



## **District of Columbia Fall 2011**

### **State Broadband Availability Data Collection and Verification Technical White Paper**

**Award #:** 11-50-M09011  
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**Project Type:** State Broadband Data Development  
**Organization Name:** District of Columbia Office of Chief Technology Officer  
**Project Title:** ARRA SBDD - District of Columbia OCTO  
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**Submission Date:** October 1, 2011

## **Introduction**

The National Telecommunications and Information Administration (NTIA), a division of the U.S. Department of Commerce, through the Broadband Data Improvement Act (BDIA), has sponsored the State Broadband Data and Development Grant Program. This Program is designed to fund projects that gather comprehensive and accurate state-level broadband mapping data, develop state-level broadband maps, aid in the development and maintenance of a national broadband map, and fund statewide initiatives for broadband planning.

The following white paper describes the data integration and verification processes employed by the District of Columbia in preparation of the Broadband Availability data set submitted to NTIA on October 1, 2011. This data collection is to be conducted on a semi-annual basis over a five-year period. The "Fall 2011 Technical White Paper" will be the fourth of ten semi-annual submissions by the District of Columbia and attempts to reflect conditions in the field as of June 30, 2011 or later.

The paper is divided into seven sections:

**Section 1 - Data Description:** describes October 1, 2011 deliverables to NTIA.

**Section 2 - Provider Participation:** summarizes provider cooperation.

**Section 3 - Data Collection:** describes outreach and collection efforts.

**Section 4 - DC geospatial data:** describes the role of DC GIS data in broadband data processing.

**Section 5 - Data integration and processing:** describes data manipulation steps.

**Section 6** - Data validation: describes efforts to validate the data received.

**Section 7** – Documentation and Submittal: Includes the NTIA final checklist steps.

## **SECTION 1 - DATA SUBMISSION DESCRIPTION**

The District of Columbia's fall 2011 submission consists of the following files:

**DC\_SBDD\_20111001.zip** – Consolidates all other files for the purpose of data transfer.

**DC\_SBDD\_2011\_10\_01.gdb** – An ESRI file based geodatabase that conforms to the data model distributed by NTIA. It contains primary data and metadata. The District provides NTIA with five data sets:

- **Community Anchor Institutions** – The location of community serving institutions and information about their broadband connections – if known.
- **Middle Mile Connections** – The locations and attributes of infrastructure that interconnects broadband networks.
- **Wireless Broadband Availability** – The service territories and attributes of wireless broadband providers including terrestrial fixed wireless and satellite.
- **Wireline Broadband Availability** – The territories and attributes of wireline broadband providers with 2010 Census Block geography.
- **Metadata** – Information about the data sets described above.

**DC\_DataPackage\_2011\_10\_01.xls** – A report on broadband providers contacted and the status of their submissions.

**DC\_2011\_10\_01.txt** – An analysis of DC\_SBDD\_2011\_10\_01.gdb known as the “data submission receipt.” This file is created by an automated script supplied by NTIA.

**DC\_Methodology\_2011\_10\_01.pdf** – An electronic version of the following document.

**DC\_Readme\_2011\_10\_01.txt** – A reduced file with the same information found in the header and section 1 of this white paper.

## **SECTION 2 - PROVIDER PARTICIPATION**

- The PSC contacted 122 prospective broadband providers.
- Of those, 38 are believed to be providing broadband service in the District and are listed in DC\_DataPackage\_2011\_10\_01.xls.
- Of those, 27 meet the NOFA definition of available (either wireline and or wireless).
- Eleven providers do not provide service in District within 10 days or are non-responsive.
- Ten provided middle mile data.

## SECTION 3 - DATA COLLECTION

### Collection of Broadband Availability Data

The District of Columbia Office of the Chief Technology Officer (“OCTO”) was awarded a grant from NTIA to map the availability of broadband services in the District of Columbia (“District”). OCTO has delegated to the District of Columbia Public Service Commission (“PSC”) the responsibility for all interaction, including data collection, with the broadband service provider community.

### Process Steps

- **Identifying and Contacting Broadband Providers** - The work of identifying providers is conducted by the PSC. The PSC reviewed its own records and those of the FCC. The initial identification of providers took place prior to the spring 2010 data call and has been refined for each NTIA submission. Firms identified as providers were:
  - All firms in PSC records as providing any kind of telecommunications service in the District.
  - All firms identified by the FCC having filed a form 477 for broadband service in the District.
  - Satellite providers were also contacted.
- **Contacting providers** - The PSC requested the assistance and cooperation of all commercial broadband service providers that provide service to any residential, business, institutional, or government entity located within the District, to provide the PSC with broadband service location data. Whenever possible, providers are initially contacted by email. The package of material sent by the PSC to providers:
  - **A letter from the Chairman of the District of Columbia Public Service Commission.** Sample letters can be found in **Appendix 1**. Providers receive one of three letters based upon their previous submission:
    - Providers that submitted Round 3 data, met the NOFA broadband service and availability definitions and were provided a Broadband Provider Portal account.
    - Providers that submitted Round 3 data and but did not meet the NOFA definitions.
    - Providers that did not submit Round 3 data or are new BSPs.
  - **Non-Disclosure Agreement (NDA)** The PSC offers every provider opportunity to enter into a NDA between OCTO and the Provider. The standard OCTO NDA is shown in **Appendix 2**. The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of the public website on broadband services available within the District that is maintained by OCTO. Key provisions of the District’s standard NDA include:

- OCTO will give the data to NTIA for the National Broadband Map.
- The service territories of individual providers will not be made public by OCTO, but OCTO has created [a public web site](#) that allows users, including potential broadband service subscribers, to enter any valid address in the District of Columbia and be referred to all the broadband service providers offering service to that location.
- Form 477 subscriber count data from all companies will be aggregated by OCTO at the Census Tract level. OCTO will use this information to estimate the residential broadband adoption rate by Census Tract. Estimated broadband service adoption rates will be made public, but the market share of individual broadband service providers will not be revealed.
- **Provider submission form** - For fall 2011, OCTO and PSC revised the data request form. The form is a Microsoft Excel based questionnaire which is accompanied by a glossary. **Appendix 3** contains a copy of the form and glossary. The form collects information on:
  - The Provider (Includes: business name, DBA name, FRN#, URL, etc.)
  - Transmission Technology
  - Business type (facility based or reseller)
  - Service Territory
  - Maximum advertised and typical upload and download speeds
  - Wireless spectrum
  - Middle mile connection points
- **Handling providers** – While we hope that all providers complete our forms, not all do. In practice OCTO will accept a variety of submission types and our policy is to work with providers interactively via email and phone whenever we or they have questions.

## SECTION 4 - THE ROLE OF DC GEOSPATIAL DATA

DC GIS maintains several datasets that are integral to processing provider submissions. Each dataset and how it is employed is described below:

<b>DC GIS Data Set</b> (Click link to view and double click and zoom)	<b>Description</b>	<b>How the data is used in broadband processing</b>
<a href="#">Imagery</a>	6" resolution 2010 ortho corrected imagery	GIS analysts superimpose provider service territory on imagery to ensure that submission fit the ground in a credible way. For example, do we have wireline service over water or parks?
<a href="#">DC Base Map</a>	1" to 100' planimetric map.	Used similarly to imagery.
<a href="#">Master Address Repository</a>	A precisely located point for every address in the District	Used to process address lists submitted by broadband providers. Also used to locate and map Community Anchor Institutions.
<a href="#">Education</a> <a href="#">Libraries</a> <a href="#">Health</a> <a href="#">Public Safety</a> <a href="#">Recreation</a>	A variety of GIS layers that include Community Anchor Institutions locations	Used to identify and survey as many Community Anchor Institutions as possible.
<a href="#">Real Property</a>	Ownership data with use codes	Used to ensure that broadband providers who provide to business are not shown as providing service in residential areas.
InfoUSA ISP Connectivity Database	Connectivity provider and connection type records by IP	Used to verify provider service area.

## SECTION 5 - DATA INTEGRATION

- **Broadband Provider Data Submission Check-in**
  - Provider data submissions are received in several ways
    - Providers send email file attachments to the PSC.
    - Providers submit data by means of a USB drive.
    - Providers upload the data to a secure OCTO FTP site.
    - Provider mails the data to PSC or OCTO. If data is received directly by OCTO, a GIS analyst will then check-in the data, make a copy and submit the original to the PSC.
    - Provider notifies the PSC that data has not changed since last submission
  - PSC will then contact OCTO that new data has been received.
  - Scanned for viruses.
  - Entered into a submission tracking database.
  - Give an initial review to ensure that each major component is present.
  
- **OCTO Data Ingestion** – The District of Columbia implemented new data submission and data processing tracking software developed by Applied Geographics for the fall 2011 data collection. After the submission has been checked in by the PSC and received by OCTO, the provider submission status is entered into a data tracker database to reflect the current status of receipt and contents of the submitted data package.
  
- **Wireline Data Processing** - The following information was collected.
  - Provider Name
  - Doing Business As
  - FRN (Federal Registration Number)
  - Census Tract and Block number
  - Technology of Transmission (DSL, Cable, etc.)
  - Maximum Download speed (greater than 768 kbps)
  - Maximum Upload Speed (greater than 200 kbps)
  - Typical Download Speed
  - Typical Upload Speed
  
- **Wireline Data Processing - Geographic**
  - **Service territory description** - In order for a provider to be eligible and have their data processed, the Company's service territory must offer broadband service to new

customers within 10 days of a service order without extraordinary effort. Note: A Company can have multiple service territories within the District of Columbia, and those territories need not be contiguous. NTIA requires that the service territory be mapped to the nearest Census Block. Companies have several options for describing their service territory:

- **District-wide broadband service provider.** The Company must offer broadband service to all customers of the entire District of Columbia. If the Company meets the definition, the description of the Company's service territory is complete. This mainly applies to non-residential only providers. The following definitions apply:
  - **"Broadband service"** is the provision to end users of two-way data transmission to and from the Internet with advertised speeds of at least 768 kilobits per second (Kbps) downstream and greater than 200 Kbps upstream.
  - **"Offer"** means that the Company can provide broadband service to end users (a residential, business, institutional or government entity) within 10 business days of a service order without an extraordinary commitment of additional resources. It also interprets "offer" to be a commercial service. We are not mapping free services such as Wifi hotspots at this time. District of Columbia Government free Wifi hotspots are included in the Community Anchor Data.
  - The **"entire District of Columbia"** means that a wireline company offers service to residential, business, institutional, or government end users in every Census Block in the District. This definition expressly excludes parkland, cemeteries, institutional campuses, bodies of water, and military bases. The definition also excludes real estate complexes where the landlord, condominium association, or similar entity controls the provision of wireline service. Even if the firm doesn't offer service in categories, it can still be a District-wide provider, which simplifies the submission. This caused some problems with OCTO's fall 2010 submission where we now believe some service territories were overstated. Any firm claiming to be a citywide provider received greater scrutiny, in particular, providers that service businesses only were restricted to reporting service to commercial, high density residential, and industrial areas as defined by property use codes.
- **Non District-wide broadband service provider.** Any of the following may be attached to the e-mail to describe the Company's service territory:
  - A **Detailed Map(s)** – Submitted maps should delineate the service area boundaries and label all DC streets within those boundaries. The map may be a

PDF file. Geographic Information System (GIS) or Computer Aided Design files may be submitted in lieu of a map.

- **A List of Census Blocks** – The Company may provide a list of Census Blocks in which they offer service. The list should be provided in a Microsoft Excel File or Text File with each Census Block listed on a separate row.

	A	B	C	D	E	F	G	H
	County	Tract	Down	Up	Tech		Residential	%Residential
1								
2	1	18.03		2	3	1	1	100
3	1	18.04		2	3	1	2	100
4	1	21.01		2	3	1	1	100
5	1	22.01		2	3	1	1	100
6	1	22.02		2	3	1	1	100

- **A Written Description** – The Company may describe one or more polygons. For example, a service territory in part of downtown could be described as “East of 23<sup>rd</sup> Street NW, South of K Street NW, West of 17<sup>th</sup> Street NW, North of Constitution Ave NW. “ Alternatively, the territories can be described by using buffers, for example, “Within 500 feet of 441 4<sup>th</sup> Street NW Washington DC 20001.”
- **Address File** - If service is only offered to certain addresses, a list of those addresses may be submitted. Address lists (whether for buffering or not) should be submitted in a Microsoft Excel table or text file with each address on a separate row. Address lists are geocoded to the structure using the District’s **Master Address Repository**. OCTO encourages providers to submit all addresses where service can be provided within 10 days not just the address of current subscribers.
- **Form 477** – The Form 477 already includes a list of Census Tracts where the firm has existing customers. Census Blocks nest within Census Tracts. Optionally, the Company may indicate that it wishes to use the Census Tracts already listed within its Form 477, minus a list of Census Blocks within those Tracts in which it does not offer service.

Technology of the connections: **Cable Modem**

Census Tract: State: DC County: District of Columbia Census Tract: 1.00

**DOWNLOAD INFORMATION TRANSFER RATE**

	Greater than 200 kbps and less than 768 kbps	Greater than or equal to 768 kbps and less than 1.5 mbps	Greater than or equal to 1.5 mbps and less than 3 mbps	Greater than or equal to 3 mbps and less than 6 mbps	Greater than or equal to 6 mbps and less than 10 mbps	Greater than or equal to 10 mbps and less than 25 mbps	Greater than or equal to 25 mbps and less than 100 mbps	Greater than or equal to 100 mbps
<b>UPLOAD INFORMATION TRANSFER RATE</b>								
Less than or equal to 200 kbps Number of Connections:	5							
Percentage Residential:	100.000%							
Greater than 200 kbps and less than 768 kbps Number of Connections:	5	12		2	2			
Percentage Residential:	100.000%	100.000%		100.000%	100.000%			



- **Wireless Data Processing** – Wireless providers often provide a polygon shapefile of their coverage area(s) and if they were an existing provider they communicate if the coverage information has changed. The majority of wireless provider’s service areas are District-wide. The following information was collected.
  - Provider Name
  - Doing Business As
  - FRN (Federal Registration Number)
  - Technology of Transmission (DSL, Cable, etc.)
  - Spectrum
  - Maximum Download speed (greater than 768 kbps)
  - Maximum Upload Speed (greater than 200 kbps)
  - Typical Download Speed
  - Typical Upload Speed
  
- **Middle Mile Data Processing** - Broadband service providers were also asked to list “middle-mile and backbone interconnection points” in the District of Columbia. Interconnection points are facilities that provide connectivity between (a) a service provider’s network elements (or segments) or (b) between a service provider’s network and another provider’s network, including the Internet backbone. Collectively, (a) and (b) are middle-mile and backbone interconnection points. The following information was collected.
  - Provider Name
  - Doing Business As Name
  - FCC Registration Number
  - Ownership Status
  - Serving Facility Capacity
  - Serving Facility Type
  - Location
  - Elevation
  
- **Community Anchor Institutions** - As part of the reporting requirements for the grant, OCTO is required to collect a list of Community Anchor Institutions (CAI) and report broadband service available at these institutions. The dataset consists of schools, libraries, medical and healthcare providers, public safety entities, institutions of higher education, and other community support entities. Data is compiled from various district agencies and by contacting institutions directly. Non-government community anchors were contacted individually to complete an online survey. The

survey requested the internet service type and service speed at the institution's location(s).

**Appendix 4** contains a copy of the Community Anchor Survey online form.

- **Data Review and Consultation with Providers**

- If a component of the submission is missing, the OCTO GIS analyst will contact PSC for assistance to receive the missing data from the provider.
- PSC and OCTO will schedule several meetings before final submittal: to review what providers have submitted data and who has not, discuss action points that need to be addressed, and review the process for areas of improvement.
- As a result of inquiries from NTIA about DC's round 2 data, we are spending more time talking to providers, particularly those who claim to offer citywide service. Most providers respond openly and are willing to make changes to their submissions when questions are raised.
- The NTIA receipt script is run against each provider submitted dataset separately. Repairs and reruns are iterated until the dataset successfully passes.

## SECTION 6 - DATA VALIDATION

During this stage, data from providers are compared with data from other sources. Discrepancies are noted and sent to the contributing provider for comment. Validation techniques vary by the type of data submitted [wireless, wire line, or middle-mile]. The following steps were taken to validate the data submitted:

- **Wireless Validation** - The District completed drive testing of major wireless providers. Drive test were completed in a single vehicle employing multiple laptops and GPS. This was accomplished by installing computer and GPS hardware and software in a vehicle and testing and mapping upstream and downstream transmission speeds. At this time, DC has not shown the drive test data to providers nor discussed our collection techniques with them. This data was collected with public funds and is not covered by NDAs, but DC has not made a decision to release it publically at this time. All providers who claim to be providing citywide wireless service are providing it, and to that end DC will declare all providers who submitted service territories to be "valid". That said, speed of service does drop below the definition of broadband, and does vary across providers, place, and time. The District did not conduct new drive testing for fall 2011. The fall 2010 drive testing results can be found in **Appendix 5**.
- **Wireline Validation**
  - The District, through PSC, has made extensive use of FCC Form 477 data. The Form 477 is used to, verify that we have contacted the correct providers, compare the technology of transmission and speed of transmission between what was reported to the FCC and what was submitted by the provider, compare the geography reported to the FCC by census tracts with the areas submitted to the District by census blocks. When discrepancies are found, the providers are asked for more information.
  - The District purchased a database of broadband subscribers from a commercial mailing list company InfoUSA. The dataset is used to crosscheck data coming from providers. The commercial mailing is not definitive. When discrepancies are found, the providers are asked for more information.
- **Middle Mile Validation** – To date the district has not attempted to validate middle mile data other than checking locations against GIS base data to be sure they are plausible.
- **Final Review** - All data undergoes a standup review conducted jointly by OCTO and PSC staff. Do service territories seem plausible? Do speeds seem realistic? How do speeds compare to other

providers using similar technologies? What is the total DSL, Cable, Fiber coverage and does it seem plausible?

- **Amalgamation and documentation** - Unless a provider's submission is conclusively invalidated (which hasn't happened) and the issue cannot be resolved with the contributing provider, it is included in the amalgamation phase. Until this stage, OCTO handles each submission separately. During this stage, all successful submissions are appended to the latest version of the NTIA/NSGIC geodatabase model, and requested transmittal forms are prepared.
  - The data is appended to the NTIA geodatabase model.
  - The amalgamated data is given a final quality review by the GIS Analysts involved in the broadband grant program.
  - FGDC Compliant metadata is prepared and included in the geodatabase.
  - The NTIA provided script is run for the last time on the data set as a whole.

## SECTION 7 - DOCUMENTATION AND SUBMITTAL

Once past the quality review, the data sets are submitted to NTIA/FCC via secure FTP. FCC data package documents are included. The checklist provided by NTIA is below:

Number	Question
1	Have you obtained a new clean Transfer Data Model?
2	Have you followed the instructions for loading data into the Transfer Data Model?
3	Have you run the receipt process (SBDD_CheckSubmission) and resolved all data integrity issues?
4	Have you included your receipt text file as part of the package?
5	Have you populated the metadata fields?
6	Have you exported the metadata as .xml files?
7	Have you obtained a new data_package.xls and filled it out appropriately?
8	Have you included methodological description?
9	Have you followed the required naming conventions of all the files?
10	If you are resubmitting any data for the current collection, have you (a) deleted your previous submission (b) informed the Program Office or the FCC of your resubmission and (c) resubmitted your entire data package (e.g., the Program Office is not accepting an partial submissions)?

**Appendix 1**  
**Sample Letters**  
**From**  
**DC Public Service Commission**  
**To**  
**Prospective Broadband Providers**

**PSC Letter to Providers that submitted Round 3 data, meet the NOFA requirements and assigned a Provider Portal account.**

Dear (Insert Name of BSP contact):

The District of Columbia ("District") Office of the Chief Technology Officer ("OCTO") and the Public Service Commission ("Commission") would like to thank you for your continued participation in the District's Broadband Service Mapping Program. To meet the objectives under the National Telecommunications and Information Administration ("NTIA") State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers that enable a residential, business, institutional, or government entity located within the District to use broadband Internet services. At this time, the Commission is now requesting broadband service availability data **current as of June 30, 2011** for processing and review before submittal to NTIA for the Fall 2011 National Broadband Map and database update.

As a means to improve data updates and validation, the District is pleased to announce a new online **Broadband Provider Portal** ("Portal") for participating broadband service providers. This new mapping application allows broadband service providers to view the dataset for their company from the last data submission and make edits to reflect current service availability in the District through a secure login account. A user manual and video demonstration are available on the Portal for your review. A secure login account has been created for your use and is provided at the end of this letter. Using the Broadband Provider Portal to provide us with updated service availability data eliminates any need for you to complete a Questionnaire such as what we have sent you in previous data request rounds.

Please note that the NTIA has requested that data should be submitted using the Census 2010 geography. **To allow an adequate time period for OCTO to convert the submitted data to the Census 2010 geography, the Commission requests broadband service providers to submit their data updates on the Portal by Friday, August 19, 2011.**

Due to the new Broadband Provider Portal application and conversion to a new Census geography, a list of data submission options is outlined below.

1. Please help us by using the Portal to provide:
  - a. Changes that have occurred in your company's service areas, technologies, speeds, infrastructure, etc. since the last data submission.
    - i. The Portal's map application displays the processed data from your last submission. Please note the data is currently being displayed with the Census 2000 geography. After you make the edits to the Portal page for your company, OCTO will process the data to the Census 2010 geography. At that time, we will ask you to help resolve any discrepancies that arise from the conversion as well as to validate the data.
    - ii. New full dataset.

1. If you are providing NTIA ready data, please make sure you have converted your data to the Census 2010 geography.
2. If you are providing address points, OCTO will geo-code and process the data to the Census 2010 geography.
3. Use one the data formats below for your company's service area. Each data format should include: technology of transmission; maximum advertised download and upload speed; and typical download and upload speed.
  - a. GIS or CAD file(s);
  - b. Text file or Excel Spreadsheet listing existing and potential customer addresses; or
  - c. Text file or Excel Spreadsheet with a list of Census Blocks with Census Tract numbers
- b. For wireless service providers, the change in the Census 2010 geography does not have any impact on your data.
- c.
2. If the data has not changed since the last submission, please send an e-mail to Mr. Virgil J. Young, Jr., Senior Telecommunications Analyst, at [vyoung@psc.dc.gov](mailto:vyoung@psc.dc.gov) and OCTO will use the data from the previous submission. Please note that your data will require validation even if there are no changes in your service to ensure the conversion from the Census 2000 to the Census 2010 geography is correct.
3. If your company is primarily a **non-residential broadband service provider**, please let Mr. Young know that as well – NTIA has requested this specific information for the Fall 2011 data submission.
4. Also, please send an email to Mr. Young if your **company has merged, sold, or bought another broadband service provider in the District** or if your company has ceased operations in the District, as that can have an impact on the data submitted to the NTIA.
5. **If your company does not currently provide broadband Internet access services to a residential, business, institutional, or government entity located within the District**, please send an email confirming your company's non-provider status to Mr. Young.

**The District's Broadband Provider Portal login page can be accessed at the following URL:**

<http://host.appgeo.com/DistrictofColumbiaProviderPortal/>

Your secure login account is provided as follows:

Username:

Password:



To help OCTO identify any improvements or changes in the adoption rates for broadband services within the District, I request that you also provide us with a copy of your company's Broadband Service Report for the District of Columbia (Form 477) filed with the Federal Communications Commission ("FCC") on or before September 1. **A PDF copy of the Form 477 for the District should be submitted by email to Mr. Young as soon as possible after the FCC's September 1 filing deadline.** A secure FTP site is available for companies that prefer that method of transmittal.

If your company submitted, in association with a previous broadband data submission, a Non-Disclosure Agreement ("NDA") with OCTO, it is still effective and will be honored. If your company would like to sign a NDA with OCTO please email your request to Mr. Young. (The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of OCTO's website on broadband services available in the District.)

Thank you in advance for completing this data request. We have attempted to make the process minimally burdensome, but understand that questions may arise. Should you have any questions regarding this data request, please contact my Policy Advisor, Cary B. Hinton, at [chinton@psc.dc.gov](mailto:chinton@psc.dc.gov) or 202-626-9186.

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

Attachments:

1. Broadband Data Definitions – Fall 2011
2. Provider Data Validation - Instruction Manual

#### **NTIA Definition of Terms**

*"Broadband service" is the provision of data transmission technology that provides two-way data communication with the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end users.*

*Internet Service Providers (ISPs) are not "end users" for this purpose. An entity is a "facilities-based" provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the*

*end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.*

*Service is “available” at an address if the provider currently provides service to a location, or if broadband service could be established, without an extraordinary commitment of resources, in a 7 to 10 business day period.*

## PSC Letter to Providers that submitted Round 3 data and didn't meet the NOFA requirements

Dear (Insert Name of Group #2 BSP contact):

The District of Columbia ("District") Office of the Chief Technology Officer ("OCTO") and the Public Service Commission ("Commission") would like to thank you for your continued participation in the District's Broadband Service Mapping Program. To meet the objectives under the National Telecommunications and Information Administration ("NTIA") State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers that enable a residential, business, institutional, or government entity located within the District to use broadband Internet services. At this time, the Commission is now requesting broadband service availability data **current as of June 30, 2011** for processing and review before submittal to NTIA for the Fall 2011 National Broadband Map and database update.

The completed broadband service data submission document, see attached "DC Broadband Mapping Questionnaire - Fall 2011" ("Questionnaire"), should be submitted to the Commission as an attachment to an e-mail response to Virgil J. Young, Jr., Senior Telecommunications Analyst, at [vyoung@psc.dc.gov](mailto:vyoung@psc.dc.gov). Please note that the NTIA has requested that data should be submitted using the Census 2010 geography. **The Commission requests broadband service providers to submit the questionnaire and data by Friday, August 19, 2011.**

A list of data submission options is outlined below.

1. New full dataset.
  - a. If you are providing NTIA ready data, please make sure you have converted your data to the Census 2010 census block geography.
  - b. If you are providing address points, OCTO will geo-code and process the data to the Census 2010 geography.
  - c. Use one the data formats below for your company's service area. Each data format should include: technology of transmission; maximum advertised download and upload speed; and typical download and upload speed.
    - a. GIS or CAD file(s);
    - b. Text file or Excel Spreadsheet listing existing and potential customer addresses; or
    - c. Text file or Excel Spreadsheet with a list of Census Blocks with Census Tract numbers
2. If the data has not changed since the last submission, please send an e-mail to Mr. Young and OCTO will use the data from the previous submission. Please note: If a service area was provided last submission, your data will require validation to ensure the conversion from the Census 2000 to the Census 2010 geography is correct. Even if there are no changes in your service.
3. Also, please send an email to Mr. Young if your **company has merged, sold, or bought another broadband service provider in the District** or if your company has ceased operations in the District, as that can have an impact on the data submitted to the NTIA.

4. **If your company does not currently provide broadband Internet access services to a residential, business, institutional, or government entity located within the District**, please send an email confirming your company's non-provider status to Mr. Young.

To help OCTO identify any improvements or changes in the adoption rates for broadband services within the District, I request that you also provide us with a copy of your company's Broadband Service Report for the District of Columbia (Form 477) filed with the Federal Communications Commission ("FCC") on or before September 1. **A PDF copy of the Form 477 for the District should be submitted by email to Mr. Young as soon as possible after the FCC's September 1 filing deadline.** A secure FTP site is available for companies that prefer that method of transmittal.

If your company submitted, in association with a previous broadband data submission, a Non-Disclosure Agreement ("NDA") with OCTO, it is still effective and will be honored. If your company would like to sign a NDA with OCTO please email your request to Mr. Young. (The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of OCTO's website on broadband services available in the District.)

Thank you in advance for completing this data request. We have attempted to make the process minimally burdensome, but understand that questions may arise. Should you have any questions regarding this data request, please contact my Policy Advisor, Cary B. Hinton, at [chinton@psc.dc.gov](mailto:chinton@psc.dc.gov) or 202-626-9186.

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

Attachments:

3. DC Broadband Mapping Questionnaire – Fall 2011
4. Broadband Data Definitions – Fall 2011

#### **NTIA Definition of Terms**

*"Broadband service" is the provision of data transmission technology that provides two-way data communication with the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end users.*

*Internet Service Providers (ISPs) are not “end users” for this purpose. An entity is a “facilities-based” provider of broadband service connections to end user locations if any of the following conditions are met: (1) it owns the portion of the physical facility that terminates at the end user location; (2) it obtains unbundled network elements (UNEs), special access lines, or other leased facilities that terminate at the end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.*

*Service is “available” at an address if the provider currently provides service to a location, or if broadband service could be established, without an extraordinary commitment of resources, in a 7 to 10 business day period.*

## PSC Letter to Providers that did not submit Round 3 data or are new BSPs

Dear (Insert Name of Group #3 BSP contact):

The District of Columbia Office of the Chief Technology Officer (“OCTO”) has been awarded a grant from the U. S. Department of Commerce, National Telecommunications and Information Administration (“NTIA”) to map the availability of broadband services in the District of Columbia (“District”). Pursuant to a Memorandum of Understanding, OCTO has delegated to the District of Columbia Public Service Commission (“Commission”) the responsibility for all interaction, including data collection, with the broadband service provider community. To meet the objectives under the NTIA’s State Broadband Data and Development Grant Program, the Commission requests the assistance and cooperation of all broadband service providers that enable a residential, business, institutional, or government entity located within the District to use broadband Internet services. At this time, the Commission is now requesting broadband service availability data **current as of June 30, 2011** for processing and review before submittal to NTIA for the Fall 2011 National Broadband Map and database update.

The completed broadband service data submission document, see attached “DC Broadband Mapping Questionnaire - Fall 2011” (“Questionnaire”), should be submitted to the Commission as an attachment to an e-mail response to Virgil J. Young, Jr., Senior Telecommunications Analyst, at [vyoung@psc.dc.gov](mailto:vyoung@psc.dc.gov). Please note that the NTIA has requested that data should be submitted using the Census 2010 geography. **The Commission requests broadband service providers to submit the questionnaire and data by Friday, August 19, 2011.**

A list of data submission options is outlined below.

1. New full dataset.
  - a. If you are providing NTIA ready data, please make sure you have converted your data to the Census 2010 block geography.
  - b. If you are providing address points, OCTO will geo-code and process the data to the Census 2010 block geography.
  - c. Use one the data formats below for your company’s service area. Each data format should include: technology of transmission; maximum advertised download and upload speed; and typical download and upload speed.
    - a. GIS or CAD file(s);
    - b. Text file or Excel Spreadsheet listing existing and potential customer addresses; or
    - c. Text file or Excel Spreadsheet with a list of Census Blocks with Census Tract numbers
2. Also, please send an email to Mr. Young if your **company has merged, sold, or bought another broadband service provider in the District** or if your company has ceased operations in the District, as that can have an impact on the data submitted to the NTIA.

3. **If your company does not currently provide broadband Internet access services to a residential, business, institutional, or government entity located within the District**, please send an email confirming your company's non-provider status to Mr. Young.

To help OCTO identify any improvements or changes in the adoption rates for broadband services within the District, I request that you also provide us with a copy of your company's Broadband Service Report for the District of Columbia (Form 477) filed with the Federal Communications Commission ("FCC") on or before September 1. **A PDF copy of the Form 477 for the District should be submitted by email to Mr. Young as soon as possible after the FCC's September 1 filing deadline.** A secure FTP site is available for companies that prefer that method of transmittal.

If your company would like to sign a Non-Disclosure Agreement ("NDA") with OCTO, please email your request to Mr. Young. (The NDA explains how OCTO will handle the submitted data; including what portions of the data will be submitted to the NTIA and what derived products will become part of OCTO's website on broadband services available in the District.)

Thank you in advance for completing this data request. We have attempted to make the process minimally burdensome, but understand that questions may arise. Should you have any questions regarding this data request, please contact my Policy Advisor, Cary B. Hinton, at [chinton@psc.dc.gov](mailto:chinton@psc.dc.gov) or 202-626-9186.

Thank you for your assistance,

Betty Ann Kane

Chairman

District of Columbia Public Service Commission

Attachments:

5. DC Broadband Mapping Questionnaire – Fall 2011
6. Broadband Data Definitions – Fall 2011

#### **NTIA Definition of Terms**

*"Broadband service" is the provision of data transmission technology that provides two-way data communication with the Internet with advertised speeds of at least 768 kilobits per second (kbps) downstream and greater than 200 kbps upstream to end users.*

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*end user location and provisions/equips them as broadband; or (3) it provisions/equips a broadband wireless channel to the end user location over licensed or unlicensed spectrum.*

*Service is “available” at an address if the provider currently provides service to a location, or if broadband service could be established, without an extraordinary commitment of resources, in a 7 to 10 business day period.*



## **Appendix 2**

### **Standard Non-Disclosure Agreement**

## NON-DISCLOSURE AGREEMENT

### (District of Columbia Broadband Service Mapping)

This **Non-Disclosure Agreement** (“**Agreement**”) is between the Office of the Chief Technology Officer of the District of Columbia (“OCTO”) and \_\_\_\_\_ (“Company”), a corporation having a business address at \_\_\_\_\_.

### RECITALS

A. Company wishes to disclose and OCTO wishes to receive certain information from Company represented by Company to be confidential and commercial / proprietary information (hereinafter collectively, “Information”) pertaining to \_\_\_\_\_. This exchange includes all communication of Information between the parties in any form whatsoever, including oral, written and machine readable form, pertaining to the above.

B. OCTO wishes to receive and Company wishes to disclose the Information for the sole purpose of participating in national broadband service mapping activities. OCTO will disclose the information only in the following ways:

To The public:

- The service territories of individual providers will not be made public, but OCTO will create a public web site that allows users, including potential broadband service subscribers, to enter any valid address in the District of Columbia and be referred to all the broadband service providers offering service to that location.
- Form 477 subscriber count data from all companies will be aggregated by OCTO at the Census Tract level. OCTO will use this information to estimate the residential broadband adoption rate by Census Tract. Estimated broadband service adoption rates will be made public, but the market share of individual broadband service providers will not be revealed.

To the U.S. Department of Commerce, National Telecommunications and Information Administration (NTIA):

- The broadband service data required by the NTIA in the Notice of Funds Availability; [clarification](#) published in the Federal Register; August 7, 2009 (74 FR 40569).

To the Metropolitan Police Department and the District of Columbia Homeland Security and Emergency Management Agency:

- Middle-mile connection points will be added to the District’s critical infrastructure data base. This critical infrastructure database is used only for public safety purposes.

These data will not be shared outside law enforcement and homeland security communities.

## **AGREEMENTS**

Therefore, OCTO and Company agree as follows:

1. That the disclosure of Information by Company is in confidence and thus OCTO agrees to:

a. (1) Not disclose the Information to any other person, and (2) use at least the same degree of care to maintain the Information confidential as OCTO uses in maintaining as confidential its own confidential information, but always at least a reasonable degree of care;

b. Use the Information only for the above purpose;

c. Restrict disclosure of the Information solely to those employees or contract staff of OCTO having a need to know such Information in order to accomplish the purposes stated above; The District Government operates an in-house broadband service provider known as DC Net, accordingly, the Information expressly will not be shared by OCTO with DC Net as an organization or its employees.

d. Advise each such individual, before he or she receives access to the Information, of the obligations of OCTO under this Agreement, and require each such individual to maintain those obligations.

2. This Agreement imposes no obligation on OCTO with respect to any portion of the Information received from Company which: (a) was known to OCTO prior to disclosure by Company, (b) is lawfully obtained by OCTO from a third party under no obligation of confidentiality, (c) is or becomes generally known or publicly available other than by unauthorized disclosure, (d) is independently developed by OCTO or (e) is disclosed by Company to a third party without a duty of confidentiality on the third party.

3. This Agreement imposes no obligation on OCTO with respect to any portion of the Information unless such portion is: (a) disclosed in a written document or machine readable media marked as "COMMERCIAL / PROPRIETARY INFORMATION" at the time of disclosure, or (b) disclosed in any other manner and summarized in a memorandum mailed to OCTO within thirty (30) days of the disclosure. Information disclosed by Company in a written document or machine readable media and marked "COMMERCIAL / PROPRIETARY INFORMATION" includes, but is not limited to, the items, if any, set forth in the request for broadband service data from the District of Columbia Public Service Commission ("Commission"); attached hereto. The Commission's request for broadband service data is incorporated herein by reference. OCTO hereby acknowledges receipt of the items listed in the Commission's request for broadband service data, if any.

4. The Information shall remain the sole property of Company.

5. In the event of a breach or threatened breach or intended breach of this Agreement by either party, the other party shall be entitled to preliminary and final injunctions, enjoining and restraining such breach or threatened breach or intended breach.

6. OCTO agrees it will not export, directly or indirectly, any technical data acquired from Company or any product utilizing any such data to any country for which the U.S. Government or any agency thereof at the time of export requires an export license or other governmental approval, without first obtaining such license or approval.

7. The validity, construction, and performance of this Agreement are governed by the laws of the District of Columbia, and suit may be brought in the District to enforce the terms of this Agreement.

8. The rights and obligations of the parties under this Agreement may not be sold, assigned or otherwise transferred.

This Agreement is binding upon OCTO and Company and upon the directors, officers, employees and agents of each. This Agreement is effective as of the later date of execution and will continue indefinitely.

**Office of the Chief Technology Officer of the District of Columbia**

By

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**(Company)**

By:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

**Appendix 3**  
**Provider Questionnaire and Glossary**  
**Microsoft Excel**

Figure 1. Contact and Broadband Service

## District of Columbia - Mapping Questionnaire Fall 2011

This questionnaire is directed to providers that have not qualified for participation in the National Broadband map. Each sheet collects a different type of information. Tabs at the bottom of the workbook allow users to switch among the three sheets.

Date Submitted:<mm/dd/yyyy>	
Company Name:	
Doing Business As:	
FRN #:	
Contact Name:	
Contact Email:	
Contact Address1:	
Contact Address2:	
Contact City, State Zip code:	

1.1 Provide a URL of the Company's website to which the District should refer potential broadband service subscribers.

--

1.2 Is your Company a facility based provider or a reseller? Please select the cell next to the technology that you provide and choose from the dropdown menu which business type applies.

Technology	Business Type	Technology	Business Type
10 Asymmetric		60 Satellite	
20 Symmetric		70 Terrestrial Fixed Wireless - Unlicensed	
30 Other Wireline		71 Terrestrial Fixed Wireless - Licensed	
40 Cable DOCSIS 3.0		80 Mobile Wireless	
41 Cable-Other		90 Electric Power Line	
50 Optical Carrier		0 Other	

1.3 If your company is a reseller, who is the facility based provider(s)?

--

1.4 Complete the following dropdown table for each Technology of Transmission that your company provides. (One row for each Technology of Transmission - click on the cell to view a list of selections per column).

	Technology	Districtwide*	Maximum Advertised Speed		Typical Speed	
	Code   Description		Download Speed	Upload Speed	Download Speed	Upload Speed
(Ex.1)	10 Asymmetric	Yes	768 kbps to 1.49 mbps	201 to 767 kbps	1.5 to 2.9 mbps	768 kbps to 1.49 mbps
1						
2						
3						
4						
5						

*\* Districtwide Definition : The Company must be able to "offer broadband service" to the "entire District of Columbia", (residential, business, institutional or government entity within 10 business days of a service order without an extraordinary commitment of additional resources.) with advertised speeds of at least 768 kilobits per second (Kbps) downstream and greater than 200 Kbps upstream .*

1.5 For each Technology of Transmission that was selected in 1.2 how long does it take to provide service to a customer after service has been ordered? (Click on the cell next to each Technology you provide and select the length of time from a drop-down list).

Technology	Length of time to provide service	Technology	Length of time to provide service
10 Asymmetric (xDSL)		60 Satellite	
20 Symmetric (xDSL)		70 Terrestrial Fixed Wireless - Unlicensed	
30 Other Wireline		71 Terrestrial Fixed Wireless - Licensed	
40 Cable Modem - DOCSIS 3.0		80 Mobile Wireless	
41 Cable Modem - Other		90 Electric Power Line	
50 Optical Carrier (Fiber to end user)		0 All Other	

1.6 For each Technology of Transmission that was selected in questions 1.2, please provide your service area in any of the following data formats (each data format should include technology of transmission, maximum advertised download and upload speed, typical download and upload speed):

- GIS or CAD file(s)
- Text file or Excel Spreadsheet listing service addresses
- Text file or Excel Spreadsheet with a list of Census Blocks with Tract numbers

See graphics below of sample data formats

1.7 Does your company primarily make your service available to residential or non-residential (i.e. business) customers?

1.8 Can you provide this service within 10 business days of a service order without extraordinary commitment of additional resources?

1.9 If you provide broadband service and can offer it to customers (residential, business, institutional, or government entity) in the District of Columbia within 10 business days of a service order without extraordinary commitment of additional resources, the District of Columbia Public Service Commission encourages your participation in the State Broadband Mapping Program. We will be happy to discuss the benefits of participation with you.

1.10 Please provide a copy of your most recent filing of Form 477 to the FCC. Provide attachment filenames below.

**Ex. of Spreadsheet** - Includes Census Tract and Block; Maximum Download and Upload Speeds; Typical Download and Upload Speed; Total Users; and Percent Residential.

	A	B	C	D	E	F	G	H	I
1	Tract	Block	Technology	Max_Download	Max_Upload	Typ_Download	Typ_Upload	Total_Users	%_Residential
2	17.01	1000	10	8	8	5	3	25	100%
3	18.01	1000	10	8	8	5	3	175	78%
4	19.01	1000	10	8	8	5	3	62	95%

**Ex. Text File with Service Address** - Includes Provider Name; FRN#; End-User Address; Technology of Transmission; Maximum

Provider Name	FRN	ID	End-User Address	City	State	Zip	Technology of Transmission	Maximum Advertised Download Speed
ACME Corporation	0001-2345-67	1	123 Main ST NW	WASHINGTON	DISTRICT OF COLUMBIA	20036	10	8

**Ex. of Form 477 by Census Tract** - Includes Technology of Transmission; Census Tract; Transfer Rate; Number of Users; and

Technology of the connections: **Cable Modem**

Census Tract: State: **DC** County: **District of Columbia** Census Tract: **1.00**

**DOWNLOAD INFORMATION TRANSFER RATE**

Greater than 200 kbps and less than 768 kbps	Greater than or equal to 768 kbps and less than 1.5 mbps	Greater than or equal to 1.5 mbps and less than 3 mbps	Greater than or equal to 3 mbps and less than 6 mbps	Greater than or equal to 6 mbps and less than 10 mbps	Greater than or equal to 10 mbps and less than 25 mbps	Greater than or equal to 25 mbps and less than 100 mbps	Greater than or equal to 100 mbps
--	--	--	--	---	--	---	-----------------------------------

**UPLOAD INFORMATION TRANSFER RATE**

Less than or equal to 200 kbps: Number of Connections: **15** Percentage Residential: **100.00%**

Greater than 200 kbps and less than 768 kbps: Number of Connections: **100.000** Percentage Residential: **%**

Number of users: **100.000**

Proceed to Sheet 2.

Figure 2. Wireless Spectrum

**Provider Name**

**Wireless Spectrum Questions (Wireline only companies may skip this sheet.)**

2.1 What spectrum(s) do you use to provide service? See table in Broadband Data Definitions guide for spectrum codes and descriptions.

**Proceed to Sheet 3.**



Broadband service providers shall provide a list of "middle-mile and backbone interconnection points" in the District of Columbia. Interconnection points are facilities that provide connectivity between (a) a service provider's network elements (or segments) or (b) between a service provider's network and another provider's network, including the Internet backbone. (Collectively, (a) and (b) are middle-mile and backbone interconnection points. Middle-mile and backbone interconnection points typically enable relatively fast data rates, are built to handle substantial capacities, and may be service-quality assured. Examples might include: points of interconnection enabling communications between an incumbent local exchange carrier's central office and the Internet, between a cable aggregation point (headend) and the Internet, or between a wireless base station and the provider's core network elements that connect to other networks, including the Internet.

"Yes" or "No"

--

[illegible]

** Serving Facility	
Type Code	Description
1	Fiber
2	Copper
3	Hybrid Fiber Coax (HFC)
4	Wireless

33

**Appendix 4**  
**Community Anchor Institution**  
**Data Request Letter and Survey Form**

Dear <Community Anchor Institution / Contact>:

The District of Columbia Government's Office of the Chief Technology Officer (OCTO) is in the fourth round of data collection as directed by the [National Telecommunications and Information Administration's \(NTIA\) State Broadband Data and Development Program](#) (SBDD). The SBDD is supported by a grant awarded by the United States Department of Commerce and NTIA to map the availability and adoption of broadband services in the District of Columbia (District).

A critical component of this grant requirement is to identify Community Anchor Institutions, such as <Community Anchor Institution>, in the District and to survey the availability of broadband service offered there, respectively. Community Anchor Institutions (CAI) consist of schools, libraries, health care providers, public safety entities, institutions of higher education, and other community supported organizations and entities.

Participation in the survey is strongly encouraged so as to develop a more accurate and comprehensive dataset of broadband availability in the District and to assist in the planning of District-wide broadband initiatives.

OCTO has developed a simple, one page web-based survey form that can be accessed and completed at this link: [DC - Community Anchor Institutions Survey \(web form\)](#)

**NOTE:** OCTO requests that the survey be completed on or before Friday, September 17, 2011. Thank you.

If you have any questions, please feel free to contact me.

Sincerely,

<Sender>

# District of Columbia - Community Anchor Institutions

---

Please fill-out the following questions below.

\* Required

Contact Name \*

Title \*

Contact Phone Number: \*

Contact Email: \*

Name of Institution \*

Institution Type \*

Address \*

Street Address

City, State, Zip \*

Institution Website \*

**Do you currently have broadband (internet) service at this institution? \***

- ☐ Yes
- ☐ No

**Do you provide Public WiFi? \***

- ☐ Yes
- ☐ No

**Name of broadband provider**

**What type of broadband transmission technology is used?**

**What is the maximum advertised download speed?**

Data transfer speed

**What is the maximum advertised upload speed?**

Data transfer speed

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## **Appendix 5**

### **Wireless Validation**

**Mobile Broadband Mapping  
Commercial Cellular Networks  
District of Columbia**

*Bob Pavlak*

*Chris San-Gaspar*

**September 29, 2010**

## **Mobile Broadband Mapping of Commercial Cellular Networks: District of Columbia**

### **Executive Summary**

The outdoor downlink and uplink throughput speeds of the commercial cellular networks serving the District of Columbia were measured in September 2010, and compared with measurements made in September 2009. In addition to the three networks tested in 2009 (Verizon Wireless, Sprint, AT&T), our 2010 measurements also include Cricket and T-Mobile.

The results of the drive test measurements are shown in the two attached files (2010 results, and 2009 results), and a qualitative analysis of the results is presented here. A more detailed quantitative analysis will be prepared later.

All five of the service providers deliver broadband service (minimum 768 kbps downlink and 200 kbps uplink) in some areas of the District. However, there is a wide variation in coverage performance. Throughput speeds may be above the “broadband” thresholds in some areas and below the “broadband” thresholds in other areas. This variation in performance is shown by the color codes on the attached citywide maps.

There is also a significant variation in performance between the cellular service providers. The downlink speeds of the AT&T and T-Mobile networks are substantially above the broadband threshold of 768 kbps, with many areas above 1.5 Mbps. The speeds on AT&T’s network are substantially higher in 2010 compared to 2009, which we believe is attributed to the 3G upgrade of the AT&T network to HSPA (High Speed Packet Access), a more recent version of 3G. Both AT&T and T-Mobile operate network infrastructure based on the 3GPP (3<sup>rd</sup> Generation Partnership Project) set of standards.

The uplink speeds on the AT&T network is by far the highest of any of the commercial service providers. We believe this is due to the more advanced version of the 3GPP standard used by AT&T. Uplink speeds on AT&T’s network exceed 768 kbps and 1.5 Mbps in all but a few areas of the drive route.

The downlink speeds on Verizon’s network, between 2009 and 2010, appear about the same. The uplink performance has improved, with many areas in 2010 above 768 kbps. Many areas in 2009 were above 200 kbps uplink (but less than 768 kbps). Similarly, Sprint’s downlink performance appears about the same between 2009 and 2010, and their uplink performance in 2010 is slightly improved from 2009, but not as high as any of the other service providers.

Sprint, via Clearwire, now offers 4G WiMax broadband service in the District. This network was not included in our broadband drive tests because the mobility performance of WiMax is poor. Sessions are frequently dropped during handoffs and the tool used for drive test measurements is unable to accommodate a high dropped session rate.



The authors wish to thank Felix Igbedior for his assistance in performing the drive tests with Chris San-Gaspar.

**Apollo Asset Manager**

File Settings Help

Scale Navigation Details

User List Select Field LBS Coverage

**GPS Trace Data**

Show Data For: Bandwidth

Direction: Download

**Data Filter**

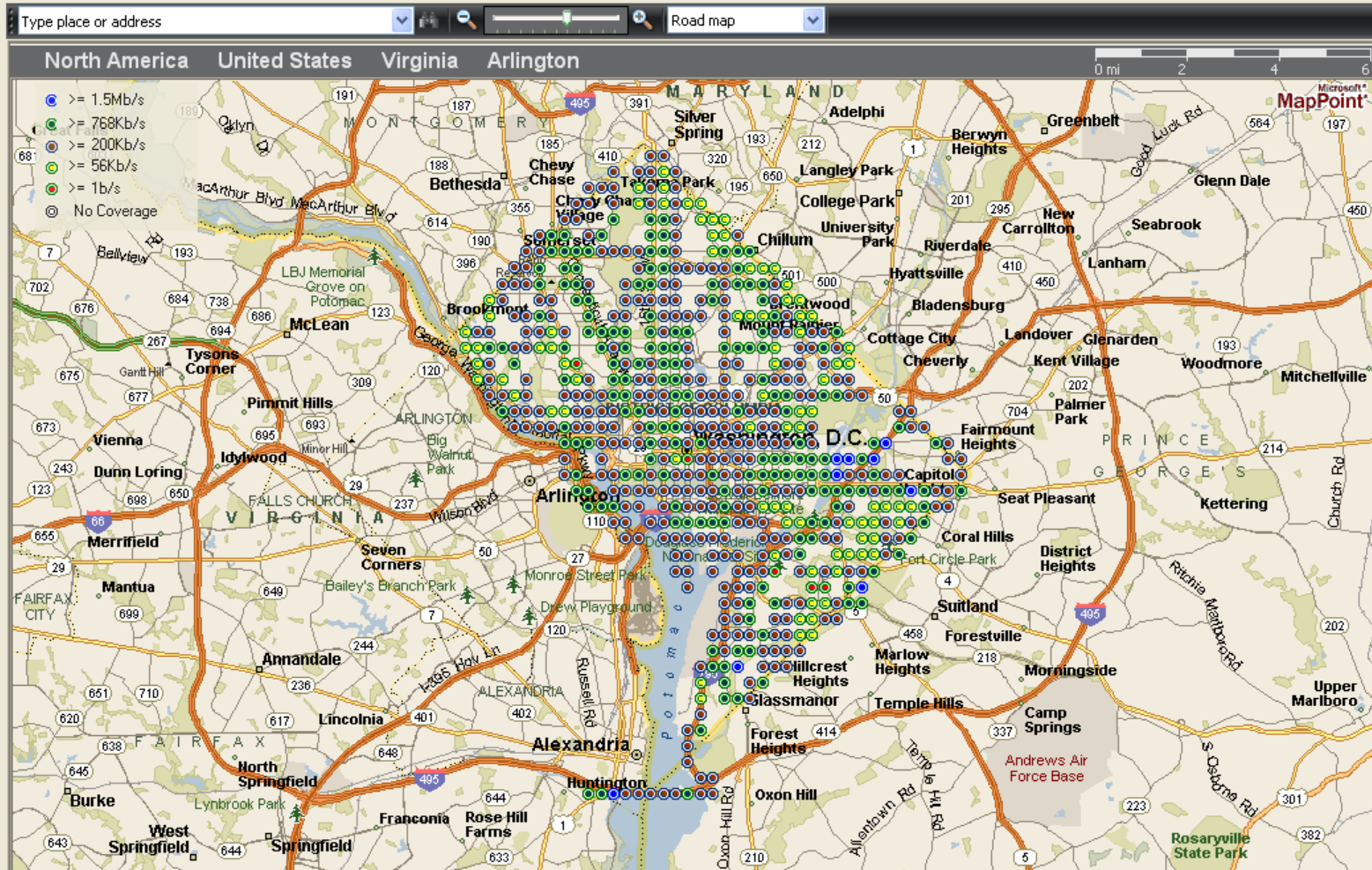
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Network/SSID: PANTECH UM17

**Location ID**

Show All  
No Coverage  
Unknown

Zoom to Selection



Load data finished

**Apollo Asset Manager**

File Settings Help

Scale Navigation Details

User List Select Field LBS Coverage

**GPS Trace Data**

Show Data For: Bandwidth

Direction: Download

**Data Filter**

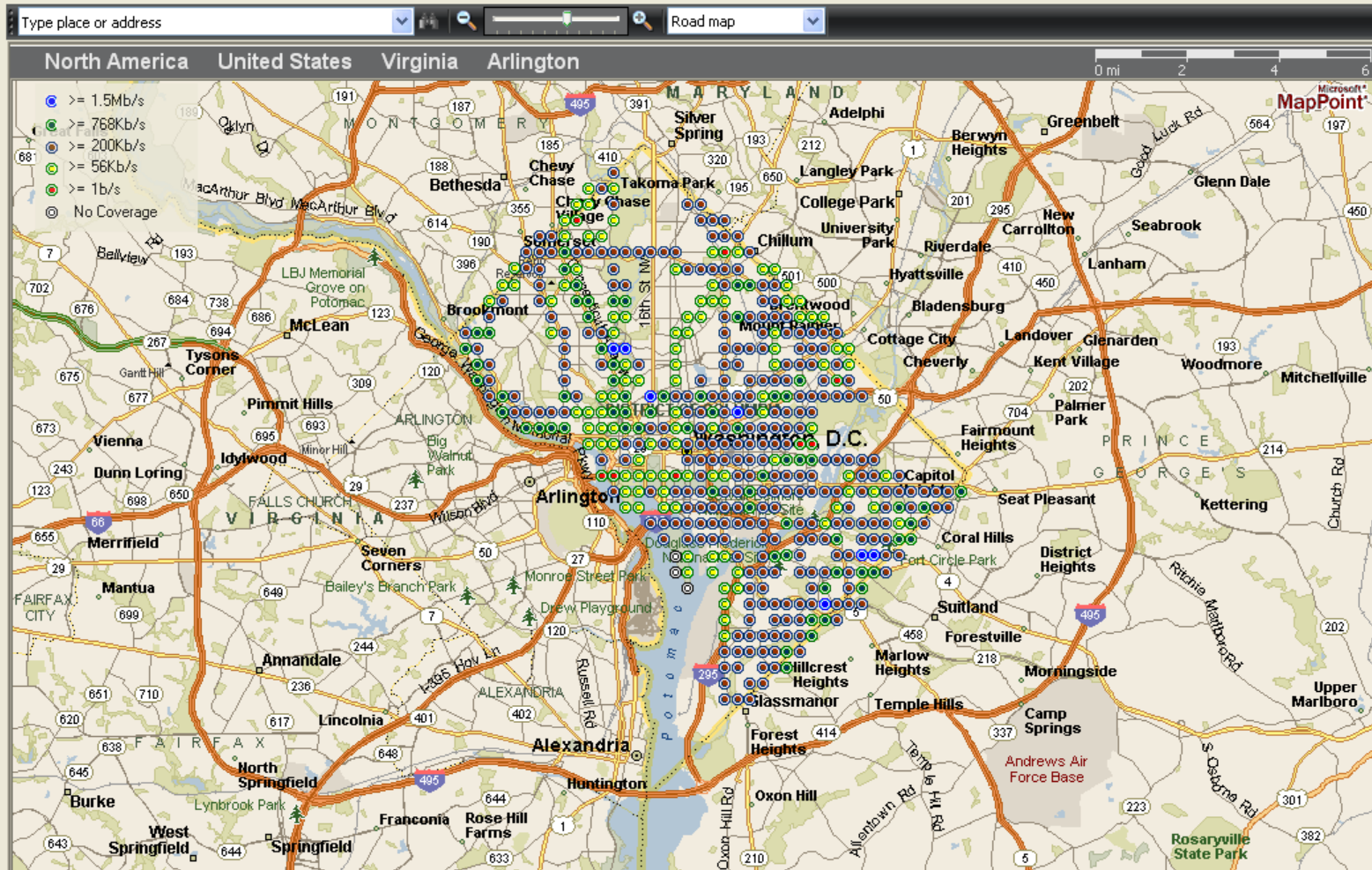
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Network/SSID: SPRINT

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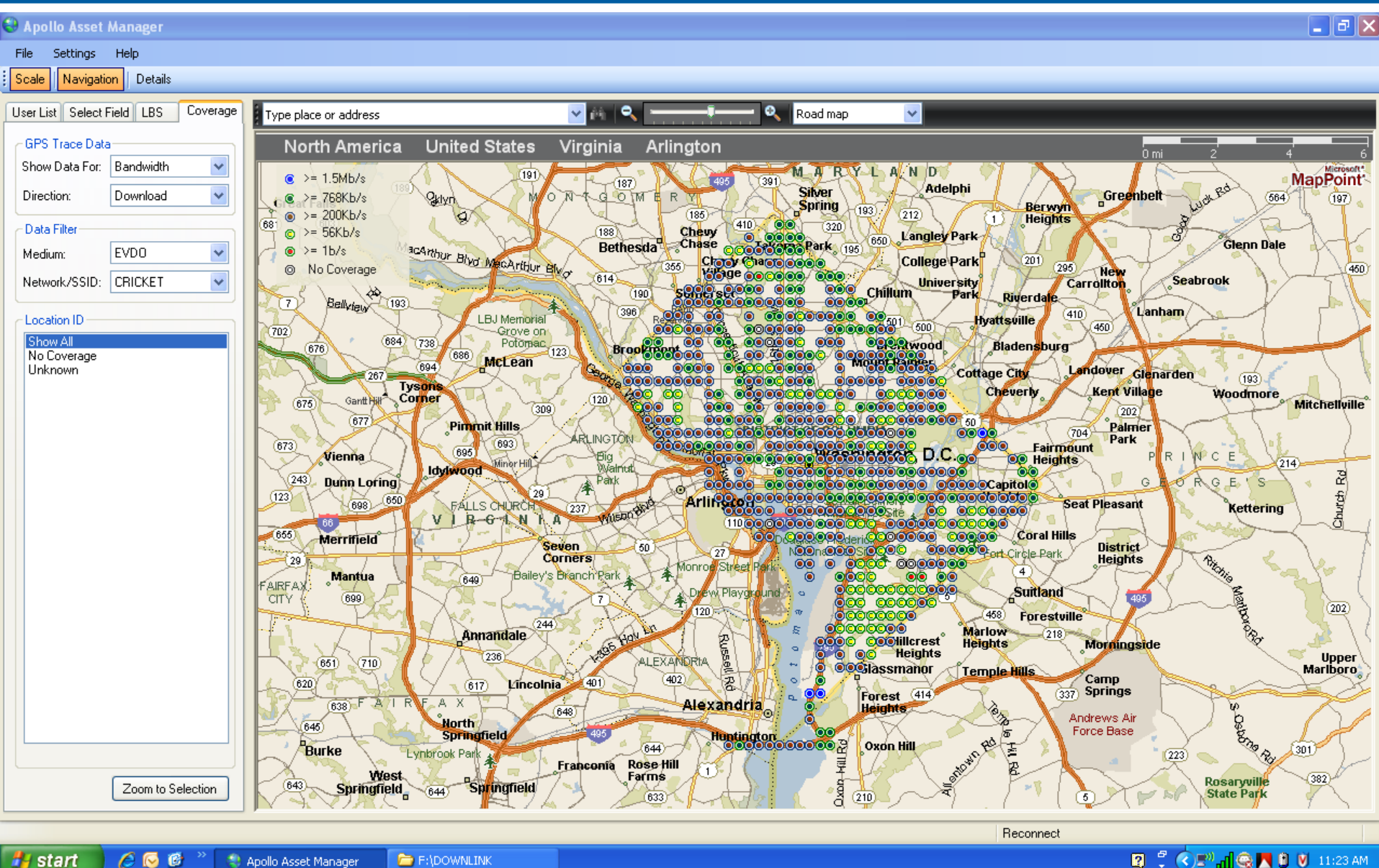


Load data finished





# CRICKET DOWNLINK 2010



# T-MOBILE DOWNLINK 2010

Apollo Asset Manager

File Settings Help

Scale Navigation Details

User List Select Field LBS Coverage

GPS Trace Data

Show Data For: Bandwidth

Direction: Download

Data Filter

Medium: GPRS/3G

Network/SSID: TMOBILE

Location ID

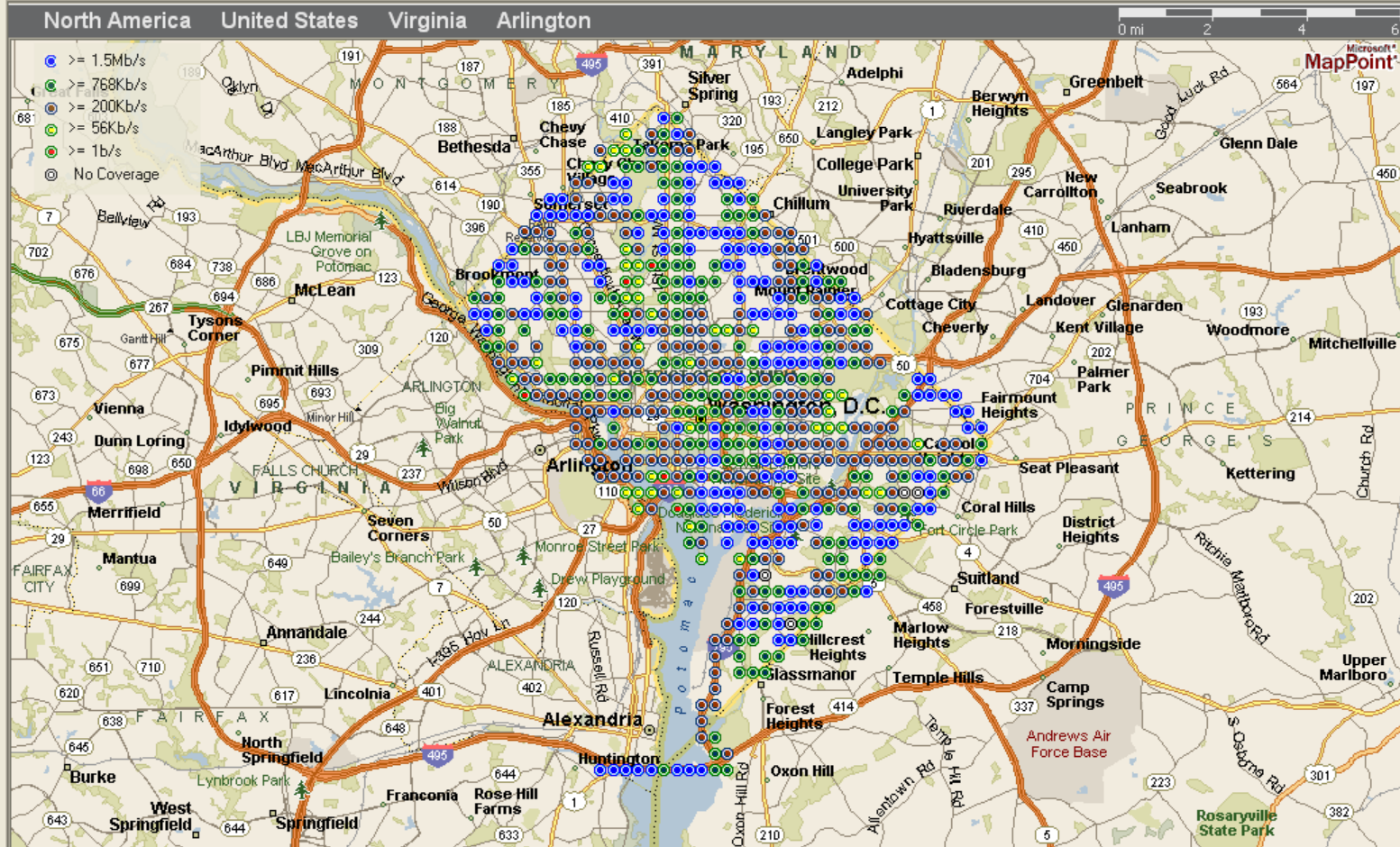
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B44F-C619  
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B457-EB47  
B457-ECD8  
B471-38EEC56  
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B475-136EC39

Zoom to Selection

Type place or address

Road map



Load data finished

## Apollo Asset Manager

File Settings Help

Scale Navigation Details

User List Select Field LBS Coverage

### GPS Trace Data

Show Data For: Bandwidth

Direction: Upload

### Data Filter

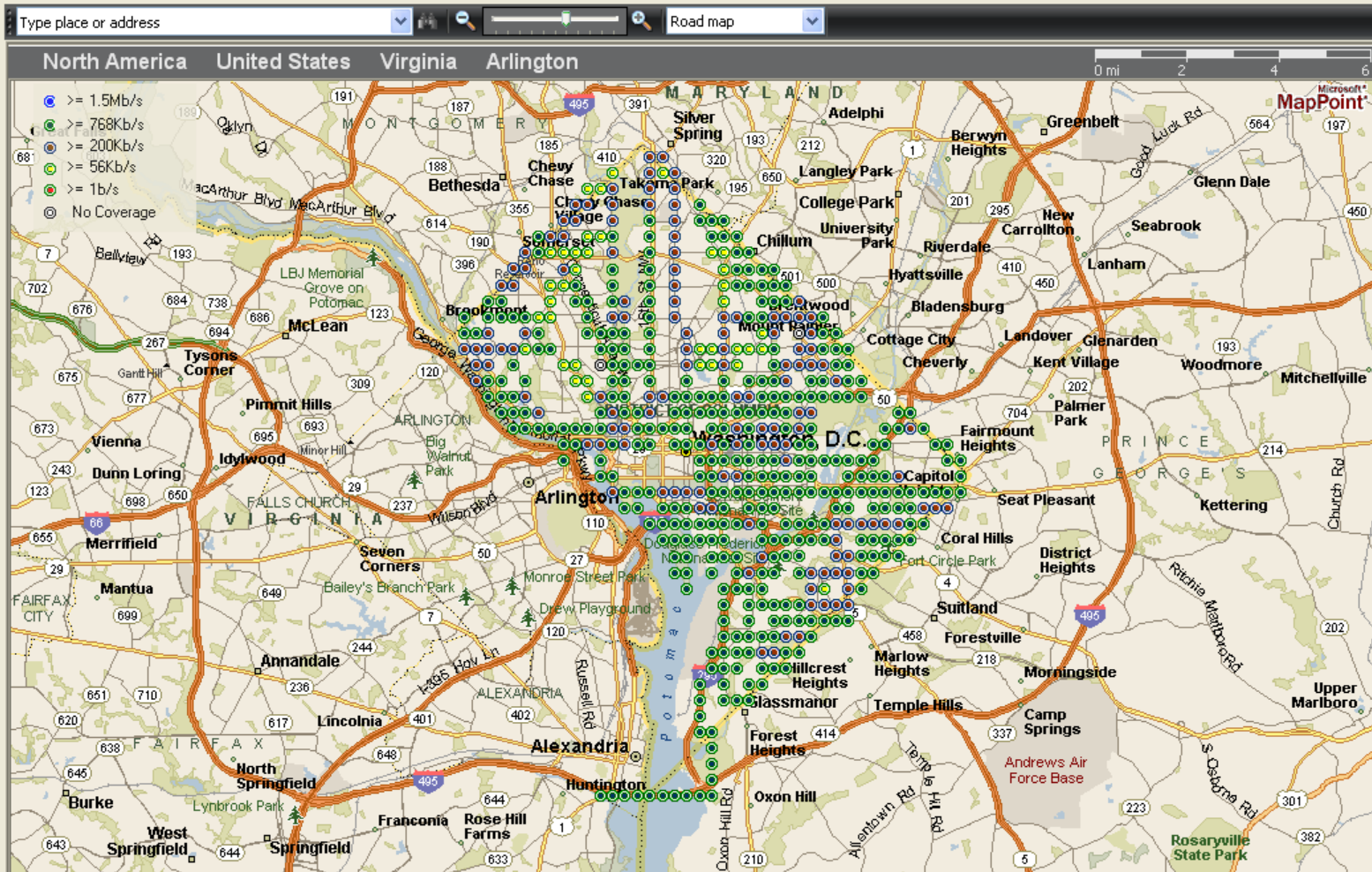
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Network/SSID: PANTECH UM17

### Location ID

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Zoom to Selection



Load data finished



**Apollo Asset Manager**

File Settings Help

Scale Navigation Details

User List Select Field LBS Coverage

**GPS Trace Data**

Show Data For: Bandwidth

Direction: Upload

**Data Filter**

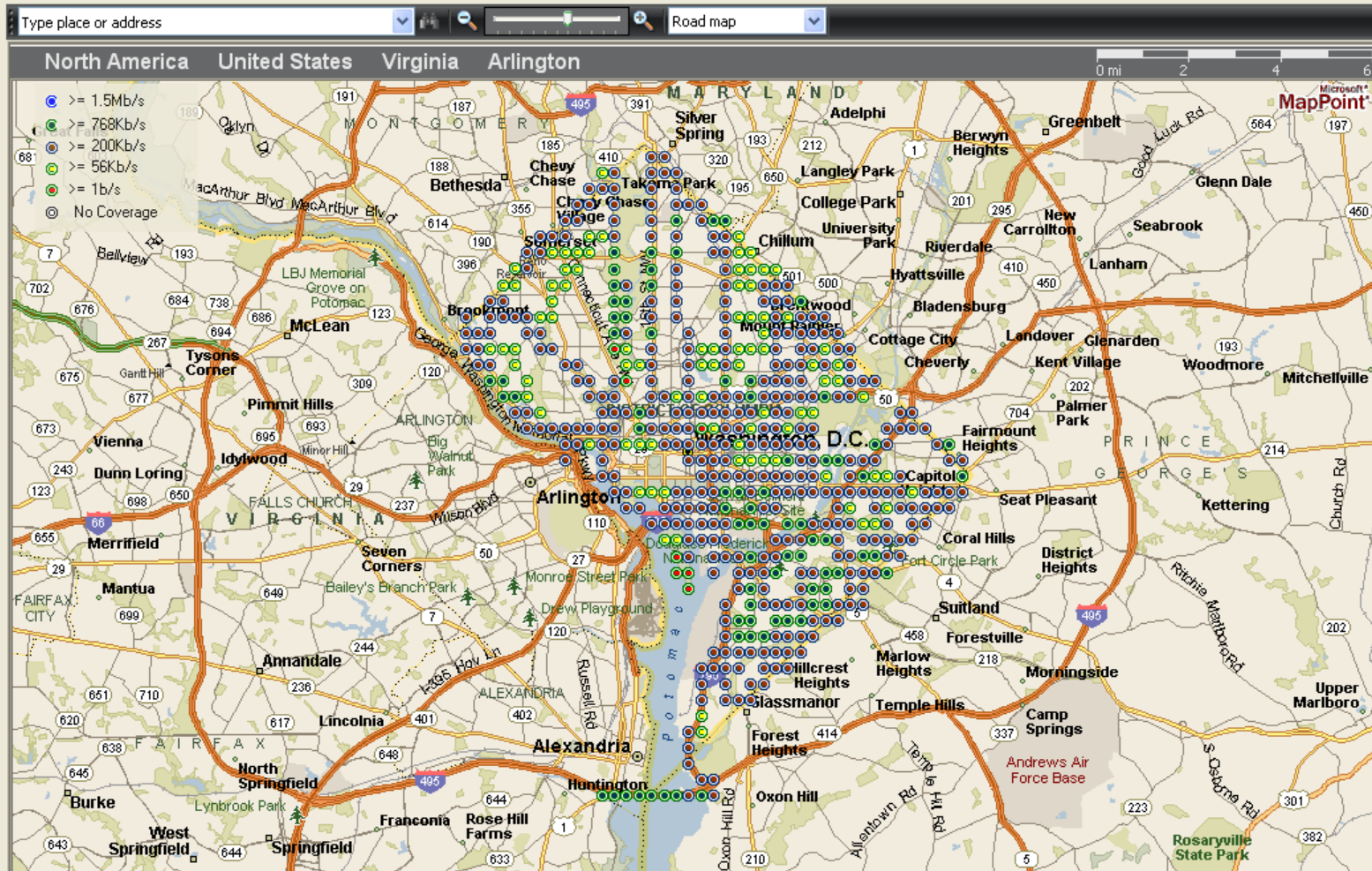
Medium: EVDO

Network/SSID: SPRINT

**Location ID**

Show All  
No Coverage  
Unknown

Zoom to Selection



Reconnect



## Apollo Asset Manager

File Settings Help

Scale Navigation Details

User List Select Field LBS Coverage

### GPS Trace Data

Show Data For: Bandwidth

Direction: Upload

### Data Filter

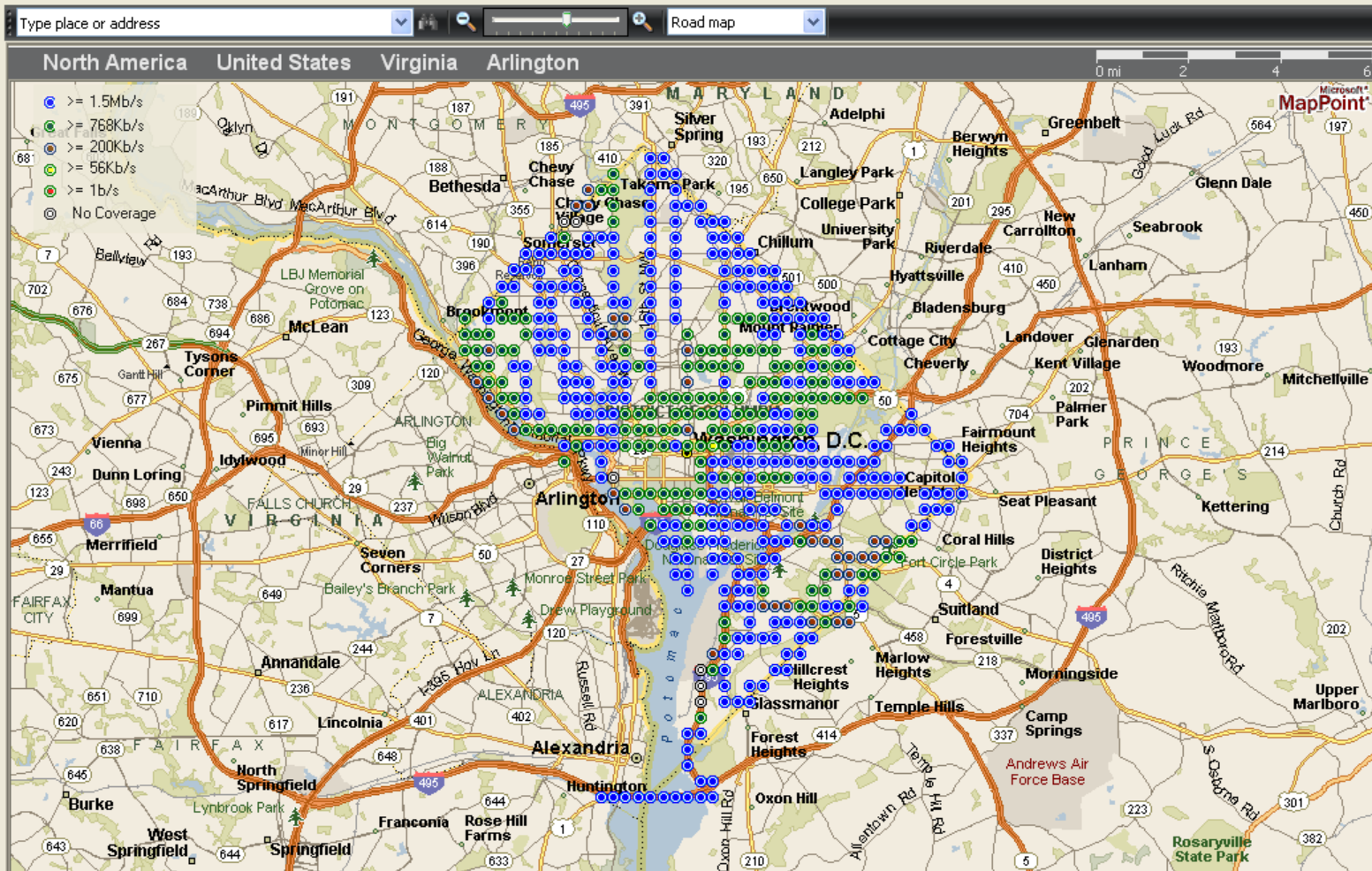
Medium: GPRS/3G

Network/SSID: AT&T

### Location ID

Show All  
No Coverage  
Unknown

Zoom to Selection



Load data finished

Apollo Asset Manager

File Settings Help

Scale Navigation Details

User List Select Field LBS Coverage

GPS Trace Data

Show Data For: Bandwidth

Direction: Upload

Data Filter

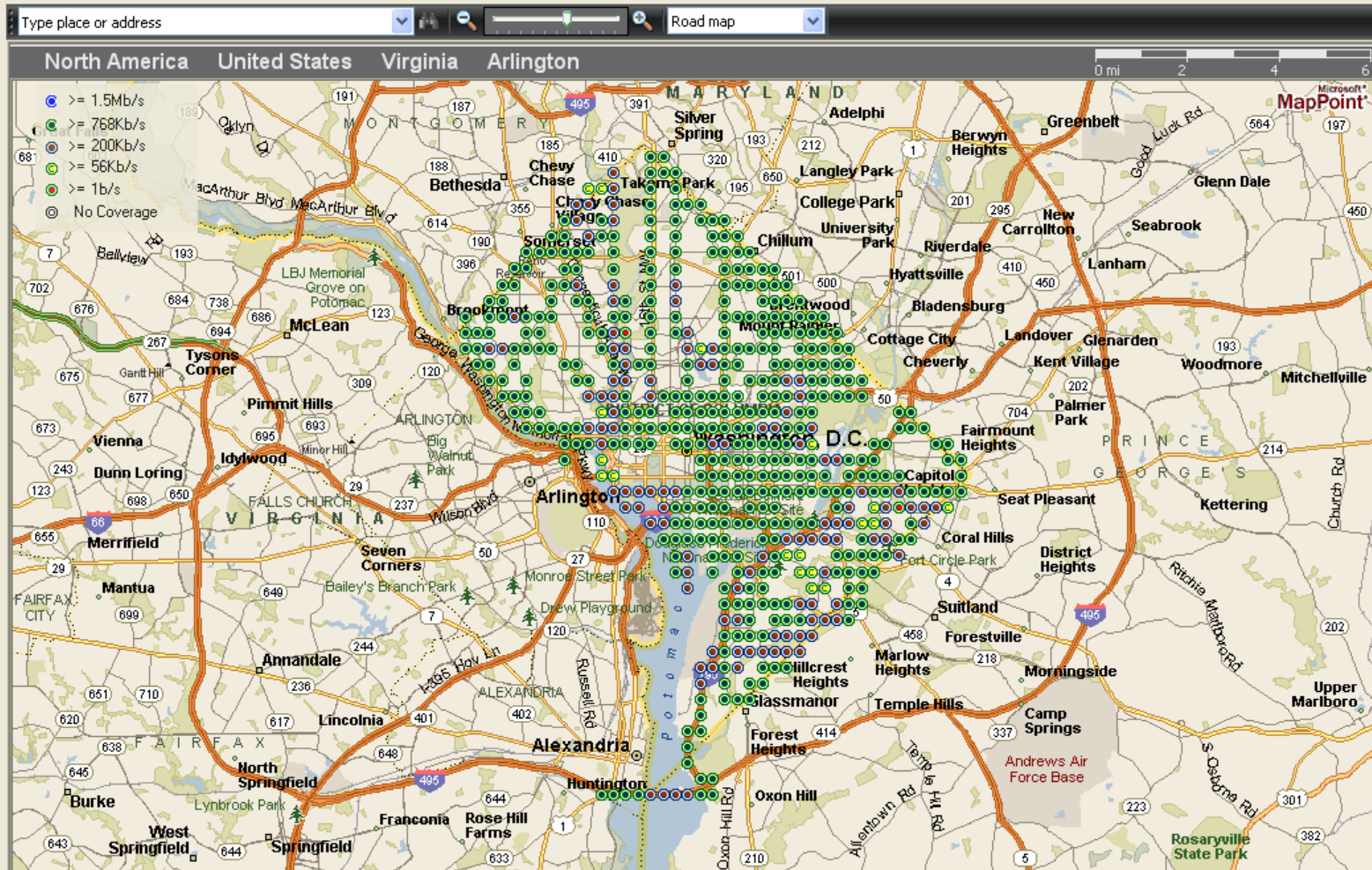
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Network/SSID: CRICKET

Location ID

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Unknown

Zoom to Selection



Reconnect

## Apollo Asset Manager

File Settings Help

Scale Navigation Details

User List Select Field LBS Coverage

### GPS Trace Data

Show Data For: Bandwidth

Direction: Upload

### Data Filter

Medium: GPRS/3G

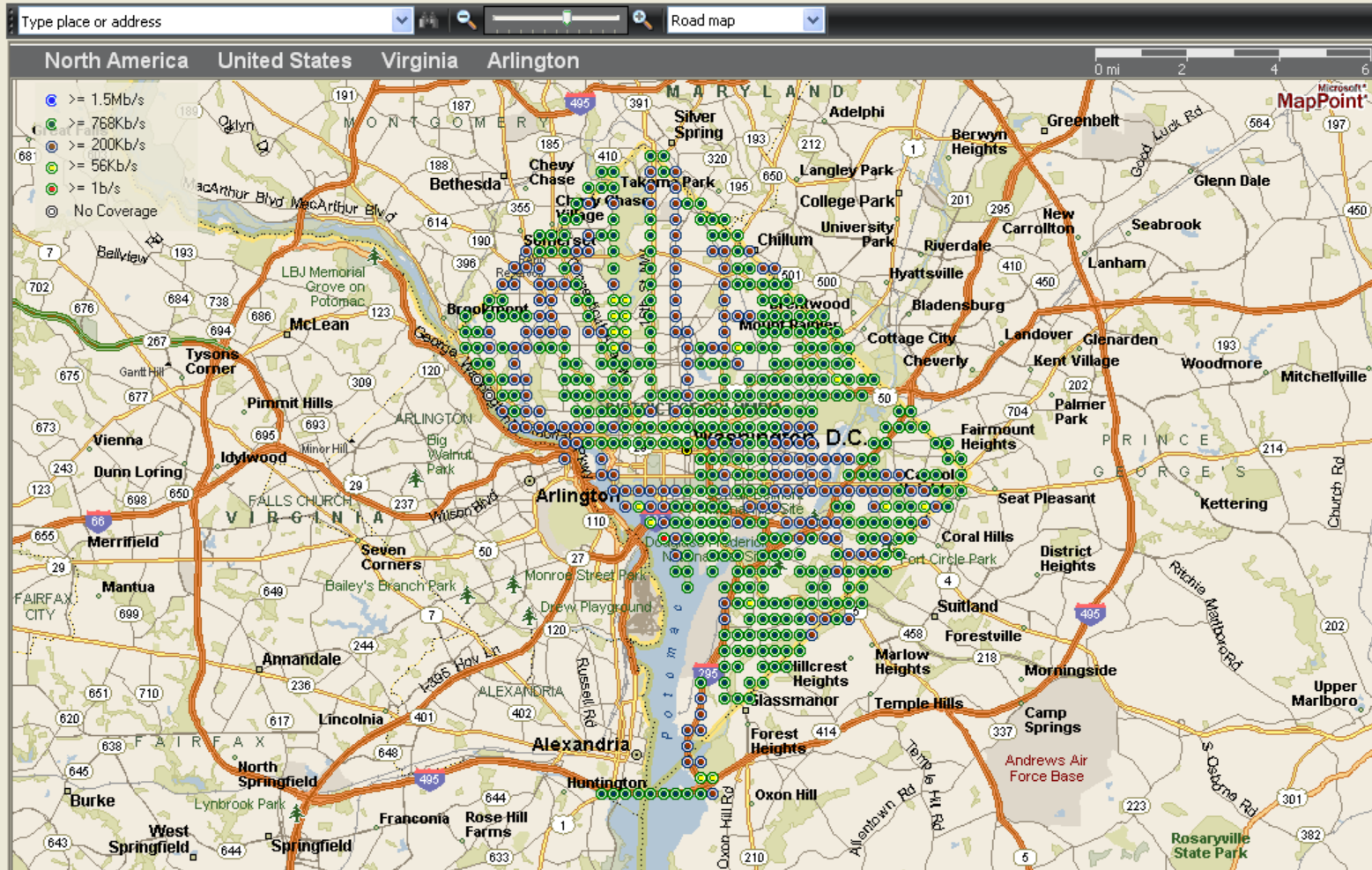
Network/SSID: TMOBILE

### Location ID

Show All

B44F-EC7E  
B471-38EB52F  
B471-38EEC06  
B471-38EEC68  
B471-38EEEC3  
B471-38EEF9D  
B471-38EF107  
B471-38EFA17  
B471-38EFC00  
B473-2629D63  
B473-262EE49  
B475-136EAA9  
B475-136EB0D  
B475-136EC38  
B475-136EC39  
B475-136ECD  
B475-136EDAA  
B475-136EDB5  
B475-136EDC7  
B475-136EE41  
B475-136F07A  
B475-136F07B  
B475-136F19D  
B476-D2EAC7  
B454 FC0B  
B457 EB02  
B457 EBA2  
B457 F10F

Zoom to Selection



Reconnect

## **Appendix 6**

### **Wireline Validation Sample**



# Sample Provider Reported Availability vs. InfoUSA ISP Connections

