OFFICIAL APRIL 2014 UPDATE SUBMISSION TO THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION UNDER THE STATE BROADBAND INITIATIVE GRANT PROGRAM FOR THE COMMONWEALTH OF PUERTO RICO

April 1, 2014

TABLE OF CONTENTS

April 1, 2014

Ms. Anne W. Neville
SBI Grant Program Director
National Telecommunications and Information Administration
U.S. Department of Commerce
Room 4716
1401 Constitution Avenue, NW
Washington, DC 20230

Dear Ms. Neville:

Connected Nation is pleased to present this submission on behalf of the Designated Entity, the Puerto Rico Office of the Chief Information Officer, and the Commonwealth of Puerto Rico's State Broadband Initiative (SBI) Grant Program, known as Connect Puerto Rico.

Truly, now more than ever, the significance of complete and validated data through this effort is impacting lives in communities all across our great country. The Connect Puerto Rico program and its collective stakeholder community continue to be faithful and energized contributors, and we are proud to play a part in forging the innovation economy of the twenty-first century.

The artifacts that comprise this submission should be found to be compliant with the April 1, 2014, deadline for the semi-annual data update and in accordance with the terms of the July 1, 2009, Notice of Funds Availability (NOFA) and all subsequent clarifications pertaining to delivery of state-level mapping of broadband service availability. This packet includes:

Inventory of Deliverables, Connect Puerto Rico: April 1, 2014

NOFA Requirement	Data Transfer Model	Data Description
Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area
Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles

Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions-Listing
Appendix A: 4	n/a	Community Anchor Institutions-Narratives
VII.A.1(a)	n/a	Accuracy and Verification Report
n/a	DataPackage.xlsx	Worksheets of Contact Information, Record Count, and Provider Summary Table
n/a	n/a	List of Changes and Corrections to the Dataset
n/a	n/a	Broadband Provider Roster and Participation Status

In addition, this data update submission should be found to be compliant with the additional program requirements instituted by the National Telecommunications and Information Administration since the time of the October 2013 SBI data submission for the Connect Puerto Rico program. Specifically, these new requirements are:

SBI Data Transfer Model

The submission of the broadband dataset for April 1, 2014, is contained within the SBI Data Transfer Model as provided to SBI Grantees on January 24, 2014. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information on each provider as possible.

Additional Submission Guidance

In collecting broadband service area datasets for inclusion on the National Broadband Map, this April 2014 submission includes business/commercial broadband service areas in addition to the residential datasets that have been collected for the SBI program. Following guidance from the program office, the end user category appropriately delineates the differences in residential service area, business service areas, and combination residential/business service areas. Further, all contacted providers were asked if they provide broadband services to business customers within their existing coverage areas and, if so, this information was noted.

This April 2014 semi-annual data update under the SBI Grant Program continues to demonstrate our dedication to implementing the joint purposes of the Recovery Act and the Broadband Data Improvement Act (BDIA) by gathering comprehensive and accurate state-level broadband mapping data, developing state-level broadband maps, aiding in the development and maintenance of the National Broadband Map, and undertaking statewide initiatives for broadband planning.

Broadband Service Availability — Provider Outreach and Verification

This data update submission under the SBI program includes datasets for 86.96 percent of the Puerto Rico provider community, or 20 of 23 total providers. Of the 20 participating providers, 11 supplied an update to their network or coverage area(s), while 6 have reported no change. The remaining 3 represent providers who previously supplied data but were non-responsive in the April 2014 update effort; therefore, their previous dataset is being put forward as part of this compilation. A complete roster by provider depicting participation status and contact history is contained herein. The 3 providers that are not represented in the attached datasets are currently in some form of progress toward data submission but were not able to submit coverage areas at the time of this submission.

This submission also includes business/commercial providers; of the 15 residential providers represented in the above section, 10 are providers that do not distinguish between serving primarily residential or primarily non-residential users (end user category 5). Three business-only providers (end user category 2) are also included in this submission.

As the aforementioned roster and attached methodology documentation will attest, it is the collective opinion of the Connect Puerto Rico principals that all commercially reasonable efforts were made to account for 100 percent of the known Puerto Rico broadband provider community, pursuant to this semi-annual data update submission.

Connect Puerto Rico has also continued to perform broadband verification activities through several means. In addition to confirmation of service area(s) by each provider, Connect Puerto Rico conducts field validation efforts. To date, 18 (78.26 percent) viable providers have been validated through field verification activities. Additional details on verification activities are contained within the Field Validation Methodology.

The Connect Puerto Rico website (www.connectpr.org) continues to serve a prominent role in the outreach and data collection effort. This program asset provides a way for the general public to participate in the process by offering interactive tools for users to test their connection speed, submit broadband inquiries, or contact a program representative.

As an indicator of stakeholder penetration, the Connect Puerto Rico website encountered 2,474 unique visits during this reporting period (23,060 total to date for the life of the grant awarded on December 20, 2009). The website also provides access to the My ConnectView™ interactive mapping application, which allows consumers and broadband providers to confirm or dispute the coverage represented on the broadband inventory map. These consumer-initiated actions are

facilitated through the Connect Puerto Rico website and the Connect Puerto Rico interactive mapping tool (My ConnectView™) that offer the stakeholders the vehicles to provide information regarding availability in their respective service area, either in affirmation or contest of the reported data represented in the Connect Puerto Rico mapping artifacts. Since the initial data collection and release of corresponding maps, feedback in the form of broadband inquiries has allowed Connect Puerto Rico to identify additional areas that are in need of field validation, which is scheduled as soon as possible.

Community Anchor Institutions

Connect Puerto Rico remains committed to gathering data regarding the location and broadband connectivity of Community Anchor Institutions in accordance with the data requirements of the SBI NOFA Technical Appendix. Multiple agencies and leaders have taken the opportunity to recommit to CAI data collection, reiterating the importance of a relationship-oriented approach with state-level agencies and organizations that generates more responses than local outreach.
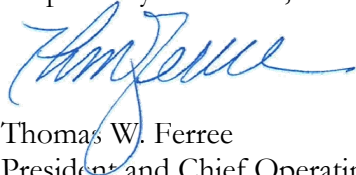
In conjunction with the Puerto Rico Office of the Chief Information Officer, outreach was conducted during this data update reporting period by Connect Puerto Rico to continue identification of existing, centralized sources for CAI connectivity data. Additionally, outreach was coordinated to distribute the CAI survey to institutions throughout the state through multiple methods including a customized online survey available on the Connect Puerto Rico website. Building on the success of past campaigns to generate excitement about CAI outreach, research, and mapping, there has been one campaign conducted since the previous NTIA data submission: Economic Development (November 2013). The Connect Puerto Rico Economic Development Campaign highlighted the benefits of broadband for economic development by building awareness, engaging stakeholders, and enlisting new stakeholders through events and a coordinated release of business surveys, widgets, infographics, policy analyses, maps, and stories from around our states and partnerships. Each release included a call to action to complete a CAI Survey and allowed the opportunity to conduct outreach outside of the releases. Survey of the government sector helped to build awareness and to establish a centralized database of key connectivity data for the mapping project. This building on existing relationships with statewide associations promotes the importance of broadband connectivity at anchor institutions and encourages participation in this data collection process.

The value of these relationships continues to impact the entire success of the Grant Program, and the CAI engagement is a logical extension of new and existing relationships. Connect Puerto Rico will continue to expand on these relationships over the coming months and utilize its contacts throughout the commonwealth to collect data and raise awareness of this project.

From our work in Puerto Rico as well as other states, we recognize the great value of this data to future collaboration efforts within the commonwealth as well as its value to the National Broadband Map. We plan to continue to bring best practices to the Connect Puerto Rico efforts, along with an investment of both human and technical resources required to reach our goal of increasing the data that is secured and reported as part of this process.

The Connect Puerto Rico program exists to improve data on the deployment and adoption of broadband services and to assist in the extension of broadband technology across all regions of the Commonwealth of Puerto Rico, as well as the United States and its territories through contribution to the National Broadband Map. We look forward to the continuing work ahead and improving upon our data collection methods.

Respectfully submitted,

Thomas W. Ferree
President and Chief Operating Officer
Connected Nation, Inc.

cc: Giancarlo Gonzalez, Chief Information Officer
    Government of Puerto Rico

PUERTO RICO COMMUNITY ANCHOR INSTITUTIONS METHODOLOGY

Connect Puerto Rico remains committed to working with Puerto Rico to gather data on the location and broadband connectivity of Community Anchor Institutions (CAI), in accordance with the data requirements of the SBI NOFA Technical Appendix. This commitment continued based on NTIA's encouragement to improve data numbers specifically in the K-12 school and library sectors to support the ConnectED White House Initiative, launched in June 2013. This encouragement translated very well with the Puerto Rico Office of the Chief Information Officer as well as K-12 school and library points of contact. The impact will be seen in this submission as well as the upcoming October 2014 submission.

In addition to the encouragement from NTIA, Connect Puerto Rico continues to promote sector-specific campaigns every quarter and focused on economic development in November 2013, specifically reaching out to and education local governments. Information received from these campaign outreaches is processed and compiled with all currently collected CAI data. Physical address information continues to be augmented through manual sourcing and geocoded by Connect Puerto Rico through Esri ArcGIS software.

Connect Puerto Rico continues to utilize a customized online survey hosted through SurveyMonkey, with a landing page on the Connect Puerto Rico website that was developed during the first reporting period. This survey, in combination with a customized data-gathering spreadsheet, was distributed on a regular basis to a targeted list of CAI throughout the island as well as organizations and agencies that work closely with the CAI. The distributions were completed with the support of the client. Connect Puerto Rico will continue to use these data-gathering tools for future targeted outreach efforts throughout the coming months leading up to the next reporting period. These materials are customized to fit the CAI categories as defined in the SBI NOFA.

The survey can be accessed at this link: http://www.surveymonkey.com/s/RGLRB9D

Connect Puerto Rico realizes the value of key relationships, new and old, to promote the importance of broadband connectivity at Community Anchor Institutions and participation in this data collection process. It is apparent that these relationships are beneficial to the entire success of the grant program, and the CAI engagement is a logical extension of new and existing relationships. Connect Puerto Rico will continue to build upon these relationships over the coming months and utilize its contacts throughout the island to collect data and raise awareness of this project.

In addition to fostering and building relationships with local agencies, associations, and organizations, Connect Puerto Rico has also developed a sector-specific calendar that supports CAI outreach as well as research and communications efforts. This focused approach allows a corporate commitment to capturing CAI data in addition to developing meaningful sector-specific content. Since the October 2013 submission, the sector-specific approach included an economic development campaign in November 2013 geared toward local governments. During these campaigns, Connect Puerto Rico committed to engage key stakeholders to educate them about the importance of our CAI data gathering efforts, distribute survey requests to sector representatives to

gather CAI information, and provide campaign-specific education through communications and webinar resources. Continued outreach to and survey of schools, libraries, hospitals, local law enforcement, and fire stations helps build awareness and establishes a centralized database of key connectivity data for planning.

Connect Puerto Rico conducts significant research as part of an ongoing process to identify existing, centralized sources for CAI connectivity data. In tandem with these efforts to identify existing data, Connect Puerto Rico continues to identify key CAI contacts in an effort to distribute and promote the online survey and raise awareness of the importance of CAI broadband connectivity. Also, when possible, Connect Puerto Rico works with the Puerto Rico Office of the Chief Information Officer to identify existing relationships that can support CAI outreach.

Connect Puerto Rico has an ongoing mission to educate CAI throughout the island on the importance of participating in the project. Participation by these institutions will raise awareness about the importance of broadband connectivity and the need to report the requested data for inclusion on the National Broadband Map.

The greatest challenge with collecting CAI data continues to be educating the CAI about the Connect Puerto Rico project as well as self-awareness of their own broadband connectivity (specifically upload and download speeds). Connect Puerto Rico will continue to research key CAI organizations and agency contacts in an effort to raise awareness of this project among CAI. When applicable, the Puerto Rico Office of the Chief Information Officer will continue to be briefed on the current CAI data and provided information so it can assist with outreach and promotion within the commonwealth.

A CAI summary of all processed and submitted data is provided below:

CAI Type	Total	Lat/Long	Technology of Transmission	Download Speed	Upload Speed
K-12 Schools	2023	1724	1543	1505	1504
Libraries	180	117	2	1	1
Healthcare	625	140	4	4	4
Public Safety	319	291	21	15	11
Higher Ed Institutions	602	144	26	20	20
Other Government	142	135	0	59	45
Other Non-Government	1594	983	8	5	5
Total	5485	3534	1604	1609	1590

Additionally, efforts were made to increase the number of CAI IDs, or federal ID codes, submitted for K-12 school and library records. The K-12 schools now have 59.86% of the CAI IDs accounted for in the records. Library records now have 7.69% of the CAI IDs accounted for in the records; additional work will be completed prior to the October 2014 submission to further increase the number of CAI IDs submitted.

During the coming months, CAI data collection will be supported by regular reporting to the Connect Puerto Rico team. The CAI data is proving an invaluable resource to all components of the Connect Puerto Rico effort. The data identifies potential local champions, sector trends, and opportunities for improvement as well as opportunities to educate CAI not familiar with their current connectivity.

SBI DATA SUBMISSION METHODOLOGY

The submission of the broadband dataset for April 1, 2014, is contained within the SBI Data Transfer Model and additional components as provided to SBI Grantees on January 24, 2014. Connected Nation (CN) has reviewed all literature that relates to the release and use of this data transfer model and recognizes that it does not replace or dictate how data is stored, processed, or displayed for the state or territory, as it is meant primarily as a means to transfer the broadband data from all states and territories and populate the National Broadband Map in a seamless fashion. Connected Nation has complied with the following guidance documents published by NTIA:

- Technical Mapping Guide, as released on the Grantee Workspace on March 24, 2011, was followed to ensure the completeness and validity of the submission through completion steps and checklists, completing the DataPackage spreadsheet, uploading broadband datasets into the Data Transfer Model, and checking the dataset using the SBDD_CheckSubmission receipt process.
- Naming Conventions and Category of End User, as released on the Grantee Workspace on March 26, 2012, was followed to ensure the consistency of individual file and zip package naming.
- Wireless Data Processing Guidance, as sent to SBI grantees on February 8, 2013, was followed to ensure that all fixed and mobile wireless provider coverage records are submitted to NTIA as separate, closed polygons whenever there is a variation in any of the required fields.

In addition to the methodologies contained herein, the Changes and Corrections documentation, as well as the DataPackage.xls containing contact information, the data dictionary, and a provider summary table, the following feature classes are submitted within the SBI Data Transfer Model for the Commonwealth of Puerto Rico.

Inventory of Deliverables, Connect Puerto Rico: April 1, 2014

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Appendix A: 1(a)(i)	BB_Service_CensusBlock	Broadband Service Availability of Facilities-Based Providers in Census Blocks of No Greater Than Two Square Miles in Area.

Appendix A: 1(a)(ii)	BB_Service_RoadSegment	Broadband Service Availability of Facilities-Based Providers by Road Segment in Census Blocks Larger in Area Than Two Square Miles.
Appendix A: 1(b)	BB_Service_Wireless	Broadband Service Availability of Wireless Services Not Provided to a Specific Address.
Appendix A: 3(b)	BB_ConnectionPoint_MiddleMile	Broadband Service Infrastructure Middle-Mile and Backbone Interconnection Points.
Appendix A: 4	BB_Service_CAInstitutions	Community Anchor Institutions- Listing.

The provider data collected by CN on behalf of the Commonwealth of Puerto Rico have been formatted per the given specifications and uploaded into the appropriate feature classes of the SBI Data Transfer Model. Wireline availability is contained within census blocks and road segments, wireless availability is contained as polygons of coverage areas, and middle-mile connections and Community Anchor Institutions are contained as point data. All speed data is contained at the census block, road segment, or wireless polygon level of availability. All efforts have been made to comply with formatting, domain, and metadata requirements to include as much information as possible.

In collecting broadband service area datasets for inclusion on the National Broadband Map, this April 2014 submission includes business/commercial broadband service areas in addition to the residential datasets that have been collected for the SBI program. Following guidance from the program office, the end user category appropriately delineates the differences in residential service area, business service areas, and combination residential/business service areas.

Connected Nation has continued outreach to satellite providers on their availability, technology, and speed information, but granular coverage is not yet available. Submitted within the wireless feature class are the satellite companies providing service to Puerto Rico as a polygon of the Commonwealth boundary. Efforts will continue to collect, process, or otherwise create more granular satellite data based on availability analyses and guidance received from NTIA. Process development continues as well to be able to create more granular satellite coverage based on satellite equipment positioning and geographic inputs; a pilot study has been initiated in Alaska to evaluate the analysis.

PUERTO RICO FIELD VALIDATION METHODOLOGY

CN focused a portion of its time on specific validation processes such as:

- conducting random spectrum analysis studies throughout the state using an Avcom PSA-37-XP spectrum analyzer;

- conducting mobile speed tests throughout the state using an iPhone, Android (or other smart phone) as well as provider-specific aircards (Sprint 3G/4G, Clearwire et al);
- identifying pre-selected, provider-submitted wireless transmit tower sites and cross-referencing data about that tower against the Federal Communications Commission (FCC) databases such as Antenna Structure Registration and/or the Universal Licensing System;
- cross-referencing Federal Registration Number data against available FCC Form 477 data as well as the FCC **CO**mmission **RE**gistration **S**ystem (CORES);
- validating provider submitted data (for example: latitude/longitude) using a handheld Garmin eTrex Summit GPS unit or GPS enabled software such as Microsoft *Streets & Trips*;
- locating physical wire-line attributes (such as Central Offices, Remote Terminals, CATV plant, etc.) and comparing them against provider submitted data; and
- conducting on-net and off-net speed tests using the FCC portal at http://www.broadband.gov/qualitytest/about/ or using the Ookla Net Metrics enabled speed test utility located on each of CN's program specific websites.

Additionally, CN cross-referenced numerous public documents in order to ensure that all known broadband providers were located and contacted. This included searching membership logs from trade associations (WISPA, WCAI, PCIA, etc.), the Cable Television Fact Book, Public Utility Commission records, Public Service Commission records, Chamber of Commerce, etc.

To date, Connected Nation's staff conducted on-site validation tests in Puerto Rico on the following viable providers: Aeronet Wireless Broadband Corp.; AT&T Mobility LLC; Ayustar Corporation; Critical Hub Networks; Data@ccess; Hughes Network Systems, LLC; INTECO; Liberty Cablevision of Puerto Rico, LLC; Neptuno Media, Inc.; PR Wireless, Inc.; PREPA Networks LLC; Puerto Rico Cable Acquisition Company, Inc. ; Puerto Rico Telephone Company Inc.; Sprint Nextel Corporation; T-Mobile USA, Inc.; Telefonica International Holding, BV; Worldnet; and XAirNet Corp.

Additionally Connected Nation had previously validated one provider which is considered non-viable, due to a merger/acquisition: San Juan Cable Holding, LLC, d.b.a. OneLink Communications.

From program initiation through this reporting period, CN has completed in-the-field validation testing against 18 viable companies (out of a universe of 23 viable providers) totaling 78.26 percent within the Commonwealth of Puerto Rico.

CN has also continued to review provider datasets for accurate speed information, platform listings, and other intricacies that may fall outside of the standard SBI Data Transfer Model parameters, as included with the submission materials provided to grantees on January 24, 2014. Any providers whose submitted coverage and attributes are anticipated to come into question have been further reviewed and confirmed; details on a case-by-case basis are presented below.

Puerto Rico Cable Acquisition Company, Inc. (Business Services)
Issue: Technology of transmission code 40 with maximum advertised download speed in tier 8, lower than expected value range for the technology.
Resolution: Provider representative confirmed that commercial services are available at tier 8 speeds.

PROVIDER VALIDATION METHODOLOGY

Broadband providers maintain their service area data in many different formats, all in varying levels of complexity and granularity. In order to ensure that the data required by the NTIA is standardized across all providers and that it is as accurate as possible, CN translates and formats the data that providers are able to supply into a GIS shapefile and produces maps for the provider to review. The resulting map(s) and review process allow for providers to see their service area in a geographic format – for some providers, this is the first time they have seen maps of their broadband service area. Having the mapped service area allows providers to quickly identify any issues that appear in the data representation, whether the issue is in the data translation into a GIS format or from the original data collection and submission. Often data is provided from various sources and through the review and revision process, local engineers who operate the networks and work in the field are able to ensure that the tabular data that has been submitted is accurate and represents the real-world network extent. Any issues in how the service area is represented on the map(s) are remedied by CN, whether they are additions, removal of service, or any other revisions. Revised maps of service area representations are sent to the provider for review and approval; CN will revise data and return maps as many times as necessary until the provider is in agreement that the map represents their service area as accurately as possible. Once the review process has been completed and final approval of the data is provided, the data is deemed ready for NTIA submission. However, if approval is not received from a provider in time for the submission, but CN believes the new/updated service area to be accurate, then the coverage will be submitted to NTIA without final provider approval with a note regarding the situation made in the provider log.

Once the data collection has been aggregated at a territory-wide level, static maps of island-wide and municipality-level availability are produced and made publicly available. In addition, consumers can visit the interactive online tool, My ConnectView, to create customized views of broadband service areas and analyze corresponding demographic information. Leveraging broadband service data on various platforms allows for public users, providers, and other stakeholders to review, scrutinize, and provide feedback on the represented data. This feedback becomes a validation method in itself, as consumers submit inquiries to CN either affirming where service is not available or identifying areas where broadband service is shown on the map, but in actuality is not available. This allows for a follow-up to providers regarding revisions to the data as it is represented; it also allows for CN to identify locations where on-site visits may be necessary to complete field validation of available services. Public feedback on all forms of mapping products serves as a localized validation method for provider-supplied information and allows CN to resolve inaccuracies as they are identified to ensure that only the highest quality information is provided to stakeholders.

Estimates derived from provider-validated data indicate that approximately 10.43 percent of Puerto Rico households do not have terrestrial fixed broadband service available, and approximately 0.17 percent of Puerto Rico households have neither mobile nor fixed broadband service available.

Within rural areas of the Commonwealth, results derived from provider-validated data indicate that approximately 16.75 percent of rural Puerto Rico households do not have terrestrial fixed broadband service available, and approximately 0.22 percent of rural Puerto Rico households have neither mobile nor fixed broadband service available. Please note that the availability estimates presented are based on Census 2010 household information.

The estimates above, in accordance with NTIA's definition of available broadband service as specified in the SBI NOFA, include broadband service with download speeds of at least 768 Kbps and upload speeds greater than 200 Kbps.

In addition, due to the nature of the SBI data collection methodology as defined by the NTIA and based on both census block geographic units and street segment data, the estimates of broadband availability derived from provider-validated data may include an overstatement of the actual number of households with broadband availability. Under the census block-based data collection method, a provider will typically report broadband availability for an entire census block whether its network is present across the whole or only a subset of that census block. This potential overestimation at the census block level can be amplified as the data is aggregated across the entire island.

WIRELESS METHODOLOGY

Broadband Service Availability in Provider's Service Area
Wireless Services Not Provided to a Specific Address

Data solicited from a fixed wireless provider to create propagation models include, but are not limited to:

1. The name of the structure.
2. Whether the transmitting device is operational or proposed.
3. The maximum advertised downstream speed, the maximum advertised upstream speed.
4. The typical downstream speed, the typical upstream speed (peak periods for both).
5. The frequency range of spectrum being used (as prescribed by NTIA). This may include (but is not limited to) spectrum authorizations identified within the Federal Communications Commission (FCC) Universal Licensing System (ULS) database or located on the FCC's Spectrum Dashboard.
6. The primary population center(s) being served (for geopolitical boundary reference).
7. The physical address of the transmit site (in the event latitude/longitude is unavailable from the provider this allows a quick reference point for geocoding).

8. Latitude in either Degrees, Minutes, and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).

9. Longitude in either Degrees, Minutes and Seconds and/or in Decimal Degrees (typically received as NAD 27 or NAD 83).

10. Antenna pattern (e.g. omnidirectional, 180°, 120°, 90°, etc.).

11. Azimuth of antenna (e.g. 360° with magnetic declination if known).

12. Approximate transmit radius (in feet, miles, or kilometers).

13. Polarity of transmit antenna (Vertical or Horizontal).

14. Transmit antenna gain (in dBi).

15. Line loss (applicable only to providers using coax, heliax, waveguide or other forms of cabling – excludes power-over-Ethernet devices).

16. Mechanical and/or Electrical beam tilt (if applicable).

17. Equipment Manufacturer (allows easy cross-reference against manufacturer's specification sheet).

18. Power output of the transmitting device (if unknown, FCC standards or manufacturer specifications are applied).

19. AMSL at base of tower site.

20. Antenna centerline AGL (height of antenna above ground level measured at the centerline of the actual antenna).

21. Foliage factors (Evergreens/Deciduous and percent of ground cover).

22. Ground Clutter (primarily used in rural areas to account for foliage and in metropolitan areas to account for types and heights of buildings if known).

23. Average gain of receive antenna.

24. Receive antenna is estimated at height above average terrain (HAAT) of 6.2 meters/20 feet.

25. Federal Registration Numbers (if applicable) which may allow opportunities to cross-reference and/or obtain additional data from the FCC's ULS and the **CO**mmission **RE**gistration **S**ystem.

Propagation modeling combines scientific data and empirical mathematical formulation for the characterization of radio wave propagation as a function of frequency, distance, and other conditions. Propagation software(s) typically use the Irregular Terrain Model (also known as Longley-Rice) of radio propagation for frequencies between 20 MHz and 20 GHz. This model is based on electromagnetic theory and statistical analyses of the combination of terrain features and radio measurements, then predicting the median attenuation of a radio signal as a function of distance and the variability of the signal in time and in space. For metropolitan areas, the software can typically be adjusted to use the Okumura-Hata model, which accounts for predicting the behavior of cellular transmissions in areas where buildings are the primary obstructions. The resulting product from either model depicts a graphical illustration of the theoretical propagation

characteristics of a selected frequency range based on defined variables (receiver sensitivity of the home/mobile device, foliage factor, and digital elevation terrain input).

After converting propagation models into a geospatial format, additional processing is completed to remove the small pixels representing service present in the resulting dataset. These areas are initially created based on the parameters entered in the software from the provider equipment information, the underlying data parameters of elevation, hill shade, etc., and the limitations of the software itself to display a broadband service area as accurately as possible. Generally, these random pixel striations appear as a result of signal levels reaching the highest elevated points within the prescribed radius. Typically, while this pixilation anomaly shows legitimate areas where signals can be received, these highly elevated points may have exceedingly sparse populations or are entirely void of population. As a result, and congruent to the *Wireless Technology Methodologies and Business Logic* white paper submitted to NTIA on January 20, 2011, all independent pixels representing service that are less than 0.125 square miles in area have been removed from the geospatial representation of each wireless provider.

BROADBAND INQUIRIES METHODOLOGY

CN collects consumer feedback in the form of broadband inquiries (BBIs). These inquiries represent any type of communication received from the public regarding broadband service. Once BBIs are received across the territory, this information is overlaid with the broadband availability information which was collected through the SBI program. This allows for a real-world comparison of the broadband landscape to the information received from broadband inquiries. Consumers submitting these inbound comments and/or inquiries are able to provide information regarding five categories: 1) residents who do not have broadband but want it; 2) residents who have broadband but want a different provider; 3) residents who do not have broadband, but the broadband inventory maps indicate that they do; 4) residents who have broadband but want a faster connection speed; and 5) residents who have broadband but want a less expensive service option.

BBIs are submitted frequently by consumers via the Connect Puerto Rico website. Inquiries often seek help to identify local broadband provider options, or to learn when a specific provider may be able to provide service to that consumer. Consumer comments also provide information which may help modify maps with actual service area information. The primary objectives of CN regarding these inquiries are 1) to improve the accuracy of the state maps with submitted consumer information and follow-up field research; 2) to provide broadband options to consumers through cooperation with mapped providers and by facilitating new broadband service options; and 3) to map and analyze information from consumers about areas of unmet broadband demand and alternatives to currently mapped services. A prime example of the second option is the utilization of the Rural Utility Service satellite eligibility tool. By simply entering the consumer's address, the CN engineer can quickly determine if the consumer meets the initial qualification status for BIP satellite subsidies.

New BBIs are assigned to either the GIS department or the Engineering & Technical Services (ETS) team depending on the category entered by the consumer on the website submission form. The GIS or ETS team members respond to each inquiry according to the information entered by the consumer. Many BBIs can be resolved through desktop research; however, if a BBI requires research in the field, the assigned ETS team member conducts such research when performing field validations in the area of the inquiry, or at another such time as is practical and appropriate. GIS and ETS team members respond to and conclude BBIs via telephone contact and/or e-mail communication.

The broadband inquiry process has been implemented in each of the CN state programs with successful results. Altogether CN has received over 19,196 broadband inquiries since 2007, allowing the state programs to evaluate each inquiry for broadband demand and data verification. These inquiries are continuously examined against current broadband availability, updated every six months, to determine if previously unserved households have been expanded to and can now receive broadband at their residence. This database of broadband inquiries has also allowed the CN state programs to aggregate demand in concentrated areas to show providers the exact locations where the population has made it clear that they would purchase broadband if it was made available to them. Providers in the states have responded to this process and have expanded to areas knowing that their investment will be worthwhile. Data verification methods have also proven successful, as the state programs have been able to show those inquiries that indicate the broadband service areas are misrepresented on the map to providers, who then verify where service cannot reach in regard to that residence(s). The broadband coverage in these states has been altered to create a more accurate map based on the inquiries submitted by the public.

During this reporting period, the Connect Puerto Rico project has received no inquiries; however, there have been 78 inquiries from grant inception to date. As more inquiries are submitted to Connect Puerto Rico, a more thorough validation of the broadband landscape can be performed, while also allowing providers to see which areas have a high demand for broadband adoption.

MY CONNECTVIEW METHODOLOGY

My ConnectView is an interactive online mapping tool for viewing, analyzing, and validating broadband data. Developed using Esri's ArcGIS for Server and Adobe's Flex Framework and hosted and maintained by Connected Nation, My ConnectView is a multi-functional, user-friendly way for local leaders, policymakers, consumers, and technology providers to devise a plan for the expansion and adoption of broadband.

First and foremost, My ConnectView allows consumers to locate their residence and identify providers that offer broadband Internet service to that location. The interactive platform allows for users to build and evaluate broadband expansion scenarios using a wealth of data, including several coverage analysis layers, speed analyses, Community Anchor Institutions, and tools to search and export household demographic information, as well as extract data in GIS, spreadsheet, and/or PDF formats.

My ConnectView also features more interactive data layers and additional tools than ever before to allow the consumer to explore the broadband data. My ConnectView provides consumers with the ability to print, e-mail, and provide feedback on the broadband data displayed on the interactive map. Through the collection of this feedback, a visual demand for broadband is presented. This visualization allows the CN state programs the ability to validate the broadband availability for accuracy. If residents within a region state they are without broadband, but the interactive map shows otherwise, this allows CN to approach the providers within that area in an effort to trim down their coverage to more accurately represent real-world availability on the ground.

The Connect Puerto Rico project launched My ConnectView on April 2, 2012 and has received 913 visits this reporting period; to date the interactive mapping application has received 4,552 visits.

SPEED TEST METHODOLOGY

The 271 speed tests that are represented in the Connect Puerto Rico Speed Test Report during this reporting period (1,993 grant inception to date) are the result of a partnership between CN and Ookla Net Metrics. Utilizing this relationship increases the level of confidence in the data being collected and provides for a far greater sample size than could be collected by a single testing site.

Ookla owns and operates Speedtest.net, as well as develops and deploys speed tests, such as the Connect Puerto Rico speed test website, for partners around the world. This network of sites that is developed and run on its testing technology provides Ookla with a vast dataset that, due to the variability of geographic information collected across the varying speed test sites, is geocoded utilizing Geo-IP technology. This technology allows for tests to be geocoded to points of aggregation, typically larger nodes across provider networks. While there are hundreds of thousands of tests that have been conducted, the level of aggregation is only sufficient for municipality-level detail due to the test results being located at these larger nodes and not at an absolute location for each speed test.

In an effort to validate broadband data from the Connect Puerto Rico project, speed test information is collected throughout the commonwealth. Speed tests provide speed information on the path taken through all networks (a provider's network as well as additional networks) a local machine must connect to in order to reach the host test. The benefit of this collection of speed information is two-tiered. First, it allows for a comprehensive dataset of speeds, while also providing Connect Puerto Rico with the information on where broadband services are available. Second, unlike theoretical speed information which may be received through the data collection process, the use of speed tests provide real-world information on the speeds that currently exist within the Commonwealth of Puerto Rico.

PROVIDERS DEEMED NON-VIABLE

The following list of companies represents the remainder of the broadband provider universe that was originally identified as complete for outreach to begin for the State Broadband Initiative. These providers are not included in the Data Package for the April 2014 submission because they have been deemed non-eligible under the parameters and guidance of the SBI grant program. This list of companies includes, but is not limited to: providers offering service but below the current definition of broadband, those that have gone out of business, technology consulting firms, infrastructure or network construction companies, non-facilities based general resellers that have not provided sufficient mapping information, etc.

	Company Name	URL	Comments
1	Adelphia	n/a	Acquired by another company; no longer in business.
2	Advance IP Applications, Inc.	www.advanceipapplications.com/	Data integrator and management company.
3	Advance Wireless Communications, Inc.	www.advancedwireless.com/	General distributor of radio equipment.
4	Affinity Mobile, LLC	www.affinitymobile.com	Inactive URL; out of business.
5	American Telephone Communication	www.americantel.com	General distributor of telephones and equipment.
6	Arroyo Calling Services	n/a	Prepaid phone services and pay phone distributor.
7	Atenas Internet	www.atenas.com/	General reseller of backhaul and dial-up; also offers B2B wireless services.
8	BLE Telecom	http://bletelecom.com	Nonfacilities-based general reseller.
9	Broadband Internet Via Air	www.bivapr.net	BIVA assets acquired by Sprint and Clearwire; Inactive URL; no longer in business.
10	Centennial Communications Corporation	n/a	General reseller; acquired by AT&T.
11	Centennial de Puerto Rico	n/a	Acquired by AT&T.
12	Centennial Puerto Rico License Corp.	n/a	Acquired by AT&T.
13	Centro Beeper	n/a	Paging company.

14	Comunicaciones Tony Plaza, Inc.	n/a	Pay phone and prepaid services.
15	Cortelco Systems Puerto Rico, Inc.	http://cortelcopr.net/	Distributor of communications and billing systems.
16	Custom Teleconnect, Inc.	www.customteleconnect.com	US provider of operator support, domestic and international direct dial service, international callback and debit card services; also an independent pay phone provider (IPP) for the hospitality and tourism industries.
17	Datavos Corporation	www.datavos.com	Inactive URL; out of business.
18	DG-TEC Puerto Rico, LLC	n/a	Dominican-based VOIP and GSM provider; may now be out of business.
19	Empire Payphones, Inc.	n/a	Prepaid phone services and pay phone distributor.
20	Ernesto L. González Morales	n/a	Not a provider of broadband services.
21	Fibercrossing Corp.	www.fibercrossing.net	Went out of business in December of 2009.
22	Globalstar Caribbean, Ltd.	www.globalstarusa.com	Provider of satellite phones and SMS service.
23	Hibridos Telecommunications, Inc. (HIB)	www.hib.itgo.com	Puerto Rico-based CLEC; refused to participate.
24	Humacao Payphone	n/a	Prepaid phone services and pay phone distributor.
25	IDT Puerto Rico Co.	www.idt.net	Resells local and long distance phone services.
26	Intellicall Operator Services, Inc.	www.intellicalloperatorservices.com	Outsourced service solutions and U.S. call center facilities.
27	Level 3 Communications, LLC	http://www.level3.com/	No broadband services offered in the state.
28	Lightyear Alliance of Puerto Rico, LLC	www.lightyear.net	Nonfacilities-based general reseller.

29	MCI Communications Services, Inc.	n/a	Acquired by Verizon.
30	MCI International, Inc.	n/a	Acquired by Verizon.
31	MEG COMMUNICATION	n/a	No longer in business.
32	Metro Beeper, Inc.	www.metrobeeper.com	Paging company.
33	MG Communications	n/a	Prepaid phone services and pay phone distributor.
34	Moises Sierra Fernandez	n/a	Not a provider of broadband services.
35	Network Communications International Corp.	www.ncic.com	Inmate telephone services, pay phone services, and directory assistance and reseller of prepaid minutes.
36	Network Operator Services, Inc.	www.centrisinfo.com	U.S. provider of operator support, domestic and international direct dial service, international callback and debit card services; also an independent pay phone provider (IPP) for the hospitality and tourism industries.
37	Neutral Tandem-Puerto Rico, LLC	www.neutraltandem.com	Provides tandem services for wholesale long distance, local transit, and international long distance.
38	Next G Network of NY, Inc.	n/a	System integrator.
39	North Sight Communications, Inc.	www.northsite.com	Was an iDEN provider in Puerto Rico; URL no longer works; may have been acquired by Proxtel Wireless.
40	Optivon Telecommunications Services, Inc.	www.optivonpr.com	Nonfacilities-based general reseller.

41	Orizon Wireless Corp.	n/a	No longer in business, contacts and website decommissioned, all licensed point-to-point authorizations now terminated by the FCC.
42	Pan American Telephone Co., PR, LLC	n/a	Hispanic-owned political consulting, public affairs, communications and business development firm on Long Island.
43	Payphone Telecom	n/a	Prepaid phone services and pay phone distributor.
44	Phoneworks, Inc.	n/a	Pay phone services and distributor.
45	PR Pronto Telecommunications Corp.	n/a	An international word-of-mouth marketing agency.
46	Primus Telecommunications Group, Inc.	www.ptgi.com//docs/factscaribbean.html	Nonfacilities-based general reseller and CLEC.
47	Qwest Communications Company, LLC	n/a	Provider acquired by CenturyLink.
48	San Juan Gas Acquisition Corporation, (SAC)	n/a	Gas and propane company with offshore communications.
49	STSJ Overseas Telephone Company, Inc.	n/a	Facilities-based long distance carrier; offers direct dial, toll-free long distance, calling and debit cards, international toll-free service and 24-hour bilingual operator services; does not offer broadband.
50	Tatiana C. Velázquez Roza	n/a	Not a provider of broadband services.
51	T-Mobile Puerto Rico, LLC	n/a	Holding company for T-Mobile; registered with JRT.
52	Tricom USA, Inc.	www.tricomusa.net	Specializes in the installation of any voice, data, and fiber cabling, from new construction to additions.

53	Value Added Communications, Inc.	n/a	Inmate telephone services, pay phone services and directory assistance.
54	Verizon Wireless	n/a	Out-of-state provider.
55	VoiceLan Group, Corp.	www.voicelangroup.com	Inactive URL; out of business.
56	VPNet, Inc.	www.vox-tel.com	Inactive URL; out of business.
57	WorldNet Telecommunications	n/a	CLEC and holding company for Worldnet.

APPENDIX A: BROADBAND PROVIDER LOG

Broadband Provider Log

Complete	30
Non-Responsive/Refused	0
In Progress	5
Reseller Providing Data	0
Count of Datasets by Status	35
Total Unique Providers Represented	23

Provider Name	Platform	Status	NDA Execution Date	Notes	End User Category
AT&T Mobility LLC	Mobile Wireless	Data Added to Statewide Inventory	12/16/2009	[JAN-30-14 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2014 submission.	5 – Both Residential/Business
Critical Hub Networks	Fiber	Data Added to Statewide Inventory	9/30/2010	[MAR-13-14 Jess Cary] Change: Provider's business coverage and speeds are different from their residential.	1 – Residential Only
Critical Hub Networks	Fiber	Data Added to Statewide Inventory	9/30/2010	[MAR-13-14 Jess Cary] Change: Provider's business coverage and speeds are different from their residential.	2 – Business Only
Liberty Cablevision of Puerto Rico, LLC	Cable	Data Added to Statewide Inventory	10/19/2009	[JAN-24-14 Jess Cary] Change: Provider increased available speeds to tier 9.	5 – Both Residential/Business
Puerto Rico Telephone Company Inc.	Fiber	Data Added to Statewide Inventory	4/23/2010	[MAR- 11-14 Jess Cary] Change: Provider added new fiber coverage, and now offers both business and residential coverage.	5 – Both Residential/Business
Puerto Rico Telephone Company Inc.	DSL	Data Added to Statewide Inventory	4/23/2010	[FEB-17-14 Jess Cary] Change: Provider expanded and increased available max download speed tier to 8.	5 – Both Residential/Business
Sprint Nextel Corporation	Mobile Wireless	Data Added to Statewide Inventory	1/14/2010	[FEB-12-14 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2014 submission.	5 – Both Residential/Business
T-Mobile USA, Inc.	Mobile Wireless	Data Added to Statewide Inventory	1/8/2010	[FEB-41-14 Jess Cary] Changes and/or Corrections: Possible service expansion or corrections to previous dataset; entirely new dataset provided for April 2014 submission.	5 – Both Residential/Business
Aeronet Wireless Broadband Corp.	Backhaul	Backhaul Provider Only Processing Complete			N/A - Backhaul
Neptuno Media, Inc.	Backhaul	Backhaul Provider Only Processing Complete	4/29/2010		N/A - Backhaul
Sprint Nextel Corporation	Backhaul	Backhaul Provider Only Processing Complete	1/14/2010		N/A - Backhaul
T-Mobile USA, Inc.	Backhaul	Backhaul Provider Only Processing Complete	1/8/2010		N/A - Backhaul
Worldnet Telecommunications Inc.	Backhaul	Backhaul Provider Only Processing Complete	4/19/2010		N/A - Backhaul
Ayustar Corporation	Fixed Wireless	Speed Only Update; Data Processing Complete	7/12/2010	[FEB-18-14 Jess Cary] Change: Provider now offers speed tier 6 max download in some areas.	5 – Both Residential/Business
XAirNet Corp.	Fixed Wireless	Approval for Update Not Received – Data Still Submitted		[FEB-24-14 Jess Cary] Change: provider expanded coverage area and business/residential speeds now vary.	1 – Residential Only
XAirNet Corp.	Fixed Wireless	Approval for Update Not Received – Data Still Submitted		[FEB-24-14 Jess Cary] Change: provider expanded coverage area and business/residential speeds now vary.	2 – Business Only
Data@ccess Communications	Backhaul	No Update to Provide	9/29/2009		N/A - Backhaul
Hughes Network Systems, LLC	Satellite	No Update to Provide	2/5/2010		1 – Residential Only
PR Wireless, Inc.	Mobile Wireless	No Update to Provide			5 – Both Residential/Business
PREPA Networks LLC	Backhaul	No Update to Provide	4/21/2010		N/A - Backhaul
Puerto Rico Cable Acquisition Company, Inc.	Cable	No Update to Provide	9/27/2010		2 – Business Only
Puerto Rico Cable Acquisition Company, Inc.	Cable	No Update to Provide	9/27/2010		1 – Residential Only
Skycasters	Satellite	No Update to Provide	10/16/2012		1 – Residential Only
Critical Hub Networks	Backhaul	No Update Provided – Use Last Submission Data	9/30/2010		N/A - Backhaul
Critical Hub Networks	Fixed Wireless	No Update Provided – Use Last Submission Data	9/30/2010		5 – Both Residential/Business
INTECO	Backhaul	No Update Provided – Use Last Submission Data	1/30/2012		N/A - Backhaul
INTECO	Fixed Wireless	No Update Provided – Use Last Submission Data	1/30/2012		5 – Both Residential/Business
PR Wi-Fi	Fixed Wireless	No Update Provided – Use Last Submission Data			5 – Both Residential/Business
Puerto Rico Telephone Company Inc.	Mobile Wireless	No Update Provided – Use Last Submission Data	4/23/2010		5 – Both Residential/Business
Spacenet, Inc.	Satellite	No Update Provided – Use Last Submission Data			1 – Residential Only
WinPR, Inc.	Fixed Wireless	Provider Gathering Data			5 – Both Residential/Business
Aeronet Wireless Broadband Corp.	Fixed Wireless	Solicited Initial Data			2 – Business Only
CoquiTel LLC	Fixed Wireless	Solicited Initial Data			1 – Residential Only
CoquiTel LLC	Fixed Wireless	Solicited Initial Data			2 – Business Only
Telefonica International Holding, BV	Backhaul	Solicited Initial Data			N/A - Backhaul