



## Dodge County Nebraska: Radio System Project Update

**Date:** February 8, 2021

**To:** Dodge County Board of Supervisors

Greetings to All:

This report is being provided as a status update on the Dodge County Nebraska Public Safety radio system project.

Significant progress was made in the latter half of 2020, with the completion of the four new 330-foot tower sites, the physical delivery and installation of the radio system equipment at the sites, and related items as outlined in this report. Provided in this report are the following topics:

1. Tower Site Development – 4 New Locations
2. Other Tower Sites (Sheriff's Office, Power Plant, etc.)
3. Motorola Radio System Equipment and Delivery
4. System Connectivity: Microwave Radio and Fiber Optic Work
5. In-Building Amplifier for Sheriff's Office and Courthouse
6. Project Schedule

### 1. Tower Site Development – 4 New Locations (Dodge/Snyder, Hooper, North Bend, Uehling):

The construction work and equipment delivery has been completed at all four tower sites, including:

- Construction and erection of the four 330-foot tower structures
- Delivery and installation of prefabricated radio equipment shelters with generators
- Site access roads (work accomplished by Motorola and County crews)
- Commercial electrical service
- Installation of all 800 MHz, UHF Paging and microwave antennas and transmission lines from the tower into the equipment shelters
- Security fencing and R56 grounding of all site components

The sites are generally considered complete, including the delivery and physical installation of the radio system and microwave radio equipment within the buildings.

Photos from some of the sites are shown on the pages at the end of this report.

## 2. Other Tower Locations:

Work has been progressing on other project locations as well:

- Dodge County Sheriff's Office/Judicial Center: The "Main System Controller" for the new Dodge County radio network will be located at this site. This room has been cleared out of old equipment and wiring, cleaned up, and new lighting installed in preparation for the new radio equipment.

New HVAC equipment for this room, along with upgraded electrical service is in the process of being completed at this location. New holes were cut in the walls for the routing of the transmission lines, along with an overhead cable tray between the two rooms.

Motorola has been installing a new "R56" grounding system in the radio rooms, as well as the generator/electrical room, which is required to ensure long-term protection of the radio system components. Once this work is completed, the new radio system and microwave radio equipment will be installed (expected this week).

- Fremont Power Plant: New microwave radio antennas will be installed at this location for connectivity into the ORION network. Motorola and Pyramid have designed antenna mounts for the installation on this building structure, and have started this work. It will be completed over the next two months.
- Elkhorn Water Tower: This site will be used as a critical link for microwave radio to connect Dodge County to the ORION radio system core site in Omaha/Douglas County. The Motorola tower crews have been working on this site for the past two months, welding new antenna mounting brackets on the structure. This work has been somewhat challenging because of the winter weather in conjunction with controlled access to the site through Douglas County.
- Douglas County (Omaha) Dispatch Center tower: The Dodge County radio project requires the installation of a new microwave radio dish antenna at the Douglas County Dispatch Center. As noted in previous reports, the existing small tower at this site is not strong enough to support the new antenna. The Dodge County team has been working with the Douglas County staff to find a solution to this problem.

A significant amount of time and effort was invested in reviewing this existing tower, including options to strengthen it for more capacity. Ultimately, there are no good options to make this work. As a result, the Dodge County team has been working with Douglas County to allow the construction of a new tower at this location. A proposal was originally obtained from Sabre towers for a new 60-foot self supporting tower; however it was determined that due to the estimated cost of this new tower (~\$70,000) it will need to be purchased through an RFP process. This RFP has been completed, and will be issued to vendors once soil testing is completed.

Soil testing will be needed to plan for a new tower, and a proposal was obtained from Terracon for this work. This proposal is awaiting signature from Dodge County to get started. We are also waiting for the Douglas County staff to finalize the exact location for the new tower at the site.

**Tower Site Summary:** The tower site development work is major element of the project which has required additional time, effort and some cost to address various challenges encountered but needing to be addressed for completion of the project.

### 3. Motorola Radio Equipment and Activities:

Weekly project conference calls continue with the Dodge County and Motorola project team staff. There has been a significant amount of work completed for the radio system.

- Primary radio system equipment: The main radio network system equipment (repeaters, etc.) for the Dodge County project has been delivered and installed at the four primary tower sites.

The system control equipment planned for the Sheriff's Office location remains in storage until construction work at the site has been completed.

- New Mobile and Portable Radios: The new mobile and portable radios for the Sheriff's office have been delivered, programmed and installed.

Rural Police and Fire agencies: The new radios for those agencies which have agreed to move forward with the new system has been delivered to the First Wireless office in Omaha; Tom Christensen is currently conducting an inventory of this equipment to verify correct models and quantities. Once this work is completed, programming of the radios will be accomplished.

### 4. ORION System and Microwave Radio Connectivity

The new microwave radio equipment will provide communications connectivity from the new Dodge County subnetwork to the ORION system core in the Omaha area. This connectivity is designed to have two separate routes between Fremont and Omaha, to allow full backup and diversity in the event of a failure of either link. The overall system package purchased from Motorola included new microwave radio hardware to provide this connectivity. Microwave radio connectivity between the four new tower sites is also included in the project.

- The new microwave radio equipment and antennas have been installed at the four new tower sites in Dodge County
- The new microwave equipment will be installed at the Elkhorn water tower, Fremont Power Plant, Dodge County SO/Judicial Center and Douglas County PSAP as soon as each site is ready for installation. Much of this will occur in the next couple of weeks.
- Fiber Optic Connectivity: The fiber optic system for the sites in Fremont is completed and ready for use with the new system.

### 5. In-Building Amplifier for Sheriff's Office and Courthouse

An In-Building radio booster/amplifier is being installed within the Sheriff's Office and Courthouse in Fremont for improved portable radio coverage. The overall density of these buildings is such that the radio signals from new 800 MHz system cannot fully penetrate all areas within them.

An RFP process was conducted, which resulted in two proposals being received for this work, and a contract was awarded to First Wireless of Omaha for this element of the project. The installation work on this system was started in late January and is well underway. Completion of the physical installation work is expected this week, with the programming and setup of the system to follow.

## 6. Project Schedule

With all of the major tower site work and system equipment delivery completed, Motorola has provided a revised project completion schedule which is attached to this report.

The radio system equipment at the four main tower sites has been "powered up" and is awaiting completion of the microwave connectivity for operation and testing. As shown in the attached schedule, Motorola plans for the following:

- Microwave radio equipment installations at the remaining sites in March
- Equipment alignment and testing to begin in March, requires 60 days
- Programming and installation of remaining mobile and portable radios in April
- System coverage testing to be conducted in April
- Cutover to new system in May 2021

However...one key factor remains the new tower needed at the Douglas County Sheriff's office. This tower will support the microwave radio antenna needed for the primary link into the ORION system, and is needed to make the system fully operational. As noted, we need to move forward with this work, but have been struggling to obtain the approvals needed from Douglas County. We now have most of these in place, and need to get the RFP process completed and a contract awarded to a vendor for this tower. Construction can take place rather quickly, but the new radio equipment at Douglas cannot be installed until this is complete. In the meantime, we are looking at options for using the "backup link" through OPPD to bring the system online for testing purposes.

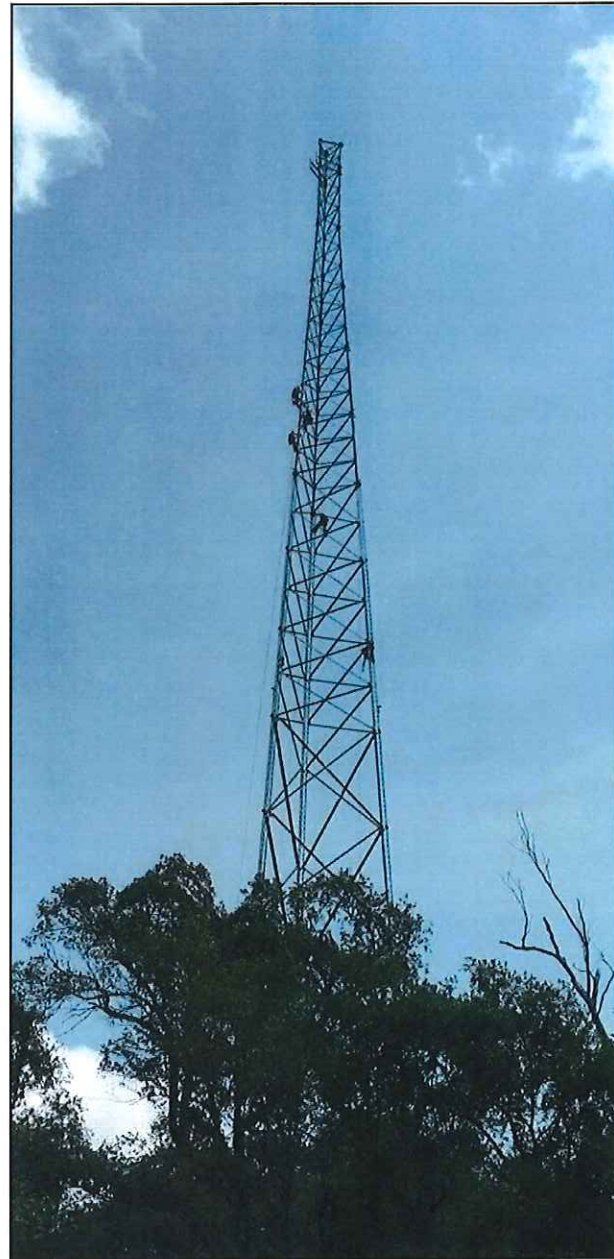
**Summary:** Overall, we are pleased to see the completion of major elements of the project, and "light at the end of the tunnel" with project completion expected in June 2021. We will continue to update the schedule and keep agencies posted on the work being conducted.

Regards



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Tower Site Photos - Hooper



Tower Site Photos - Hooper



Hooper Shelter and Tower (prior to fence installation)

Tower Site Photos – Elkhorn Water Tower



Welding antenna mount on side of tank structure



New antenna mounts on top of water tank

Dodge County NE - Motorola Project Schedule			
Revised January 2021			
Task Name	Duration	Target Dates	
<b>Douglas County Sheriff Site</b>	<b>6 days</b>		
M/W Equipment Install	2 days	3/1/2021	
M/W Ant & Line Install	3 days	3/3/2021	
R56 Inspection	1 day		Can be completed in parallel once all equipment installed
<b>Elkhorn Water Tower Site</b>	<b>6 days</b>		
M/W Equipment Install	2 days	3/3/2021	
M/W Ant & Line Install	3 days	3/8/2021	
R56 Inspection	1 day		Can be completed in parallel once all equipment installed
<b>Fremont Power Site</b>	<b>6 days</b>		
M/W Equipment Install	2 days	3/8/2021	
M/W Ant & Line Install	3 days	3/11/2021	
R56 Inspection	1 day		Can be completed in parallel once all equipment installed
<b>Dodge County Sheriff Site</b>	<b>9 days</b>		
RF Equipment Install	3 days	2/8/2021	
M/W Equipment Install	2 days	3/10/2021	
M/W Ant & Line Install	3 days	3/15/2021	
R56 Inspection	1 day		Can be completed in parallel once all equipment installed
<b>Network Optimization</b>	<b>70 days</b>		
M/W Optimization (Incl Pathing & MPLS Config)	40 days	3/18/2021	This work may be able to start earlier or go faster depending on the M/W teams task they can complete outside of having the dishes installed.
RF Connectivity/Optimization	30 days	5/17/2021	We may be able to complete some of the paging and site alarming before the m/w is connected, which would reduce the duration.



<b>System Fleetmapping and Subscriber Templates</b>	<b>37 days</b>		
Subscriber Fleetmap Template Inputs	15 days	2/15/2021	This work could start sooner based on the different agencies inputs, and we believe that Dodge County has already started this work. This duration may also be shorter based on Dodge County's knowledge.
Test Sample of Templates	5 days	3/8/2021	
Generate test Code Plugs	5 days	3/15/2021	
Program & Distribute Test Radios	2 days	3/22/2021	
Perform Tests, Gather Feedback	5 days	3/31/2021	This schedule shows testing the programming, not on the system.
Generate Code Plugs	5 days	4/7/2021	
<b>Subscriber Programming and Installations</b>	<b>62 days</b>		
Program Portables	8 days	4/14/2021	This duration may be able to be improved
Install Mobiles & Program	54 days	4/26/2021	This duration is based on installing 2 mobiles per day. This duration could be shortened if agencies could have the install work start sooner. This depends on space within the vehicle.
<b>Acceptance Testing</b>	<b>3 days</b>		
System Acceptance Testing with Customer	3 days	5/3/2021	This assumes acceptance testing can occur before all subscribers are completed
<b>Coverage Acceptance Testing (CATP)</b>	<b>12 days</b>		
CATP Training and Set-up	2 days	5/6/2021	
Coverage Acceptance Testing and Reporting	7 days	5/10/2021	
Coverage Testing Data Compilation and Reporting	2 days	5/18/2021	
Customer Review and Acceptance of Acceptance Testing Results	1 day	5/20/2021	
<b>Training</b>	<b>2 days</b>		
Subscriber Training (Train the Trainer)	2 days	4/26/2021	This is based on not having all mobiles installed, but having approval for the radio programming.
<b>Cutover and Migration</b>	<b>10 days</b>		
Implement Cutover Plan	10 days	5/21/2021	

<b>Project Close</b>	<b>20 days</b>		
Final Inspections w/Customer	3 days	6/7/2021	Much of this work can be completed earlier also, as it involves walking sites.
Punchlist Resolution	5 days	6/10/2021	Much of this work can be completed earlier also, as it involves feedback from walking sites.
Final System Documentation Development and Delivery	10 days	6/24/2021	This duration can be shortened depending on how engineering structures the work.
Transition Service	1 day	6/25/2021	
Final System Acceptance	1 day	6/28/2021	