of an emergency or other situation that requires action by an emergency response agency."

longer than 90 seconds. This is especially true in situations where the call taker is providing EMD pre-arrival instructions. The key to this standard, as it would be to any response standard, is to dispatch units in a timely and efficient manner.

Potential response time decreases will be due to:

- True call taker and dispatcher environment
- Caller location identification
- Coordination of resources
- Direct access to mutual aid

A true call taker and dispatcher system allows call takers to be on line with the caller, obtaining vital information for responders, while the dispatcher sends units. 9-1-1 callers are queried to determine the incident type (nature), the incident location, vital information, and the caller's callback phone number. The call information is then sent via CAD to the appropriate dispatcher(s) for radio dispatch of field units. Because the call taker remains on line with the caller, further information important to response and mitigation of the incident can be gathered, entered into CAD, and viewed by the dispatcher(s) and relayed to the field units. This model will improve the service provided to callers by potentially reducing the overall response times and the number of times a caller is queried, by reducing the multiple points of failure, and by creating, in essence, one geographic response area.

Intervention protocols administered during call taking can be time intensive. In a consolidated environment, however, the call delivery time via CAD to the respective dispatcher(s) is not delayed by this process. If a caller is in danger, such as a domestic violence situation, it is protocol to stay on the line with the caller until help arrives. If a caller is reporting a structure fire with known or possible occupants and/or citizens are attempting to extinguish the fire or rescue the occupants themselves, it is protocol to keep the caller on the line to ascertain further information. If a caller is reporting a medical emergency and is in a position to administer aid to the patient, it is protocol to keep the caller on the line to provide instructions. These are but a few call types that will require the call taker to stay on the line until responders arrive on scene. Thus, the call taker connection to the caller cannot be accurately measured/captured in a table. However, the call taker's effort of creating an event in the CAD system and forwarding it to the dispatcher(s) is measurable and plays a significant role in reducing the overall call processing time. Time savings is realized through eliminating the separate call processes.

Situations where a caller may remain on the line, which will increase the call taker's time and potentially the total response time, may include:

- More intensive EMD protocols
- In-progress/just occurred events
- Suicidal or homicidal persons

In these instances, the responders are already dispatched and are kept apprised of the updated information by the dispatcher(s). The unit/apparatus initial dispatch response overall will be reduced by having the call available for dispatch simultaneously and potentially all necessary responders, law enforcement, fire and EMS, dispatched at once. A medical call is often the highest priority call taken, and as such, every

effort for the fastest response should be made. Responders from all disciplines can be dispatched and fed additional information while en route to a call for service.

Proximity, standardized protocols and unified systems create expedient and successful handling of every call received. There are no opportunities to lose a call in a transfer, or miss vital information in re-questioning the caller two or three times. There is the benefit of enhanced responder safety by providing information sooner, more completely, accurately and in real-time for all responders.

Consolidated operations will bring about increased efficiencies and coordination of communications and emergency response services.

A reduction in the number of call takers and dispatchers handling the call, plus the elimination of transfers between different PSAPs with differing protocols and equipment equals faster overall response time and saves lives.

13.2 COORDINATION OF RESOURCES

During incident command situations and long-term and/or large-scale events, the ability to quickly coordinate responses and shared resources with OEM will be greatly enhanced in a consolidated PSAP with the appropriate training, protocols and up-to-date reference material readily available.

Coordination of resources also applies to mutual aid. With all Sussex County agencies dispatched by a consolidated PSAP, mutual aid will be coordinated through one location. This will decrease response times as dispatchers will be able to better anticipate the needs of responders and be better prepared to meet those needs upon request. The processes for accessing mutual aid beyond County jurisdictions will be improved and better coordinated through standardizing protocols, enabled interoperability, and data sharing beyond the consolidated PSAP.

13.3 ADMINISTRATIVE CALL HANDLING

One of the commonly voiced concerns from participating agencies is the desire to maintain the quality of service levels currently provided. In many of the public safety agencies, the emergency call taking and dispatching functions are a small percentage of their roles. Particularly in the smaller agencies, the dispatcher is the agency's initial point of contact and is usually the municipality's only after-hours contact. The dispatchers perform as switchboard operators assisting callers with locating individuals and services within the agency and municipality served. They also provide a myriad of municipal services unique to their respective locality and are able to direct or transfer callers to outside municipalities and/or services.

In a consolidated environment, some of these services may continue without noticeable interruption, if the function is in direct support of 9-1-1. These needs may be accommodated through established protocol, training and technology. For example, when a caller contacts the consolidated PSAP on a non-emergency or administrative line requesting to speak with specific supervisory or responding agency staff, or any

person/office in any of the agencies, the call taker simply locates the requested party's number and transfers the caller or directs the caller to the appropriate agency.

Functionality exists in current phone systems, CPE or separate PBX to program frequently called numbers. There are also many ways to store and update this data to prevent the loss of contact information, schedules, call back information and more. Speed dial functionality is also prevalent in CPE and PBX systems, allowing the call taker to quickly locate pre-programmed numbers to provide to the caller or to transfer the call. Established protocol, training and commitment by the served agencies and consolidated PSAP staff to maintain accurate contact information and schedules are paramount to successfully serving these callers.

Many non-emergency/administrative functions are handled by the existing PSAPs. Functions that are not relative to the processing of 9-1-1 calls will continue to be handled at the local level by the agency or municipality. During the planning phase, all jurisdictions will need to evaluate and determine how best to handle non-emergency/administrative needs, both common and unique. Some examples and a potential for handling them follow.

- There may be instances where dispatcher(s) currently function as the initial contact for non-public safety related services; a jurisdiction or municipality may elect to staff a clerical position for normal business hours.
- Law enforcement records request calls can be of a high or low priority. The decisions made on how best to handle each agency's after-hours records requests will impact requests from field units as well.
    - Low priority requests are requests for copies of previously entered reports. These requests can usually be referred to appropriate records staff during normal business hours and may involve a payment requirement, such as job application criminal history requests.
    - High priority requests are requests for actual paperwork, such as warrants, detention orders or court ordered documents. Protocol will have to be established for handling these records requests after hours.
    - If records requests from units are to be made through the PSAP, then arrangements for access to those records must be determined.
    - Protocols for handling external requests from other law enforcement agencies must be established.
        - To manage warrant requests the NJ Administrative Office of Courts (AOC) has an electronic system to enter and track all criminal complaints, traffic complaints and criminal and traffic warrants. The criminal system is the Automated Criminal System (ACS) and the traffic system is referred to as the Automated Traffic System (ATS). This system has virtually eliminated the need for paper warrants. If a warrant exists in the system it is considered valid. The whole authenticating process for warrants is termed "AOC-, ATS- or ACS-reliant." The same concept exists for domestic violence restraining orders. That system is the Family Automated Case System (FCTS) and houses the Domestic Central Registry and Juvenile Central Registry. The Domestic Central Registry houses all Temporary Restraining Orders (TROs) and all Final Restraining Orders (FROs). Each

system is electronically accessed by all New Jersey agencies and no one is needed after hours for authentication of paper warrants.

- Animal control calls are public service calls related to public safety needs and should be handled in a consolidated dispatch environment.
- Public works calls are also related to public safety, and citizens can be directed to a non-emergency line in the consolidated PSAP for public works calls, with appropriate protocols in place.
- Special event calls, such as calls asking when a road or bridge will be closed or calls asking when a municipality's holiday parade will take place, can be suited to a consolidated dispatch environment with appropriate notification process and protocols, training and communication.

The consolidated PSAP can handle non-emergency/administrative calls by forwarding or direct routing. These configuration and protocol options can be applied to public safety-related non-emergency/administrative calls for all participating agencies that do not have staff consistently available during normal business hours and after-hours.

- Any non-emergency line/administrative line can be permanently routed to the PSAP.
- A new number/alternate number can be listed/advertised for non-emergency service for any agency. The new number/listing provides direct contact with the consolidated PSAP.
- Any non-emergency/administrative line can be configured to roll-over to the PSAP's non-emergency/administrative lines if not answered within a prescribed number of rings.

Citizens also access services via walk-in to agencies' offices. Once consolidated if there is a need to continue 24/7 walk-in service individual municipalities may decide to staff their offices after hours. A more efficient method is to provide this service in one or more ways, such as:

- Signage and/or recordings directing visitors or callers to appropriate after-hours contacts or providing directions/instructions for handling/reporting the situation(s). These recordings or signs should begin with instructions to dial 9-1-1 (or use a call box if provided) if there is an emergency.
- Posting/Distributing the consolidated PSAP's non-emergency number(s) with specific information that can be obtained from the PSAP staff. For example, requests for agency-specific information, after-hours contacts for municipal services, and non-emergency requests for service. This requires that contact information for each municipality, to include updated contact names and numbers, be posted and available at all times to the consolidated PSAP staff. For optimum access and ease of use, an automated mechanism will best serve the multiple municipalities and service providers planning to participate in the consolidation.
- Providing an external call box at the agency headquarters/station in a well-lit location with adequate posted instruction on how to contact the consolidated PSAP in case of emergency, and with appropriate contact information for non-emergency requests. This hotline should ring directly into the consolidated PSAP and should arrive on a dedicated trunk(s) so that staff is immediately aware of where the call originates. These dedicated trunks should be 9-1-1 trunks routed through the ANI/ALI controller to provide location information to the call taker.

- For example, if an unstaffed station has a call box located at both the rear and front entrance of a building, the location information can be delivered with appropriate directions.
- The trunks should be set up to allow the call taker to call back to the call box phone in case re-contact with the caller is necessary.

Individual municipal and agency needs must be considered carefully in the planning phase, and there are many variations possible for the consolidated PSAP to meet most public safety related administrative call needs.

13.4 NEXT GENERATION 9-1-1 (NG9-1-1) IMPACT

13.4.1 Operations

The operational impact of NG9-1-1 on PSAPs will come from the anticipated new capabilities and services. The impact will be felt by PSAP leaders and frontline operational staff. For Sussex County this means that the User-specific Work Groups and PSAP management will have to work closely together to determine how to develop or alter PSAP policies, procedures, protocols and training to accommodate NG9-1-1 capabilities and services. The human factor must be considered throughout so that staff is well prepared for new or altered protocols and methods for locating callers, routing information, new equipment, services, functions and features. Standards and specific training do not exist for operating in an IP environment.

The impact on call taking will be the increased complexity of the call taking process due to multi-media data. Attention to system configuration and appropriate training with the call taker in mind will control and minimize the impact on the call taker. The call taking function will expand from locating wireline and wireless callers to real-time multi-media information from devices that text and transport pictures and streaming video. IP-based systems will be expected to manage the complexity and increased quantity of data; however, the human component will need the training and skills to recognize and process calls from numerous communication devices, delivery methods and caller location determination. Policy and training will need to focus on giving the staff the direction, knowledge and decision-making skills needed to determine what information should be relayed to dispatchers and responders. Policy will also drive how supportive or supplemental information (e.g. automatic crash notification data or patient allergies to certain medications) will be used, processed and stored or relayed.

Records management will be impacted by the variety of new information and formats, audio, video, text, photos, streaming video and data, which will require storage and archiving.

Aside from the changes anticipated in processing calls, relaying and storing records, and developing and conducting training, there are areas that will impact the overall operational methodology in a NG environment. Additional response agencies (local, regional, state and federal) will require building relationships. The served population will be re-defined as geographic boundaries expand or become less relevant to call routing. With the expansion of voice and data interoperability, the emergency management and other coordinated response level roles (government, hospitals) will expand and become more integrated with PSAP first response capabilities, functions and features.

Post-September 11th and Katrina, other forms and levels of fall back planning are necessary for survival of the local PSAP. Concepts such as virtual PSAPs, supported by appropriate planning, capabilities, management, networking and training, are becoming feasible.

13.4.2 Training

Technology-based educational requirements for PSAP staff in an IP-enabled environment will include GIS-based directories of authorized organizations and resources, and expanded training for systems and features, such as MSAG, mapping, logger, CAD and IP-based CPE.

Operations-based educational requirements for PSAP staff in an IP-enabled environment will include understanding basic call routing, transport, interoperability and security (access control/identity management for implementation of information sharing polices) and application layers supporting interoperability between diverse networks.

13.4.3 Workstation Configuration

The number of systems and amount of information monitored and directed per position and person will require a review of how systems are configured, integrated or interfaced. This will also drive where and how many monitors will be placed at each workstation. The functional capacity of the operations staff must be considered when determining what and how many systems an individual or group of individuals will be required to monitor, the workload generated by the monitored systems, and the ability of management to adequately provide supervision and perform QA/QC on the resulting performance.

14. BACKUP CAPABILITIES

The current backup/disaster plans for Sussex County PSAPs follow a default routing plan for 9-1-1 calls. Each PSAP has up to three alternate routing paths that automatically route 9-1-1 calls should the original destination PSAP not have the ability accept calls due to trunks being overwhelmed or out of service. This backup method does not serve Sussex County public agencies and citizens well. The limits to data and voice interoperability between the existing PSAPs prevent this backup configuration from becoming a full backup plan for Sussex County.

14.1 CASE STUDIES

Though there are limits to the effectiveness of re-routing 9-1-1 calls in Sussex County, the PSAPs have proven very resourceful during critical incidents as demonstrated in the case studies that follow.

14.1.1 August 12, 2000

On August 12, 2000, Sussex County saw over 14 inches of rain fall in 5 hours. Three neighboring counties, Morris, Warren and Hunterdon, were also affected. In Sussex County, the torrential rains caused the failure of four dams; affected the integrity of 15 other dams; damaged bridges and roads, including Highway 15; and isolated a portion of the population. The flooding was primarily localized in one area of Sparta, which was the hardest hit, but affected other areas of the county as well.

Initially, each PSAP handled their respective jurisdiction. After several hours, the County established a make-shift command center next door to the Sparta PSAP. The command center had ten phone lines, some radios, emergency workers and supplies. The command center took calls for Sparta and calls related to the flood. The command center was active for approximately four days.

While the efforts of all public safety agencies were commendable, one incident illustrates the impact of not having a single consolidated PSAP to effect true data and voice interoperability. In Sparta during the flood, a swift water rescue team was needed for a woman in labor. Sparta reached out to Delaware Water Gap for assistance; however, closer to the incident a swift water rescue team was on standby in Hardyston. Had a consolidated PSAP existed in Sussex County that served all agencies, coordination and communication would have been the norm and some issues may not have occurred.

14.1.2 September 11, 2001

Like all of the surrounding counties and many others across the nation, Sussex County provided support to the New York City response and recovery agencies immediately following the September 11, 2001 World Trade Center attacks. The six PSAPs had to coordinate six months of support for this effort. Understandably, all involved recognized that assembling resources was more complicated and time intensive than need be. A single countywide PSAP could have streamlined the effort and produced support more quickly for this situation.

14.1.3 March 14, 2003

In March 2003, a propane explosion in Newton resulted in a fire that created coordination, response and recovery roadblocks for OEM and the affected PSAPs. The Newton PSAP handled the incident, coordinating the response and support of other PSAPs. On scene incident command communicated through the Newton PSAP until Warren County's Field Command Unit (FCU) and staff arrived. The Warren County FCU and staff remained in Sussex County providing incident command communications and coordination for the six day event.

Assembling resources and coordinating response and recovery efforts were hindered by the number of PSAPs in Sussex County.

14.2 SHORT TERM BACKUP

Through interviews with OEM and County staff, Kimball learned that Sussex County plans to work with Warren County on developing a backup plan in which Warren County's consolidated PSAP provides backup to Sussex County's anticipated consolidated PSAP. As a short term backup plan, this is appropriate as Warren and Sussex Counties have similar demographics. Unfortunately, the similar demographics and workload will make it difficult for Warren County to operate as a long term backup to Sussex County; this will also make it difficult for Sussex County to backup Warren County long term. Sussex County's anticipated workload will double the workload for Warren County. With operational modifications to both counties, providing backup for hours, days or a few weeks may be possible.

In addition to expanding any existing mutual aid agreements, technical issues must be addressed. The Counties can work with Verizon to form a disaster plan for routing 9-1-1 calls. Radio system connectivity will prove more difficult. Sussex County's disparate radio systems will need to be interconnected to initially support a countywide consolidated PSAP while future plans are formed to build out a countywide radio system. For Warren County and/or staff from Sussex County relocated to Warren to fully backup Sussex County, there must be a reliable interconnection from the Warren PSAP into the Sussex County interconnected system-of-systems and the future countywide system. Data interoperability is also necessary to prevent loss of information and to best support coordination of resources for response and recovery regardless of the incident type or size.

The agreement with Warren County should allow Sussex to reciprocate services by backing up Warren County. This will require voice and data interoperability with and among the Warren County voice (radio and 9-1-1 trunking) and data systems.

This high level conceptual plan can be used to begin revising and updating the Sussex County EOP, mutual aid agreement/s, technology and operations toward a complete and specific plan.

Another short term backup option may be to maintain one of the larger equipped existing PSAPs (e.g. Sparta) as an overflow/training/special operations site. While this will not provide full backup capabilities or capacity, it could supplement other backup plans. This supplemental site could provide support during incidents that do not require evacuating the primary PSAP.

14.3 LONG TERM BACKUP

Utilizing Warren County as a long term backup to Sussex County may not be feasible due to similar workload and capacity. The concept of maintaining one of the larger PSAPs as an overflow/training/special operations site can augment any short or long term plan. Neither option will sustain Sussex County long term. A catastrophic manmade or natural event could leave Sussex County without a PSAP in the current configuration and future consolidated model. In this scenario Sussex County could be without a PSAP(s) for months while recovery efforts occur.

Factors for long term backup planning will include where and how to restore and sustain 9-1-1 service. Studying options for long term backup plans should be included in the planning phase of consolidation. Options for consideration include:

- The construction or renovation of a hardened backup facility of a capacity to support Sussex County's full operations for an extended period of time; the facility should be located at least three to five miles from the primary PSAP.
- The use of temporary structures, such as pre-fabricated metal buildings/trailers, which is a less costly option. Establishing an agreement with local suppliers may allow for a quick response and assembly on a pre-determined site(s). This option allows the potential choice of locations for a long term, yet temporary, structure to house the displaced PSAP. While grant opportunities exist to acquire and equip a mobile command unit, this is not the best fit for long term relocation for an operation the size of Sussex County.
- Licensing and software agreements with PSAP systems/equipment vendors may allow shifting applications to other workstations, or mobilizing workstations or laptops. It is sometimes cost prohibitive to acquire and maintain licenses for backup operations that are seldom used.

14.4 NEXT GENERATION 9-1-1 (NG9-1-1) IMPACT ON BACKUP PLANNING

The short and long term planning issues and considerations described use strategies available or feasible within the context of current operational and technological frames. NG9-1-1 will alter the way that response and recovery and backup planning in general will be carried out. Self-healing networks, removing roadblocks to routing 9-1-1 calls, and provisioning dispatch services from backup sites external to geographical coverage areas will improve and enhance the ability to recover primary or initiate backup operations. IP-enabled networks will increase reliability and disaster recovery of voice (9-1-1, radio) and data (real time information sharing) delivery networks. Clearer demarcations of responsibility and accountability and reduced points of failure in the network will exist. With the lifting of service area restrictions, 9-1-1 calls will be able to be processed and dispatched via routing and transfers across the state and across state boundaries with location information intact.

15. NEXT STEPS

To advance towards consolidation, the County and participating PSAPs should maintain the current momentum by progressing directly into the planning and implementation phases. The success of this phase and its individual components will have a direct impact on the success of the consolidation initiative.

Step One:
Task A - Determine direction of the Board of Chosen Freeholders

Task B - Obtain commitment from all stakeholders to proceed with the planning phase; commitment should be in writing where practicable.

Task C - Coinciding with commitments, site selection should occur. While locating a suitable site for construction or renovation, more formal programming and design activities can occur to allow stakeholders and planning activities to determine what the facility should look like and what it should contain.

Step Two:
Hire a manager/director. The County, TWG and User-specific Work Groups should work together in the hiring process to name a director who will assist in accomplishing the operational objectives of consolidation. To augment the County's, stakeholders' and new director's expertise, external professional services may be sought to manage a project of this type and size.

Step Three:
Task A - Develop transition and migration plans in alignment with construction schedules. The director and professional support, if applicable, should continuously monitor, control and edit these plans as the consolidation process moves forward.

Task B - Identify a suitable backup / alternate site and plan as soon as practical. Backup plans should include several layers of contingency planning.

Task C - Converge and develop common policies and procedures, and protocols in support of the new consolidated operation. Training and QA/QC programs should be developed in conjunction with this effort.

Step Four:
Hire a deputy director to begin working with the director. Other management, administrative and support staff may be needed at this point.

Step Five:
Task A - Develop and implement two-phase hiring process that will identify qualified employees from participating PSAPs and identify qualified candidates from external hiring pools to fill available positions. Pay and benefits equalization within the County's classification and benefits system should be addressed for transitioning employees.

Task B - Continue filling remaining administrative, management and support positions.

Task C - Begin implementation of new technology.

Task D - Train employees on new systems and protocols.

Step Six:
Task A - Adjust and implement final migration plans as facility occupancy is allowed and systems installation and cutover dates can be confidently projected.

Task B - Direct transition from the individual PSAPs into the consolidated PSAP, which includes Task C - cutting over systems and testing. When all systems and operations are successfully on-line for a period of one to two weeks, the former PSAPs can be shut down.

15.1 TRANSITION COMPONENTS SUMMARY

15.1.1 Facility

Locate a suitable site and proceed with the design and construction of a new facility or renovation of existing facility. Maintain operational and design expertise in the design and construction to identify and address needs specific to public safety communications.

15.1.2 Technical (Equipment)

Phase automated systems and console furniture installations based on integrations and interfacing systems. Allows for coordination of vendors and enhanced ability to monitor installations, testing, training, and acceptance.

15.1.3 Operational (Personnel)

Phase staff into the consolidated PSAP immediately after new operating procedures acclimation training and systems training.

15.2 PLANNING AND IMPLEMENTATION ASSISTANCE

Due to the magnitude of undertaking a multiple PSAP consolidation, consideration should be given to using experienced, professional third-party assistance during the planning and implementation phases. There are also planning and start-up responsibilities that will not exist once the fully consolidated PSAP has been launched. Outsourcing planning, implementation, and technical transition management frees the board and PSAP management to concentrate on developing policies, budgets, and personnel, all of which are critical to the success of consolidation.

Appendix I contains a project plan that may be used as a template for transition and migration planning.

ACRONYMS

ACD	Automatic Call Distribution
ACN	Automatic Crash Notification
ACS	Automated Criminal System
ADA	Americans with Disabilities Act
ALI	Automatic Location Identification
Andover	Andover Township
ANI	Automatic Number Identification
ANSI	American National Standards Institute
AOC	Administrative Office of Courts
APCO	Association of Public-Safety Communications Officials – International
API	Application Programming Interface
ARRA	American Recovery and Reinvestment Act
ATS	Automated Traffic System
AVL	Automatic Vehicle Location
CAD	Computer Aided Dispatch
CALEA	Commission on Accreditation of Law Enforcement Agencies
CAMA	Centralized Automatic Message Accounting
CATV	Cable Television
CCTV	Closed-Circuit Television
CFAI	Commission on Fire Accreditation International
CLEC	Competitive Local Exchange Carrier
CMRS	Commercial Radio Mobile Service
County of Sussex	County
CPE	Customer Premise Equipment
CTCSS	Continuous Tone Controlled Squelch System
DAQ	Delivered Audio Quality
DHS	Department of Homeland Security
DOT	Department of Transportation
E9-1-1	Enhanced 9-1-1
EIA	Electronic Industries Alliance
EMA	Emergency Management Agency
EMD	Emergency Medical Dispatch
EMS	Emergency Medical Services
EOC	Emergency Operations Center
EOP	Emergency Operations Plan
ERP	Effective Radiated Power
ESInet	Emergency Services Internet Protocol Network
ESN	Emergency Service Number
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation
FCC	Federal Communications Commission
FCTS	Family Automated Case System
FCU	Field Command Unit
FEMA	Federal Emergency Management Agency

FRO	Final Restraining Order
FTE	Full Time Equivalent
GIS	Geographic Information System
Hardyston	Hardyston Township
Hopatcong	Hopatcong Borough
HVAC	Heating, Ventilation and Air Conditioning
IBC	International Building Code
ICS	Incident Command System
IECGP	Interoperable Emergency Communications Grant Program
IEEE	Institute of Electrical and Electronic Engineers
IP	Internet Protocol
ISO	Insurance Services Office
JDC	Juvenile Detention Center
LAN	Local Area Network
LEC	Local Exchange Carrier
MDT	Mobile Data Terminal
MHz	Megahertz
MIS	Management Information System
MMRS	Metropolitan Medical Response System
MOU	Memorandum of Understanding
MSAG	Master Street Address Guide
NAWAS	National Warning System
NCIC	National Crime Information Center
NEC	National Electrical Code
NENA	National Emergency Number Association
NESC	National Electric Safety Code
NFPA	National Fire Protection Association
NG9-1-1	Next Generation 9-1-1
NIMS	National Incident Management System
NJ	New Jersey
NLETS	National Law Enforcement Telecommunications System
NTIA	National Telecommunications and Information Administration
OEM	Office of Emergency Management
OETS	Office of Emergency Telecommunications Services
OIT	Office of Information Technology
P.L.	Public Law
PBX	Private Branch Exchange
PC	Personal Computer
PDA	Personal Digital Assistant
PSAP	Public Safety Answering Point
PSDP	Public Safety Dispatch Point
PSFA	Public Safety Foundation of America
PSIC	Public Safety Interoperable Communications
QA	Quality Assurance
QC	Quality Control
RETAINS	Responsive Efforts to Address Integral Needs in Staffing

RF	Radio Frequency
RFP	Request for Proposal
RITA	Research and Innovative Technology Administration
RMS	Records Management System
SAA	State Administrative Agency
SCCC	Sussex County Community College
SCIC	State Criminal Information Center
SF	Square Feet
SIP	Session Initiation Protocol
SMS	Short Message Service
SOG	Standard Operating Guideline
SOP	Standard Operating Procedure
Sparta	Sparta Township
SPSCA	Standards for Public Safety Communications Agencies
Sussex County	County
TAC	Terminal Agency Coordinator
TDD	Telecommunications Device for the Deaf
TDMM	Telecommunications Distribution Method Manual
TIA	Telecommunications Industry Association
Newton	Town of Newton
TRO	Temporary Restraining Order
TTY	Teletypewriter
TWG	Telecommunications Working Group
UASI	Urban Area Security Initiative
UHF	Ultra High Frequency
UPS	Uninterruptible Power Supply
US DOT	United States Department of Transportation
Vernon	Vernon Township
VHF	Very High Frequency
VIN	Vehicle Identification Number
VoIP	Voice over Internet Protocol

REFERENCES

Remainder of this page intentionally left blank.

9-1-1 WORKING GROUP RESOLUTION

RESOLUTION RE: AUTHORIZATION FOR THE BOARD OF CHOSEN FREEHOLDERS TO ESTABLISH A SUSSEX COUNTY 9-1-1 WORKING GROUP AND TO PROVIDE FOR THE APPOINTMENT OF A CHAIRPERSON, EX-OFFICIO MEMBERS AND ORGANIZATION-DESIGNATED MEMBERS THEREOF WITH THE GOAL OF IMPROVED 9-1-1 SERVICES IN AND FOR SUSSEX COUNTY

WHEREAS, in the Years 2000 through 2006, the State of New Jersey has conducted no less than three studies, and in 2007 has passed no less than two laws governing the implementation of 9-1-1 emergency telecommunications improvements in and for the State of New Jersey; and

WHEREAS, the State of New Jersey, through the Office of Emergency Telecommunications Services and the 9-1-1 Commission, has established minimum standards for the funding of Public Safety Answering Points (9-1-1 Telecommunications Centers) pursuant to N.J.S.A. 52:17C-1, et seq. and N.J.A.C. 17:24-1 et seq.; and

WHEREAS, the funding of Next Generation 9-1-1 Technology, as mandated by the federal government in or about 2010, will not permit the State of New Jersey to even partially fund more than twenty-one county-wide communications centers, fifteen urban communications centers, and six suburban regional communications centers serving at least 65,346 residents; and

WHEREAS, the County of Sussex currently has six Public Safety Answering Points (9-1-1 Telecommunications Centers), none of which meets the newly promulgated standards; and

WHEREAS, at the behest of a majority of its municipalities, the County of Sussex has conducted two studies related to the improvement of 9-1-1 emergency telecommunications services in Sussex County, funded by grants from the New Jersey Office of Emergency Telecommunications Services; and

WHEREAS, the studies conducted by R.C.C. Consultants, Inc., concluded that there should be consolidation of Public Safety Answering Points (PSAPs) in and for Sussex County; and

WHEREAS, there appears to be support in all emergency services and at the municipal government level to proceed with the study of 9-1-1 consolidation and the implementation of an effective, efficient, and economical solution; and

WHEREAS, the New Jersey Chapter of the National Emergency Number Association recommends that 9-1-1 consolidation be the result of a broad-based effort on behalf of and by all likely shareholders.

NOW, THEREFORE, BE IT RESOLVED that the Board of Chosen Freeholders of the County of Sussex hereby establishes the Sussex County 9-1-1 Telecommunications Working Group; and

BE IT FURTHER RESOLVED that the Sussex County 9-1-1 Telecommunications Working Group, hereinafter TWG, shall be chaired by John Drake and that the further structure of the TWG, i.e., vice-chair(s), subcommittees, etc., shall be determined by the TWG; and

BE IT FURTHER RESOLVED that the following will be *ex-officio* members: one Freeholder appointed by the Freeholder Director, the County Administrator, the County Sheriff, the County Emergency Management and 9-1-1 Director, the County Fire Coordinator, the County EMS Coordinator, and the County Shared Services Director; and

BE IT FURTHER RESOLVED that the following members will be appointed from recommendations by the appropriate stakeholder organizations to the Board of Chosen Freeholders: two chiefs of police: one from a PSAP community, and one from a non-PSAP community; two municipal fire chiefs: one from a PSAP community, and one from a non-PSAP community; two EMS chiefs/captains: one from a PSAP community, and one from a non-PSAP community; and two municipal OEM coordinators: one from a PSAP community, and one from a non-PSAP community; and

BE IT FURTHER RESOLVED that the Office of the Sheriff, Division of Emergency Management, and 9-1-1 Communications Coordination shall supply the administrative and clerical support for the 9-1-1 Telecommunications Working Group; and

BE IT FURTHER RESOLVED that a certified copy of this Resolution shall be forwarded to the State of New Jersey, Office of Emergency Telecommunications Services, P. O. Box 212, Trenton, NJ 08625; the Sussex County Administrator; the Sussex County Sheriff; and the Sussex County Division of Emergency Management.

Certified as a true copy of
the Resolution adopted by
the Board of Chosen Freeholders
on the 30th day of January, 2008.

Elaine A. Morgan

Elaine A. Morgan, Clerk
Board of Chosen Freeholders
County of Sussex, New Jersey

RECORD OF VOTE						
FREEHOLDER	AYE	NAY	N.V.	ABS	MOVE	SEC
Chiusano	✓					
~~Crohn~~ Arnott	✓					
Vetrano	✓				✓	
Wirths	✓					
Zellman	✓					✓

N.V.-Not Voting SEC-Resolution Seconded
MOVE-Resolution Moved ABS-Absent

52:17C1-16 STATEWIDE 9-1-1 ENHANCED EMERGENCY TELEPHONE SYSTEM

STATEWIDE 9-1-1 ENHANCED
EMERGENCY TELEPHONE SYSTEM
52:17C1-16
(FULL TEXT WITH JUNE 1999 AMENDMENTS)

52:17C-1 Definitions.

1.As used in this act:

a. "Automatic number identification (ANI)" means an enhanced 9-1-1 service capability that enables the automatic display of the callback number used to place a 9-1-1 call;

b. "Automatic location identification (ALI)" means an enhanced 9-1-1 service capability that enables the automatic display of information defining the geographical location of the telephone used to place a 9-1-1 call;

c. "Commission" means the 9-1-1 Commission;

d. "County 9-1-1 Coordinator" means the County 9-1-1 Coordinator appointed pursuant to section 5 of this act;

e. "Enhanced 9-1-1 network" means the switching equipment, trunk system, database operation and connections to the public safety answering point;

f. "Enhanced 9-1-1 network features" means those features of selective routing which have the capability of automatic number and location identification;

g. "Enhanced 9-1-1 service" means a service consisting of telephone network features and public safety answering points provided for users of the public telephone system enabling the users to reach a public service answering point by dialing the digits "9-1-1." The service directs 9-1-1 calls to appropriate public safety answering points by selective routing based on the location from which the call originated and provides for automatic number identification and automatic location identification features;

h. "Enhanced 9-1-1 termination equipment" means the equipment located at the public safety answering point which is needed to receive or record voice and data communications from the enhanced 9-1-1 network;

i. "Office" means the Office of Emergency Telecommunications Services established by section 3 of this act;

j. "Public safety agency" means a functional division of a municipality, a county, or the State which dispatches or provides law enforcement, fire fighting, emergency medical services, or other emergency services;

k. "Private safety agency" means any entity, except a municipality or a public safety agency, providing emergency medical services, fire fighting, or other emergency services;

l. "Public safety answering point (PSAP)" means a facility, operated on a 24-hour basis, assigned the responsibility of receiving 9-1-1 calls and, as appropriate, directly dispatching emergency response services or transferring or relaying emergency 9-1-1 calls to other public safety agencies. A public safety answering point is the first point of reception by a public safety agency of 9-1-1 calls and serves the jurisdictions in which it is located or other participating jurisdictions;

m. "Selective routing" means the method employed to direct 9-1-1 calls to the appropriate public safety answering point based on the location from which the call originated;

n. "Emergency enhanced 9-1-1 system" or "system" means the emergency enhanced 9-1-1 telephone system to be established pursuant to this act, including wireless enhanced 9-1-1 service;

o. "Telephone company" means the organization that provides switched local telephone exchange access service;

p. "Wireless telephone company" means any person providing commercial mobile radio service as defined in 47 U.S.C.s. 332 (d);

q. "FCC wireless E9-1-1 requirements" means the order adopted in the Federal Communications Commission proceeding entitled "Revision of the Commission's Rules to Ensure Comparability with Enhanced 9-1-1 Emergency Calling Systems," (CC Docket No. 94-102: RM-8143), or any successor proceeding, and the rules adopted by the Federal Communications Commission in any such proceeding, as these rules may be amended from time to time;

r. "Wireless 9-1-1 service" means the service which enables wireless telephone company customers to dial the digits 9-1-1 and be connected to a public safety agency;

s. "Wireless enhanced 9-1-1 service" means the service required to be provided by a wireless telephone company pursuant to FCC wireless E9-1-1 requirements;

t. "Chief Technology Officer" means the person appointed by and serving at the pleasure of the Governing Board who is responsible for the day-to-day operations of the Office of Information Technology;

u. "Governing Board" means the seven-member board established by Executive Order 87 of 1998 to oversee the Office of Information Technology; and

v. "Office of Information Technology" means the Office of Information Technology established by Executive Order 87 of 1998.

52:17C-2 9-1-1 Commission.

2. a. There is created in the Office of Information Technology a commission to be known as the 9-1-1 Commission which shall oversee the office in the planning, design, and implementation of the Statewide emergency enhanced 9-1-1 telephone system to be established pursuant to this act. The commission shall consist of 30 members as follows: two members appointed by the Governor upon the recommendation of the President of the Senate, who shall not be both of the same political party; two members appointed by the Governor upon the recommendation of the Speaker of the General Assembly, who shall not be both of the same political party; the following members ex officio: Chief

Technology Officer of the Office of Information Technology; President of the Board of Public Utilities; Superintendent of State Police; Deputy Director of the State Office of Emergency Management in the Department of Law and Public Safety; Director of the Bureau of Fire Safety in the Department of Community Affairs; Director of Emergency Medical Services in the Department of Health and Senior Services; one member of the Governing Board of the Office of Information Technology in but not of the Department of the Treasury; the following public members appointed by the Governor with the advice and consent of the Senate: a representative of the New Jersey State League of Municipalities; a representative of the New Jersey State Association of Chiefs of Police; a representative of the Fire Fighters' Association of New Jersey; a representative of the New Jersey First Aid Council; a representative of the Associated Public Safety Communications Officers (APCO); a representative of Bell Atlantic-New Jersey; a representative of the independent telephone companies; two representatives of the wireless telephone companies; one representative of the National Emergency Number Association; two members representing county-wide dispatch centers; one representative of the Sheriffs Association of New Jersey; one representative of the New Jersey Fire Chiefs Association; one representative from the Certified Local Exchange Carriers;two members representing multi-municipal public safety dispatch centers who serve more than one, but less than five municipalities; and two members representing municipal public safety dispatch centers.

Of the public members first appointed by the Governor with the advice and consent of the Senate and of the members first appointed by the Governor upon recommendation of the President of the Senate and the Speaker of the General Assembly, eight shall be appointed for terms of three years, eight shall be appointed for terms of two years, and seven shall be appointed for terms of one year. Thereafter, the public members of the commission and members appointed by the Governor upon recommendation of the President of the Senate and the Speaker of the General Assembly shall be appointed for terms of three years. Vacancies on the commission shall be filled in the same manner as the original appointment but for the unexpired term. Members may be removed by the appointing authority for cause. The initial members shall be appointed within 30 days of the effective date of P.L.1999, c.125 (C.52:17C-3.1 et al.). The commission shall have the authority to establish subcommittees as it deems appropriate to carry out the purposes of this act.

b. Members of the commission shall serve without compensation but the members, other than the ex officio members, shall be entitled to reimbursement for expenses incurred in performance of their duties, within the limits of any funds appropriated or otherwise made available for that purpose.

c. Each ex officio member may designate an employee of the member's department or agency to represent the member at meetings or hearings of the commission. All designees may lawfully vote and otherwise act on behalf of the members for whom they constitute the designees.

d. The 9-1-1 Commission shall be constituted upon the appointment of the majority of its authorized membership and shall have no expiration date. Until the commission is constituted: (1) the Advisory Commission appointed by the Chief Technology Officer before the effective date of P.L.1999, c.125 (C.52:17C-3.1 et al.) shall be continued and shall exercise the advisory functions granted to it by the Chief Technology Officer and (2) the Chief Technology Officer shall be responsible for the review and approval of any function of the office which is the responsibility of the 9-1-1 Commission. Membership on the advisory commission shall not disqualify a person from membership on the 9-1-1 Commission.

52:17C-3 Office of Emergency Telecommunications Services.

3. a. There is established in the Office of Information Technology an Office of Emergency Telecommunications Services.

b. The office shall be under the immediate supervision of a director, who shall be a person qualified by training and experience to direct the work of the office. The director shall administer the provisions of this act subject to review by the Chief Technology Officer and shall perform other duties as may be provided by law. The director shall be appointed by the Chief Technology Officer, but the commission shall advise the Chief Technology Officer on the qualifications of the director. The Chief Technology Officer is authorized to appoint, in accordance with Title 11A of the New Jersey Statutes, clerical, technical, and professional assistants, and also may designate any available personnel as shall be necessary to effectuate the purposes of this act.

The office shall, subject to review by the commission and the Chief Technology Officer, only as provided in subsection c. of this section, and in consultation with the telephone companies, the Board of Public Utilities and the wireless telephone companies, and with the assistance of the Office of Information Technology in but not of the Department of the Treasury, continue to plan, design, implement, and coordinate the Statewide emergency enhanced 9-1-1 telephone system to be established pursuant to this act as well as any changes to that system needed to provide wireless enhanced 9-1-1 service.

To this end the office shall establish, after review and approval by the commission, a State plan for the emergency enhanced 9-1-1 system in this State, which plan shall include:

(1) The configuration of, and requirements for, the enhanced 9-1-1 network. The office with the approval of the commission and the Chief Technology Officer, only as provided herein, and assistance and advice of the Office of Information Technology in but not of the Department of the Treasury is empowered to enter into contracts with the telephone companies and the wireless telephone companies for the provision of this network.

(2) The role and responsibilities of the counties and municipalities of the State in the implementation of the system, consistent with the provisions of this act, including a timetable for implementation.

(3) Technical and operational standards for the establishment of public safety answering points (PSAPs) which utilize enhanced 9-1-1 network features in accordance with the provisions of this act. Those entities having responsibility for the creation and management of PSAPs shall conform to these standards in the design, implementation and operation of the PSAPs. These standards shall include provision for the training and certification of call-takers and public safety dispatchers or for the adoption of such a program.

The State plan shall be established within 270 days of the operative date of this act except that the technical and operational standards specified in paragraph (3) of this subsection shall be established within 180 days of the operative date of this act.

The office, after review and approval by the commission and the Chief Technology Officer, only as provided herein, may update and revise the State plan from time to time.

The office may inspect each PSAP to determine if it meets the requirements of this act and the technical and operational standards established pursuant to this section. The office shall explore ways to maximize the reliability of the system.

The plan or any portion of it may be implemented by the adoption of regulations pursuant to subsection b. of section 15 of this act.

The office shall plan, implement and coordinate a Statewide public education program designed to generate public awareness at all levels of the emergency enhanced 9-1-1 system. Advertising and display of 9-1-1 shall be in accordance with standards established by the office. Advertising expenses may be defrayed from the moneys appropriated to the office.

The office, after review and approval by the commission and the Chief Technology Officer, only as provided herein, shall submit a report to the Senate Revenue, Finance and Appropriations Committee and the Assembly Appropriations Committee, or their successors, not later than February 15 of each year, concerning its progress in carrying out this act and the expenditure of moneys appropriated thereto and appropriated for the purposes of installation of the Statewide enhanced 9-1-1 network.

c. (Deleted by amendment, P.L.1999, c.125).

L.1989,c.3,s.3; amended 1999, c.125, s.3.

52:17C-3.1 Transfer of Office of Emergency Telecommunications Services.

8. The transfer of the Office of Emergency Telecommunications Services shall be accomplished in conformity with the provisions of the "State Agency Transfer Act," P.L.1971, c.375 (C.52:14D-1 et seq.), and shall be effectuated as determined by the Attorney General and the Chief Technology Officer.

52:17C-4 Enhanced 9-1-1 service.

4. Each telephone company providing service within the State shall provide within three years of the operative date of this act enhanced 9-1-1 service to include selective routing, automatic number identification and automatic location identification features as a tariffed service package in compliance with a timetable issued by the office with the approval of the commission. The office with the approval of the commission may extend the three-year limit if necessary.

Each wireless telephone company providing service within the State shall provide wireless enhanced 9-1-1 service pursuant to FCC wireless E9-1-1 requirements and P.L.1999, c.125 (C.52:17C-3.1 et al.). L.1989,c.3,s.4; amended 1999, c.125, s.4.

52:17C-5. County coordinator

In order to ensure that the enhanced 9-1-1 system is implemented expeditiously and effectively throughout the State and that each locality participates in the system:

a. The governing body of each county shall appoint a county 9-1-1 coordinator who shall coordinate the 9-1-1 activities within the county in accordance with this act and standards developed by the office pursuant to this act. The county shall ensure that all necessary steps are taken and time schedules met in connection with the county's responsibilities under the State plan.

b. The county coordinator shall meet with representatives of the county, the municipalities, local public safety agencies, and the State Police in order to propose a draft plan for adoption by the county governing body. The plan shall provide for the implementation of enhanced 9-1-1 service throughout the county. The plan shall specify the number of and locations of the PSAPs, the membership of each PSAP and the organizational characteristics of each PSAP. Any PSAP existing on the operative date of this act may continue to operate within the guidelines of this act.

c. Within one year of the operative date of this act, the governing body of each county shall submit an enhanced 9-1-1 service utilization plan to the office for its review and approval. The office shall review each plan to determine if it meets the requirements of this act and the technical and operational standards established in the State plan.

52:17C-6. Municipal compliance

The governing body of each municipality shall:

a. Provide or cause to be provided the data required for the establishment of the automatic location identification capability of the system.

b. Within one year of the operative date of this act, notify in writing the county 9-1-1 coordinator appointed under this act of the nature of its proposed participation in the system, whether singly or in conjunction with other municipalities or on a regional or county basis. This subsection shall not apply to those municipalities located in counties which have a county-wide PSAP in existence on the operative date of this act.

c. Within three years of the operative date of this act, establish, singly or in conjunction with other municipalities or participate on a regional or on a county basis in, a PSAP which utilizes enhanced 9-1-1 network features. The office may extend this time period in the case of those municipalities where it is deemed necessary.

52:17C-7. Public safety answering points

No provision of this act shall be construed to prohibit or require in any manner the formation of multi-agency, multi-jurisdictional, regional or county-wide public safety answering points. However, the formation of public safety answering points that serve groups of municipalities is encouraged in the interest of reducing cost and increasing the efficiency of administration.

52:17C-8. PSAP functions

a. Each public safety answering point shall be capable of dispatching or forwarding requests for law enforcement, fire fighting, emergency medical services, or other emergency services to a public or private safety agency that provides the requested services.

b. Each public safety answering point shall be equipped with a system approved by the office for the processing of requests for emergency services for the physically disabled. No person shall connect to a telephone company's network any automatic alarm or other automatic alerting device which causes the number "9-1-1" to be automatically dialed and which provides a prerecorded message in order to directly access emergency services, except for devices which may be approved by the office. Devices approved by the office shall be registered with the office on forms provided by the office.

c. Each entity operating a public safety answering point shall be responsible for obtaining, operating, and maintaining enhanced 9-1-1 termination equipment. The operations and maintenance of this equipment shall be in accordance with standards set forth by the office pursuant to section 3 of this act.

52:17C-9. Service outside jurisdiction

a. A public safety agency which receives a request for emergency service outside of its jurisdiction shall promptly forward the request to the public safety answering point or public safety agency responsible for that geographical area. Any emergency unit dispatched to a location outside its jurisdiction in response to such a request shall render service to the requesting party until relieved by the public safety agency responsible for that geographical area.

b. Municipalities may enter into written cooperative agreements to carry out the provisions of subsection a. of this section.

52:17C-10 Forwarding subscriber information.

10. a. Whenever possible and practicable, telephone companies shall forward to jurisdictional public safety answering points via enhanced 9-1-1 network features, the telephone number and street address of any telephone used to place a 9-1-1 call. Subscriber information provided in accordance with this section shall be used only for the purpose of responding to emergency calls or for the investigation of false or intentionally misleading reports of incidents requiring emergency service.

b. (Deleted by amendment, P.L.1999, c.125).

c. No telephone company, person providing commercial mobile radio service as defined in 47 U.S.C.s. 332(d), public safety answering point, or manufacturer supplying equipment to a telephone company, wireless telephone company, or PSAP, or any employee, director, officer, or agent of any such entity, shall be liable for damages to any person who uses or attempts to use the enhanced 9-1-1 service, wireless 9-1-1 service or wireless enhanced 9-1-1 service established under this act for release of the information specified in this section, including non-published telephone numbers. This limitation of liability is inapplicable if such failure resulted from a malicious purpose or a wanton and willful disregard for the safety of persons or property.

d. No telephone company, person providing commercial mobile radio service as defined in 47 U.S.C.s. 332(d), public safety answering point, or manufacturer supplying equipment to a telephone company, wireless telephone company, or PSAP, or any employee, director, officer, or agent of any such entity, shall be liable to any person for civil damages, or subject to criminal prosecution resulting from or caused by any act, failure or omission in the development, design, installation, operation, maintenance, performance or provisioning of any hardware, software, or any other aspect of delivering enhanced 9-1-1 service, wireless 9-1-1 service or wireless enhanced 9-1-1 service.

This limitation of liability is inapplicable if such failure resulted from a malicious purpose or a wanton and willful disregard for the safety of persons or property.

e. No telephone company, person providing commercial mobile radio service as defined in 47 U.S.C.s. 332(d), public safety answering point, or manufacturer supplying equipment to a telephone company, wireless telephone company, or PSAP, or any employee, director, officer, or agent of any such entity, shall be liable to any person for damages resulting from or in connection with such entity's provision of any lawful assistance to any investigative or law enforcement officer of this State or a political subdivision of this State, of the United States, or of any other state or a political subdivision of such state in connection with any lawful investigation by or other law enforcement activity of the law enforcement officer unless the entity, in providing such assistance, acted in a manner exhibiting wanton and willful disregard for the safety of persons or property.

L.1989,c.3,s.10; amended 1996, c.63, s.2; 1999, c.125, s.5.

52:17C-11. Dial tone first capability

As enhanced 9-1-1 service becomes available, all coin and credit card telephones whether public or private within areas served by enhanced 9-1-1 service shall be converted to dial tone first capability, which shall allow a caller to dial 9-1-1 without first inserting a coin or any other device. On each converted telephone, instructions on how to access the emergency enhanced 9-1-1 system shall be prominently displayed.

52:17C-12. Expenses

a. All expenses incurred in the installation, operation and maintenance of a PSAP shall be defrayed by the municipality or county operating or controlling the PSAP. If the PSAP is operated or controlled by more than one municipality or by a regional entity, then the expenses shall be defrayed by the municipalities or regional entity as the case may be, in accordance with an agreement made pursuant to the provisions of the "Interlocal Services Act," P.L. 1973, c. 208 (C. 40:8A-1 et seq.).

b. Expenses of the office and the commission shall be paid from appropriations made thereto.

52:17C-13. 9-1-1 Emergency Telephone System Account

There is established in the General Fund an account entitled the "9-1-1 Emergency Telephone System Account." There shall be credited to the account such moneys as may be appropriated thereto and any interest earned from the investment thereon. Funds in the 9-1-1 Emergency Telephone System Account shall be expended for costs incurred in the initial installation of the Statewide enhanced 9-1-1 network according to the provisions of this act and for the costs incurred by a county for the employment of a county 9-1-1 coordinator in an amount not to exceed $25,000 per county 9-1-1 coordinator.

52:17C-14 Annual appropriation.

14. a. The Legislature shall annually appropriate such sums as are necessary to pay for the operation and maintenance of the enhanced 9-1-1 service and for county 9-1-1 coordinators pursuant to section 13 of P.L.1989,c.3

(C.52:17C-13). A telephone company incurring operation and maintenance costs of the system shall submit the costs thereof, after review and approval by the Board of Public Utilities, to the State Treasurer. The operation and maintenance charges for the enhanced 9-1-1 service shall accrue coincident with the availability of the enhanced 9-1-1 service and shall be submitted to the State upon that availability. The State Treasurer, upon warrant of the Director of the Division of Budget and Accounting in the Department of the Treasury, shall pay such costs from moneys appropriated pursuant to this section.

b. The Legislature shall annually appropriate such sums as are necessary to pay for the installation, operation and maintenance costs required to provide wireless enhanced 9-1-1 service upon request by the office pursuant to 47 CFR 20.18(f). A wireless telephone company incurring installation, operation and maintenance costs required to provide wireless enhanced 9-1-1 service shall submit the costs thereof, after review and approval by the office and the commission, to the State Treasurer. The installation, operation and maintenance costs for wireless enhanced 9-1-1 service shall accrue coincident with the availability of such service and shall be submitted to the State upon that availability. The State Treasurer, upon warrant of the Director of the Division of Budget and Accounting in the Department of the Treasury, shall pay such costs from moneys appropriated pursuant to this section.

L.1989,c.3,s.14; amended 1999, c.125, s.6.

52:17C-15 Civil proceedings; rules, regulations.

15. a. The Attorney General may, at the request of the commission, or on his own initiative, institute civil proceedings against any appropriate party to enforce the provisions of this act.

b. The Chief Technology Officer may, after consulting with the director of the office, and subject to the review of the commission, promulgate such rules and regulations in accordance with the "Administrative Procedure Act," P.L.1968, c.410 (C.52:14B-1 et seq.) as he deems necessary to effectuate the purposes of this act.

L.1989,c.3,s.15; amended 1999, c.125, s.7.

52:17C-16. Penalties

Any person who violates the provisions of this act shall be subject to a penalty of $200.00 for the first offense and $500.00 for each subsequent offense. If the violation of this act is of a continuing nature, each day during which it continues shall constitute a separate offense for the purpose of this section. The penalty shall be collected and enforced by summary proceedings under "the penalty enforcement law," N.J.S. 2A:58-1 et seq.

17:24 9-1-1 EMERGENCY TELECOMMUNICATION SYSTEM

9-1-1 Emergency Telecommunication System

Readoption and Recodification with Amendments: N.J.A.C. 13:81 as 17:24

Proposed: June 5, 2000 at 32 N.J.R. 1912(a)

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- Subchapter 1 General Provisions

17:24-1.1 Purpose

The chapter establishes the technical requirements and operational standards for all components of the Statewide 9-1-1 Enhanced Emergency Telephone System. It defines and allocates responsibility for planning, equipping, staffing, establishing, operating and maintaining Public Safety Answering Points, Public Safety Dispatch Points, and the Enhanced 9-1-1 Network, and it defines and allocates responsibility for providing information necessary to establish and maintain the Automatic Location Information capability of the System.

17:24-1.2 Definitions

The following words and terms, as used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise:

"Abandoned Call" means a call placed to 9-1-1 in which the caller disconnects before the call can be answered by the PSAP.

"Automatic Location Identification (ALI)" means the automatic display of the calling party's telephone number, address and supplementary information at the PSAP.

"Automatic Number Identification (ANI)" means the automatic display of the calling party's telephone number.

"Average busiest hour" means the one-hour period during each week in which the most emergency telephone calls are received.

"Blind Transfer" means failing to advise the calling party that the call is being transferred and failing to remain on the line until there is confirmation that the appropriate transfer has been made.

"Call relay" means pertinent information is received by the PSAP operator and relayed to the proper dispatch center.

"Call referral" means callers are referred to secondary numbers for response to their needs.

"Call transfer" means the PSAP operator determines the proper responding agency and connects the caller to that agency which then performs the necessary dispatching.

"Calling party hold" means a feature that prevents the calling party from disconnecting the call even if the caller hangs up the telephone.

"Commission" means the New Jersey State 9-1-1 Commission established pursuant to N.J.A.C. 52:17C-2 which shall oversee the Office of Emergency Telecommunications Services in the planning, design, and implementation of the Statewide enhanced 9-1-1 telephone system.

"Computer Aided Dispatch (CAD)" means a computer system designed to assist PSAP/PSDP operators and dispatchers to increase the efficiency and accuracy of dispatching public safety services.

"Conventional PSAP" means a PSAP that has on-site ANI controllers which are directly connected to one of the 9-1-1 OETS Statewide Network Tandem Switches via central office type trunks and requires on-site ALI multiplexers and other dedicated equipment and data circuits in order to receive, process or transfer 9-1-1 calls.

"Dedicated trunks" means telephone lines used exclusively for transmission of 9-1-1 calls. Other trunks are shared by multiple telephone numbers.

"Dial tone first" means the allowance of a 9-1-1 or "O" Operator calls to be completed without the deposit of a coin or credit card.

"Direct dispatch" means 9-1-1 call answering and public safety dispatching is done by the personnel at the PSAP.

"Emergency Service Zone (ESZ)" means the geographical area having a unique combination of police, fire, and EMS services.

"Enhanced 9-1-1" means an emergency telephone system that provides sophisticated features via computers and electronic switches so that calls can be selectively routed to one of multiple PSAPs and, when answered, provides an ANI and/or ALI display at the PSAP.

"Forced disconnect" means the capability of a PSAP to disconnect a 9-1-1 call to avoid caller jamming of the incoming phone lines.

"Instant playback recorder" means a device that records voice or voice/ALI data and is capable of instantly replaying the same.

"Integrated PSAP" means a PSAP that is directly interconnected to one of the 9-1-1 OETS Statewide Network Tandem Switches, intercommunicates via Dual Tone Multi-Frequency (DTMF), and does not necessarily require on-site control cabinets or switches in order to receive, process or transfer 9-1-1 calls.

"Logging recorder" means a device that electronically records all voice communications and transactions on the 9-1-1 network at PSAPs and PSDPs. A logging recorder provides date/time information, is operative on a continuous or controlled basis, and is primarily for archival purposes.

"Master Street Address Guide (MSAG)" means the computer file containing address ranges and communities that define the emergency service zones.

"OETS" means the Office of Emergency Telecommunications Services in the New Jersey Office of Information Technology.

"P.01 grade of service" means a grade of emergency telephone service where no more than one call in 100 attempts will be blocked during the average busiest hour.

"Public Safety Answering Point (PSAP)" means the first point of reception of a 9-1-1 call.

"Public Safety Dispatch Points (PSDP)" means a location which provides dispatch services for one or more public safety agencies.

"Public safety agency" means a functional division of a public agency which provides firefighting, police, EMS, or other emergency service.

"Ringback" means a feature that permits the PSAP to ring the hung up telephone on a held circuit.

"Ringdown time" means the length of time that a phone rings before it is answered. This factor affects both the number of telephone lines and the number of 9-1-1 call-takers that are required at the PSAP.

"Selective routing" means a feature that routes a 9-1-1 call from a central office to the designated PSAP based upon the identified number of the calling party, or in the case of a cellular call, a unique seven-digit identification number for each cell site, or if so configured, each sector at the cell site.

"Telephone company" means the organization that provides switched local telephone exchange access service or equivalent.

"TTY" means a telecommunication device for the deaf**,** speech or hearing impaired.

"Wireless telephone company" means any person providing commercial mobile radio service as defined in 47 U.S.C.s. 332 (d).

17:24-1.3 Inspection

OETS will cause an inspection to be made of each PSAP and PSDP prior to start-up and, thereafter, periodically, at announced or unannounced times, to determine whether the facility meets the technical and

operational standards specified in this chapter and in N.J.S.A. 52:17C-1 to 52:17C-16. This inspection may include an inspection of any records required by this chapter.

17:24-1.4 Enforcement

OETS will issue a Notice of Noncompliance upon discovery of any failure to comply with this chapter or with the provisions of N.J.S.A. 52:17C-1 to 52:17C-16. Such Notice will allow 10 days for correction of any noncompliance noted, unless a shorter compliance time is warranted under the circumstances. If compliance is not achieved as specified in the Notice of Noncompliance, OETS will take appropriate enforcement action.

- Subchapter 2. Public Safety Answering Points: Staffing and

17:24-2.1 PSAP: required and recommended equipment

(a) Each PSAP call-taker position shall have the following equipment:

1. 9-1-1 Terminal: A telecommunications device which will enable the call-taker to utilize all the enhanced features of the 9-1-1 network;

2. Conference and transfer: Conference and transfer "Push-button" type buttons which will allow the PSAP operator to do single button transfers and conferences to other PSAPs and/or Public Safety Dispatch Points (PSDPs) as well as other telephones on the public switched telephone network;

3. Except for integrated PSAPs, an ANI display: A device which displays the telephone number from which the call was made. Typically, this display is also used for error indication and other messages generated by 9-1-1 terminal equipment;

4. ALI screen: A computer-like screen which displays the address location information (ALI) and telephone number of the telephone from which the 9-1-1 call was made, and which lists the primary police, fire, and EMS agency having jurisdiction in the area in which the address is located;

5. Instant playback recorders: Either an:

i. Instant playback voice recorder that will record and is capable of instantly replaying a 9-1-1 call; or

ii. Instant playback voice/ALI screen recorder that will record and is capable of instantly replaying a 9-1-1 call and ALI data; and

6. An uninterruptible power supply (UPS) that offers a high degree of protection from power surges and spikes and has a capacity sufficient to keep all 9-1-1 terminal equipment fully operative for a minimum of 15 minutes.

(b) Each PSAP shall have the number of fully equipped call-taker positions sufficient to provide a ringdown time of no more than 10 seconds for 90 percent of all 9-1-1 calls during the average busiest hour of the day.

(c) Each PSAP shall have the number of telephone lines necessary to provide a P.01 grade of service.

(d) Each PSAP shall be equipped with a 9-1-1 line printer, in the immediate vicinity of the PSAP operators, which prints a record for each 9-1-1 call, including abandoned calls, indicating the caller's telephone number, the time the 9-1-1 telephone equipment seized the line, the time the call was answered, the time the call was transferred (if applicable), the time the call was disconnected, the trunk line the call came in on, and the call-taker position in the PSAP.

(e) Each PSAP shall be equipped with TTY devices in accordance with the Americans with Disabilities Act of 1990 (Pub. L. 101-336) and amendments thereof. Each TTY device shall be capable of either:

1. Producing a hard copy of the conversation; or
2. Electronically storing the conversation with the capability of immediately recalling and displaying the conversation.

(f) Each 9-1-1 line or each 9-1-1 terminal shall be connected to a logging recorder that records and time-date stamps the time and disposition of all 9-1-1 calls.

(g) Each PSAP shall maintain a means of communication other than the 9-1-1 system to permit interagency communications and the ability to receive 9-1-1 calls forwarded to the PSAP in the event of a failure or breakdown in the 9-1-1 system. Such communications shall include at least one direct dialed phone number into the PSAP that is not connected to an automated attendant or any other automatic answering device.

(h) The following PSAP equipment is recommended but not required:

1. Emergency generators for all critical electric circuits;
2. Lightning protection consisting of a state-of-the-art common ground, ring-type lightning protection system that will minimize catastrophic damage and downtime due to electrical storms. Cad-welding should be used to the extent feasible on all earth grounds; and
3. Logging recorders for all radio channels and other public safety emergency telephone lines, if the PSAP is also a PSDP.

17:24-2.2 PSAP: required and recommended staffing

(a) Each PSAP shall be staffed 24 hours a day, seven days a week.

(b) Each PSAP shall, at all times, be staffed with the number of call-takers necessary to permit the PSAP to answer all calls within 10 seconds, except that during the average busiest hour 10 percent of the calls may be answered within 20 seconds.

(c) Each call-taker and dispatcher position in a PSAP, except as provided in (d) below, shall be staffed by a person certified by OETS as qualified on the basis of the following:

1.Current certification in a Basic Training Course approved by the Commission consisting of either:

i. A Basic Training Course approved by the Commission, which shall include but not be limited to the following topics:

(1) Interpersonal Communications

(2) Telecommunicator Role in Public Safety

(3) Overview of the Police Function

(4) Overview of the Fire Function

(5) Overview of the EMS Function

(6) Public Safety Telecommunications Systems

(7) Radio Broadcasting Rules and Procedures

(8) Public Safety Records Systems

(9) Telephone Techniques

(10) Enhanced 9-1-1 Systems and Operating Procedures

(11) Telecommunicator Legal Issues; or

ii. Past certification in the APCO Institute 24-Hour Public Safety Telecommunicator Basic Training Course for New Jersey, which was a course developed by the Associated Public-Safety Communications Officers' Institute that was adapted to provide training in unique features of the New Jersey 9-1-1 emergency enhanced telecommunications network and system and was approved by OETS, if the call-taker either:

(1) Demonstrated to OETS that he or she has had 320 hours of work experience as a call-taker or public safety dispatcher in a local emergency telecommunications center in New Jersey prior to the local center's implementation of the 9-1-1 system; or

(2) Obtained a determination from OETS that a public safety telecommunicators basic training course, which the person had successfully completed, provided training that, when supplemented with the APCO Institute 24-Hour Public Safety Telecommunicator Basic Training Course for New Jersey, will be substantially equivalent to the APCO Institute 40-Hour Public Safety Telecommunicator Basic Training Course for New Jersey;

2. Successful completion of annual in-service training during each year of service following initial certification, consisting of an 8-hour program developed by the local PSAP and approved by OETS to address technical developments and improve the provision of 9-1-1 services;

3. Except for a call-taker or dispatcher in a PSAP that directly transfers emergency medical service calls to another agency that is staffed by emergency medical PSDP personnel who meet the

requirements of this paragraph and (c)4 below, current certification in American Heart Association (AHA), American Red Cross (ARC), or National Safety Council (NSC) CPR training.

4. Except for a call-taker or dispatcher in a PSAP that directly transfers emergency medical service calls another agency that is staffed by emergency medical PSDP personnel who meet the requirements of this paragraph and (c)3 above, and unless the person meets the requirements of (c) lii (l) above, current certification in an Emergency Medical Dispatch Training Course approved by the Commission which utilizes Emergency Medical Dispatch Guidecards approved by the New Jersey State Department of Health and Senior Services, Office of Emergency Medical Services, meets ASTM Standard F 1552-94, and follows the National Highway Traffic Safety Administration, Emergency Medical Dispatch, National Standard Curriculum; and

5. Except for a call-taker or dispatcher in a PSAP that directly transfers emergency medical service calls to another agency that is staffed by emergency medical PSDP personnel who meet the requirements of (c) 3 and 4 above, call-takers and dispatchers who meet the requirements of (c) lii (l) above, shall

i. Become certified, prior to December 2002, in a 24-Hour Emergency Medical Dispatch Training Course approved by the Commission specifically for individuals meeting the requirements of (c) 1ii(1) above which utilizes Emergency Medical Dispatch Guidecards approved by the New Jersey State Department of Health and Senior Services meets ASTM Standard F 1552-94, and follows the National Highway Traffic Safety Administration, Emergency Medical Dispatch, National Standard Curriculum.; and

ii. Shall be exempt from the requirement of (c) 2 above from the date of completing the training required in (c) 5i above until December 2003.

(d) Persons who are not certified as provided in (c) above may be utilized to substitute for a certified call-taker or dispatcher under the following circumstances:

1. A certified call-taker or dispatcher is scheduled for duty but unavailable due to illness or an emergency. Substitute call-takers or dispatchers are not to be used for coverage for meal breaks or other routine scheduled breaks, and

2. The person is one who meets the following requirements:

i. Has successfully completed the U.S. Department of Transportation’s "First Responders: Emergency Medical Care Training Course," or "Crash Injury Management for Traffic Law Enforcement Officers" or "EMT Course";

ii. Has a current ARC, NSC, or AHA CPR certification;

iii. Has successfully completed an eight-hour introductory course on the New Jersey 9-1-1 emergency enhanced telecommunications system which has been prepared by the local PSAP and approved by OETS; and

iv. Has successfully completed annual in-service training during each year of service following completion of the introductory course on the New Jersey 9-1 -1 emergency enhanced telecommunications system, consisting of an eight-hour program developed by the local PSAP and approved by OETS to address technical developments and improve the provision of 9-1-1 services.

(e) A PSAP serving a municipality identified by the most recent census as having a non-English speaking population of greater than five percent of the population, shall either:

1. Have a language interpreter available at the PSAP; or

2. Have a language interpreter immediately available, under contract, by telephone conference call.

(f) The following PSAP call-taker and dispatcher training is recommended but not required for PSAPs that directly transfer emergency medical calls to another agency that is staffed by emergency medical PSDP personnel who meet the requirements of (c)3 and (c)4 above;

1. A current AHA, ARC or NSC CPR certification

2. Current certification in an Emergency Medical Dispatch Course approved by the Commission which utilizes Emergency Medical Dispatch Guidecards approved by the New Jersey State Department of Health and Senior Services, Office of Emergency Medical Services, meets ASTM Standard F 1552-94, and follows the National Highway Traffic Safety Administration, Emergency Medical Dispatch, National Standard Curriculum.

17:24-2.3 PSAP: operational standards

(a) Each PSAP shall be operated so as to comply with the following operational standards:

1. All components of the 9-1-1 network shall meet or exceed a P.01 grade of service which is no more than one busy signal in 100 call attempts in the average busiest hour.

2. All PSAPs shall be operated on a full-time basis, 24 hours a day, seven days a week.

3. All 9-1-1 calls should be answered in 10 seconds, except that 10 percent of the calls received during the average busiest hour may be answered within 20 seconds.

4. No more than two percent of incoming 9-1-1 calls shall overflow to an alternate PSAP.

5. All 9-1-1 calls shall be answered with a response such as "9-1-1 where is the emergency?" No 9-1-1 call shall be answered with a response that identifies the PSAP as a police department, fire department, or emergency medical service or that gives a geographical or political location of the PSAP.

6. Following receipt of a 9-1-1 call requiring a dispatch of emergency medical, emergency police or emergency fire services, a PSAP call-taker, within 20 seconds for 90 percent of the calls received, will dispose of the call as follows:

i. If the PSAP also serves as a PSDP with respect to some or all emergency services, the PSAP call-taker shall transfer the call to the appropriate dispatcher;

ii. If the PSAP does not serve as a PSDP, the PSAP call-taker shall transfer the call to the appropriate PSDP or PSAP, unless the circumstances require a different approved disposition.

7. No call-taker shall transfer a 9-1-1 call without first advising the calling party that the call is being transferred and that the caller should remain on the line until the call is connected. No "blind transfers" are permitted.

8. Following receipt of a 9-1-1 call that is not emergent and does not require emergency services, the call-taker shall clear the line as quickly as possible under the circumstances. If circumstances permit, the call-taker may, if appropriate, refer the caller to the appropriate public safety agency, either verbally or through a prerecorded message.

9. Whenever possible and practicable, PSAPs and PSDPs dispatching emergency medical services must provide pre-arrival instructions utilizing Emergency Medical Dispatch Guidecards approved by the New Jersey State Department of Health and Senior Services, Office of Emergency Medical Services.

17:24-2.4 PSAP: record keeping

(a) Each PSAP shall maintain the following:

1. Recordings produced by the logging recorder and all documents or records related to 9-1-1 calls in a secured area for no less than 31 days;

2. A current listing of PSAP call-takers, which indicates the call-takers' certification date, at all times; and

3. A record of each occasion on which a substitute call-taker or dispatcher was utilized, which includes the name of the substitute, the date and time of the substitution, and the reason for the substitution, which shall be retained for one year.

17:24-2.5 PSAP: formation

Nothing contained in this chapter shall be construed to prohibit or require in any manner the formation of multi-agency, multi-jurisdictional, regional or county-wide PSAPs. However, the formation of PSAPs that serve groups of municipalities is encouraged in the interest of reducing costs and increasing the efficiency of administration.

- Subchapter 3. Public Safety Dispatch Points: Staffing and Equipment Requirements and Operational Standards

17:24-3.1 PSDP: required and recommended equipment

(a) Each PSDP shall be equipped with basic or integrated PSAP telephones which will allow 9-1-1 calls to be transferred from the designated 9-1-1 tandem central offices by either direct connection or seven-digit transfers over the shared public network as determined by OETS in consultation with the county 9-1-1 coordinator.

(b) Each PSDP shall be equipped with the number of telephone lines sufficient to permit the PSDP to answer 90 percent of the PSAP transfers within 10 seconds during the average busiest hour.

(c) A PSDP may elect to have enhanced 9-1-1 call-taker equipment such as ANI displays, ALI screens, and line printers, as approved by OETS in consultation with the county 9-1-1 coordinator.

17:24-3.2 PSDP: required staffing

(a) Each PSDP shall, at all times, be staffed with the number of dispatchers necessary to permit the PSDP to comply with the level of dispatch performance established by the local governing agencies.

(b) Each dispatcher shall be a person trained in the specific services they will dispatch (that is, police, fire, emergency medical services) by the local governing agency or certified by OETS on the basis provided in N.J.A.C. 17:24-2.2 (c).

17:24-3.3 PSDP: record keeping

(a) Each PSDP shall maintain the following:

1. All documents or records related to 9-1-1 calls in a secured area for no less than 31 days; and
2. A current listing of PSDP dispatchers, which indicates the dispatchers' certification date, at all times.

- Subchapter 4. Network Features and Design

17:24-4.1 Network features

(a) The following features shall be incorporated in the 9-1-1 enhanced network and will, where appropriate, be provided for in any contract for such telephone services:

1. Selective routing: A feature that routes a 9-1-1 call from a central office to the designated PSAP based upon the identified number of the calling party or, in the case of a wireless call, a unique ten-digit identification number for each cell site, or if so configured, each sector at the cell site;
2. Automatic Number identification (ANI): The automatic display of the ten-digit number used to place a 9-1-1 call;
3. Automatic location identification (ALI): The automatic display of information on a computer-like screen which displays the geographical location of the telephone used to place a 9-1-1 call;
4. Idle-circuit-tone application: An idle circuit tone which enables the PSAP attendant to distinguish between calls that have been abandoned before they are answered and calls where the calling party is connected but unable to speak;
5. Switchhook status indication: A feature which provides the PSAP with audible and visual indications of whether a 9-1-1 call which has been received and put on hold is still on hold or has disconnected. This feature helps ensure that a caller's line is not held up unnecessarily after the emergency call is completed;
6. Forced disconnect: A feature which enables the PSAP to release a connection (hang up to clear the line) on a 9-1-1 call even if the calling party has not hung up. The time required for a forced disconnect varies with telephone central office switching equipment, but is generally under 10 seconds. This feature prevents intentional jamming of 9-1-1 lines by individuals who dial 9-1-1 and refuse to hang up;
7. Alternate routing: A feature which provides backup for a PSAP by routing 9-1-1 calls to an alternate PSAP when all lines to the intended PSAP are busy, out of service, or have exceeded the pre-determined queue length;
8. Default routing: A feature which provides backup for a PSAP by routing 9-1-1 calls to a location based on the originating local trunk group when an incoming 9-1-1 call cannot be selectively routed due to an ANI failure, garbled digits, party-line service or multi-party service, or for any other reason;
9. Selective transfer: A feature which allows call-takers to transfer incoming calls to PSDPs by depressing a single "type of service" button;
10. Call detail recording: A printed record for each 9-1-1 call indicating the caller's telephone number, the time the 9-1-1 telephone equipment seized the line, the time the call was answered, the time the call was transferred (if appropriate), the time the call was disconnected, the trunk line the call came in on, and the call-taker position in the PSAP;
11. Protected circuits: All facilities and equipment associated with, included in or attached to the 9-1-1 network shall be equipped with protective devices to prevent accidental worker contact. Each protected termination shall be clearly identified, and no protected 9-1-1 circuits shall be opened, grounded, short-circuited, or manipulated in any way unless the appropriate PSAP has released the circuit;
12. Calling party hold: (Reserved); and

13. Ringback: (Reserved).

17:24-4.2 Network design

(a) The following features shall be incorporated in the 9-1-1 enhanced network design and will, where appropriate, be provided for in any contract for such telephone services:

1. A four or more tandem switch architecture, featuring redundant, diversely routed links to all local central offices and between the tandems. This design shall support both integrated PSAPs which do not require on-site control cabinets or switches as well as conventional PSAPs;
2. A network protection plan that permits network recovery from a catastrophic switch failure;
3. A mechanism to expeditiously provide switching and rerouting to a back-up 9-1-1 tandem in the event of a 9-1-1 tandem failure. The back-up 9-1-1 tandem shall provide selective routing, in a normal fashion, to the designed PSAP until the failed tandem has been restored;
4. A method to instantaneously default 9-1-1 calls to a PSAP or PSDP in accordance with the respective county 9-1-1 plan, in the event a 9-1-1 call cannot be routed to a 9-1-1 tandem;
5. Monitoring of all 9-1-1 tandems on a 24-hour, seven-day-a-week basis by a 9-1-1 switching control center (SCC). The 9-1-1 SCC's responsibilities include the maintenance and repair of the 9-1-1 tandem switches. The 9-1-1 SCC acts as the central point of contact for all PSAP trouble reports via a toll free 800 number. The 9-1-1 SCC is also responsible for the expeditious repair of any other 9-1-1 network components affecting the critical 9-1-1 service; and
6. Monitoring of the Statewide 9-1-1 network providing 24-hour coverage, with priority 9-1-1 traffic flow from all dedicated lines, end offices, sector tandems, and operator services position system tandems into the 9-1-1 network.

- Subchapter 5. Municipalities: Responsibility to Provide Data for Automatic Location Identification and to Plan, Equip, Staff and Operate PSAPs and PSDPs

17:24-5.1 Municipal 9-1-1 coordinator

(a) The governing body of each municipality shall appoint a municipal 9-1-1 coordinator who shall coordinate the 9-1-1 implementation and the operation of 9-1-1 activities within the municipality in accordance with N.J.S.A. 52:17C-1 to 52:17C-16 and the rules incorporated in this chapter.

(b) The municipal 9-1-1 coordinator, after consultation with representatives of local public safety agencies shall:

1. Maintain a municipal plan for 9-1-1 enhanced service throughout the municipality. The plan shall specify:

i. The number and locations of all PSAPs and PSDPs serving the municipality;

ii. The procedure each PSAP will employ for continuing essential services during the loss of commercial power;

iii. The membership and organizational characteristics of each PSAP and PSDP;

iv. The number of lines and call-taker positions that each PSAP will utilize; and

v. Alternate communications as required by section 17:24-2.1(g).

17:24-5.2 Municipalities: responsibility to provide ALI data

(a) The governing body of each municipality shall provide the data necessary for the Automatic Location Identification capability of the 9-1-1 Emergency Telecommunication System as follows:

1. Within 60 days of receipt of the appropriate map through OETS;

i. Correct or verify the accuracy of the street and address information;

ii. Where necessary, supplement the street and address information; and

iii. Label the map to indicate political boundaries, fire service zones, emergency medical service zones and police service zones; and

2. Following submission of the initial information, update the map when required by changes in or the addition of streets and addresses in the municipality.

17:24-5.3 Municipalities: 9-1-1 plan

(a) Except as provided in (b) below the governing body of each municipality shall maintain with the county 9-1-1 coordinator a written plan that identifies:

1. PSAPs and PSDPs that will be utilized by the municipality, either alone or in conjunction with other municipalities, to service the municipality; and

2. Alternate PSAPs.

(b) Municipalities located in counties that currently utilize a county-wide PSAP need not supply the written plan described in (a) above, if the municipality indicates in writing that it will continue to utilize its county-wide PSAP. If the municipality at any time discontinues its association with its county-wide PSAP, the municipality must submit a plan within 60 days.

- Subchapter 6. Counties: Responsibility to Plan and Implement Enhanced 9-1-1 Service Throughout the County

17:24-6.1 County 9-1-1 coordinator

(a) The governing body of each county shall appoint a county 9-1-1 coordinator who shall coordinate the 9-1-1 implementation and the operation of 9-1-1 activities within the county in accordance with N.J.S.A. 52:17C-1 to 52:17C-16 and the rules incorporated in this chapter.

(b) The county coordinator, after consultation with representatives of the county, the municipalities, local public safety agencies, and OETS, and utilizing the information supplied by the municipalities, shall:

1. Maintain a county plan for 9-1-1 enhanced service throughout the county. The plan shall specify:

i. The number and locations of all PSAPs and PSDPs serving municipalities within the county;

ii. The procedure each PSAP will employ for continuing essential services during the loss of commercial power;

iii. The membership and organizational characteristics of each PSAP and PSDP; and

iv. The number of lines and call-taker position that each PSAP will utilize

17:24-6.2 Submission and approval of county plan

(a) The governing body of each county shall maintain an enhanced 9-1-1 service utilization plan with OETS for its review and approval.

(b) OETS will review modifications to the plan for compliance with N.J.S.A. 52:17C-1 to 52:17C-16 and this chapter. OETS shall act on each submission within 60 days, by either approving or disapproving it, or returning it to the county for revision.

17:24-6.3 Modification of county plan

A county plan that has been approved by OETS cannot be changed until a modified plan is submitted by the county and approved by OETS pursuant to N.J.A.C. 17:24-6.2(b).

17:24-6.4 Funding for County 9-1-1 Coordinator

(a) Pursuant to N.J.S.A. 52:17C-13, each county may receive funding, within the limits of any funds appropriated, for the costs incurred by a county for the employment of a county 9-1-1 coordinator in an amount not to exceed $25,000 per county 9-1-1 coordinator.

(b) Each county shall submit to OETS a funding application and spending resolution indicating the proposed use of the funds.

(c) OETS will approve and process the funding application for payment to the county in a lump sum, provided;

1. The description of the proposed use of funds indicated in the spending resolution is directly related to functions of the County 9-1-1 Coordinator; and

2. The County 9-1-1 Coordinator has demonstrated compliance with the provisions of this chapter.

- Subchapter 7. Wireless Phone Companies: Responsibility to Provide Cell-Site Information and ANI/ALI

17:24-7.1 Wireless phone companies: responsibility

(a) Each wireless telephone company shall transmit to the appropriate 9-1-1 tandem, via a dedicated direct trunk group, providing a P.01 grade of service as determined by the wireless telephone company, based on a geographical area established by OETS, in consultation with the wireless telephone company, a unique ten-digit identification number for each cell site, or if so configured, each sector at the cell site, and the ten-digit callback number, when available, of the wireless phone placing the 9-1-1 call, using a signaling format designated by OETS in consultation with the wireless phone companies, and compatible with the 9-1-1 network. This 10-digit identification number will be selectively routed to a PSAP designated by OETS after consultation with county 9-1-1 coordinators and municipalities or selectively routed to a PSAP based on the geographic location of the caller when available.

(b) Each wireless telephone company providing service within the State shall provide wireless enhanced 9-1-1 service pursuant to FCC wireless E9-1-1 requirement entitled "Revision of the Commission's Rules to Ensure Comparability with Enhanced 9-1-1 Emergency Calling Systems," (FCC Docket No. 94-102: RM-8143) incorporated herein by reference as amended and supplemented.

- Subchapter 8. Connections to the 9-1-1 System: Approval of Equipment

17:24-8.1 Suppliers of 9-1-1 equipment: responsibility to obtain approval of equipment

(a) No vendor, manufacturer, or installer shall connect any device to the New Jersey 9-1-1 network that has not been approved by OETS as follows:

1. Manufacturers or suppliers of equipment proposed for connection to the 9-1-1 network shall submit application for type approval to OETS at least 90 days prior to a proposed connection.
2. OETS will grant type approval if the equipment is capable of performing its proposed 9-1-1 function, incorporates all network features of N.J.A.C. 17:24-4.1, is sufficiently reliable to perform its proposed function and will not present a danger to the integrity of the system.
3. All vendors, manufacturers and installers, prior to accepting an order, shall disclose to prospective customers the status of type approval on all equipment being marketed for connection to the New Jersey 9-1-1 network.

17:24-8.2 Automatic dial devices

No person shall connect to a telephone company network an automatic alarm or alerting device that causes the number 9-1-1 to be dialed. OETS has not approved any automatic dialing device.

17:24-8.3 Blockage of 9-1-1 calls

No person, firm or corporation shall program any telephone or associated equipment with outgoing access to the public switched network of a telephone company so as to prevent a 9-1-1 call from being transmitted from such telephone to a PSAP.

- Subchapter 9. Suppliers of Public Telephones

17:24-9.1 Suppliers of public telephones: responsibility to provide dial tone first equipment

All public telephones including coin and credit card telephones, both public and private, shall be configured to allow a caller to dial, be transferred as necessary, and complete a 9-1-1 call without inserting a coin or any other device. On each such telephone, instructions on how to access the 9-1-1 system shall be prominently displayed.

- Subchapter 10. Publication and Use of the 9-1-1 Number

17:24-10.1 Publishers of telephone number listings

Any person who publishes a telephone listing including emergency numbers shall list "9-1-1" as the only "Emergency" number. Nothing in this section is intended to preclude a listing of the telephone numbers of police or fire departments or emergency medical services under headings other than "Emergency."

17:24-10.2 Use and advertisement of the 9-1-1 number

(a) No company or organization, either public or private, shall use the numerals 9-1-1 in the name of their company or organization or display the numerals 9-1-1 on their property or in their advertising, unless authorized by OETS for the purpose of publicizing or promoting 9-1-1 emergency services.

(b) The following standards shall be followed whenever displaying 9-1-1.

1. "9-1-1" must be hyphenated.
2. The word "EMERGENCY" shall appear whenever displaying 9-1-1 to promote the proper use of 9-1-1 services.
3. When displaying "9-1-1", either all services must be listed (POLICE, FIRE, MEDICAL) or, no services are to be listed.
4. The indication of CALL or DIAL may be used if agency desires.

17:24-10.3 Advertising and promoting other emergency numbers

No person or entity, including a public safety agency, shall advertise or otherwise promote the use of any telephone number for emergency police, fire, or medical response services other than "9-1-1".

- Subchapter 11 Certified Local Exchange Carriers (CLEC); Interconnection Requirements

17:24-11.1 CLEC responsibility to provide Enhanced 9-1-1 service.

Prior to providing outbound access to the public switched telephone network, each CLEC authorized to provide service in New Jersey shall provide enhanced 9-1-1 service to their customers in accordance with N.J.S.A. 52:17C-1 to 52:17C-16 and this chapter.

17:24-11.2 Submission and approval of interconnection plan.

(a) Each CLEC requesting to connect to the statewide enhanced 9-1-1 network shall submit an interconnect plan to OETS for approval.

(b) The CLEC interconnect plan shall include the following information:

1. Name and address of CLEC;

2. Name, address and telephone numbers of key personnel involved in the design, installation and testing of the 9-1-1 network;

3. Location of all switching facilities providing service in New Jersey. When located outside of the state of New Jersey, the closest point of presence (POP) will be indicated;

4. Names of all rate centers and NPA/NXX number code assignments where service shall be offered;

5. Toll free phone number of the 24-hour network operation center responsible for monitoring and maintenance of dedicated 9-1-1 trunks. This number shall be used by PSAPs and the State designated 9-1-1 Control Center;

6. The toll free FAX number for PSAPs to forward database correction requests to;

7. Method of processing operator assisted emergency calls into the 9-1-1 network;

8. The test plan to be utilized by the CLEC in verifying primary trunk routing, alternate trunk routing, no record found default routing, and no ANI default routing, in conjunction with the State designated 9-1-1 Control Center;

(c) OETS will review the plan for compliance with N.J.S.A. 52:17C-1 to 52:17C-16 and this chapter. OETS shall act on each submission within 30 days, by either approving or disapproving it, or returning it to the CLEC for revision.

13:82-11.3 Modification to CLEC interconnect plan

A CLEC's interconnect plan that has been submitted to OETS cannot be changed until a modified plan is submitted by the CLEC and approved pursuant to N.J.A.C. 17:24-11.2.

17:24-11.4 CLEC network design

(a)Each CLEC shall connect to the Statewide enhanced 9-1-1 from their local central office switch via dedicated trunks that shall be:

1. Configured in a single trunk group for each county, sized for a P.01 grade of service connected to:

i. The primary 9-1-1 tandem switch as determined by OETS; and

ii. A trunk group of equal size to the alternate 9-1-1 tandem switch as determined by OETS.

MAXIMIZING OUR NATION'S BROADBAND INFRASTRUCTURE INVESTMENT

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A position paper from Kimball
March 2009

Maximizing our Nation's Broadband Infrastructure Investment

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Kimball
TECHNOLOGY

We are not working in the most efficient manner possible to maximize the dollars we're investing in our wireless infrastructure.

Obama's American Recovery and Reinvestment Act is an opportunity to be smarter about how we develop these networks.

Maximizing our Nation's Broadband Infrastructure Investment

Within many communities, public safety and other government agencies often are not working in the most efficient manner to get the most from the dollars they're investing in broadband networks. Local governments are building their own enterprise networks at the same time that public safety units are building out new IP infrastructure connecting tower sites; cable and telephone companies are laying fiber optic cables; and schools are setting up their own broadband capabilities. We are literally crossing over each other with fiber optic, microwave and wireless networks.

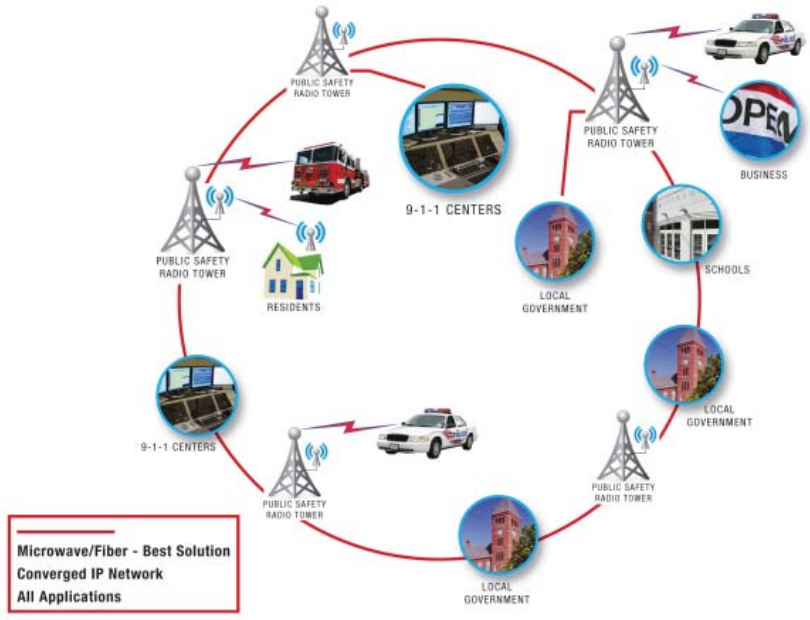
A major emphasis of the Obama Administration's American Recovery and Reinvestment Act is developing broadband networks in rural and underserved areas, as well as funding for broadband systems for educational, government and medical institutions. This presents the mission critical industry with a major opportunity — to jointly invest in converged broadband systems with other stakeholders, such as private business, medical users, education systems and local government.

The billions of dollars available from the stimulus program could take us a very long way toward constructing these backbones across the country. All stakeholders could jointly tap into this converged, integrated backbone network running through their community, with additional investment needed only for the last-mile connections. This will overcome the high costs that often prohibit these types of systems to be constructed and will help create greater ROI of the stimulus plan. Furthermore, combining funding from the broadband stimulus with investments and infrastructure already made or planned by state and local governments can provide network presence throughout areas that were previously not practical.

This backbone network is a super-core that carries enough capacity and speed to serve all the needs that currently are being filled by separate, standalone networks. Whether radio communications, Next Generation (NG) 9-1-1, or broadband and Internet access, a single key enabling element is required to deliver these critical services: a high-speed, high-capacity IP connectivity backbone.

HIGHLIGHTS

The new broadband funding available can dually support 9-1-1 and radio communications — and act as a springboard for consumer broadband networks.



IP networks are already an integral part of the mission critical communications process. Many public safety users rely on county-wide radio networks to establish seamless communications across agencies and jurisdictions. These networks are intended to meet federal adopted Project 25 (P25) NTIA mandates already in place and help public safety reach the highest level of interoperability on the SAFECOM Department of Homeland Security Continuum.

In addition to radio communications, new, IP-based 9-1-1 networks are replacing legacy telephone networks across the county to support new communications devices that consumers are using, such as Smart Phones, video communications, laptop telecommunications and text messaging. Many of these IP networks are being deployed in the form of Emergency Services IP-Enabled Networks (ESInet). ESInets are wide area networks that can meet these overarching goals and help us migrate to the next generation of 9-1-1.

The new broadband funding available can leverage existing public safety IP networks — whether they be 9-1-1 or radio communications-oriented — and act as a springboard for additional elements such as scalable, wireless broadband networks for the community, schools and private business. Transport mediums, such as fiber optic cable, can expand networks to support additional capabilities. The result — more advanced and consumer-driven public safety services for both 9-1-1 and radio

This approach will help us build a converged high-speed backbone and overcome prohibitive cost and ROI features to implementing these diverse networks today.

communications, new means of communications for our communities, greater access to wireless in our nation's hospitals and schools and increased opportunities for commerce. And it can achieve the true intent of the economic stimulus plan by driving new opportunities for economic growth and providing a balanced benefit to government, our nation's citizens and businesses.

Using stimulus-plan funds to build a converged high-speed backbone can overcome the previously prohibitive cost and ROI issues facing IP providers in many areas. Combining funding from the broadband stimulus with investments and infrastructure already made or planned by state and local governments can provide network presence throughout areas that were previously not practical for providers.

Kimball is working on just such a project with Greater Harris County, Texas. When completed, this system will serve a number of different mission critical applications and provide public safety first responders with a seamless county-wide communications system. Additionally, the IP backbone we're constructing supports the goals of NG 9-1-1, the legacy telephone network, various enterprise applications, and creates a platform for interoperability which will support public safety radio networks. There is also a potential for providing a scalable wireless broadband network for Greater Harris County residents, schools and business.

To help support American Recovery and Reinvestment Act funding, additional funding sources can be pursued through Department of Homeland Security grant sources, education-based grant services, shared public-private revenue streams, federal highway funding sources and agriculture funding sources.

If ever we lived in a time for change, that time is now; let's begin changing the way we think about our broadband future so that everyone will benefit.

APPENDIX A – MUNICIPAL COST BREAKDOWN

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COUNTY OF SUSSEX
PROJECTED COST TO EACH MUNICIPALITY
9-1-1 COUNTYWIDE SYSTEM

			Difference	
Andover Boro	23,378.33	27,477.99	4,099.66	
Andover Township	239,727.38	281,766.38	42,039.00	
Branchville Borough	40,190.56	47,238.45	7,047.88	
Byram Township	315,074.74	370,326.78	55,252.04	
Frankford Township	251,706.94	295,846.70	44,139.75	
Franklin Borough	144,481.25	169,817.73	25,336.48	
Fredon Township	144,284.89	169,586.93	25,302.04	
Green Township	154,818.29	181,967.49	27,149.20	
Hamburg Boro	96,553.48	113,485.26	16,931.78	
Hampton Township	205,521.60	241,562.22	36,040.61	
Hardyston Township	401,546.86	471,962.80	70,415.93	
Hopatcong Borough	516,689.71	607,297.29	90,607.58	
Lafayette Township	122,229.41	143,663.76	21,434.35	
Montague Township	123,306.61	144,929.86	21,623.25	
Town of Newton	219,988.95	258,566.59	38,577.63	
Ogdensburg Borough	66,429.60	78,078.80	11,649.21	
Sandyston Township	75,055.16	88,216.96	13,161.80	
Sparta Township	984,555.69	1,157,209.04	172,653.34	
Stanhope Borough	113,366.95	133,247.17	19,880.22	
Stillwater Township	157,369.54	184,966.12	27,596.59	
Sussex Borough	43,311.08	50,906.19	7,595.10	
Vernon Township	866,481.58	1,018,429.25	151,947.67	
Walpack Township	666.23	783.06	116.83	
Wantage Township	395,765.16	465,167.20	69,402.04	
Total	**5,702,500.00**	**6,702,500.00**	**1,000,000.00**	17.54%

Operating	4,000,000.00	5,000,000.00	1,000,000.00
Facility Debt Service	814,500.00	814,500.00	-
Equipment Debt Service	888,000.00	888,000.00	-
	5,702,500.00	6,702,500.00	1,000,000.00

APPENDIX B – ANDOVER CURRENT CONDITIONS

Andover, with a population exceeding 6,000, encompasses an area of 20.8 square miles. The Andover PSAP is operated by the Andover Police Department and handles over 16,000 calls for service annually.

PSAP/DISPATCH/RADIO EQUIPMENT	
Dispatch positions:	Two
Radio console vendor:	Orbacom
Communications area expandable:	Yes
CAD vendor:	Enforsys
Police RMS vendor:	Enforsys
Fire RMS vendor:	None
Emergency power available:	Yes
Backup dispatch:	No
Backup PSAP:	No
CPE:	KML
9-1-1 provider:	Verizon
Full-time employees:	Five
EMD:	Yes
MDT:	Yes—Verizon
AVL:	No
GIS interface:	No

The Andover PSAP has two dispatch/radio console positions in good operating condition with full capabilities. Logging recorders, call checks and ancillary equipment are in good repair and operating properly.

The Enforsys CAD system interfaces to an RMS, NCIC, E9-1-1 system and mobile data terminals. The Andover PSAP uses individual servers for CAD/RMS, audio and 9-1-1. The PSAP may also have access to other servers, such as exchange server and domain controller, operated by other township entities.

There is no dedicated HVAC (climate control) equipment provided for the server room, radio room or dispatch area. All climate control is provided by the building's central environmental system.

Reliable and adequate emergency power is available. The site has a Generac 2000 series 3-Phase (3Ph) 100KVA diesel-powered generator with a 100-gallon fuel tank. This system provides an estimated run time of approximately 24 hours with a full tank. Limited UPS power is provided to individual servers by various small UPS units in the computer room. There is no UPS backup for radio equipment.

Adequate space does not exist within the current dispatch area to accommodate expansion to a full countywide PSAP.

A 50 cable pair feed from the local phone company, split into two 25-pair services, feeds the Nortel phone systems, office phones, radio tie lines and 9-1-1 trunks.

A 50-foot light-duty self-supporting tower provides connectivity to remote transceivers and direct two-way radio communications to field units.

A loose network of radio systems operating in VHF Low and VHF High bands throughout the county provide radio communications. The Andover PSAP controls part of this radio network via UHF RF links and tie lines and has the ability to activate remote transceivers that cover their dispatch area.

A single ground lead, #2 AWG solid tinned, from one tower leg appears to be connected to a single driven rod. There is only visual evidence of a single ground rod for the tower; it is unknown what sub-surface grounding system exists. *(Industry standards call for each tower leg to be bonded to a sub-surface grounding system.)*

There are no buss bars installed on the tower. All transmission lines have ground kits installed just prior to building entry. The kits are bonded to a ground bar installed on the building's exterior wall. The ground bar appears to be connected to a single driven rod with an undersized ground lead. Grounding leads also connect internal components to the external ground bar through the entry port. *(Industry standards call for the transmission lines to have ground kits installed at both the top and bottom of the tower. These kits would be bonded to buss bars installed on the tower. The bottom external ground bar should be tied to the sub-surface grounding system via a #2 AWG stranded copper lead. The improper connection of internal leads to the external buss bar defeats the protection afforded by the cable entry port and the external grounding system. This creates the potential to bring damaging and deadly lightning strikes into the building.)*

There is a lack of surge protection on the electrical and telephone services. The radio room lacks an internal perimeter ground buss (HALO). *(Industry standards call for the above components to be installed as part of a unified communications grounding system.)*

APPENDIX C – HARDYSTON CURRENT CONDITIONS

Hardyston, with a population exceeding 6,100, encompasses an area of 32.6 square miles. The Hardyston PSAP is operated by the Hardyston Police Department and handles over 16,800 calls for service annually.

PSAP/DISPATCH/RADIO EQUIPMENT	
Dispatch positions:	Two
Radio console vendor:	Zetron
Communications area expandable:	Yes
CAD vendor:	Enforsys
Police RMS vendor:	Enforsys
Fire RMS vendor:	None
Emergency power available:	Yes
Backup dispatch:	No
Backup PSAP:	No
CPE:	KML
9-1-1 provider:	Verizon
Full-time employees:	Four
EMD:	Yes
MDT:	Yes—Verizon
AVL:	No
GIS interface:	No

The Hardyston PSAP has two dispatch/radio console positions in good operating condition with full capabilities. Logging recorders, call checks and ancillary equipment are in good repair and operating properly.

The Enforsys CAD system interfaces to an RMS, NCIC, E9-1-1 system and MDTs. The Hardyston PSAP uses a CAD server, a file server, a Courtline server, a call manager server, an e-mail server, and a server for Info-Cop.

There are dedicated HVAC (climate control) systems, independent of one another and the building system, for the dispatch area and the server room. A central environmental system services the remainder of the building.

Reliable and adequate emergency power is available. The site has a Generac 3Ph 175KVA generator. An underground natural gas feed supplies fuel to this generator. Assuming no disruption to the gas service, this system effectively has an unlimited run time (respectful of normal maintenance). Limited UPS power is provided to individual servers by various small UPS units in the computer room. There is no UPS backup for radio equipment.

Adequate space does not exist within the current dispatch area to accommodate expansion to a full countywide PSAP.

The local phone company provides two separate service feeds. A dedicated 50-pair feed supports PSAP operations, while a 25-pair service appears to feed the remaining phone circuits in the building.

A 60-foot light-duty self-supporting tower provides connectivity to remote transceivers and direct two-way radio communications to field units.

A loose network of radio systems operating in VHF Low and VHF High bands throughout the county provide radio communications. The Hardyston PSAP controls part of this radio network via UHF RF links and tie lines and has the ability to activate remote transceivers that cover their township.

Each tower leg is bonded to a sub-surface grounding system by a #2 AWG stranded lead, which is exothermically welded to the tower legs as recommended by contemporary standards for communication sites.

No grounding kits are installed on the transmission lines prior to entering the building. This creates the potential to bring damaging and deadly lightning strikes into the building. *(Industry standards call for the transmission lines to have ground kits installed at both the top and bottom of the tower. These kits would be bonded to buss bars installed on the tower. The bottom external ground bar should be tied to the sub-surface grounding system via a #2 AWG stranded copper lead.)*

There is a lack of surge protection on telephone services. The radio room lacks an internal perimeter ground buss (HALO). *(Industry standards call for the above components to be installed as part of a unified communications grounding system.)*

APPENDIX D – HOPATCONG CURRENT CONDITIONS

Hopatcong, with a population exceeding 15,800, encompasses an area of 12.3 square miles. The Hopatcong PSAP is operated by the Hopatcong Police Department and handles over 32,500 calls for service annually.

PSAP/DISPATCH/RADIO EQUIPMENT	
Dispatch positions:	Two
Radio console vendor:	Zetron
Communications area expandable:	Yes
CAD vendor:	Enforsys
Police RMS vendor:	Enforsys
Fire RMS vendor:	None
Emergency power available:	Yes
Backup dispatch:	No
Backup PSAP:	No
CPE:	KML
9-1-1 provider:	Verizon
Full-time employees:	Seven
EMD:	Yes
MDT:	Yes—Verizon
AVL:	No
GIS interface:	Yes

The Hopatcong PSAP has two dispatch/radio console positions in good operating condition with full capabilities. Logging recorders, call checks and ancillary equipment are in good repair and operating properly.

The Enforsys CAD system interfaces to an RMS, NCIC, E9-1-1 system, GIS and MDT systems. The Hopatcong PSAP uses an Audx server, a CAD server, a BioKey MDT server, a terminal server, two domain servers and two KML 9-1-1 call servers.

A wall mounted air conditioning unit provides supplemental cooling capability in the radio/server room. All remaining climate control is provided by the building's central environmental system.

Reliable and adequate emergency power is available. The site has a Datagen 3Ph 100KVA diesel-powered generator with a 100-gallon tank. There is limited battery backup for some radio equipment. UPS is provided to all servers and radio equipment.

Adequate space does not exist within the current dispatch area to accommodate expansion to a full countywide PSAP.

The local phone company provides two separate service feeds. A 200-pair copper feed enters the building and is stepped down to twin 25- pair lines for actual use. A fiber optic service is present in the utility room, but its status is uncertain.

An 80-foot light-duty self-supporting tower provides connectivity to remote transceivers and direct two-way radio communications to field units.

A loose network of radio systems operating in VHF Low and VHF High bands throughout the county provide radio communications. The Hopatcong Borough PSAP controls part of this radio network via UHF RF links and tie lines and has the ability to activate remote transceivers that cover their dispatch area.

Two grounding leads, tie strapped to the tower, are attached to a leg flange at the tower base by a mechanical clamp. While it was not possible to determine to what the leads connected, they appear to be the only grounding components utilized on the tower. There is no evidence of a sub-surface grounding system. *(Standard practice calls for each tower leg to be bonded to a sub-surface grounding system using #2 AWG stranded bare copper leads and exothermic welds.)*

No grounding kits are installed on the transmission lines prior to entering the building. This creates the potential to bring damaging and deadly lightning strikes into the building. *(Industry standards call for the transmission lines to have ground kits installed at both the top and bottom of the tower. These kits would be bonded to buss bars installed on the tower. The top buss bar would bond to tower steel while the bottom buss bar connects to the sub-surface system using a #2 AWG, stranded bare copper lead, compression lug and exothermic weld.)*

Lightning arrestors, mounted on a buss bar located inside the radio/server room, are installed on the transmission cables. The buss bar is improperly bonded to a metallic conduit by an undersized lead, effectively defeating its purpose.

There is a lack of surge protection on the electrical and telephone services. The radio room lacks an internal perimeter ground buss (HALO). The radio equipment bonds are improperly connected to metallic conduits. *(Industry standards call for the above components to be installed as part of a unified communications grounding system.)*

APPENDIX E –NEWTON CURRENT CONDITIONS

Newton, with a population exceeding 8,100, encompasses an area of 3.1 square miles. The Newton PSAP is operated by the Newton Police Department and handles over 25,000 calls for service annually.

PSAP/DISPATCH/RADIO EQUIPMENT	
Dispatch positions:	Three
Radio console vendor:	Orbacom
Communications area expandable:	Yes
CAD vendor:	Enforsys
Police RMS vendor:	Enforsys
Fire RMS vendor:	Enforsys
Emergency power available:	Yes
Backup dispatch:	No
Backup PSAP:	Yes – Andover and Sparta
CPE:	KML
9-1-1 provider:	Verizon
Full-time employees:	Eight
EMD:	Yes
MDT:	Yes—Verizon
AVL:	No
GIS interface:	No

The Newton PSAP has three dispatch/radio console positions in good working condition with full capabilities. Logging recorders, call checks and ancillary equipment are in good repair and operating properly.

The Enforsys CAD system interfaces to an RMS, NCIC, E9-1-1 system and MDT system. The Newton PSAP uses an Info-Cop server, an Enforsys server, an exchange server and a watchdog/Newton homepage server.

A stand-alone heating and air conditioning unit, independent of the building's environmental system, services the dispatch area. The server room has a separate air conditioning unit for climate control.

Reliable and adequate emergency power is available. The site has a Cummings 3Ph 125 KVA diesel-powered generator with a 194-gallon tank. This system provides an estimated run time of approximately 24 hours with a full tank. Battery backup is provided via a centralized APC UPS. An additional APC UPS in the computer room supports the servers.

Adequate space does not exist within the current dispatch area to accommodate expansion to a full countywide PSAP.

A 100-pair copper phone service split into two 50-pair services supports the PSAP, the radio tie lines and the general phone service for the building.

No tower currently exists on this site. Radio antennas located on the roof of the municipal building are for the towns dispatched by the Newton PSAP. These antennas provide connectivity to remote transceivers and direct two-way radio communications to field units.

A loose network of radio systems operating in VHF LOW and VHF HIGH bands throughout the county provide radio communications. The Vernon PSAP controls part of this radio network via UHF RF links and tie lines and has the ability to activate remote transceivers that cover their dispatch area.

The chimney-mounted antennas and link radio systems located in the PSAP building show no indications of grounding or surge protection. Ground kits should be installed on the antenna coax prior to entry into the building. Surge protection should be installed upon entry to the building.

APPENDIX F – SPARTA CURRENT CONDITIONS

Sparta, with a population exceeding 18,000, encompasses an area of 39.2 square miles. The Sparta PSAP is operated by the Sparta Police Department and handles over 58,500 calls for service annually.

PSAP/DISPATCH/RADIO EQUIPMENT	
Dispatch positions:	Six
Radio console vendor:	Orbacom
Communications area expandable:	Yes
CAD vendor:	Enforsys
Police RMS vendor:	Enforsys
Fire RMS vendor:	ESP Fire
Emergency power available:	Yes
Backup dispatch:	No
Backup PSAP:	No
CPE:	KML
9-1-1 provider:	Verizon
Full-time employees:	Eight
EMD:	Yes
MDT:	Yes—Verizon
AVL:	Yes
GIS interface:	Yes

The Sparta PSAP has four dispatch/radio console positions in good operating condition with full capabilities. Logging recorders, call checks and ancillary equipment are in good repair and operating properly.

The Enforsys CAD system interfaces to an RMS, NCIC, E9-1-1 system, GIS and MDT systems. The Sparta PSAP uses a county call server, a CAD server, an audio logger server, an Info-Cop and ESP server, an exchange server, a terminal server and two domain servers.

An air conditioning unit provides supplemental cooling capability in the server room. All remaining climate control is provided by the building's central environmental system.

Reliable and adequate emergency power is available. The site has a Kohler 3Ph 300 KVA diesel-powered generator with a 2000-gallon tank. A centralized UPS system is in the server room. There is battery backup in the radio shelter for the radio equipment.

Adequate space does not exist within the current dispatch area to accommodate expansion to a full countywide PSAP.

A 100-pair copper service feeds the PSAP and the municipal building.

A 50-foot light-duty self-supporting tower provides connectivity to remote transceivers and direct two-way radio communications to field units.

A loose network of radio systems operating in VHF Low and VHF High bands throughout the county provide radio communications. The Sparta PSAP controls part of this radio network via UHF RF links and tie lines and has the ability to activate remote transceivers that cover their dispatch area.

Only one tower leg has a ground connection. The ground lead is insulated, undersized and bolted to the tower. This ground lead should be exothermically welded. *(Industry standards call for each tower leg to be bonded to a sub-surface grounding system using #2 AWG stranded bare copper leads and exothermic welds.)*

The radio shelter ground kits are properly installed on the external side of the entry port and lightning suppression is installed correctly on the interior side of the entry port. The transmission lines should have ground kits installed on the base of the tower.

The site has properly installed electrical surge protection.

APPENDIX G – VERNON CURRENT CONDITIONS

Vernon, with a population exceeding 24,500, encompasses an area of 70.5 square miles. The Vernon PSAP is operated by the Vernon Police Department and handles over 20,000 calls for service annually.

PSAP/DISPATCH/RADIO EQUIPMENT	
Dispatch positions:	Two
Radio console vendor:	Zetron
Communications area expandable:	Yes
CAD vendor:	Enforsys
Police RMS vendor:	Enforsys
Fire RMS vendor:	None
Emergency power available:	Yes
Backup dispatch:	No
Backup PSAP:	Yes - Hardyston
CPE:	KML
9-1-1 provider:	Verizon
Full-time employees:	Six
EMD:	Yes
MDT:	Yes—Verizon
AVL:	No
GIS interface:	Yes – Enforsys Think Map Viewer

The Vernon PSAP has two dispatch/radio console positions in good operating condition with full capabilities. Logging recorders, call checks and ancillary equipment are in good repair and operating properly.

The Enforsys CAD system interfaces to an RMS, NCIC, E9-1-1 system, and MDT system. The Vernon PSAP uses an Info-Cop MDT server, a CAD server, an Enforsys-blue server, and a data server.

All air conditioning and climate control is provided by the building's environmental system. There is no additional cooling for the servers, radios or dispatch positions.

Reliable and adequate emergency power is available. The site has a Cummings 3Ph 400 KVA diesel-powered generator with a 660-gallon tank. This system provides an estimated run time of approximately 24 hours with a full tank. There are individual rack-mounted UPS systems.

Adequate space does not exist within the current dispatch area to accommodate expansion to a full countywide PSAP.

A 100-pair service provides all the telephone needs of the building. Only 50 pairs extend to the cross connect blocks.

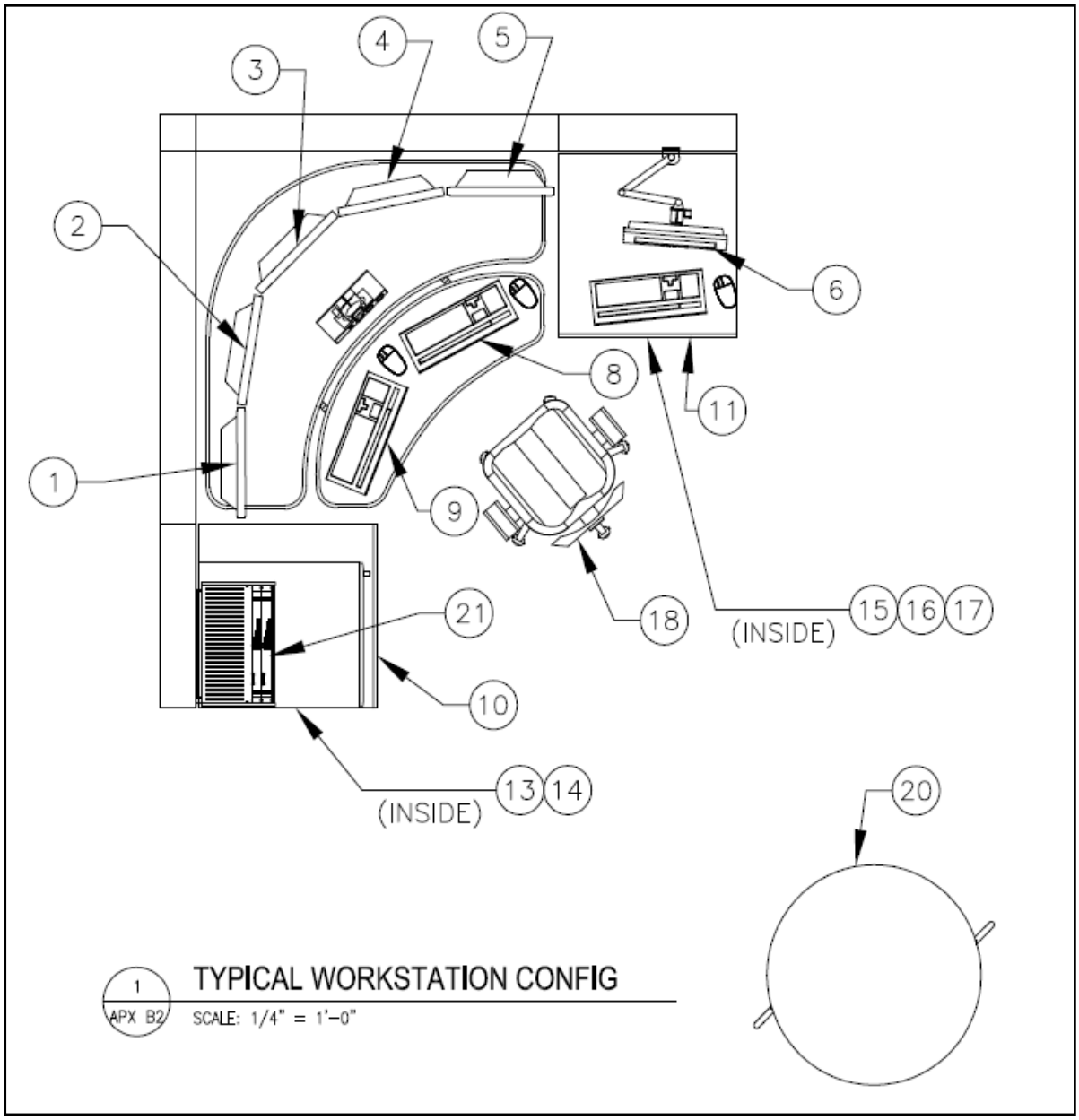
All antennas located at the Vernon PSAP are roof-mounted. These antennas provide the link signals and connectivity to the voted receiver network.

A loose network of radio systems operating in VHF Low and VHF High bands throughout the county provide radio communications. The Vernon Township PSAP controls part of this radio network via UHF RF links and tie lines and has the ability to activate remote transceivers that cover their dispatch area.

While there is little radio infrastructure at the Vernon site, no grounding or surge protection is evident on any of the RF lines at the building entry port.

APPENDIX H– ERGONOMIC FURNITURE DIAGRAM

Note: This diagram and schedule are for reference only and are not representative of the County's current or future technical dispatch furniture configuration.



The table below illustrates the specialized equipment that may appear at a typical communications console position. The infrastructure design supporting electrical and data cabling needs for each position on the PSAP floor requires protected and unprotected power feeds, multiple Category 6 (CAT6) cable drops and sometimes specialized RF cabling. Today's established dispatch furniture products typically accommodate floor box access and/or surface mount termination points.

DISPATCH FURNITURE FIXTURE SCHEDULE				
ID #	**ITEM**	**DESCRIPTION**	**SUPPLIED and INSTALLED BY**	**COMMENTS**
1	CAD SCREEN 1	FREESTANDING 21" LCD MONITOR	OWNER	
2	CAD SCREEN 2	FREESTANDING 21" LCD MONITOR	OWNER	
3	CAD SCREEN 3	FREESTANDING 21" LCD MONITOR	OWNER	
4	TELEPHONY SCREEN	FREESTANDING 21" LCD MONITOR	PHONE VENDOR	COORDINATE MAKE/MODEL WITH OWNER
5	RADIO SCREEN	FREESTANDING 21" LCD MONITOR	RADIO VENDOR	COORDINATE MAKE/MODEL WITH OWNER
6	NCIC SCREEN	SWING ARM MOUNT 21" LCD MONITOR	OWNER	LOCATED @ SHARED AREAS BETWEEN D1-2, D3-4 AND D5-6
7	HOME CONFINEMENT SCREEN	SWING ARM MOUNT 21" LCD MONITOR	OWNER	LOCATED AT S1 ONLY
8	CAD INPUT	STANDARD KEYBOARD & MOUSE	OWNER	
9	TELEPHONY INPUT	STANDARD KEYBOARD w/NUMBER PAD & MOUSE	PHONE VENDOR	
10	RADIO INPUT	STANDARD KEYBOARD & MOUSE	RADIO VENDOR	LIMITED USE ITEM TO BE STORED AT POSITION
11	NCIC INPUT	STANDARD KEYBOARD & MOUSE	OWNER	LOCATED @ SHARED AREAS BETWEEN D1-2, D3-4 AND D5-6
12	HOME CONFINEMENT INPUT	STANDARD KEYBOARD & MOUSE	OWNER	LOCATED AT S1 ONLY
13	CAD COMPUTER	STANDARD PC	OWNER	
14	TELEPHONY COMPUTER	STANDARD PC	PHONE VENDOR	COORDINATE POSITION IN CABINET WITH OWNER
15	RADIO COMPUTER	STANDARD PC	RADIO VENDOR	COORDINATE POSITION IN CABINET WITH OWNER
16	NCIC COMPUTER	STANDARD PC	OWNER	LOCATED @ SHARED AREAS BETWEEN D1-2, D3-4 AND D5-6
17	HOME CONFINEMENT PC	STANDARD PC	OWNER	LOCATED AT S1 ONLY
18	24 / 7 CHAIR	DISPATCH CHAIR RATED FOR USE IN 24 / 7 ENVIRONMENT	FURN. VENDOR	COORDINATE MAKE/MODEL WITH OWNER
19	COMMON WORK AREAS	PENINSULA EXTENSIONS AND SHARED CABINET SPACE	FURN. VENDOR	SIZE AND QUANTITY PER PLAN, COORDINATE FINISH w/OWNER
20	BINDER STORAGE/PRINTER	APPROX 38" ROTATING RESOURCE CENTER	FURN. VENDOR	TWO UNITS TOTAL PER PLAN, PRINTERS BY OWNER

NOT SHOWN	HEADSET & INTERFACE	PHONE AND RADIO SYSTEM INTERFACE TO HEADSET	PHONE/RADIO	RADIO & PHONE VENDORS SHALL COORDINATE w/OWNER
	TELEPHONY SPEAKER	INSTANT RECALL REC. PLAYBACK STANDARD PC SPEAKER	PHONE VENDOR	COORDINATE MAKE/MODEL WITH OWNER
	RADIO SPEAKER	UNSELECTED AUDIO STANDARD PC SPEAKER	RADIO VENDOR	COORDINATE MAKE/MODEL WITH OWNER
	BACK-UP PHONE HANDSET	SHELF MOUNT/FREE STANDING DESK SET w/RECEIVER	OWNER	
	BACK-UP RADIO/ENCODER	19" RACK MOUNT EQUIPMENT (APPROX 8 RACK UNITS)	RADIO VENDOR	19" MOUNTING RAILS BY FURN MFR.
	TASK LIGHT	FREESTANDING FLUORESCENT TASK LIGHT	FURN. VENDOR	
	GROUND BUS BAR	MIN. 1" x 6" x 1/4" PRE-DRILLED COPPER GROUND BUS BAR	FURN. VENDOR	TIE TO UNDERFLOOR GROUND GRID BY TELECOM CONTRACTOR
	INPUT EXTENSION CABLES	USB TYPE CABLE EXTENSIONS (AS NECESSARY)	FURN. VENDOR	SEE NOTE #3
	SCREEN EXTENSION CABLES	VGA TYPE CABLE EXTENSIONS (AS NECESSARY)	FURN. VENDOR	SEE NOTE #3
	POWER DISTRIBUTION	MIN. 8 OUTLET 20 AMP POWER STRIP	FURN. VENDOR	SEE NOTES #4, 5, & 6
	ELECT HEIGHT ADJUSTMENT	POWERED LIFT BASE - KEYBOARD AND DISPLAY PLATFORM	FURN. VENDOR	

NOTES:

1.) CCTV CAMERA FEEDS TO BE TIED INTO WORKSTATION VIA ADMIN-LAN CONNECTION TO NETWORK EQUIPMENT LOCATED IN SYSTEMS ROOM #116. ADMIN LAN EQUIPMENT BY OWNER. SEE ASSOCIATED ELECTRONIC SECURITY DRAWINGS FOR INSTALLATION DETAILS.

2.) REMOTE ACCESS CONTROL TO BE TIED INTO WORKSTATION VIA RADIO CONSOLE AUXILARY INPUTS. SEE ASSOCIATED ELECTRONIC SECURITY DRAWINGS FOR INSTALLATION DETAILS AS WELL AS NECESSARY COORDINATION WITH OWNER AND RADIO SYSTEM VENDOR.

3.) FURNITURE VENDOR/MANUFACTURER TO SUPPLY/INSTALL INPUT AND SCREEN SIGNAL EXTENSION CABLES AS NECESSARY. EACH EXTENSION CABLE SHALL BE APPROPRIATELY TESTED AND LABELED ON EACH END.

4.) POWER STRIPS SHALL BE LOCATED IN SUCH A MANNER THST MONITOR, PC AND EQUIPMENT POWER CORDS DO NOT EXCEED 6' IN LENGTH. COORDINATE QUANTITY OF POWER STRIPS WITH ELECTRICAL DRAWINGS/CIRCUIT COUNT AND OWNER REQUIREMENTS.

5.) POWER AND COMMUNICATIONS CABLING SHALL BE SEPARATED TO THE GREATEST PRACTICAL EXTENT.

6.) EACH POWER STRIP SHALL BE LABELED TO IDENTIFY UPS OR NON-UPS CIRCUITS.

APPENDIX I – TRANSITION AND MIGRATION PLAN TEMPLATE

The project plan outline that follows is a template that may be used for initiating transition and migration planning. This is a dynamic outline and planning document that provides a generic starting point for the TWG to begin planning activities. This outline will require detailed review and revision during the planning phase of consolidation to further customize it to the County's needs. Appropriate County staff, TWG and User-specific Work Groups should refine any plan as the effort moves forward. This plan outline can easily be placed into project management software (e.g. MS Project) to allow ease of scheduling. Timelines can be developed and can be overlaid to help develop and illustrate the overall schedule. This is an important tool for coordinating construction and technology schedules and operational transitions.

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A. Facility

1. Future Facility(s)
   - Identify Facility Requirements
     - Spatial
     - Redundancies
     - Pathways
     - Wiring Infrastructure
     - Technologies
     - Furnishings
       - Dispatch console furniture
       - Other technical furnishings
2. Programming to Accommodate Systems & Operations
   - Studies and Permitting
   - Facility Implementation
   - Design
   - Schematic Design
   - Design Development
   - Construction Documents
   - Bid
   - Build

B. Facility

1. Utilities/Connectivity
   - Telephone/Data - Dual Facility Entrance
   - Power - Diverse Power Grid
   - Commercial Broadband/ISP
   - Cable TV
   - Fuel/Natural Gas
2. Building occupancy
   - Systems Installation
   - Testing
   - Acceptance
   - Training

- Closeout

C. Systems (Technology)

1. Identify System Requirements (Repeat for each PSAP**)**
   - Inventory 10-digit lines
   - Identify use (Emergency versus agency Admin)
   - Decision to keep line at agency, or transition for consolidated PSAP coverage

2. Computer Aided Dispatch *(Plan will vary based on result of Enforsys decision)
   - Inventory Verification (Repeat for each PSAP)
     - Server(s) and associated capacity (size of hard drive, amount of data stored, operating system, defined redundancy, processor speed, etc.)
     - Interface hardware and configuration diagramming
     - Workstations (processors and screens)
     - Third party software necessary to operate the system
     - Network Diagram of entire CAD network and associated workstations (including remote access)
   - Systems Evaluation (configuration requirements and review of agency/system statistics)
   - Identify System Requirements

   Tasks that the listed agency will need to accomplish prior to and/or during a transition to a new CAD system.
   - Collect data and define requirements for transfer to new system(s)
     - CAD Incident types
     - Interface requirements
     - CAD incident dispositions
     - Define data conversion requirements
   - Response boundaries and unit recommendations
3. Logging Recorder
   - Inventory Verification
   - Systems Evaluation (configuration requirements and review of agency/system statistics)
   - Identify System Requirements
   - **Repeat for each PSAP**
     - Inventory existing channels (determine ""what"" is being logged)
     - Determine Analog, IP, or Digital
     - Determine special procedures and agency-specific requirements (i.e. recording requirements, reporting, etc.)
4. CPE
   - Inventory Verification
   - Systems Evaluation (configuration requirements and review of agency/system statistics)
   - Identify System Requirements
   - **Repeat for each PSAP**
     - "Determination of ring-down requirements, speed dials, etc."
5. GIS
   - Determine mapping layers for CAD use
   - Determine feasibility of point layer for address verification
   - Determine status of jurisdictional boundary, beat, and response zone layers (shape files)

- Determine ortho-photography layer status, accuracy, and synchronization with point layer(s) and building footprints

D. Future Systems

1. CAD System Upgrade/Procurement (Plan will vary based on Enforsys decision)
   - Needs Assessment
   - RFP Development
   - RFP Evaluation
   - Bid Evaluation
   - Vendor and Contract Negotiation - work effort (After the selection of the primary vendor and before award of contract. This effort assumes that contract negotiation is successful.)
   - Completion of Vendor and Contract Negotiations - milestone

   CAD Implementation
   - CAD Hardware procurement and installation
   - CAD Master File set-up
   - CAD Map set-up
   - CAD Master File review and continued set-up
   - CAD interface integration
   - CAD Acceptance Testing
   - CAD Integration Testing
   - CAD User Training (at least 16 hour per dispatcher)
   - CAD Go-Live
   - CAD Functional Testing
   - Closeout
2. System Furniture Procurement
   - Turnover of Building - Occupancy
   - Furniture Layout
     - Furniture Assessment
     - Development of Layout
     - Review of Layout
     - Approval of Layout
   - System Furniture RFP
   - Contract
     - Contract Negotiations
     - Contract Award
     - Contract Signing / Notice to Proceed
   - System Furniture Ordering and Installation
   - System Furniture Installation Inspection/Training
3. Telephony Procurement
   - Installation of Console Furniture
   - Telephone Procurement
   - Network Requirements
     - Telephony Assessment
     - Development of Network Requirements
     - Review of Requirements
     - County Approval of Requirements

- Telephony RFP (Telephone CPE)
  - Develop Telephony RFP
  - RFP Distribution
  - RFP Evaluation
  - Selection of Vendor to Begin Negotiations
- Contract
  - Contract Negotiations
  - Contract Award
  - Contract Signing / Notice to Proceed
- Telephony Equipment Ordering and Installation
  - Order Telephony Hardware and Equipment
  - Telephony Equipment Shipped
  - Unpack and Inventory Hardware and Equipment
  - Hardware and Equipment Installed
  - Software Installation, Internal Programming and Internal Testing
  - Completion of Hardware and Equipment Installation
- Develop Call Flow Plan
  - ACD call flow (how incoming calls flow)
  - Call overflow process
  - Transferring calls
  - Console layout
  - Incoming line/button layout
  - Call queues
  - Agent set ups and logins
  - Agent work modes
  - Naming conventions
- Telephony Circuits
  - Order 9-1-1 Trunks
  - Install 9-1-1 Trunks
- Admin Phone Lines
  - Order Admin Lines
  - Install Admin Lines
- Telephony Equipment Testing
- Coordinate & Test E9-1-1 CAD Interface
- Digital Recorder Cross Connects
- Telephony System Training
  - System Administrator
  - Management Information System - Answering Position
  - Management Information System – PBX
  - Answering Position Training – Users
  - Administrative Phone System Training
- System Acceptance & Readiness for Cutover
- Commencement of System Maintenance/Warranty

4. Logging Recorder Procurement
   - Network Design
     - Logging Recorder & Channel Assessment

        - Positions to be recorded
        - Phone lines to be recorded
        - Radio channels to be recorded
        - Q/A software requirements
        - IRR needed
      - Development of Network Design
      - Review of Network
      - County Approval of Network
  - Logging Recorder RFP
  - Recording Equipment Ordering and Installation
  - Digital Recorder Software/Cross Connects
  - Recording Equipment Inspection/Training
  - System Acceptance & Readiness for Cutover
5. Radio Consoles
  - Radio Design
    - Console/Equipment Room Configuration/Assessment
      - Positions available/needed.
      - Back room equipment available/needed.
      - Features to be included
    - Development of Network Design
      - Types of Consoles
      - Interfaces to other systems
      - IRR
      - Migration Issues, if any
    - Review of Design
    - County Approval of Design
  - Radio System SOW
  - Radio FCC Licensing
  - Contract
  - Radio Equipment Ordering and Installation
  - Radio Equipment Inspection/Training
  - Radio Acceptance Test
  - Radio System Acceptance & Readiness Cutover
6. Master Clock
  - Design/Redundancy
    - Radio Consoles
    - CAD
    - Logging Recorder
    - Telephone CPE
    - LAN/IT Network
    - Mapping/GIS
  - Wall Clocks
    - Cabling/connectivity
  - Procurement
  - Installation
7. Structured Cable System

- Implementation
- Design Review
- Testing
- Cable Infrastructure Inspection / Acceptance
- Final Inspection and Acceptance
- Readiness for Cutover
- System Available

8. Electronic Security System
   - System Installation
   - Implementation
   - Finalize Design - coordinate w/ architect
   - Installation Complete
   - System Operational Test
   - Electronic Security Inspection / Acceptance
   - Final Inspection
   - User Training
   - Readiness for Occupancy
   - System Available
9. Audio Visual System
   - System Installation
   - Implementation
   - Finalize Design - coordinate w/ AE
   - Product Order Placed
   - Installation Process
   - System Operational Test
   - System Control Inspection / Acceptance
   - Final Inspection
   - User Training
   - Readiness for Cutover
   - System Available/Burn in/Stability Testing
10. County LAN & WAN
    - System Installation
    - Implementation
    - Finalize Design - coordinate w/ architect and PSAP management

    Verify data jacks for specialized systems in Admin areas
    - CAD
    - 9-1-1 MIS
    - Logging Recorder
    - CPE Activity Monitor
    - Radio Console Admin
    - Installation Complete
11. System Control Inspection / Acceptance
    - Punchlist Inspection
    - Punchlist Corrections
    - Final Inspection

- Acceptance
- Readiness for Cutover
- Network security verified
- IP addressing
- System Available

E. County Operations

- Staff/equipment migration
- Readiness
- Develop move/stay plan and equipment list
- Arrange for mover
- Orient staff to move parameters
- Staff facility tours
- Finalize new facility operating procedures
- Verify facility readiness
- Building Activation/Acceptance
- Building systems tests
- Fire suppression
- Emergency Power Off buttons
- Generator/UPS
- Test Corrections/operating procedure modifications
- Final Operations Inspection
- As-builts Review and cataloging
- Electronic Asset Management Database
- Acceptance

F. Staff Facility Training

- Conduct Needed Training
- Cutover

G. System Available

- Go / No Go Decision
- Cut over/live calls
- Debrief/lessons learned

H. Facility Dedication

- Schedule
- Arrangements
- Announcement
- Ceremony

I. Operations Transition

- Current Operations

Review current operations and assess any change in operations that will be necessary with the move to the new facility.

- Verify Inventory
- Training
  - New facility
    - Security/Building Access
    - Back-up Systems/Power/UPS/Generator
    - HVAC
    - Fire Alarm/Protection
    - System Furniture
  - New technology
    - Telephone
    - CAD
    - Radio Consoles
    - Logging Recorder
    - Audio Visual System
  - Operations
    - Policies and Procedures
    - Standard Operating Guidelines
    - Facility and operations acclimation training
- Training Locations
- Training Staff
- Staffing

Review and address any staffing requirements that will be needed for required training. This includes any changes in schedules that will be required to allow staff to be trained and/or any changes in schedules that will be needed to cover existing operations while staff is being trained.

- Staffing levels

Identify required staffing levels for existing operations while training is being conducted.

- Overtime Procedures
- Workload Definitions
- Call Volume Determinations
- Peak Times
- Radio Traffic channel usage/availability
- Standard Operating Guidelines (Related to the Transition ONLY)
- Back-up procedures
- Work Flow Processing on processes affected by move/transition
- Emergency Operating Procedures (how used during transition)
- Adjacencies
- Admin Office
- EOC
- Other Agencies and Departments
- Evaluation of Inventoried Processes

J. Future Operations

- Identification of New Operations Requirements (What is required operationally to bring new facility on-line)

- Staffing
- Overtime Needs
- Duration planning for transition time frame
- Scheduling
- Standard Operating Procedures
- Back-up Procedures
- Emergency Operations
- Mutual Aid and Other Agency Dependencies
- Workflow Processing
- Workload
- Anticipating Call Volumes
- Radio Channel Assignment and Usage
- Programming to Accommodate Facilities & Systems
- Implementation of Operations Transition Plan
- Testing
- Acceptance
- Training
- Cutover

K. Media Relations

L. Go/No-Go Decisions

M. Contingency Plans

N. Post Cut-over Status Monitoring/Stability

SITE EVALUATION REPORT

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Site Evaluation Study for
Proposed Sussex County Consolidated Communications Center

Candidate Site Locations:	**Site 1: Sussex County Juvenile Detention Center, Frankford Township, NJ** **Site 2: Sussex County Community College, Newton, NJ** **Site 3: Wheatsworth Road Property, Hardyston Township, NJ**

Prepared by: L.R. Kimball & Tim Lisle, AIA, with Jacobs Wyper Architects

Submitted: January 21, 2010

On December 16, 2009, Sherri Bush, of L.R. Kimball and Tim Lisle, of Jacobs Wyper Architects, toured the candidate sites considered for locating the proposed Sussex County consolidated PSAP. Representing Sussex County on the tour were Keith Armstrong, John Drake and Skip Danielson. The purpose of the tour was to evaluate the overall suitability of the subject properties as a possible location for the new consolidated PSAP.

Additionally, discussion with Sussex County representatives provided some detail regarding the preliminary definition of facility needs for the new PSAP. This was augmented by a WebEx conference on Tuesday, December 22, 2009, where a preliminary Facilities Program document was created and reviewed by Sussex County representatives to establish a preliminary list of space needs and associated space requirements. The proposed facility is planned to house an Emergency Communications Center with ten dispatch positions and two training positions, an Emergency Operations Center with approximately twenty positions, and administrative and support spaces necessary for the operation of the new facility. Based on this defined need and preliminary planning, the new facility is expected to be approximately 11,000 to 13,000 gross square feet in area. Programming shall be discussed in detail further within this report.

Available documentation and site information utilized for this site evaluation includes:

- Site aerial views with overlay information from the Sussex County GIS website
- Google Earth™
- As-built documentation for the County Juvenile Detention Center, including site plans and building floor plans

The weather the day of the site tour was sunny with intermittent clouds, temperature approximately 20^{o} F.

Respective candidate sites are discussed individually as follows:

Site 1: Site of Sussex County Juvenile Detention Center, Frankford Township, NJ

General Site Description

As the County is developing a new consolidated detention facility on a different site, the current Juvenile Detention Center (JDC) is slated to become available to the County in the near future for alternative uses (DETERMINE TIMING). The site is part of a large County-owned tract located on Morris Turnpike at the intersection of Morris Avenue that includes other nearby County facilities, most specifically a large nursing home approximately 800 feet to the immediate south and separated by a pond.

The existing JDC is a single-story structure approximately 12,000 square feet in size. It is positioned on an elevated flat area of the site some 500 feet back from Morris Turnpike. A winding two-way drive connects the facility to Morris Turnpike across a landscaped area and around an existing small pond. Original construction documents for the JDC facility indicate site access from Morris Avenue to the north of the existing building. While this route into the site was not developed, it serves as an indication that a second means of access to the site may be developed to provide diverse access routes to the essential facility.

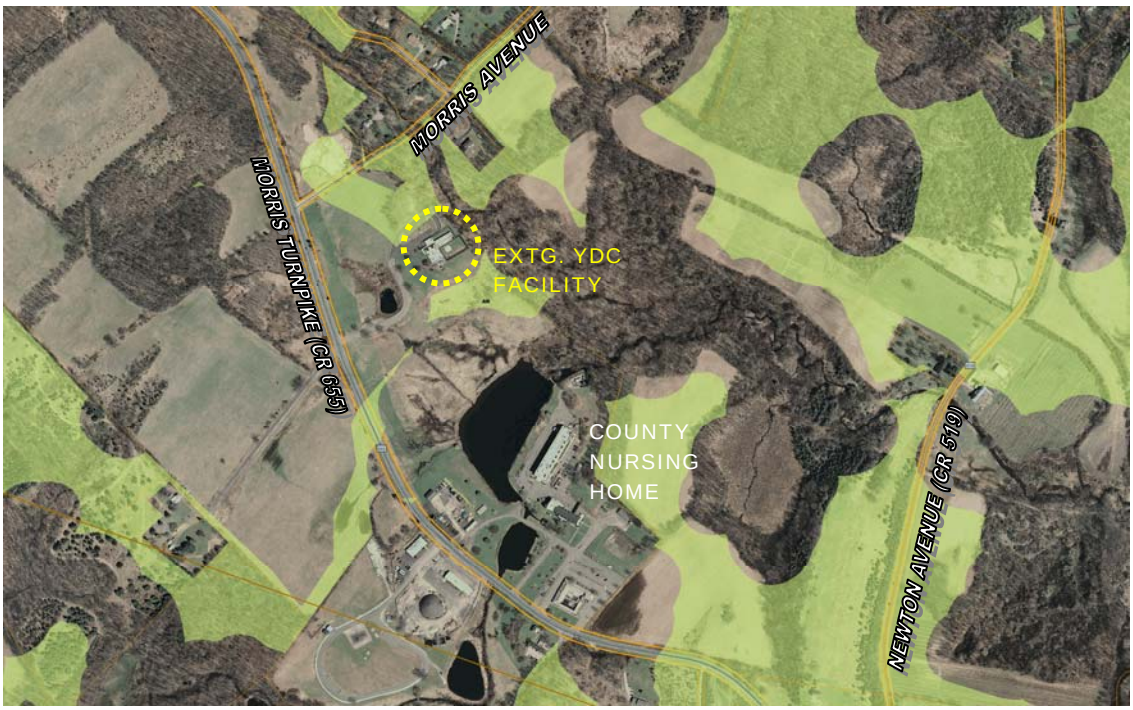

Figure 1: Site 1 - County Juvenile Detention Center

The existing building is designed with secure entrance to the north side (addressing existing on-site parking), a small administrative wing to the front (west) side, multi-purpose/correctional support space in a wing extending to the south, and secure bedrooms in the rear (east) wing of the building. The primary building structure is masonry bearing walls and 8" precast concrete planks for spanning roof deck elements. Based upon a site visit, only exterior site observation, and review of original construction documents for the facility, there are two approaches for use of the site as a PSAP:

Option 1. Remove the rear bedroom wing, which is a low-roofed, masonry bearing structure for construction of new hardened "core" elements, including the emergency

communications and operation centers, and renovate the remainder of the existing structure to be re-purposed for support and administrative functions.

Option 2. Completely demolish the existing JDC and construct new PSAP to best address defined programmatic needs.

Of the above approaches, it is felt that that Option 2 shall best address the County's needs in the most cost-effective manner. The following factors are the basis for this conclusion:

A. Given the age and projected conditions of both service and finish of facility interior and exterior elements and the assumption that the building systems have both reached the limits of the expected service life and are not suitable for the PSAP/essential facility use, it is felt that much normally expected existing building utility that may be realized through renovations and adaptive re-use are non-existent.
B. The structural system utilizing load-bearing masonry walls and precast concrete planks for roof spanning elements result in a great deal of existing bearing walls hindering the flexibility of re-planning efforts and expense for structural remediation.
C. New International Building Code requirements require enhanced structural performance for essential facilities. The structural, as described above, typically does perform well with diagonal loading requirements and could in all probability require significant structural augmentation to comply with the code as would be necessary as part of the building conversion to the new use.
D. The present siting of the existing building is somewhat close to the rear property line (approximately 50 feet). Even with reconstruction of the core elements to replace the bedroom wing, this construction may still be closer than security practices would normally recommend. With new construction, the entire building may be further westward and sufficiently away from the rear property line.

Figure 2: Site 1 - JDC, Detailed View

The site currently has utility infrastructure to support the JDC use. As such it is anticipated that both existing gas and domestic water feeds are sufficient for the new PSAP use with the exception that the new facility shall be fully suppressed and may require a separate fire line feed. Sanitary sewer is addressed by an on-site septic system located to the south of the existing JDC and shall require detailed study to determine if it meets current regulations and required capacity for the new facility. Stormwater management likewise shall be through on-site systems to requirements and sustainable building practices. Power currently is feed from Morris Avenue along the rear (eastern) side of the site. It is anticipated that the existing electrical feed is inadequate for the loads anticipated for the new Center. A new feeder with the potential for a secondary feeder providing diversity of service should be planned. It is understood that the County has considered developing a data backup site in the vicinity, indicating the likely presence of robust fiber connectivity for the site. This connectivity may be managed with electrical feeds, ideally extended on-site through armored underground duct-backs instead of aerial feeds.

Site 2: Sussex County Community College, Newton, NJ

General Site Description

On the Sussex County Community College campus grounds, this site offers a green-field location for development of the new PSAP. The SCCC campus fronts Mill Street (County Road 519) extending from Newton Swartswood Road (County Road 662) to the southern edge to Plotts Road at the northern edge. The campus is situated on the southern slope of a significant hill with the proposed site on the northwest corner of the campus at the summit of the hill approximately 200 feet above Mill Street. It is understood that the former Don Bosco College was absorbed into SCCC and the site is in the vicinity of former Don Bosco facilities.

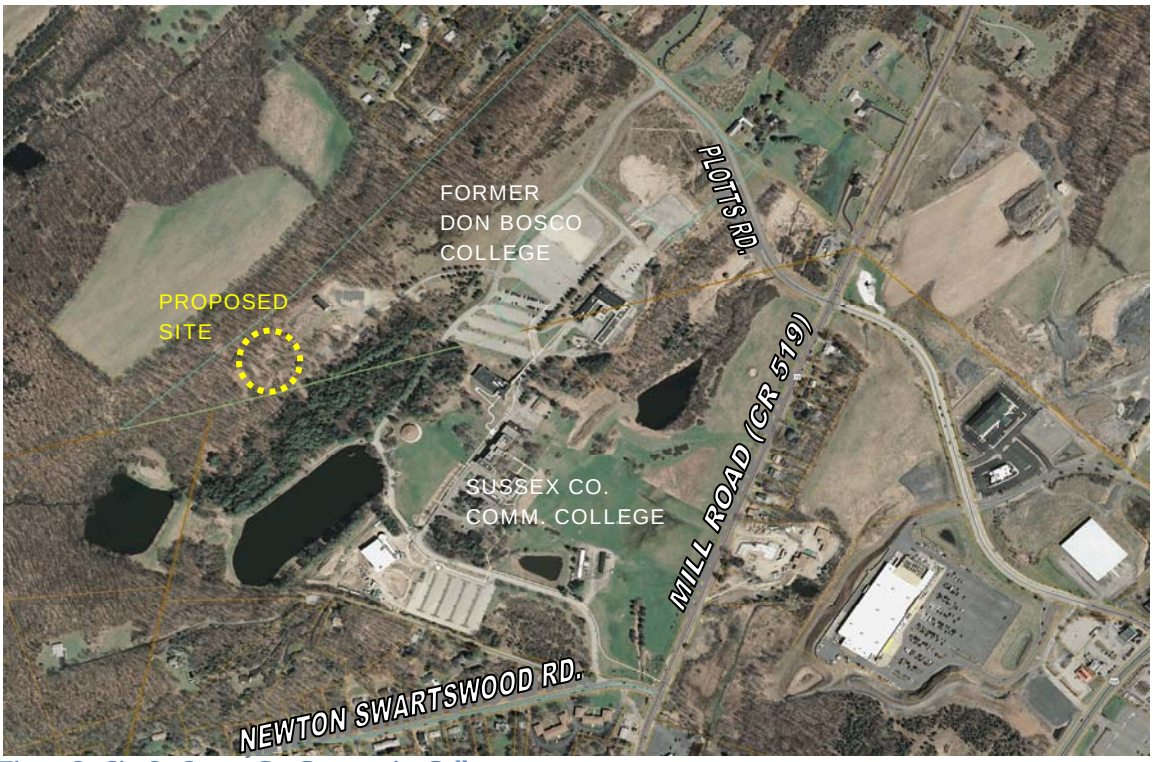

Figure 3: Site 2 - Sussex Co. Community College

Vehicular access to the site is through the College via diverse routes with the most direct route from Plotts Road along the northern edge of campus. In the specific area of the site, access is via a cleared area that is presently graveled for overflow College parking. An old service road runs past the site and continues around and down the hill past Horton's Pond connecting again with campus roadways. This road may be improved to ensure diverse access to the new PSAP.

It should be noted that on-site discussion regarding the road gradient to achieve in accessing the site could pose issues with snow and ice. Sussex County representatives were very confident in the County's road maintenance capabilities and their ability to provide clear, passable access during inclement weather conditions.

Situated at the crest of the hill building from Mill Road, the site presents considerable slope that strongly suggests a planning and design response for the new PSAP that works with the sloping terrain. The site slope is oriented to the southeast direction, offering close to ideal solar orientation and exposure for a building and associated solar controls, interior daylighting opportunities, and possibly solar panels, should that technology be considered.

In addition to the institutional (college) adjacency, Sussex County GIS data indicates that the large tract of land immediately adjacent to the north is protected farmland, ensuring that future development is restricted, thus controlling any undesirable future uses that may create vulnerabilities or threats to the PSAP operations. The area north and east of the proposed site has been cleared, graded and graveled for a large level parking area serving the overflow parking needs of the College. This area presents a source of public access near the site and should be considered in the site planning and development of facility security measures with regard to security zoning and protections. Alternatively, this parking area provides excellent overflow parking capacity for larger training and EOC activations that demand higher "surge" populations within the proposed PSAP.

One note regarding the County GIS data with respect to Site 2: Certain mapping indicates the site area to be within dedicated open space and is mapped accordingly. Project stakeholders are advised to review this issue with Sussex County planners to determine possible restrictions on the use of the site.

Given that the area was formerly used by the Don Bosco College, there exists nominal utility infrastructure to support the new essential facility and it is anticipated that significant upgrades are required. The somewhat remote location on the "back" side of the campus necessitates longer utility reaches from service delivery sources – most likely from Plotts Road. For service diversity, feeds from other service points and routes to the site may also be considered. It is assumed that power and fiber can be accessed on Mill Road (CR 519), specifically from an electrical transformer station at the intersection of Plotts and Mill Roads. Gas and water service may be available within the SCCC campus or could be extended from Plotts Road. Sanitary sewer and storm-water management will be addressed on site with appropriate on-site infrastructure. With minimum distances of over 2,000 feet to major roadways and primary utility feeds, development of a new PSAP on Site 2 should anticipate and plan for significant infrastructure costs as part of project site development, especially with consideration of diverse service feeds. The relatively high elevation and position at the pinnacle of the top of the hill also provides an ideal location for a new communications tower for both radio and microwave signals.

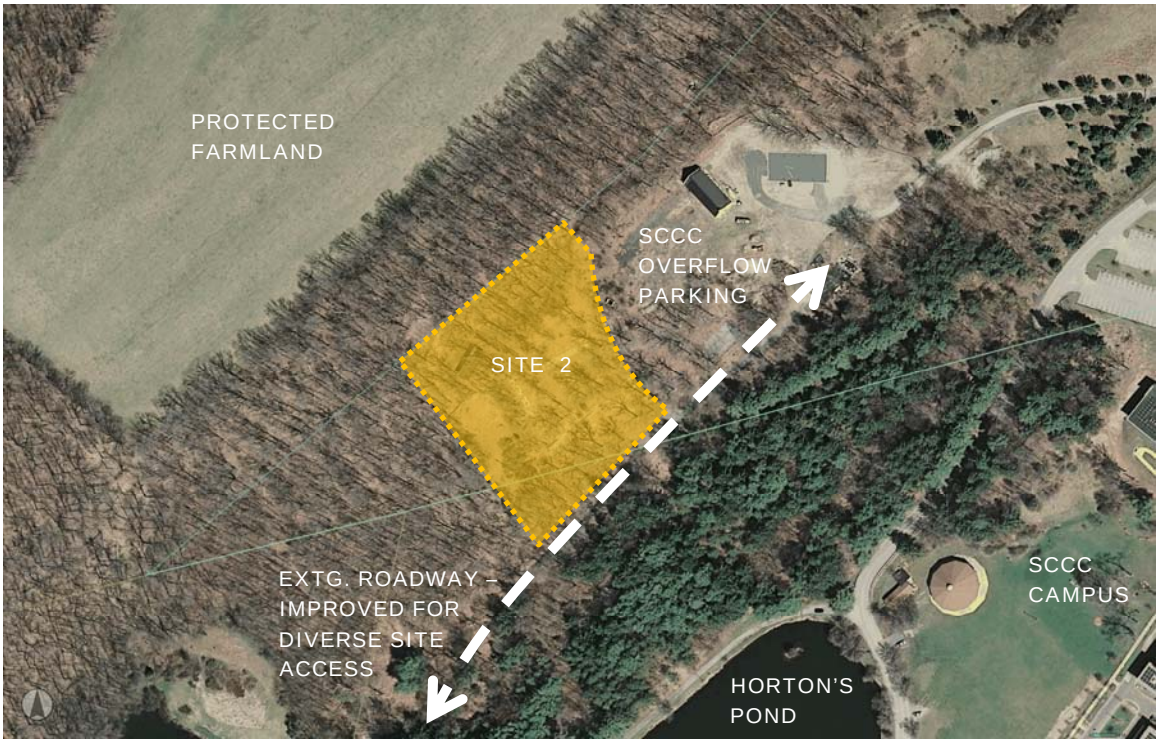

Figure 4: Site 2 - Specific Site Features

Site 3: Wheatsworth Road Property, Hardyston Township, NJ

General Site Description

This site is part of a property recently purchased by Sussex County. A large two-story structure exists on the site and was originally constructed as a building materials showroom, corporate office, and vehicle bays for materials and vehicles. It is the County's intention to convert this facility to Public Works use for which it is ideally suited. A portion of the site to the southwest, indicated as a separate land parcel, can be devoted to other use and development for the County. This parcel has a frontage of approximately 200 feet along Wheatsworth Road and extends approximately 600 feet into the site away from Wheatsworth Road with an area of approximately three acres. It should be noted that while the front portion of the property is relatively flat, the rear of the property extending approximately 150 to 175 feet out from the rear property line is considered unbuildable due to severe upwardly sloping terrain.

The nearby vicinity is typically residential and open farmland. A larger institutional development exists to the northeastern border of the County property, separated from the subject parcel by the property considered for County Public Works use. The quarry that was originally part of the overall property and situated on the southwest edge of the subject property is understood to remain in private ownership and possibly to be continued as a quarry use.

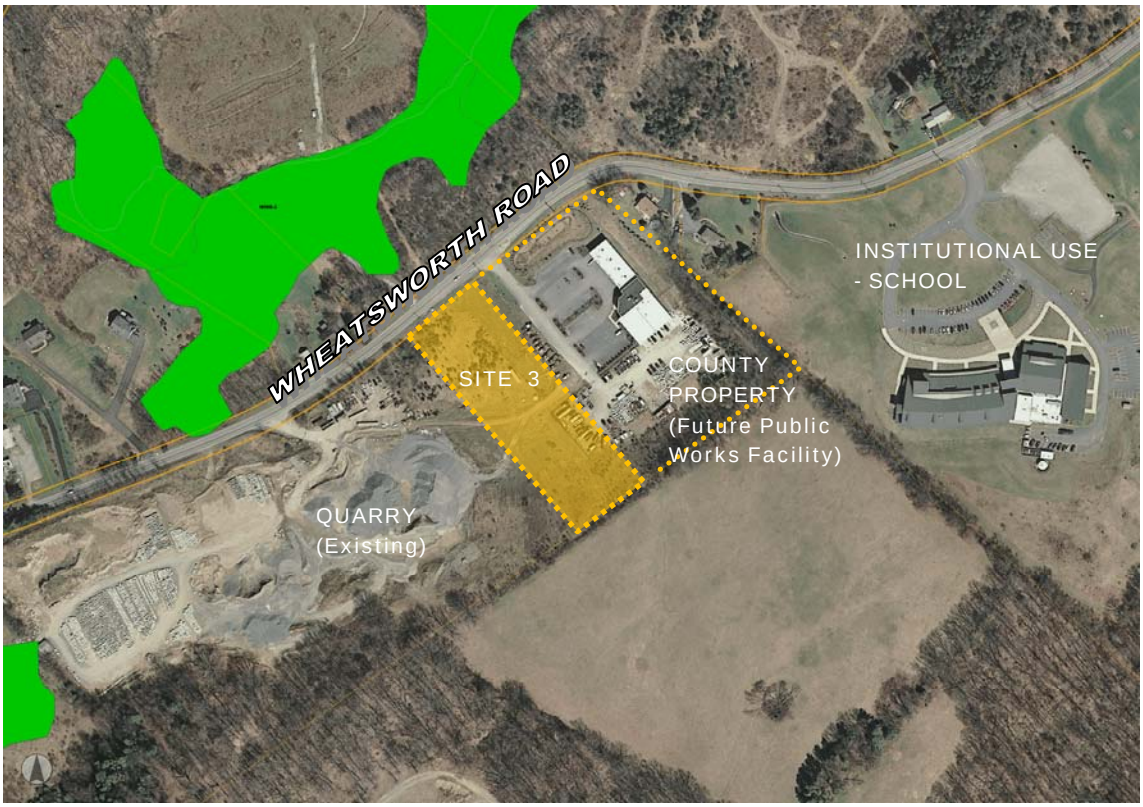

Figure 5: Site 3 - Wheatsworth Road Site

Initial review of the site suggests that it is too restrictive in size and configuration to accommodate a public safety facility of the size contemplated by the County. Certain key factors and planning practices essential to the development of a secure PSAP are compromised due to the narrow north-south width of the site (approximately 200 feet). It is anticipated that the facility as ideally planned would be seventy-five feet in width to best accommodate the core areas as well as office and technical spaces that typically cluster around operations floors. This coupled with the standard practice of establishing security stand-offs from public access areas and site security zoning best accomplished by placing the building seventy-five to one hundred feet from the closest point of public access.

Programmatic Site Criteria

The Kimball Consolidation Study and initial facility programming indicates the need for up to 12 call taker/dispatch positions based on a 20 year growth projection. The proposed center shall also house administrative, support, and critical equipment spaces necessary for County emergency communications operations. It was also confirmed that an EOC is to be integral to the proposed facility program – this space potentially also addressing conference and training needs for the center. On this basis, a building size ranging from 11,000-13,300 SF is assumed for purposes of preliminary site evaluation. Additionally, a future 4,000 SF building and exterior service space accommodating Emergency Management equipment and vehicles was considered.

A conceptual building plan was thus developed based on the above and the assumption of a sloped site suitable for a two-level planning approach. Sussex County stakeholders expressed a strong desire to place the emergency communications center on the lower level of the facility with the EOC positioned on the upper level with an overlook to the communications floor.

Layouts were accordingly developed and served as the basis for the conceptual site planning for both candidate sites 1 and 2.

The attached Building Facilities Program (Attachment 1) provides a detailed tabulation of the list of spaces, assigned square footages for each space, and preliminary comment regarding specific needs for each space.

Site features to be considered include:

- Parking proportionate to building size, internal function, and zoning requirement
- Vehicular service and delivery needs
- Establishment of security perimeter and zoning
- Potential force protections and stand-off dimensions for public access points
- Buffer and setback requirements as set by Newton Township Zoning Regulations or authority having jurisdiction
- Adequate space for possible location of a communications tower (initially assumed to be approximately 125 – 140 FT height) and associated fall zone
- Possible facility expansion capabilities for both building functions and proportionate site features and infrastructure to support future expansion

Attachments 2.a and 2.b illustrate conceptual floor plans for the two-level facility and serve to test the Building Facilities Program both for arrangement/adjacencies of programmed spaces as well as aggregate square footage required for the overall building configuration.

Attachments 3 and 4 provide conceptual site and facility planning layouts for development of candidate site 1 and 2 for the proposed PSAP facility. These documents provide a study in the:

- Incorporation of site security zoning
- Definition of secure perimeters and incorporation of force protections
- Development of functional facility plans based on Sussex County needs, testing the newly generated facilities program, and potential desired adjacencies within the new facility

Recommendations

In consideration of the preceding site evaluations and based on the initial level of research and understanding of each candidate site, it is this consultant's assessment that both Site 1 – County JDC and Site 2 – SCCC Campus offer potentially secure, viable sites for development of the new Consolidated PSAP.

Of the two sites, Site 1 – County JDC site is considered the best candidate site given the following factors:

1. Relative ease of site access and lack of gradient required to climb as is present at the SCCC site.
2. Proximity to other Sussex County facilities and potential mutual benefit and focus of resources for the County.
3. Infrastructure connections and cost of possible upgrades is considered to be more quantifiable and controllable with the JDC site. The length of feeders and the conditions that may be encountered with the SCCC site present cost indeterminants that may be significant to the overall cost of the project.

As has been previously presented, Site 3 – Wheatsworth Road Property does not provide the necessary land area and security stand-off dimensions required for proper planning of a new consolidated PSAP. This site has been eliminated from further consideration.

Attachments

Attachment 1 – Building Facilities Program, dated 12/18/09
Attachment 2.a – Conceptual Floor Plan, Lower Level
Attachment 2.b – Conceptual Floor Plan, Upper Level
Attachment 3 – Conceptual Site Plan for the Juvenile Detention Center Site
Attachment 4 – Conceptual Site Plan for the Sussex County Community College Site
Attachment 5 – Preliminary Project Cost Analysis Matrix, dated 01/22/10

ATTACHMENT 1

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Estimated Space Requirements County-wide 9-1-1 Emergency Communications Center, Sussex County, NJ

	9-1-1 Emergency Communication Center Building Facilities Program December 2009 Program Development	Date: 12/23/2009 1/12/2010 rev. a						
Ref. #	Space Description	# of Spaces / Occupants		*Type of Space (See *types below)	Unit Sq. Ft.	Total Sq. Ft.	Remarks	Adjacencies
		5-Year	20-Year					(by Ref. #)
100	**Building Administration**							
	Executive / Administrative							
101	Public Safety Director		1	PO1	225	225	Director Level	
102	Deputy Public Safety Director		0	PO2	195	0	Director Level	
103	Administrative Assistant		1	WS1	95	95		
104	HR Coordinator		0	WS1	95	0		
	Emergency Communications							
105	Training QA/QC Coordinator		1	PO3	135	135	Supervisor Level	
106	Training Assistant(s)		0	WS2	75	0		
107	Chief Telecommunicator (ECC Operations)		1	PO3	135	135	Manager Level	
108	ECC Technology Manager		1	WS1	95	95	Manager Level	
109	QA/QC Manager (fire, police, & EMS)		0	PO3	135	0	Coordinator Level & Accreditation Mgr	
110	QA/QC Coordinator (fire, police, & EMS)		0	WS1	95	0	Coordinator Level	
111	TAC Officer		1	WS1	95	95	Coordinator Level	
112	ECC NCIC Operations - Technicians		0	WS1	95	0	Coordinator Level	
113	ECC Technicians: GIS/ALI/Radio/CAD/MDT/AVL		0	WS1	95	0		
114	Contractor Work Stations		2	WS2	75	150	Supports NCIC report filing	
	Emergency Management							
115	Emergency Management Director		1	PO1	225	225	Adjacent to EOC	
116	Deputy Emergency Management Coordinator		1	PO3	135	135	Adjacent to EOC	
117	Fire Coordinators		2	PO3	135	270	Adjacent to EOC	
118	Administrative Assistant		1	WS1	95	95	Adjacent to EOC	
	Admin Common Area / Support							
119	Administrative Assistant (future)		0	WS1	95	0	Division Head - undedicated	
120	OPS Coordinators		0	WS1	95	0	Administrative Space (Payroll/Staff Scheduling, Finance/Purchasing)	
121	Administrative Equipment/Supplies/Work Room/Copy & Printer		1	WR	150	150		
122	Administrative Conference Room (12 occupants)		12	CF	25	300		
123	Administrative Reception		0	WS1	95	0		
124	Waiting area		1	SO	100	100		
125	Toilet Rooms		0	SO	125	0	Staff all use commoon tiolet/locker facilities	
							Section 100 Subtotal = 2,205 NSF	
200	**CAD/Radio/GIS/ALI Work Area**							
201	GIS/Plotting/Printing/File Storage/Work Area		1	WR	150	150	In or adjacent to EOC	
202	Radio Systems Supervisor		0	WS1	95	0	See item 113	
203	MDT/Radio Service Technician Workroom		0	WR	150	0		
204	Technician's Bench space (separate Workroom)		1	WR	100	100	IT bench space within Comm Equip. Rm	
							Section 200 Subtotal = 250 NSF	
300	**County IT**							
301	IT Officer Space		0	PO3	135	0		
302	IT Work Stations		2	WS2	75	150		
							Section 300 Subtotal = 150 NSF	

Estimated Space Requirements County-wide 9-1-1 Emergency Communications Center, Sussex County, NJ

Ref. #	Space Description	# of Spaces / Occupants		*Type of Space (See *types below)	Unit Sq. Ft.	Total Sq. Ft.	Remarks	Adjacencies
		5-Year	20-Year					(by Ref. #)
400	**Training Area**							
401	Staff Offices		0	WS1	95	0	See Administrative	
402	Meeting/Public Room/Training & Media Briefing		0	TR	25	0	16 occupants (accommodate media feed requirements) -Equip for potential use as call center (Recovery, NJOEM/FEMA)	
403	Training supplies		1	WR	150	150	Literature & Props storage (may be shared with other stoage - Multi-purpose)	
404	Vending area		0	SO	50	0		
405	Copy/Work Room/Office Supplies		0	WR	125	0		
							Section 400 Subtotal = 150 NSF	
500	**Emergency Operations Center - EOC**							
501	EOC Operations Floor		15	EOC	45	675		
502	Command/Control Pod		2	EOC	45	90	Located to rear of EOC - adjacency to EOC Dispatch & Situation Room (elevated)	
503	Situation Room		12	CF	25	300	20 occupants plus 6 support positions	
504	RACES		2	CF	25	50		
507	LEPC/Files		0	SO	125	0	Utilize Web-based information	
508	Rumor Control / Citizens Information Room		0	CF	400	0		
509	A/V Control		1	ER	150	150		
510	Library/Reference		0	SO	140	0		
511	EOC Equipment Room		1	ER	125	125	Laptop, telephone, furniture storage	
512	Copier/Work Areas		1	WR	125	125	Share with ECC	
513	Closets/Coats/Storage		1	SO	100	100		
							Section 500 Subtotal = 1,615 NSF	
600	**Emergency Comm. Center (ECC)**							
601	Supervisor Work/Office Area		4	WS2	45	180	Small carrel-type workstations and specific personnel file storage for full load of Supervisors (3).	
602	Supervisor Consoles		2	OPS	150	300	ECC/Elevated consoles: 18"	
603	Call-takers/Dispatchers		10	OPS	150	1500	Universal Call-taker/dispatch positions	
604	Future CT/Dispatch		0	OPS	150	0	Included in above.	
605	NCIC/Database Position		0	OPS	150	0	Combined with positions above	
606	NCIC File Storage		0	SO	75	0	Contiguous w/ Comm. Floor	
607	Systems Training Consoles		1	OPS	150	150		
608	QA Supervisor		0	WS1	95	0	Included in Administrative	
609	Ready (Shift-Change) Room		0	SO	12	0		
610	Quiet Room		1	SO	125	125		
611	Storage/Supplies		1	SO	40	40		
612	Printer/Fax Areas/File/Copier		0	SO	125	0		
							Section 600 Subtotal = 2,295 NSF	
700	**Common Areas / Front of the House**							
701	Lobby/Waiting		0	SO	125	0		
702	Public Toilet Rooms		2	SO	150	300		
703	Reception/Security Room		0	WS2	75	0		
704	Coat Room		1	SO	50	50		
705	Storage		0	SO	200	0		
							Section 700 Subtotal = 350 NSF	

Estimated Space Requirements County-wide 9-1-1 Emergency Communications Center, Sussex County, NJ

Ref. #	Space Description	# of Spaces / Occupants		*Type of Space (See *types below)	Unit Sq. Ft.	Total Sq. Ft.	Remarks	Adjacencies
		5-Year	20-Year					(by Ref. #)
800	**Common Support Area-Back of House**							
801	Fire Resistive Storage		0	SO	200	0		
802	Loading/Staging Areas/Trash Handling		1	SO	150	150		
804	Break/Lunch Room		12	SO	20	240	Close proximity to ECC floor	
806	Kitchen/Vending		1	SO	140	140		
807	Kitchen Storage (pantry)		1	SO	60	60		
808	Bulk Food/Water/Supply Closet		1	SO	100	100		
809	Staff Mail & Intra-agency communication		1	SO	100	100	Near Secure staff entry & Break-Area	
810	Women Locker/Shower Room/Toilet		1	SO	300	300	40 2-tier lockers - 12" wideLockers in hallway separate from Tlt-shwr	
811	Men Locker/Shower Room/Toilet		1	SO	300	300	40 2-tier lockers - 12" wideLockers in hallway separate from Tlt-shwr	
812	Women Sleeping Areas		0	SO	0	0	occurs in Conf. or Exercise Rooms	
813	Men's Sleeping Areas		0	SO	0	0	occurs in Conf. or Exercise Rooms	
814	Bunk Storage		1	SO	65	65		
815	Multi-Purpose Room		0	TR	25	0		
816	Storage/Janitor Closet		2	SO	75	150	One smaller on 'Public' Side / One on 'Secure' side	
817	Maintenance/Building Storage		1	WR	100	100		
818	Exercise Room		0	SO	200	0		
							Section 800 Subtotal = 1,705 NSF	
900	**Equipment Rooms**							
901	Systems Equipment Room		1	ER	350	300	Radio/Logger/MDT Equip Room/CAD/Telco	
902	Radio Tech Work Repair Room		1	ER	125	125	See Information/Tech Area	
903	Telephony - ALI Equip. Rm		1	ER	200	150		
904	Server Rm (County IT Svrs/E911 Svrs/Admin Svrs)		1	ER	350	300	County IT - TBD	
905	Admin. Server Equip. Rm		0	ER	100	0	See Item 904 - Server Rm	
906	Vendor Work Station		0	ER	75	0	Within Equipment Rooms	
907	Electrical/Main Power Distribution		1	MECH	200	200		
908	Secondary Elect/Data Room		1	MECH	100	100		
909	UPS Room		1	MECH	150	150		
910	Emergency Generator(s)		0	MECH	180	0	Yard-mounted in secure location adjacent to Mechanical Room	
911	Electric/Telco Closets (remote)		0	MECH	80	0		
912	Telco Equipment Rooms (demarc)		1	ER	125	125		
913	Mech. Equipment Room		1	MECH	600	400		
914	Fire Suppression Room		1	MECH	120	120		
							Section 900 Subtotal = 1,970 NSF	
1000	**Garage Areas (See Next Page)**							
	Building Sub-Total					10,690	NSF	
	Building Efficiency Factor (NSF to GSF)		30%			3,207		
	Total Building in Sq. Ft. (GSF)					**13,897**	**GSF**	

NOTES

Estimated Space Requirements County-wide 9-1-1 Emergency Communications Center, Sussex County, NJ

Ref. #	Space Description	# of Spaces / Occupants		*Type of Space (See *types below)	Unit Sq. Ft.	Total Sq. Ft.	Remarks	Adjacencies
		5-Year	20-Year					(by Ref. #)

*Space Type Designations:		Recommended area (SF) - Room or Occupant area
PO1	-Private Office - Director Level	225
PO2	-Private Office - Division Level	195
PO3	-Private Office - Manager Level	135
WS1	-Work Station - Coordinator station	95
WS2	-Work Station	75
OPS	-Operations Floor (utilizes raised floor and/or cable raceways and systems-type furniture)	150
EOC	-Position space allocation	45
SO	-Shared Office or Common Area	
WR	-Work Room (shelves and work counter)	
TR	-Training Room (set-up for classroom or hands-on training)	25
CF	-Conference Room (equipped with audio-visual systems & possible technology links to Emergency information systems)	25
SA	-Systems Area (may utilize raised floor and/or cable raceways and systems-type furniture)	
ER	-Equipment Room (R-56 compliant/utilizes raised floor and/or cable raceways and systems-type furniture)	
MECH	-Mechanical Areas housing HVAC, Electrical, Life-safety infrastructure	
GA	-Equipment bay or garage with outside exhaust vents and liquid drainage	350

Departmental Square Footage Breakdown

Net ECC Area		3305 NSF
Bldg. Efficiency Factor (NSF to GSF)	30%	992 SF
Gross ECC Area		**4297 GSF**
Net OEM Area		2340 NSF
Bldg. Efficiency Factor (NSF to GSF)	30%	702 SF
Gross OEM Area		**3042 GSF**
Net County IT Area		150 NSF
Bldg. Efficiency Factor (NSF to GSF)	30%	45 SF
Gross County IT Area		**195 GSF**
Net Common Use Area		4895 NSF
Bldg. Efficiency Factor (NSF to GSF)	30%	1469 SF
Gross Common Use Area		**6364 GSF**

ATTACHMENTS 2a and 2b

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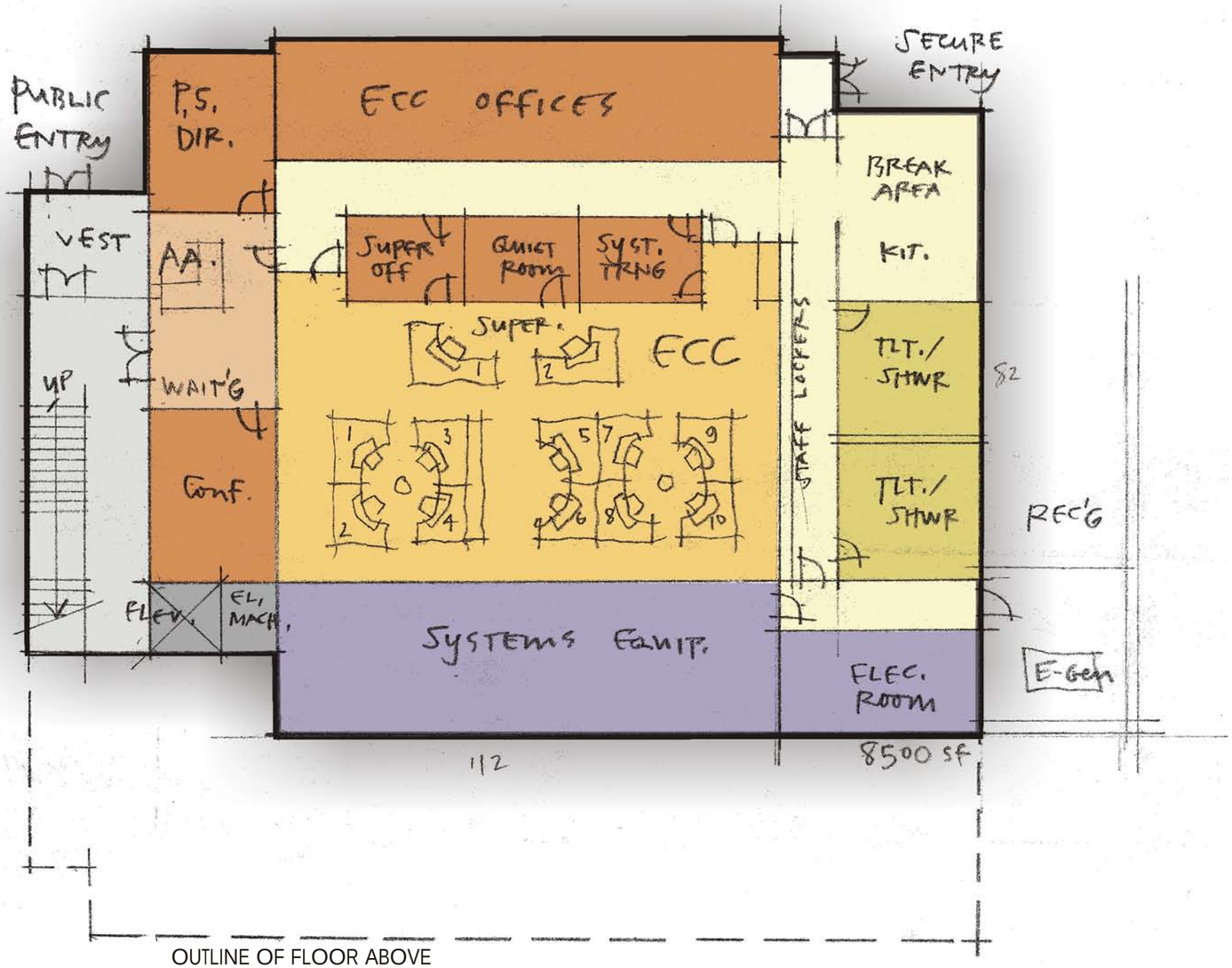
ATTACHMENT 2.a



LOWER LEVEL PLAN

Scale: 1/16"=1'-0"

0' 8' 16' 32' 64'

Area Tabulation

Lower Level:	*8,500 GSF*
Upper Level:	*4,800 GSF*
Total Area:	*13,300 GSF*

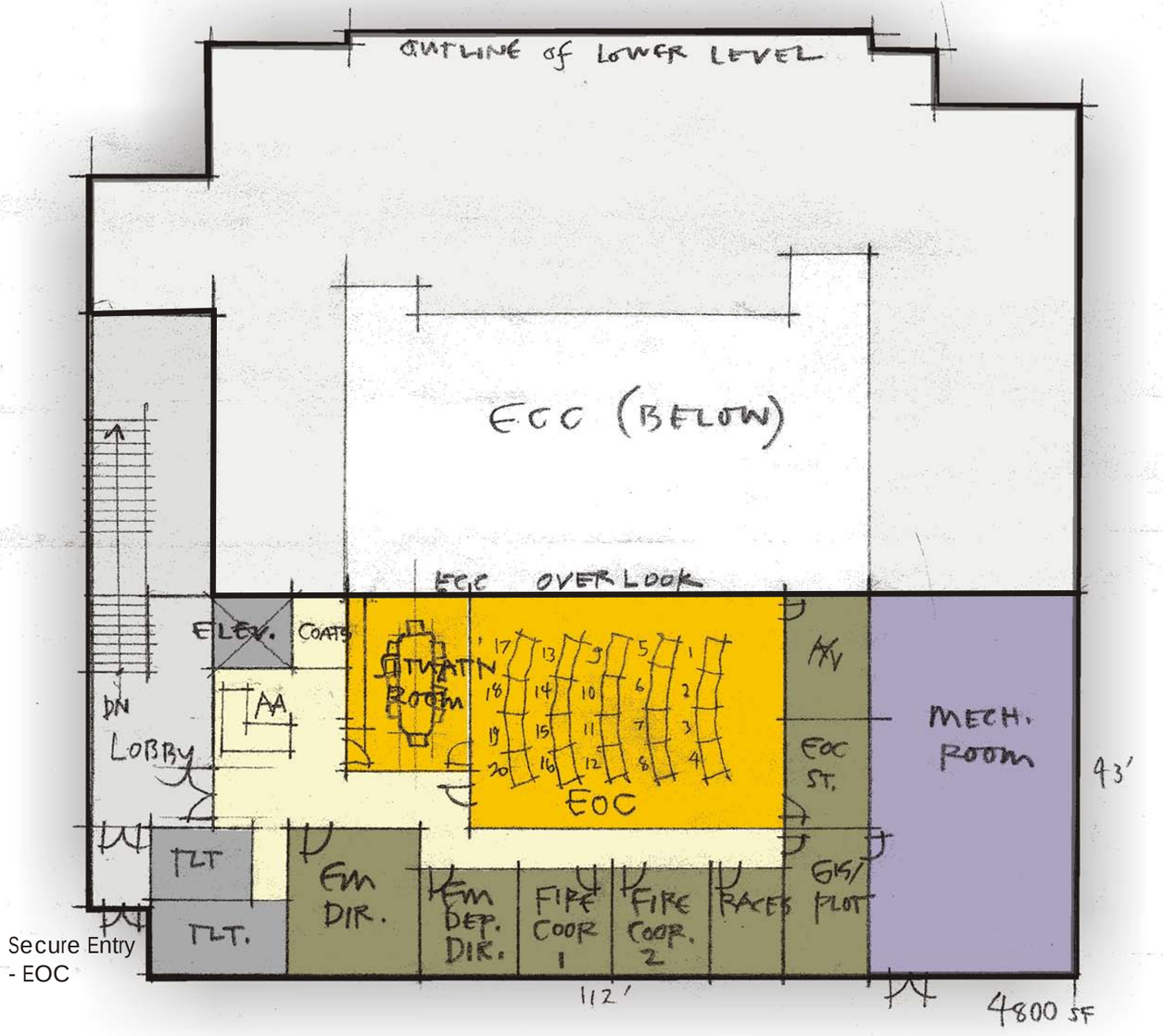
Concept Floor Plan

Consolidated Communications & Emergency Operations Center

January 21, 2010

L. Robert Kimball & Associates

jacobswyper ARCHITECTS, LLP



UPPER LEVEL PLAN

Scale: 1/16”=1’-0”

0’ 8’ 16’ 32’ 64’

Concept Floor Plan

Consolidated Communications & Emergency Operations Center

January 21, 2010

L. Robert Kimball & Associates

jacobswyper ARCHITECTS, LLP

ATTACHMENT 3

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Sketch Site Plan No. 2 – County Juvenile Detention Center Location

Consolidated Communications & Emergency Operations Center

January 21, 2010

L. Robert Kimball & Associates

jacobswyper ARCHITECTS, LLP

ATTACHMENT 4

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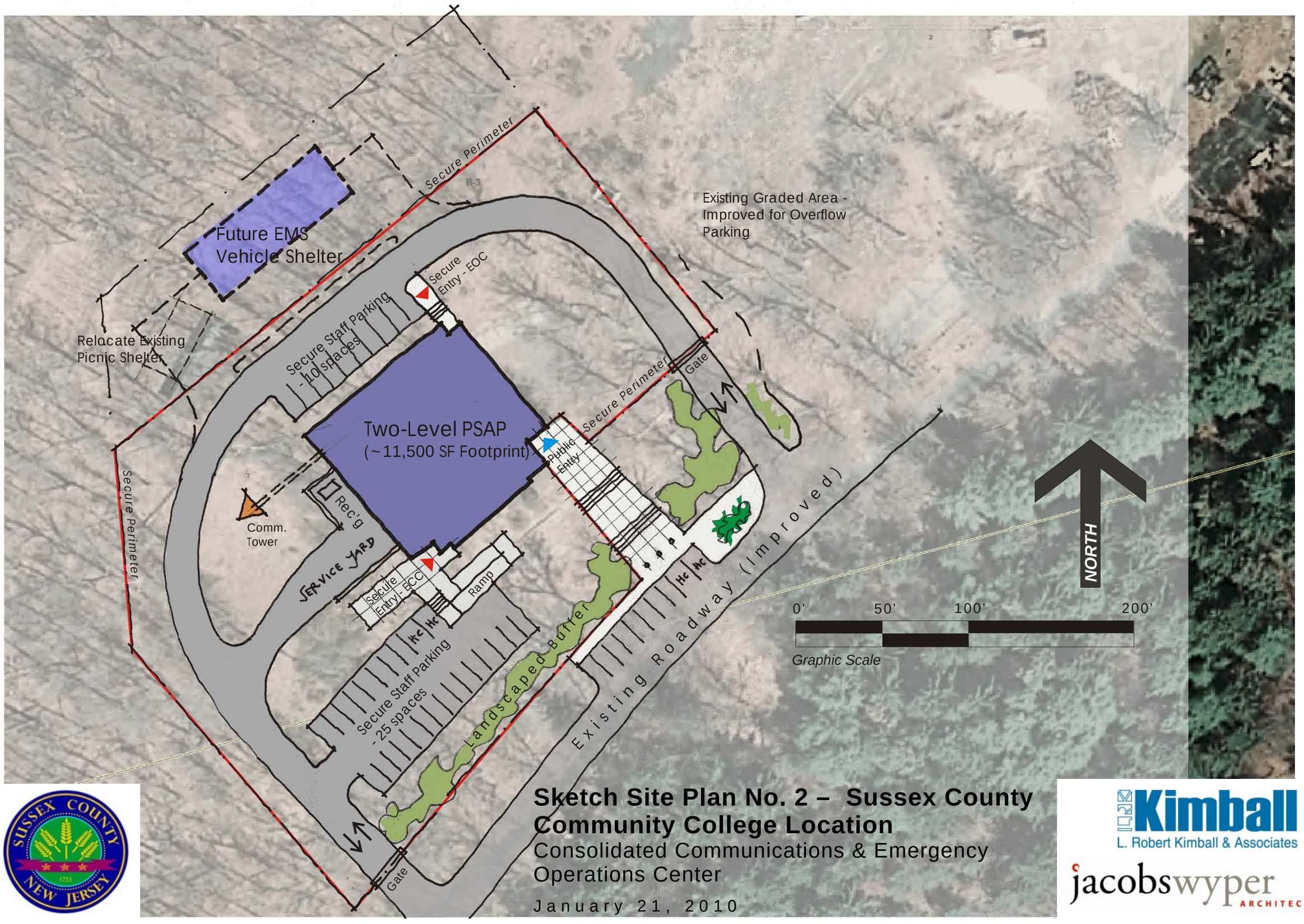

Sketch Site Plan No. 2 – Sussex County Community College Location

Consolidated Communications & Emergency Operations Center

January 21, 2010

L. Robert Kimball & Associates

jacobswyper ARCHITECTS, LLP

ATTACHMENT 5

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Sussex County, NJ

Consolidated County-Wide Communications & EOC Facility
Concept Design Study

PRELIMINARY PROJECT COST ANALYSIS

Date: 23-Dec-09
Revised: 22-Jan-10

Project Phase: Programming/Project Initiation

COST PHASE - CONSTRUCTION		project area			
1.	New Construction - ECC / EOC	13,300 GSF @ $410/SF	$ 5,453,000		
	-Inclusive of Site Preparation, Interior wiring pathways, emergency generator, UPS, Building Security Systems				
2.	Contingency @	10%	$ 545,300		
3.	Escalation to Mid-Point of Construction (14 Months) @	3% per annum	$ 209,941		
4.	**Total Construction Cost Estimate**			**$**	**6,208,241**
COST PHASE - DESIGN					
5.	A/E Consultant Design Fee	Allowance @ 9.0%	$ 620,824		
6.	Telecomm. Consultant Design Fee		$ -		
7.	Geotechnical Investigation		$ 25,000		
8.	Land Survey Services		$ 10,000		
9.	Inspection / Testing Services		$ 25,000		
10.	Land Development Approvals		$ 20,000		
11.	Clerk of the Works - County	0%	$ -		
12.	Other (Specify) _____		-		
13.	**Total Design Services**			**$**	**700,824**
COST PHASE - PERMITS					
14.	County Conservation District		$ -		
15.	Building Permit		$ -		
16.	NJDot Permits		$ -		
17.	Water Service / Sanitary Service		$ -		
18.	FAA Aproval		$ -		
19.	DEP Permit		$ -		
20.	**Total Permitting**			**$**	**-**
COST PHASE - TELECOMMUNICATIONS					
21.	Radio Connectivity & Infrastructure (Microwave) Improvements		$ -		
22.	Dispatch Furniture ECC		$ -		
23.	911 Customer Premise Equipment		$ -		
24.	Telephone / PBX		$ -		
25.	CAD system		$ -		
26.	Logger-Recorder		$ -		
27.	EOC Furniture/Equipment		$ -		
28.	Radio Console Electronics		$ -		
29.	Audiovisual (allowance)		$ -		
30.	Misc. Support Systems/Services		$ -		
31.	Tower		$ -		
32.	Subtotal	(Reference Technology Cost Analysis for Detail)	$ 3,565,000		
33.	General Contingency @	5%	$ 178,250		
34.	Escalation to Mid-Point of Construction (14 Months) @	3% per annum	$ 131,014		
34.	**Total Telecommunications**			**$**	**3,874,264**
COST PHASE - OTHER COSTS					
35.	Furniture (not including console furniture)	@ 3% of Constr. Cost	$ 186,247		
36.	Site Infrastructure Contingency (allowance)		$ 100,000		
37.	**Total Other Costs**			**$**	**286,247**
38.	**Current Working Estimate**			**$**	**11,069,576**