



City of Fayetteville & Cumberland County, NC Emergency Communication Center Programming and Planning Study

Prepared for:

**City of Fayetteville
Administrative Complex
433 Hay Street
Fayetteville, NC 28301**

**Cumberland County
County Courthouse
117 Dick Street
Fayetteville, NC 28301**

March 4, 2016



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EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

INTRODUCTION

Mission Critical Partners, Inc. (MCP) with SCHRADERGROUP architecture (SGA) was contracted by The City of Fayetteville/ Cumberland County Team to conduct a comprehensive analysis and evaluation of the objectives identified below. The summary of each of these objectives and related issues are considered the essence of the project scope.

- Conduct a thorough programming effort to determine future space needs
- Conduct a threat assessment to evaluate different sites and the feasibility of use for a new Emergency Communication Center
- Develop a systems narrative to describe proposed building systems
- Develop a concept floor plan and site plan for each of the proposed sites
- Develop a set of conceptual budgets from those design concepts and site test fits

MCP/SGA met with The City of Fayetteville/ Cumberland County Team to understand the needs of the organization in November of 2015. This kick-off meeting and programming workshop focused on understanding the proposed operations of the co-located organizations and how those operations might translate into a new facility. The team then visited the various sites identified in this study. Extensive conversation occurred focusing on the feasibility of each site for the proposed use. A preliminary Threat and Vulnerability discussion was then held from which the Threat Assessment portion of this document is derived.

The diagrams in this study attempt to provide some form to the programming effort undertaken in November in order to test the program on the sites presented. The balance of this document supports the overall programming effort undertaken by the team in November.

BUILDING DESIGN PHILOSOPHY

The proposed building construction will be developed to house the functions of the combined City of Fayetteville Communication Agency, The Cumberland County Communication Agency as well as the County Emergency Management Agency. The City Data Disaster Recovery program was also included the overall building program. Following extended conversation the team also allotted area in an ancillary building for the storage of EMA vehicles and equipment.

Since the facility will house the Co-located Communications Center, the Emergency Operations Center and the City Data Disaster Recovery elements, the building must provide for all disaster related operations. Disaster related operations are defined as periods of natural and civil disaster where normal building access and services may be temporarily disrupted.

Construction should:

- Consider the most economical solution to the proposed construction project
- Consider cost effectiveness of operations when evaluating capital expenditures
- Consider near and long term environmental impact when evaluating capital expenditures
- Provide the space required to adequately deliver Public Safety Services to the Region
- Provide appropriate levels of sustainability and survivability to maintain the critical operations of the facility
- Provide an ergonomically appropriate facility that considers the extended periods of use by personnel

The balance of this Section provide a brief summary of each of the Sections included in this overall document.

CONCLUSIONS

Program Summary

The programming information will be used as the basis for locating these functions within the concept plan developed later in this document. What is included in this section are all of the building elements anticipated for the proposed facility. The Concept Design identified in Section 5 of this document and the Concept Budgets described in Section 6 of this document reflect the building program outlined here.

Following the programming workshop a program document was developed. Ultimately the program document (provided beginning on page 2-3) breaks the facility into 7 major components. In addition, the programming sessions identified the need for a separate EMA Vehicle Storage facility on the site (as previously described). The gross square footage program for the facility is as follows:

Administrative Offices	7,830 s.f.
Emergency Communication Center	5,313 s.f.
Training	751 s.f.
Emergency Operations Center	3,457 s.f.
Media Relations	1,101 s.f.
Technology Spaces	4,771 s.f.
Common Spaces	6,291 s.f.
Subtotal (Main Building)	29,514 Net Square Feet
Net to Gross Conversion	2,951 s.f.
TOTAL MAIN BUILDING	32,465 Gross Square Feet
EMA Vehicle Storage Building	6,959 Net Square Feet
Net to Gross Conversion	696 s.f.
TOTAL EMA VEHICLE STORAGE BUILDING	7,654 Gross Square Feet
TOTAL BUILDING AREA	40,119 Gross Square Feet

These building components are used in the concept diagrams and budget exercises developed for Section 5 and 6 of this overall study. It should be noted that once this program was test fit into a concept diagram the building areas remained remarkably close to the programmed areas outlined on the pages to follow.

Threat Assessment

This section highlights a Threat Assessment developed for each of the three proposed sites assembled for this Study. These Threat Assessments are performed in general conformance with FEMA 452 Risk Assessment criteria. Topics similar to those identified in the FEMA document are addressed however they are addressed in a format more specific to a site selection process.

Fayetteville-Cumberland County asked the team to assess and propose development on three sites within the County. A fourth site was originally toured and contemplated however after review of the threat assessment and after further overall review of the site, the Owner elected to remove that fourth site from the Study.

Further information is provided for the three remaining sites in Section 5. The three proposed sites are as follows:

SITE 1 - Cedar Creek Business Park

Location encompasses Lot 1 of the Cedar Creek business Park along with adjacent Parcel with mailing address 2736 Cedar Creek Road

SITE 2 - Fields Road Site

Location is Approximately 300 yards from the intersection of Fields Road and Cedar Creek Road and is labeled as Parcel 0445-97-3707

SITE 3 - Tracy Hall Road Site

Location is approximately ¼ mile from the intersection of Tracy Hall Roads, Wilmington Highway and NC HWY 87 S.

The threat assessments developed in this section were developed after the workshop conducted with the City/County team however they are developed using information provided during the Programming Workshop. The Threat Assessments were then forwarded to the Team for review and comment.

To some extent, the majority of threats to the proposed sites for this project are natural forces or weather related incidents. There is always some concern for continuity of operations generated by the nearby military installation. This threat assessment recognizes those concerns and attempts to provide mitigating strategies to counteract them.

Actual remediation efforts for any of the perceived threats are included on the following pages and in Section 4 to follow.

Proposed Systems Narrative

The facility will be required to satisfy typical IBC/ICC/ North Carolina Adopted Version of this Code and all associated Codes. The facility will be required to meet at a minimum all of those requirements.

Beyond those requirements however, there are a separate set of criteria to be utilized in the integration of and selection of building systems. The first criteria indicated under IBC/ICC/North Carolina Code is that the facility will be required to satisfy Essential Facility requirements of the code which increase the seismic criteria and wind loadings among other things. Second, however, a series of additional guidelines come into play to help develop the ultimate systems to be utilized in the facility.

This facility must continue operations even under the most adverse conditions (ie: last operational building). To accomplish this, the design team will need to incorporate site features, architectural features, and structural design that will allow the facility to maintain its physical integrity under extreme conditions. The building must also be designed to include sufficient redundancy to ensure continuity of operations in case of equipment failure or during maintenance periods. Backup power must be scaled to provide sufficient power for mission critical spaces and equipment for extended periods of time.

The balance of this section identifies those specific criteria that should be utilized to allow the facility to serve as a PSAP/ EOC/ City Data Disaster Recovery Facility.

Concept Diagram Summary

The focus of this entire study was to develop a program specifically for City of Fayetteville/ Cumberland County's proposed Emergency Communication Center and then to test it in several ways to determine the best future for the co-located organizations' facility use. The planning team was tasked with developing a concept diagram reflecting the programming effort outlined in Section 2 of this document and then to test the concept diagram on several sites.

The proposed programs for the site are as follows:

- Site #1** - **Cedar Creek Business Center Site** – On this site, the Owner has requested that the design team test-fit the Emergency Communication Center program only
- Site #2** - **Fields Road Site** – On this site the Owner has requested that the planning team test fit the Emergency Communication Center program along with a Proposed Fire Station. The combined facility attempts to merge shared site elements between these two programs together. It also attempts to link the two buildings. This is described further in the Site Analysis options on the pages to follow.
- Site #3** - **Tracy Hall Road Site** - On this site, the Owner has requested that the design team test-fit the Emergency Communication Center program only

All site configurations are further investigated for cost in Section 6 of this document.

This Section begins with the analysis of the three construction sites identified by City of Fayetteville/ Cumberland County. The planning team has develop a simplified site analysis for use in this document. Note that much of the analysis of the proposed sites is based upon conversation held during the Workshop in November 2015 and from follow-up data provided by City personnel.

Overall, this section provides the following information:

- A brief analysis of Site Location #1
- A brief analysis of Site Location #2
- A brief analysis of Site Location #3
- Concept Floor Plan
- Site Concept Plan - Location #1
- Site Concept Plan – Location #2 (note that both Concept #2A and #2B are shown as one diagram. The reader will need to extrapolate the emergency communucaiotn center program elements for the drawing to understand the plans used for estimating in Section 6)
- Site Concept Plan – Location #3

Budget Estimate Summary

For the costs identified in this Section, MCP/SGA utilized historic square foot cost data and developed a complete estimate that correlates to the concept diagrams and site diagrams provided in Section 5. Local construction costs, escalation, general site information and knowledge of current construction pricing of communication facilities are included as much as we can anticipate them in the estimates shown on the following pages. The costs included are for budgeting purposes only as no final design has

been derived at this time but we obviously had the benefit of the concept diagrams to work from. Escalation is included to a hypothetical midpoint of construction at a total of 4.00% annually (8% total) in the estimates to follow.

The team attempted to include as many of the items discussed in the Workshop Session and in the Systems Narrative described in other sections of this document. Note that all costs described in this document and all associated systems are considered to be part of this conceptual budget.

The estimates included herein are line item conceptual budget estimates and are broken down to depict several of the types of project costs. The types of cost areas are described below:

Overall Budget Description

The overall budget includes the following:

- **CONSTRUCTION BUDGET** – Includes anticipated construction costs broken down to support the program area. HVAC systems will be one of the greatest variables depending upon what type of HVAC system is proposed. The other major cost variable will be for the Electrical Systems.
- **DESIGN COSTS** – Includes anticipated project design costs including the testing services normally anticipated for a project of this type.
- **PERMIT COSTS** – Includes anticipated permit costs for a project of a similar nature. The value of these permits will not truly be known until the project design process is underway.
- **TECHNOLOGY SYSTEMS** – The consulting team has included telecommunication technology from the MCP equipment cost estimate and equipment as we understand it at this time. As the project evolves there may be further development that modifies the technology needs.
- **OTHER COSTS** – includes other anticipated costs that the design team has experienced on other projects of a similar nature. This is also the area of the estimate which contains a Fire Equipment Allowance for Option #2B.
- **CONTINGENCY** – Readers will note a 10% project contingency which is common at this stage of the project.

Obviously no programming phase budget can anticipate all of the project costs that may arise during a design and construction process however the MCP/SGA team's knowledge of this project type provides significant insight into the various project costs typically experienced. The hope is that these budgets provide a good foundation from which the City/County Team can begin their decision making process.

Overall Summary

The Planning Team has been privileged to work with The City of Fayetteville/ Cumberland County Team on this Study. The concern for continuing the level of service to the Citizens of the Cumberland County Region into the future was evident throughout the process. We look forward to an opportunity to further develop this project at the Owner's convenience.

Mission Critical Partners | SCHRADERGROUP
design | planning | programming

PROGRAMMING STUDY

2

PROGRAMMING STUDY

INTRODUCTION

The MCP/SGA design team worked with a team composed of representatives from The City of Fayetteville and The County of Cumberland, NC in November of 2015 to develop preliminary space programs for a conceptual facility. The goal was to determine anticipated future space needs for the proposed Emergency Communication Center. Once facility needs were derived and future programs were established, the design team developed the proposed overall building areas required for each of the functions. The results of the programming study are included on the following pages.

The programming information will be used as the basis for locating these functions within the concept plan developed later in this document. What follows in this section are all of the building elements anticipated for the proposed facility. The Concept Design identified in Section 5 of this document and the Concept Budgets described in Section 6 of this document reflect the building program outlined here.

SPACE STANDARDS

The entire program study uses Space Standards agreed to with the planning team at the meeting in November. The standards utilized are as follows:

<u>PERSONNEL TITLE</u>	<u>STANDARD S.F.</u>
Manager/Director Office	250 s.f.
Assistant Manager/ Director	200 s.f.
Private/ Manager Office	150 s.f.
Private Office	120 s.f.
Supervisor Workstation	96 s.f.
Telecommunicator Position	64 s.f.
Conference/Training	20 s.f. per person

The programming worksheet then utilizes a net to gross square footage conversion for each workstation or office type. Typically our worksheet will show a 75% NSF to GSF conversion for workstation spaces and a 30% NSF to GSF conversion for office spaces. Various other spaces receive other conversion factors. This tallies into a total GSF for each of the parts of the facility and then a total building NSF to GSF allocation of 10% is applied to cover exterior walls and other utility spaces.

PROGRAM

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EMERGENCY COMMUNICATION CENTER PROGRAM SUMMARY

		NSF	Grossing Factor	GSF	Total
1.0	ADMINISTRATIVE OFFICES	5822	35 %	2008	7830
2.0	EMERGENCY COMMUNICATION CENTER	3348	35 %	1965	5313
3.0	TRAINING	524	33 %	227	751
4.0	EMERGENCY OPERATIONS CENTER	2348	39 %	1109	3457
5.0	MEDIA RELATIONS	794	42 %	307	1101
6.0	TECHNOLOGY SPACES	3430	62 %	1341	4771
7.0	COMMONS	5020	26 %	1271	6291
	Subtotal	21286	39 %	8228	29514
	Building GSF @ 10%			2951	
	TOTAL BUILDING	21286		11179	32465
8.0	EMA VEHICLE STORAGE	6310	18 %	649	6959
	Subtotal	6310	18 %	649	6959
	Building GSF @ 10%			696	
	TOTAL STORAGE FACILITY	6310		1344	7654
	GRAND TOTAL COMPLEX	27596		12523	40119

		Space Code	Area/ Unit	Proposed # Units	NSF	Grossing Factor		GSF	Total	Comments
1.0	ADMINISTRATIVE OFFICES									
1.1	City Communications Administration									
1.1.1	Manager/Director	CO	250	1	250	30 %		75	325	
1.1.2	Assistant Manager/ Director	CO	200	1	200	30 %		60	260	
1.1.3	Training Supervisor	CO	150	1	150	30 %		45	195	
1.1.4	Training Specialist	WS	96	2	192	50 %		96	288	
1.1.5	QA Specialist	CO	150	1	150	30 %		45	195	
1.1.6	QA Technician	SO	96	2	192	30 %		58	250	Shared space with County QA
1.1.7	Financial Analyst	CO	150	1	150	30 %		45	195	
1.1.8	9-1-1 Coordinator	CO	150	1	150	30 %		45	195	
1.1.9	Clerical/Reception (Shared with County)	WS	96	1	96	50 %		48	144	
1.1.10	Future Office Space	CO	150	1	150	30 %		45	195	
1.1.11	Conference		20	16	370	30 %		111	481	
1.1.12	Waiting - Reception		15	4	60	30 %		18	78	
1.1.13	Storage		100	1	100	25 %		25	125	
1.1.14	Work/ Copy / File Area		120	1	120	25 %		30	150	
				Subtotal	2330	32 %		746	3076	
1.2	County Communications Administration									
1.2.1	Director EM and Comm and Fire Marshall	CO	250	1	250	30 %		75	325	
1.2.2	Telecomm Manager	CO	150	1	150	30 %		45	195	
1.2.3	CTO (Certified Training Officer)	SO	96	2	192	50 %		96	288	
1.2.4	Assistant Telecomm Manager	WS	96	1	96	50 %		48	144	
1.2.5	QA/ 9-1-1 Specialist	CO	150	1	150	30 %		45	195	
1.2.6	QA Technicians	SO	96	2	192	50 %		96	288	Shared space with City QA
1.2.7	Financial Analyst	CO	150	1	150	30 %		45	195	
1.2.8	Administrative Coordinators	SO	96	2	192	50 %		96	288	
1.2.9	Assistant Administrative Coordinator	WS	96	1	96	50 %		48	144	
1.2.10	Telecomm Communication Manager	CO	150	2	300	30 %		90	390	
1.2.11	Conference		20	10	250	30 %		75	325	
1.2.12	Waiting - Reception		15	4	60	30 %		18	78	
1.2.13	Storage		100	1	100	25 %		25	125	
1.2.14	Work/ Copy / File Area		120	1	120	25 %		30	150	
				Subtotal	2298	36 %		832	3130	

		Space Code	Area/ Unit	Proposed # Units	NSF	Grossing Factor		GSF	Total	Comments
1.3	County EM/ Fire Marshall Admin									
1.3.1	Deputy Director	CO	200	1	200	30 %		60	260	
1.3.2	Emergency Management Coordinator	CO	150	1	150	30 %		45	195	
1.3.3	Emergency Management Planner	CO	120	1	120	30 %		36	156	
1.3.4	Grant Coordinator	CO	120	1	120	30 %		36	156	
1.3.5	COOP Specialist	CO	120	1	120	30 %		36	156	
1.3.6	Fire Inspectors	SO	96	2	192	50 %		96	288	
1.3.7	Clerical Support/ Analyst	WS	96	1	96	50 %		48	144	
1.3.8	Community Relations	WS	96	1	96	50 %		48	144	
1.3.9	Storage		100	1	100	25 %		25	125	
Subtotal					1194	36 %		430	1624	

SUBTOTAL SUPPORT 5822 35 % 2008 7830

2.0	EMERGENCY COMMUNICATION CENTER									
2.1	Communication									
2.1.1	Shift Supervisors Workstations (County and City)	WS	96	3	288	75 %		216	504	
2.1.2	City Supervisors Office	CO	150	1	150	30 %		45	195	Cabinet drawers for each shift supervisor. Doubles as counselling space
2.1.3	County Supervisors Office	CO	150	1	150	30 %		45	195	Cabinet drawers for each shift supervisor. Doubles as counselling space
2.1.4	Communication Workstations (County and City)	WS	64	30	1920	75 %		1440	3360	At least two workstations are available for training workstations
2.1.5	AV Display		100	1	100	10 %		10	110	
2.1.6	Storage Cabinets		100	1	100	10 %		10	110	
2.1.7	Quiet Room		100	1	100	30 %		30	130	
2.1.8	Toilet Room		70	2	140	35 %		49	189	
2.1.9	Lactation Room		100	1	100	35 %		35	135	
2.1.10	Kitchenette		80	1	80	35 %		28	108	
2.1.11	Mailboxes		0.5	40	20	35 %		7	27	
2.1.12	Printer/ Scanner/Copy Area		50	1	50	25 %		13	63	
2.1.13	Storage/supplies		150	1	150	25 %		38	188	
Subtotal					3348	35 %		1965	5313	

		Space Code	Area/ Unit	Proposed # Units	NSF	Grossing Factor		GSF	Total	Comments
3.0	TRAINING									
3.1	Training									
3.1.1	Communication Training Lab		64	6	384	50 %		192	576	Both recurrent training as well as training console. Visible from Supervisor position. Glass connection to the floor. Between EOC and Comm Center
3.1.2	Storage		40	1	40	25 %		10	50	
3.1.3	Public Relations Material Storage		100	1	100	25 %		25	125	
				Subtotal	524	33 %		227	751	
4.0	EMERGENCY OPERATIONS CENTER									
4.1	EOC									
4.1.1	EOC/Training Room	WS	18	50	900	75 %		675	1575	(Training space for up to 55 people). Folding partition dividing
4.1.2	Manual and Plan Storage		100	1	100	30 %		30	130	
4.1.3	AV Display		100	1	100	30 %		30	130	
4.1.4	Breakout Spaces		300	4	1200	30 %		360	1560	Folding partitions between every two rooms. Organized as Executive, Planning, Finance, Ops
4.1.5	HAM Radio Spaces		12	4	48	30 %		14	62	
				Subtotal	2348	39 %		1109	3457	
5.0	MEDIA RELATIONS									
5.1	Media Relations									
5.1.1	Training/ Conference/ Media		1	400	400	30 %		120	520	
5.1.2	JIC Positions	WS	15	12	180	50 %		90	270	
5.1.3	JIC Workstation	WS	64	1	64	50 %		32	96	
5.1.4	PIO Office	SO	100	1	100	50 %		50	150	
5.1.5	JIC Storage		50	1	50	30 %		15	65	
				Subtotal	794	42 %		307	1101	

		Space Code	Area/ Unit	Proposed # Units	NSF	Grossing Factor		GSF	Total	Comments
6.0	TECHNOLOGY SPACES									
6.1	Technology Office									
6.1.1	IT Manager	CO	150	1	150	30 %		45	195	
6.1.2	GIS Technician	WS	96	2	192	50 %		96	288	
6.1.3	CAD/ Database Manager	CO	150	1	150	30 %		45	195	
6.1.4	CAD/ Database Technician	WS	96	1	96	50 %		48	144	
6.1.5	IT Technician	WS	96	2	192	50 %		96	288	
6.1.6	Radio Technician	WS	96	3	288	50 %		144	432	
6.1.7	Vendor Workstations	WS	64	2	128	50 %		64	192	
6.1.8	Repair		100	1	100	50 %		50	150	
6.1.9	Technology Secure Storage Area		250	1	250	25 %		63	313	
Subtotal					1546	43 %		651	2197	
6.2	Equip Rooms									
6.2.1	Rack Systems		12	10	120	150 %		180	300	
6.2.2	Future Racks/ Switchout		12	7	84	150 %		126	210	
6.2.3	CRAC Unit		120	2	240	100 %		240	480	redundant HVAC
Subtotal					444	133 %		546	990	
6.3	Fayetteville Utility Ops Data Disaster Recovery									
6.3.1	Disaster Recovery Server Space		1200	1	1200	10 %		120	1320	
6.3.2	CRAC Unit		120	2	240	10 %		24	264	redundant HVAC
Subtotal					1440	10 %		144	1584	
SUBTOTAL SUPPORT					3430	62 %		1341	4771	

		Space Code	Area/ Unit	Proposed # Units	NSF	Grossing Factor		GSF	Total	Comments
7.0	COMMONS									
7.1	Front of house									
7.1.1	Secure Vestibule		100	1	100	30 %		30	130	
7.1.2	Lobby/ Waiting		350	1	350	30 %		105	455	
7.1.3	Toilet Rooms		70	2	140	35 %		49	189	
				Subtotal	590	32 %		184	774	
7.2	Back of house									
7.2.1	Kitchen		300	1	300	30 %		90	390	Full Prep
7.2.2	Dining		400	1	400	30 %		120	520	Include vending
7.2.3	Lockers		4	55	220	30 %		66	286	110 half size Lockers
7.2.4	Toilet Rooms		200	2	400	35 %		140	540	
7.2.5	Shower/ Changing Rooms		80	4	320	35 %		112	432	
7.2.6	Break Room		400	1	400	30 %		120	520	
7.2.7	Fitness Room		400	1	400	30 %		120	520	
7.2.8	Training/Sleeping Rooms with Storage		300	2	600	30 %		180	780	With closet for cots
7.2.9	Main Power Distribution		200	1	200	10 %		20	220	
7.2.10	Secondary Electrical Rooms		100	1	100	10 %		10	110	
7.2.11	UPS rooms		200	1	200	10 %		20	220	
7.2.12	Emergency Generator		0	0	0	10 %		0	0	outside
7.2.13	Mechanical/Plumbing Room/ Fire protection		500	1	500	10 %		50	550	
7.2.14	Maintenance/Custodial Stor./ Work		100	1	100	10 %		10	110	
7.2.15	Janitorial Spaces		50	1	50	10 %		5	55	
7.2.16	Building Storage		240	1	240	10 %		24	264	
				Subtotal	4430	21 %		1087	5517	
				SUBTOTAL COMMONS	5020	26 %		1271	6291	
8.0	EMA VEHICLE STORAGE									
8.1	Vehicle Storage									
8.1.1	Trailers		480	12	5760	10 %		576	6336	3 light towers, two trailers, 6 - 20' trailers, 2 generators, signage trailers
8.1.2	EMA enclosed storage		480	1	480	10 %		48	528	Cots, Tarps, MREs, Cleanup kits, blankets, bottled water
8.1.3	Toilet Rooms		70	1	70	35 %		25	95	
				Subtotal	6310	18 %		649	6959	

THREAT ASSESSMENT

INTRODUCTION

This section highlights a Threat Assessment developed for each of the three proposed sites assembled for this Study. These Threat Assessments are performed in general conformance with FEMA 452 Risk Assessment criteria. Topics similar to those identified in the FEMA document are addressed however they are addressed in a format more specific to a site selection process.

Fayetteville-Cumberland County asked the team to assess and propose development on three sites within the County. A fourth site was originally toured and contemplated however after review of the threat assessment and after further overall review of the site, the City/ County Team elected to remove that fourth site from the Study.

Further information is provided for the three remaining sites in Section 5. The three proposed sites are as follows:

SITE 1 - Cedar Creek Business Park

Location encompasses Lot 1 of the Cedar Creek business Park along with adjacent Parcel with mailing address 2736 Cedar Creek Road

SITE 2 - Fields Road Site

Location is Approximately 300 yards from the intersection of Fields Road and Cedar Creek Road and is labeled as Parcel 0445-97-3707

SITE 3 - Tracy Hall Road Site

Location is approximately ¼ mile from the intersection of Tracy Hall Roads, Wilmington Highway and NC HWY 87 S.

The threat assessments developed in this section were developed after the workshop conducted with the City/County team however they are developed using information provided during the Programming Workshop. The Threat Assessments were then forwarded to the Team for review and comment.

What follows is an assessment for each of the proposed sites. The design team has taken these Threat Assessments plus the requirements that we believe are applicable to a mission critical facility in this region and have modified the assessment to reflect those issues. The results create the basis for architecture and engineering considerations provided in Section 4.

To some extent, the majority of threats to the proposed sites for this project are natural forces or weather related incidents. There is always some concern for continuity of operations generated by the nearby military installation. This threat assessment recognizes those concerns and attempts to provide mitigating strategies to counteract them.

Actual remediation efforts for any of the perceived threats are included on the following pages and in Section 4 to follow.

SITE 1

Cedar Creek Business Park

CEDARS CREEK BUSINESS PARK - SITE #1		ASSESSMENT		DESIGN PRECAUTIONS						
Threat and Vulnerability Assessment				ARE NOTED FOR THE FOLLOWING BUILDING SYSTEMS						
Completion Date:	12/15/2015	Rank (high, medium, low)								
		Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
NATURAL THREATS										
	Weather									
	Flood	low	high	-	-	Provide for internal floor drains with positive drainage	-	-		
	Flash Flood	low	high	-	-	Provide for internal floor drains with positive drainage	-	-		
	Snow/Ice	medium	low	-	Provide appropriate roof loading design	-	Power for seven days post storm. Diesel and/or Natural gas generator (cost to be considered). UPS to the site.	Fiber will be brought to the building. Microwave is primary, fiber is backup. Tower on site.	Fuel tank size will be considered based on municipal gas service to the site. Look at 72 hour for FEMA or less.	
	Hail	medium	low	-	Design roofing product to accommodate hail. Also, treat roofing and ceiling system acoustically to reduce internal impact during hail.	Shield roof top and exterior equipment	Shield roof top and exterior equipment	-	-	
	Hurricane/ Tropical Storm in this location	medium	high	Meet North Carolina Building Code - Critical Occupancy Considerations. 160 mph wind.	Consider upgrades to exterior wall and window systems.	Rooftop units will require special anchorage and screen wall capable of missile projectiles.	Power for seven days post storm. Diesel and/or Natural gas generator (cost to be considered). UPS to the site.	Fiber will be brought to the building. Microwave is primary, fiber is backup. Tower on site.	Consider impact resistant window systems from a budget standpoint.	
	Tornado/ Microburst	medium	high	Meet North Carolina Building Code - Critical Occupancy Considerations. Design for 200 mph Tornado zone.	Consider upgrades to exterior wall and window systems.	Rooftop units will require special anchorage and screen wall capable of missile projectiles.	Power for seven days post storm. Diesel and/or Natural gas generator (cost to be considered). UPS to the site.	Fiber will be brought to the building. Microwave is primary, fiber is backup. Tower on site.	Consider impact resistant window systems from a budget standpoint.	
	Lightning	high	high	Trees will need to be eliminated far enough from the building for fall protection		May have to provide lightning protection to any rooftop units	TVSS protection to building and telecomm. Lightning protection on the whole building (including the old building)	R56 Grounding requirements.		
	Wildfires	low	high	Trees will need to be eliminated far enough from the building for protection from fire	-	Provide outside air intake shutdown	-	-		
	Seismic/Geological									
	Earthquake	low	medium	In a seismic zone. Seismic Design Category C. Structurally the factor of safety is the same as the wind	Provide seismic protection to all architectural elements	Seismic hangers for pipes, ductwork etc.	Seismic support for lighting and other elements	-	-	
	Mud/ Rock Slide	NA	NA	-	-	-	-	-	-	
Radon	NA	NA	-	-	-	-	-	-		
Subsidence	NA	NA	-	-	-	-	-	-		

		Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
	<i>Service Interruption (Natural Occurrences)</i>									
	Interruption of Primary Power Supply (natural)	high	high	-		-	-	Outages are possible. Provide separate primary power specifically to this building. Diesel or Natural gas generator (cost to be considered). UPS in the building. Consider the cost of gas line and the primary power.	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	Fuel tank size will be considered based on municipal service to the site. Look at 72 hour for FEMA or less.
	Interruption of Secondary Power Supply (natural)	low	high	-		-	-	Run Primary line to the building. A natural gas generator may be interrupted by a seismic event.	-	-
	Interruption of Water (natural)	low	low		Consider bottled water	-	-	-	-	Note, there is not municipal sewer to the site. Will need to accommodate.
	Interruption of Telecomm/ Wireless (natural)	low	high	-		-	-	-	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	-
	Interruption of Food Supply (natural)	NA	NA	-		-	-	-	-	-
	Interruption of Transport (natural)	NA	NA	-		-	-	-	-	-

	Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
CIVIL THREATS									
Terrorism	Chemical	low	high	-	-	Outside air intake shutdown. High intake from two sides of the building. Possible consideration of filtration if necessary.	-	-	-
	Biological	low	low	-	-	Outside air intake shutdown. Intake from two sides of the building. High intakes. Possible consideration of filtration	-	-	-
	Incendiary (explosives)	low	high	-	Provide appropriate standoff on the site, gating, bollards.	-	-	-	-
	Firearms	low	medium	Provide appropriate standoff on the site, gating, bollards.	Ballistic wall systems in high importance areas, ballistic windows where low, general windows placed up high.	-	-	-	Cost consideration. Determine ballistic protection
	Vehicle	low	medium	-	Provide appropriate standoff on the site, gating, bollards.	-	-	-	-
	Aircraft	low	low	Not protecting the building from aircraft	-	-	-	-	-
	Radiological	low	low	Not protecting the building from radiation	-	-	-	-	Note that the site is within the 50 mile radius of the Shearon Harris Nuclear Plant
	Interruption of Power (malicious)	low	high	-	Create standoff from any electrical equipment (where possible)	-	Provide separate primary power specifically to this building. Diesel or Natural gas generator (cost to be considered). UPS in the building. Consider the cost of gas line and the primary power.	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	-
	Interruption of Fuels (malicious)	low	medium	-	Standoff on the site, gating, bollards.	-	Provide diesel storage in the belly tank of the generator with a standoff	-	-
	Interruption of Water (malicious)	low	low	Consider bottled water	-	-	-	-	-
	Interruption of Telecomm/ Wireless (malicious)	low	high	-	-	-	-	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	-
	Interruption of Food Supply (malicious)	low	low	-	-	-	-	-	-
	Unauthorized entry - forced	low	medium	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session	-	Provide security lighting on the exterior.	-	CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV
	Unauthorized entry - visual access	low	low	-	-	-	-	-	-

		Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
	<i>Vandalism</i>									
	Property Damage	low	low	-	-	-	-	-	-	-
	Theft	low	low	-	-	-	-	-	-	-
	Unauthorized Entry (physical)	low	low	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session	-	Provide security lighting on the exterior.	-	CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV	
	Unauthorized Entry (electronic)	low	low	-	-	-	-	All systems are security protected and are not provided through wireless.	-	
	<i>Information Security</i>									
	Acoustical and Visual Interception of Data	low	low	-	-	-	-	-	-	-
ACCIDENT HAZARDS										
	<i>Internal</i>									
	Chemical Release	medium	medium	-	-	All custodial and janitorial are exhausted.	-	-	-	If we use VRF Systems provide refrigerant sensors
	Fire	low	high	24/7 facility	-	Office area is wet pipe sprinkler, comm center is double interlock preaction, data center is chemical suppression	Provide spot smoke protection in remote or less occupied locations	-	-	
	Water	low	low	-	-	Consider drains. Consider water detection sensors if raised floor	-	-	-	
	<i>External (vicinity of facility)</i>									
	Chemical Release	medium	high	-	-	Outside air intake shutdown. High intake from two sides of the building. Possible consideration of filtration if necessary.	-	-	-	
	Wildfires	medium	high	Trees will need to be eliminated far enough from the building for protection from fire	-	Provide outside air intake shutdown	-	-	-	
	Radiological	low	low	Not protecting the building from radiation	-	-	-	-	-	
	Aircraft Crash	low	low	Not protecting the building from aircraft	-	-	-	-	-	
	<i>Personal Safety</i>									
PERSONAL THREATS										
	Indoor	low	low	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session		Provide security lighting on the exterior.		CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV	
	Outdoor on-site and near site	low	low	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session		Provide security lighting on the exterior.		-	

SITE 2

Fields Road

FIELDS ROAD SITE - SITE #2 Threat and Vulnerability Assessment		ASSESSMENT		DESIGN PRECAUTIONS ARE NOTED FOR THE FOLLOWING BUILDING SYSTEMS					
Completion Date:	12/15/2015	Rank (high, medium, low)							
		Probability of Occurrence	Importance of Occurrence	Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
NATURAL THREATS									
	<i>Weather</i>								
	Flood	low	low	-	-	-	-	-	
	Flash Flood	medium	high	Verify elevation of building and parking footprint	Building must accommodate potential flooding	Provide for internal floor drains with positive drainage	Transformer and generator to be above flood plain	Telecomm Floor must be above flood plain	
	Snow/Ice	medium	low	-	Provide appropriate roof loading design	-	Power for seven days post storm. Diesel and/or Natural gas generator (cost to be considered). UPS to the site.	Fiber will be brought to the building. Microwave is primary, fiber is backup. Tower on site.	Fuel tank size will be considered based on municipal gas service to the site. Look at 72 hour for FEMA or less.
	Hail	medium	low	-	Design roofing product to accommodate hail. Also, treat roofing and ceiling system acoustically to reduce internal impact during hail.	Shield roof top and exterior equipment	Shield roof top and exterior equipment	-	-
	Hurricane/ Tropical Storm in this location	medium	high	Meet North Carolina Building Code - Critical Occupancy Considerations. 160 mph wind.	Consider upgrades to exterior wall and window systems.	Rooftop units will require special anchorage and screen wall capable of missile projectiles.	Power for seven days post storm. Diesel and/or Natural gas generator (cost to be considered). UPS to the site.	Fiber will be brought to the building. Microwave is primary, fiber is backup. Tower on site.	Consider impact resistant window systems from a budget standpoint.
	Tornado/ Microburst	medium	high	Meet North Carolina Building Code - Critical Occupancy Considerations. Design for 200 mph Tornado zone.	Consider upgrades to exterior wall and window systems.	Rooftop units will require special anchorage and screen wall capable of missile projectiles.	Power for seven days post storm. Diesel and/or Natural gas generator (cost to be considered). UPS to the site.	Fiber will be brought to the building. Microwave is primary, fiber is backup. Tower on site.	Consider impact resistant window systems from a budget standpoint.
	Lightning	high	high	-		May have to provide lightning protection to any rooftop units	TVSS protection to building and telecomm. Lightning protection on the whole building (including the old building)	R56 Grounding requirements.	
	Wildfires	low	low	-	-	Provide outside air intake shutdown	-	-	
	<i>Seismic/Geological</i>								
	Earthquake	low	medium	In a seismic zone. Seismic Design Category C. Structurally the factor of safety is the same as the wind	Provide seismic protection to all architectural elements	Seismic hangers for pipes, ductwork etc.	Seismic support for lighting and other elements	-	-
	Mud/ Rock Slide	NA	NA	-	-	-	-	-	-
	Radon	NA	NA	-	-	-	-	-	-
	Subsidence	NA	NA	-	-	-	-	-	-

		Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
	<i>Service Interruption (Natural Occurrences)</i>									
	Interruption of Primary Power Supply (natural)	high	high	-		-	-	Outages are frequent. Provide separate primary power specifically to this building. Diesel or Natural gas generator (cost to be considered). UPS in the building. Consider the cost of gas line and the primary power.	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	Fuel tank size will be considered based on municipal service to the site. Look at 72 hour for FEMA or less.
	Interruption of Secondary Power Supply (natural)	low	high	-		-	-	Run Primary line to the building. A natural gas generator may be interrupted by a seismic event.	-	-
	Interruption of Water (natural)	low	low		Consider bottled water	-	-	-	-	-
	Interruption of Telecomm/ Wireless (natural)	low	high	-		-	-	-	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	-
	Interruption of Food Supply (natural)	NA	NA	-		-	-	-	-	-
	Interruption of Transport (natural)	NA	NA	-		-	-	-	-	-

	Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
CIVIL THREATS									
Terrorism	Chemical	low	high	-	-	Outside air intake shutdown. High intake from two sides of the building. Possible consideration of filtration if necessary.	-	-	-
	Biological	low	low	-	-	Outside air intake shutdown. Intake from two sides of the building. High intakes. Possible consideration of filtration	-	-	-
	Incendiary (explosives)	low	high	-	Provide appropriate standoff on the site, gating, bollards.	-	-	-	-
	Firearms	low	medium	Provide appropriate standoff on the site, gating, bollards.	Ballistic wall systems in high importance areas, ballistic windows where low, general windows placed up high.	-	-	-	Cost consideration. Determine ballistic protection
	Vehicle	low	medium	-	Provide appropriate standoff on the site, gating, bollards.	-	-	-	-
	Aircraft	low	low	Not protecting the building from aircraft	-	-	-	-	-
	Radiological	low	low	Not protecting the building from radiation	-	-	-	-	Note that the site is within the 50 mile radius of the Shearon Harris Nuclear Plant
	Interruption of Power (malicious)	low	high	-	Create standoff from any electrical equipment (where possible)	-	Provide separate primary power specifically to this building. Diesel or Natural gas generator (cost to be considered). UPS in the building. Consider the cost of gas line and the primary power.	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	-
	Interruption of Fuels (malicious)	low	medium	-	Standoff on the site, gating, bollards.	-	Provide diesel storage in the belly tank of the generator with a standoff	-	-
	Interruption of Water (malicious)	low	low	Consider bottled water	-	-	-	-	-
	Interruption of Telecomm/ Wireless (malicious)	low	high	-	-	-	-	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	-
	Interruption of Food Supply (malicious)	low	low	-	-	-	-	-	-
	Unauthorized entry - forced	low	medium	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session	-	Provide security lighting on the exterior.	-	CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV
	Unauthorized entry - visual access	low	low	-	-	-	-	-	-

		Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
	<i>Vandalism</i>									
	Property Damage	low	low	-	-	-	-	-	-	-
	Theft	low	low	-	-	-	-	-	-	-
	Unauthorized Entry (physical)	low	low	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session	-	Provide security lighting on the exterior.	-	CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV	
	Unauthorized Entry (electronic)	low	low	-	-	-	-	All systems are security protected and are not provided through wireless.	-	
	<i>Information Security</i>									
	Acoustical and Visual Interception of Data	low	low	-	-	-	-	-	-	-
ACCIDENT HAZARDS										
	<i>Internal</i>									
	Chemical Release	medium	medium	-	-	All custodial and janitorial are exhausted.	-	-	-	If we use VRF Systems provide refrigerant sensors
	Fire	low	high	24/7 facility	-	Office area is wet pipe sprinkler, comm center is double interlock preaction, data center is chemical suppression	Provide spot smoke protection in remote or less occupied locations	-	-	
	Water	low	low	-	-	Consider drains. Consider water detection sensors if raised floor	-	-	-	
	<i>External (vicinity of facility)</i>									
	Chemical Release	low	low	-	-	Outside air intake shutdown. High intake from two sides of the building. Possible consideration of filtration if necessary.	-	-	-	
	Wildfires	low	low	-	-	Provide outside air intake shutdown	-	-	-	
	Radiological	low	low	Not protecting the building from radiation	-	-	-	-	-	
	Aircraft Crash	low	low	Not protecting the building from aircraft	-	-	-	-	-	
PERSONAL THREATS										
	<i>Personal Safety</i>									
	Indoor	low	low	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session		Provide security lighting on the exterior.		CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV	
	Outdoor on-site and near site	low	low	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session		Provide security lighting on the exterior.		CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV	

SITE 3

Tracy Hall Road

TRACY HALL ROAD SITE - SITE #3		ASSESSMENT		DESIGN PRECAUTIONS ARE NOTED FOR THE FOLLOWING BUILDING SYSTEMS					
Threat and Vulnerability Assessment	Completion Date: 12/15/2015	Rank (high, medium, low)							
		Probability of Occurrence	Importance of Occurrence	Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
NATURAL THREATS									
	<i>Weather</i>								
	Flood	high	high	Raise elevation of building and parking footprint	Building must accommodate potential flooding	Provide for internal floor drains with positive drainage	Transformer and generator to be above flood plain	Telecomm Floor must be above flood plain	
	Flash Flood	high	high	Raise elevation of building and parking footprint	Building must accommodate potential flooding	Provide for internal floor drains with positive drainage	Transformer and generator to be above flood plain	Telecomm Floor must be above flood plain	
	Snow/Ice	medium	low	-	Provide appropriate roof loading design	-	Power for seven days post storm. Diesel and/or Natural gas generator (cost to be considered). UPS to the site.	Fiber will be brought to the building. Microwave is primary, fiber is backup. Tower on site.	Fuel tank size will be considered based on municipal gas service to the site. Look at 72 hour for FEMA or less.
	Hail	medium	low	-	Design roofing product to accommodate hail. Also, treat roofing and ceiling system acoustically to reduce internal impact during hail.	Shield roof top and exterior equipment	Shield roof top and exterior equipment	-	-
	Hurricane/ Tropical Storm in this location	medium	high	Meet North Carolina Building Code - Critical Occupancy Considerations. 160 mph wind.	Consider upgrades to exterior wall and window systems.	Rooftop units will require special anchorage and screen wall capable of missile projectiles.	Power for seven days post storm. Diesel and/or Natural gas generator (cost to be considered). UPS to the site.	Fiber will be brought to the building. Microwave is primary, fiber is backup. Tower on site.	Consider impact resistant window systems from a budget standpoint.
	Tornado/ Microburst	medium	high	Meet North Carolina Building Code - Critical Occupancy Considerations. Design for 200 mph Tornado zone.	Consider upgrades to exterior wall and window systems.	Rooftop units will require special anchorage and screen wall capable of missile projectiles.	Power for seven days post storm. Diesel and/or Natural gas generator (cost to be considered). UPS to the site.	Fiber will be brought to the building. Microwave is primary, fiber is backup. Tower on site.	Consider impact resistant window systems from a budget standpoint.
	Lightning	high	high	Trees will need to be eliminated far enough from the building for fall protection		May have to provide lightning protection to any rooftop units	TVSS protection to building and telecomm. Lightning protection on the whole building (including the old building)	R56 Grounding requirements.	
	Wildfires	medium	high	Trees will need to be eliminated far enough from the building for protection from fire	-	Provide outside air intake shutdown	-	-	
	<i>Seismic/Geological</i>								
	Earthquake	low	medium	In a seismic zone. Seismic Design Category C. Structurally the factor of safety is the same as the wind	Provide seismic protection to all architectural elements	Seismic hangers for pipes, ductwork etc.	Seismic support for lighting and other elements	-	-
	Mud/ Rock Slide	NA	NA	-	-	-	-	-	-
	Radon	NA	NA	-	-	-	-	-	-
	Subsidence	NA	NA	-	-	-	-	-	-

		Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
	<i>Service Interruption (Natural Occurrences)</i>									
	Interruption of Primary Power Supply (natural)	high	high	-		-	-	Outages are frequent. Provide separate primary power specifically to this building. Diesel or Natural gas generator (cost to be considered). UPS in the building. Consider the cost of gas line and the primary power.	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	Fuel tank size will be considered based on municipal service to the site. Look at 72 hour for FEMA or less.
	Interruption of Secondary Power Supply (natural)	low	high	-		-	-	Run Primary line to the building. A natural gas generator may be interrupted by a seismic event.	-	-
	Interruption of Water (natural)	low	low		Consider bottled water	-	-	-	-	-
	Interruption of Telecomm/ Wireless (natural)	low	high	-		-	-	-	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	-
	Interruption of Food Supply (natural)	NA	NA	-		-	-	-	-	-
	Interruption of Transport (natural)	NA	NA	-		-	-	-	-	-

	Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
CIVIL THREATS									
Terrorism	Chemical	medium	high	-	-	Outside air intake shutdown. High intake from two sides of the building. Possible consideration of filtration if necessary.	-	-	Sewer plant adjacent to this site. Also, concern about another neighboring property. Appears to process some chemical compound.
	Biological	low	low	-	-	Outside air intake shutdown. Intake from two sides of the building. High intakes. Possible consideration of filtration	-	-	-
	Incendiary (explosives)	low	high	-	Provide appropriate standoff on the site, gating, bollards.	-	-	-	-
	Firearms	low	medium	Provide appropriate standoff on the site, gating, bollards.	Ballistic wall systems in high importance areas, ballistic windows where low, general windows placed up high.	-	-	-	Cost consideration. Determine ballistic protection
	Vehicle	low	medium	-	Provide appropriate standoff on the site, gating, bollards.	-	-	-	-
	Aircraft	low	low	Not protecting the building from aircraft	-	-	-	-	-
	Radiological	low	low	Not protecting the building from radiation	-	-	-	-	Note that the site is within the 50 mile radius of the Shearon Harris Nuclear Plant
	Interruption of Power (malicious)	low	high	-	Create standoff from any electrical equipment (where possible)	-	Provide separate primary power specifically to this building. Diesel or Natural gas generator (cost to be considered). UPS in the building. Consider the cost of gas line and the primary power.	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	-
	Interruption of Fuels (malicious)	low	medium	-	Standoff on the site, gating, bollards.	-	Provide diesel storage in the belly tank of the generator with a standoff	-	-
	Interruption of Water (malicious)	low	low	Consider bottled water	-	-	-	-	-
	Interruption of Telecomm/ Wireless (malicious)	low	high	-	-	-	-	Fiber will be brought specifically to the building. Microwave is primary, fiber is backup. Provide tower	-
	Interruption of Food Supply (malicious)	low	low	-	-	-	-	-	-
	Unauthorized entry - forced	low	medium	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session	-	Provide security lighting on the exterior.	-	CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV
	Unauthorized entry - visual access	low	low	-	-	-	-	-	-

		Probability of Occurrence	Importance of Occurrence		Vulnerability Precautions	Architectural Solutions	HVAC/Plumb/ Fire Protect Redundancy	Electrical Redundancy	Telecomm Redundancy	Other
	<i>Vandalism</i>									
	Property Damage	low	low	-	-	-	-	-	-	-
	Theft	low	low	-	-	-	-	-	-	-
	Unauthorized Entry (physical)	low	low	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session	-	Provide security lighting on the exterior.	-	CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV	
	Unauthorized Entry (electronic)	low	low	-	-	-	-	All systems are security protected and are not provided through wireless.	-	
	<i>Information Security</i>									
	Acoustical and Visual Interception of Data	low	low	-	-	-	-	-	-	-
ACCIDENT HAZARDS										
	<i>Internal</i>									
	Chemical Release	medium	medium	-	-	All custodial and janitorial are exhausted.	-	-	-	If we use VRF Systems provide refrigerant sensors
	Fire	low	high	24/7 facility	-	Office area is wet pipe sprinkler, comm center is double interlock preaction, data center is chemical suppression	Provide spot smoke protection in remote or less occupied locations	-	-	
	Water	low	low	-	-	Consider drains. Consider water detection sensors if raised floor	-	-	-	
	<i>External (vicinity of facility)</i>									
	Chemical Release	medium	high	-	-	Outside air intake shutdown. High intake from two sides of the building. Possible consideration of filtration if necessary.	-	-	-	Sewer plant adjacent to this site. Also, concern about another neighboring property. Appears to process some chemical compound.
	Wildfires	medium	high	Trees will need to be eliminated far enough from the building for protection from fire	-	Provide outside air intake shutdown	-	-	-	
	Radiological	low	low	Not protecting the building from radiation	-	-	-	-	-	
	Aircraft Crash	low	low	Not protecting the building from aircraft	-	-	-	-	-	
	<i>Personal Safety</i>									
	Indoor	low	low	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session		Provide security lighting on the exterior.			CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV
	Outdoor on-site and near site	low	low	24/7 facility	Secure vestibule. Address exterior door and window systems discussed in programming session		Provide security lighting on the exterior.			CCTV system and access controls. Camera at gate and door. Use keypad access. Remote access release provided at all comm positions. Provide recording device on CCTV
PERSONAL THREATS										

PROPOSED SYSTEMS NARRATIVE

OVERVIEW

This planning project is designed to accommodate the needs of regional communications. It houses administrative offices for the co-located organizations and also contains the communications center and Emergency Operations Center. Further, the Fayetteville Utility Operations Data Disaster Recovery function has been located within this building program as well. These facilities typically utilize hardened, redundant and survivable construction and systems.

The facility will be required to satisfy typical IBC/ICC/ North Carolina Adopted Version of this Code and all associated Codes. The facility will be required to meet at a minimum all of those requirements.

Beyond those requirements however, there are a separate set of criteria to be utilized in the integration of and selection of building systems. The first criteria indicated under IBC/ICC/North Carolina Code is that the facility will be required to satisfy Essential Facility requirements of the code which increase the seismic criteria and wind loadings among other things. Second, however, a series of additional guidelines come into play to help develop the ultimate systems to be utilized in the facility.

The balance of this section identifies those specific criteria that should be utilized to allow the facility to serve as a PSAP/ EOC/ Fayetteville Utility Operations Data Disaster Recovery.

GENERAL PSAP/ EOC (Mission Critical Facility) DESIGN GUIDELINES

This facility must continue operations even under the most adverse conditions (ie: last operational building). To accomplish this, the design team will need to incorporate site features, architectural features, and structural design that will allow the facility to maintain its physical integrity under extreme conditions. The building must also be designed to include sufficient redundancy to ensure continuity of operations in case of equipment failure or during maintenance periods. Backup power must be scaled to provide sufficient power for mission critical spaces and equipment for extended periods of time.

Recommended Design Criteria

Aside from referencing the DoD UFC requirements, the Building will be designed in accordance with a number of standards related to the design of critical infrastructure including the following:

- The most recent local and State Building Code
- National Fire Protection Agency (NFPA) 1221 –Standard for Installation, Maintenance, and Use of Emergency Services Communications Systems, 2010.
- National Fire Protection Agency (NFPA) 1660, NAC 783
- Federal Emergency Management Agency (FEMA) 361- Design and Construction Guidance for Community Shelters
- FEMA 452 –A How-To Guide to Mitigate Potential Terrorist Attacks Against Buildings, January 2005.
- Unified Facilities Criteria (UFC) 4-010-01- Department of Defense (DoD) Minimum Antiterrorism Standards for Buildings
- Unified Facilities Criteria (UFC) 4-141-04- Department of Defense (DoD) Emergency Operations Center Planning and Design
- National Institute for Occupational Safety and Health (NIOSH) – Guidance for Protecting Building Environments from Airborne Chemical, Biological, or Radiological Attacks
- TIA 942 Telecommunications Infrastructure Standards for Data Centers
- NENA 04-502 E9-1-1 PSAP/ EOC CPE Site Characteristics Technical Information Document
- NENA Generic E9-1-1 Requirements Technical Information Document

Critical Infrastructure Associated with the Facility

Several components of this new facility will be considered as part of the critical infrastructure and will include the following as they are developed in the project:

- PSAP (Communication Center)
- Emergency Operations Center
- Fayetteville Utility Operations Data Disaster Recovery Equipment Space
- Computer Equipment Space and Common Spaces

Best Practice Recommendations for Mitigating Risk

While the DoD UFC has specific elements of design prescribed for this facility we often find it advisable to delineate general design concepts. Those elements of design important to a facility of this type are encapsulated below.

A. Site Perimeter and Access Points

- a. Perimeter fencing will be provided and will be considered the controlled perimeter per UFC in order to implement UFC standoff requirements. Note that the design team will likely need to utilize the outside perimeter of the facility as the standoff boundary to minimize site impacts
 - b. Provide ability to reject unauthorized vehicles in secure parking areas.
 - c. Provide clearly defined employee vehicle access with a second means of egress.
- B. Site Layout
- a. Recommended standoff of 82 feet (25 meters) to parking areas and drive lanes
 - b. If standoff is less than 82 feet, provide enhanced structure, enhanced perimeter, exterior windows, etc. per UFC 4-010-01.
 - c. Locate primary loading/receiving area outside secure parking area.
 - d. Provide vehicle barrier between the parking and building to inhibit vehicle access.
 - e. Locate critical utilities 50 feet away from high-risk areas such as loading / receiving area
 - f. Do not locate areas of concealment such as trash containers and ash cans within 30 feet of buildings.
 - g. Provide electronic access control to secured areas.
 - h. Provide sufficient light levels around buildings and in parking areas, 4 foot candles (fc) in parking areas
- C. Building Layout
- a. Create multiple security levels within the facility.
 - b. Provide vestibules / airlocks at public and staff entrances.
 - c. Control the public entry / lobby.
 - d. Provide a dedicated employee entry point if possible.
 - e. Secure service access point.
 - f. Limit glass at and around emergency egress routes to prevent visual access into secure spaces and opportunities for intrusion.
 - g. Avoid building shapes with reentrant corners to limit hiding areas.
 - h. Provide electronic access control to secure areas of the building.
- D. Building Envelope
- a. Use conventional construction if building is located 82 feet away from public parking areas and is less than three stories in height.
 - b. Design building envelope to withstand 4 psi – 28psi per millisecond dynamic load if standoff is within 50 to 82 feet from public parking areas pending design described above.
 - c. Design building envelope to a specific threat if standoff is less than 50 feet.
 - d. Exterior doors should open outward.
 - e. Provide windows as recommended by UFC 4-010-01 if 82 foot standoff is not guaranteed.

- f. Windows shall be designed to comply with FEMA 361.
 - g. Windows around the Backup PSAP/ EOC may comply with NFPA 1221 for ballistic protection.
- E. Building Structure
 - a. Use non-combustible materials per Uniform Construction Code.
 - b. Minimize column spacing where acceptable to provide for reduction of the chance of progressive collapse
 - c. Provide vertical continuity of columns (avoid using transfer girders)
 - d. Design connections to the capacity of the element for standoff less than 82 feet
 - e. Design elements for blast if the standoff is less than 50 feet.
- F. HVAC / Fire Protection
 - a. Place outdoor air intakes high on side walls, on the roof, or in high soffits per NIOSH guidelines.
 - b. Provide emergency shut-off for outdoor air intake and monitoring system.
 - c. Provide separate exhaust system for public lobby, mail room, and loading area.
 - d. Provide redundant / independent HVAC system for emergency communications per NFPA 1221.
- G. Electrical / Telecom
 - a. Provide underground utilities encased in duct bank.
 - b. Provide emergency generators for all functions and uninterruptible power supply (UPS) for critical infrastructure.
 - c. Provide CCTV surveillance around the building perimeter and in parking areas.
- H. Other
 - a. Provide security desk with visitor screening. Provide ballistic glazing and wall construction around security desk for a controlled entry point.
 - b. Provide mail/package room.
 - c. Provide the potential future installation of security screening areas

Architectural Considerations

In addition to the above stated requirements for the various components of security and vulnerability a variety of requirements also serve as good guidelines for architectural design of a PSAP/ EOC facility.

Zoned or layered levels of protection

Facilities of this type should be designed utilizing intensifying areas of security and hardening starting at the site perimeter and moving to the interior of the building. This will become particularly important with the interest in providing continued public access for training in the facility.

Passive vs. Active Security Design

While it is critical to include appropriate electronic monitoring and security measures, good architectural techniques should be utilized to provide a facility that creates appropriate levels of hardening and anti-vulnerability through its design. Careful consideration should be given to this approach architecturally. A multi-disciplinary design approach should be utilized to create a facility that utilizes all of its systems to deter intruders.

Capability of increasing or decreasing security

A facility such as this should have the ability to vary its security levels in response to various levels of heightening threat.

General Site recommendations

Buffer Zones

Provide adequate exterior buffer zones around the hardened portion of the site to prevent vehicular intrusion in proximity to the facility. Sufficient setback must be available on the site to accommodate this specific need. In addition, the site should allow appropriate buffering from adjacent sites and where available, sites of high risk adjacent to a potential chosen site should be avoided.

Landscaping

Appropriate setbacks from the facility can be accommodated through landscaping of the site. Specific solutions include berming, street furniture, podium design of public spaces, large diameter deciduous trees, ponds, trenches, fences, water basins, sculpture and bollards among others.

Perimeter protections The site perimeter is the first step in the provision of the vulnerability zones of protection. Appropriate vehicle speeds should be taken into account dependent upon the level of anti-vulnerability desired for a project of this type. In addition, site circulation should be designed to prevent high-speed approaches by vehicles.

Site Signage Appropriate site circulation signage should be provided to assist visitors in finding their way to eliminate accidental entry into forbidden areas. In addition, elimination of signage in sensitive areas should be considered to discourage entry.

Architectural space considerations

Office Locations Offices of vulnerable officials may be placed or glazed so that the occupant cannot be seen from an uncontrolled area. Either a location with visual access into a secure area or courtyard should be considered or suitable obscuration of glazing, window treatment, ballistic resistant glazing or other protective devices should be provided.

Mixed occupancies Public areas should be separated from high risk areas (i.e. PSAP/ EOC floor area) utilizing appropriate anti-vulnerability measures. In addition, no public toilets or service-oriented spaces should be located in non-secure areas.

Loading docks Any shipping or receiving area should be given special attention. These areas should be separated from utility rooms, utility mains, service entries (including electrical, telephone, data, fire protection, alarm systems, fire suppression, cooling and heating mains etc.) by a minimum of 50 feet. Loading docks and service access should be located so that no vehicles will be driven into or parked under the facility.

Other items The following items must be located remotely from the main entrance, vehicle circulation, parking and maintenance areas. If this cannot be accommodated, harden the spaces as necessary:

- Emergency generator, fuel systems, day tank, fire sprinkler and water supply
- Normal fuel storage
- Main switchgear
- Telephone distribution and main switchgear

- Fire pumps
- Building control centers
- UPS systems controlling critical functions
- Main refrigeration systems critical to building operation
- Shafts for utilities
- Critical distribution feeders for emergency power

<i>Concealment Areas</i>	Avoid installing features such as trash receptacles and mailboxes that can be used to hide devices.
<i>Exterior walls</i>	The description provided here is specific to a building where it is determined blast design must be applied. Again, the owner and designer must contemplate the potential situation mitigation described throughout this section to determine if blast design is needed or not.

Other Architectural and Structural Requirements

The design of the facility should conform to the following, except where local codes or regulations override:

- NFPA Standards, as applicable – NFPA 1221
- State-wide Building Code and all other applicable Building Code
- Applicable Structural Specialty Code
- Applicable Fire and Life Safety Regulations
- Applicable Police/Public Safety Guidelines or Standards, if any
- International Plumbing Code, latest edition
- International Mechanical Code, latest edition
- International Electrical Code, latest edition
- Americans with Disabilities Act
- American Society of Heating, Refrigeration and Air Conditioning (ASHRAE) Handbooks
- American Society of Sanitary Engineering (ASSE) Standards
- American National Standards Institute (ANSI) Standards
- American Water Works Association (AWWA) Standards
- American Society for Testing and Materials (ASTM) Standards
- American Society of Mechanical Engineers (ASME) Standards
- Sheet Metal and Air Conditioning Contractors National Association (SMACNA) Standards
- Plumbing and Drainage Institute (PDI) Standards

- Environmental Protection Agency (EPA) Regulations
- Hydronics Institute (HI) Standards
- Air Moving and Conditioning Association (AMCA) Standards
- Air Conditioning and Refrigeration Institute (ARI) Standards
- Illuminating Engineering Society (IES) Handbooks and Recommendations
- Owners Insurance Underwriter Requirements

Expansion

The design of the facility will be such as to accommodate any planned or reasonably anticipated future expansion of either the building itself or the number of stations in the PSAP/ EOC and associated equipment in the Server Room. Note that this will be driven by site size. It should be noted that while the team did not allow for future spaces in the PSAP/ EOC, the floor might be expanded into the offices or the common space by the nature of its design. The equipment room floor allows for expansion of equipment and migration of systems within racks.

Ergonomics

Some of the ergonomic issues include:

- Individual controls of lighting at the console (PSAP/ EOC only)
- Windows and natural light where appropriate and possible
- Neutral color schemes throughout
- Possibility of variable height consoles
- Wrist pads at the keyboards
- Foot rests
- Break room
- Comfortable and durable chairs
- Indirect lighting
- Flat screen low gloss monitors

Acoustics

The design of the PSAP/ EOC must be such that the ambient sound levels in critical spaces are appropriate and do not interfere with the activities occurring therein. The Noise Criteria (sound level) experienced in the various spaces should not exceed those tabulated below.

Area	NC Level	Notes
PSAP/ EOC	35	
Equipment Room	50	Assumes room normally unoccupied
Training/Conference Room	35	
Office/Administration Areas	40	

Provide duct sound attenuators as required. Packless type preferred. Duct lining to be avoided whenever possible.

HVAC

HEATING, VENTILATING AND AIR CONDITIONING

Design Conditions

Outdoor:

Summer and Winter Ambient Dry Bulb (DB) and Wet Bulb (WB) temperatures will be as listed in the latest edition of the ASHRAE Fundamentals Handbook.

Indoor:

Summer: Drybulb temperature and relative humidity should be designed to the local comfort level to match code requirements.

Winter: Drybulb temperature and relative humidity should be designed to the local comfort level to match code requirements.

Fuel Supply

The facility design must take into account the loss of utility delivered fuels that may be used as the source of building heating system.

The heating system shall be served by natural gas or with propane as a backup. Fuel storage tanks should be sized for the eventuality that delivery may be interrupted during an emergency condition. Minimum fuel reserve of 72 hours should be included (including delivery time) if FEMA requirements are being taken into account. Lesser reserves can be considered by the Owner if desired and if fuel delivery alternatives can be arranged. This should be further discussed when actual design for this facility ensues.

Consideration must be given for the physical security of the fuel tanks consistent with the threat level anticipated.

Ventilation

Outdoor air ventilation requirements for all spaces will be in accordance with the Natural Ventilation and Mechanical Ventilation sections of the applicable Mechanical Code.

Roof mounted intakes will be avoided wherever possible. Wall louvers, shall be located high enough above adjacent grade and remote from generator exhaust to prohibit easy access. Louver location and appearance will be coordinated with the general design

of the building to block entry of foreign objects and camouflage its location. Manbars will be considered on all louvers large enough to inhibit human passage.

Indoor Air Handling Unit

Two separate intake louvers on opposite sides of the building (if possible) should be installed to provide redundancy should one intake be violated. Motorized dampers will be included to isolate the contaminated intake. Each intake will be sized for 100% ventilation airflow. Outdoor air in-takes for air-handling unit shall be provided with iodine, chlorine and carbon monoxide and nitrogen dioxide sensors (if necessary and if determined by the threat assessment). Each system shall be complete with a monitoring system. Unit shall also be provided with supply duct smoke detectors. Sensors shall close outdoor air dampers upon detection of gases, and smoke duct detectors shut-down unit upon detection of smoke.

General

Although a final systems selection must occur during the design process, the following system selection is one potential means to handle the heating and cooling for the facility. (Note that the team should also consider a geo coupled heat pump system or a VRF with cassette unit system as well). Other systems are available that may be more applicable to this facility and should be considered at the beginning of the actual design process.

Two high efficiency water boilers (each sized at 65% - 100% of building heating requirements) will provide hot water heating to the indoor air handling unit along with two roof top units (or a single rooftop unit with dual fans and infrastructure), perimeter radiation, (at perimeter office walls) cabinet heaters (entrances, etc.) and VAV box re-heat coils. Hot water will be distributed by two floor mounted hot water pumps (one 100% stand-by).

A chilled water air handling unit will be designed utilizing an air-cooled chiller. Cooling will be by the air handler with thermostat control and VAV boxes for the PSAP/ EOC.

The primary source of cooling energy might be provided by an air-cooled chiller, provided with 30% polypropylene glycol solutions. The chiller will be interfaced with the new DDC system.

Chilled water shall be circulated throughout the building via base mounted centrifugal pumps (one standby).

Chilled Water: Chilled water system shall be a constant flow – system with a chilled water storage tank. System to be provided with DDC Controls interfaced with Building Management System, and provided with flow meter to allow for chilled water capacity control.

Provide two (2) constant flow glycol chilled water pumps. Two pumps (one 100% stand-by) shall serve the PSAP/ EOC area air-handling unit and the office area rooftop units. Pumps shall be complete with suction diffusers, triple duty valve, flexible connectors, isolation valves, thermometer and pressure gauges. Pumps shall be mounted on vibration isolators.

Ventilation air and combustion air shall be provided for the mechanical room. Intake fan shall be two speeds and shall be interlocked with the boiler operation. Boiler burner kill switches shall be provided at the mechanical room door.

Pressure breeching and stacks will be provided for each boiler. Stack caps shall be installed at termination point.

Toilet rooms, break rooms and janitor closets shall be provided with mechanical exhaust systems at a rate of 2 CFM per square foot of floor space and per International Code regulations.

The control system shall be of the electric digital type with head end control and monitoring. Air handling units, VAV boxes, rooftop units and boilers shall be provided with stand-a-lone controls and shall be monitored, controlled and alarmed through the head end.

The Equipment Room and UPS Room (if separate) shall be provided with a floor mounted environmentally controlled Computer Room type air conditioning units (CRAC Unit).

Supply air diffusers shall be of the adjustable lay-on panel or surface mounted type, louver faced with control damper. Slot diffusers will be utilized in exterior offices.

All supply air ductwork and hot water supply and return piping shall be fully insulated with vapor barrier cover.

All water and air systems shall be balanced.

The Server Room shall be provided with an exhaust system in support of the chemical fire suppression system.

All wall louvers shall be approved for hurricane conditions.

Seismic: The PSAP/ EOC may be classified as an Essential Facility according to the IBC. All Mechanical Components will need to meet the Seismic Design Requirements of Section 1621 of the 2003 IBC as well as those set forth in Section 9.6 of ASCE 7-02.

Air Distribution

PSAP/ EOC HVAC System

The HVAC System shall consist of a modular VAV air handling unit with hot water heating and chilled water cooling (or other terminal unit system). Units will provide conditioned air to the PSAP/ EOC space overhead (or underfloor if possible) system. Return air will be obtained from area return registers.

Minimum ventilation air shall be provided through the unit economizer. The economizer shall provide free cooling whenever outdoor air conditions permit.

Support Area HVAC System (Office and other areas)

Again, a myriad of HVAC systems are available depending on final location and design. General areas might be designed as follows. Split systems can be used in the non-emergent spaces. All return air shall be ducted. Ductwork shall be designed for SMACNA requirements. Medium pressure ducts shall have Class A seals and low pressure shall have Class C seals. Flexible ductwork to diffusers shall be insulated medium pressure with reinforced foil face.

Modular Air Handling Unit: (PSAP/ EOC)

Provide a VAV air handling unit located in the proposed mechanical equipment room. Unit shall be provided with an outside and return air mixing box, filler box, (30% Pre-filter, 95% particle filter and Purafil PK12 filled with "CP" select blend carbon filter), chilled water cooling coil with face and by pass, hot water heating coil, supply and return fan sections with VFD drive, diffuser section and 99.999 Hepa Filter. Units shall be mounted on vibration isolators and provided with sound attenuator on supply and return sections, stainless steel drain pan and stainless steel coil casing, ultra-violet disinfection system, air flow measuring station, duct smoke detectors, and DDC controllers.

Roof-Top Units: Support Area HVAC SYSTEM

The HVAC System shall consist of roof-top packaged unit systems with hot water heating and direct expansion cooling. Return air will be obtained from area return registers.

Minimum ventilation air shall be provided through the unit economizer. The economizer shall provide free cooling whenever outdoor air conditions permit.

Units shall also be provided with supply duct smoke detectors. Smoke duct detectors shall shut-down unit upon detection of smoke.

Minimum ventilation air shall be provided through the unit economizer. The economizer shall provide free cooling whenever outdoor air conditions permit.

Server Room

Provide one primary and one redundant indoor horizontal mounted air-handling unit with chilled water cooling coil and hot water heating coil.

The air distribution ductwork from the air-handling unit to the diffusers shall be low pressure and all return air ductwork shall be low pressure. All return air shall be ducted. Ductwork shall be designed for SMACNA requirements. Low pressure shall have Class C seals. Flexible ductwork to diffusers shall be insulated medium pressure with reinforced foil face.

Controls

A complete system of automatic temperature control shall be provided only if requested by the client. The system shall be electric/DDC complete with a head end computer. DDC system shall interface with the existing chiller air handling unit and roof-top unit controllers, monitoring CO₂, VAV Box controllers and reheat. Provide start/start-alarm and communication functions with controllers and shall tie into the boiler control panels for the boilers. In addition, the DDC shall provide time of day control, startup, temperature control, safeties, alarms, etc. The Fin radiation shall be controlled by room thermostats common with the VAV box/reheat and unit heaters by area thermostats. Exhaust fans shall be sequenced on/off through the head end. Head end shall be a web accessible system and shall have interface capabilities with the technology equipment at the PSAP/ EOC Supervisor's workstation. If the DDC system is not used and a simple wall mounted control system is used in lieu, then a means by which outside air intake shutdown can be activated must be investigated.

Chemical Suppression System Exhaust Systems (Server Room)

Provide an in-line exhaust fan along with associated ductwork, controls and grilles.

Exhaust louver for each system shall be as approved for tornado conditions.

Exhaust Fans

Exhaust fans shall be provided for toilet rooms, break room, janitor closets and electrical closets. Exhaust requirements shall be 2 CFM per square foot of floor space and per IBC regulations. Fans shall have back draft dampers, built in disconnects, bird screen and roof curbs.

Duct Insulation

All supply air concealed ducts shall be insulated with 1 1/2" thick standard duct wrap with FSK facing and all exposed supply, return and outside air intake ductwork shall have 1 1/2" thick 1B Board.

Piping Valves and Fittings

All hot water piping shall be schedule 40, black steel. Valves and fittings shall be provided along with isolation ball valves and strainers for all coils, hot water cabinet, heaters and fin radiation.

Pipe Insulation

Pipe insulation with ASJ jacket for hot water piping. Insulation shall be 1 1/2" thick except 1" pipe and smaller shall be 1/2" thick. Exposed piping and fitting to be insulated and provided with aluminum jacket.

Breeching and Stack

Breeching and Stack with 2" insulation fill, aluminum outer jacket and stainless outer jacket. Stack exposed to outdoor conditions shall also have a stainless steel outer jacket. Stack exit shall have a stack cap.

PLUMBING

General

The plumbing systems shall be installed in accordance with the rules and regulations of the Local and State Building Code, the International Plumbing Code, and any authority having jurisdiction. The plumbing systems shall be furnished complete and ready for occupancy. All trenching, excavation, bedding and backfill required for the installation of underground piping shall be provided.

All hangers, hanger rods, beam clamps, rise clamps, etc. required for the installation of above ground piping shall also be provided. All plumbing work shall be performed by an authorized plumbing contractor.

The PSAP/ EOC will have to be classified as an Essential Facility according to the IBC. The seismic design category shall meet those criteria. All mechanical systems and components will need to meet the Seismic Design Requirements of Section 1621 of the IBC as well as those set forth in Section 9.6 of ASCE 7-02.

Sanitary and Vent Systems

The sanitary system shall serve toilet rooms, janitor closets, floor drains, trench drains and all other fixtures requiring drainage. The sanitary piping system shall slope at a minimum of 1/8 inch per foot and shall be vented through roof as required by code.

All above ground sanitary waste and vent piping and underground sanitary piping shall be cast iron pipe and fittings. The above ground cast iron piping shall use the no-hub jointing method with anchors at chair carrier connections. The underground cast iron piping shall utilize modification hub type fittings. Provide cleanouts at the bottom of all risers, each turn and at 50 foot intervals on straight runs.

Domestic Hot and Cold Water Piping Systems

Water service shall connect to the municipal water system. The service shall be provided with a reduced pressure zone backflow preventer, pressure reducing valve, strainers, valves and meter.

The underground domestic water service piping from the municipal water main connection to the building and underground within the building shall be cement lined ductile iron pipe with mechanical joints. All above ground domestic hot and cold water piping shall be Type "L" seamless copper tubing, for use with solder type fittings. Fittings for copper tubing shall be wrought copper or cast bronze. Valves for iron piping shall be iron body; valves for copper tubing shall have bronze bodies. Solder shall be lead free type.

All domestic cold water, hot water, hot water return, and horizontal storm water piping shall be insulated with fiberglass insulation with all service jackets. Insulation thickness shall be in accordance with the International Energy Code.

A 72 hour supply of bottled water for drinking will be provided on site.

Stormwater Piping System

The building stormwater system shall consist of roof area sloped to gutters, leaders, scuppers and downspouts (systems dependent on final roof design). All exterior drains with scuppers and downspouts should at some time be tied to an exterior drain system or else the leaders should hit splash blocks.

Plumbing Fixtures

The fixtures shall be white vitreous china. Water closets shall be 1.6 GPM water saver, wall hung or tank type. Urinals shall be wall hung type with sensor operated flush valves. Lavatories shall be under counter mount with sensor operated faucets. Shower assemblies shall be fitted with faucets, fittings, heads and mixing. Sinks shall be single or double bowl, stainless steel, counter top mounted with gooseneck faucets and wrist blade handles. Molded stone service sinks with service sink faucets shall be provided in janitor closets. Dual level wall hung electric water cooler.

Handicapped fixtures shall be provided within the requirements of the State Codes and the ADA Codes. Water closets and urinals shall be water conservation type.

Fixtures shall be commercial grade plumbing fixtures.

Fixtures shall be furnished in sufficient quantity to satisfy the applicable plumbing code.

Provide water hammer arrestors in domestic water piping to fixtures in accordance with PDI standard "PDI-WH-201".

Plumbing Equipment

Hot water shall be provided by an electric or gas, tank type water heater and recirculating hot water piping system and pump. Heater shall provide appropriate storage with a fast recovery. Heater shall be supplied complete with ASME rated pressure and temperature relief valves.

Plumbing Specialties

Non freeze hose bibbs shall be provided on the exterior of the building for maintenance purposes. A hose bibb shall be in the Mechanical Room. Backflow preventers and vacuum breakers shall be provided at hose faucets and all other areas required by code. Pipe anchors and supports and shock absorber devices shall be provided where required. Floor drains with trap primers shall be provided in Toilet Rooms, and Mechanical Rooms, and under raised floor areas in the PSAP/ EOC and Server Room (if raised floor).

Fire Protection

The fire protection system be designed and installed in accordance with the rules and regulations of the International Building Code, International Fire Code, appropriate County and State Codes, Insurance Underwriter, Local Fire Department Standards, NFPA Codes and any other authority having jurisdiction. The fire protection system shall be furnished complete and ready for occupancy. All trenching, excavation, bedding and backfill required for the installation of underground piping shall be provided. All hangers, hanger rods, beam clamps, riser clamps, etc. required for the installation of above ground piping shall also be provided.

The office area of the facility shall be protected by an automatic wet-pipe sprinkler system (if required by square footage). The system shall be hydraulically calculated to meet NFPA 13 light hazard occupancy requirements.

The PSAP/ EOC, where protection of electronic equipment is a consideration, shall be protected with a double interlocked pre-action system. This system requires the activation of two detectors and melting of a sprinkler head prior to water discharge. After the first action an alarm shall be initiated to allow the building occupants to deal with the fire before water discharge.

The Server Room shall be protected by an FM-200 or ECARO-25 chemical fire suppression system to prevent damage to the contents. FM-200 and ECARO-25 fire suppression systems are replacement agents for Halon 1301 systems and are not damaging to the ozone layer. These systems are controlled by their own smoke and ionization detection systems and control panels which are interconnected with the building fire alarm system. The area shall be protected above the raised floors at the ceiling level. Only if allowed by the local Fire Marshall and insurance underwriter, a time delay feature and abort switch may be provided. This provides a time window after alarm initiation that will give the occupants time to access the situation and deal with the fire and abort system activation if desired prior to chemical discharge. No backup water based fire suppression system will be provided in this area.

The incoming fire service shall be ductile iron pipe and shall connect to the municipal water system or to the current building. The service shall have a double detector check valve assembly, complete riser trim, fire department connection, and wall post indicator valve.

The building shall have fire extinguishers furnished and installed in accordance with NFPA 10 requirements.

The requirements for backflow and metering of the fire service shall be coordinated with the water utility company. No on site storage of fire protection water will be required as far as the design team knows. An analysis of the available water supply must be made per the requirements of NFPA to determine if a fire pump will be required.

The designs for all systems shall conform to the seismic requirements of the International Building Code and NFPA requirements.

ELECTRICAL

Power, lighting etc.

System Redundancy and Emergency Power Supply

The PSAP/ EOC/ Fayetteville Utility Operations Data Disaster Recovery Space and Server Room portions of the facility shall be designed so that the failure of any one piece of equipment will not compromise the public safety mission. In addition, sufficient equipment must be connected to the emergency power supply to similarly achieve the mission during a utility failure. System/Equipment redundancy and emergency power requirements should be in accordance with the following table:

Area/System	Redundancy	Emergency Power
PSAP/ EOC A/C Unit	N + 1	Yes
Server Room/ Data Disaster Recovery A/C Unit	N + 1	Yes
General A/C Units & Fans	N	No (dependent on location)

Notes:

N= Number and capacity required to satisfy 100% of load.

Compliance

The new electrical service installation shall comply with the most recently adopted edition of the National Electrical Code and International Electrical Codes, as well as with all applicable ordinances of authorities having jurisdiction, and the local Utility's requirements. Reasonable provisions for anticipated growth shall be provided for in the design.

Electrical design philosophy

Principles of value engineering will be applied for the most practical and economical system for initial installation, operation, and maintenance costs. Consideration to not compromise safety, performance, and reliability will be incorporated.

Equipment

Equipment with high power factor and energy efficient motors will be provided to reduce power consumption costs and promote energy conservation.

Incoming service

Dual power supplies from the utility company are preferred over a single source. Obviously this will be very site dependent. Redundant power grids may not be directly available but should continue to be discussed.

At the building, each incoming service shall terminate in a separate double ended switchboard arrangement. The switchboard shall contain a main breaker for each incoming service and a common tie breaker. Mains and tie shall be electrically operated and key interlocked. Three (3) feeder breakers, plus one spare and one space shall be provided. Owner electronic check metering shall be provided for both sides of the switchboard.

All circuit breakers in the switchboard shall have electronic trip elements (short time, long time and instantaneous for feeders; short time and long time only for the mains and tie) and be of the power air drawout circuit breaker type.

Building Loads

The building loads should be developed for the entire square footage and a reasonable factor for building increase of approximately 25% shall be included in the load calculations.

Emergency Standby Power

One Natural Gas generator with propane fuel backup is desired (minimally dependent on available utilities at a given site), capable of full load for at least the PSAP/ EOC and Server Room. If budget allows, a two-generator system should be considered (can be an add alternate in any bid situation). The generator shall be provided with tanks and 72 hour fuel capacity (or as discussed previously in this section).

UPS System

A new UPS shall be provided capable of providing UPS for all of the critical systems within the facility (specifically the Server Room/ City Data Disaster Recovery and the PSAP/ EOC). The UPS will also power a dedicated computer receptacle in every other occupiable space in the facility. The goal is to be sure computers throughout the facility are uninterruptible. This unit will be required to provide for additional growth.

Mechanical Equipment Power

Mechanical equipment in the office support areas shall be fed from the distribution/branch panels in that area. Mechanical equipment in the PSAP/ EOC and Server Room in the hardened areas shall be fed from the distribution/branch panels in that area. Disconnect switches/motor starters for HVAC equipment shall be furnished.

Lighting and Controls

Note that our comments below for office spaces and conference spaces should serve as guidelines only. It should also be noted that many times LED fixtures have become as cost effective as fluorescent fixtures and should be considered where fluorescent is identified.

Provide 2' x 4' recessed fluorescent direct/indirect three lamp (T5HO) lighting fixtures in all office spaces as indicated (one per 70 sq. ft.). In corridors provide the same fixture as the office except two (2) lamps and spaced 12'-0" on center. Provide nominal 6" diameter recessed fluorescent downlights (2 – 26 watt) with suspended glass decorative diffusers for accent lighting in conference rooms, lobbies and reception areas (dimmable ballasts). Assume one (1) fixture per 40 sq. ft.

Lighting in the PSAP/ EOC shall be direct/indirect fluorescent or LED. Continuous rows of 3 lamp (T8-32W) with one fixture for approximately every 65 sq. ft. Innes lamps shall be on a separate circuit. Provide dimming ballasts.

Lighting in the Server room shall be 3 lamp, 2' x 4' recessed acrylic fluorescent. Linear fluorescent lamps shall be T8-32 w or T5-54wHD; compact fluorescent ballasts shall be of the electronic type with less than 10% THD.

In each individual office and conference room provide a wall mounted switchable P.I.R. occupancy sensor.

Selected fixtures in corridors and large spaces will be provided with emergency ballasts and also be connected to life safety circuits and be utilized for night/emergency lighting (unswitched). Lighting in the computer equipment room shall be locally switched.

Lighting controls in the Board Meeting/Training rooms and PSAP/ EOC can consist of local dimming packages with multiple scene pre-set controls at the Owner's discretion.

All fluorescent ballasts shall be electronic with <10% THD.

Power Distribution Unit(s) (PDU)

Provide two (2) power distribution units with shielded isolation transformer, two panelboard sections with a total number of poles and power input junction boxes (adequate for total building loading) with surge suppression plates in the Equipment Room.

Remote Power Panels (RPP)

Provide (2) two (size to be determined by electrical sizing) remote power panels in rack type assemblies.

Grounding

Provide grounding in accordance with NEC 250, the requirements identified in Motorola R56 Guidelines, and the following:

Insulated green ground for all lighting, power and mechanical equipment circuits.

#2 AWG insulated ground from switchboard to Voice/Data MDF Room Main Ground Bus (MGB) #2 AWG from MGB to Subsystem Ground Bus (SSGB) and IDF rooms. Provide a 2" x 1/4" x 24" long copper ground bar drilled and mounted on insulated standoffs.

Main Electric Room: 2" x 1/4" long ground bar(s) mounted on insulated stand-offs.

Telecomm/Radio Equipment Grounding: As per Motorola Standard R56. (#2 AWG from SSGB to ground bar in equipment racks.)

UPS System/PDUs: Input and output ground to be same size as phase conductors.

Raised Floor: #6 AWG ground on – 6' x 6' grid (to be final determined by PSAP/ EOC console sizes) attached to pedestals and all panels serving raised floor area, including consoles.

Receptacles

All receptacles shall be heavy duty specification grade, NEMA 5-15R in all office support areas except kitchens, bathrooms and locker rooms which will be NEMA 5-20R (GFCI where indicated). All receptacles in the PSAP/ EOC and Server Room shall be NEMA 5-20R isolated ground type (except where special outlets are identified.)

In raised floor areas of the PSAP/ EOC area, receptacles shall be mounted in access floor service boxes (mounted in the raised floor tile).

Flush floor boxes in concrete floors shall be of the adjustable type, steel with natural aluminum finish faceplates and carpet flange.

As a minimum, provide the following quantity of receptacles:

Offices:	(1) double duplex, (2) duplex
Conference Rooms:	(1) double duplex, (4) duplex, (1) flush floor
Toilet/Lockers:	(1) GFCI
Corridors:	(1) duplex every 50 feet
Reception:	(4) duplex
Kitchen:	(4) double duplex (separate circuits each)
Training:	(1) flush duplex per (2) chairs
PSAP/ EOC areas:	(2) Double duplex (one circuit per outlet) receptacle to serve four pre-wired tables and two per each PSAP workstation
Mechanical/Electrical	(2) duplex minimum
Telecomm IDF	(2) double duplex (separate circuit) or as required by telecommunications designer. Wire per R56 Requirements

Circuiting

Maximum loading per circuit shall be as follows:

277 volt lighting:
3200 watts
120 volt lighting:
1600 watts

Receptacles: 2 standard work stations per circuit
Multiple circuits as required for each Backup PSAP/ EOC position
8 maximum receptacles per circuit other areas

Microwave: Separate circuit

Refrigerator: Separate circuit

Vending:	2 machines per circuit
Range:	60A 250V circuit
Dimming Circuits:	Separate neutral/switch leg
Homeruns:	Three single phase circuits max. (Separate neutral on clean circuits) Three phase motor circuits: Separate homerun
	120 V circuits over 75 feet: #10 AWG
	277 V circuits over 175 feet: #10 AWG

Equipment Room Ground

Continuous #6 bare ground perimeter of room (below raised floor) for single point ground of communications equipment. All grounding to meet Motorola R56 standards at a minimum.

Lightning Protection

Provide a complete master labeled Class I system in accordance with NFPA 780 and UL 96A.

Fire Alarm

New devices need to be installed in the appropriate manner in the building.

- Manual Pull Stations
- Audible Alarms
- Audible/Visual Alarms
- Smoke Detectors
- Heat Detectors
- Duct Smoke Detectors
- Main Fire Alarm Control Panel
- Annunciators
- Sprinkler Tie-in

Suppression System Tie-in
Auxiliary input/output relays for door release, fan shutdown, etc.

Interface wiring between fire alarm panel and mechanical equipment shall be provided.

Voice/Data Communications

Provide a complete voice/data infrastructure for the building.

Seismic

All equipment, conduit, and other devices related to the electrical installation, etc. shall be seismically braced per the requirements of the Essential Facility requirements.

Seismic bracing and isolation materials shall be of the same manufacturer and shall be certified by the manufacturer.

It is the intent of the seismic portion of this narrative to keep all electrical building system components in place during a seismic event and operational after the event should that be required by code.

All such systems must be installed in strict accordance with seismic codes, component manufacturer's and building construction standards. Whenever a conflict occurs between the manufacture's or construction standards, the most stringent shall apply.

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SITE ANALYSIS & CONCEPT OPTIONS

5

SITE ANALYSIS & CONCEPT OPTIONS

INTRODUCTION

The focus of this entire study was to develop a program specifically for City of Fayetteville/ Cumberland County's proposed Emergency Communication Center and then to test it in several ways to determine the best future for the co-located organizations' facility use. The planning team was tasked with developing a concept diagram reflecting the programming effort outlined in Section 2 of this document and then to test the concept diagram on several sites.

Initially the City of Fayetteville/ Cumberland County team identified four sites on which the project might be located. During the Workshop Sessions held in November 2015 the team toured the sites and had general discussion about the viability of the various locations. Following the visit the planning team developed Threat Assessments for each site and eventually through process of elimination three sites were recommended for further study. This study focuses on those three sites. A slightly different program is developed for each site based on requests made by the Owner Team.

THE SITES

The sites and the proposed programs are as follows (note: these sites are identified by address in Section 3):

- Site #1** - **Cedar Creek Business Center Site** – On this site, the Owner has requested that the design team test-fit the Emergency Communication Center program only
- Site #2** - **Fields Road Site** – On this site the Owner has requested that the planning team test fit the Emergency Communication Center program along with a Proposed Fire Station. The combined facility attempts to merge shared site elements between these two programs together. It also attempts to link the two buildings. This is described further in the Site Analysis options on the pages to follow.
- Site #3** - **Tracy Hall Road Site** - On this site, the Owner has requested that the design team test-fit the Emergency Communication Center program only

All site configurations are further investigated for cost in Section 6 of this document.

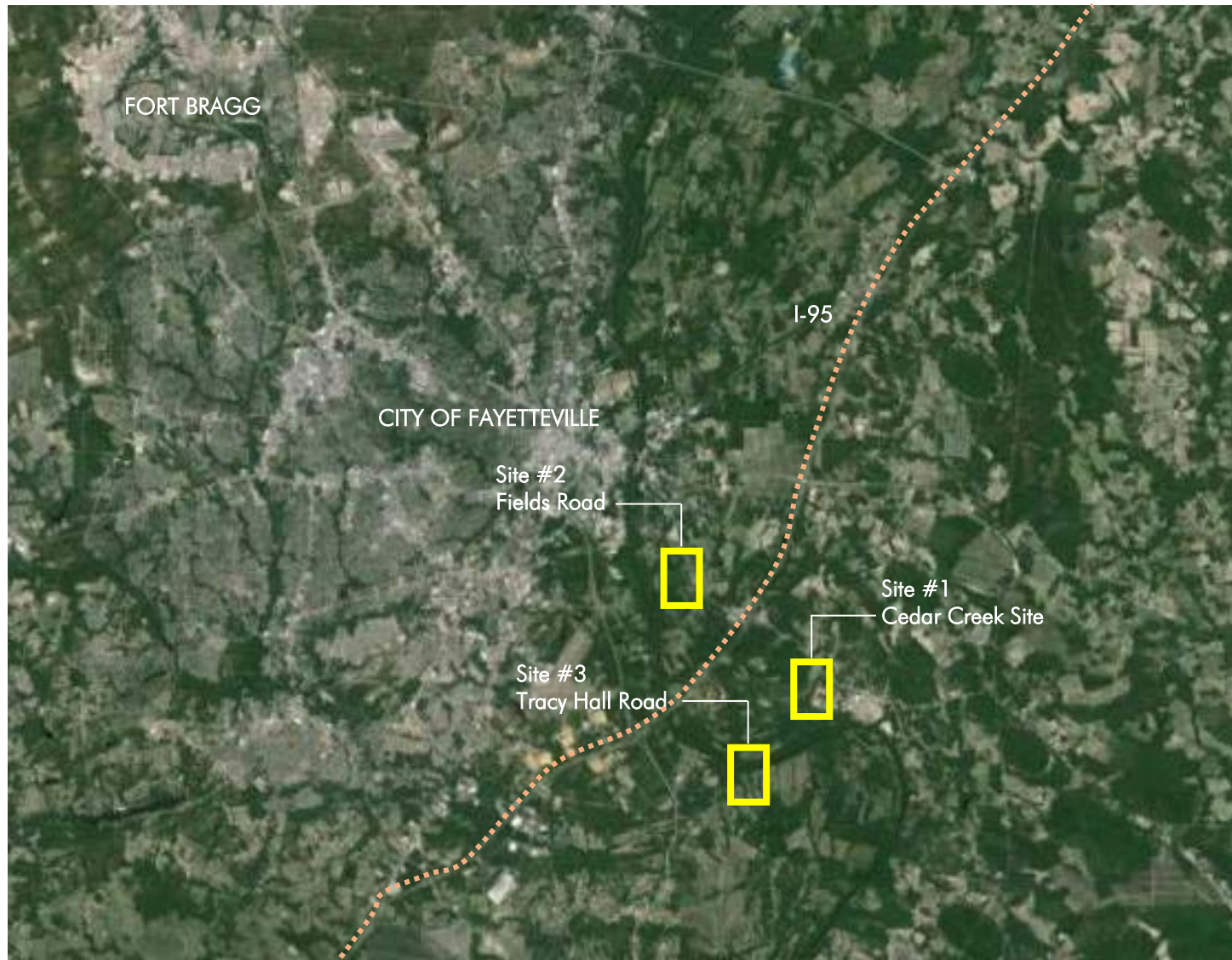
This Section begins with the analysis of the three construction sites identified by City of Fayetteville/ Cumberland County. The planning team has develop a simplified site analysis for use in this document. Note that much of the analysis of the proposed sites is based upon conversation held during the Workshop in November 2015 and from follow-up data provided by City personnel.

Overall, this section provides the following information:

- A brief analysis of Site Location #1
- A brief analysis of Site Location #2
- A brief analysis of Site Location #3
- Concept Floor Plan
- Site Concept Plan - Location #1
- Site Concept Plan – Location #2 (note that both Concept #2A and #2B are shown as one diagram. The reader will need to extrapolate the emergency communication center program elements from the drawing to understand the plans used for estimating in Section 6)
- Site Concept Plan – Location #3

Section 6 of this document provides an order of magnitude budget cost estimate for each site. Except for the Fields Road site, Section 6 utilizes the same building area for each site and will utilize the same structural and material finishes. Further variations in project cost will likely emerge due to site related costs.

The three sites are shown below.



Potential Sites

SITE ANALYSIS

Proposed Site Location #1

LOCATION

Cedar Creek Business Center, Fayetteville, NC

ZONING

Specific zoning classification was not available to the design team however the development is approved as commercial so zoning regulations will likely allow the facility. The allowance of a tower will be a question under each zoning classification.

DESCRIPTION

Site #1 is located on the south west side of Cedar Creek Road at the entry to the Cedar Creek Business Center. It is marked as Parcel #1 on the Cedar Creek Master Plan subdivisions with the suggestion of adding the triangular piece of residential property directly to the north and west of it. Parcel #1 is a rectilinear piece of property of approximately 10.36 acres which when combined with the triangular piece will be in the neighborhood of 15 acres. When Parcel #1 is combined with the triangular piece of property it has approximately 650 feet fronting Cedar Creek Road.

The subdivision information does show a flood plain line within the Cedar Creek development however the flood plain line appears to be over 1,400 feet from Parcel #1. There are a series of wetlands located approximately 1,500 feet to the south and west within the development. According to the development information this site sits approximately twelve feet above the wetland area.

Cedar Creek Road is considered a primary roadway connecting State Route 210 to State Route 242. The site will provide (once the master plan roadway is completed) a secondary means of egress. Current access is directly adjacent to this proposed site to Cedar Creek and the secondary egress in the future may be along Clark West Road which exits to Evans Dairy Road. Access to major highways includes a direct connection from Cedar Creek road 1.5 miles to the north and west. Access to and from the site appears to be very good.

The immediate area contains fields, woods and some residential. Within 1.5 miles there are a mixture of commercial and retail properties.

As with all land development and zoning ordinances, codes should be reviewed in detail prior to further consideration of this piece of property for the project.

UTILITIES

Electricity – Power is provided immediately adjacent to the property along Cedar Creek Road.

Fiber – It is assumed that fiber is provided immediately adjacent along Cedar Creek Road.

Water – 24" diameter PWC water main in Cedar Creek Road.

Sewer – The complex will be served by a 48" diameter PWC sanitary sewer outfall along its western and southern boundaries. An 8" stub is intended to support each individual property on the site. It should be confirmed that these are installed as of this date.

SITE VULNERABILITIES

From the initial analysis, the overall site appears to be a very good and buildable site. Please see the Concept Site Plan provided later in this Section. It seems to have good accessibility and is a flat and buildable site. All of that said, there are some site vulnerabilities to be aware of.

It is not clear whether this site is within range of any plume zone however as noted above, it is located within 1.5 miles of I-95 which is hazardous materials route. This site is just to the east of that route meaning it may be within the predominant prevailing winds. A prevailing wind investigation should be completed to understand the ramifications that a plume might have on the site.

The site is directly adjacent to a Primary Roadway (Cedar Creek Road). Precautions should be taken to harden the facility from the direct drive by capability from that road.

It is unclear whether diverse pathways are available for power or telecommunications. The lack of power redundancy can be overcome. It is more difficult to overcome lack of diverse routing for telecommunications. Water and sewer service appear at first glance to have the capacity for the project however full studies should be undertaken.

A zoning ordinance analysis was not completed as part of this study. Zoning may create more restrictions than identified here however the first glance at the use seems reasonable given the intent of use of the balance of the development.

GENERAL SITE SUMMARY

From the perspective of available site area and buildability, this site is very reasonable. The fact that this site is relatively separate (distance-wise) from the other County and City sites allows for continuity of operations in the region.

The vulnerabilities and inconveniences all may be overcome with reasonable analysis and design. Further investigation should be conducted to determine the feasibility of using this site however at first glance it appears to be suitable. See site images on the next page.



Cedar Creek Business Park Site (Parcel #1 plus adjacent site combined)

SITE ANALYSIS

Proposed Site Location #2

LOCATION

Fields Road, Fayetteville, NC, Tax Pin: 0445-97-3707

ZONING

LC/ Limited Commercial

DESCRIPTION

Site #2 is located on the south side of Fields Road approximately 1/4 mile west of Cedar Creek Road. It is a rectangular piece of property of approximately 50 acres. It has approximately 800 feet fronting Fields Road but does not have access to a second means of egress directly from the site.

The city has indicated that there are plans to develop this site into a sports complex. Other discussions have also suggested the possibility of a law enforcement training facility at this site.

Information provided does not show whether the site is in a flood plain although the front portion of the site being considered for this project appears to be high and dry.

Fields Road is considered a secondary roadway connected to Cedar Creek Road. It is located within 5300 feet (1 mile as the crow flies) of I-95 and passes over that roadway. Access to and from the site appears good.

The immediate area contains fields and woods. Within a 1/4 mile there are a mixture of commercial, retail and residential properties.

As with all land development and zoning ordinances, codes should be reviewed in detail prior to further consideration of this piece of property for the project.

UTILITIES

Electricity – PWC at the site. Three phases available

Fiber – PWC, 16,340 feet of overhead line away from the site

Water – 8" AC water main stub out to Fields Road approximately 800' to the north. If the main is extended to this property, PWC requires that the extension continues across the entire front of the property. This means 800' of 8" water main.

Sewer – 36" SS outfall to the east that may require an aerial crossing, wetlands permits and off-site easements

SITE VULNERABILITIES

From the initial analysis, the overall site appears to be a very good and buildable site. Please see the Concept Site Plan provided later in this Section. The grouping of retail and residential properties to the east of the site is testament to the buildable nature of the area. All of that said, there are some site vulnerabilities to be aware of.

The site has some access issues. While it has direct accessibility to Fields Road which empties to Cedar Creek, the secondary access from the actual site will link Fields Road back to Cedar Creek further to the south (by way of Evans Dairy Road). This access works in concept however if Cedar Creek Road is ever blocked this site will have no alternative means of egress.

It is not clear whether this site is within range of any plume zone however it is located within 1 mile of I-95 which is a hazardous materials route. This site is just to the north and west of that route meaning it may be out of the predominant prevailing winds. A prevailing wind investigation should be completed to understand the ramifications that a plume might have on the site.

It is unclear whether diverse pathways are available for power or telecommunications. The lack of power redundancy can be overcome. It is more difficult to overcome lack of diverse routing for telecommunications.

Water and sewer service appear at first glance to have the capacity for the project however full studies should be undertaken. The concern expressed above for sewer connection is a legitimate schedule and cost concern.

A zoning ordinance analysis was not completed as part of this study. Zoning may create more restrictions than identified here however the first glance at the use seems reasonable.

GENERAL SITE SUMMARY

From the perspective of available site area and buildability, this site is very reasonable. This site makes good sense particularly with the potential inclusion of the fire station. Also, the fact that this site is relatively separate (distance-wise) from the other County and City sites allows for continuity of operations in the region.

The vulnerabilities and inconveniences all may be overcome with reasonable analysis and design. Further investigation should be done to determine the feasibility of using this site however at first glance it appears to be suitable with the exception of concern for the potential sewer extension.



Fields Road Site

SITE ANALYSIS

Proposed Site Location #3

LOCATION

Tracy Hall Road, Fayetteville, NC, Tax Pin: 0454-02-0075

ZONING

Industrial (County)

DESCRIPTION

Site #3 is located on the south side of Tracy Hall Road approximately 1/4 mile east of State Route 87. The overall property is an irregularly shaped parcel of approximately 245 acres. The site is framed by Tracy Hall Road, Cape Fear River and a tributary to the river. The proposed site for the actual Emergency Communications Center is a small portion of the overall site likely comprised of approximately 10 acres. The proposed portion utilizes approximately 400 feet of frontage along Tracy Hall Road.

Much of the overall site appears to be in flood plain. The portion proposed for this project indicates a 100 year flood plain line running approximately 100 feet from our proposed property line.

Tracy Hall Road is a utility roadway serving the waste water facility. It is located within 6,000 feet of the I-95 access ramp. Access to and from the site is decent however there is only one means of egress from the site along Tracy Hall Road.

The immediate area contains woods. Within a 1/4 mile there is a wastewater treatment plant, a chemical manufacturing facility and a nursery.

As with all land development and zoning ordinances, codes should be reviewed in detail prior to further consideration of this piece of property for the project.

UTILITIES

Electricity – PWC at the site. Three phases available

Fiber – PWC, 2,115 feet of overhead line away from the site

Water – 6" water main on Tracy Hall Road. An 8" water main may be required if the existing main does not meet fire flow requirements. The design team will need to verify.

Sewer – 50" outfall to the east. PWC will not allow sewer taps on this main therefore the sewer service will need to connect directly into a manhole.

SITE VULNERABILITIES

From the initial analysis, the overall site appears to be a reasonably buildable site. Please see the Concept Site Plan provided later in this Section. There are some site vulnerabilities to be aware of.

The site has access issues. While it has direct accessibility to Wilmington Highway and Route 87 there is no secondary means of egress from Tracy Hall Road itself. If Tracy Hall Road is ever blocked this site will have no alternative means of egress.

It is not clear whether this site is within range of any plume zone however as noted above, it is located within 1 mile of I-95 which is a hazardous materials route and Route 87. This site is just to the south and east of those routes meaning is likely in the path of prevailing winds. A prevailing wind investigation should be completed to understand the ramifications that a plume might have on the site.

The site is very close to the waste water treatment facility and the chemical facility. These should be further investigated as there are the potential of plume zones generated by these.

It is unclear whether diverse pathways are available for power or telecommunications. The lack of power redundancy can be overcome. It is more difficult to overcome lack of diverse routing for telecommunications.

Water and sewer service appear at first glance to have the capacity for the project however per the challenges described above, full studies should be undertaken.

The site is very close to the 100 year flood plain. Further investigation will need to be done to evaluate that potential vulnerability.

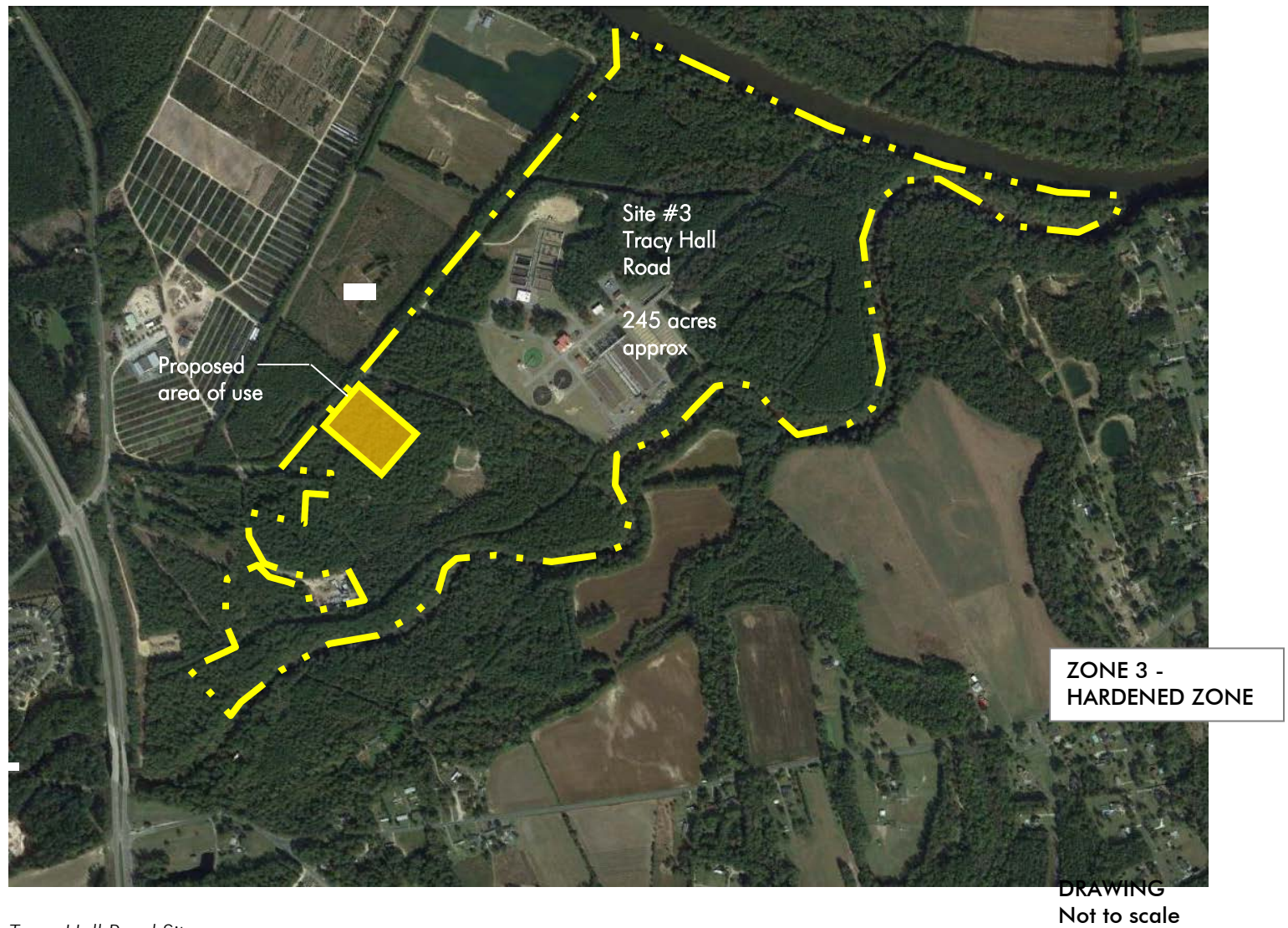
A zoning ordinance analysis was not completed as part of this study. Zoning may create more restrictions than identified here however the first glance at the use seems reasonable.

GENERAL SITE SUMMARY

From the perspective of available site area and buildability, this site is very reasonable. Given fact that this site is relatively separate (distance-wise) from the other County and City sites allows for continuity of operations in the region.

Most of the vulnerabilities and inconveniences may be overcome with reasonable analysis and design however the lack of secondary access, the potential water and sewer challenges and the 100 year flood plain all should raise some red flags. There is also some concern for the proximity of the site to the waste water treatment plant as well as the chemical facility located behind. It is unclear what threat the chemical facility might represent so as frank conversation with the facility will provide more information. Further investigation should be done to determine the feasibility of using this site.

See site images on the next page.



Tracy Hall Road Site

FLOOR PLAN CONCEPT - DESCRIPTION

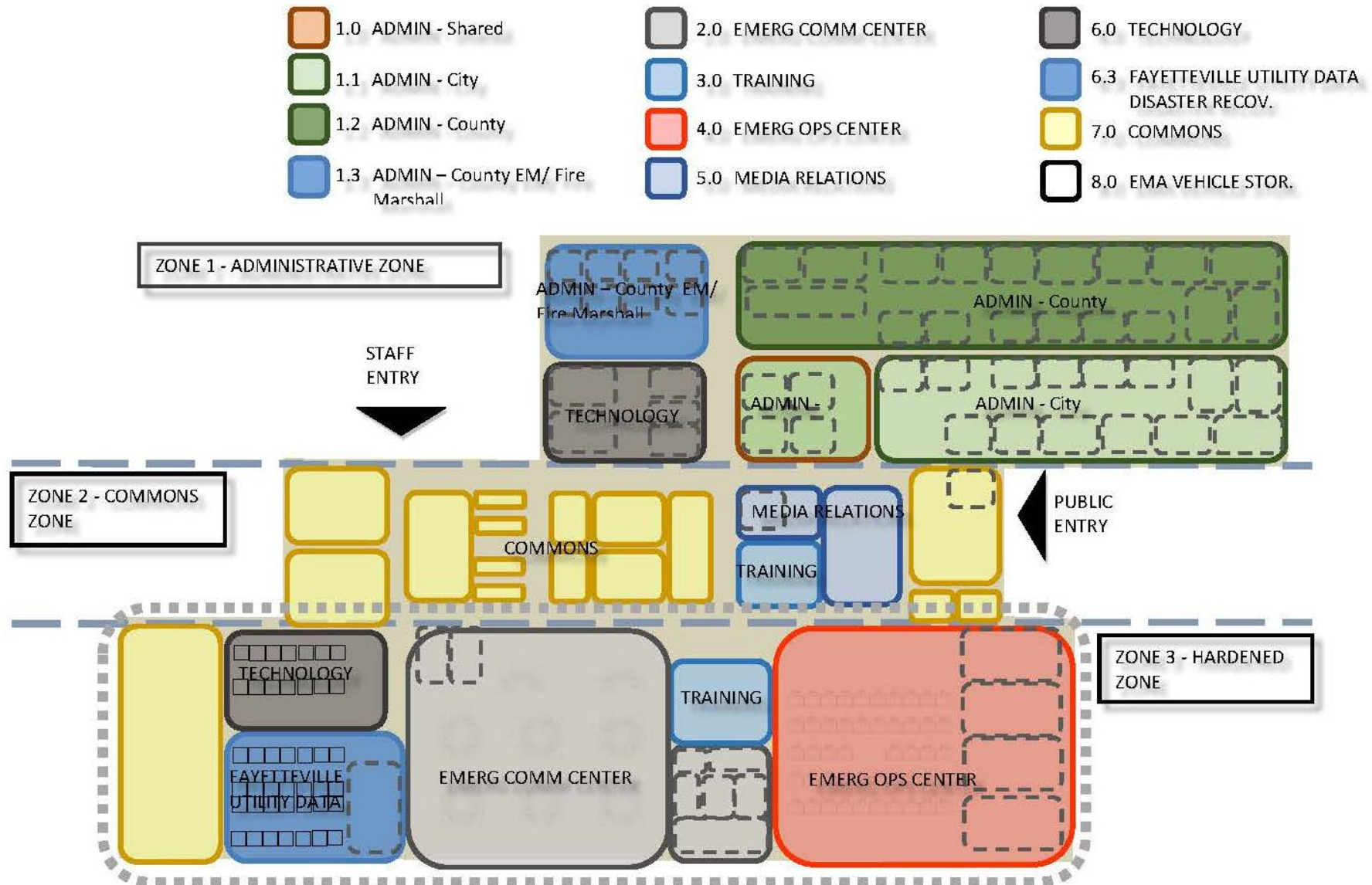
The Floor Plan Concept shown on the following page utilizes the programming developed in Section 2 of this document. The concept diagram demonstrates a single story approach to the program. Given the overall square footage there is the possibility of developing a two-story scheme however the costs of vertical circulation (including stairways and elevator) must be reconciled with the overall project costs provided in Section 6 of this document.

The concept shown on the next page essentially creates a building comprised of several zones. The zones are described as follows:

- Zone 1 – Zone 1 contains all office functions for County and City. The Fayetteville Utility Data Disaster Recovery offices are also included in the Administrative zone.
- Zone 2 - The next zone (center zone) is the shared function area. This zone contains the community functions demonstrated by the program. In this space reside common conference spaces as well as locker areas, break areas, kitchen, etc..
- Zone 3 - The last zone is the true hardened zone of the facility. And, while the balance of the facility is hardened to some extent, this zone of the facility is intended to encapsulate all of the critical systems required to continue operations of the facilities it contains. The EOC, the co-located communications functions, the disaster recovery computers, the technology and equipment room and the building services are located here. Should anything happen to any other part of the facility, this portion is truly stand alone.

The site plans will all utilize the “hardened” zone of the facility as the generator for the 25 meter standoff zone. Look for that in the site concepts.

The concept floor plan is provide on the following page.



SITE CONCEPTS

GENERAL SITE SUMMARY

The site Analysis provided earlier in this Section provides a reasonable summary of the advantages and disadvantages of each site. The ultimate test, for the sake of this Study however, is to test the footprint of the concept on each site. The images that follow this page provide that graphic test. These concepts are conceptual in nature and would need further design analysis to determine their accuracy. That said, these are reasonable site implementation strategies.

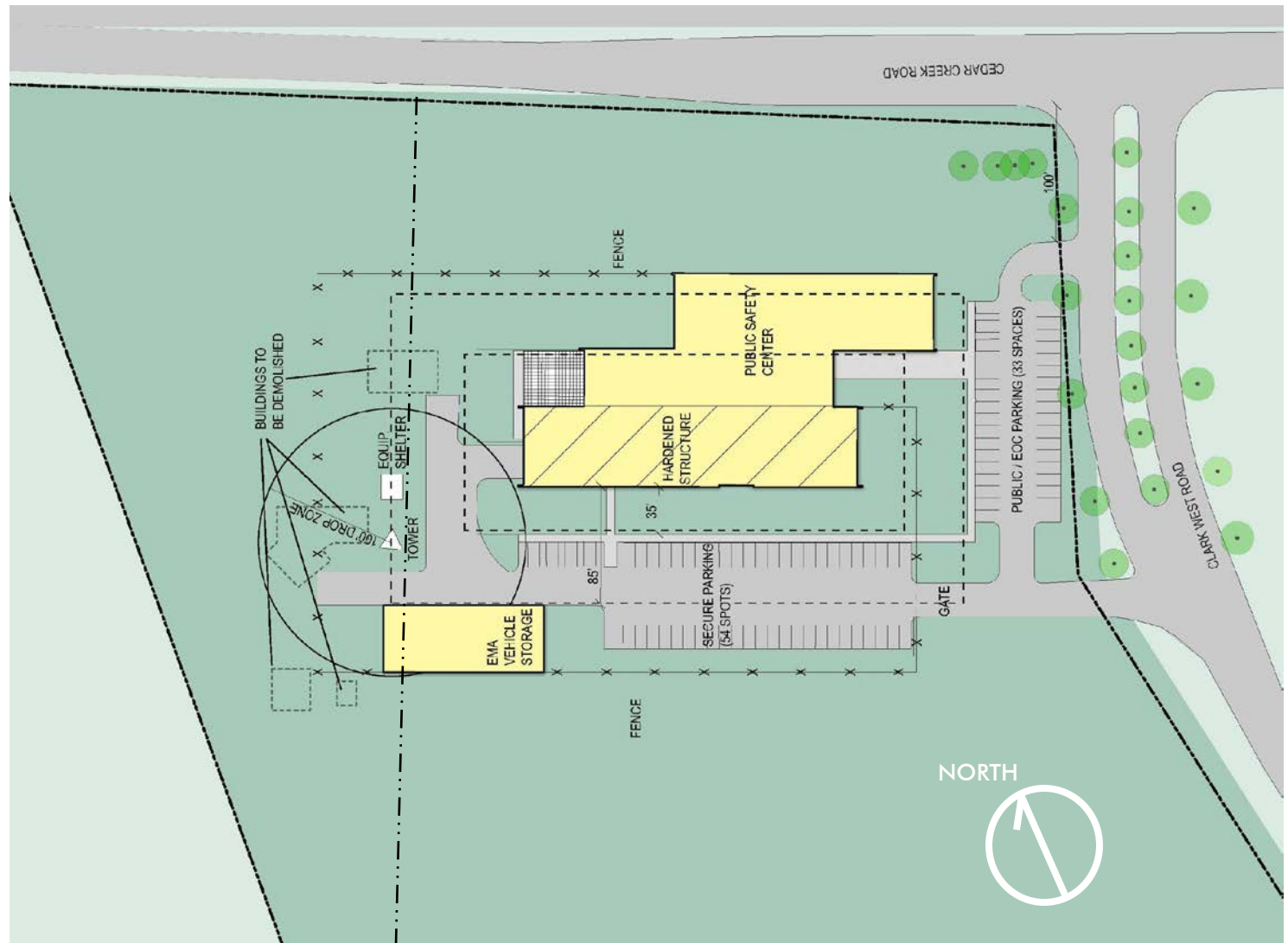
The site concepts incorporate some of the hardening strategies identified in Section 4 of this document. In so doing the planning team has attempted to include a building standoff from the “hardened” portion of the project. Parking for “cleared” vehicles is included in the standoff area assuming those are vehicles of building occupants or other officials previously vetted with the organization.

The concept tested on each site includes the concept floor plan provided on the preceding page. The plan is flipped and turned based on the orientation of the sites and on the capability of the site to accommodate the several different levels of parking. Each site concept also incorporates a 100’ tower and potential drop zone. These are the site elements that are consistent for each of the sites.

Site #2, The Fields Road site shows a slight modification of this concept. The City of Fayetteville/ Cumberland County Team has requested that the planning team provide the Emergency Communication Center connected to or incorporated in some way with a previously approved fire station floor plan. The planning team has incorporated the Emergency Communication Center with the Fire station so that it incorporates parking for the two into a cohesive scheme. Fencing, parking and site amenities are all combined and shared by the two facilities as well. The two facilities, however, remain completely structurally independent in terms of their functions. They are physically connected in plan, however, and will have continuous facades to allow for a cohesive campus “look”. The 25 meter standoff is accommodated within the scheme and allows for both facilities to function completely without disrupting that standoff.

Physically, all sites accommodate the building and site program. The question for the project overall, will be the vulnerabilities presented at the individual sites.

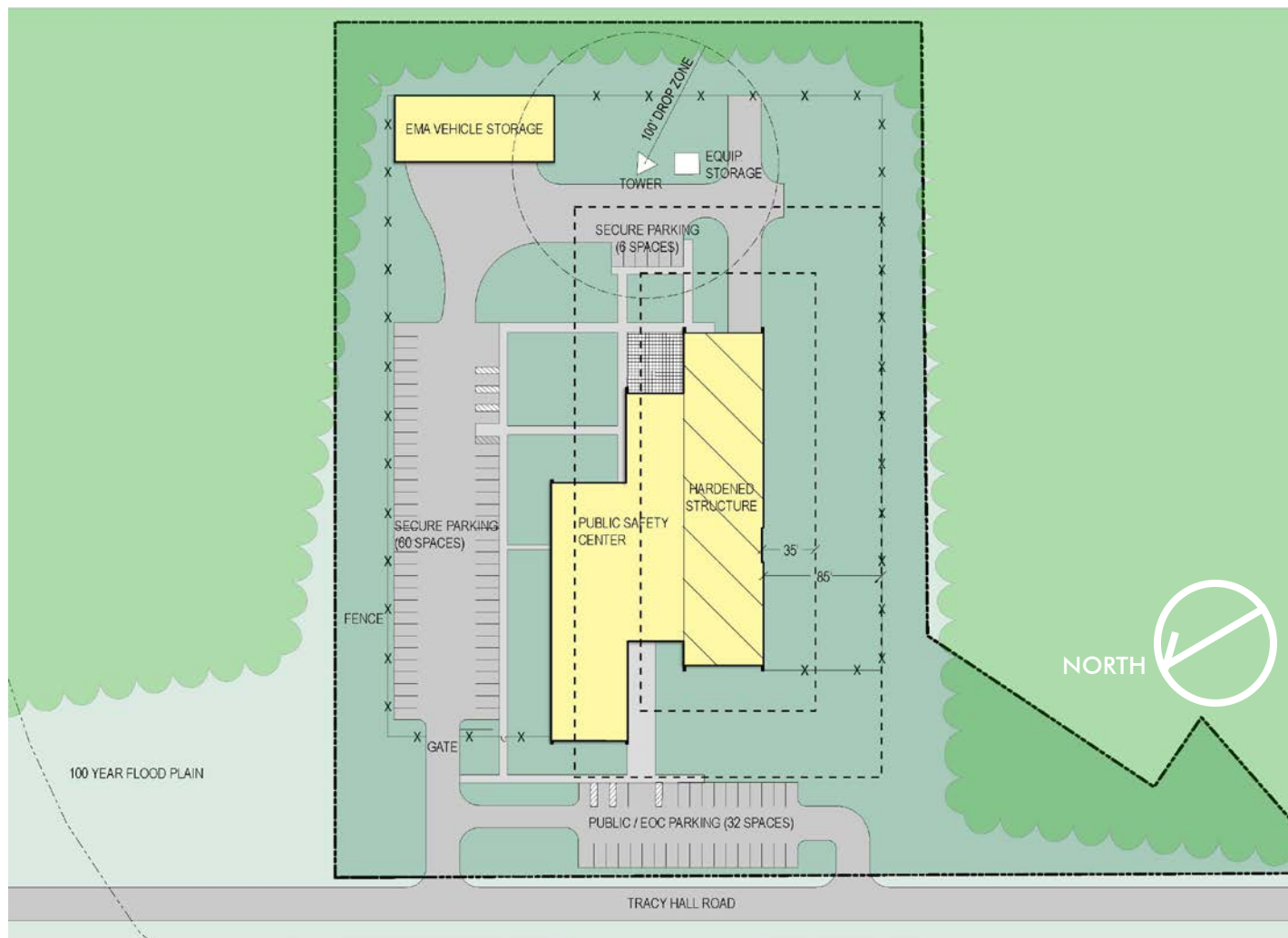
CONCEPT SITE PLAN #1 – Cedar Creek Business Park



CONCEPT SITE PLAN #2 – Fields Road



CONCEPT SITE PLAN #3 – Tracy Hall Road



CONCLUSION

As always, utility investigations, environmental assessments, full Zoning Ordinance reviews and other resource agencies will need to be consulted prior to actual design commencing. Information gleaned from those studies may help to further inform how the building and site is to be used.

While locations of spaces within the floor plans, locations of the facility and site program will likely change as the City of Fayetteville/ Cumberland County begins the design process with an architect, the concept diagrams provided in this section indicate that the program derived during the Programming Workshop held in November generally fit onto the various sites being analyzed. Site #1 works well as an overall location for this program. Site #2 provides the room to accommodate the additional fire station program. Site #3 provides for some concern relative to its secondary means of egress as well as the proximity of the 100 year flood plain.

This information is invaluable in proving that the ideas discussed in that November Workshop meeting can indeed be brought to fruition through a pragmatic design process.

CONCEPTUAL BUDGET

INTRODUCTION

Section 2 of this document provides an architectural program developed through our Programming Workshop. That building program is developed into a Conceptual Diagram in Section 5 that is then test fit onto the proposed sites. This section develops a project budget around those concepts.

For the costs identified in this Section, MCP/SGA utilized historic square foot cost data and developed a complete estimate that correlates to the concept diagrams and site diagrams provided in Section 5. Local construction costs, escalation, general site information and knowledge of current construction pricing of communication facilities are included as much as we can anticipate them in the estimates shown on the following pages. The costs included are for budgeting purposes only as no final design has been derived at this time but we obviously had the benefit of the concept diagrams to work from. Escalation is included to a hypothetical midpoint of construction at a total of 4.00% annually (8% total) in the estimates to follow.

When the design process has begun, more accurate cost estimate information will be generated.

BUDGET DESCRIPTION

The team attempted to include as many of the items discussed in the Workshop Session and in the Systems Narrative described in other sections of this document. Note that all costs described in this document and all associated systems are considered to be part of this conceptual budget.

The estimates included herein are line item conceptual budget estimates and are broken down to depict several of the types of project costs. The types of cost areas are described below:

Overall Budget Description

The overall budget includes the following:

- CONSTRUCTION BUDGET – Includes anticipated construction costs broken down to support the program area. HVAC systems will be one of the greatest variables depending upon what type of HVAC system is proposed. The other major cost variable will be for the Electrical Systems.
- DESIGN COSTS – Includes anticipated project design costs including the testing services normally anticipated for a project of this type.
- PERMIT COSTS – Includes anticipated permit costs for a project of a similar nature. The value of these permits will not truly be known until the project design process is underway.
- TECHNOLOGY SYSTEMS – The consulting team has included telecommunication technology from the MCP equipment cost estimate and equipment as we understand it at this time. As the project evolves there may be further development that modifies the technology needs.
- OTHER COSTS – includes other anticipated costs that the design team has experienced on other projects of a similar nature. This is also the area of the estimate which contains a Fire Equipment Allowance for Option #2B.
- CONTINGENCY – Readers will note a 10% project contingency which is common at this stage of the project.

Obviously no programming phase budget can anticipate all of the project costs that may arise during a design and construction process however the MCP/SGA team's knowledge of this project type provides significant insight into the various project costs typically experienced. The hope is that these budgets provide a good foundation from which the City/County Team can begin their decision making process.

SUMMARY BUDGET ESTIMATE FOR NEW CONSTRUCTION

The Summary CONCEPT PROJECT BUDGETS are shown on the pages to follow for each of the Site Concepts. They are then expanded upon in the individual budget worksheets following these pages.

SITE #1 – Cedar Creek Site

	<u>CONCEPTUAL BUDGET</u>
Overall Cost	
Construction	\$18,023,527
Design	\$ 1,531,382
Permits	\$ 55,000
Technology	\$ 6,512,210
Other Costs	\$ 326,000
Project Contingency	<u>\$ 2,644,812</u>
Total Conceptual Budget	\$29,092,931

SITE #2 – Fields Road Site

This budget shows the costs for the Emergency Communication Facility and associated site work only as Site #2 – Version A (not drawn) and then shows the total construction cost to include the fire station and its site work – Version B (as drawn).

VERSION A (Comm Center Only)	<u>CONCEPTUAL BUDGET</u>
Overall Cost	
Construction	\$18,233,090
Design	\$ 1,548,147
Permits	\$ 55,000
Technology	\$ 6,512,210
Other Costs	\$ 326,000
Project Contingency	<u>\$ 2,667,445</u>
Total Conceptual Budget	\$29,341,892

SITE #2 – Fields Road Site (cont.)

VERSION B (Incl. Fire Station)	CONCEPTUAL BUDGET
Overall Cost	
Construction	\$21,489,938
Design	\$ 1,808,695
Permits	\$ 55,000
Technology	\$ 6,512,210
Other Costs	\$ 626,000
Project Contingency	<u>\$ 3,049,184</u>
Total Conceptual Budget	\$33,541,028

SITE #3 – Tracy Hall Road Site

	CONCEPTUAL BUDGET
Overall Cost	
Construction	\$18,442,653
Design	\$ 1,564,912
Permits	\$ 55,000
Technology	\$ 6,512,210
Other Costs	\$ 326,000
Project Contingency	<u>\$ 2,690,078</u>
Total Conceptual Budget	\$29,590,853

Please refer to the budget worksheets included starting on page 6-6 to follow for further costing information.

BUILDING OPERATION COSTS

Operations in a facility such as this are comprised of three costs; Utility costs to run the systems within the facility (electrical, natural gas, sewer and water), the maintenance costs for the systems (replacement of filters etc.) and the manpower to operate the facility. A facility of this size can often be operated by the users with the assistance of a half FTE (Full Time Equivalent) of support from the maintenance and custodial team for the City/ County. The assumption is that a Building Operations person for the City or County can operate this facility for less than one hour a day and a custodial person or a custodial service might be needed for three hours to clean. The City/ County experience will vary depending on how they staff these functions.

We combine utility operations costs and maintenance into one number and assign \$2.00 per square foot annually to building costs for the main building (this cost will vary widely based on systems chosen and utility costs in your region) and \$0.75 per square foot for the Ancillary Building. We assign one-half FTE at \$35,000 per year with a 2X multiplier for costs (again, this cost will vary depending on City/ County benefit and pay packages. Given that, for the sake of budgeting, the costs to operate this facility annually may be:

Utility and Maintenance			
Main Building	33,000 s.f. x \$2.00/s.f.	= \$ 66,000 annually	
Ancillary Building	7,700 s.f. x \$1.00/s.f.	= \$ 7,700 annually	
Operations			
Operations Personnel	½ FTE x \$35,000 x 2.00	= <u>\$ 35,000 annually</u>	
		= \$108,700 annually	

Costs will vary widely but for preliminary purposes it is reasonable to assume that budgeting \$108,700 annually to run a building of this type will be a good starting point. Again, the team must recognize that this number will vary significantly depending on systems chosen, current and future energy costs and staffing costs.

SITE #1
Cedar Creek Business Center
Concept Project Budget

EMERGENCY COMMUNICATION CENTER

PROPOSED NEW FACILITY

SITE #1 - Cedar Creek Road

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000	s.f.
Vehicle Storage Building Area	7,700	s.f.
Total Area	40,700	s.f.

Project Phase: Programming

CONSTRUCTION

cost/s.f. (using building construction cost only)

BUILDING CONSTRUCTION COSTS

1	Total Main Building Construction Cost Estimate		33,000	s.f.	
2	General Construction	\$273.28	s.f.	\$	9,018,240.00
3	HVAC Construction	\$54.88	s.f.	\$	1,811,040.00
4	Plumbing/ FP Construction	\$16.80	s.f.	\$	554,400.00
5	Electrical Construction	\$61.60	s.f.	\$	2,032,800.00
6	SUBTOTAL MAIN BUILDING	\$406.56			\$ 13,416,480.00
7	Total Vehicle Storage Building Construction Cost Estimate		7,700	s.f.	
8	General Construction	\$87.50		\$	673,750.00
9	HVAC Construction	\$14.45		\$	111,265.00
10	Plumbing/ FP Construction	\$8.85		\$	68,145.00
11	Electrical Construction	\$18.93		\$	145,722.50
12	SUBTOTAL VEHICLE STORAGE BUILDING	\$129.73			\$ 998,882.50

SITE CONSTRUCTION

13	Total Site Construction Cost Estimate (using main building s.f.)	\$44.80	s.f.	\$	1,478,400.00
14	SUBTOTAL CONSTRUCTION ESTIMATE			\$	15,893,762.50
15	2 year escalation @	8.00%		\$	1,271,501.00
16				SUBTOTAL	\$ 17,165,263.50
17	Const. Contingency @	5%		\$	858,263.18
18		\$ 442.84		GRANDTOTAL	\$ 18,023,526.68

SITE #1 - Cedar Creek Road (continued)

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

DESIGN			
19	Programming and Needs Assessment (already completed)		NA
20	A/E Design Fee	@	8.0%
21	Expenses		\$ 20,000
22	Telecomm. Consultant Design & Project Management		\$ -
23	Geotechnical Investigation		\$ 12,000
24	Land Survey Services		\$ 7,500
25	Inspection / Testing Services		\$ 50,000
26	Land Development Approvals		NA
27	Total Design Services		\$ 1,531,382.13
PERMITS			
28	State Approvals		\$ 10,000
29	Building Permit		\$ 20,000
30	Highway/Streets Permits		\$ -
31	Water Service / Sanitary Service		\$ 10,000
32	FAA Approval (tower)		\$ 5,000
33	Other Approvals		\$ 10,000
34	Total Permitting		\$ 55,000.00

Separate number
includes resistivity

SITE #1 - Cedar Creek Road (continued)

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

TECHNOLOGY

Communications

35	Comm. & EOC Workstations	\$	716,400	
36	Customer Premise Equipment (CPE)	\$	75,000	Move Cost
37	Logger/ Recorder (Enterprise)	\$	350,010	
38	Computers for Comm. Ops Only	\$	108,000	
39	Network Equip	\$	124,500	
40	Synchronized Clock System	\$	20,669	
41	Radio Antenna System	\$	50,000	
42	Radio consoles	\$	2,880,000	
43	CSSI Console Connections	\$	150,000	
44	Amateur Radio Emergency Services (ARES) Equip	\$	12,000	
45	Computer Aided Dispatch	\$	50,000	Relocation of Equip Only
46	Satellite Phones	\$	12,000	
47	Admin Telephone Systems	\$	97,500	
48	Audio/Video (AV) Systems	\$	325,000	
49	Access Control/Intrusion Detection/ CCTV	\$	120,550	
50	Telecomm Service Access - Telephone, CATV, Internet	\$	50,000	
51	Communications Tower	\$	100,000	
52	Telecomm Structured Cabling	\$	291,260	
	Subtotal	\$	5,532,889	
			10% Contingency	
		\$	553,288.90	
			7% Sales Tax	
		\$	426,032.45	
53	Total Technology Costs			\$ 6,512,210.35

SITE #1 - Cedar Creek Road (continued)

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

OTHER COSTS					
Other Systems					
54	Off-Site Electrical Connection			\$ 20,000	
55	Ancillary Computer Equipment for entire building			\$ 153,000	
56	Other			\$ -	
57		Subtotal		\$ 173,000	
Other Costs					
58	Furniture (not including console furniture)			\$ 153,000	
59		Subtotal		\$ 153,000	
60	Total Other Costs				\$ 326,000.00
CONTINGENCY					
			Subtotal	\$	26,448,119.16
61	Project Contingency	@	10%	\$ 2,644,812	
62	TOTAL PROJECT BUDGET				\$ 29,092,931.08

SITE #2A

Fields Road – Emergency Communications Only

Concept Project Budget

EMERGENCY COMMUNICATION CENTER

PROPOSED NEW FACILITY

SITE #2A - Fields Road - Emergency Communications Only

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000	s.f.
Vehicle Storage Building Area	7,700	s.f.
Total Area	40,700	s.f.

Project Phase: Programming

CONSTRUCTION

cost/s.f. (using building construction cost only)

BUILDING CONSTRUCTION COSTS

1	Total Main Building Construction Cost Estimate		33,000	s.f.	
2	General Construction	\$273.28	s.f.	\$	9,018,240.00
3	HVAC Construction	\$54.88	s.f.	\$	1,811,040.00
4	Plumbing/ FP Construction	\$16.80	s.f.	\$	554,400.00
5	Electrical Construction	\$61.60	s.f.	\$	2,032,800.00
6	SUBTOTAL MAIN BUILDING	\$406.56			\$ 13,416,480.00
7	Total Vehicle Storage Building Construction Cost Estimate		7,700	s.f.	
8	General Construction	\$87.50		\$	673,750.00
9	HVAC Construction	\$14.45		\$	111,265.00
10	Plumbing/ FP Construction	\$8.85		\$	68,145.00
11	Electrical Construction	\$18.93		\$	145,722.50
12	SUBTOTAL VEHICLE STORAGE BUILDING	\$129.73			\$ 998,882.50

SITE CONSTRUCTION

13	Total Site Construction Cost Estimate (using main building s.f.)	\$50.40	s.f.	\$	1,663,200.00
14	SUBTOTAL CONSTRUCTION ESTIMATE			\$	16,078,562.50
15	2 year escalation @	8.00%		\$	1,286,285.00
16				SUBTOTAL	\$ 17,364,847.50
17	Const. Contingency @	5%		\$	868,242.38
18		\$ 447.99		GRANDTOTAL	\$ 18,233,089.88

SITE #2A - Fields Road - Emergency Communications Only (cont.)

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

DESIGN			
19	Programming and Needs Assessment (already completed)		NA
20	A/E Design Fee	@ 8.0%	\$ 1,458,647
21	Expenses		\$ 20,000
22	Telecomm. Consultant Design & Project Management		\$ -
23	Geotechnical Investigation		\$ 12,000
24	Land Survey Services		\$ 7,500
25	Inspection / Testing Services		\$ 50,000
26	Land Development Approvals		NA
27	Total Design Services		\$ 1,548,147.19
PERMITS			
28	State Approvals		\$ 10,000
29	Building Permit		\$ 20,000
30	Highway/Streets Permits		\$ -
31	Water Service / Sanitary Service		\$ 10,000
32	FAA Approval (tower)		\$ 5,000
33	Other Approvals		\$ 10,000
34	Total Permitting		\$ 55,000.00

Separate number
includes resistivity

SITE #2A - Fields Road - Emergency Communications Only (cont.)

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

TECHNOLOGY

Communications

35	Comm. & EOC Workstations	\$	716,400	
36	Customer Premise Equipment (CPE)	\$	75,000	Move Cost
37	Logger/ Recorder (Enterprise)	\$	350,010	
38	Computers for Comm. Ops Only	\$	108,000	
39	Network Equip	\$	124,500	
40	Synchronized Clock System	\$	20,669	
41	Radio Antenna System	\$	50,000	
42	Radio consoles	\$	2,880,000	
43	CSSI Console Connections	\$	150,000	
44	Amateur Radio Emergency Services (ARES) Equip	\$	12,000	
45	Computer Aided Dispatch	\$	50,000	Relocation of Equip Only
46	Satellite Phones	\$	12,000	
47	Admin Telephone Systems	\$	97,500	
48	Audio/Video (AV) Systems	\$	325,000	
49	Access Control/Intrusion Detection/ CCTV	\$	120,550	
50	Telecomm Service Access - Telephone, CATV, Internet	\$	50,000	
51	Communications Tower	\$	100,000	
52	Telecomm Structured Cabling	\$	291,260	
	Subtotal	\$	5,532,889	
			10% Contingency	
		\$	553,288.90	
			7% Sales Tax	
		\$	426,032.45	
53	Total Technology Costs			\$ 6,512,210.35

SITE #2A - Fields Road - Emergency Communications Only (cont.)

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

OTHER COSTS				
Other Systems				
54	Off-Site Electrical Connection		\$	20,000
55	Ancillary Computer Equipment for entire building		\$	153,000
56	Other		\$	-
57		Subtotal	\$	173,000
Other Costs				
58	Furniture (not including console furniture)		\$	153,000
59		Subtotal	\$	153,000
60	Total Other Costs		\$	326,000.00
CONTINGENCY				
			Subtotal	\$ 26,674,447.42
61	Project Contingency	@	10%	\$ 2,667,445
62	TOTAL PROJECT BUDGET			\$ 29,341,892.16

SITE #2B

Fields Road – Emergency Communications & Fire Station

Concept Project Budget

EMERGENCY COMMUNICATION CENTER

PROPOSED NEW FACILITY

SITE #2B - Fields Road - Emergency Communication & Fire Station

Fayetteville-Cumberland County, NC

Communication Building Area	33,000	s.f.
Fire Station Area	10,000	s.f.
Vehicle Storage Building Area	7,700	s.f.
Total Area	40,700	s.f.

BUDGET COST ANALYSIS

Date: 27-Jan-16

Project Phase: Programming

CONSTRUCTION

cost/s.f. (using building construction cost only)

BUILDING CONSTRUCTION COSTS

1	Total Main Building Construction Cost Estimate		33,000	.f.	
2	General Construction	\$273.28	s.f.	\$	9,018,240.00
3	HVAC Construction	\$54.88	s.f.	\$	1,811,040.00
4	Plumbing/ FP Construction	\$16.80	s.f.	\$	554,400.00
5	Electrical Construction	\$61.60	s.f.	\$	2,032,800.00
6	SUBTOTAL MAIN BUILDING	\$406.56			\$ 13,416,480.00
1	Total Fire Building Construction Cost Estimate		10,000	.f.	
2	General Construction	\$150.00	s.f.	\$	1,500,000.00
3	HVAC Construction	\$30.00	s.f.	\$	300,000.00
4	Plumbing/ FP Construction	\$16.80	s.f.	\$	168,000.00
5	Electrical Construction	\$40.00	s.f.	\$	400,000.00
6	SUBTOTAL FIRE BUILDING	\$236.80			\$ 2,368,000.00
7	Total Vehicle Storage Building Construction Cost Estimate		7,700	.f.	
8	General Construction	\$87.50		\$	673,750.00
9	HVAC Construction	\$14.45		\$	111,265.00
10	Plumbing/ FP Construction	\$8.85		\$	68,145.00
11	Electrical Construction	\$18.93		\$	145,722.50
12	SUBTOTAL VEHICLE STORAGE BUILDING	\$129.73			\$ 998,882.50

SITE #2B - Fields Road - Emergency Communication & Fire Station (cont.)

Fayetteville-Cumberland County, NC

Communication Building Area	33,000 s.f.
Fire Station Area	10,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

BUDGET COST ANALYSIS

Date: 27-Jan-16

SITE CONSTRUCTION				
13	Total Site Const Cost Estimate (using main bldg & fire station s.f.)	\$50.40 s.f.		\$ 2,167,200.00
14	SUBTOTAL CONSTRUCTION ESTIMATE			\$ 18,950,562.50
15	2 year escalation @	8.00%		\$ 1,516,045.00
16			SUBTOTAL	\$ 20,466,607.50
17	Const. Contingency @	5%		\$ 1,023,330.38
18		\$ 528.01	GRANDTOTAL	\$ 21,489,937.88

SITE #2B - Fields Road - Emergency Communication & Fire Station (cont.)

Fayetteville-Cumberland County, NC

Communication Building Area	33,000	s.f.
Fire Station Area	10,000	s.f.
Vehicle Storage Building Area	7,700	s.f.
Total Area	40,700	s.f.

BUDGET COST ANALYSIS

Date: 27-Jan-16

DESIGN					
19	Programming and Needs Assessment (already completed)			NA	
20	A/E Design Fee	@	8.0%	\$ 1,719,195	
21	Expenses			\$ 20,000	
22	Telecomm. Consultant Design & Project Management			\$ -	Separate number includes resistivity
23	Geotechnical Investigation			\$ 12,000	
24	Land Survey Services			\$ 7,500	
25	Inspection / Testing Services			\$ 50,000	
26	Land Development Approvals			NA	
27	Total Design Services				\$ 1,808,695.03
PERMITS					
28	State Approvals			\$ 10,000	
29	Building Permit			\$ 20,000	
30	Highway/Streets Permits			\$ -	
31	Water Service / Sanitary Service			\$ 10,000	
32	FAA Approval (tower)			\$ 5,000	
33	Other Approvals			\$ 10,000	
34	Total Permitting				\$ 55,000.00

SITE #2B - Fields Road - Emergency Communication & Fire Station (cont.)

Fayetteville-Cumberland County, NC

Communication Building Area	33,000 s.f.
Fire Station Area	10,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

BUDGET COST ANALYSIS

Date: 27-Jan-16

TECHNOLOGY

Communications

35	Comm. & EOC Workstations	\$	716,400	
36	Customer Premise Equipment (CPE)	\$	75,000	Move Cost
37	Logger/ Recorder (Enterprise)	\$	350,010	
38	Computers for Comm. Ops Only	\$	108,000	
39	Network Equip	\$	124,500	
40	Synchronized Clock System	\$	20,669	
41	Radio Antenna System	\$	50,000	
42	Radio consoles	\$	2,880,000	
43	CSSI Console Connections	\$	150,000	
44	Amateur Radio Emergency Services (ARES) Equip	\$	12,000	
45	Computer Aided Dispatch	\$	50,000	Relocation of Equip Only
46	Satellite Phones	\$	12,000	
47	Admin Telephone Systems	\$	97,500	
48	Audio/Video (AV) Systems	\$	325,000	
49	Access Control/Intrusion Detection/ CCTV	\$	120,550	
50	Telecomm Service Access - Telephone, CATV, Internet	\$	50,000	
51	Communications Tower	\$	100,000	
52	Telecomm Structured Cabling	\$	291,260	
	Subtotal	\$	5,532,889	
		\$	553,288.90	10% Contingency
		\$	426,032.45	7% Sales Tax
53	Total Technology Costs	\$	6,512,210.35	

SITE #2B - Fields Road - Emergency Communication & Fire Station (cont.)

Fayetteville-Cumberland County, NC

Communication Building Area	33,000	s.f.
Fire Station Area	10,000	s.f.
Vehicle Storage Building Area	7,700	s.f.
Total Area	40,700	s.f.

BUDGET COST ANALYSIS

Date: 27-Jan-16

OTHER COSTS				
Other Systems				
54	Off-Site Electrical Connection		\$	20,000
55	Ancillary Computer Equipment for entire building		\$	153,000
56	Fire Station Equipment Allowance		\$	300,000
57		Subtotal	\$	473,000
Other Costs				
58	Furniture (not including console furniture)		\$	153,000
59		Subtotal	\$	153,000
60	Total Other Costs		\$	626,000.00
CONTINGENCY				
			Subtotal	\$ 30,491,843.26
61	Project Contingency	@	10%	\$ 3,049,184
62	TOTAL PROJECT BUDGET			\$ 33,541,027.58

SITE #3
Tracy Hall Road
Concept Project Budget

EMERGENCY COMMUNICATION CENTER

PROPOSED NEW FACILITY

SITE #3 - Tracy Hall Road

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000	s.f.
Vehicle Storage Building Area	7,700	s.f.
Total Area	40,700	s.f.

Project Phase: Programming

CONSTRUCTION

cost/s.f. (using building construction cost only)

BUILDING CONSTRUCTION COSTS

1	Total Main Building Construction Cost Estimate		33,000	s.f.	
2	General Construction	\$273.28	s.f.	\$	9,018,240.00
3	HVAC Construction	\$54.88	s.f.	\$	1,811,040.00
4	Plumbing/ FP Construction	\$16.80	s.f.	\$	554,400.00
5	Electrical Construction	\$61.60	s.f.	\$	2,032,800.00
6	SUBTOTAL MAIN BUILDING	\$406.56			\$ 13,416,480.00
7	Total Vehicle Storage Building Construction Cost Estimate		7,700	s.f.	
8	General Construction	\$87.50		\$	673,750.00
9	HVAC Construction	\$14.45		\$	111,265.00
10	Plumbing/ FP Construction	\$8.85		\$	68,145.00
11	Electrical Construction	\$18.93		\$	145,722.50
12	SUBTOTAL VEHICLE STORAGE BUILDING	\$129.73			\$ 998,882.50

SITE CONSTRUCTION

13	Total Site Construction Cost Estimate (using main building s.f.)	\$56.00	s.f.	\$	1,848,000.00
14	SUBTOTAL CONSTRUCTION ESTIMATE			\$	16,263,362.50
15	2 year escalation @	8.00%		\$	1,301,069.00
16				SUBTOTAL	\$ 17,564,431.50
17	Const. Contingency @	5%		\$	878,221.58
18		\$ 453.14		GRANDTOTAL	\$ 18,442,653.08

SITE #3 - Tracy Hall Road (continued)

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

DESIGN			
19	Programming and Needs Assessment (already completed)		NA
20	A/E Design Fee	@ 8.0%	\$ 1,475,412
21	Expenses		\$ 20,000
22	Telecomm. Consultant Design & Project Management		\$ -
23	Geotechnical Investigation		\$ 12,000
24	Land Survey Services		\$ 7,500
25	Inspection / Testing Services		\$ 50,000
26	Land Development Approvals		NA
27	Total Design Services		\$ 1,564,912.25
PERMITS			
28	State Approvals		\$ 10,000
29	Building Permit		\$ 20,000
30	Highway/Streets Permits		\$ -
31	Water Service / Sanitary Service		\$ 10,000
32	FAA Approval (tower)		\$ 5,000
33	Other Approvals		\$ 10,000
34	Total Permitting		\$ 55,000.00

Separate number
includes resistivity

SITE #3 - Tracy Hall Road (continued)

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

TECHNOLOGY

Communications

35	Comm. & EOC Workstations	\$	716,400	
36	Customer Premise Equipment (CPE)	\$	75,000	Move Cost
37	Logger/ Recorder (Enterprise)	\$	350,010	
38	Computers for Comm. Ops Only	\$	108,000	
39	Network Equip	\$	124,500	
40	Synchronized Clock System	\$	20,669	
41	Radio Antenna System	\$	50,000	
42	Radio consoles	\$	2,880,000	
43	CSSI Console Connections	\$	150,000	
44	Amateur Radio Emergency Services (ARES) Equip	\$	12,000	
45	Computer Aided Dispatch	\$	50,000	Relocation of Equip Only
46	Satellite Phones	\$	12,000	
47	Admin Telephone Systems	\$	97,500	
48	Audio/Video (AV) Systems	\$	325,000	
49	Access Control/Intrusion Detection/ CCTV	\$	120,550	
50	Telecomm Service Access - Telephone, CATV, Internet	\$	50,000	
51	Communications Tower	\$	100,000	
52	Telecomm Structured Cabling	\$	291,260	
		\$	5,532,889	
	Subtotal			
			\$ 553,288.90	10% Contingency
			\$ 426,032.45	7% Sales Tax
53	Total Technology Costs			\$ 6,512,210.35

SITE #3 - Tracy Hall Road (continued)

Fayetteville-Cumberland County, NC

BUDGET COST ANALYSIS

Date: 27-Jan-16

Main Building Area	33,000 s.f.
Vehicle Storage Building Area	7,700 s.f.
Total Area	40,700 s.f.

OTHER COSTS				
Other Systems				
54	Off-Site Electrical Connection		\$	20,000
55	Ancillary Computer Equipment for entire building		\$	153,000
56	Other		\$	-
57		Subtotal	\$	173,000
Other Costs				
58	Furniture (not including console furniture)		\$	153,000
59		Subtotal	\$	153,000
60	Total Other Costs		\$	326,000.00
CONTINGENCY				
			Subtotal	\$ 26,900,775.67
61	Project Contingency	@	10%	\$ 2,690,078
62	TOTAL PROJECT BUDGET		\$	29,590,853.24

CONCEPTUAL FLOOR PLAN

FLOOR PLAN CONCEPT - DESCRIPTION

During the course of this process, an actual floor plan concept was derived. That floor plan should be taken as a development of spatial relationships at a given scale only. The plan has not been endorsed by the users. The ultimate design of the facility will be derived from a process of development with the ultimate architect hired for this process. The users thought it helpful to include this plan as an appendix item only because it shows that the program itself fits within the space created through this process.

The concept floor plan is provided on the following page.



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690 Grays Woods Blvd.
161 Leverington Avenue, Suite 105

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