Apex CoVantage

National Broadband Mapping

Presentation to NTIA

March 12, 2009

Agenda

- Broadband Mapping Goals
- Methodology
- ProField™ Demo

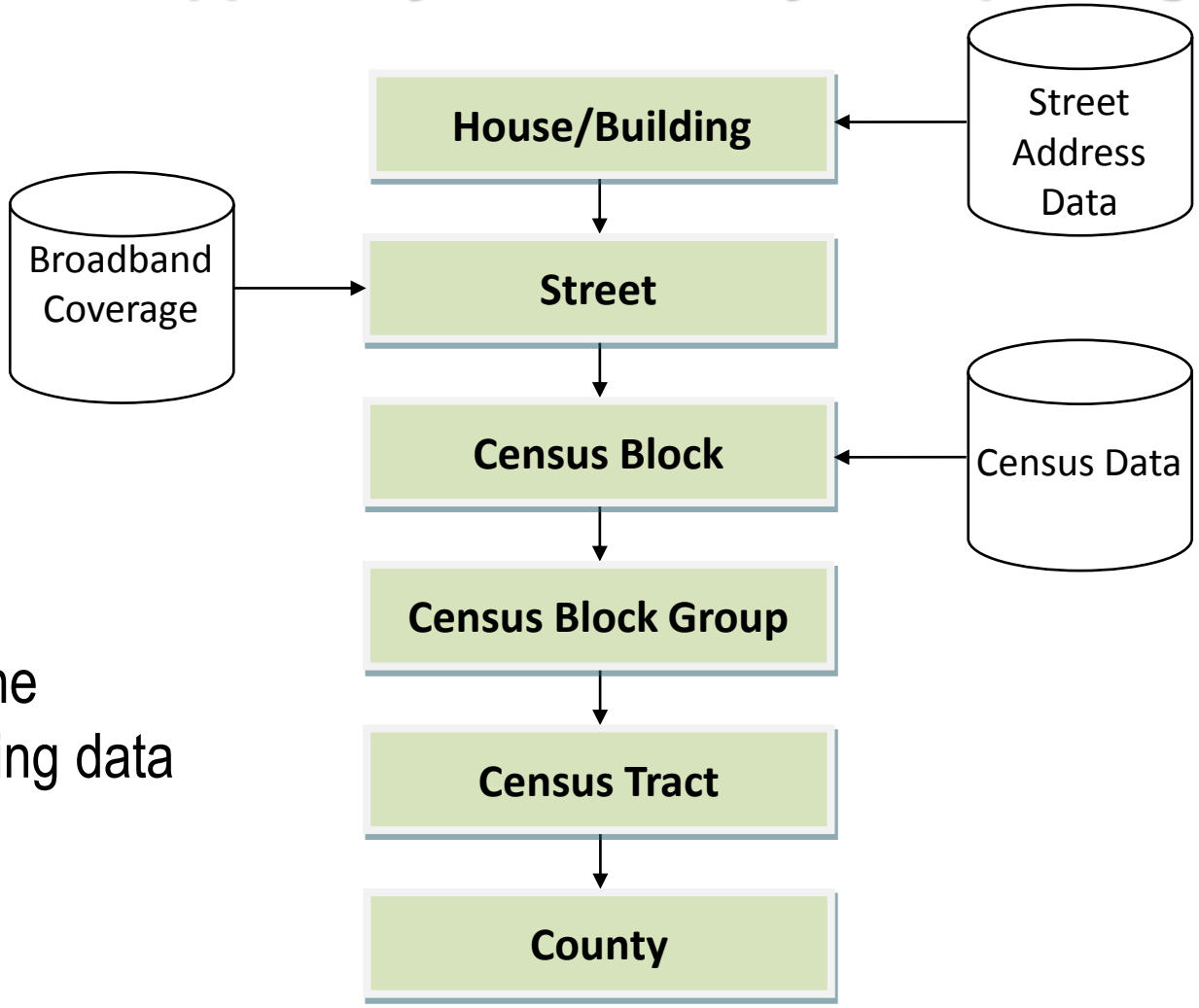
Broadband Mapping Goals

- Mapping Database Software (Intelligent Map)
- Accurate Data
- Consistent Nationwide Model and Data
- Support Economic Stimulus

Mapping Database Software

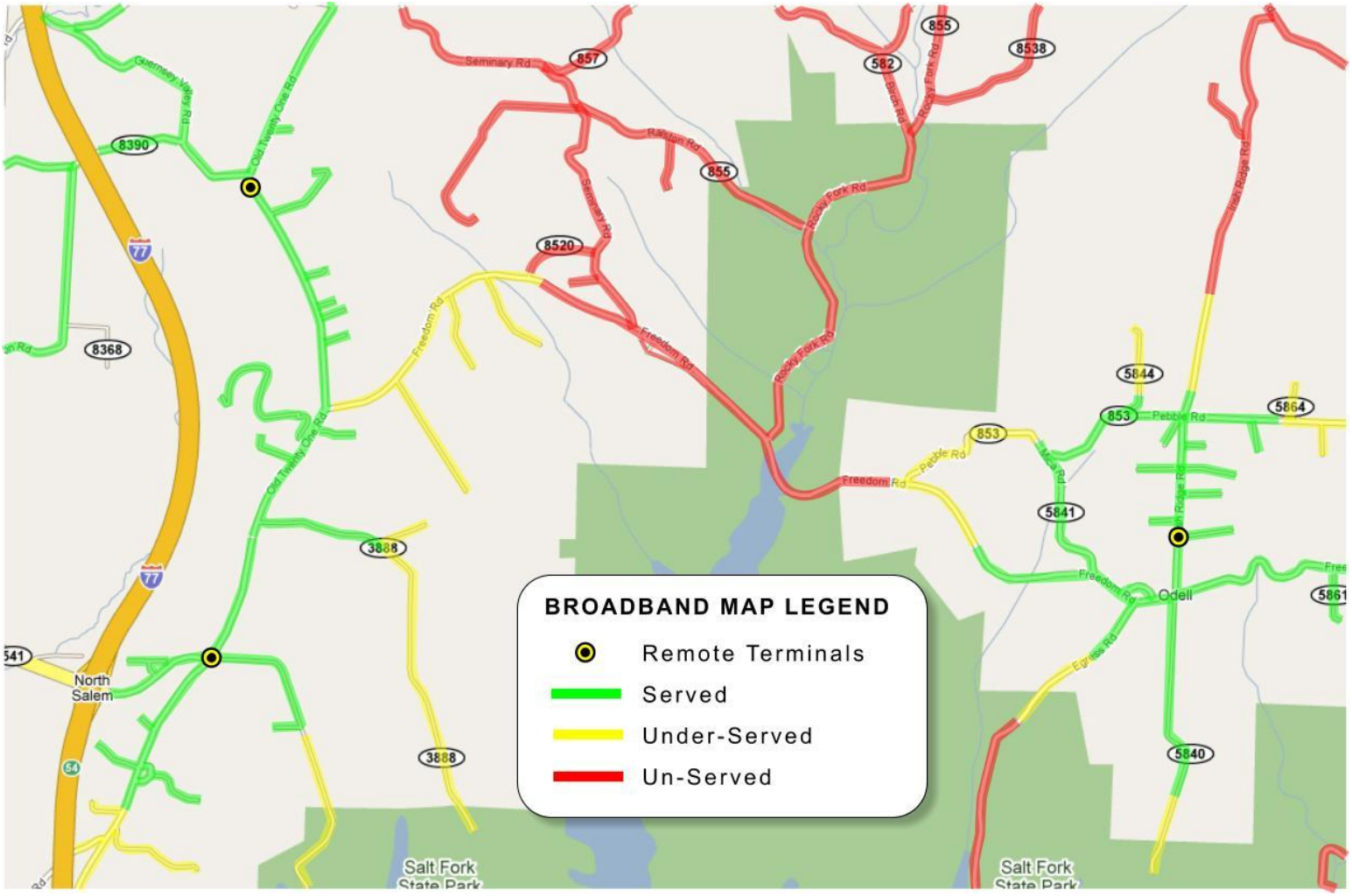
- Data Model for Dynamic Query and Reporting
- Broadband Coverage needed at the ***Street-level***
- Costing Tool for Evaluating Grant Applications
- Software Tools for All Stakeholders
  - Federal & State Governments
  - Providers
  - Affected Parties
  - Public

Data Model
To Support Dynamic Query & Reporting

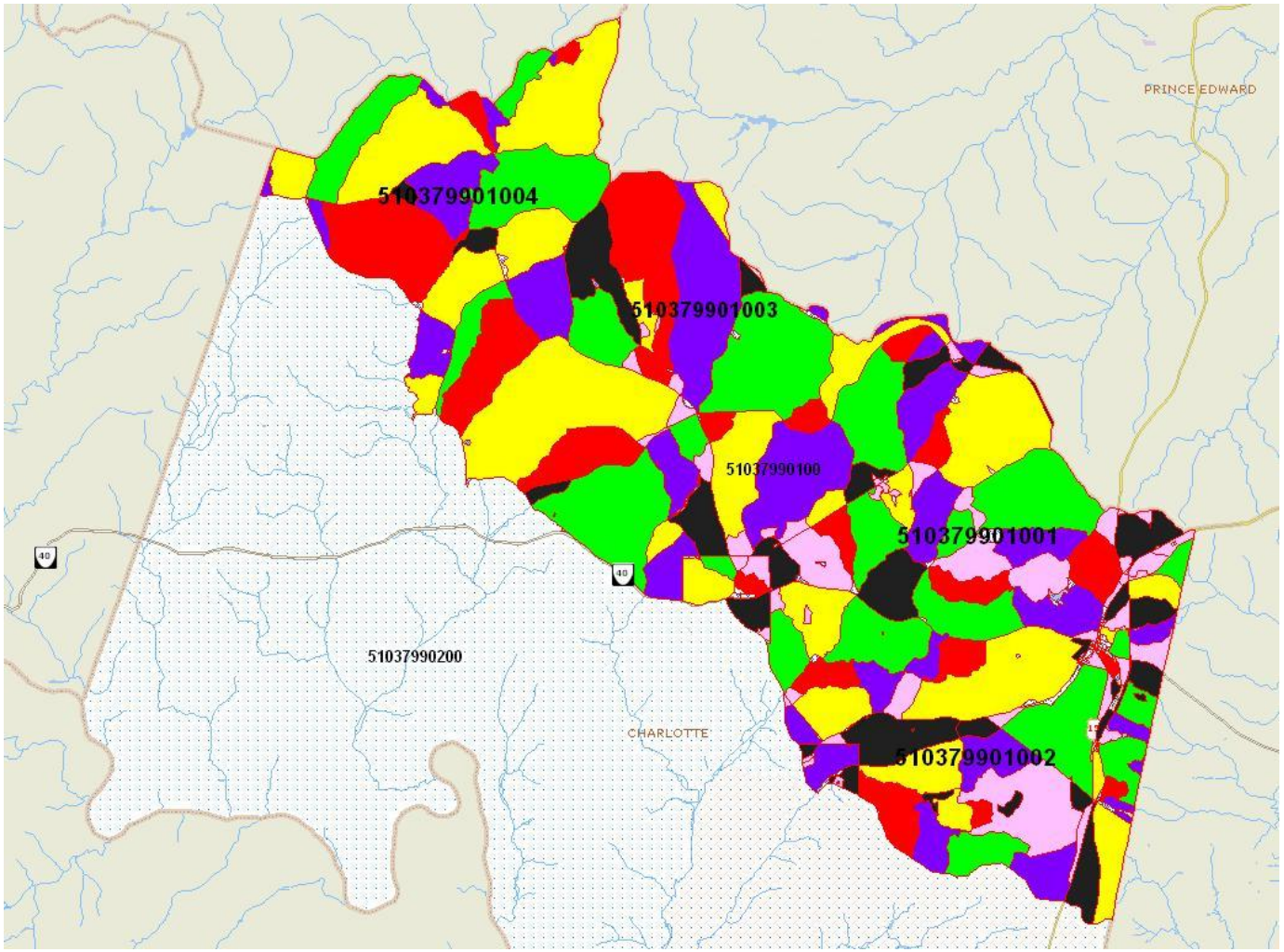


Tip:
Verify the underlying data model

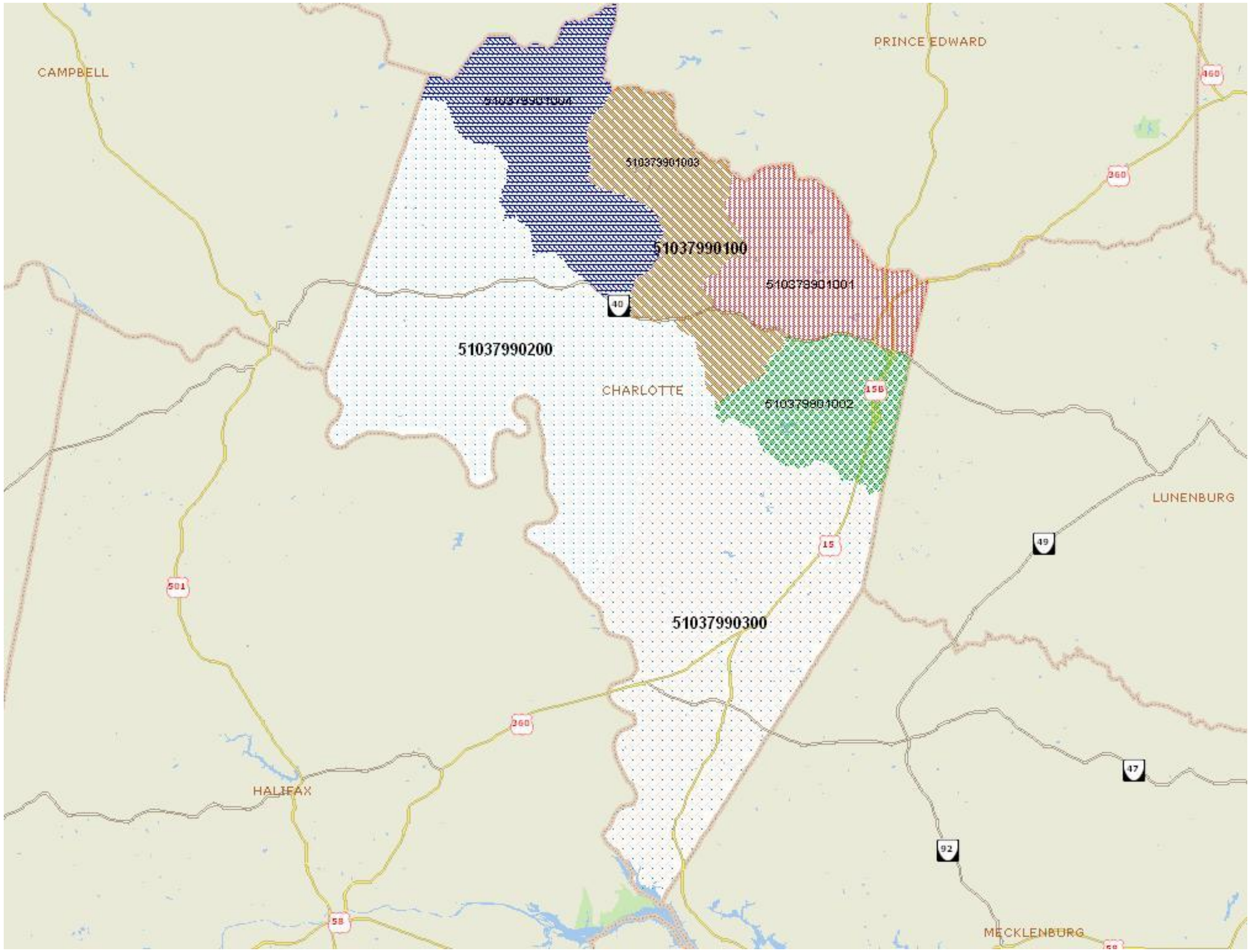
Street Level Broadband Coverage



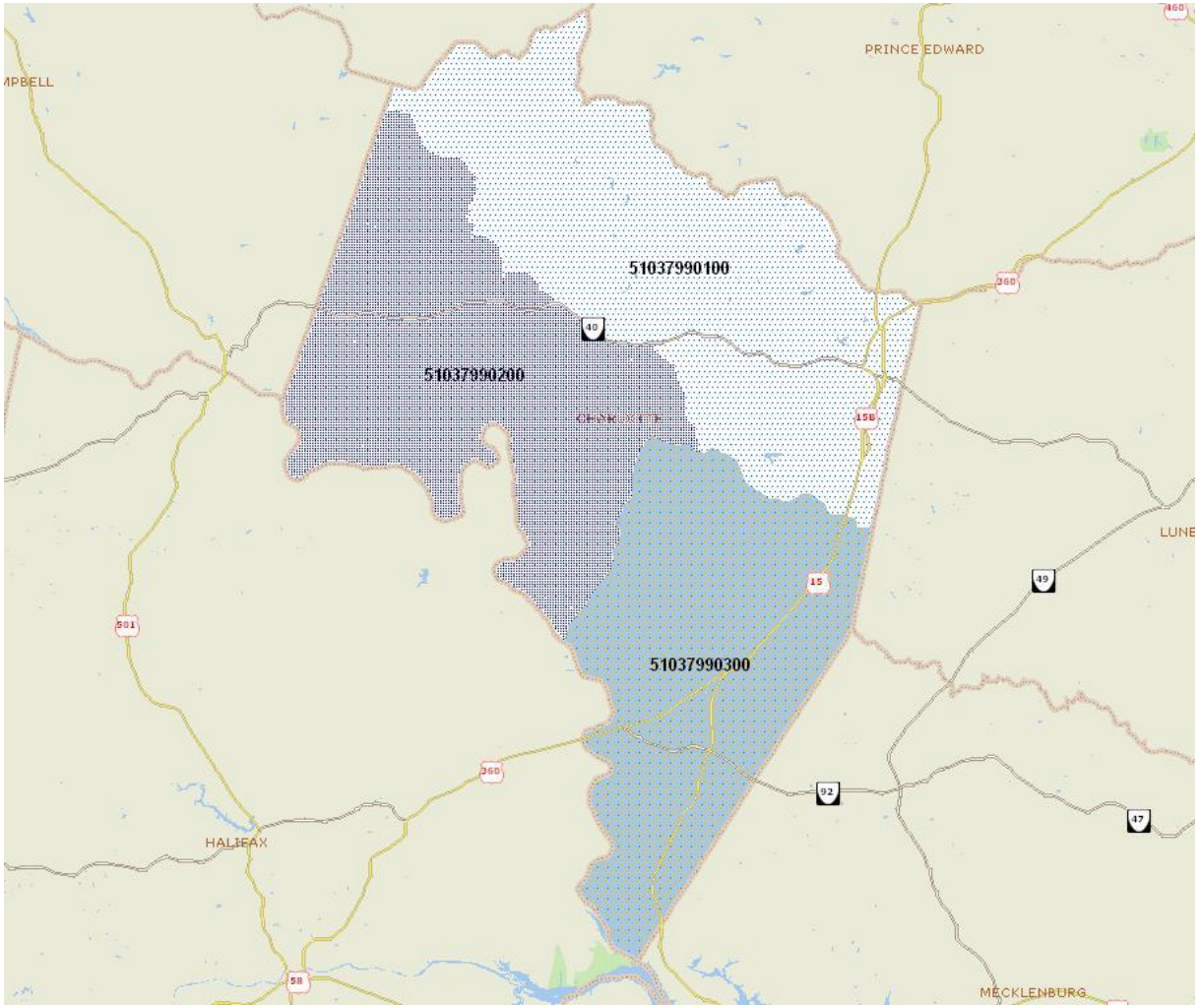
Census Blocks



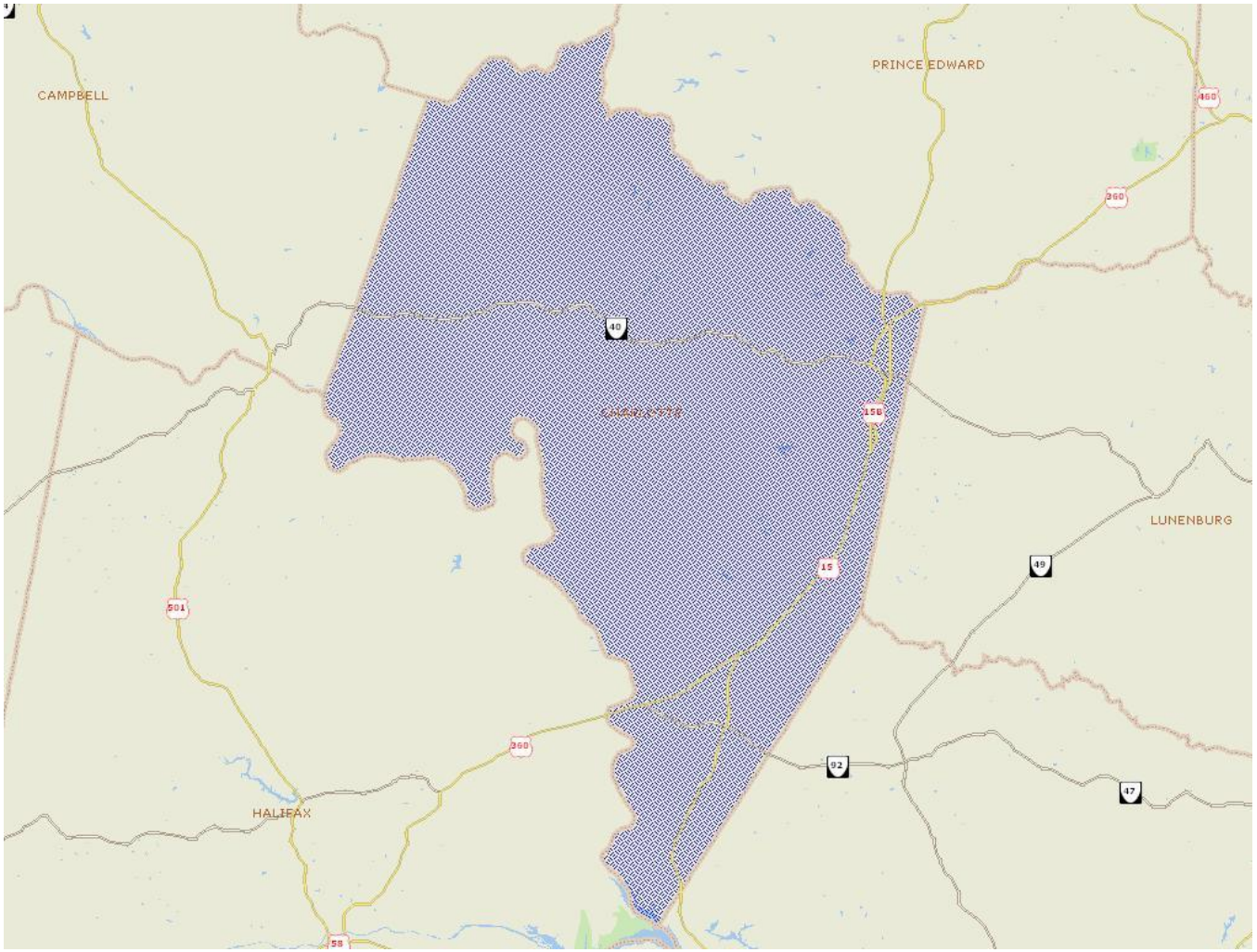
Block Groups



Tracts in Charlotte County



Charlotte County, VA



Broadband Data
Dynamic Query & Roll-up

Block Level

Block Level Data

Aggregated to Tract Level

Census Tract Level Data

Accurate Data

- Nationwide Field-Survey is Required to Assure Accuracy of Coverage Data
  - Provider Data is not Accurate
  - FCC Data is at Census Tract Level
  - State Mapping Programs Data is Not at Street-Level
    - Consumer-Supplied Data Points Added in Some Cases
- Data Accuracy is Critical (99%)
  - Will support $7b in Grants
  - President's Open Government Pledge
  - Sensitive data visible to public

Pennsylvania Broadband Program

- Pennsylvania requires Verizon to provide broadband service to 100% of its customers by 2015 (≥ 1.544 mbps)
- Verizon PA's Network Modernization Plan requires Verizon to file interim reports tracking Verizon's progress towards its 2015 goal.
- The Pennsylvania PUC retained the Liberty Consulting Group to audit the Verizon's most recent interim report

Pennsylvania Broadband Program

- **Verizon's Methodology:**
  - Uses electronic test equipment to conduct a high frequency loss test (21% of records)
  - Uses median terminal loop length of all pairs working at the same terminal (37%)
  - Unknown – Uses this specification when it cannot determine the source of the data (18%)

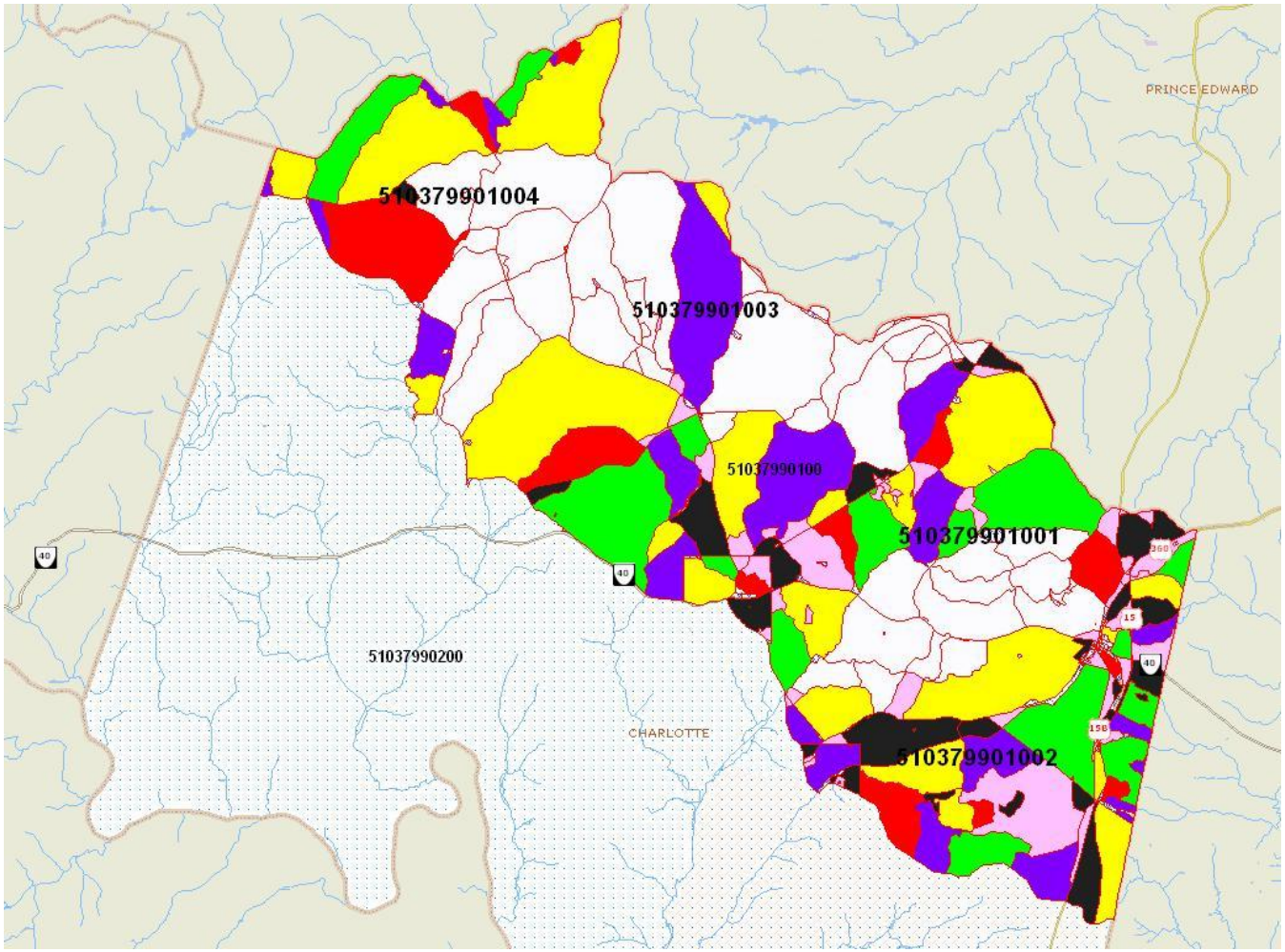
Pennsylvania Broadband Program

- **Audit Findings:**
  - Verizon's method for determining broadband availability (≥1.544 Mbps) does not accurately reflect actual availability
  - Verizon's data includes lines not readily available for broadband service
  - Information provided by Verizon's Golden Source database is not consistent with information provided by Verizon's online website
  - Liberty was unable to replicate Verizon's reported results for broadband and rural DSL availability

Results of Recent Field Audit

- 60,000+ Remote Terminals Inventoried
- Of which,
  - 6,484 Locations were wrong
  - 2,237 Did not exist

Tract Level FCC Data Masks Un-served Areas



State Mapping Programs

- State broadband mapping programs were tailored for each state – not consistent from State to State
- Primary reliance on Provider-supplied Data, not known for its accuracy
- No data model; maps are static “views”
- The requirements of the current broadband mapping initiative are fundamentally different

A Standard National Methodology and Data Model

- A scientific, defensible methodology including field-validation of provider-supplied data is essential
  - Apex offers to develop and license a complete ProField solution for use nationwide – at a substantial discount or free
- A consistent, rich data model is essential for the current national mapping initiative
  - Apex offers to develop and share its data model for national use

Supporting Economic Stimulus

- Apex's methodology involves hiring, training and deploying an estimated 2,000 college students from across the country
- Field Survey work to be completed in the Summer of 2009 – Managed with ProField™
- Project Completion Targeted for Dec 2009

Questions?

Apex's Methodology

- **Step 1: Develop Base Map**
  - Street Data
  - Census Data
  - Political Boundaries
  - Public Buildings
    - Schools (82,000; 28,000-rural)
    - Higher Education (5,000)
    - Churches (400,000)
    - Libraries (9,000)
    - Fire Stations (25,000)
    - Police Stations (17,000)
    - Hospitals (7,569)

Apex's Methodology

- **Step 2:** Build Costing Model
  - By Census Block
- **Step 3:** Collect Provider Data
  - Locations of broadband-enabled terminating equipment
  - Customer addresses
  - Service level and type

Apex's Methodology

- **Step 4:** Geo-Code Provider Data on Base Map
- **Step 5:** Compute Served Area Boundaries using Provider Data:
  - Terrain models for wireless broadband
  - Along streets for telecom/cable broadband

Apex's Methodology

- **Step 6: Define Field-Study Area**
  - Categorize Census Blocks by population density
  - Conflate computed Service Boundaries
  - Include all schools, colleges, hospitals, libraries, churches, police stations and other public buildings
  - Identify Census Blocks to be surveyed

Apex's Methodology

- **Step 7: Develop Survey Instruments**
  - Questionnaire
  - Script and procedure for requesting speed readings
  - Leave-behind educational literature (for un-served and underserved households)

Apex's Methodology

- **Step 8: Customize ProField**
- **Step 9: Conduct Field Data Collection**
  - » GPS Reading
  - » Spectrum analysis for wireless connectivity speeds
  - » If telephone/cable service is available, perform speed tests (or request customer)

Apex's Methodology

- **Step 10: Update Broadband Map**
  - » Correct Service Area Boundaries based on Field Data
- **Step 11: Deliver (or Host) National Website and Mapping Database:**
  - » Dashboard progress reporting with drill-down
  - » On-line Construction Grant Application
  - » Grant Tracker and Evaluator
  - » Public Portals and Tools

Summary

- **Intelligent Maps**
  - Supports real time information updates
  - Allows the NTIA to efficiently use and maintain the broadband maps
  - Compares multiple provider information in a single layer
  - Integrates the mapping project with grant evaluation
- **99+% Accurate Data**

Summary

- Dynamic, Interactive Tool for all Stakeholders
  - Federal & State Governments
  - Provider Community
  - General Public
- Consistent Nation-wide Data
- The Field Survey is used to educate customers
- Supports the President's economic stimulus

How can Apex help?