



Governor's Office of Economic Development

BUSINESS • TOURISM • FILM

State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Q. VAL HALE
Executive Director

BENJAMIN L. HART
Deputy Director

Federal Communications Commission
445 12th Street SW, Room TW-A325
Washington, DC 20554

Chairman Ajit Pai
Commissioner Mignon Clyburn
Commissioner Michael O'Rielly
Commissioner Brendan Carr
Commissioner Jessica Rosenworcel

Comments on WC Docket No. 11–10; FCC 17–103 Modernizing the FCC Form 477 Data Program

The Utah Governor's Office of Economic Development (GOED) would like to provide comments to the Federal Communications Commission on WC Docket No. 11–10 and FCC 17–103, "Modernizing the FCC Form 477 Data Program." GOED believes this notice of proposed rulemaking will impact Utah's broadband providers and the state's interest in expanding citizen and business access to high capability broadband services across the state. GOED has taken an active role in broadband planning and mapping efforts since 2010 and feels that well-designed changes to the Form 477 data collection could result in a more informed view of broadband access. Since this data is being used in both policy and funding decisions, we feel that improving the data collection will be beneficial to Utah residents and service providers. We are encouraged by the FCC's efforts to improve this process.

Working with broadband providers, federal agencies, state and local governments, businesses and other stakeholders has given our office a unique perspective on broadband deployment and we would like to provide recommendations to the FCC based on issues raised in the docket.

OVERARCHING ISSUES FOR COMMENT:

- 3. Are there other external uses of the data for which the Commission should account if the Commission makes changes to the collection? Is the existing data collection well designed for Commission and stakeholder use? Will the revisions under consideration in the FNPRM better align the data the Commission collects with the use of those data? Are there elements of the collection not discussed below that should be considered for elimination because of redundancy or insufficient usefulness?**

Broadband coverage and speed data can be important inputs to Public Safety, Economic Development, Transportation, and other users. As the FCC continues to collect this type of information from providers, it should consider expanding the types of government agencies that may request and be granted access to the data. The Commission should also look to improve the accuracy and granularity with which the data is collected, particularly since Form 477 data is being

used in both policy and funding decisions. Areas deemed served that are only partially covered may be denied funding, leaving those citizens without services and disqualifying providers who wish to cover them.

4-7. Is there a way by which the Commission can improve its current data collection to better understand and evaluate the actual consumer experience? Should the Commission require that filers submit their mobile deployment files as rasters (raster datasets “are commonly used for representing and managing imagery, digital elevation models,” or “as a way to represent point, line, and polygon features.”), as well as, or instead of, shapefiles? Would the publication of the minimum advertised speed plus a more meaningful disclosure of the methodologies used by individual service providers allow a better reflection of actual consumer experience, and enhance the ability of policymakers and consumers to compare across service providers?

Allowing providers to submit data on a sub-census block level (whether by raster or polygon) is crucial to understanding and evaluating gaps in coverage, especially in rural areas where census blocks can be quite large. If the FCC continues to collect broadband coverage data, the speeds reported, whether maximum advertised speed, minimum advertised speed or expected speed, should be made publicly available for both mobile and fixed technologies. Maximum advertised speeds, for example, are already marketed by providers and do not threaten proprietary information. Publicly publishing mobile broadband speeds that are already being gathered as part of Form 477 would ensure that mobile providers are treated similarly relative to their non-mobile broadband provider counterparts that currently must report this information. Under current practices the FCC releases speed data on fixed technologies under the existing 477 and mobile technologies should be treated similarly. This information is useful to business, government, citizens, and visitors.

8. Should the Commission require filers to use predictive propagation models to prepare their Form 477 deployment filings? Should the Commission require that deployment shapefiles represent coverage at median speeds as well as speeds at the cell edge? If so, how should the Commission decide the specified speeds? Or, for instance, the Commission could specify a median download speed of 10 Mbps with an edge speed of 3 Mbps. Would this be appropriate, and if not, why not? Should the Commission also consider setting a cell edge upload speed such as a voice-over-LTE (VoLTE) requirement or an upload speed of 1 Mbps, or would an upload speed lower than 1 Mbps be appropriate, and if so, why?

A standard methodology for determining mobile and fixed wireless broadband coverage (signal propagation model and parameters for example) is desirable but may prove to be a difficult or burdensome requirement, in which case, filers should be required to describe the methodology employed to arrive at the coverage areas that they are reporting. The commission should consider guidance for best practices for both mobile and fixed wireless service modeling so that data users can see propagated models that reflect the coverage area and speeds available. As stated before, all speeds should be made publicly available to inform policy and funding decisions, and to not give preference to broadband service providers according to the types of technology they have deployed.

- 10. To more accurately reflect consumer experience, should some actual speed test data, aggregated up to a certain geographic level, be required? How could the Commission impose such a requirement without being unduly burdensome? Are there data of this kind that service providers already generate during the ordinary course of business which would be less burdensome to collect?**

If the FCC is going to collect data and use it to inform policy and funding decisions, the Commission will need to have a reasonable level of data verification to ensure basic fairness to providers and consumers. GOED recommends that the FCC develop a data verification standard for each applicable technology to ensure the broadband service data is correct and so funding can be allocated to areas which truly meet thresholds for being classified as unserved or underserved. This verification should also include a mechanism for stakeholders to request that the FCC review any reported inaccuracies so that maps can be corrected.

Working with public safety and other existing boots-on-the-ground organizations, in particular state patrol/police, transportation departments and others with extensive field operations in rural areas may also prove valuable for on-the-ground identification and/or validation of areas known to lack mobile broadband services. Insight may be gained from anecdotal or empirical (speed drive tests) information collected in conjunction with existing, authoritative field operations.

- 11. Should the Commission require separate reporting of 5G mobile broadband deployment? Are there any aspects of 5G mobile broadband services that would suggest a need to represent deployment on Form 477 differently from 4G LTE and other mobile technologies? For instance, what are the specific use cases for mobile 5G service that the Commission should consider when collecting data to accurately represent 5G services being deployed to consumers? Should the Commission define 5G for the purposes of the Form 477 data collection, and, if so, how? Further, the Commission seeks comment on whether and, if so, in what circumstances, should the Form 477 take into account the deployment of facilities used in non-traditional ways in offering wireless services to consumers? For example, while Wi-Fi facilities traditionally have provided consumers with portable, not mobile, wireless connectivity, should the Form 477 track deployment of such facilities when offered to consumers in conjunction with resold mobile service? Might there develop other wireless services based exclusively on the integration of numerous unlicensed facilities, such as Wi-Fi routers, that might warrant tracking in Form 477? If so, under what circumstances, and how should any such facilities deployment be reported?**

The existing form should be designed for 5G mobile data to be collected when that technology is implemented. However the form should be somewhat open ended to allow providers to describe speeds and technologies utilized as the commission determines an appropriate standard.

- 16. The Commission seeks comment on whether the Commission should simplify the filing process by requiring that coverage maps be provided for four categories of technology – 3G, 4G non-LTE, 4G LTE, and 5G – rather than by each specific broadband technology, and how these categories should be defined. Are these categories defined and distinct enough to ensure accurate and meaningful reporting? Are the distinctions between categories, such as**

4G versus 5G, clear enough for the data to be meaningful and for respondents to accurately submit data? Will the Commission need to specify which technologies correspond to which category?

As the FCC continues to collect broadband coverage data through the Form 477 process, the reporting of mobile broadband coverage information should be simplified using categories more directly aligned to consumer understanding of available coverage and their actual user experience (3G, 4G Non-LTE, 4G LTE). However, the data should still be accompanied with speed data. The Commission should also specify which technologies fit into each category so that data users can understand the data collection method.

- 20. The Commission seeks comment on whether to eliminate the requirement to submit voice coverage data by technology and spectrum band. Does the Commission still need these data to accurately evaluate the mobile voice services that are available to subscribers? Is the distinction between voice and broadband coverage significant, or do providers most often include mobile voice coverage wherever they have some form of broadband coverage? If providers include mobile voice coverage wherever they have broadband coverage, should the Commission revise its requirements to allow providers to simply check a box indicating that they provide voice coverage wherever they have a particular mobile broadband technology? How would the Commission account for areas in which a provider provides only mobile voice services?**

In support of public safety and rural economic activity, we believe it is likely still valuable to gather coverage information for service categories below 3G that support voice and/or texting. This data should include geographic data on where these services are available.

- 25. Would collecting subscribership data at the census-tract level be sufficient to improve the quality of the Commission's data on subscribership? Are subscribers' billing addresses sufficiently correlated with the areas in which subscribers use their mobile wireless devices to be meaningful in the Commission's competitive analyses, and if not, what else should the Commission consider? Does the answer differ for residential and business accounts? Should the Commission consider requiring subscribership data for a different geographic area? For example, while reporting subscribership at the census-tract level would parallel the requirement for fixed service, what are the costs and benefits of reporting at a different geographic level? Whatever the geographic level adopted, the Commission seeks comment on whether using the billing address to assign subscribers to a census tract would be appropriate or, in the alternative, whether using the customer place of primary use address would be preferable as it may be less burdensome for providers. How should filers assign resold lines and broadband-only lines to the more granular geographic level? How should the Commission consider subscribership with respect to 5G services and the Internet of Things? What metrics might the Commission consider in measuring subscribership?**

Aggregation of actual subscriber count data within established speed tiers, perhaps using the tiers established under the National Broadband Map, would provide a useful benchmark for broadband policy considerations and a more informed market for broadband services. This information could help assess broadband adoption levels, for example. Counts should be publicly reported as a total across all providers, nationally and by state, with complete anonymity with respect to individuals

and their service provider. However state and federal programs should be able to use the raw data, under non-disclosure provisions, to assist in determining competition levels for Universal Service Fund decisions.

27-28. The Commission also seeks comment on the best way to collect data reflecting the speeds offered to business/enterprise/ government end-users in the absence of CIR data. Will the maximum advertised down- and upload speeds used for mass-market work for business best efforts data collection? How can the Commission capture speeds for business/enterprise/government end users that are not best-efforts? Alternatively, should the Commission require fixed broadband providers to continue to report whether they offer business/enterprise/government services, but no longer report any speed data associated with such services? The Commission notes that this approach would lessen the burden on filers, but would it also help ensure more accurate reporting? Would information about business/enterprise/government services still be valuable in the absence of speed data, or would it be better to remove the requirement to report these data altogether?

Discontinuing the reporting differences between consumer and business / enterprise / government services within the Form 477 filing simplifies the process for industry without degrading the insight gained from the filing. However, providers should be required to indicate any service and coverage that is exclusively marketed to business customers and not available for residential customers.

32-34. To the extent providers do not routinely store data in such a format, or to ensure comparability among different providers' data, the Commission also seeks comment on how to specify a single methodology for determining the coverage area of a network. What burdens would be associated with creating such geospatial data? In addition, since the Commission lacks the locations of individual homes (or businesses), knowing the areas served does not provide information about the location or number of homes that have or lack service (i.e., it provides information on the areas that have or lack service, not the homes that lack service). Should the Commission assume that all homes within a block have service even if only a fraction of a block's area has service? Should the Commission assume that the fraction of a partially served block with the service correlates with a fraction of homes within that block that have service? This would mean determining what fraction of people or homes (e.g., tenths or hundredths) have had broadband deployed. Over larger areas, such fractional people or homes would likely tend to reflect overall coverage; but over smaller areas would reflect a probabilistic estimate of coverage rather than an accurate count of people or homes lacking coverage. The Commission seeks comment about how it could make the best use of such geospatial data to find the number and location of the unserved, and the value of such data compared to the burden of such a filing.

Data collection is crucial to evaluating and encouraging the investment of broadband services. Any current and future programs implemented by the FCC, the National Telecommunications and Information Administration (NTIA), the United States Department of Agriculture (USDA) and other federal and state agencies will rely heavily on the accuracy and precision of the mapping data that is collected. GOED recommends that the FCC consider the following strategies to improve broadband data collection efforts.

- Refine Broadband Data Collection Processes to Meet the Needs of Funding and Planning Efforts* – Beginning in the Fall of 2014, the FCC began collecting broadband data directly from providers and changed the collection standard by aggregating all data to a census block level. Basing data collection, planning efforts, and funding decisions on census blocks is problematic, particularly in blocks which are large, remote and include terrain that makes it difficult to install infrastructure. For example, in Utah, *the largest populated census block is 947 square miles*. Under the current Form 477 submission process, any census block that is partially covered would be ineligible for all federal broadband programs, even if only a small percentage of households or census block area is covered. Additionally, there are instances in rural Utah where the existing telephone company's study area boundaries do not align with census block boundaries, creating a situation where multiple carriers could have overlapping carrier of last resort obligations. The FCC should work with providers and state broadband mapping programs to coordinate data collection and mapping efforts in order to collect actual provider service footprints. These footprints could be collected through either shape or raster files (provided raster cells are sized small enough to make the data meaningful). Guidelines and specifications should be developed and basic tools and documentation should be made available, especially those that would bring benefit of geospatial technology to providers without such current capabilities. Collecting this more refined data will ensure that projects designed to reach unserved residents and businesses in partially covered blocks are included in broadband planning efforts and eligible for available funding. The Utah Broadband Outreach Center in GOED has developed maps to show the discrepancy between the Center's data model and the FCC's data collection model. These attached maps cover cable, DSL, fiber, and fixed wireless. These maps illustrate these discrepancies and highlight large geographic areas where coverage is overstated by the current Form 477 filing process.
- Assist Providers in Completing Successful Data Submissions* - It has also been our experience that many small rural carriers may require assistance to submit broadband data, regardless of the data model implemented. Over the last 7 years, our mapping team has helped many providers complete successful data submissions. The FCC should ensure that the data model and collection process will be simple for providers or should provide tools and other resources to help them successfully complete submissions. Since the State Broadband Initiative (SBI) programs ended, several states, including Utah, have decided to continue a state data collection because the FCC model has not been sufficient to determine the locations of unserved households for state and local planning efforts. The FCC should consider utilizing state broadband offices and commissions to arbitrate this process to assist providers in submitting data, which would require ongoing state funding.
- Make Broadband Data Publicly Accessible* – We would also ask the FCC to develop a strategy to display broadband data in the form of an interactive national map web application and make the raw data available for download, and as data-as-a-service so states and local governments may incorporate this information into maps and planning activities. Since the FCC is not currently maintaining a national broadband map, it is difficult for stakeholders without GIS capabilities to assess broadband access. Other data deficiencies exist with the current Form 477 strategy. Among the most notable are 1) the length of time between receipt and publishing, and 2) the preferential treatment given to mobile wireless service by not publishing speed data

publicly available. This makes it difficult for state and local planning groups to evaluate mobile broadband needs. The FCC should also work with states to display more refined data when available.

- *Utilize and Create New Data Sets that Identify Unserved Households* – The FCC should also consider collecting data that specifically maps unserved/underserved residential areas and community anchor institutions (e.g. schools, hospitals, libraries, government buildings, tribal centers, etc.) Providers and other interested stakeholders should be included in this process and should have the opportunity to identify specific locations that are unserved/underserved and recommend ways to fund these areas. Mapping data on unserved/underserved areas could utilize existing data sets such as address points (street addresses paired with their location expressed as geographic location) and Community Anchor Institutions (CAI) location points which were created and sustained under the NTIA SBI program, and possibly other settlement and business location data sets. The FCC should also explore entering into an agreement with the US Census Bureau to better utilize its data to identify unserved locations.

35-36. The Commission also seeks comment on whether there is a publicly available, nationwide data set containing the address and location (latitude and longitude; and for Multiple Dwelling Units (MDUs), possibly altitude information to distinguish data about units on different floors) for each housing unit in the country, such that filers, or the Commission could geocode street addresses. The Commission seeks comment on whether it should require providers to geocode all the addresses at which service is available. The Commission seeks comment on the costs and benefits associated with this approach, and on ways that the Commission could ease the burden on filers. For example, should the Commission specify a single geocoding methodology to be used by all providers (e.g., require all providers to use a single geocoding service, and specify how to handle any geocoding partial matches or failures), or require that providers file a latitude and longitude measured in the field?

Tasking broadband providers with address geocoding, or taking this on at the Commission will introduce numerous undesired data quality issues. There are many issues associated with geocoding street addresses, especially in rural areas or fast growing areas where address data is not well-developed or updated with a sufficient frequency to accurately determine geographic locations. Presently, there is no national address database of sufficient data quality or data currency to make address geocoding a viable solution for broadband coverage mapping. The Census Bureau master address file is not kept sufficiently current and is not available for use outside of the Bureau's internal processes. An initiative led by the USDOT, connecting with state-level needs for address data for Next Generation 911 systems, while promising, is underfunded and not yet mature. Commercial address datasets and related geocoding services are not publicly distributable and are known to be incomplete in rural areas. Finally, the underserved and unserved addresses, the locations precisely most important to broadband policy, are the least likely addresses to be located by geocoding techniques due to the quality of the geographic reference data in these areas. Manual determination of ungeocoded addresses will be a daunting task with little collateral benefit compared to building and sustaining the geographic reference data for the rural areas where the largest issues will occur. We have provided a more extensive recommendation under response 40.

37. The Commission also seeks comment on other sub-census block alternatives, such as collecting data about what street segments providers cover.

Largely for the well-articulated precision issues mentioned in this section of the FNPRM itself, the use of road centerlines to express broadband service availability would be a cumbersome and otherwise mediocre solution at best. We have provided a more extensive recommendation under response 40.

40. In sum, the Commission seeks comment on whether it should move to a more granular basis for reporting deployment data and, if so, what basis would be appropriate. For each basis they support, commenters should explain in detail the methodology or approach they propose for capturing the data in a sufficiently uniform format to facilitate processing (e.g., geocoding, latitude/longitude, address).

As the FCC continues to mandate provider reporting of broadband services through Form 477, the requirements, reporting process, and publishing timeframe should be streamlined to ensure the maximum benefit to industry and citizens, with minimum expenditure of resources.

The two primary map data layers that are most valuable to informing the consumer market, setting strategy, and managing investment to expand broadband capabilities are 1) providers' current capabilities (coverage, speed and technology) and 2) precision location of un-/under-served address points. Taken together, these layers should provide focus where it is needed most, and get last mile connections to discrete locations where broadband service is not yet at expected levels.

The current capabilities map layer should provide a neighborhood-level overview for the general expectation of service, including upload and download speeds, any inherent dependencies of the provided broadband service (e.g. a line-of-sight requirement, whether the last mile is 'dedicated' or 'shared' among subscribers, and latency limitations that significantly and uniformly impact the service offering). It is Utah's experience, this current capabilities layer can be generalized using census blocks, geometric grid cells, or other fine scale geographic unit of aggregation, *provided the second layer, described below, is created independently and sustained.*

The second layer, underserved locations should define with geographic precision, the location and characteristics of residential, commercial, and government structures that are currently unserved or underserved (i.e. below the established speed goals) with sufficient detail for the provision or upgrade of services to be evaluated by potential broadband providers, policy makers, programmatic staff, and other stakeholders. The FCC should consider sustaining this dataset overtime, and should inventory address point locations that have been upgraded to meet national service level goals.

It should be noted that the FCC, through its Public Safety and Homeland Security Bureau, has authority related to 911 responses. The mapping of underserved and unserved locations for broadband, as address location points (street address, latitude, and longitude) should be considered together with the public safety and economic development benefits of establishing these precise locations, especially in rural areas. Strong consideration should be given by the FCC to collaborating with other national and state programs to produce a publicly available, national set of address location points in rural areas. This should be done outside of the Form 477 process as,

lacking sufficient incentives, this would likely present an undue burden on broadband providers. However, a national dataset of address location points could be utilized by providers, where and when available to report underserved locations and could be utilized to determine broadband expansion program eligibility.

The FCC should actively explore joining with other federal stakeholders, potentially through the existing Federal Geographic Data Committee's address theme subcommittee (<https://www.fgdc.gov/organization/working-groups-subcommittees/address-sc/index.html>) to properly define requirements, develop a process inclusive of state and local government, and ensure adequate funding for a National Address Database effort.

Until a nationwide address point data set is realized, we recommend that states, providers, and other stakeholders be allowed to submit the precise locations (geographic coordinates and street addresses) of un-/under-served location to the FCC.

- 47. The Commission proposes that certain collected data that are currently treated as confidential be made public. First, the Commission proposes that minimum advertised or expected speed data for mobile broadband services should not be treated as confidential and it proposes releasing such data for all subsequent Form 477 filings going forward. In addition, the Commission expects that dissemination of minimum advertised or expected speed data to the public would promote a more informed, efficient market by providing information that can aid in independent analyses. Making such data available to the public provides consumers, states, and experts the opportunity to review the data to ensure the accuracy of the information. The Commission seeks comment on this proposal. To the extent the Commission collects any other speed data that are currently treated as confidential, it seeks comment on whether such data should also be made available to the public, again to promote a more informed, efficient market and aid in independent competitive analyses.**

As the FCC continues to collect broadband coverage data, the speeds reported, whether maximum advertised speed, minimum advertised speed or expected speed, should be made publicly available for both mobile and fixed technologies. Maximum advertised speeds, for example, are already marketed by providers and do not threaten proprietary information. Publicly publishing mobile broadband speeds that are already being gathered as part of Form 477 would ensure that mobile providers are treated similarly relative to their non-mobile broadband provider counterparts. This information is useful to business, government, citizens, and visitors.

- 48. Similarly, the Commission proposes that, if detailed propagation model parameters are submitted in the Form 477 filings, some of these parameters should be treated as public information, as the Commission believes that such parameters are not competitively sensitive. The Commission seeks comment on this proposal.**

Propagation model results have already been publicly available through past federal programs, specifically through the SBI programs and National Broadband Map operated by NTIA. Releasing model parameters would help federal agencies, states and other stakeholders assess data quality, consistency and broadband needs, as validating unserved areas is crucial in promoting broadband deployment in the private sector.

- 49. National-Level, Fixed Broadband Subscriber Counts.** The Commission has historically determined not to make filer-specific broadband subscription data collected on Form 477 routinely available to the public. . The Commission has noted, however, that increased public access to disaggregated subscription data could have significant benefits. The Commission believes that these benefits may outweigh any confidentiality interests for some disaggregated subscription data. In particular, the Commission believes that making public the number of subscribers at each reported speed on a national level would provide a meaningful metric of the state of broadband adoption in the U.S. The Commission seeks comment on whether disclosure of this information would be beneficial and, if so, whether any measures are necessary to ensure that the interests of the filers are protected.

Aggregation of actual subscriber count data within established speed tiers, perhaps using the tiers established under the National Broadband Map, would provide a useful benchmark for broadband policy considerations and a more informed market for broadband services. This information could help assess broadband adoption levels, for example. Counts should be publicly reported as a total across all providers, nationally and by state, with complete anonymity with respect to individuals and their service provider. However state and federal programs should be able to use the raw data, under non-disclosure agreement, to assist in assessing competition levels for Universal Service Fund decisions.

- 53. The Commission also seeks comment on whether collecting on a twelve-month cycle would render the data less useful for its purposes, given the rate of broadband deployment and uptake, particularly at higher speeds, industrywide. For example, how would an annual collection affect Commission policymaking? Would it be more difficult to analyze industry trends – such as competition, entry/expansion, adoption of newer technologies and faster speeds – with only annual data? On a one-year cycle, the most recently filed data available for analysis may be up to six months older than it is now. Would the lack of more recent data unduly impair the Commission’s ability to carry out transaction review effectively or generate comprehensive and up-to-date Broadband Progress reports?**

GOED currently conducts a state lead broadband data collection and accepts data every 6 months, which has been useful in planning activities. We recommend that regardless of the number of times the data is collected annually, the biggest issue with the timeframe is the amount of time it has taken for the FCC to release the data. Currently, the FCC has taken as long as 18 months to release data. We recommend that the FCC release broadband data within 6 months of the collection deadline.

- 54. As part of its examination of the Form 477 collection, the Commission also seeks input on how it makes the Form 477 data available to the public and stakeholders. How would the proposals described in this FNPRM affect the Commission’s ability to process the data and make them available? Given current data and the proposals above, what approach should the Commission take with regard to the National Broadband Map (NBM) (www.broadbandmap.gov)?**

Having broadband data available in an online mapping format is crucial for stakeholders, particularly those who do not have GIS capabilities. The online map should allow users to view individual provider footprint, download raw data and filter data by speed and technology type (cable,

DSL, fiber, fixed wireless and mobile wireless). It would also be useful to include a layer of address points (where available) so the map accurately depicts the coverage needs. An additional feature we would suggest is allowing map users to submit their own address to add to the data set and identify unserved locations. States could submit address point sets where available as well. The Utah Broadband Map at broadband.utah.gov/map includes many of these features and could be used as an example.

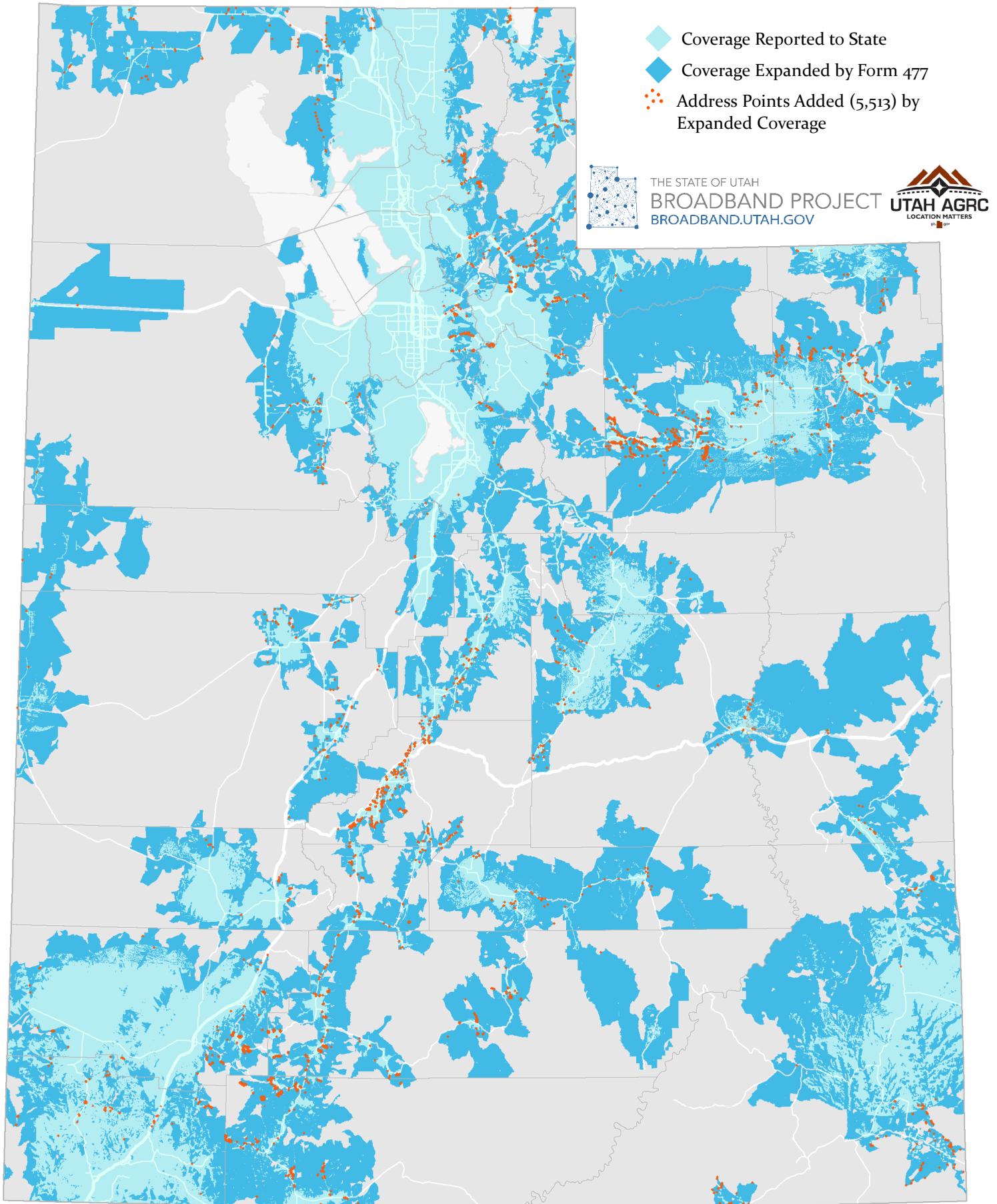
In conclusion, we thank the FCC for evaluating these important issues and hope to continue collaborating on how to appropriately collect mapping data to improve broadband services for individuals, businesses and communities.

Sincerely,

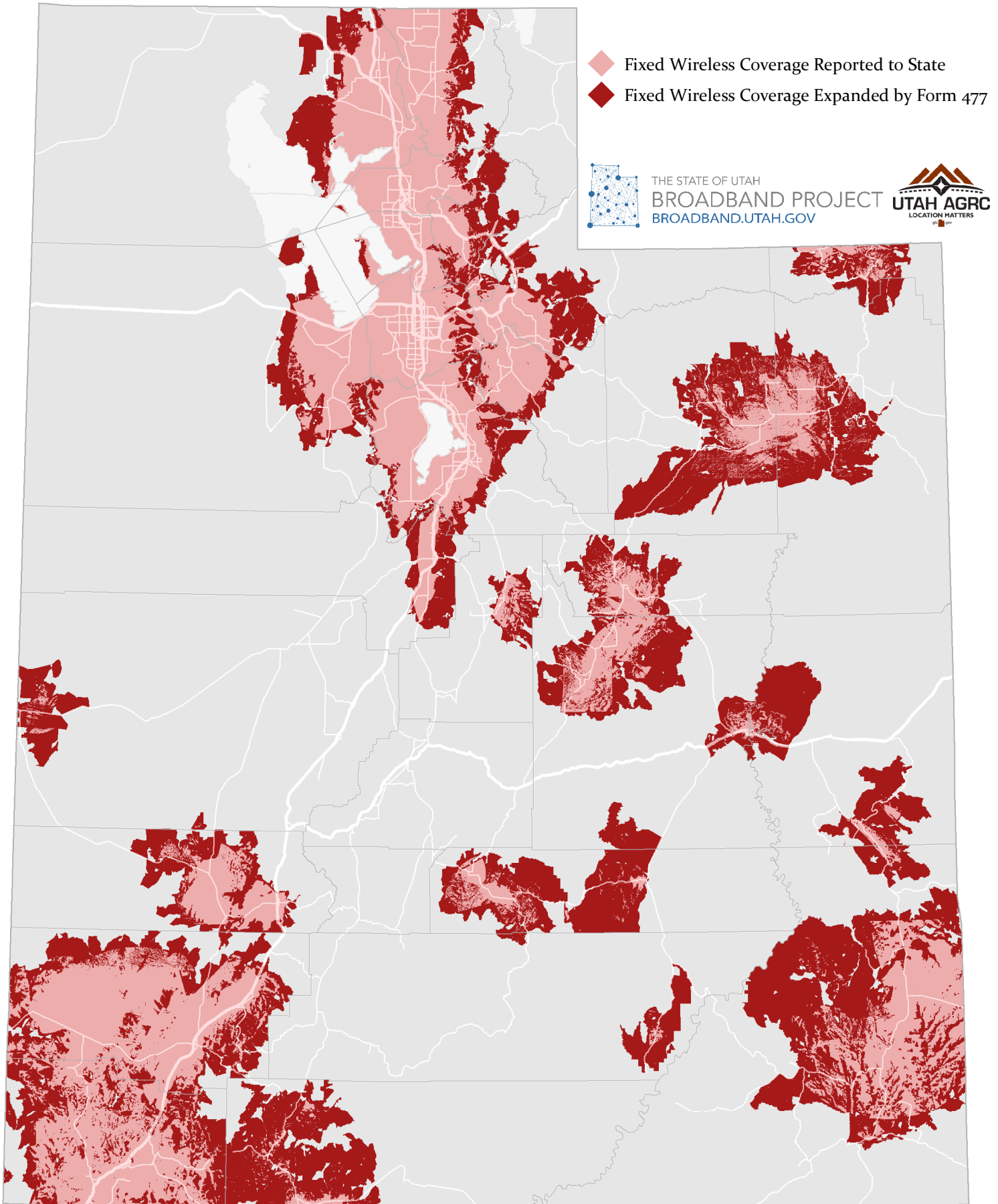
A handwritten signature in blue ink, appearing to read "Val Hale", with a long, sweeping horizontal line extending from the end of the signature.

Q. Val Hale
Executive Director
Utah Governor's Office of Economic Development

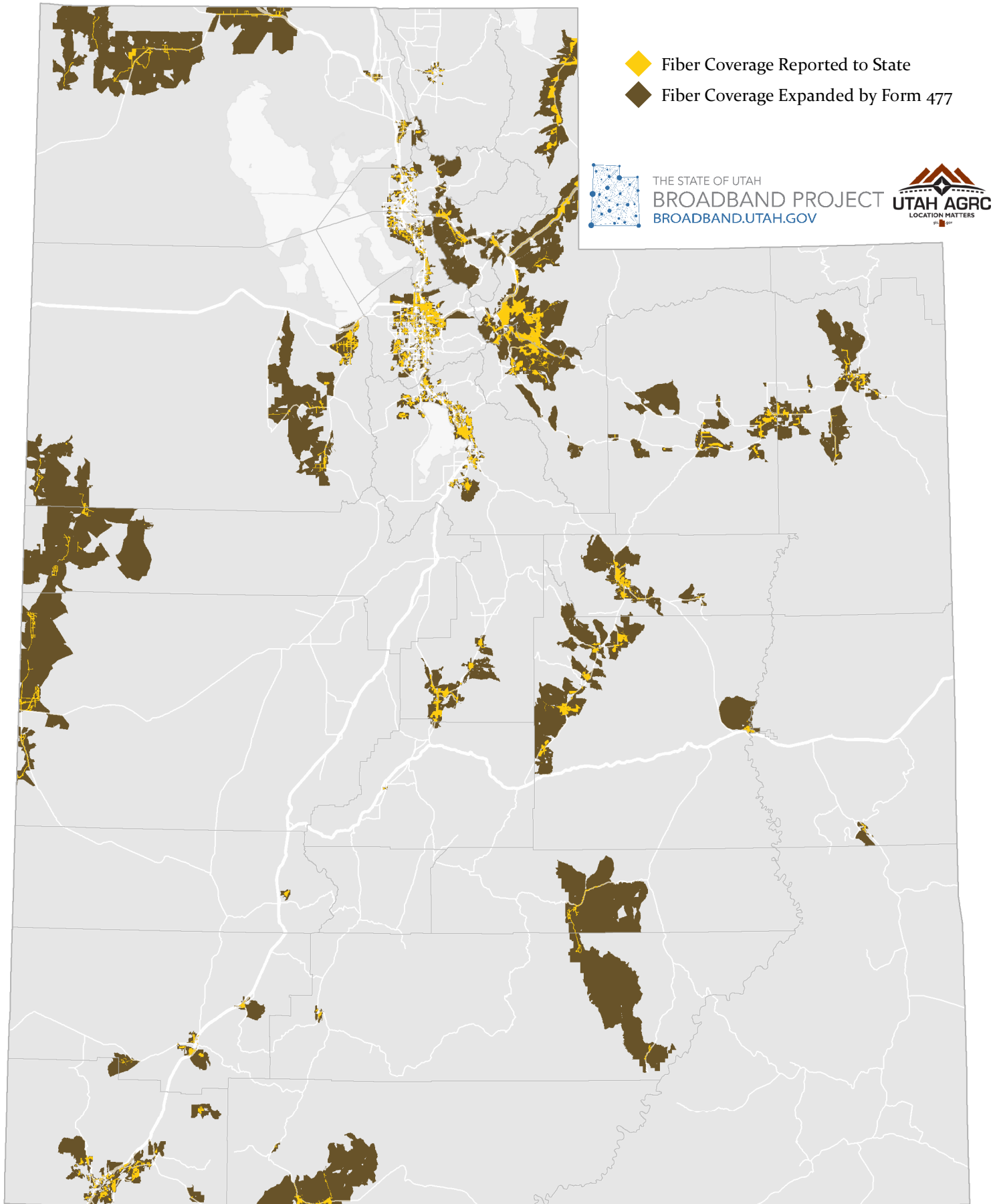
FCC Form 477's Broadband Coverage Maps by Census Block Overreport Service Areas as Reported to the State of Utah



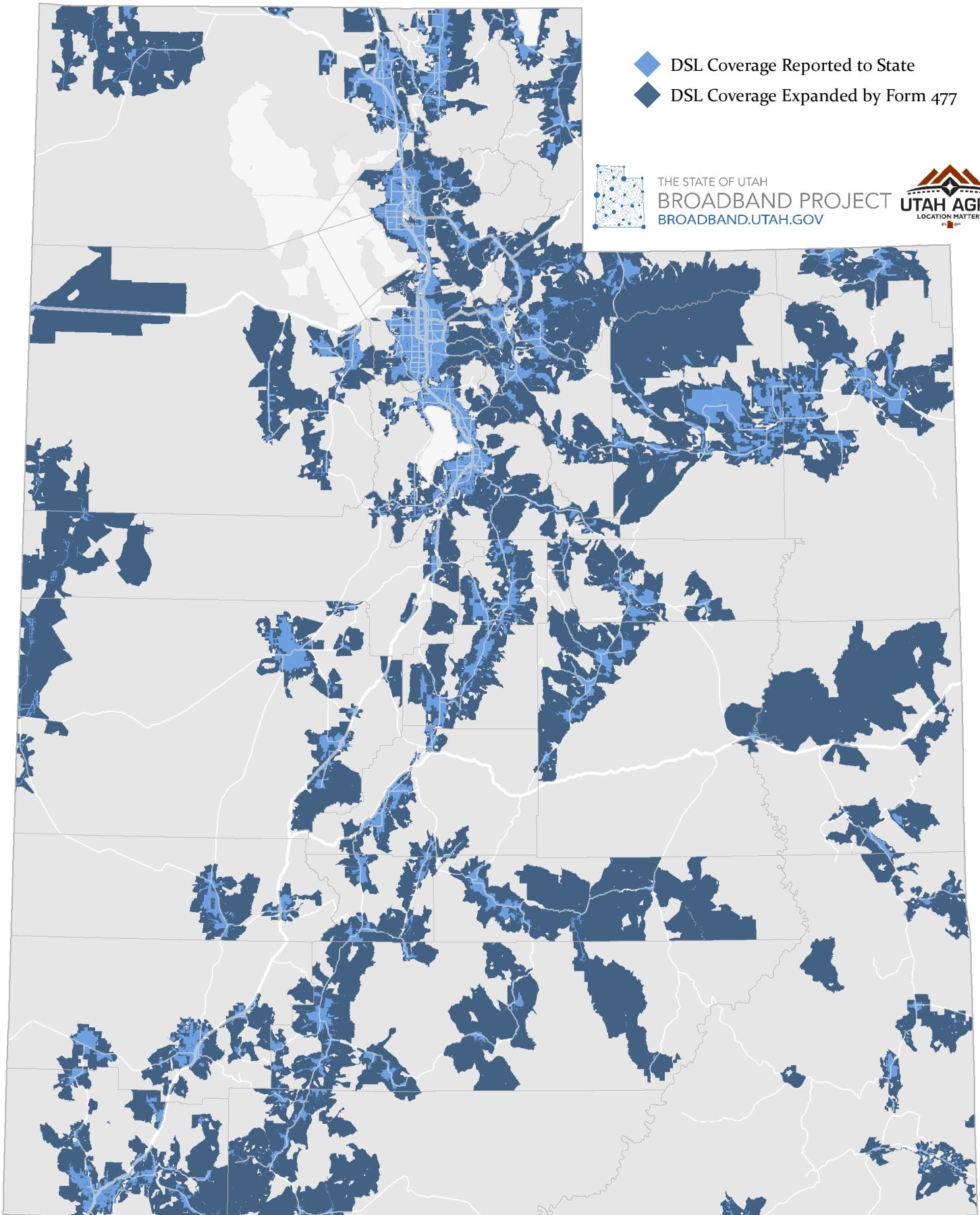
FCC Form 477's Broadband Coverage Maps by Census Block Overreport Service Areas as Reported to the State of Utah



FCC Form 477's Broadband Coverage Maps by Census Block Overreport Service Areas as Reported to the State of Utah



FCC Form 477's Broadband Coverage Maps by Census Block Overreport Service Areas as Reported to the State of Utah



FCC Form 477's Broadband Coverage Maps by Census Block Overreport Service Areas as Reported to the State of Utah

