



Texas Public Safety Broadband Program

State of Texas Response to RURAL Topics

NTIA Request for Comment

Docket #140821696-4696-01

Submitted by

Texas Department of Public Safety



October 27, 2014

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NTIA - Notice and Request for Comment

Docket number 140821696-4696-01

1. Defining the Term “Rural”

Within the docket, NTIA has concluded that a definition of “rural” is needed to assure that the program meets the rural requirements outlined by Section 6206 of *The Middle Class Tax Relief and Job Creation Act of 2012*. This document provides recommendations and approaches for both accomplishing and managing accountability to this critically important legislative objective.

The State of Texas believes the Rural Areas definition¹ provided under the Rural Electrification Act of 1936 to be inadequate and instead recommends a more workable approach be considered.

1.1 Selection of “Rural Areas” Definition from *The Rural Electrification Act*²

The Rural Policy Research Institute Health Panel, a government think tank which published excellent material³ on the complexities of defining “rural” for policy purposes, declares

“There is no single, universally preferred definition of rural that serves all policy purposes. The choice of a rural definition affects who benefits from a policy and who does not.”

— Rural Policy Research Institute Health Panel

The State of Texas asserts that the beneficiary of the Rural Electrification Act is ultimately private US residents living in “Rural Areas” as defined. The beneficiaries of the Spectrum Act, which defines the Nationwide Public Safety Broadband Network (NPSBN) and created FirstNet, are Public Safety agencies, varying in size from single station volunteer fire stations to vast federal investigation agencies.

For these reasons, the State of Texas rejects the use of the Rural Area definitions and requests that the entire definition be thoughtfully modified and customized to the unique and complex needs of deploying a NPSBN.

1.1.1 More Precision and Granularity Required

The Rural Electrification Act of 1936 definition of Rural as, “any city, town, or incorporated area that has a population of less than 20,000 inhabitants⁴ AND is NOT contiguous or adjacent to a city or town that has a population greater than 50,000 inhabitants”. This definition is vague and not easily measurable using readily available public information, because:

- City, town, or incorporated areas are not mutually exclusive (i.e. a town could be in a city and a incorporated area could be in a city), and
- Non-incorporated areas not included, could represent substantial rural areas.

¹ See Federal Register/ Vol. 79, No.185

² See Rural Electrification Act of 1936, as amended through P.L. 110-246, May 22, 2008

³ See “*Choosing Rural Definitions: Implications for Health Policy*”, Rural Policy Research Institute Health Panel, RuralDefinitionsBrief.pdf, March 2007

⁴ See Federal Register/ Vol. 79, No. 185 under 3. Defining the Term “Rural”

In summary, significant incremental resources, time, further definitions, and clarifications would be needed to create this complex calculation for over 25 million inhabitants scattered across the vast geography of Texas or any other state with substantial rural areas.

1.1.2 Difficulty of “Adjacency Prong” Problem

The FFO requests comments on whether or not the adjacency prong of the definition will pose any difficulties in applying the definition under the Act.

The State would like to emphasize the answer to this question is YES. For instance, a definition which defines an area by its adjacency to other areas is inherently complex to manage and assess, creating an overhead which the State believes would be distracting and unproductive.

In summary, to be effective, the definition for a Rural Area must be established in a manner which allows it to be measured and assessed without complex analysis. The State recommends the use of Counties as planning units, a strategy which has been utilized in many Federal Rural Area Definitions.⁵

1.1.3 Not Sufficiently Well Known

The State challenges the assertion that the Rural Electrification Act’s “Rural Areas” definition selection is sufficiently “well known and familiar” across the nationwide and diverse Public Safety and commercial community. There are dozens of conflicting Federal definitions of “Rural”. The State of Texas believes this is one of the least appropriate definitions for FirstNet to use, and does not agree that this language is widely understood across the NPSBN stakeholders and Public Safety agencies involved.

Additionally, the Act contains at least three separate definitions, with the most recent being the Rural Broadband clause, so it seems fair to assume the Rural Electrification community has a fractured familiarity.

1.1.4 Results in Minimal Reduction, Perhaps Incremental Increase in Effort

The docket asserts that adopting the Rural Electrification Act’s (“Act”) definition of Rural, “*would obviate the need for FirstNet to take additional, time-consuming steps to educate itself and the stakeholder community on the parameters of a novel or less familiar definition of ‘rural’ or ‘rural area’.*” The State disagrees with this assumption, because:

- Even if reused, the Public Safety and FirstNet communities still need to be educated on the clarified definition,
- FirstNet and States are set up to do this through established Outreach & Education programs,
- Even if incremental, the effort is a necessary part of the process,
- The State believes this effort is necessary to assure that the purposes of the mandate are met, and
- Indeed, for reasons described in other sections, using these vague and highly relational constructs increase data management in all areas of measurement, planning and tracking.

For these reasons, the State of Texas does not agree that reusing the Rural Electrification Act’s Rural definition will reduce efforts in any meaningful way, and will in fact create numerous problems for FirstNet and the States, in particular most of those west of Delaware.

⁵ OMB, Economic Research Service, USDA Continuum Codes, USDA Urban Influence

1.1.5 Rural Broadband Access Loan Program - Different End Users

The Rural Electrification Act was created to improve the lives of citizens in rural America and to “give rural Americans a ‘fair chance’⁶. Similarly, the goal of the Rural Broadband Access Loan (RBAL) and Loan Guarantee Program (LGP) is to “ensure that rural consumers enjoy the same quality and range of services that are available in urban and suburban communities⁷.” Although informative, the State of Texas asserts that because the Rural Electrification Act, the RBAL, and LGP have significantly different end users than the nationwide public safety network, the Act’s definitions diverge significantly in the overall purpose and therefore should not be adopted.

The purpose of the NPSBN is not to bring a technology such as electricity or broadband to the citizen living in rural America. The purpose of the nationwide public safety network is to provide Public Safety entities with “a network they can count on during emergencies and to meet their everyday missions.”⁸ The complex combination of attributes that would determine what areas Public Safety entities need coverage is vastly different from that of the citizens.

1.2 Section Summary

The State of Texas believes the proposed Rural Area definition ... “any city, town, or incorporated area that has a population of less than 20,000 inhabitants, and is NOT contiguous or adjacent to a city or town that has a population greater than 50,000 inhabitants” is unsatisfactory for reasons stated in the previous section and summarized in the table below.

Reason Selected by NTIA	Reason Rejected
<ul style="list-style-type: none"> • Sufficiently specific and granular 	<ul style="list-style-type: none"> • Not specific enough, in fact creates difficult data issues such as the “Adjacency Prong” problem • Very difficult to measure
<ul style="list-style-type: none"> • Definition is “widely known” 	<ul style="list-style-type: none"> • Not well known in NPSBN community; the Electrification Act has three very different “Rural Area” definitions⁹
<ul style="list-style-type: none"> • Will save us time since everyone already knows it 	<ul style="list-style-type: none"> • Has to be defined and clarified to entire audience regardless of which definition is selected
<ul style="list-style-type: none"> • Same objectives as Rural Loan program 	<ul style="list-style-type: none"> • Similar but not same and end beneficiary is very different

⁶ See National Park Service, U.S. Department of the Interior website: <http://www.nps.gov/home/historyculture/ruralelect.htm>

⁷ See Rural Assistance Center website: <http://www.raconline.org/funding/438>

⁸ See FirstNet website: <http://www.firstnet.gov/about/why>

⁹ See Sec. 601 7 U.S.S 950bb, 7 U.S.C. 913 and 7 U.S.C. 924

2. Defining “Rural Areas”

Texas chose to use Counties as a basis for a planning unit because of objective, reliable and readily available data. The State proposes the statutory performance to be measured by the footprint of actual coverage achieved within the jurisdictional boundaries of Texas Counties, categorized as “Rural” based upon the definition presented below.

2.1 Texas “Rural Areas” Definition

The State of Texas has consulted with rural stakeholders¹⁰ and proposes a definition for Texas Rural Counties which we believe is a more effective and manageable approach.

A Texas “Rural County” is defined as a county in Texas with a population density of less than 160 persons per square mile.

The definition is a calculated figure based upon 2010 US Census Inhabitants by County population data and the Texas Association of Counties figures for square miles by county. These reliable and stable parameters are simply combined into a density value measured in “Persons per Square Mile.”

In order to define “Rural Areas”, other categories must also be defined. The State of Texas has chosen to use three general categories, “Rural”, “Suburban” and “Urban” along with four associated sub-categories contained within each major category, which capture more detail and granularity. The overall framework defines other segments such as “Dense Urban”, “Rural Suburban”, “Frontier” and “Remote Frontier” which are shown and defined in the summary below.

This framework creates general categories defined as below and further segmented and illustrated in the map which follows:

- **General URBAN COUNTY** – Texas counties with a calculated population density of **more than 1000 persons per square mile**
- **General SUBURBAN COUNTY** – Texas counties with a calculated population density of **between 160 and 1000 persons per square mile**
- **General RURAL COUNTY** – Texas counties with a calculated population density of **less than 160 persons per square mile**

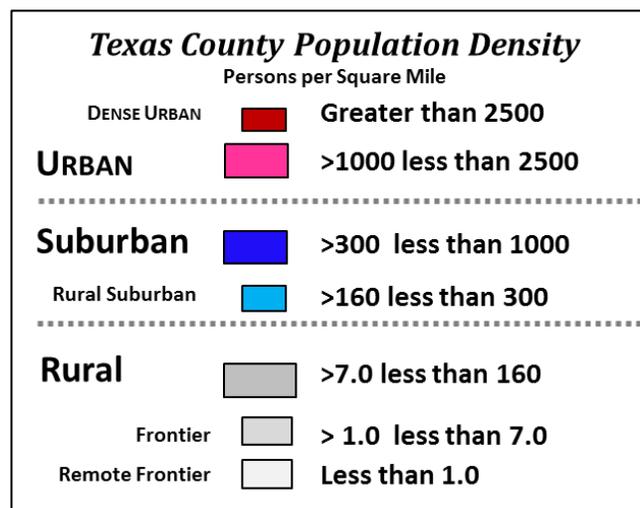
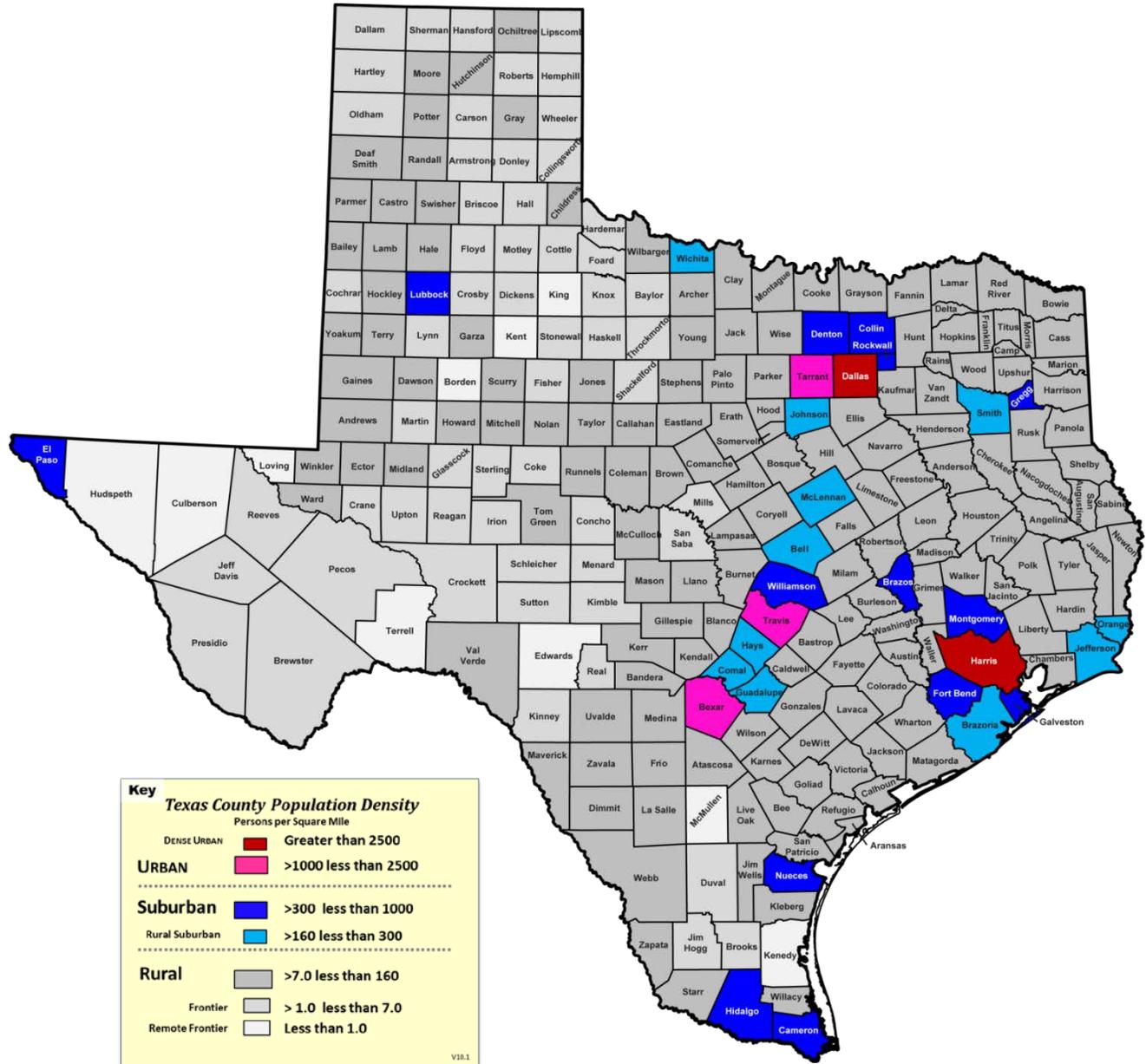


Fig. 1 Texas County Population Density – This illustration shows the framework which refined the overall Rural Areas definition, along with how these relate to other categories, definitions and sub-categories

¹⁰ Methodology and content reviewed in October 6th and October 22nd Texas Rural Strategic Advisory Group (SAG) conference calls

2.1.1 Texas County Population Density Map

The map below illustrates the categorization of each Texas County in map form, indicating RURAL counties in grays, SUBURBAN in blues and URBAN in reds/magentas. The map clearly illustrates the variety of population density challenges, from two of the most densely populated counties in the country (Dallas and Harris) to vast territories with less than one person per square mile.



Persons Per Square Mile, calculated from:
 [1] US Census Bureau 2010 US Census - Inhabitants by County in Texas
 [2] Texas Association of Counties – Square Mile By County

Source Data: TxPSB_Rural_Coverage_Analysis_v18.1.xlsx

Fig. 2 Texas Counties by Population Categories Defined – This illustration shows the population density of each county, categorized by overall category. This map shows the astonishingly huge Texas rural area.

2.1.2 Texas Counties by the Numbers – Analysis

The table below illustrates the importance of rural areas.

	v10	Number of Counties	%Counties	Area (Sq. Miles)	% Area	Population	%Pop		
Rural	<160 pp/mi ²	224	88%	235,386	90.11%	5,859,541	23.30%	NON	Rural
Rural Suburban	>160 pp/mi ² < 300	11	4%	8,942	3.423%	2,081,677	8.28%	URBAN	Non Rural
Suburban	>300 pp/mi ² < 1000	14	6%	11,237	4.301%	6,195,672	24.64%	URBAN	
Urban	>1000 pp/mi ²	5	2%	5,668	2.170%	11,008,671	43.78%		
		254	100%	261,233	100%	25,145,561	100%		

Fig. 3 Analysis of Texas Counties by Category – This table shows the proportions of each county-based category by percent of total (254) counties, area and population of the State.

Chart 1 – Percent of Texas AREA by County Categories

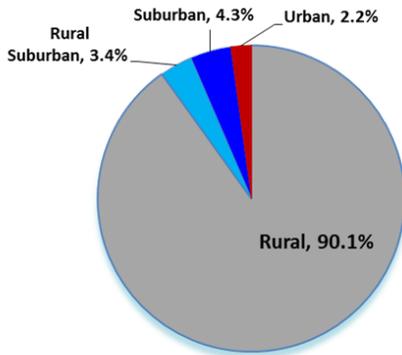


Chart 2– Percent of Texas POPULATION by County Categories

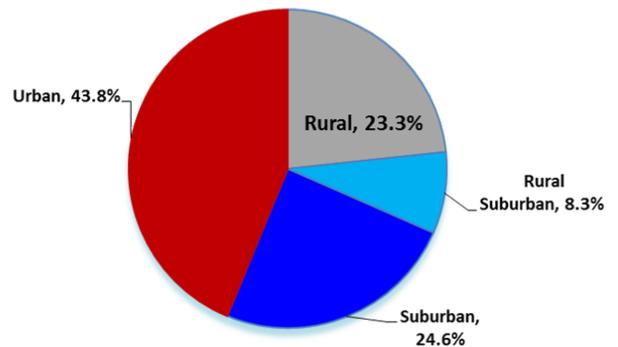


Chart 3 – Percent of Texas 254 Counties by Category

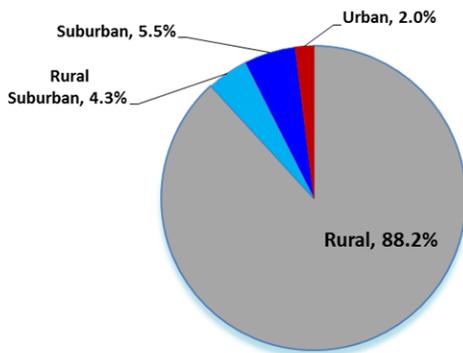


Fig. 4 Texas Rural Proportions of Area, Population and Counties – These charts illustrate the critical importance of meeting the diverse needs, of Rural County users and stakeholders.

Observations include:

- Over 90% of the geography of Texas is comprised of Rural Areas, representing over 23% of the overall population,
- The vast majority of Texas counties, 224 out of 254 are Rural Counties, and
- Although only 2% of the land area, Urban counties represent over 43% of the population.

2.2 NPSBN Rural Definitions – Other Factors

How do definitions impact ability to reach “Substantial Rural Coverage Milestones”? We seek comments regarding whether the term “substantial rural coverage” should be defined only in terms of geographic coverage, or whether other factors such as population or the frequency of first responder activity in an area should be included.

It is critical to expand these factors to include disaster prone areas as seen in Figure 4, and other areas with critical infrastructure, large transient venues, areas with high risks, and high 911 call rates. If population density becomes the sole determinant, critical coverage areas will be left vulnerable and Public Safety needs will not be met. Because the Texas Public Safety Broadband team has developed and submitted these ideas in a number of previous occasions, the table below has been further defined and developed, evolving the concepts substantially and providing an example of how this could be approached.

An example of an expanded list, along with associated definitions and assumptions, is provided below.

The Other Factors expand the scope of assessment factors. These include Public Safety Risk Factors, protection of critical infrastructure, international border needs and categories which capture coastlines and waterways, which although not a factor for cellular providers, create specific coverage, user devices and use cases which must be considered.

The analysis reveals an additional complexity in the population data-driven approach. Because the population density categories (urban, suburban, rural, etc.) are based upon US Census Data the data reflects actual residents or “inhabitants”. Unfortunately, it doesn’t capture user density variations created by large public gatherings, such as sporting events, festivals or tourist attractions such as national parks and recreation areas. Many of these scenarios have much more impact on Public Safety agencies than the relatively simple carrier issue of capacity overload.

Each category is presented with a suggested definition, design/solution assumptions and a few examples of these situations faced by the State of Texas.

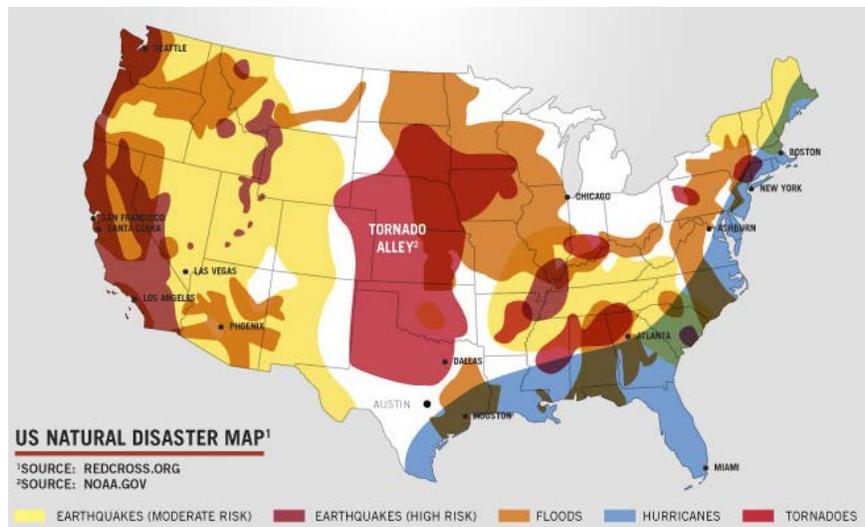


Fig. 5 US Natural Disaster Map - Texas has significant territories threatened by all four disaster threats: earthquakes (moderate), Tornadoes, Floods and Hurricanes.

2.2.1 Texas Table of Coverage Factors

v6.1			
Type of Topology or Coverage	Definition	Texas Examples	COVERAGE Solution Notes & Assumptions
Rural County	County has between 7 and 160 persons per sq. mi.	158 counties fall into the specific rural definition with over 88% of the Texas geography covered by the general Rural Category (less than 160)	Very little in-building coverage, coverage in population centers >20000, primary need for mobile coverage, assume entire county covered by NPSBN
Rural Suburban County	County has between 160 and 300 persons per sq. mi.	Counties with more rural suburban areas, examples include Bell, McLennan, Smith, Wichita	Select In-building, coverage in population centers, primary need for mobile coverage, assume entire county covered
Suburban County	County has between 300 and 1000 persons per sq. mi.	Counties with fairly dense suburban areas, examples include Neuces Hays, Galveston, El Paso, Lubbock, Denton	Select In-building, coverage in population centers, primary need for mobile coverage, assume entire county covered
Urban County	County has > 1000 less than 2500 persons per sq. mi.	Texas has just three counties in this category: Tarrant, Travis and Bexar, covering the urban centers of Fort Worth, Austin and San Antonio respectively	In-building, small cell in urban, need for portable on the street
Dense Urban County	County has > 2500 persons per sq. mi.	With two of nation's 10 top most populous counties, Harris and Dallas counties are "Dense Urban"	In-building, small cell in urban, need for portable on the street
Frontier	County has > 1 person and less than 7 persons per sq. mi.	56 counties fall into this strata including Armstrong, Presidio and Throckmorton	No need for inbuilding or portable network coverage, primary solutions sat deployable, outdoor mobile and direct mode for local incident scene management, assume only partially covered by NPSBN
Remote Frontier	County has less than 1 person per sq. mi.	10 counties in Texas have LESS than 1.0 persons per sq mile and include counties like Hudspeth, Terrell and Culberson, some of which have many miles of US-Mexico border	No need for inbuilding or portable network coverage, primary solutions sat deployable, outdoor mobile and direct mode for local incident scene management, assume only minimally covered by NPSBN infrastructure unless other factors exist.
International Border	County has international border, requiring complex federal and coordinated operations	National Security Priority for security of over 1240 miles of US-Mexico Border	Assume complete coverage for mobile operations with need for portable
Critical Infrastructure & Homeland Security areas	Presence in the County of critical infrastructure, such as airports, refineries, hospitals, nuclear power plants, and other designated resources not included in other categories.	Examples include PANTEX nuclear weapons storage facility, nuclear power plants, national gas facilities, oil refineries	Facilities and staffing for critical infrastructure Ops, by definition stationary, non-mobile. Need for portable in-building and wifi in-building for localized ops
Ports of Entry	International ports of entry, to include all international airports	Counties with major ports of entry (i.e. Hidalgo, Cameron, El Paso and Harris). Texas has 3 of top 5 busiest sea ports in the US.	Facilities and staffing located on International land or marine border.
Coastline or Waterway	Requires consideration of marine vessels, search and rescue and impacts RF coverage behaviors.	367 of miles coast + 1,240 miles along Rio Grande	Assume partial coverage for mobile operations based on specific locations. Need for portable, but no inbuilding. Need for direct mode for localized ops such as rescue.
Interstate, US and State Highways, transportation corridors	Critical for commerce, prisoner transport, accident management, manhunts, coverage of smuggling routes.	80,000+ centerline highway miles	No need for inbuilding, entirely outdoor mobile, assume full coverage and that all interstates are Critical Infrastructure. Direct mode useful for onsite ops. Calls for specific coverage and infrastructure optimizations
Temporary, Visitor, Tourist Areas	Areas which create risk due to large numbers of temporary visitors, scheduled events (Super Bowls, automobile races or festivals), figures not reflected in populations census data. Primarily handheld devices.	Examples include Texas Motor Speedway (TMS), SXSW festival, large sporting events, races, marathons	These areas require additional capacity, often in a concentrated area, but which is not driven by actual population of local residents. Solutions could be permanent or temporary infrastructure. Need for Mobile and Portable device coverage.
Disaster Risk / Incident Density Factor	Areas which are either at higher risk for disaster, or necessary to respond to a disaster.	Hurricane, Tornado zones, flood plains, wildfire risks	Anticipate infrastructure will require special deployment, such as mounting above flood plain, earthquake proof siting customized for the specific threat identified.

Fig. 6 Other PS Coverage Factors – This table defines various coverage prioritization factors, notes assumptions and solutions aspects and provides a few examples.

2.3 Comment on Proposed Definition of “Frontier”

“...we seek comment on whether population density below a five person per square mile or lower standard should be considered frontier, rather than rural, for purposes of the Act.”

The State chose to use a definition of less than seven persons per square mile for “Frontier” and noted an additional category in the table above, “Remote Frontier”, which may also be useful for counties with less than one inhabitant per square mile.

2.4 Definition of “Non-Urban”

“...we seek comment on the distinction between the terms rural and non-urban areas and how to define non-urban under the Act.”

The definition of “Non-Urban” areas for the purposes of responding to the legislation shall be any geography not defined as “Rural Area” as defined above, which is any county that has **more** than 160 persons per square mile.

Conclusion

Upon analyzing the proposed language, and through the development of answers and recommendations requested, the State of Texas has reached a number of conclusions and provides some recommendations which are summarized here and described further in the preceding sections.

- **The State Disagrees with Rural Areas Definition Proposed** - The State rejects the proposed definition of “Rural Area” based upon The Rural Electrification Act as inadequate because it is not specific or comprehensive enough. It requires complex data management compared to alternatives and it results in an inadequate accounting of rural coverage.
- **The State Recommends Basing Assessments on County-Level Data** - The State describes how the data will need to be managed, assessed and measured which means the definitions need to reflect existing data sets, and therefore should be based upon County-level Population data. This further allows FirstNet to use a common statistical area across the nation.
- **Texas Rural Area Definition** - The State Recommends that Rural should be measured using Population Density by County (Persons/square mile) with a Rural County being defined as “a County with less than 160 persons per square mile”.
- **States Should be Given Responsibility for Defining ‘Rural Areas’ for their State** – Because it may be possible that no one definition will either work or gain consensus, and because it is possible for rural definitions to vary as demonstrated by the analysis of the multitude of “rural” definitions, the State of Texas recommends that States be given the flexibility to define “Rural Areas” on behalf of their State.
- **Rural Coverage Priorities Must Consider Other Factors** – The State cannot emphasize strongly enough the need to consider a variety of factors to determine the priority of coverage and deployment. An example analysis and presentation of the factors is provided herein.
 - **The State recommends that the rollout out of Rural Coverage should not be prioritized by Population Density but rather a variety of factors which represent Public Safety Critical needs.**

In closing, the State of Texas greatly appreciates the partnership with NTIA and FirstNet and the willingness of both NTIA and FirstNet to listen and incorporate the feedback from Texas stakeholders. Thank you!