Methodology Paper

United States Virgin Islands Territory

State Broadband Data and Development Program

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Prepared for:
US Virgin Islands Public Finance Authority
Office of Economic Development
32-33 Kongens Gade
St. Thomas, VI 00802

Prepared by:
Stratum Broadband, LLC
Suite 207
116 Main Street
Medway, MA 02053

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PREFACE

This technical paper has been prepared by Stratum Broadband, LLC, as part of a consulting services engagement with the United States Virgin Islands Territory (USVI). The engagement covers support services provided to the USVI as part of a broadband mapping and planning project funded by the National Telecommunications Administration (NTIA) as part of the America Reinvestment and Recovery Act (ARRA) of 2009.

Purpose

This technical paper documents the process that has been used to collect and publish information regarding broadband availability in the Territory.

Scope

The State Broadband Data and Development Program (SBDD) follows guidelines for implementation as promulgated in the Notice of Funds Availability (NOFA) Docket No. 0660-ZA29. The Technical Appendix of the NOFA and the associated Clarification document provide a data model for reporting findings and definition for the data elements.

The SBDD program seeks to document information regarding certain institutions in the Territory representing government, education, libraries, public safety, and healthcare. In addition to identifying these institutions, information profiling their existing utilization of broadband service is being collected. The collection and reporting process can be found in the Community Anchor Institutions (CAI) section.

The SBDD program also seeks to document the general availability of broadband service throughout the Territory. The data is drawn directly from providers of broadband services within the Territory and from public sources. In addition to documenting advertised services, the SBDD Program seeks to validate the information collected using available means. Lastly, the SBDD Program expects an effort will be made by the Territory to verify to what extent advertised services are actually reaching the consumer.

Document Organization

This document is organized into the following sections:

Section 1, Background - This section provides some insight regarding the physical and political environment of the Territory that has some bearing on the strategy and tactics employed in carrying out the intent of the program.

Section 2, Community Anchor Institutions - This section describes the approach used to identify, qualify, collect, and document data regarding institutions classified as Anchor Institutions.

Section 3, Service Providers - This section documents the process of identifying, qualifying, and collecting data from providers of broadband service to consumers in the Territory.

Section 4, Verification - This section describes activities already undertaken or planned to verify the data reported for the project.

Acronyms

This document uses the following acronyms:

ARRA	America Reinvestment and Recovery Act
FIPS	Federal Information Processing Standards
NTIA	National Telecommunications Administration
NOFA	Notice of Funds Availability
SBDD	State Broadband Data and Development Program
USVI	United States Virgin Islands Territory
UVI	University of the Virgin Islands
viNGN	Virgin Islands Next Generation Network
VIPFA	Virgin Islands Public Finance Authority
VIWAPA	Virgin Islands Water and Power Authority

1. BACKGROUND

This section provides some insight regarding the physical and political environment of the Territory that has some bearing on the strategy and tactics employed in carrying out the intent of the program.

1.1. Geography

The USVI is comprised of a group of islands some 70 miles east of San Juan, Puerto Rico. The Territory has a total population of about 108,000 residents. Most of the population resides on St. Thomas and St. Croix, the two largest islands. St. Croix is about 40 miles due south of St. Thomas. The third island of St. John is located 2 miles east of St. Thomas and is the site of a US National Park which occupies more than half of the land area on the island. A fourth island known as Water Island is located in the harbor of Charlotte Amalie on St. Thomas. It is the smallest island with fewer than 600 residents. US Census Bureau record keeping overlays the three largest islands with the notion of county. The FIPS codes for USVI "counties" are:

78010 – St. Croix

78020 – St. John

78030 – St. Thomas

Water Island is included in FIPS 78030 (St. Thomas). The Territory government does not recognize or use the term county.

1.2. Government

The government of the USVI is made up of three branches: Executive, Legislative, and Judiciary. The Executive branch includes the Governor, Lt Governor and the Cabinet. The Cabinet is comprised of 26 department heads. The Territory is represented at the Federal level by an elected member of the US House of Representatives.

The Department of Education operates thirty-four K-12 schools in the Territory. There is one four year university, the University of the Virgin Islands (UVI), with campuses on St. Thomas and St. Croix.

There are full service hospitals on each of the two large islands and medical service facilities on St. John.

While the head of government is on St. Thomas, many of the departments maintain administrative facilities on both St. Thomas and St. Croix due to the

physical separation of the Caribbean Sea between them. The government structure also includes organizational entities known as Authorities. These include the Public Finance Authority, Virgin Islands Next Generation Network, Virgin Islands Water and Power Authority, and the Virgin Islands Port Authority.

1.2.1. Public Finance Authority – Office of Economic Opportunity (VIPFA/OEO)

The Public Finance Authority, Office of Economic Opportunity is the named awardee for the SBDD Program Grant.

1.2.2. Virgin Islands Next Generation Network (viNGN)

The Virgin Islands Next Generation Network is a public-private corporation established to construct and operate a Territory-wide wholesale fiber-optic network. The Territory is the recipient of an ARRA BTOP grant intended to fund the construction of this network.

The Public Finance Authority has delegated authority to manage fulfillment of the State Broadband Data and Development to viNGN.

1.2.3. Virgin Islands Water and Power Authority (VIWAPA)

Virgin Islands Water and Power Authority is the government operated water and electric power utility of the Virgin Islands. It is a public private corporation which operates electric generation facilities and electric power distribution in the Territory. VIWAPA also operates water desalinization and distribution facilities. VIWAPA has contributed rights of way, underground conduit, and poles that will support deployment of the viNGN optical fiber wholesale broadband network.

During the planning portion of the SBDD project, VIWAPA contributed Computer Aided Design (CAD) files of pole locations to the SBDD project.

1.3. Special Conditions

During the course of collection and validation of information, there were a few conditions that influenced the process.

1.3.1. Geocoding Constraints

The US Census Bureau Tiger Line records for Census 2000 data do not provide any street segment data for the USVI. Street names in the USVI are meaningful only within the context of historic land areas referred to as

"estates." This land management structure is a carry-over from earlier governance of the islands by Denmark. The USVI became a US possession as the result of its purchase from the government of Denmark in 1917. Land parcel ownership records are currently maintained in this estate format.

When interviewing service providers, we found that service location identification, which is typically based on street addressing, is virtually nonexistent in provider record keeping. Billing is almost exclusively directed to post office boxes. Where physical plant service locations are recorded, they are generally defined by reference to known landmarks.

The Lt. Governor's office includes a GIS organization which has been guiding a collaborative effort among all Territory departments to share available geodata in a common structure. The Virgin Islands Geospatial Information Council (VIGIC) is engaged with Federal agencies, such as the US Geological Survey, as well. There is currently a project underway to plan for conversion to geocoded street addressing system over the next two to four years.

1.3.2. Internet Exchange Service Availability

All terrestrial service providers rely on submarine cable based data services from Florida for telephone and broadband data services. The cables are operated by AT&T (St. Thomas) or Global Crossing (St. Croix).

Communication services between the islands of St. Thomas and St. Croix is available by submarine cable service leased from AT&T in 45Mbps increments. Communication services between St. Thomas and St. John is available by submarine fiber cable operated by the VIWAPA.

1.3.3. Non Terrestrial Service Providers

Wireless mobile broadband service providers use licensed spectrum and operate radios in the Territory for 3G services. They merchandise end user equipment through local retails stores or authorized dealers. Except for local dealer advertising, services are advertised on national broadband sites including general coverage maps. The business operations for national providers are not located in the Territory.

Ground station equipment for consumers is available from at least two satellite providers through dealers located on St. Thomas. These dealers will travel to the other islands to effect installation.

2. COMMUNITY ANCHOR INSTITUTIONS

This section provides information regarding the collection and classification of data pertaining to Community Anchor Institutions (CAIs).

2.1. Data Gathering

CAIs are comprised of schools, libraries, medical and healthcare providers, public safety entities, institutions of higher education, and other community support organizations and entities. The NTIA has asked that these CAIs be categorized according to the codes shown in Table 2-1.

Table 2-1 Community Anchor Institution Category Codes

Category Code	Category
1	School – K through 12
2	Library
3	Medical/healthcare
4	Public safety
5	University, college, other post-secondary
6	Other community support – government
7	Other community support – nongovernmental

While most CAIs fall into obvious classification, some decisions are required where the NOFA does not directly address certain situations. These exceptions for the USVI are summarized in Table 2-2.

Table 2-2 Community Anchor Institutions Categorization Decisions

Categorization Exception	Categorization Decision
Adult Education geared toward GED-level learning	Included with Code 1: Learning at the K-12 level
Private preschool programs that include Kindergarten	Included with Code 1: Though main focus of institution is pre-K, a qualifying program is offered
V.I. Department of Education administrative offices and facilities	Included with Code 6: Since these facilities are not used for actual education of students, it seems they are community support – government
Single private medical offices	Not included: Individual medical offices do not seem to fall into the notion of community support
Buildings housing many private medical offices	Included with code 3: Most of these multi-practice buildings have association with public healthcare facilities and house a significant number of healthcare providers.
Other community support – nongovernmental	Included with code 7: It was decided to limit this category to established community, learning, and recreation centers, as well as nationally recognized youth clubs.
Co-located CAI	A certain number of CAIs are co-located in common municipal or other buildings. In these situations it was determined that co-located CAI falling under a common department or authority would be considered a single CAI. In cases where the CAIs were of different departments of authorities, they would be considered separate CAIs.

The bulk of the initial CAI list was generated from a Google Earth (kml) layer file obtained by Stratum Broadband from the engineering department of the VIWAPA. VIWAPA maintains a location-based list of most public and private institutions on the islands for planning and service purposes. Due to the size of the Territory, it was practical to supplement this list of potential CAIs with data culled from public sources, such as the local phone book and standard web searches.

Data regarding broadband service at each identified CAI is being collected by Stratum Broadband and the newly created Virgin Islands Next Generation Network (viNGN), the USVI Territory grantee, through a CAI outreach program designed to benefit both the SBDD and the Broadband Technology Opportunities Program (BTOP). This program includes paper surveys distributed at meetings for the CAIs run by viNGN and the Territorial governor, online surveys at vingn.com, and personal contacts with information technology directors of the various institutions. As of April 1, 2011, a determination of broadband service subscription has been made at approximately 10% of the 324 CAI locations. It is projected that by October 1, 2011, this number will be at 75% or higher.

2.2. Data Validation and Processing

There are three main points of validation and processing for the CAI data: location, data format normalization, and broadband service subscription.

2.2.1. Location

Validation of CAI locations is made difficult in the Territory by the absence of a consistent addressing convention and by the unavailability of geocoding resources. These concerns are being addressed currently by a project under the direction of the Office of the Lieutenant Governor. This data will be used as it becomes available.

In lieu of geocoding resources, a week-long program was undertaken by Stratum Broadband and VIWAPA to verify the location of each identified CAI. Latitude and longitude values were taken using a standard retail Garmin Zumo model 550 with WAAS enabled at a location as close to the building entrance as practical. As a result, all reported CAI locations have been visually confirmed by Stratum Broadband, and most GPS readings are within 50 yards of the physical building entrance on the street side.

All CAI locations were verified using ESRI ArcMap Topology tools to fall within the state boundaries.

2.2.2. Data Format Normalization

There are two main issues with normalizing the data formats for reporting to the NTIA. The first issue is with CAI naming conventions, and the second issue is with consistent street addressing.

The NTIA has asked that the name of each CAI be unique. While this is satisfied in many cases by using the formal name of the CAI facility, there are a number of cases, particularly in the public safety and other community support – government categories, where formal facility names are not unique. For example, a government department may have an office on each of the three islands, each bearing only the name of the department. Table 2-3 summarizes the general naming conventions used for each CAI category code.

Table 2-3 Community Anchor Institution Naming Conventions

Code	Category	Naming Convention ([ ] denotes used as needed)
1	School – K through 12	Formal name [- geographic name]
2	Library	Formal name
3	Medical/healthcare	Formal name [- geographic name]
4	Public safety	Formal name [- geographic name]
5	University, college, other post-secondary	Formal name [- geographic name]
6	Other community support – government	Department [-facility name[- geographic name]
7	Other community support – nongovernmental	Formal name [- geographic name]

The second data format normalization issue is due to the non-conventional and non-consistent addressing scheme used to identify street addresses in the USVI. Where verifiable, the publicly advertised (by phone book and/or web site) address was used.

There seems to be two main schemes for designating a street address. The collected street address data also showed combinations and variations of these two main schemes.

1. Building Number, Street Name, City, State, ZIP code

2. Parcel Number, Estate, Island, State, ZIP code

Scheme 1 maps very closely with the addressing format requested by the NTIA and addresses conforming to this scheme required no further processing.

For addresses not conforming to Scheme 1, the conversions shown in Table 2-4 were used where applicable.

Table 2-4 Non-conventional Address Mapping

Non-conventional Address Part	NTIA Address Field
Parcel Number	Building Number
Estate	STREET NAME
Island	CITY

About 40% of the addresses have no obvious analog to the Building Number. In these cases the Building Number field was reported as “N/A.”

2.2.3. Broadband Service Subscription

To this point in time, there have been no attempts to validate broadband service subscription at the CAI locations. CAI representatives are reporting the speeds according to their contracts with the various providers. In cases

where a CAI may have more than one broadband connection, the higher speed connection is reported. It is hoped that a future activity will involve collecting of speed test data from a number of CAIs to validate a sampling of the reported speeds.

2.3. Reporting Summary

For the Spring 2011 NTIA reporting period, Stratum Broadband identified 324 CAIs. Table 2-5 summarizes the breakdown by category. Subscription to broadband service has been identified in about 10% of the total number of CAIs. Of those whose broadband subscription status is known, 47% have internet access at qualifying speeds.

Table 2-5 Community Anchor Institution Breakdown by Category

Code	Category	Count	% of Total
1	School – K through 12	82	25
2	Library	7	2
3	Medical/healthcare	19	6
4	Public safety	42	13
5	University, college, other post-secondary	4	1
6	Other community support – government	133	41
7	Other community support – nongovernmental	37	11

3. SERVICE PROVIDERS

This section describes the identification, collection, and processing of data related to broadband service providers operating in the USVI.

3.1. Data Gathering

The NOFA defines available broadband service in the following words:

> *Broadband service is "available" to an end user at an address if a broadband service does, or could, within a typical service interval (7 to 10 business days) without an extraordinary commitment of resources, provision two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and at least 200 kbps upstream to the end user at the address*

For practical purposes of classification, this statement was interpreted into a set of rules to determine what qualifies as broadband service in the USVI. An Internet service provider is considered to offer qualifying broadband service if the following requirements are met:

1. **Provider offers two-way data transmission to the Internet for end users in a geographical area within the USVI.** This rule was used to exclude two companies who provide internal network services targeted only to the hospitality industry and who, as part of their network services, resell internet connections from facility-based providers. They do not offer broadband service generally to end users in a geographic region. It is possible that this restriction may be altered in future reports to allow these companies to appear as resellers.

2. **Provider publicly advertises Internet service levels of at least 768 kbps downstream and 200 kbps upstream.** This rule was used to exclude all dial-up services and a number of Terrestrial Fixed Wireless and DSL service offerings. However, no wireless or DSL providers were excluded by this rule since all offer at least one service level meeting the minimum speed standards.

3. **Provider must be able to provision the service to the end user within a typical service interval of 7-10 business days.** This rule excluded a number of traditional copper wireline services, as well as a number of high bandwidth point-to-point business service offerings.

While not used to determine broadband service qualification, the question was raised whether both residential and business offerings should be considered when determining the maximum advertised speeds. In general, the business offerings include speed tiers above those offered to residential customers with an often quite significant increase in pricing structure. The concern is that a resident or small business owner may view the National Broadband Map and see that 5 Mbps service is available at his location, but find out from the providers that one must be able and willing to pay a significant monthly fee ($500-$1000) that is impractical for a typical household or small business. Conversely, if reported speeds were limited to residential offerings, the medium and large businesses would not find useful information on the National Broadband Map. Ultimately, since no clear language in the NOFA or various clarifications provided by the NTIA could be used to exclude a service level based on price or target market, it was decided to include the qualifying business offerings when determining the maximum advertised speed levels.

In total eight providers, offering nine qualifying broadband services, were identified. The Table 3-1 shows a breakdown of qualifying services by transmission type. Of the eight identified providers, four are local providers operating mostly in the USVI. The remaining four are national cellular or satellite providers.

Table 3-1 Qualifying Services by Transmission Type

Code	Transmission Type	Qualifying Services
10	Asymmetric xDSL	1
60	Satellite	2
70	Terrestrial Fixed Wireless - Unlicensed	1
71	Terrestrial Fixed Wireless - Licensed	2
80	Terrestrial Mobile Wireless	3
	Total	9

3.2. Data Collection

Collection of service provider data has mostly been facilitated through leveraging of personal contacts with each of the providers. The relatively small number of providers in the USVI makes this approach feasible. Initial contacts among the local providers were made during stakeholder meetings convened by the Territorial Government in the early planning phases.

Subsequently, Stratum Broadband personnel have met with each provider to explain the purposes of the SBDD program, to detail the information required, and to address concerns of confidentiality of proprietary data.

Before data could be collected from the local providers, Non-Disclosure Agreements (NDAs) were negotiated. One unique and common concern addressed in the NDA was that infrastructure information (last mile, middle mile, and backhaul) should only be known by Stratum Broadband and not be shared with the Territorial government agencies involved in the project. The issue being that of information in the hands of government officials becomes subject to requests for public data.

The data collected for the national carriers was all done from public sources, such as web sites and FCC licensing data, as well as personal contact with local resellers of the service. No NDAs were negotiated with these national providers, nor has Stratum Broadband yet been able to identify suitable contacts within the national providers to confirm the data collected. No infrastructure data is known for these national providers.

3.2.1. Infrastructure Data

Each local provider agreed to share information with Stratum Broadband about the qualifying services under the established NDA. Spreadsheets detailing the required data were prepared and emailed to the appropriate contact for each provider. Completed spreadsheets, along with supporting information, were delivered to Stratum Broadband by email. Generally, more details about the network infrastructure were given to Stratum Broadband than the NDA permitted to be disclosed to the NTIA. Particularly, information detailing location, technology, or capacity of last mile and middle mile nodes were useful in adjudging the reasonableness of claimed availability areas, but were not reported in full.

3.2.2. Broadband Availability Areas

Each provider of qualifying service presents a unique situation regarding the designation of areas of availability. Stratum Broadband worked with each provider to collect the data necessary to present an acceptable representation of the actual area of availability. Table 3-2 summarizes the data collected from each provider for use in determining availability areas.

Table 3-2 Summary of Collected Availability Area Data

Provider	Service Type	Source	Type of Data
AT&T Mobility	Mobile Wireless	web site	GIF file from national coverage tool
Broadband VI	Fixed Wireless	Google Earth file	Hand-drawn polygon of area where no coverage, locations of access radios
Choice Communications	Fixed Wireless	GeoTiff file	Output of RF propagation tool
Choice Communications	Mobile Wireless	web site	GIF file from national coverage tool
HughesNet	Satellite	email	Experience of local reseller
Innovative PowerNet	Asymmetric xDSL	spreadsheet	Locations of DSLAM access nodes
SmartNet	Fixed Wireless	spreadsheet	Locations of access radios
Sprint Mobile	Mobile Wireless	web site	GIF file from national coverage tool
StarBand	Satellite	email	Experience of local reseller

3.3. Data Validation and Processing

3.3.1. Infrastructure Data

In general, network infrastructure is difficult to validate and must be assumed to be truthfully reported. Stratum Broadband has made an effort to spot check some location claims of access and middle mile points through direct visual inspection of facilities, such as a wireline central office or radio antenna, and public records, such as FCC licensing records. Stratum Broadband has found no evidence that would make the reported infrastructure data come under suspicion.

Spreadsheets containing the location data for the various provider infrastructure networks were imported into separate ESRI data layers as XY data for each provider. Locations serving end users were considered to be access nodes and are classified as “last mile.” Locations that aggregate data from two or more access nodes are classified as “middle mile.” Some middle mile points are also last mile points.

This infrastructure data is mostly used to validate the reasonableness of broadband availability areas. However, some of the middle mile data, as permitted by the agreements with the providers, is reported to the NTIA during the semi-annual data submissions. In no case does a provider permit the reporting of last mile points or of middle mile backhaul capacity. In some instances, a provider may request that the locations of certain middle mile points be omitted. The reported data, therefore, is mostly just the geographic locations of a subset of the actual middle mile points and cannot be considered to be a full representation of the network infrastructure for any given provider.

Table 3-3 summarizes the number of middle mile points reported for each qualifying service.

Table 3-3 Summary of Middle Mile Points by Service

Provider	Technology	Count of Middle Mile Points Reported
AT&T Mobility	Mobile Wireless	0
Broadband VI	Fixed Wireless	18
Choice Communications	Fixed Wireless	2
Choice Communications	Mobile Wireless	0
HughesNet	Satellite	0
Innovative PowerNet	Asymmetric xDSL	6
SmartNet	Fixed Wireless	4
Sprint Mobile	Mobile Wireless	0
StarBand	Satellite	0

3.3.2. Broadband Availability Area

Due to the unique data made available by the providers to determine the area of availability, each qualifying service will be treated individually in this section. In all cases, service availability has been restricted to land areas, though it should be noted that all wireless services are, in fact, available in some portion of the waters surrounding the USVI.

3.3.2.1. AT&T Mobility (Terrestrial Mobile Wireless)

The sources for both coverage and spectrum are collected from public data available through the AT&T web site and the FCC Universal Licensing System. The coverage polygon was hand drawn by Stratum Broadband to approximate the advertised 3G coverage map available on the national AT&T wireless web site. The spectrum data is a best guess based on the spectrums owned by AT&T Mobility in the USVI matched against the specifications of the data-capable phones available through local AT&T Mobility resellers.

The data here should be considered preliminary and is likely to be adjusted significantly by the Round 4 submission in October 2011.

3.3.2.2. Broadband VI (Terrestrial Fixed Wireless)

Broadband VI (BBVI) uses unlicensed spectrum and does not maintain RF propagation maps of coverage area. However, BBVI engineers have extensive practical knowledge of BBVI service availability. BBVI provided hand-generated polygons representing where coverage is not available. These polygons were merged with a polygon layer representing the land area of the USVI. The result was a polygon with holes where BBVI has determined it does not serve. This polygon represented the claimed area of availability.

This polygon was visually compared to the location and direction of each BBVI access radio, as well as topological features of the islands, to judge the reasonableness of the claimed coverage. Small modifications were made manually to this polygon by Stratum Broadband in areas where topological features would likely block signal from known access tower locations.

This data is likely a close representation of the internet service provided by BBVI.

3.3.2.3. Choice Communications (Terrestrial Fixed Wireless)

The source of this data feature was provided by Choice Communications (Choice) during the collection of data prior to the Round 1 submission in April, 2010. Choice has been unwilling to provide further data. Stratum Broadband has found no public evidence that the data has changed significantly since that time.

The coverage polygon is the result of using standard ESRI tools to convert a rasterized TIFF file, generated by Choice using RF propagation tools, into an ESRI shapefile. The coverage polygon was smoothed to eliminate subparts of less than approximately one-eighth square miles. No special validation was done since the source data was used by internal Choice engineers to manage its network. The spectrum data was provided by Choice engineers.

This data set should be considered to be highly accurate with the caveat that the data is aged.

3.3.2.4. Choice Communications (Terrestrial Mobile Wireless)

Choice began offering a "4G" mobile internet service in late Fall 2010. Choice declined to provide data concerning this service. All data is approximated from publicly available information. The coverage polygon was hand-drawn to approximate the coverage represented in a GIF image on the Choice web site. The spectrum data is a best guess based on the spectrums owned by Choice in the USVI.

This data should be considered preliminary and approximate.

3.3.2.5. HughesNet (Satellite)

Coverage for this satellite provider has been approximated to encompass the entirety of the major land areas of the USVI. This decision was made based on the anecdotal information provided by the local reseller who believes service is available in all parts of the territories, despite the fact that quality of service does vary in certain areas. This data will be refined by the Round 4 submission in October of 2011.

The data in this feature should be considered preliminary and approximate.

3.3.2.6. Innovative PowerNet (Asymmetric xDSL)

Innovative DSL service availability is reported at the census block level. Due to limited Road Segment data in the 2000 Census geographic data for the USVI, the availability of broadband in the six census blocks greater than two square miles is reported with the census block data. Additionally, only census blocks with land area greater than zero have been considered.

The availability of DSL service from Innovative was derived by Stratum Broadband based on the locations of Innovative DSLAMs (access nodes). Working under the industry-accepted assumption that DSL service can reasonably be provisioned to end points less than approximately 12,000 line-feet from a DSLAM, Stratum Broadband drew circular buffers, with radius of 12,000 feet, around each. To further refine the actual areas of reasonable availability, Stratum Broadband manually made modifications to each circle where appropriate, based on data layers of roads and utility pole locations to better approximate points within a distance of 12,000 line feet from each DSLAM.

Census blocks intersecting the derived coverage polygon were determined to have access to this DSL service. The resulting collection of census blocks was trimmed to exclude any census blocks having no land area. Census blocks with zero population were retained.

This data is likely a close representation of the Internet service provided by Innovative.

3.3.2.7. SmartNet (Terrestrial Fixed Wireless)

SmartNet does not maintain RF propagation maps of coverage area. However, SmartNet engineers have provided hand-generated polygons representing where coverage is available. This claimed coverage area was compared to the location and direction of each SmartNet access radio, as well as to topological features of the islands, to judge the reasonableness of the claimed coverage. Small modifications were made by Stratum Broadband where it seemed appropriate.

This data is likely a close representation of the internet service provided by SmartNet.

3.3.2.8. Sprint Mobile (Terrestrial Mobile Wireless)

The sources for both coverage and spectrum are collected from public data available through the Sprint Mobile web site and the FCC Universal Licensing

System. The coverage polygon was hand drawn by Stratum Broadband to approximate the advertised 3G coverage map available on the national Sprint Mobile wireless web site. The spectrum data is a best guess based on the spectrums owned by Sprint Mobile in the USVI matched against the specifications of the data-capable phones available through local Sprint Mobile resellers.

The data here should be considered preliminary and is likely to be adjusted significantly by the Round 4 submission in October 2011.

3.3.2.9. Starband Communications (Satellite)

Coverage for this satellite provider has been approximated to encompass the major land areas of the USVI. This decision was made based on the anecdotal information provided by the local reseller who believes service is available in all parts of the territories, despite the fact that quality of service does vary in certain areas. This data will be refined by the Round 4 submission in October of 2011.

The data in this feature should be considered preliminary and approximate.

3.4. Reporting Summary

As of December 31, 2010, eight broadband service providers were offering a total of nine different qualifying broadband services in the USVI. Table 3-4 summarizes each service including the percent coverage of each service by land area, households, and population.

Table 3-4 Summary of Qualifying Broadband Services

Provider	Technology	Max Down*	Max Up*	% Land Area	% Households	% Population
AT&T Mobility	Mobile Wireless	3	2	99.1	98.4	98.6
Broadband VI	Fixed Wireless	4	4	90.8	91.2	92.0
Choice Communications	Fixed Wireless	3	2	51.8	54.5	56.3
Choice Communications	Mobile Wireless	4	3	86.2	95.5	96.0
HughesNet	Satellite	5	3	99.8	98.8	98.9
Innovative PowerNet	Asymmetric xDSL	3	2	91.4	99.2	99.2
SmartNet	Fixed Wireless	4	3	62.0	85.4	87.1
Sprint Mobile	Mobile Wireless	3	2	69.8	89.1	90.1
StarBand	Satellite	3	2	99.8	98.8	98.9

* **2** = 200 kbps – 768 kbps, **3** = 768 kbps – 1.5 Mbps, **4** = 1.5 Mbps – 3.0 Mbps, **5** = 3.0 Mbps – 6.0 Mbps

4. VERIFICATION

This section describes activities already undertaken or planned to verify the data reported for the project.

4.1. Community Anchor Institutions

At the outset of the project, more than 90% of the 321 identified CAIs were visited to verify their existence, clarify naming, verify addressing (as available), and establish geo location (GPS collection of Latitude and Longitude coordinates). The geo coordinates were plotted to verify reasonableness by observation.

An on-going effort by viNGN and Stratum Broadband continues to reach out to CAIs by on-line survey and telephone as needed to collect and verify broadband service delivery technology type and performance.

4.2. Service Providers

Efforts have been made to ensure the inclusion of all eligible service providers in the collection and reporting. This has included searches of the FCC Universal Licensing System, web searches, media searches, such as Yellow Pages, and newspapers.

A further source would be the use of data gathered from FCC Form 477 submissions as authorized FCC Order 10-71. We anticipate completing service provider validation using this source during 2011.

4.3. Speed Testing

Speed testing, operated by the USVI as part of this program, will be used to document representative levels of broadband data rates wherever possible. Speed test information reported from outside services such as the FCC will be monitored and rationalized where possible to compliment project office results.

4.3.1. FCC Sponsored

The FCC is making some data available as part of an agreement with national services by OOKLA and MLabs. The expectation was that data would be shared at regular monthly intervals, but that has not been the experience so far. When attempting to use the data, we have found the process of determining the location of the originating request to be difficult and without enough location precision to be meaningful.

4.3.2. USVI Project Office Sponsored

Our planned deployment of project office sponsored speed testing has been delayed a number of times while project office administrative issues are sorted out. The planned implementation will provide for user-initiated speed testing to a common (not provider specific) point in an effort to normalize the user experience while also capturing user location to the nearest Census Tract or "Estate" boundary. This assumes user cooperation in selecting their geographic location on an interactive map before initiating the speed test.

4.4. Surveys

Surveys are being used to collect information directly from an end user, whether they are residents, businesses, or CAIs.

4.4.1. Community Anchor Institutions

The Office of the Governor has held a series of meetings with department heads of the government and other enterprises that make up the CAI database. These meetings provided an opportunity to present written survey forms to participants to solicit information regarding broadband service capabilities. This also provided an opportunity to solicit telephone contact information to the technical resource in each institution who would be responsible for the broadband service arrangements. Data collected in this exchange is being entered directly into a project geodatabase maintained for the project.

The project office has also launched an on-line interactive survey with the expectation that new information will be derived. This will require some effort to guide CAI organizations to the survey site.

4.4.2. Businesses

The project office has launched an on-line interactive survey in hopes of collecting broadband service usage information directly from enterprises in the Territory. This will require some effort to guide enterprises in locating the on-line survey site.

4.4.3. End Users

The project office has launched an on-line interactive survey in hopes of collecting broadband service usage information directly from end users in the Territory. This will require some effort to guide visitors in locating the on-line survey site.

4.5. Performance Probe

The plan for operating a performance probe has been available from the beginning of the project. Sorting out the details of funding and implementation has delayed the launch to date. A commercial software product is necessary to conduct this sort of verification.

The technique requires the cooperation of testers willing to host a probe agent on their home computer system. The goal is to identify up to 200 users to participate in the program. User participation as a volunteer would be solicited while visiting the Territory Broadband Map site. Volunteers would be screened by the program office and selected by the geographic location of their system. This selection process is necessary to assure a suitable distribution across the geography of the Territory. The test results can be quite reliable assuming a participation sample of 200 end users.

A central server manages the entire process of installing the probe client on the volunteer's system. Other than accepting the client installer on to his system, no further user participation is required. The central server configures the client to initiate a test at regular intervals 24 hours a day and 7 days a week. The server at the central site is responsible for storing the results of each test along with the identity of the client. The results are collected in a proprietary database at the managing server. Periodically, results are exported to relational database using a standard API provided by the probe system vendor. The individual results are analyzed and then aggregated to provide performance reporting.

With this automated testing, we can establish the "busy hour" while also establishing "typical" speeds.