

ARMER Participation Plan

Otter Tail County, Minnesota

SEH No. OTTEC 110504

December 2009



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ARMER Participation Plan

Prepared for Otter Tail County, Minnesota

1.0 ARMER Participation Request

Otter Tail County seeks approval to participate on the Allied Radio Matrix for Emergency Response (ARMER) backbone system. Otter Tail County intends to be a “Full Participant”, whose primary voice communications are fully integrated into the ARMER backbone. Otter Tail County requests that this ARMER Participation Plan be adopted by the Central Minnesota Regional Radio Board, and incorporated into the Central Minnesota Region’s plan and the Statewide Radio Board’s plan.

This plan has been prepared in accordance with the ARMER standards for requesting and configuring participation. Otter Tail County intends to contract with the Central Minnesota Regional Radio Board (CMRRB) and the Minnesota Department of Transportation (Mn/DOT) for participation on the ARMER System. Otter Tail County seeks review and approval of its plan by the CMRRB and the Mn/DOT. Otter Tail County believes that:

- This plan accurately reflects impacts on the ARMER system that would result from its implementation.
- This plan is consistent with the capacity and operational constraints of the ARMER system.
- This plan is consistent with the currently adopted plan and standards of the State wide Radio Board (SRB).

As this project proceeds through the approval and funding process within Otter Tail County and the Central Minnesota Regional Radio Board it is anticipated that specific technical details may vary from those specifically contained in this Participation Plan. Examples of items that may change include microwave connectivity, project schedule, subscriber equipment counts, etc. Every effort will be made to conform to the scope, intent and character of this participation plan as here presented. Any items that change through the natural course of this project will be brought forward as updates to the Participation Plan for approval and inclusion in the plan.

2.0 Project Background

2.1 Otter Tail County Public Safety Radio Communications Project

In 2008 Otter Tail County, in cooperation with the Central Minnesota Regional Radio Advisory Committee, completed a detailed assessment of current public safety radio systems operating within Otter Tail County. The assessment included an analysis of alternative approaches to delivery of essential public safety radio system services into the future. The report also evaluated the changing dynamic of public safety communications interoperability and the opportunities available to integrate county radio system infrastructure with the ARMER system backbone currently being deployed throughout the central region of Minnesota which includes Otter Tail County. The 2008 Report noted areas of the existing radio system that need improvement. The summary of current radio system issues/concerns included:

- Interference in the form of skip and other signals from distant stations
- Noise and interference from nearby electronic equipment
- Portable radio coverage
- Age of equipment
- Capacity of system during major events
- The FCC will require all VHF licensed radio systems to convert from “wideband” frequency spacing by 2013.

2.2 Allied Radio Matrix for Emergency Response (ARMER)

The State of Minnesota is currently deploying the Allied Radio Matrix for Emergency Response system. The standards-based shared public safety radio system is intended to provide technology with the highest potential level of interoperability. The adoption of a statewide system also provides the opportunity to integrate local government radio systems into a common backbone.

The backbone for the ARMER system was first implemented in the Minneapolis/St. Paul metropolitan area in 2001. At that time a number of local governments transitioned to the ARMER system as their primary public safety and governmental communication system. In 2008, all seven counties of the Minneapolis/St. Paul metropolitan area were fully integrated on to the ARMER system. Phase Three of the ARMER implementation was funded by the Minnesota Legislature in 2005 and the Minnesota Department of Transportation (Mn/DOT) is currently in the process of expanding the backbone into 23 counties of central and southeastern Minnesota. It is estimated that the Phase Three backbone will be completed in the end of 2009. Currently, Benton, Sherburne, Stearns, Wright and Olmsted County in State of Minnesota have fully integrated their public safety communications into the Phase Three backbone. Kandiyohi County is in the process of integrating and scheduled for completion in late 2009.

This plan proposes the use of the ARMER system backbone sites at Amor, Eagle Lake, Erhard, Fergus Falls, Luce, New York Mills, Parkers Prairie and the ARMER system Zone Controller (zone 4 - St. Cloud). The sites at Amor, New York Mills and Parkers Prairie are currently in the site development process. New York Mills and Parkers Prairie are scheduled for completion by July 2010. Amor is currently in the engineering review phase.

3.0 Technical Design Plan

This section identifies the major technical elements of the Otter Tail County ARMER Participation Plan. This plan presents information related to the system infrastructure architecture, site additions, site RF coverage, Erlang calculations, channel additions and frequency plan.

3.1 Infrastructure

This plan section describes the system level requirements and topology of the Otter Tail County regional radio system enhancement to the ARMER backbone.

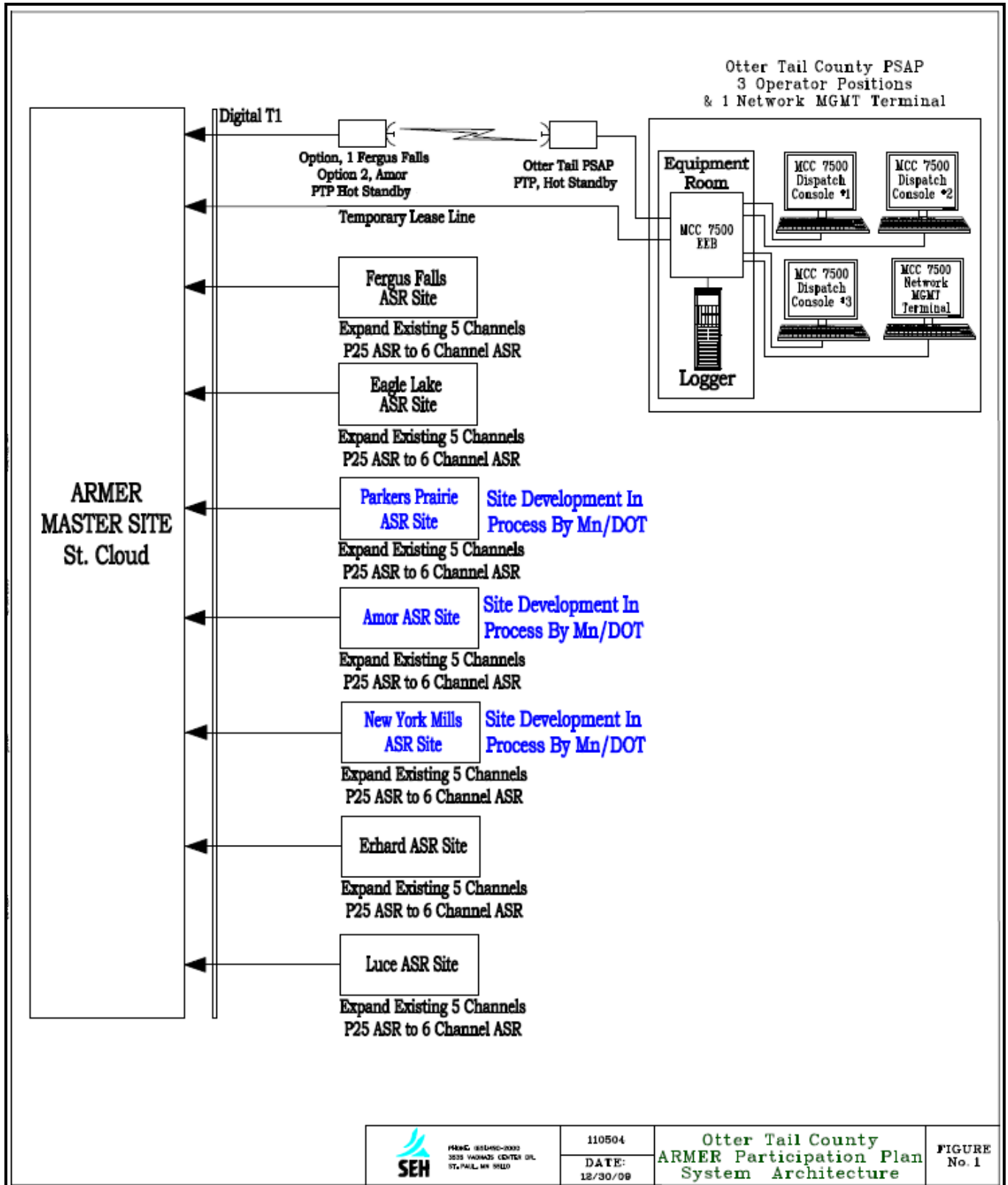
3.2 System Architecture


This plan proposes for Otter Tail County to receive primary system coverage from the ARMER backbone sites at Amor, Eagle Lake, Erhard, Fergus Falls, Luce, New York Mills, and Parkers Prairie. The system will link into the ARMER system Zone Controller (zone 4 - St. Cloud). This seven site system will retain the multi-cast operation planned for use in the state ARMER plan. Additional coverage will primarily come from the Barnesville, Cormorant, Hewitt, and Nashua ARMER sites which are outside the county.

The County is currently exploring options for relocation of their dispatch operations. The dispatch center may reside in its current location in Fergus Falls or be relocated at the new County Operations Center in Ottertail. This determination has not been finalized. However, it is expected that both site would use a hot standby microwave link into the ARMER backbone for primary connectivity and a backup leased T1 circuit for a backup path into the system. The system diagram reflects both potential locations.

The Otter Tail County Subsystem Architecture is represented in the attached diagram.

Figure 1 – System Architecture

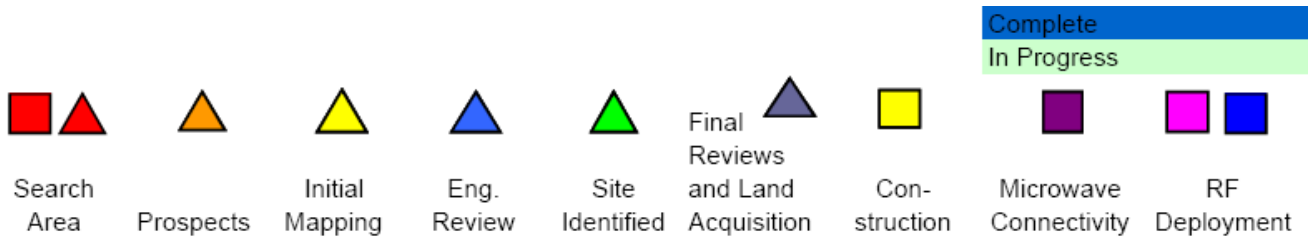
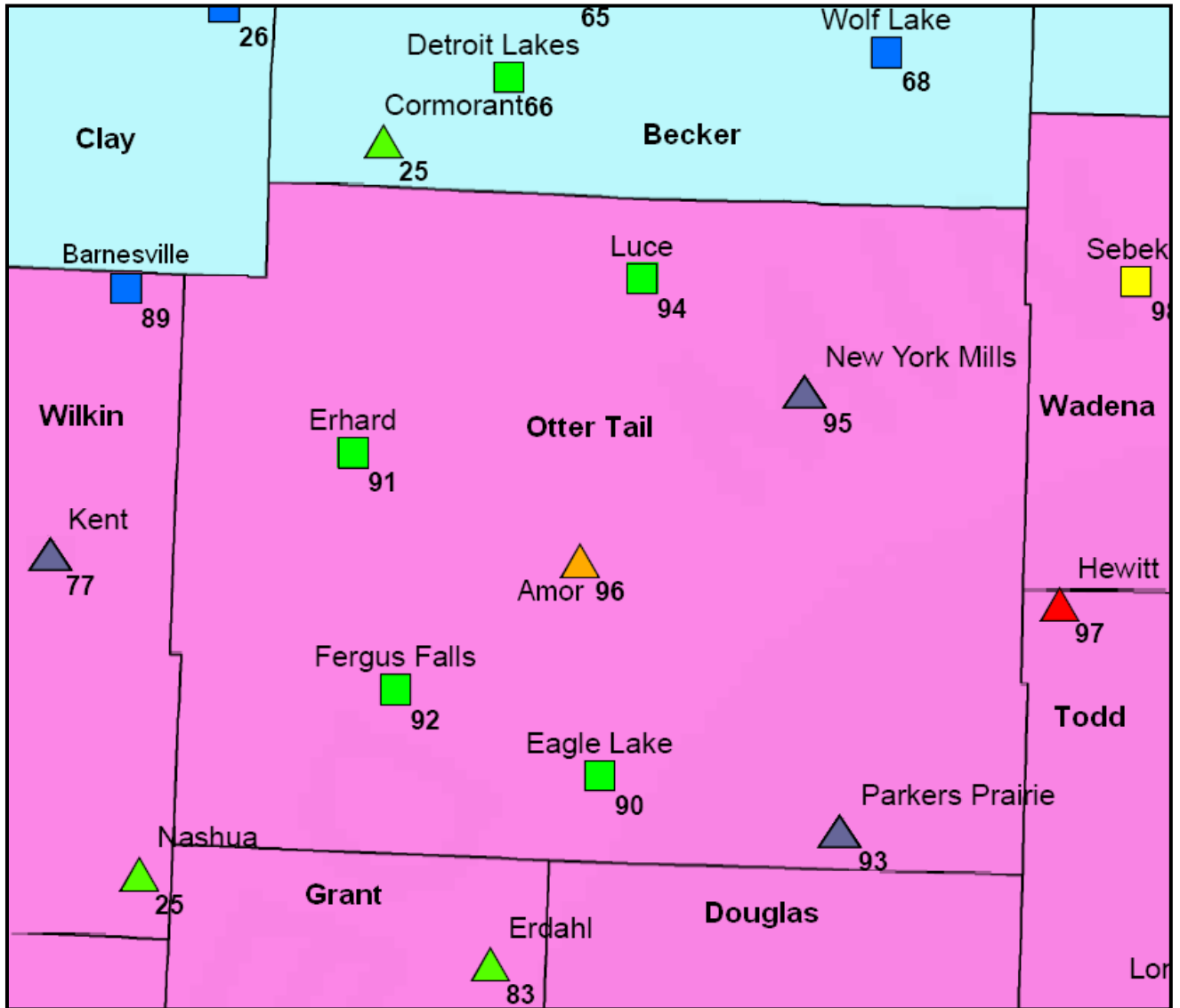


 SEH <small>PLANNING & DESIGN SERVICES 3030 VANDERBILT CENTER DR. ST. PAUL, MN 55110</small>	110504	Otter Tail County ARMER Participation Plan System Architecture	FIGURE No. 1
	DATE: 12/30/09		

3.3 Site Additions and Data

The Otter Tail County participation plan proposes use of the existing state ARMER backbone in its current multi cast configuration. The graphic in figure 2 shows the sites that ARMER has planned for installation in and around Otter Tail County. The sites identified are shown in the diagram below and the site data is attached on the following pages:

Figure 2 – Infrastructure Sites



Luce Tower: EXISTING SITE - ARMER BACKBONE SITE

Registration Detail			
Reg Number	██████████	Status	Constructed
File Number	██████████	Constructed	10/16/1954
FAA Study	██████████	EMI	No
FAA Issue Date	10/20/1993	NEPA	No
Antenna Structure			
Structure Type	TOWER - Free standing or Guyed Structure used for Communications Purposes		
Location (in NAD83 Coordinates - Convert to NAD27)			
Lat/Long	██████████	██████████	
City, State	LUCE , MN		
Center of AM Array			
Heights (meters)			
Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)		
455.7	89.3		
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances		
545.0	83.8		
Painting and Lighting Specifications			
FAA Chapters 4, 6, 13 Paint and Light in Accordance with FAA Circular Number 70/7460-1H			
Owner & Contact Information			
FRN	0002608115	Licensee ID	L00001503
Assignor FRN	0005885157	Assignor ID	L00131936
Owner			
State of Minnesota - Dept of Transportation Attention To: Mike Hogan 395 John Ireland Blvd. Saint Paul , MN 55155-1899		P: (651)296-7421 E:	

Erhard Tower: EXISTING SITE - ARMER BACKBONE SITE

Call Sign	[REDACTED]			Radio Service	PW - Public Safety Pool, Conventional
6 Total Locations				Location:	5 - ERHARD, MN <input type="button" value="GO"/>
Return to Locations Summary					
Location 5 (Fixed)					
Frequencies (3)					
[REDACTED]			Coordinates	[REDACTED]	
ERHARD, MN OTTER TAIL County					
Site Elevation (AMSL)	496.0m	Height w/o Appurtenances	55.0m		
ASR #	N/A	Height w/ Appurtenances	61.0m		
Support Structure Type	TOWER - A free standing or guyed structure				
NEPA Required	No				
Quiet Zone Notification Date		Quiet Zone Consent			
Is coordination with Canada required?					
Is coordination with Mexico required?					
Special Conditions	None				
Antenna 1					
HAAT	141.0	Hgt to Tip	55.0m	Polarization	
Azimuth		Beamwidth		Gain	
Antenna 2					
HAAT	147.0	Hgt to Tip	61.0m	Polarization	
Azimuth		Beamwidth		Gain	

The FCC does not require an ASR for this site. The State of Minnesota is currently licensed on this tower under FCC call sign KAD775 and is in the process of making this into an ARMER site.

Eagle Lake (Battle Lake): EXISTING SITE - ARMER BACKBONE SITE

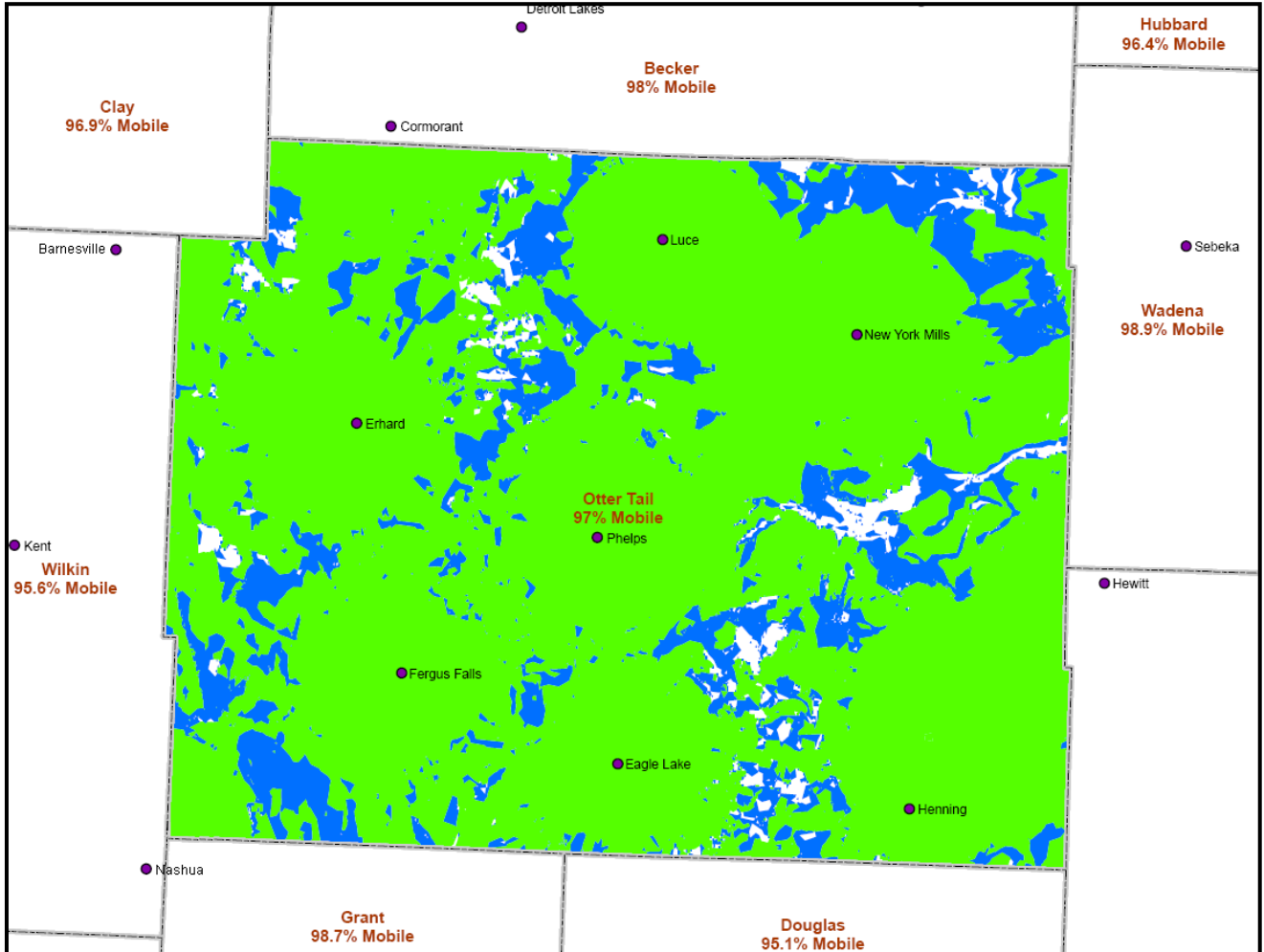
Registration Detail			
Reg Number	██████████	Status	Constructed
File Number	██████████	Constructed	10/15/2004
FAA Study	██████████████████	EMI	No
FAA Issue Date	09/09/2003	NEPA	No
Antenna Structure			
Structure Type	TOWER - Free standing or Guyed Structure used for Communications Purposes		
Location (in NAD83 Coordinates - Convert to NAD27)			
Lat/Long	██████████████████	██████████████████	
City, State	Battle Lake , MN		
Center of AM Array			
Heights (meters)			
Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)		
427.6	82.3		
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances		
509.9	76.2		
Painting and Lighting Specifications			
FAA Chapters 4, 8, 12 Paint and Light in Accordance with FAA Circular Number 70/7460-1K			
Owner & Contact Information			
FRN	0002608115	Licensee ID	L00001503
Owner			
Minnesota, State of Attention To: David Savolainen 395 John Ireland Blvd. MS730 St. Paul , MN 55155		P: (651)297-8266 E: david.savolainen@dot.state.mn.us	

New York Mills Tower: EXISTING SITE - ARMER BACKBONE SITE

Registration Detail			
Reg Number	██████████	Status	Granted
File Number	██████████	Constructed	
FAA Study	██████████████████	EMI	No
FAA Issue Date	11/13/2008	NEPA	No
Antenna Structure			
Structure Type	TOWER - Free standing or Guyed Structure used for Communications Purposes		
Location (in NAD83 Coordinates - Convert to NAD27)			
Lat/Long	██████████████████	██	
City, State	New York Mills , MN		
Center of AM Array			
Heights (meters)			
Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)		
430.6	106.7		
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances		
537.3	100.6		
Painting and Lighting Specifications			
FAA Chapters 4, 8, 12 Paint and Light in Accordance with FAA Circular Number 70/7460-1K			
Owner & Contact Information			
FRN	0002608115	Licensee ID	L00001503
Owner			
Minnesota, State of Attention To: Office of Electronic Communications 395 John Ireland Boulevard P.O. Box MS730 Saint Paul , MN 55155		P: (651)297-3692 E:	

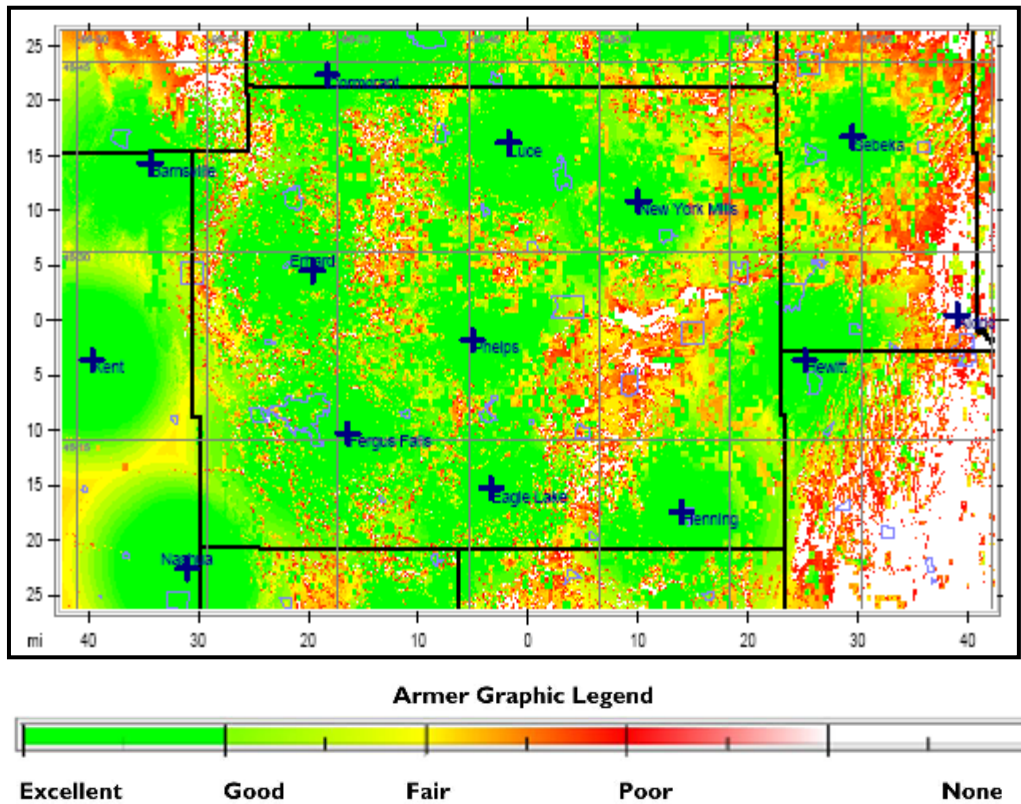
It is noted that some portions of the coverage provided by the ARMER system are dependant on tower sites located out side of the County. In particular the Barnesville and Cormorant sites provide for coverage in the far northwest, Nashua in the southwest, and Hewitt and Sebeka in the eastern portions of the County.

Figure 3 – ARMER Mobile Coverage Preliminary



In their 2008 report for Otter Tail County, GeoComm did a calculated prediction of the on the street ARMER coverage for portable radios. This is intended to predict the signal propagation, based on a seven site, 800 MHz multicast system. The first graphic predicts coverage for portable radios on the street with the State ARMER towers. The second graphic projects portable coverage with the addition of a county-supplied site in an area that appears to have minimal coverage located between the ARMER sites New York Mills and Parkers Prairie.

Figure 4 – GeoComm Predicted Portable Radio Coverage On The Street



3.5 Channel Additions / Erlang Calculations

Otter Tail County intends to migrate onto the ARMER system with one channel addition at all seven ARMER sites within Otter Tail County (Amor, Eagle Lake, Erhard, Fergus Falls, Luce, New York Mills and Parkers Prairie). The table in section 4.1 identifies the estimated number and type of radios the County intends to bring onto the system. The total radio count, with anticipated future growth, is 858 radios. In the state ARMER plan, the state allocated five channels to be shared by state agencies such as the State Patrol, DNR and others; and for use by County agencies. Four of the channels are available for voice traffic while the fifth is used as a control channel. The channels in the ARMER system are referred to as trunks, or trunking channels. Trunking means the automatic sharing of a group of communication paths (trunks) among a large number of users. The ARMER system is managed by a computer at the master site; for each transmission it assigns a trunking channel to the participants for the duration of that transaction.

To estimate radio capacity and determine the need for additional trunking channel additions, an Erlang C traffic modeling formula is used. Erlang C is used in a variety of call center scheduling and trunked communication system channel modeling estimates. The model is used to calculate delays or predict waiting times, and can also calculate the resources that will be needed to limit busies or wait times on trunked radio systems. For Otter Tail County, the Erlang C model was used to calculate the number of transmissions per hour that can be handled with 4 trunks. The table below shows Erlang calculations for 4 trunks based on an average service time of 6 seconds per transmission, average wait time of 1.5 seconds and a service level of 99% (Grade of Service = 1%). The number of transmissions per hour that can be handled by 4 trunks was calculated to be 486 with an average wait time of 1.5 second.

Erlang-C Calculator				
Data				
<input type="checkbox"/> Transmissions	486.00	per	hour	
<input checked="" type="checkbox"/> Service time	6		seconds	
<input checked="" type="checkbox"/> Number of trunks	4	(integer required)		
<input checked="" type="checkbox"/> Average waiting time	1.5		seconds	
<input checked="" type="checkbox"/> Service level	99	% waits less than	0.00	seconds

To maintain the grade of service offered by the State backbone while increasing the traffic volume with the addition of up to 858 new subscribers, Otter Tail County will add channel capacity to the system. Using an estimate of .3 PTT per user per hour; and 1.7:1 peak hour volume estimate; there is a potential of .51 PTT/hour/user. Giving an additional 20% capacity safety margin, then a .61 PTT/hour estimate with 858 radios creates an added load to the ARMER system of 523 transmissions per hour. If we assume that no more than one third of the total radio fleet is active at any given moment, then we would calculate the additional load created by 286 active radios. Applying the calculations described above, these radios introduce an additional 175 transmissions per hour. To maintain the baseline level of service on the system a single channel addition would allow for 755 transmissions per hour, increasing the original load capability by 269 transmissions per hour.

Erlang-C Calculator				
Data				
<input type="checkbox"/> Transmissions	755.45	per	hour	
<input checked="" type="checkbox"/> Service time	6		seconds	
<input checked="" type="checkbox"/> Number of trunks	5	(integer required)		
<input checked="" type="checkbox"/> Average waiting time	1.5		seconds	
<input checked="" type="checkbox"/> Service level	99	% waits less than	0.00	seconds

This should be adequate to allow for the additional Otter Tail County loading, considering that not all radios would be in service at any given time.

In addition to the calculations presented above, the CMRRB has completed a region wide loading study to aid in determining the additional resources that may be needed to support local participation on the ARMER Backbone. The analysis, completed by GeoComm, uses similar calculation methods and the result supports the assertion that a minimum of one channel addition would be recommended to adequately support the Otter Tail County users for day to day operations with a 20% loading safety margin to accommodate emergency traffic

situations. Regardless of this channel loading plan, Otter Tail County understands that future traffic reports may determine the need to expand the system and add additional trunks (frequencies) to handle increase traffic load. Otter Tail County, consistent with its obligations called out in its partnership agreement with Mn/DOT and the CMRRB, will work with Mn/DOT to determine how the system will be expanded and how any associated costs will be split between the County and Mn/DOT if needed in the future.

3.6 Frequency Use Plan

The basic ARMER state backbone plan calls for seven sites with five channels each, operating in a multicast configuration within Otter Tail County.

The County proposes to use the four channels allocated for use in Otter Tail County from the National Public Safety Planning Advisory Committee (NPSAC) plan and to search for additional channels from the general category pool of 800MHz frequencies. The channels identified for the Otter Tail County ARMER improvements are listed below. This channel plan will accommodate the proposed seven site multicast system with six channels at each site.

The Otter Tail County channel allocations include:

Amor	Channel Number	Frequency (MHz)	Spacing (KHz)
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Mn/DOT	183	853.4000	
Mn/DOT	??	806 ?	
Otter Tail County Additional	??	806 ?	
Eagle Lake			
Eagle Lake	Channel Number	Frequency (MHz)	Spacing (KHz)
Mn/DOT	31	851.4000	
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Otter Tail County Additional	61	851.8000	400
Erhard			
Erhard	Channel Number	Frequency (MHz)	Spacing (KHz)
Mn/DOT	36	851.4625	
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Otter Tail County Additional	180	853.3625	1900

Fergus Falls	Channel Number	Frequency (MHz)	Spacing (KHz)
Mn/DOT	29	851.3750	
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Mn/DOT	224	853.9125	
Otter Tail County Additional	44	851.5875	212

Luce	Channel Number	Frequency (MHz)	Spacing (KHz)
Mn/DOT	34	851.4375	
Mn/DOT	72	851.9375	500
Mn/DOT	83	852.1000	163
Mn/DOT	108	852.4125	313
Mn/DOT	??	806 ?	
Otter Tail County Additional	11	851.1500	288

New York Mills	Channel Number	Frequency (MHz)	Spacing (KHz)
Mn/DOT	??	806 ?	
Mn/DOT	??	806 ?	
Mn/DOT	74	851.9625	
Mn/DOT	150	852.9625	1000
Mn/DOT	188	853.4625	500
Otter Tail County Additional	??	806 ?	

Parkers Prairie	Channel Number	Frequency (MHz)	Spacing (KHz)
Mn/DOT	??	806 ?	
Mn/DOT	69	851.9000	
Mn/DOT	??	806 ?	
Mn/DOT	185	853.4250	
Mn/DOT	??	806 ?	
Otter Tail County Additional	210	853.7375	313

4.0 Subscriber Equipment

4.1 Subscriber Radios

Otter Tail County intends to purchase new mobile and portable radio equipment for operation on the ARMER system. It is anticipated that local agencies dispatched by the County will also migrate to the system along with the County and that subscriber equipment for local agencies will be purchased at the time of system migration for those agencies.

The county wide subscriber loading is estimated to be 296 mobile radios and 521 portable units. The estimated agency radio counts are listed below:

AGENCY	Estimated Mobile Radios	Estimated Portable Radios	800 MHz Radios Initial Estimate	800 MHz Radios 3 Year Estimate
LAW ENFORCEMENT				
Battle Lake Police Department	3	6	9	9
Fergus Falls Police Department	17	25	42	44
Henning Police Department	3	10	13	14
New York Mills Police Department	5	4	9	9
Otter Tail County Corrections	4	34	38	40
Otter Tail County Sheriff	46	63	109	114
Parkers Prairie Police Department	3	4	7	7
Pelican Rapids Police Department	5	6	11	12
Perham Police Department	4	9	13	14
LAW ENFORCEMENT TOTAL:	90	161	251	264
FIRE DEPARTMENT				
Battle Lake Fire Department	6	6	12	13
Battle Lake Rescue	0	2	2	2
Bluffton Fire Department	6	11	17	18
Dalton Fire Department	10	18	28	29
Deer Creek Fire Department	6	10	16	17
Dent Fire Department	9	7	16	17
Elizabeth Fire Department	5	10	15	16
Fergus Falls Fire Department	12	36	48	50
New York Mills Fire Department	8	12	20	21
Ottertail Fire Department	8	6	14	15
Parkers Prairie Fire Department	8	12	20	21
Pelican Rapids Fire Department	9	19	28	29
Perham Fire Department	10	23	33	35
Rothsay Fire Department	6	4	10	11
Underwood Fire Department	6	4	10	11
Vergas Fire Department	8	26	34	36
Vining Fire Department	4	5	9	9
FIRE DEPARTMENT TOTAL:	121	211	332	349
PUBLIC WORKS				
City of Pelican Rapids	9	14	23	24
Fergus Falls Public Works	23	25	48	50
New York Mills Public Works	3	2	5	5
Otter Tail County Highway Department	12	62	74	78
Parkers Prairie Public Works	3	3	6	6
Pelican Rapids Public Works	6	5	11	12
Perham Public Works	3	5	8	8
PUBLIC WORKS TOTAL:	59	116	175	184
EMS/HOSPITALS/CLINICS				
Henning Fire Department/Ambulance	2	2	4	4
Lake Region Health	7	0	7	7
Parkers Prairie Ambulance	2	2	4	4
Perham Ambulance	5	15	20	21
Perham Hospital	1	7	8	8
Ringdahl Ambulance	9	7	16	17
HOSPITALS/CLINICS TOTAL:	26	33	59	62
SCHOOLS/BUS TRANSPORTATION				
Fergus Falls Schools	0	0	0	0
New York Mills High School	0	0	0	0
Underwood Schools	0	0	0	0
SCHOOLS/BUS TRANSPORTATION TOTAL:	0	0	0	0
GRAND TOTAL	296	521	817	858

**Law enforcement radios will be encryption capable. See the fleet map plan for detail on encrypted talk group assignments.

The number of system IDs requested for initial implementation of the Otter Tail County plan is 858 based on this loading table. However, the final configuration of control stations and subscriber equipment ultimately deployed is expected to vary slightly from this estimate. Minimal growth is anticipated so a growth factor of 5% has been applied to accommodate possible deployment variations and the unknown growth expected over the next 3 years.

4.2 Talk Groups / Preliminary Fleet Map Plan

The County has formed an ARMER Project Working Group to plan for and implement the fleet map to accommodate the transition onto the ARMER system. The working group includes members from the local government within the county and has a variety of disciplines represented. The County intends to provide the system administration for the entire county and will work closely with Mn/DOT and the Central Region to implement the talk group plan for the county.

Otter Tail County has the eighth largest geographic land area of the 87 counties in Minnesota. There are a large number of cities within this county and high level of mutual aid that occurs with neighboring cities and counties. Due to the larger geographic area served and the larger number of cities within the county, it is anticipated that Otter Tail County will have a higher than average number of talk groups.

The fleet map table for Otter Tail County is included as an attachment to this document and is identified as Appendix A. The fleet map identifies state and regional resources as well as new resources intended to be created by Otter Tail County. The talk groups to be implemented for Otter Tail County will continue to evolve and update as the work group plans for transition to the system. It is not anticipated that a significant number of new talk groups will be created or added beyond what is listed in the current fleet map table.

Otter Tail County Fleet Map – See Appendix 1.

5.0 Communication Center

5.1 Console Equipment and Configuration

The Otter Tail County Dispatch Center will operate with three operator positions. The County will install new Motorola MCC 7500 IP based console equipment. The County is currently exploring options for relocation of their dispatch operations. The dispatch center may reside in its current location in Fergus Falls or be relocated at the new County Operations Center in Ottertail. This determination has not been finalized. The consoles will incorporate the ARMER talk groups as well as legacy County VHF conventional equipment for paging, communications through the migration phase, and for interoperability and support of agencies that have not migrated to ARMER. The Consoles will be connected to the ARMER zone 4 controller located in Saint Cloud.

The conventional resources identified to interface to the MCC Consoles include the following:

Otter Tail County, Conventional Resources, (11/16/09)				
Resource	2-Wire/4-Wire	Tone or DC	T1R1/T1R2	Notes
Main Dispatch - LEC Tower	4-Wire	Tone	T1R1	
County Fire - LEC Tower	4-Wire	Tone	T1R1	
ESC Channels - LEC Tower	4-Wire	Tone	T1R1	
County Law - LEC Tower	4-Wire	Tone	T1R1	
Paging - LEC Tower	4-Wire	Tone	T1R1	
County ESC - Fergus Falls Tower	4-Wire	Tone	T1R1	
County Paging - Fergus Falls Tower	4-Wire	Tone	T1R1	
County Highway - Vining Tower	4-Wire	Tone	T1R1	
County ESC - Vining Tower	4-Wire	Tone	T1R1	
County Paging - Vining Tower	4-Wire	Tone	T1R1	
MINSEF - Hoot Lake Tower	4-Wire	Tone	T1R1	
County Law - Erhard Tower	4-Wire	Tone	T1R1	
County Paging - Erhard Tower	4-Wire	Tone	T1R1	
County ESC - Erhard Tower	4-Wire	Tone	T1R1	
County Highway - Erhard Tower	4-Wire	Tone	T1R1	
County Paging - Perham Tower	4-Wire	Tone	T1R1	
County ESC - Perham Tower	4-Wire	Tone	T1R1	
County Law - Amor Tower	4-Wire	Tone	T1R1	

5.2 Audio Logging

The County plans to record console audio from the MCC7500 consoles. The County is currently exploring the potential of logging audio on an existing Verint Audiolog 16 Channel Max Pro audio logger. The County is also exploring the possibility of joining with neighboring counties in the Central Region to create a shared centralized logging solution using a NICE logging product. The County recognizes that audio logging has the potential to create a system load and resource requirement. The County will review any final design decisions regarding logging that introduce a resource load to the ARMER system with Mn/DOT prior to its implementation. The talk groups planned for logging are identified in the Talk Group Plan sheet included as Appendix 1. The audio logger will also continue to log conventional resource audio as well as trunked talk groups, interoperability resources and telephone logging.

5.3 ATIA Data Requirement

At this time, Otter Tail County does not anticipate use of the ATIA data stream for interface with third party monitoring or reporting systems, or for any other purpose. However, depending on the final logging solution selected by the County, the use of ATIA Data may be reevaluated. Any ARMER impact will be reviewed with Mn/DOT and a plan addendum would be provided as appropriate.

5.4 Contingency/Back Up Communications Plan

The county will incorporate the use of 800MHz control stations to provide for back-up communications in the event that the Communication Center loses connectivity to the MSO or to accommodate communication when the ARMER system is operating in the site trunking condition. Seven control stations will be installed to accommodate the necessary system access in the Dispatch center. The county intends to retain its current VHF systems through their transition to ARMER and for a period of time after the transition to provide near term back up while any system migration issues are addressed. The VHF systems (other than fire paging) will be decommissioned as the 2013 narrow band rules take effect.

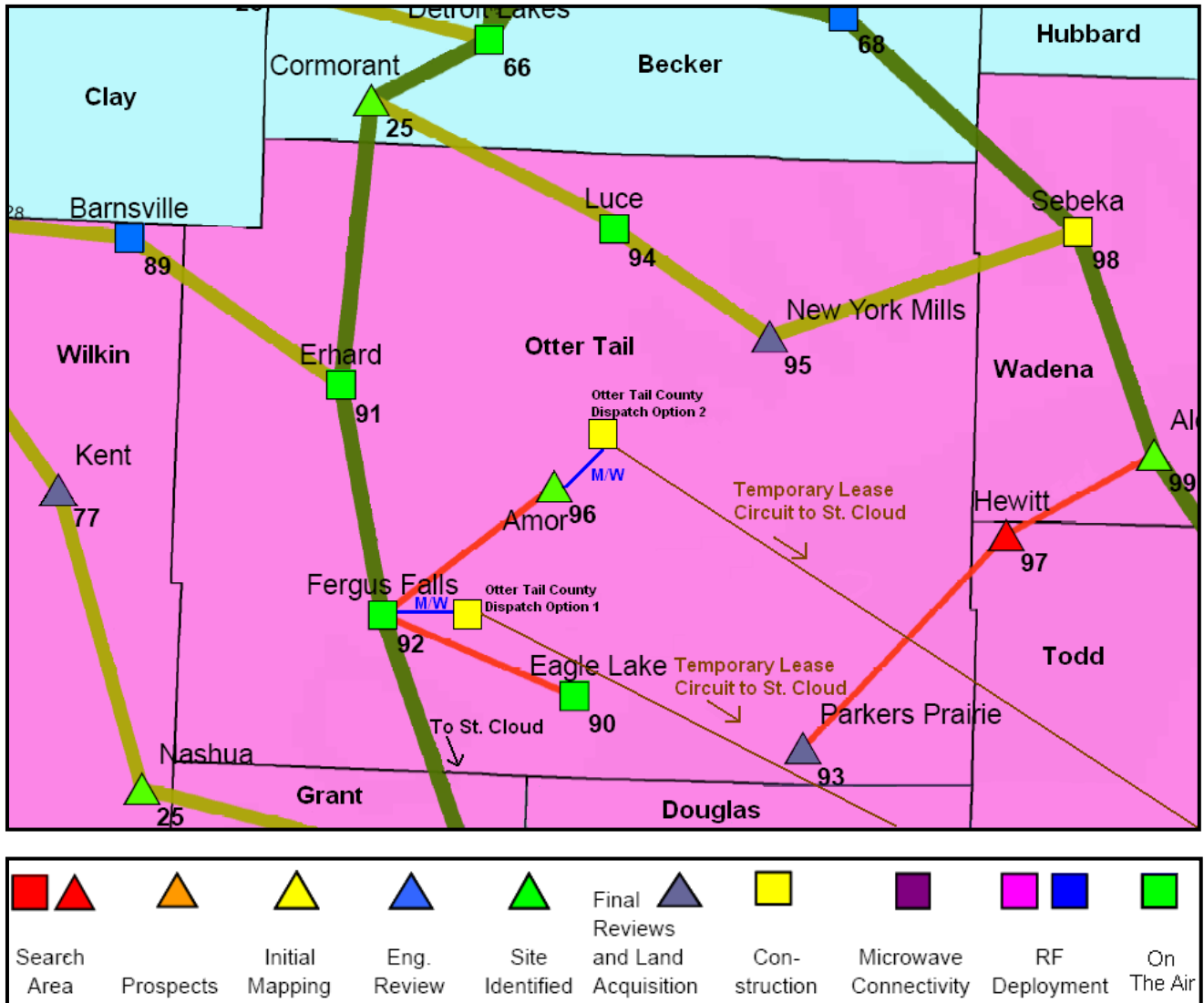
Otter Tail County also has an agreement for back up dispatch service and 911 call taking with Grant County that adds another level of back-up capability for their operations.

5.5 Connectivity to the ARMER Backbone

The connectivity plan shown in Figure 5 reflects the Mn/DOT ARMER system preliminary design for connectivity plan, published March 11, 2008.

The connectivity diagram shows the link from the ARMER tower site to the Otter Tail PSAP. The County is currently exploring options for relocation of their dispatch operations. The dispatch center may reside in its current location in Fergus Falls or be relocated at the new County Operations Center in Ottertail. This determination has not been finalized. However, it is expected that either site would use a hot standby microwave link into the ARMER backbone for primary connectivity, and a leased T1 circuit for a backup path into the system. The connectivity system diagram reflects both potential locations.

Figure 5 – Connectivity Diagram



5.6 Alarming & Monitoring

Otter Tail County will operate off of the State ARMER backbone sites. The site alarming monitored by Mn/DOT is intended to be the primary mode of monitoring site related alarms. Otter Tail County does not intend to add additional monitoring to the ARMER backbone. The

County anticipates that it will have its own alarm monitoring that includes the new microwave equipment.

5.7 Interoperability

The ARMER system is intended to be the primary communication system for use within the County. The ARMER backbone with Otter Tail County channel additions will provide the primary day-to-day communications and interoperability needs of Otter Tail County radio users. The county has considered its interoperability needs for both short term and long term migration onto the ARMER System.

The County is currently operating on wideband VHF and intends to retain this system through the ARMER migration and will begin decommissioning of these systems as the 2013 narrow band transition approaches. The VHF Fire paging system will be retained and converted to narrowband VHF. For the short term, until county users have migrated to the ARMER system, the County intends to install the seven 800MHz control stations supported via the ARMER grant program. These control stations will be connected to the new MCC 7500 console equipment to allow talk group patches to existing county conventional resources for interoperability between county VHF users and itinerant 800MHz users. Current county VHF users that leave the county will be dependant on similar 800 to VHF cross band system patches until their migration is complete.

Upon migration onto the ARMER system, day to day communications and the primary interoperability with users that migrate to the ARMER system will be via the common ARMER 800 MHz infrastructure and shared talk groups.

For long term interoperability with those agencies remaining on VHF or other communications systems, Otter Tail County users will rely on the interoperability solution ultimately implemented by the ARMER program to provide additional interoperability. Otter Tail County does not intend to retain its wideband VHF infrastructure, or deploy any narrowband VHF, UHF, or conventional 800MHz infrastructure to provide for additional interoperability.

The interoperability needs for Otter Tail County will be reevaluated as the January 1, 2013 narrow band transition takes effect with the anticipation that a state wide 800/VHF interoperability capability will be in place as an element of the state backbone.

5.8 System Administration/Management Plan

Otter Tail County plans to have one network administration terminal to provide for agency wide system configuration, monitoring and support. A network management terminal will be implemented in conjunction with the MCC7500 console installation at the County PSAP. The County understands that there is a significant level of training needed to operate the subsystem level of network management and system administration. The County has identified staff to attend vendor specific training to support internal needs for system programming and administrations. The County will continue to make use of local two way radio shop support, and coordinate with the Central Minnesota Region and Mn/DOT as needed for higher level system administration functions.

6.0 Project Management & Delivery

6.1 Training Plan

Otter Tail County recognizes the importance of a robust training program as a key element of its successful migration onto the ARMER system. A training program is being developed to meet the requirements of the ARMER training standards (standard 1.10 a-e). The training plan will also make beneficial use of the guidance and experience of others in the region that have migrated to the ARMER system and with input of the Central Minnesota Regional Advisory Committee.

The County intends to have trainers available for the initial user migration onto ARMER and trainers for long term ongoing user training and refresher courses. The County is currently exploring available consultant services and vendor provided training to establish its training plan in the following areas:

- Train-the-Trainer Training
- Radio User Training
- System Administrator Training
- Console Operator Training
- Interop Only User Training

6.2 Cut Over Plan

Otter Tail County intends to time its migration onto the ARMER system along with the final deployment and commissioning of the Mn/DOT sites at Amor, New York Mills and Parkers Prairie. The County will conduct system coverage testing to determine in building system performance and make any final determination on the need for local subsystem enhancements such as in building systems, vehicular repeaters, or site additions. Otter Tail County will proceed with installing a new MCC 7500 console and installing back up control stations. Once these systems are operational and connectivity to the ARMER system is in place, the County will begin user training, programming and distribution of radios. Otter Tail County will coordinate its migration timing with Mn/DOT for implementation of talk groups and system user IDs.

6.3 Schedule/Project Time Line

This section is under development and will be completed with input from the Vendor as part of the Detailed Design Review process. Wherever practical the County would like to coordinate its efforts along with the ARMER installations taking place in the County.

6.4 Maintenance Plan/Spare Parts

The State ARMER backbone system with the Otter Tail County subsystem additions will provide the primary communications infrastructure for the County. Otter Tail County will share the responsibility with the State for maintaining the ARMER backbone infrastructure, by providing for the maintenance of any County subsystem equipment additions. The County will provide for the maintenance and spare parts needed to support the channel additions to the system. The County will have full responsibility for maintenance of its console systems, mobile and portable radios, and interoperability control station equipment. The County has some internal support capability and also contracts for service from private sector service providers to provide ongoing support and maintenance of County owned radio infrastructure and subscriber equipment.

Appendix A

Otter Tail County Fleet Map

Talk Group / MultiGroup	On Console ?	Resource Owner	Resource Administrator (Admin Agency)	Description	Logging	Encryption	Statewide	Resource Sharing Permissions * (Global Sharing)	Priority	Site Access Permissions	Decimal ID	Hex ID	Other
Other Tail SHARED													
OTEMTS	Y	Other Tail Co	Other Tail Co	EMSFire Main 800	Y	N	N	Law, Fire, EMS					
OTEMRMGT	Y	Other Tail Emerg Mgt.	Other Tail Co	Emergency Management Main	Y	N	N	Law, Fire, EMS					
OTEMRGADMIN	N	Other Tail Emerg Mgt.	Other Tail Co	Emergency Management Admin	N	N	N	Law, Fire, EMS					
OTOPS2	Y	Other Tail Co	Other Tail Co	Operational - Countywide	Y	N	N	Law, Fire, EMS					
OTOPS3	Y	Other Tail Co	Other Tail Co	Operational - Countywide	Y	N	N	Law, Fire, EMS					
OTOPS4	Y	Other Tail Co	Other Tail Co	Operational - Countywide	Y	N	N	Law, Fire, EMS					
OTOPS5	Y	Other Tail Co	Other Tail Co	Operational - Countywide	Y	N	N	Law, Fire, EMS					
OTOPS6	Y	Other Tail Co	Other Tail Co	Operational - Countywide	Y	N	N	Law, Fire, EMS					
OTOPS7	Y	Other Tail Co	Other Tail Co	Operational - Countywide	Y	N	N	Law, Fire, EMS					
OTOPS8	Y	Other Tail Co	Other Tail Co	Operational - Countywide	Y	N	N	Law, Fire, EMS					
OT 911	Y	Other Tail County	Other Tail County	County Wide Emergency	Y	N	N	Law, Fire, EMS, PW, TS					
OT PAGE	Y	Other Tail County	Other Tail County	Other Tail County Paging	Y	N	N	Law, Fire, EMS					
OT ANNOUNCE	Y	Other Tail County	Other Tail County	Other Tail County Announcement	Y	N	N	Law, Fire, EMS					
OT TRAIN	Y	Other Tail County	Other Tail County	Countywide Training Talkgroup	N	N	N	Law, Fire, EMS, PW, TS					
Other Tail FIRE													
SFMAMAIN	Y	State Fire Marshall	Other Tail County	State Fire Marshall Main	N	N	Y	Law, Fire, EMS					
BLF	N	City of Battle Lake	Other Tail County	Battle Lake Fire Admin	N	N	N	Law, Fire, EMS					
BLR	N	City of Battle Lake	Other Tail County	Battle Lake Rescue Admin	N	N	N	Law, Fire, EMS					
BFF	N	City of Bluffton	Other Tail County	Bluffton Fire Admin	N	N	N	Law, Fire, EMS					
DIF	N	City of Dalton	Other Tail County	Dalton Fire Admin	N	N	N	Law, Fire, EMS					
DCF	N	City of Deer Creek	Other Tail County	Deer Creek Fire Admin	N	N	N	Law, Fire, EMS					
DTF	N	City of Dent	Other Tail County	Deer Creek Fire Admin	N	N	N	Law, Fire, EMS					
EBF	N	City of Elizabeth	Other Tail County	Deer Creek Fire Admin	N	N	N	Law, Fire, EMS					
FFF	N	City of Fergus Falls	Other Tail County	Elizabeth Fire Admin	N	N	N	Law, Fire, EMS					
HNF	N	City of Henning	Other Tail County	Fergus Falls Fire Admin	N	N	N	Law, Fire, EMS					
NYMIF	N	City of New York Mills	Other Tail County	Henning Fire Admin	N	N	N	Law, Fire, EMS					
OTF	N	City of Otter Tail	Other Tail County	New York Mills Fire Admin	N	N	N	Law, Fire, EMS					
PPF	N	City of Parkers Prairie	Other Tail County	Otter Tail Fire Admin	N	N	N	Law, Fire, EMS					
PRF	N	City of Pelican Rapids	Other Tail County	Parkers Prairie Fire & Law Admin	N	N	N	Law, Fire, EMS					
PHF	N	City of Perham	Other Tail County	Pelican Rapids Fire Admin	N	N	N	Law, Fire, EMS					
RHF	N	City of Rothsay	Other Tail County	Perham Fire Admin	N	N	N	Law, Fire, EMS					
UHF	N	City of Underwood	Other Tail County	Rothsay Fire Admin	N	N	N	Law, Fire, EMS					
VGF	N	City of Vergas	Other Tail County	Underwood Fire Admin	N	N	N	Law, Fire, EMS					
VNF	N	City of Vining	Other Tail County	Vergas Fire Admin	N	N	N	Law, Fire, EMS					
DOUGLAS FIRE													
Grant FIRE	Y	Douglas Co.	Other Tail County	Douglas Fire	N	N	N	Law, Fire, EMS					
Todd FIRE	Y	Todd Co.	Other Tail County	Grant Fire	N	N	N	Law, Fire, EMS					
Wadena FIRE	Y	Wadena Co.	Other Tail County	Todd Fire	N	N	N	Law, Fire, EMS					
Wilkin FIRE	Y	Wilkin Co.	Other Tail County	Wadena Fire	N	N	N	Law, Fire, EMS					
Other Tail LAW													
OTMAIN	Y	Other Tail Law	Other Tail County	Sheriff's Main	Y	N	N	SO LAW					
OTMAIN2	Y	Other Tail Law	Other Tail County	Sheriff's Main Encrypted	Y	Y	N	OT Law					
OTADMIN	N	Other Tail Law	Other Tail County	Sheriff's Admin	Y	Y	N	OT Law					
OTPTFL E	N	Other Tail Law	Other Tail County	East County Car to Car	N	N	N	OT Law					
OTPTFL W	N	Other Tail Law	Other Tail County	West County Car to Car	N	N	N	OT Law					
OTINVEST	N	Other Tail Law	Other Tail County	Sheriff's INV/Marc	Y	Y	N	OT Law					
OTWCMDDT	N	Douglas Co.	Other Tail County	W/C Drug Task Force	N	N	N	OT Law					
OTLE ROOM	Y	Other Tail Law	Other Tail County	Subsystem Roaming Talkgroup	N	N	N	OT Law					
OTSWAT1	N	Other Tail Law	Other Tail County	Swat Main 1	Y	Y	N	SO LAW					
OTSWAT2	N	Other Tail Law	Other Tail County	Swat Main 2	Y	Y	N	SO LAW					
OTSWAT3	N	Other Tail Law	Other Tail County	Swat Main 3	Y	Y	N	SO LAW					
OTSWAT4	N	Other Tail Law	Other Tail County	Swat Main 4	Y	Y	N	SO LAW					
BL PD Main	N	Other Tail Law	Other Tail County	Battle Lake PD	Y	N	N	OT Law					
HN PD Main	N	Other Tail Law	Other Tail County	Henning PD	Y	N	N	OT Law					
NVM Main	N	Other Tail Law	Other Tail County	New York Mills PD	Y	N	N	OT Law					
PR Main	N	Other Tail Law	Other Tail County	Pelican Rapids PD	Y	N	N	OT Law					
PH Main	N	Other Tail Law	Other Tail County	Perham PD	Y	N	N	OT Law					
SP 2900 MAIN	N	State Patrol	Other Tail County	State Patrol 2900 Main Channel	Y	N	N	OT Law					
SP 2900 CAR	N	State Patrol	Other Tail County	State Patrol 2900 Car to Car	Y	N	N	OT Law					
SP 2900 TAC	N	State Patrol	Other Tail County	State Patrol 2900 Side Tactical	Y	N	N	OT Law					
OT CO DET	Y	Other Tail Law	Other Tail County	Other Tail County Detention	Y	N	N	OT Law					
OT JAIL 911	N	Other Tail Law	Other Tail County	Other Tail County Jail Emergency	Y	N	N	OT Law					
OT JAIL MTNC	N	Other Tail Law	Other Tail County	Other Tail County Jail Maintenance	N	N	N	OT Law					
OT STS CREW	N	Other Tail Law	Other Tail County	Other Tail Co STS Crew	N	N	N	OT Law					
OT COURT	N	Other Tail Law	Other Tail County	Other Tail County Court Security	N	N	N	OT Law					
FFPD MAIN	Y	Fergus Falls	Other Tail County	Fergus Falls PD Main	Y	N	N	OT Law					

Appendix B

Participation Time Line



Otter Tail County, ARMER Participation Timeline

JCC
12/10/09

