Orange County Replacement Radio Project

Board Of County Commissioners Meeting

May 2, 2017

Federal Engineering, Inc.

"Unleashing the Power of Technology"

Agenda

- Replacement Radio Project Purpose and Overview / Needs
- Existing Radio Systems and Architecture
- Alternatives Considered / Estimated Costs
- Recommended Solution / Estimated Costs
- Agency Cost Allocations
- Next Steps

Project Purpose

Determine the most economical, efficient, reliable, and state-of-the-art method for designing and provisioning a countywide radio communications system to meet long term voice, paging, and voice interoperability needs

Project Overview - Scope

- Needs and Requirements
- Alternatives Analysis and Cost Estimates
- Recommended System Solution ← **We are here**
- Technical Specifications / RFP Development
- Procurement Support

Project Overview

Needs and Requirements

- Interviews
- Surveys
- Radio coverage
- Capacity
- Interoperability

Alternatives

- VIPER expansion
- Standalone 700/800 MHz P25 System
- Shared 700/800 MHz P25 System
- Standalone VHF System

Recommended Solution

- Shared system
- 700/800 MHz P25 long term – countywide
- VHF system – paging
- Staged approach

Project Overview – Needs

Users – Emergency

- Law Enforcement
- Fire
- EMS
- Emergency Management

Users – Non-emergency

- Public Works
- Transit
- Schools
- Animal Control
- OWASA
- Solid Waste

Project Overview – Needs

- Radio coverage improvements
  - Portable radios – outdoor
  - Portable radios – indoor
  - Leverage new sites for multiple purposes
- Radio system capacity improvements
  - Increase number of channels to reduce congestion
  - Leverage new microwave system - multiple purposes
- Local system administration
  - Add users
  - Change aliases
  - Modify talkgroups

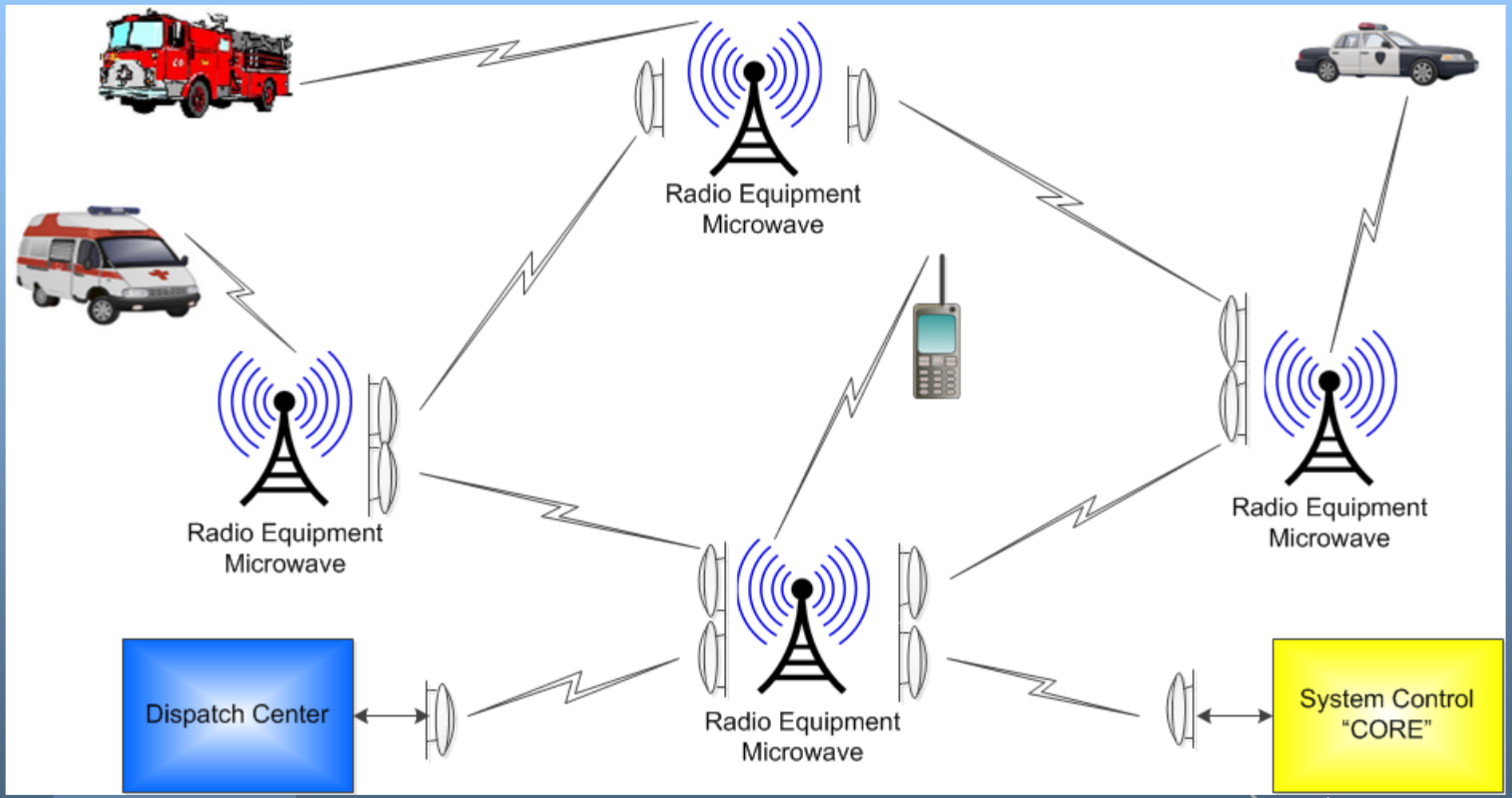
Project Overview – Needs

- Interoperability (ability to communicate with others and mutual aid)
  - Intra-County
  - Inter-County
- System availability improvements
  - Direct County control of system elements
  - Direct County control of system maintenance
  - Redundancy
- Estimated costs
- Migration plans

Existing Radio Systems

- VIPER – 700/800 MHz P25 – all public safety users
  - No local system administration
  - Single points of failure / lack of redundancy
  - Expansion possible – current model: purchase equipment and give to State
- UHF – backup system for Chapel Hill
- VHF – fire paging, schools, animal services, backup for multiple public safety agencies

Radio System Architecture



Alternatives Considered

- VIPER 700/800 MHz P25 channel expansion
- Standalone 700/800 MHz P25
- Shared 700/800 MHz P25 system (Durham County)
- Standalone VHF Analog

Standalone alternatives consist of building blocks that can be combined between alternatives

VIPER Channel Expansion

- Add channels to existing VIPER sites
- Improves capacity – fewer busies/blocked calls
- Lowest cost of alternatives
- Does not address
  - Required radio coverage improvements
  - Required system availability/redundancy improvements/single points of failure
  - Required local system administration improvements
  - System use by public services (schools, public works, transit, animal services, OWASA, solid waste)

Standalone 700/800 MHz P25

- Dedicated 700/800 MHz P25 system for County, serving all users (now and in future)
- New system control equipment (redundant)
- New radio site equipment (sites, towers, shelters, radio channel equipment, microwave)
- New consoles (or use existing), control stations (to access “other” systems)
- Retention of most existing portable/mobile radios

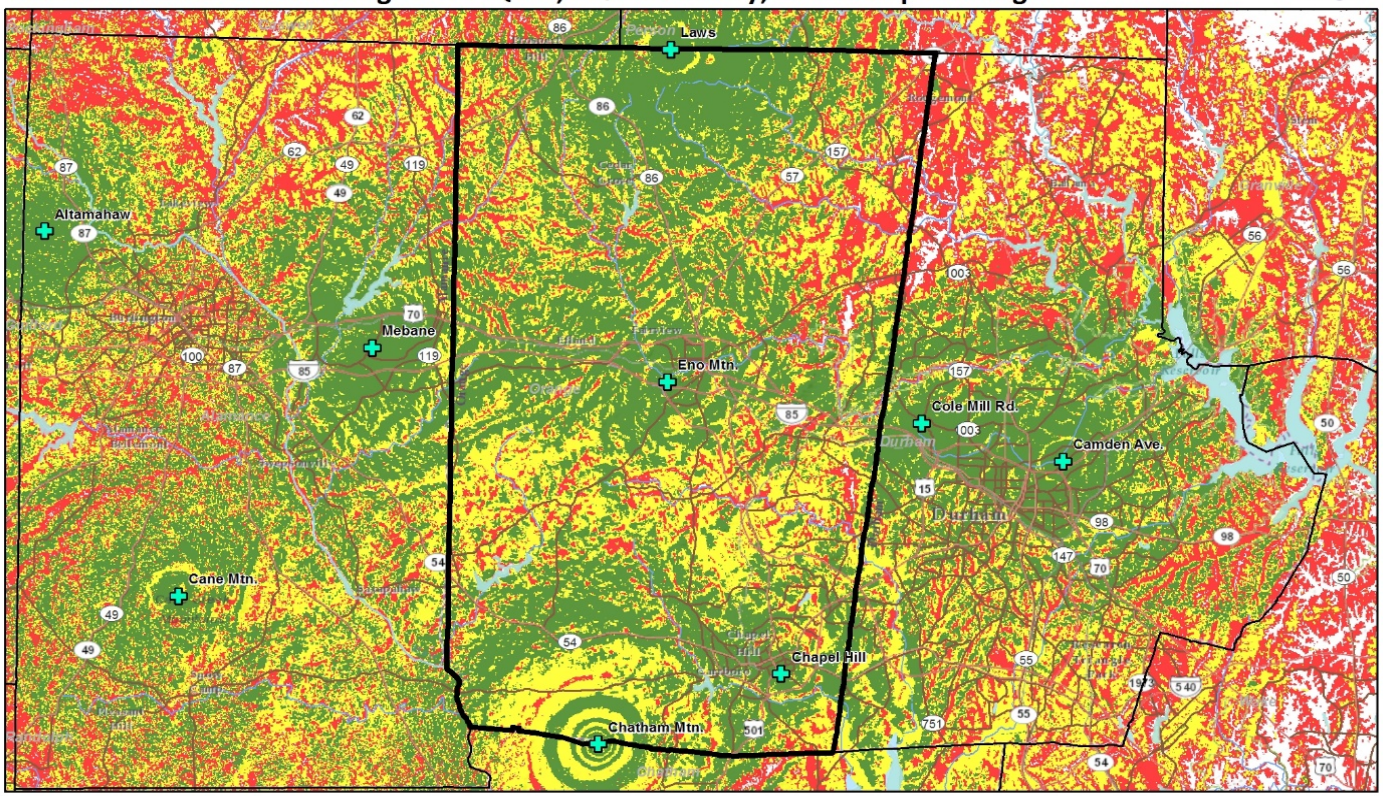
Standalone 700/800 MHz P25

- Provides improved:
  - Outdoor and indoor radio coverage
  - Capacity for all users, expandable
  - Local system administration
  - System availability/reliability (redundancy – no single point of failure)
- Sites built for 700/800 MHz P25 leveraged for use by VHF system, County broadband
- Dedicated microwave for radio systems, leveraged for use for County data, County broadband

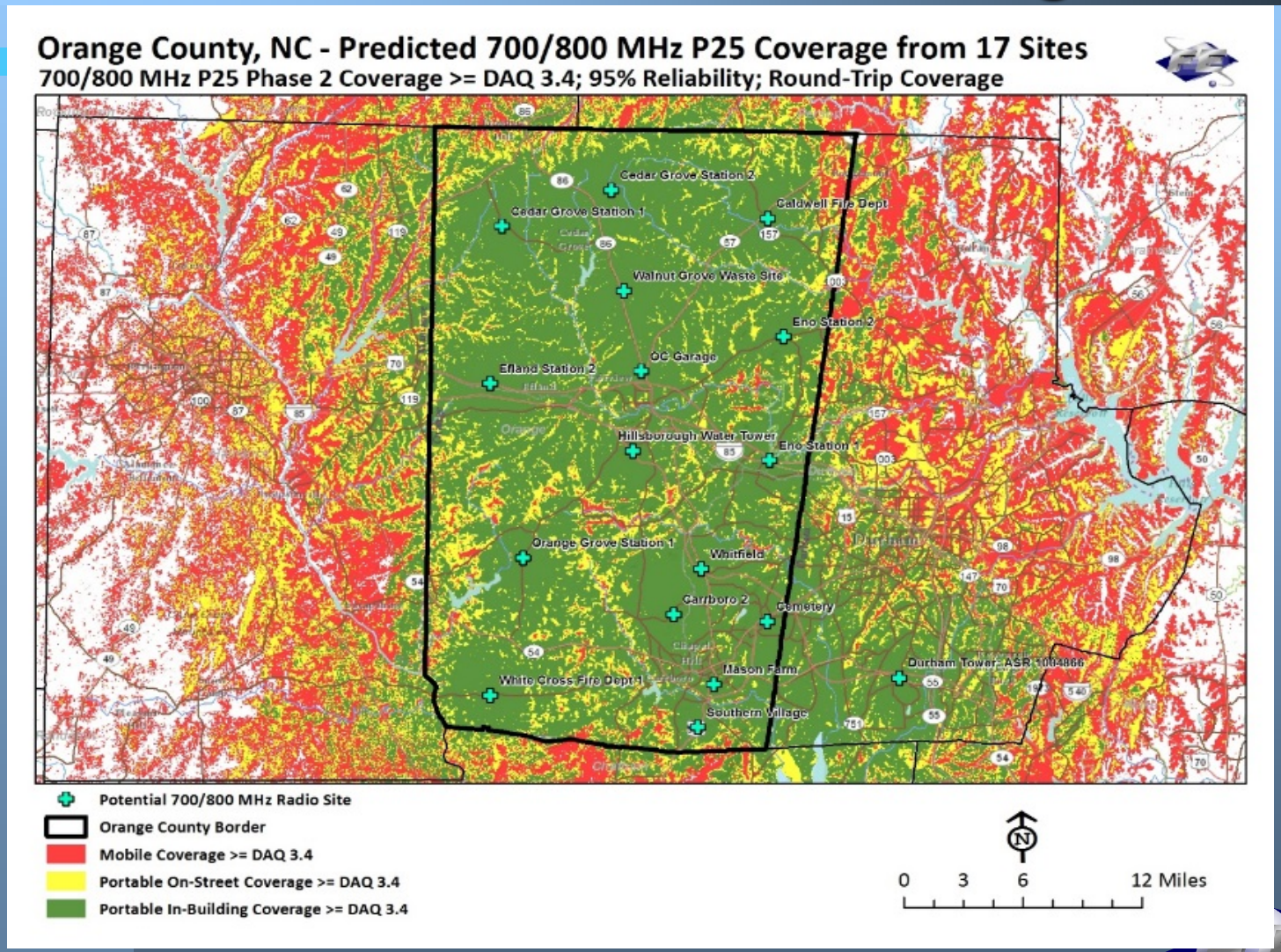
Shared System – 700/800 MHz P25

- Same as standalone 700/800 MHz P25 system EXCEPT
  - System control equipment provided Durham (significant initial capital cost savings)
  - Cost sharing model used between Durham and Orange County for ongoing shared equipment, system upgrades, and maintenance
  - Interlocal agreement to be executed (governance, cost sharing)

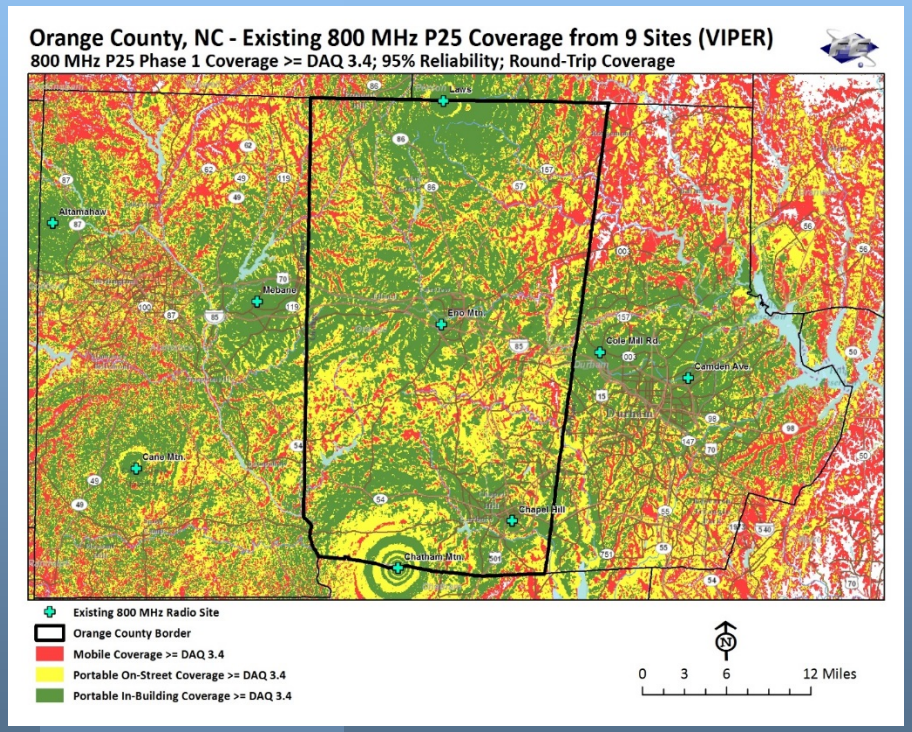
700/800 MHz P25 Radio Coverage

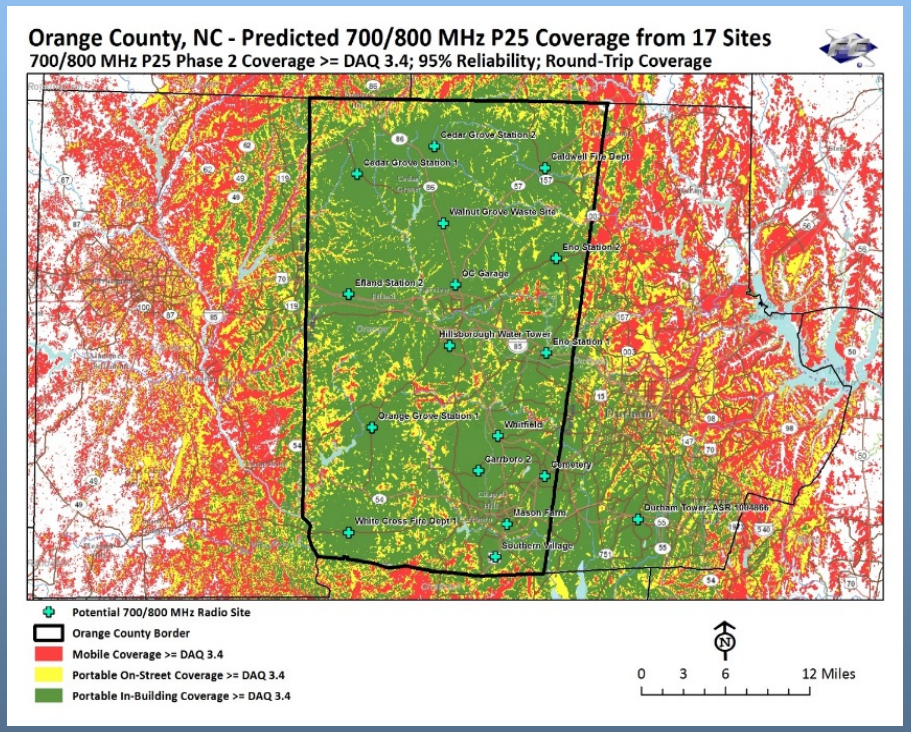


700/800 MHz P25 Radio Coverage



700/800 MHz P25 Radio Coverage



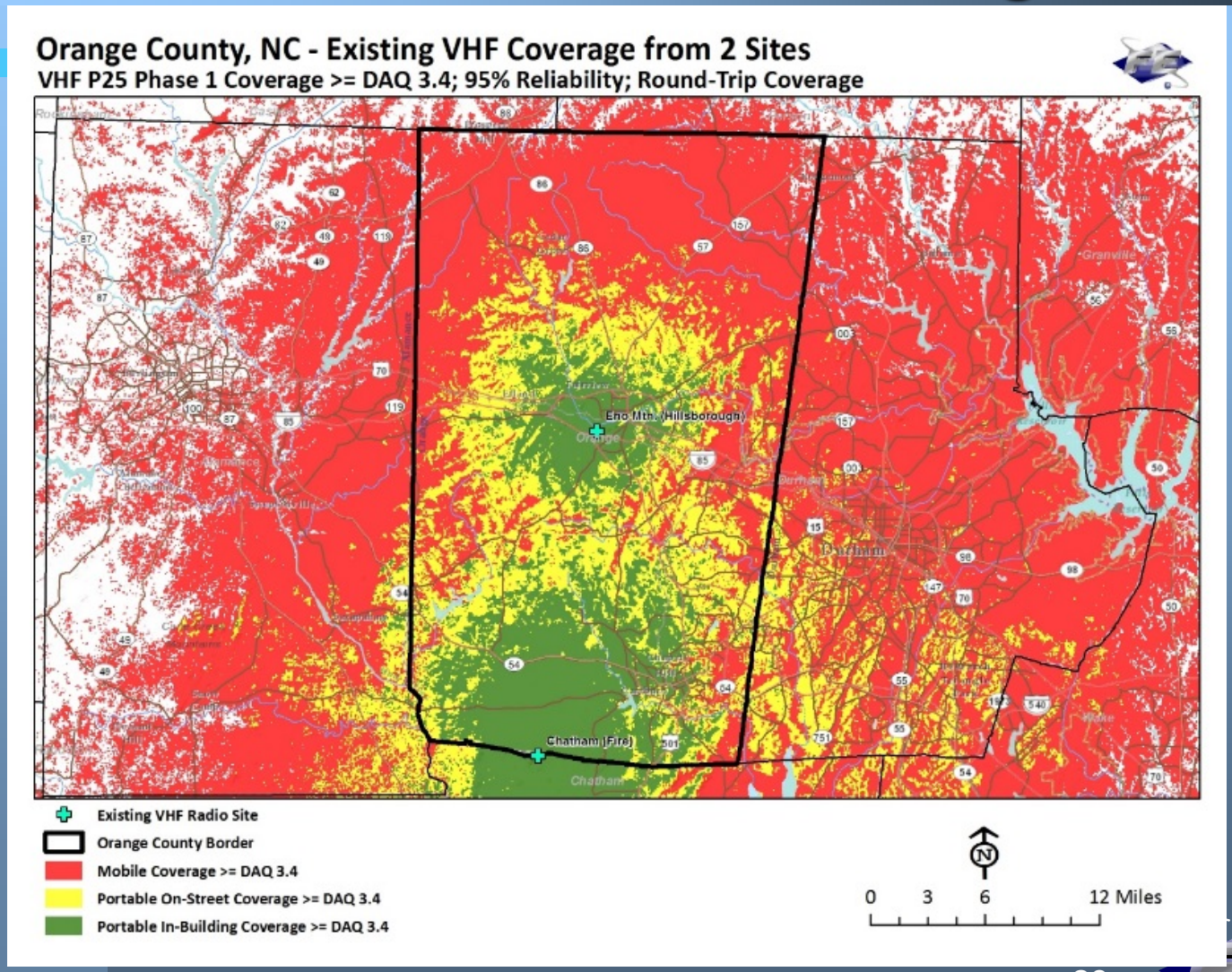


700/800 MHz P25 Radio Coverage

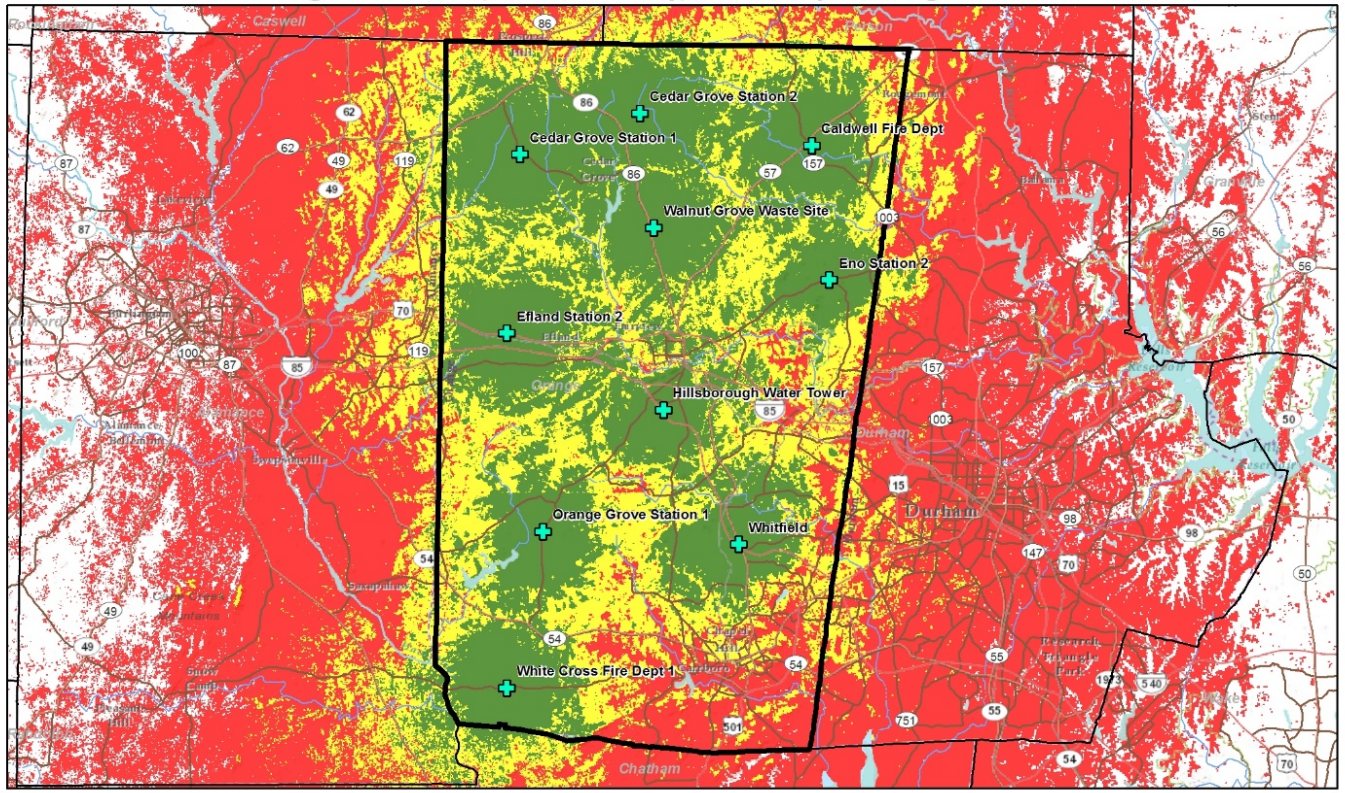
System Name	Frequency Band	System Technology	Number of Sites	Coverage Percentages		
				Mobile	Portable On-Street	Portable In-Building
Existing 700/800 MHz Voice (VIPER)	700/800 MHz	Trunked Multicast P25 Phase 1	9	99	85	50
700/800 Alternative: 17-Site P25 Voice	700/800 MHz	Trunked Simulcast P25 Phase 1/2	17	>99	96	81

Industry Standard – 95% portable on-street coverage

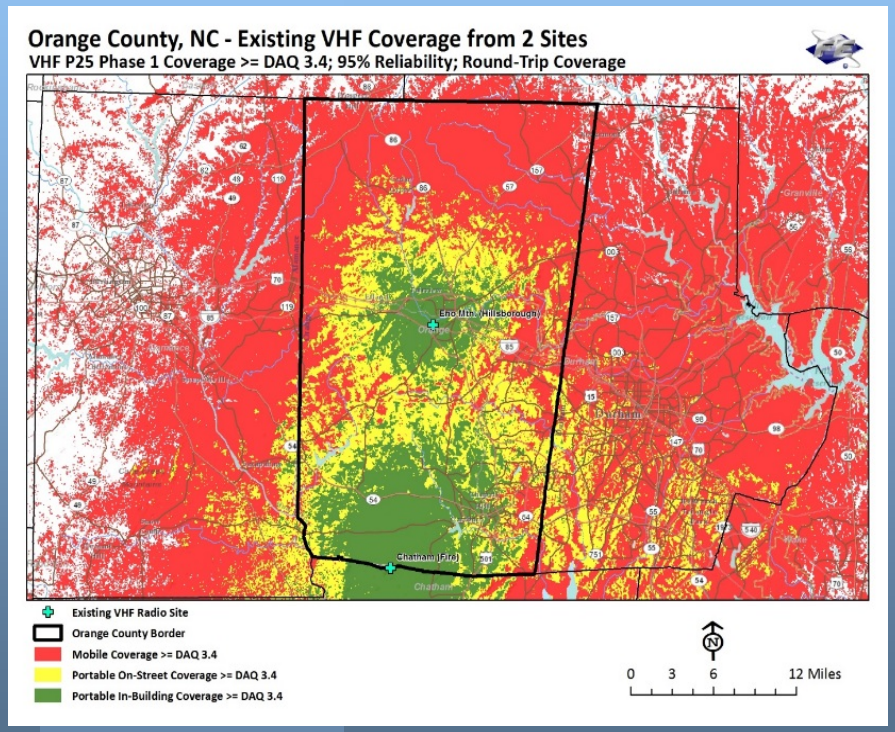
Standalone VHF Radio Coverage

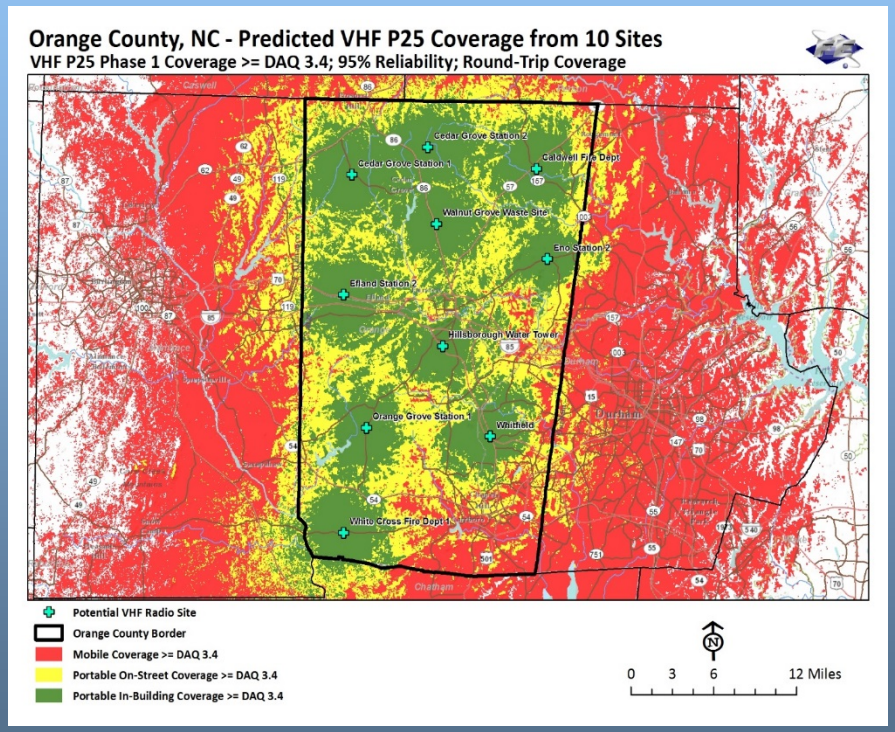


Standalone VHF Radio Coverage



Standalone VHF Radio Coverage





Standalone VHF Radio Coverage

System Name	Frequency Band	System Technology	Number of Sites	Coverage Percentages		
				Mobile	Portable On-Street	Portable In-Building
Existing VHF Voice	VHF	Conventional Simulcast P25 Phase 1	2	99	53	25
VHF Alternative10-Site Voice	VHF	Conventional Simulcast P25 Phase 1	10	>99	89	55

Industry Standard – 95% portable on-street coverage

Standalone VHF Radio Coverage

System Name	Frequency Band	System Technology	Number of Sites	Coverage Percentages	
				Paging On-Street	Paging In-Building
Existing VHF Paging	VHF	Analog Paging	2	42	17
VHF Alternative 10-Site Paging	VHF	Analog Paging	10	78	39

Long term total site count = 17
(700/800 MHz and VHF share sites)

Alternatives – Estimated Costs

Alternative/ Approach	Infrastructure	Reprogramming Radio Units	Total
VIPER	$2,002,000	$139,000	$2,141,000
Standalone 700/800 MHz	$29,294,00	$139,000	$29,433,000
Standalone VHF	$10,692,000	$139,000	$10,831,000
Shared System 700/800 MHz	$26,513,000	$139,000	$26,652,000

Recommended Replacement Radio Solution

- Excellent County stakeholder participation throughout project
- County Radio Team reviewed needs and requirements – foundation for alternatives
- County Radio Team reviewed alternatives
- Consensus and agreement by entire County Radio team on the recommended replacement radio solution

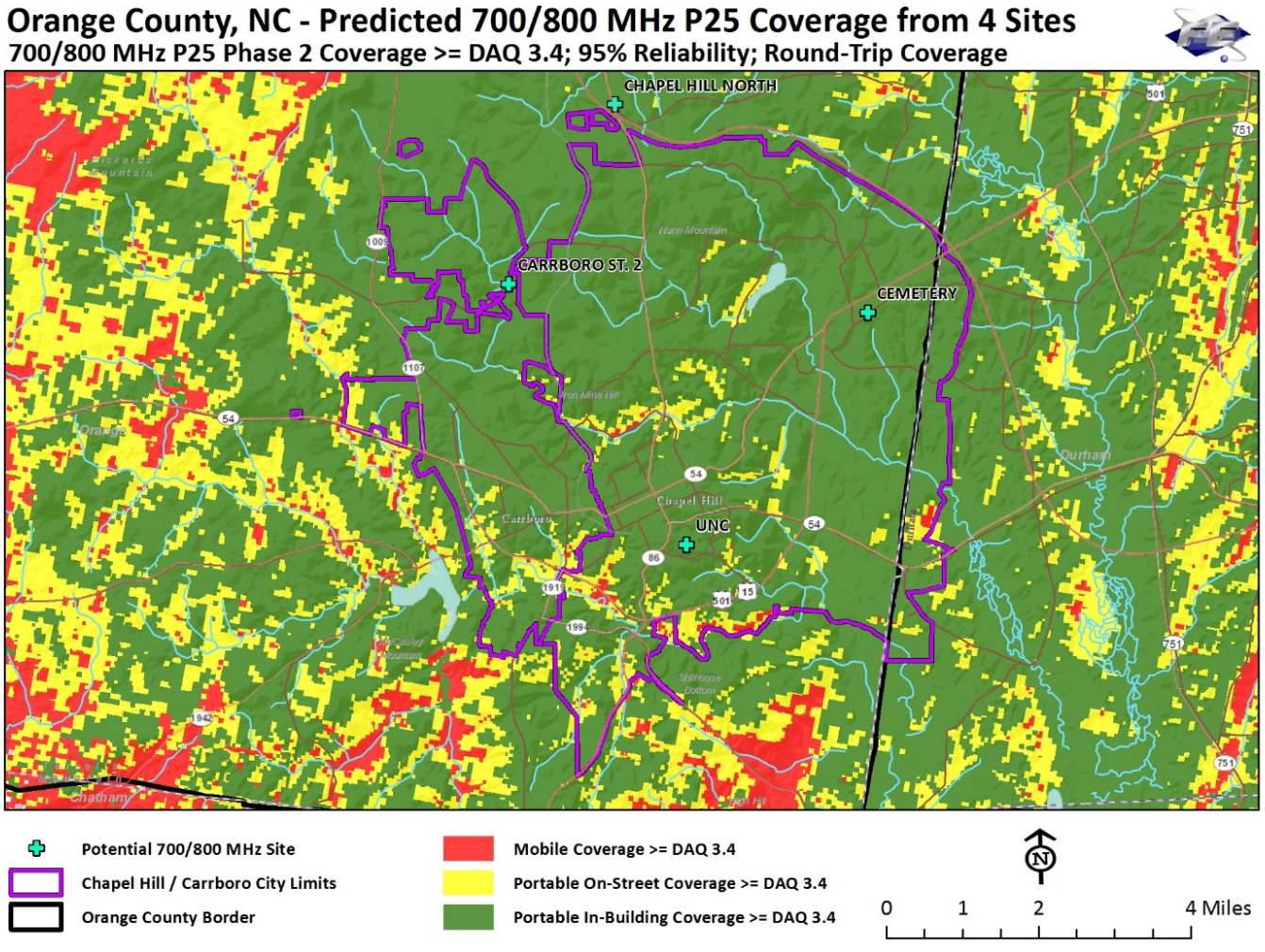
Recommended Replacement Radio Solution

- VIPER – no additional channels to be added
- Combination of two alternatives – Shared System (Durham) and VHF
- Implement systems in stages (steps)
- Long term 700/800 MHz P25 solution
  - 700/800 MHz trunked P25 for all users – countywide radio coverage
  - 17 site buildout
- VHF solution
  - Lower cost radio units (than P25) for public service
  - 4-site buildout

Recommended Replacement Radio Solution

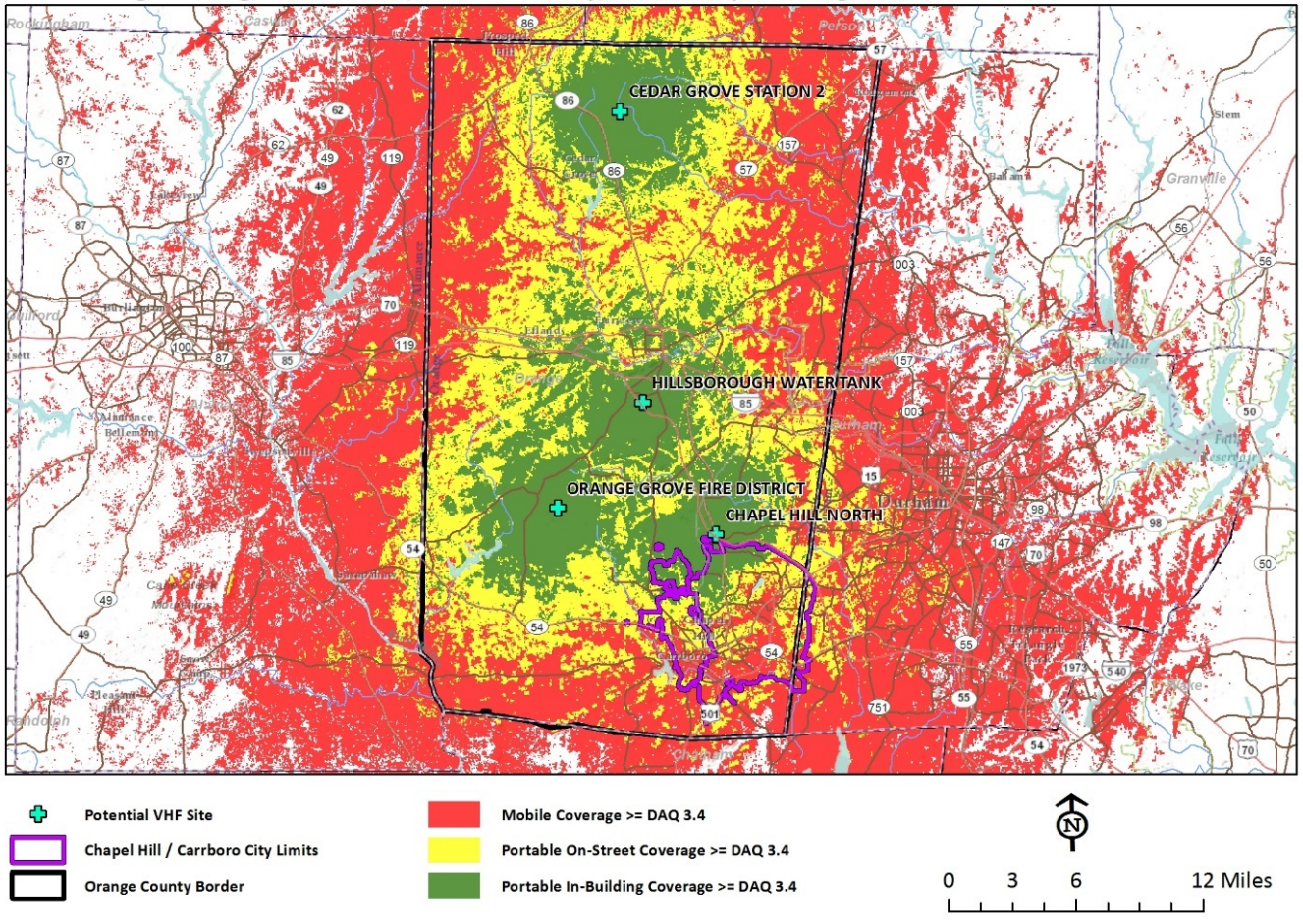
- Step 1
  - Share Durham system control equipment (core)
  - Procure and build 4 700/800 MHz P25 sites in Chapel Hill and Carrboro area, connect to Durham core, and dispatch center consoles
- Step 2
  - Procure and build 4 VHF sites in County (use sites that will also be used for 700/800 MHz P25)
- Step 3 (could be divided into multiple steps)
  - Procure and build the balance of the 17 700/800 MHz P25 sites

Recommended Replacement Radio Solution



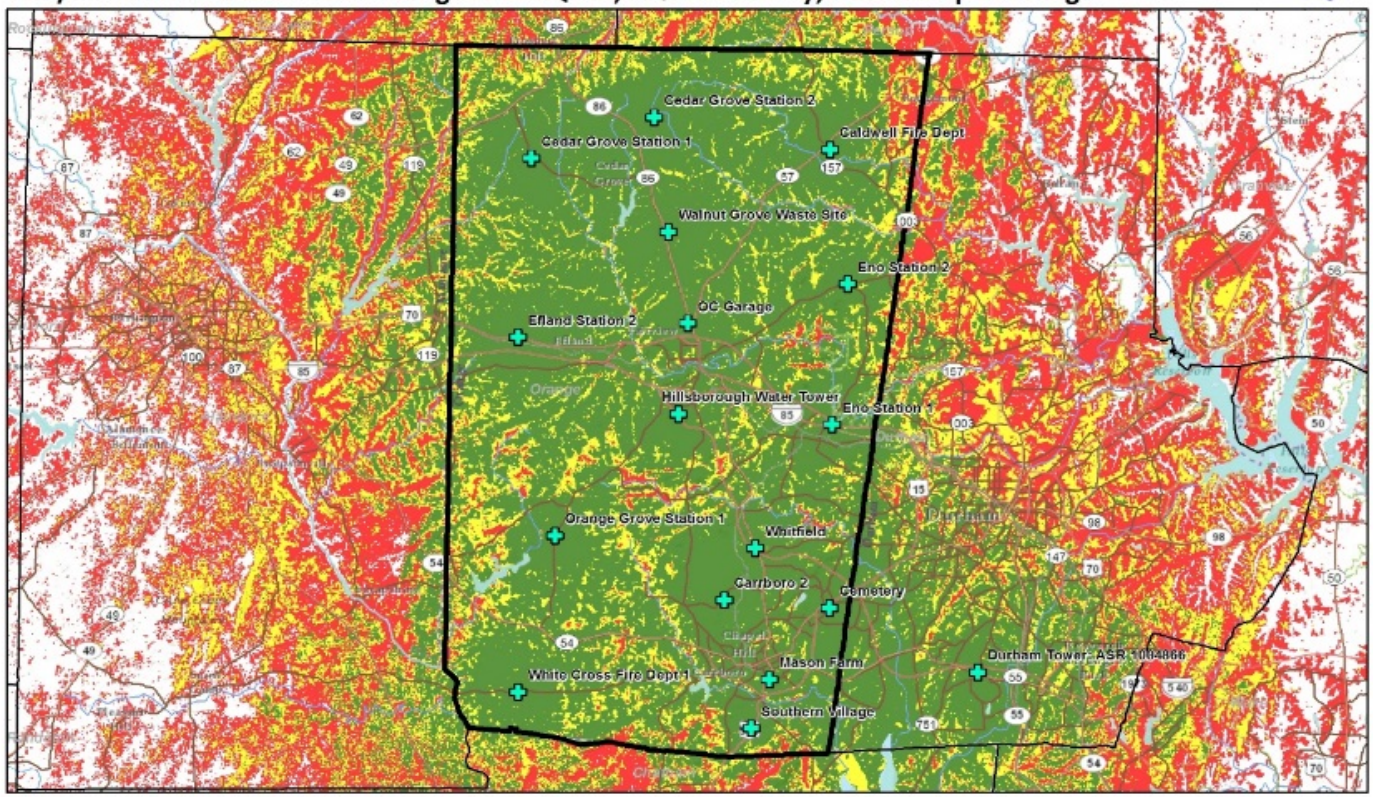
Step 1

Recommended Replacement Radio Solution



Step 2

Recommended Replacement Radio Solution



Step 3

Estimated Costs

Estimated Costs per Step			
Step	Equipment	Services	Extended
1	$4,634,000	$2,453,000	$7,087,001
1 Optional	$664,000	$354,000	$1,018,000
2	$2,474,000	$1,323,000	$3,797,002
3	$11,713,000	$6,191,000	$17,904,003
TOTAL	$19,485,000	$10,321,000	$29,806,006

Shared System cost – approximately $50,000 to $100,000, based on number of radio users

Agency Cost Allocations

Potential Cost Allocations

- County provides new radio system infrastructure for emergency and non-emergency users
- Each agency purchases portables, mobiles, and control stations, and programming for radio units
- Each agency pays a usage fee to the County for use of the new system

Agency Cost Allocations

System Usage Fee

- County will need to define formula and basis for fees
- Examples from other similar systems
  - Fee based on number of talkgroups (channels), and unique features (encryption, GPS/location, individual call) – monthly recurring per unit (example – South Carolina)
  - Fee based on number of radio units – one time fee as radio unit is added (example: $250/unit – one time, $32/radio/month)

Next Steps

- County approval of recommended replacement radio solution
- Confirm project stages/steps and schedules
- Identify and secure funding
- Define procurement approach (competitive RFP, negotiation with vendor)

Next Steps

- Develop technical specifications/RFP for long-term system solutions, and require buildout in stages
  - Vendor guaranteed radio coverage (outdoor, indoor)
  - Vendor guaranteed grade of service (capacity)
  - Vendor guaranteed system availability/reliability
- Procurement process
- Negotiation and contract award
- Implementation

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Questions