



Territory of American Samoa

Response to NTIA

*State Broadband Data and
Development Grant Program*



Data Gathering

1. Please explain how you plan to incorporate Residential Broadband Service Pricing data into this task (the application implies this is required by NTIA). Do you have reason to believe that providers will be delivering this data upon request?

In our conversations with various Broadband providers, we have identified many carriers that would be willing to provide extremely more detail about their serviceability and customer data than is expected from the NOFA. It is our intention to incorporate that data (address level data, pricing data) into our database and delivered such data to the NTIA.

2. Please provide more information about your potential plans to automate data collection with providers. Is it your expectation that most providers will have data in a format that makes an ETL process feasible? (if so, please provide basis for this expectation.) What are the specific costs in the first two years associated with developing the ETL scripts (distinct from other aspects of data collection)?

We are establishing relationships with individual providers to allow us to automatically collect and ingest data. Many providers already have systems that enable automated export of address and broadband serviceability information. These processes are typically associated with billing software (ensures the consumer is billed appropriately for the services they purchase) and service records (indicate the physical location where services are performed). Based on the relation that already exists between a consumer, their location, and their broadband services, specific reports can be designed that detail the information we need to collect. Once developed, such processes are easily repeated on a scheduled or on-demand basis.

Upon receipt of a provider's data, BroadMap will ingest this data, run automated standardization scripts, and bring the data into our systems where the analyses and data aggregation (census blocks, tracks, etc.) will be performed.

It is our expectation that at least 25% of all carriers will have data in a format that will allow for us to automate the process. Based upon the work that we have done in the past with the major service providers and the research we have done with a host of small to medium sized carriers, we have knowledge of the methodologies used to produce serviceability data. We utilize that knowledge to estimate the percentage of carriers mentioned above.

The development of the ETL scripts is built into the development cost of the project. With multiple sessions of data collection planned, automation at the data entry point provides the most cost efficient method of data ingestion, minimizing the overall costs of data collection for both the sender and receiver over time.

3. Please provide more detail about how you will integrate data that arrives via fax.

We are highly confident that the data received from carriers will be in a usable digital format that minimizes manual interaction. In the exceedingly rare condition where digital files are not available (such as fax) our plans include leveraging OCR (Optical Character Recognition) technologies for automated translation and/or manual efforts to transfer this information.



Accuracy and Verification:

1. Please define more clearly what you mean by 'sample representative' data... how big of a sample? What criteria are employed to determine that the sample data is representative?

BroadMap employs a holistic approach to data validation. Following the initial mapping of providers' coverage area and serviceability claims, we then:

- Visually and programmatically compare the coverage against 3rd party aggregate data. All differences identified are analyzed. 3rd party aggregate data providers include ComSearch, American Roamer and MediaPrints.
- Visually compare the coverage against any marketing material or websites depicting coverage for that provider. All differences are analyzed.
- Allow carriers to review their data, displayed through a controlled web interface, to ensure that accurate information was supplied. This step helps control against partial data delivery, corrupt data delivery, or translation and ingestion issues that can occur during processing.
- Perform infrastructure analysis. We create predictive coverage models based on available components such as Fiber Networks, Central Offices, and Tower Locations to compare against coverage claims provided from the carriers' data for which differences are identified and analyzed. Infrastructure components are sourced directly from the providers as well as 3rd party aggregators such as Geo-Tel, ComSearch and Navteq.

SAMPLING includes:

- Creating a geographically distributed sample set of locations for which a follow up survey will be conducted.
 - Initially this will be done by leveraging the work being done to support the Anchor Institution requirements of the project. We believe these "Anchor Institutions" are highly incented to provide quick and accurate responses.
 - In addition to Anchor Institutions, our plan includes leveraging the expertise of our data partner, InfoUSA, for surveying business and residential consumers. InfoUSA data is a recognized industry standard and is collected and refined to the highest standards.
- A Crowd Sourcing Tool is deployed via the web to the public in order to solicit location, serviceability, and internet diagnostics that can be gleaned through their Internet Connection (i.e., speed tests.)
- To ensure the sample data is representative, the process takes into account the various confidence levels associated with each type of response and is in line with ISO-2659-1:1999 survey sampling technique guidelines.

In American Samoa, the methods combined are expected to yield, conservatively, over 5% of estimated households and businesses. We firmly believe this plan will allow for a very high degree of confidence and will satisfy requirements.

2. Please provide more information about the plan to provide "spot checks".

Please see above discussion on sampling.



3. Please provide specific examples of how some of the 20 layers of data provided by the territory and others will be utilized for quality control and verification.

The team deploys a compilation process whereby multiple data sources are used in conjunction with comparison techniques to identify areas of conflict. When conflicts are found, they are further analyzed to understand the correct resolution. Specific examples include:

- **Address Locations:** Point Addresses from public and private data providers and street centerline geo-coded locations are compared. Where there are multiple locations for the same address, the situation is investigated and the correct location is assigned.
- **Broadband Coverage:** Direct feeds from service providers, Form477 data, and 3rd party aggregate data are compared. Where there are discrepancies in coverage areas it is investigated and the coverage is adjusted appropriately.

GIS Framework Layers

Type – Census Layers - Cities, Place Names, Populated Places, Population Density, Census Tracts and Blocks

Source(s) - US Census, NAVTEQ

Type – Transportation Terminals and Roads - Airports, Seaports, Roads, Bridges

Source(s) – US Census, NAVTEQ

Type - Hydrography - Streams, Wetlands, Dams, Rivers, Reservoirs

Source(s) – US Census, NAVTEQ, NHS

Type - Cadastral – Land Parcels

Source(s) – First American Solutions

Type – Addresses – MAF and Point Addresses

Source(s) – InfoUSA, NAVTEQ, State

Type – Residential and Business Locations

Source(s) - InfoUSA

Type - Postal - ZIP codes points and polygons

Source(s) - US Census, NAVTEQ

Type – Land Use - Landcover, Landuse

Source(s) – US Census, NAVTEQ

Type - Terrain - Digital Elevation Model (DEM), Contours, Radar-derived DEM (IfSAR), Shaded Relief, LIDAR, Topographic Maps (DRG's)

Source(s) - United States Geological Survey, State

Type - Imagery - Satellite (Landsat, SPOT, IKONS, QuickBird), Air Photos

Source(s) – State, Digital Globe

Type – Anchor Institutions

Source(s) – InfoUSA, NAVTEQ



Type – Points of Interest

Source(s) – State, NAVTEQ

Broadband and Mapping Data

Type – Traditional Telephone Companies - Location of central offices and wire centers with data capabilities. End user data, categories of users, end user codes, speed tier codes, transmission types, and last mile connection points

Source(s) – State Public Utilities Commission Data, ILECs and CLECS providing voice and data services, FCC Form 477 data and Telephone Association Data

Type - Cable System Operators - State Public Utilities Commission Data, Location of central offices and wire centers with data capabilities. End user data, categories of users, end user codes, speed tier codes, transmission types and last mile connection points

Source(s) - Cable Companies, FCC Form 477 data and Cable Association Data

Type - Wireless (Cellular) Service Providers - Vertical asset locations and coverage areas for various classes of services. End user data, categories of users, end user codes, speed tier codes, transmission types and spectrum utilized and tower locations.

Source(s) – Wireless Companies and Wireless Associations, ComSearch and American Roamer

Type - Wireless (Other) Service Providers - Includes fixed, mesh and mobile wireless data providers such as Wi-Fi, WiMAX and microwave. Vertical Asset locations and coverage areas for various classes of service. End user data, categories of users, end user codes, speed tier codes, transmission types, ARPU, spectrum utilized and tower locations.

Source(s) - Wi-Fi, WiMAX, Fixed Wireless and Microwave based companies, WIMAX Forum, ComSearch and American Roamer

Type – Fiber Infrastructure Providers - Fiber maps of long-haul, middle mile and last-mile connectivity plus geo-coordinates for on-net buildings, fiber to premises services and coordinates/addresses of serviceable locations

Source(s) – NAVTEQ, Service Providers Data, Private Sources

Type – Satellite and Data Providers - Specific footprints, delivery options and performance data End user data, categories of users, end user codes, speed tier codes, transmission types, and last mile connection points

Source(s) – Satellite Providers

Type – Middle Mile and Long Haul Infrastructure Providers - Fiber interconnections between population centers and other long distance fiber transport capabilities and infrastructure

Source(s) – NAVTEQ, Fiber infrastructure maps collected from public sources

Type – Metro Fiber Infrastructure – Fiber Infrastructure

Source(s) – NAVTEQ

Type – Wireless Spectrum Data - Spectrum holdings, graphic representations of telecom systems, Microwave and Antenna database, license information, classification of spectrum and incumbent license data



Source(s) – Comsearch, American Roamer

Type – Wireless Tower Locations - Geographic locations of wireless tower structures

Source(s) – ComSearch, American Roamer

Type – Cable Service provider Boundary Data - Geographic boundaries for cable licensees with varying layers for different classes of service including high-speed Internet

Source(s) – MediaPrints, Media Biz

Type – DSLAM Locations - Deep fiber penetration and DSL service origin

Source(s) – ILECs and CLECS providing voice and data services

Type – Data Center Location Data - Location and capabilities of data centers in major metropolitan areas

Source(s) – NAVTEQ

Type – Anchor Institution Data - Key data for Anchor Institutions (Schools, Libraries, Medical and Healthcare Facilities, Public Safety, universities) including location, category, technology and speed of service

Source(s) – InfoUSA, Market Data Retrieval, Department of Education, Schools Health and Libraries Coalition and Digital Connectors

Type – Crowd-Sourcing Data - End user based tool that provides information on speed, price, technology and location

Source(s) – New America, MLabs and Google

Type – Digital Connectors Data – Survey information accumulated through the efforts of the Planning Initiatives

Source(s) – One Economy

Type – WISP Data – Compilation of Wireless Internet Service Provider location data

Source(s) – New America, ComSearch

4. Who is the “conference center partner” and who are the “data partners” mentioned in the verification section? Please provide additional information about these partners and their role in this project.

InfoUSA is our conference center provider. There are several other examples of public and private providers of geographic content for landmarks and points of interest such state agencies, NAVTEQ, Market Data Retrieval and others. BroadMap partners with many sources –including the service providers themselves – to ensure the highest possible quality of data to be supplied.

5. Has the web-based data access tool (provider verification) already been created? If not, will its development costs be shared across all of the One Economy contractor projects? Is this tool at all integrated with the public Broadband Atlas web application, or being developed independently?

BroadMap is currently building the core technology for the following web-based data access tools:

1. Single provider access for map data verification and quality control
2. Map Enabled Crowd Sourcing tool



3. State Broadband Atlas web application

The core technology – a state-specific, data-driven geographic information system – is shared across all tools, with different information and functionalities exposed to different intended users/audiences.

6. The application describes identifying discrepancies via algorithms such as comparing aggregated data to inter-connect network capacities. Please provide more information about how you will determine the inter-connect network capacities. If based upon infrastructure data, how will you be verifying the infrastructure data?

We gather infrastructure data in much the same way as broadband serviceability data. Our provider outreach program includes requesting the necessary interconnection points and associated data directly from the providers. In addition, we are also leveraging infrastructure data from 3rd party data aggregators including GeoTel, ComSearch, Navteq, and Pitney Bowes. We leverage comparison and analysis techniques between the sources to create the most accurate infrastructure layers.

We then create predictive coverage models based on available components such as fiber networks, central offices, and tower locations to compare against coverage claims provided by the carriers. Where anomalies or discrepancies are found, they are further investigated and analyzed.

7. Why are you planning to specifically survey the areas with anomalies in order to establish a statewide baseline? Wouldn't the non-anomalous areas be better suited to establishing a baseline (against which to compare the anomalous areas)?

The phrasing of this piece of the application was perhaps misleading. We survey a geographically distributed, statistically significant sample of data in order to validate our initial baseline. After the initial baseline is set, where statistical anomalies occur, we deploy more detailed analysis in order to model the actual coverage on the ground. This in turn refines our baseline and provides a more accurate picture of the broadband landscape.

Baseline Mapping

This project requires the establishment of a solid base map for the Territory for three main purposes:

Locating addresses

The two most important geographic data components of the broadband initiative are broadband availability extent and address location. In order to provide accurate tabulation of broadband availability by address or even by Census Block using address information requires locating each address and determining its service. There are numerous methods of locating addresses, each with associated resulting accuracy expectations. Since broadband availability for many technologies can vary even within a large parcel, it is important to locate addresses at as high a positional accuracy as reasonably possible.

American Samoa, as with many islands, has a mixture of old and new GIS data of varying levels of detail. E-911 house numbering has not been instituted, and naming, street, building and parcel data is out-of-date and incomplete. Additionally, natural disasters continue to have a large impact on the landscape, including the location and addressing of buildings. In order to generate a mapping of addresses to broadband service that would support the NTIA requirements it is critical that a complete base map including broadband-serviceable structures, streets, and associated attributes be created.



Leveraging the existing GIS framework will help make baseline mapping more efficient, but most areas will need to be surveyed to capture current building locations associated with the correct street access. When possible, imagery (typically sub-meter aerial photography) will be used to effectively capture and/or validate features at a greater speed than land survey.

Mapping

A key component of a GIS system aimed at correlating addresses and the various broadband options is a robust visualization environment. Mapping these features in the proper context of other relevant features such as topography, land use / land cover, and water allows for more complete understanding. The more complete the picture the more complete the understanding of what we are looking for.

We also intend to leverage this reference data in a mapping context for end-users trying to locate themselves without an address. By having a complete, accurate, current base map backdrop, typically used in conjunction with imagery to show non-vector features, a user can find their home/business much more easily than with lesser data.

Maintenance

Clearly the GIS environment is critical to the initial build of the address-to-broadband data relationship. Once this is established, we need to ensure that updated source data is properly ingested and processed through the system. As new streets are built, houses built, older buildings replaced, and other common occurrences, the administrators of the GIS system will need to keep the base map up-to-date. To allow and encourage use of computer GIS for this maintenance, the underlying base map should be modeled and adapted to this purpose.

Accessibility:

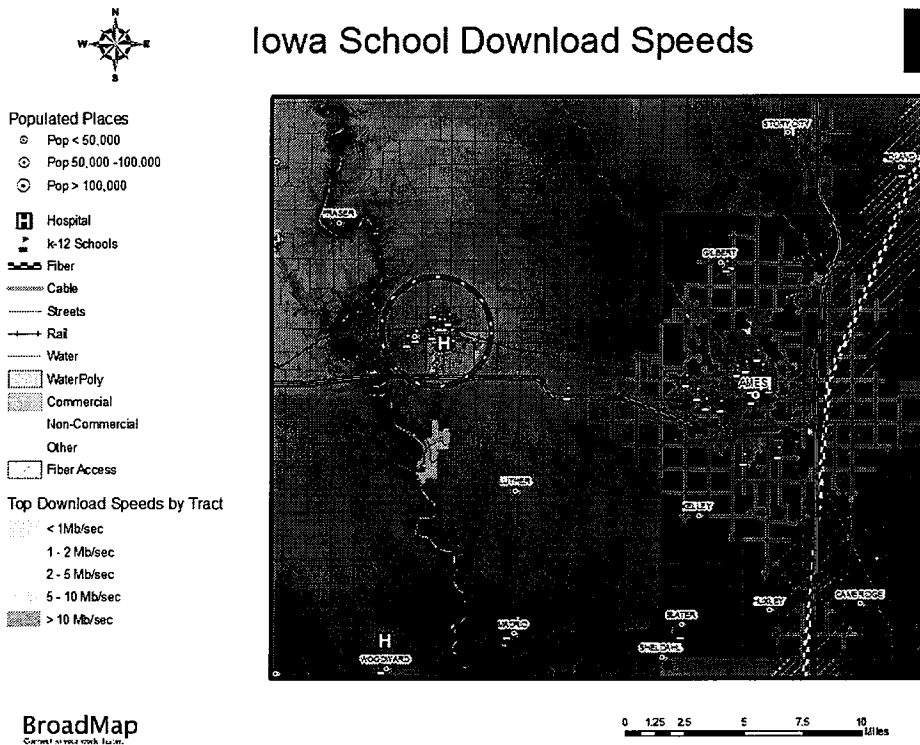
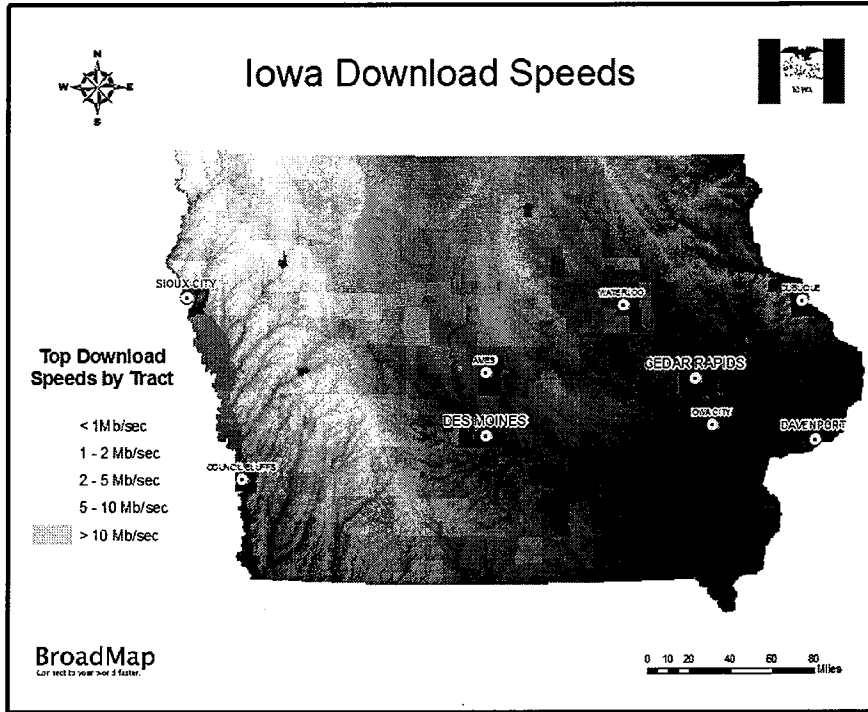
1. In the section describing the Broadband Portal's potential uses, many planning purposes are proposed. Are there costs associated with these uses now, or is this simply a description of potential uses?

This is simply a description of potential uses of the website.

2. Are mock-ups or more detailed descriptions of map available... or can you provide a link to a different mapping application that your project team has previously implemented?

Please see below for mock-ups. Please note these are samples.



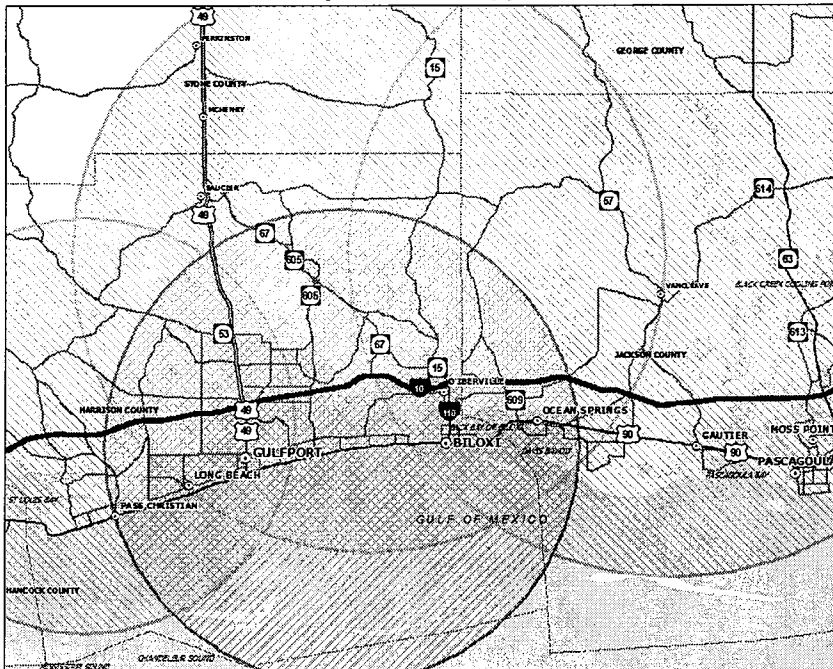




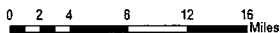
Mock Cell Coverage Biloxi - Gulfport, Mississippi



- 3G Cell
- Standard Cell



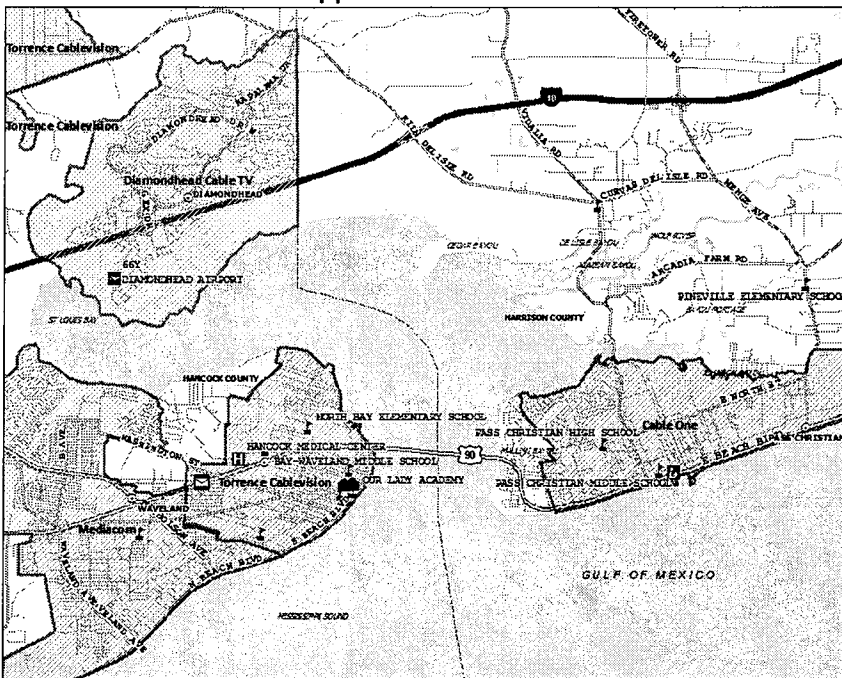
BroadMap
Copyright © 2008



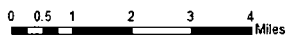
Historic Cable Coverage Mississippi Gulf Coast



- State Capital
- Civic Center
- City Hall
- Court Building
- Police Department
- Post Office
- College/University
- School
- Library
- Hospital
- Train Station
- Bus Station
- Airport
- Historic Cable



BroadMap
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3. How will the public be made aware of the availability of this broadband map?

We will take the following steps to generate awareness:

- To make the public aware of the existence of the website, we are already working actively with communications and marketing teams to do public outreach, including media outreach, press releases, op-ed pieces, and appropriate blogs.
- We are leveraging social media websites (Facebook, Twitter) with all of our partners, including One Economy and New America, to discuss Broadband and encourage the public to visit our Broadband Portal.
- We will link the Broadband Portal to existing partner's websites.
- We are working with Google on an adwords campaign to drive users to our website.

4. What is the timeline for the map being publicly available? Is this encompassed by the "Launch of All Broadband Provider Data" item (March 1, 2010), or does that refer only to the underlying datasets themselves being complete?

March 1, 2010

Security and Confidentiality:

1. Please provide more information about the specific data security protocols in place and whether the partner who maintains the data currently secures any data with security implications. For any partner who will have confidential/secure data reside on their own systems, what are the cyber security protocols in place, and are these same standards/methodologies consistent across all partners? Is the project team working with the respective territory's Department of Homeland Security on this project?

BroadMap's security is two-fold: IT-based (role-based user/password, and IP-locking as examples) and metadata-based (explicit identification of confidential data within the system to ensure that it is filtered, summarized, or otherwise reduced to an acceptably non-confidential level in publicly accessible interfaces).

More specifically, BroadMap's wide variety of security measures includes:

- Encryption: When data with security implications is stored on computers, it is stored in encrypted files.
- Air Gap: When BroadMap receives data with security implications, it is stored on a computer that is isolated from BroadMap networks via a high-resistance air gap, meaning that the computer will not be physically connected to the BroadMap network or any other network, and the computer will not have any wireless networking capabilities, including, but not limited to 802.11b and Bluetooth.
- Database: Direct access to databases will not be enabled for entities outside the BroadMap network. database access to data with security implications will only be accessible via applications that implement https. Database access to data with security implications will only be granted to users who need-to-know, have strong usernames and passwords and specific roles.
- Passwords: Employees use strong passwords on domains and change them monthly. Previous passwords will not be allowed.



- **Experience:** BroadMap' employees have had secret Department of Defense security clearance. We have had training and experience with managing proper protocol for handling data with security implications. Additionally, we have had training and experience with web applications design, development and implementation that incorporated the following security factors:
 - Top Secret networks, data and information that could seriously harm the security of the United States and allies.
 - Network authentication using https.
 - Military-issue Common Access Cards (CAC) (Smart Cards) which contain certificates for network and web service authentication.
 - Web application design, development and implementation with Java and C# in this environment.
- **Background Checks:** BroadMap performs background checks on employees during the hiring process to ensure that they are not likely to be compromised.
- **Software:** BroadMap implements Norton Internet Security software on all BroadMap computers. BroadMap implements Symantec Enterprise Security Manager software to prevent data spills.
- **FTP:** BroadMap employs SFTP, or secure ftp. This means all information passed between client and server is encrypted, including both the login credentials and the data itself.

Metadata:

The IT-based measures ensure how hardware and software are used to securely control access to the confidential data. This is possible because at the same time, metadata inside the core database and within the MapConnect product make it clear what data can and should be accessible.

There are two main components of metadata that apply to security and confidentiality:

- **Inheritance:** Confidential data is flagged during its first inclusion in the database and monitored at all times through its life within the process flow. As features are copied, split, merged, edited and validated the metadata associated with each attribute is inherited onto the resulting feature(s) appropriately.
- **Summarization:** The BroadMap internal database used for all compilation, conflation and other process steps has full access to source data, whether confidential or not. However, when this data is converted into a product form and location, the metadata is used to properly filter, summarize, or otherwise reduce the data to a confidentiality level appropriate to the authorized audience. For a public web application, for example, no confidential data will be accessible or even present on the web server.

Applicant Capacity, Knowledge, and Experience:

1. As described in the NOFA, please provide a description of the knowledge and experience of the applicant and associated project personnel. If you have not yet hired for certain positions please provide a description of the qualifications and expected work activities for these positions, and note whether these are new hires.

The attached resumes are provided to illustrate the depth of knowledge and experience of One Economy and BroadMap. Additionally, we have provided an overview of our experience below:



QUAN VU – CHIEF TECHNICAL OFFICER - Quan Vu has over 23 years of digital mapping experience and is a senior executive who has worked for leading GIS mapping and navigation companies, such as Etak, subsidiary of News Corporation, subsidiary of Sony and Tele Atlas, one of the leading global digital mapping companies. Through out Quan’s career, he has served in various management and senior management roles and responsibilities from Engineering, Operations, Product Management, Product marketing, Sales and Business Development. Quan has over 18 years of international business experience and traveled the globe to develop GIS / navigations products and global partnerships in various industries. Quan holds a BS degree in Computer Science Engineering from San Jose State University.

MARK NEWCOMB – SENIOR DIRECTOR, PRODUCT DESIGN & DEVELOPMENT - Mark Newcomb accumulated over 19 years of experience designing, managing, developing, documenting, and supporting relational databases, spatial databases, and digital map products at Etak and Tele Atlas. As a database designer and manager, map production expert, GIS Engineer, Sales Engineer, Product Architect, and Product Manager, he had to understand all the details related to complex geographic and non-geographic databases. He was recognized as the subject matter expert on Tele Atlas global map products. He was the last line for customer support and on the front line communicating product details with Product Managers and technical teams of major partners and customers. He received a Bachelor of Arts in Geography from the University of California at Santa Barbara in 1988.

JESSE SHERIDAN – SENIOR DIRECTOR, GIS MAPPING AND SUPPORT - Jesse Sheridan has been a professional in the GIS industry for over 15 years. During that time he has focused on product, database, and quality design in support of thousands of customer applications. In his tenure at Geographic Data Technology (GDT) he managed the Customer Support department and later developed their Transportation and Display product lines, including hands-on involvement with all aspects of the production. At Tele Atlas he managed the global specification department, distributed across North America, Europe, and Asia. In all roles he has been a go-to GIS engineer when needed and the preferred interface for important partners around the globe. He graduated from the University of Vermont in 1993 with a BA in Geography, and a strong minor in Pure Mathematics.

Chris Mabey, Senior Mapping Technician and Customer Support – Chris has over 14 years of GIS experience from the GDT/Tele Atlas direction. The majority of his efforts were in managing the Mapping Services Department, where deliverables ranged from presentation quality maps (to support global sales and marketing), to large scale cartographic production of atlases, locator maps, and custom territory boundaries. Other roles that Chris undertook included managing the Customer Support department, and coordinator of the Database Improvement Department (which encompassed the core production of Geographic Data Technologies’ North American dataset). He graduated from Johnson State College in 1987 with a BA in Environmental Studies.

Dennis Ulatowski, GIS Mapping Technician and Customer Support – Dennis has over 12 years of GIS implementation experience and spatial analysis expertise in small- to large-scale organizations within both the public and private sectors. During his career, Dennis has spearheaded a number of high-profile projects, including complex spatial analyses to support major urban planning projects in New York City, deployments of GISs to satisfy mandates for emergency preparedness to meet Department of Homeland Security requirements, and the establishment of technical quality assurance frameworks for deliverables to navigation database customers. He holds a B.A. in Geography from SUNY-Geneseo and an M.S. in Resource Administration from Antioch New England Graduate School.



Aaron Fritz, GIS Tools Engineer - Aaron comes to BroadMap from the Cayman Islands Government, where he was a lead GIS Programmer working with Land Registry projects for various Caribbean Islands. His role involved many of the same tools, methodologies and goals that we share at BroadMap, lending a specialized understanding for our Island partner projects. Prior to working in the Cayman Islands, Aaron worked at Tele Atlas and GDT developing prototype and production GIS code in a variety of languages and contexts. Aaron built the core internal tools, such as, the metadata storage and maintenance systems, conflation technologies, editing environments, and the baseline mapping toolset. Aaron holds a B.S. in Wildlife Management from the University of New Hampshire and an M.S. in Geography (GIS/Remote Sensing, Software Engineering) from Utah State University.

Mike Davern, GIS Tools Engineer – Michael comes to BroadMap with over 13 years experience in the GIS, mapping, and navigation arenas. His experiences include digital cartography and technical development at Rand McNally, technical support at Intergraph Corporation and Geographic Data Technology, and data analysis and process automation at Tele Atlas/GDT. Michael has developed production tools and processes to support GIS data evaluation and standardization, conflation activities, and metadata maintenance, just to name a few. Michael holds a Master of Arts in Geography – Physical Environmental Systems from Binghamton University, and a Bachelors of Science in Geography from SUNY-Cortland.

Todd LaClair, Senior Systems Administrator – Todd, an experienced IT technician with over 14 years experience is responsible for building and maintaining our vast data center. He works closely with both our partners and technical teams to ensure highest availability of all production systems and maintains the technical infrastructure to meet the workflow standards needed to set by all groups; technical and business.

BRIAN SCAFFIDI – SENIOR DIRECTOR, QUALITY ASSURANCE AND SOURCING – Brian Scaffidi has accumulated over 11 years of experience in the digital mapping space. His background includes project management and product quality roles at Tele Atlas. Additionally, Brian has experience in digital cartography management, product analysis and database architectural development and engineering. Brian received a Bachelor’s Degree in Geography from the State University of New York. Brian and his team are responsible for Quality Assurance and Quality Control, Technical Sourcing Acquisition, and Product & Services Testing. Additional responsibilities include:

- Development QA/QC strategies and programs.
- Development of source code control methodologies, Quality Assurance methodologies.
- Interface with broadband source providers and other data sources
- Code, script, and process development of QA/QC programs to meet standards developed by NTIA and the State of Georgia.
- Sourcing of Broadband and related data sources

MARKETING

JOY MOREL, CHIEF MARKETING OFFICER - Joy brings a wealth of experience and leadership in enterprise and consumer business marketing. She most recently helped establish GPS as a major consumer category in her work at Tele Atlas, a global mapping company, by creating strategic partnerships with national retailers including Best Buy, Wal-Mart, Target, and RadioShack as well as OEMs within the automotive navigation space. Earlier in her career, at AOL Joy managed areas within Interactive Marketing and Communications, building integrated marketing campaigns. Her work with AOL grew to include Partner Marketing where she helped to drive awareness and demand for broadband service,



expanding the company's reach via the promotion of large consumer partner brands. Joy leverages her proven expertise in managing complex marketing activities and in building partnerships to enable long term growth, profitability and client satisfaction. A graduate of the Pamplin College of Business from Virginia Tech, Joy holds a Bachelors of Science in Marketing and Communications.

Caroline Life, Director, Partner Marketing – Caroline is a consummate marketing and communications professional, much of her time being spent in the GIS world, including over eight years at Etak/Tele Atlas in various marketing roles. Most notably, Caroline helped to launch the Tele Atlas brand in the U.S., as well as the company's first turn-by-turn map database. She most recently was part of their Channel Marketing team, where she cultivated relationships with large retail partners including Best Buy, Target, and Walmart. Caroline will lend her expertise to each state/territory broadband mapping program to drive consumer awareness and adoption of broadband. Caroline has a BA in English from the University of Wisconsin–Madison.

Todd Schmitt, Senior, Product Manager – Todd, a GIS professional, joins BroadMap from GDT/Tele Atlas, where over the last 11 years he performed a number of roles in project management, product management, and marketing, including bringing several new products to market. Throughout his career at Tele Atlas, Todd worked closely with clients in a variety of industries including tool providers and application developers, business intelligence, risk management, banking, demographics, utilities, state governments, and telecommunication companies. Todd maintains a holistic and structured product management process enabling BroadMap to bring the best possible product to market. Todd holds a BS in Financial Management from Franklin Pierce College and an MBA from Plymouth State University.

PROGRAM MANAGEMENT CENTER OF EXCELLENCE

Tony Hook – Program Management Center of Excellence - Tony has extensive experience in Project Management. He carries Project Management Professional (PMP) and Prosci Change Management certifications. He has over 13 years experience in developing, implementing and monitoring projects including responsibilities for project management governance, tools and processes. His previous work experience includes key roles with Brown-Forman Corporation and United Parcel Service. Tony holds a Masters of Science Degree (Applied Information Technology) in 2006 from Bellarmine University and a Bachelors of Administration in Finance from the University of Louisville in 1993

Tony and his team are responsible for:

- Development and implementation of the Program Management Center of Excellence focused on the development of a project management methodology including templates, guides, best practices and techniques
- Oversight of the enterprise project portfolio management application
- Program Management of all Broadband Mapping initiatives
- Resource capacity management
- Project Administration Metrics

Kristen Rousseau, Business Analyst – Kristin has spent the last 8+ years in numerous GIS roles, including business architect, project manager, quality architect and operations. Throughout her career, she has worked to improve internal processes and quality. Kristin is responsible for eliciting requirements, developing functional use cases and managing requirements while developing processes for these activities. She manages these processes by working with our internal teams and clients to facilitate requirements understanding and application specification development. Kristin is a Lean Six Sigma Yellow Belt, earned at the Thayer School of Engineering at Dartmouth, she is an Internal Auditor ISO/TS



16949:2002 - QAI – Training for Quality, holds a Project Management Certificate from the University of New Hampshire and has a diploma in Computer Technology from the ECPI College of Technology.

Clara Hook, Data Resource Specialist – Clara comes to Broadmap with 15 years Information Technology experience from Humana, Inc. and Kindred Healthcare. Clara has a Master Degree in Applied Information Technology from Bellermine University. She has played many roles throughout her career, such as, being a Business Analyst, Application Quality Tester, Project/Program Manager for small to enterprise wide projects, and an IT Manager for 7 years.

Melissa Hipes, Financial Analyst – Melissa comes to BroadMap from Capital One, where over the last 10 years she has held numerous leadership roles in Accounts Payable, Accounts Receivables, Cash Management and Fraud Detection. Throughout her career, she has worked with cross-functional teams to develop and improve internal processes. Melissa is responsible for BroadMap’s internal processes for capturing employee time, billing, contract management, audit, project and department budgeting.

THE TERRITORY OF AMERICAN SAMOA

The Territory of American Samoa through the Governor’s Office takes the lead as the applicant of record for this program. The Territory will utilize the resources of the American Samoa Community College (ASCC) as the overall technical project manager.

For the current project, ASCC is responsible for:

- Project Management of overall project initiatives.
- Facilitate local contacts for the project.
- Facilitate GIS curriculum planning and implementation between ITT, MIS and Broadmap.
- Facilitate local hiring or project employees.
- Liaison for ASG Office of the Governor for project decisions.

AMERICAN SAMOA COMMUNITY COLLEGE

Grace Tulafono, Chief Information Officer – Grace comes to American Samoa Community College with 11 years of IT experience, 5 of which have been at ASCC. Grace has a Master of Science degree in Information Systems from Hawaii Pacific University. Throughout her career, she has worked in technical support, system implementation, and project management. Grace has completed three major projects since starting at ASCC involving technology grant implementation and one major administrative software system implementation.

Arlene Sewell, Assistant Chief Information Officer – Arlene comes to American Samoa Community College with 10 years Information Technology experience in technical support and system administration. Arlene has her Bachelors of Science Degree in Information Systems from Brigham Young University – Hawaii. She has been involved with various projects in Health, Telecommunications, and Education environments. Throughout her career has worked on projects implementing new innovative options to improve productivity.

Sal Poloa’i, Technology and Curriculum Specialist - Sal comes to ASCC with 18 years of experience in Information Technology and instruction. He has a Masters Degree in Instructional Technology and Telecommunications from the Western Illinois University. He has extensive experience with grant proposals and implementation. Throughout his career, he has been an influential Board and Committee member of both government and private sector organizations.



AMERICAN SAMOA DEPARTMENT OF COMMERCE

The American Samoa Department of Commerce is one of the founding members of the American Samoa GIS Users Group, which was established in 2002. ASDOC's GIS Program primarily focuses on the management of coastal resources, land use management and economic development in the Territory. It has been a key partner in the development of GIS since the Territory started using GIS in the late 1990s. ASDOC houses and maintains the GIS databank for the Territory. The staff currently houses and IT & Communications Specialist, who deals with the Information Technology end of GIS and two GIS Specialists, who deal with day to day GIS for the department.

2. Please provide specific examples of past mapping projects completed by the contractors.

BroadMap employees have worked on projects for the states of New York, Tennessee, Connecticut, Pennsylvania, California, and many others as well as for FEMA, USDA, DEA, FBI, CDC, DOT, and DOE.

One such project was the creation of a single, enterprise-wide street database for use by all state, municipal, and county agencies in the State of Tennessee. The custom database covered all of Tennessee's 95 counties as well as more than 50 contiguous counties in eight bordering states and was widely credited with cutting costs and improving public safety response.

GOVERNMENT MAPPING EFFORTS

Our team has worked closely with State and County departments (Police, Neighborhood Services, Assessor and Tax Collector) to engineer applications specific to the customer's specifications before some of today's more advanced technologies even existed giving us a strong understanding and knowledge of the intricacies needed to develop the mapping needs of today. Here are some examples:

SFGIS: (San Francisco Enterprise GIS Dept.)

http://www.sfgov.org/site/gis_index.asp

We also developed many application designed to be housed behind City firewalls for "in house" use for Police, Fire, 911, Public Utilities Commission, and Street Departments as some examples.

Internal cartography development: http://www.sfgov.org/site/gis_index.asp?id=368

SFGIS Applications: http://www.sfgov.org/site/gis_index.asp?id=371

SF Prospector: http://sfgov.org/site/sfprospector_index.asp

<http://gispub02.sfgov.org/website/sfprospector/ed.asp?cmd=start2&nvis=ncor>

SF CrimeMaps: http://www.sfgov.org/site/police_index.asp?id=23813

SFGIS GIS Data Catalog: <http://gispub02.sfgov.org/website/sfshare/index2.asp>

SFParcel: <http://gispub02.sfgov.org/website/sfparcel/INDEX.htm>

SFViewer: <http://gispubweb.sfgov.org/website/sfviewer/INDEX.htm> (IE - Internet Explorer required)

SFFind: <http://gispubweb.sfgov.org/website/nuviewer/monsmmap.asp>

SFPUC: (San Francisco Public Utilities Commission): Many of the "in house" GIS web mapping applications for the SFPUC are not displayed to the general public due to Homeland Security concerns:

http://sfwater.org/msc_main.cfm/MC_ID/35/MSC_ID/393

http://sfwater.org/mto_main.cfm/MC_ID/14/MSC_ID/117/MTO_ID/218

PLANNING & CROWD SOURCING

One Economy has years of experience in the Broadband Planning space and has assisted lower income families in their efforts to gain access to Broadband at an affordable cost. Their experience in the Broadband space extends back to the early days of Broadband. New America provides our consortium



with an enormous amount of experience in the wireless space and access to some of the most innovative crowd sourcing tools available. Their relationship with Google allows for our team to have access to infrastructure across the country to collect speed and user data that is being incorporated into our database.

M-labs

www.measurementlab.net

Through the creation of the MeasurementLab (M-Lab) platform, New America provides consumers and academic researchers with real-time feedback on the speed and quality of their Internet connections. The M-Lab was founded by New America's Open Technology Institute (OTI), Google Inc., the PlanetLab Consortium at Princeton University, and other academic researchers to enhance Internet transparency and to sustain a healthy, innovative Internet.

Since its launch in late January, millions of individual consumers have used M-Lab to test both the speed and the quality of their broadband connections by briefly communicating with a server elsewhere on the Internet. This provides the consumer with immediate feedback, provides Internet researchers with aggregate data to discern patterns and, in the context of broadband mapping, M-Lab can add geographically specific queries in order to generate views and reports that reveal the actual user experience in discrete local areas. All data collected via M-Lab is openly available to the academic research community to allow researchers to build on a common pool of network measurement data.

Greene County, NC – Beyond Tobacco

<http://www.co.greene.nc.us/beyondtobacco.aspx>

Beginning in November 2003, a diverse team of stakeholders, including the Greene County local government, the school system, grassroots leaders, and social service providers, used technology and its tools to positively impact the pressing economic needs in the area. The technology infusion began at the school-level by bringing Apple I-Books to each 6th through 12th grader in the County. However, the schools and the community quickly realized that without broad-based, affordable access to the Internet, the benefits of technology would be severely limited in the community. In November 2003, Greene County Leadership began working with One Economy to help develop Internet tools and content for the community. Over the next 24 months, Greene County developed free Internet hotspots at schools and fire stations. The County then contracted with Internet Service Provider, Wavelength, to create a municipal broadband solution for the entire County.

One Economy's Community Outreach and Web Planning Tools:

<http://www.thebeehive.org/>

<http://www.247townhall.org/>

<http://www.ziproad.org/>

<http://www.pic.tv/>

We are also in the process of developing a relief web site for our partners in American Samoa helping them recover from the current tsunami crisis: **<http://americansamoa2009.emergencyzone.org/>**

DATA VERIFICATION

Our team also built a tool to collect real-time, consumer feedback about the changes happening in their local communities, used this data to verify changes in the map data, then after verifying the data and accuracy, incorporated the real world changes into the map: **<http://mapinsight.teleatlas.com>**



3. Please ensure that you clearly delineate the specific responsibilities for each partner mentioned in the project (both public and private).

Eligible Entity: Office of the Governor of American Samoa
 Contractor: American Samoa Community College
 Demand Planning: One Economy
 Data Collection Work: BroadMap LLC
 Mapping: BroadMap LLC

Roles	Responsibilities
Program Manager	Focus on oversight of project management application, development and implementation of methodology, guides, best practices and metrics.
Technical Project Manager	Focus on assisting with managing the day-to-day details of the technical execution and is also specifically tasked with ensuring high quality standards are met.
Database and Requirements Engineer	Responsible for creation and design RDBMS database model to store Broadband maps, demographic data, broadband assets and services. Also responsible for the creation of collection requirements and specifications for all databases.
Database Administrator	Responsible for managing and coordinating project database services.
GIS Systems and Mapping Engineer	Responsible for deploying the selected GIS suite of tools for production; write required production scripts and tools to interact with and or to incorporate other 3rd party sources.
Applications and Tools Engineer	Responsible for working with Google KML and Microsoft.net / Bing environments to integrate 3rd party data and applications on top of Google Earth or Microsoft Virtual Earth.
Geo-coding and Conflation Engineer	Responsible for developing algorithms and tools to perform geo-coding and reverse geo-coding to assist with geo-coding functionality. Will manage geopolitical and postal structures.
Sr. Quality Control Manager	Responsible for the overall quality metrics which includes measurement criteria, definition of quality requirements, development of quality tools, and quality & certification processes. Responsible for conducting and executing quality control / assurance programs to ensure that all input data sources and generated map data meet quality control specifications and requirements.
Senior Web Designer	Responsible for Broadband Portal development; integration with Google maps or MS Virtual Earth and One Economy content to render broadband availability and serviceability result.



Cartographic Specialist	Responsible for the production aspects of street map data manipulation, X boundary generation, creation and aggregation, geo-referencing 3rd party data, such as demographics data and serviceability data to highly accurate street map data. Also responsible for the formatting and preprocessing of 3rd party input sources to meet preproduction specifications and requirements.
Data Sourcing Manager	Lead for managing the relationship with all data providers that are utilized as part of the State Broadband Mapping program.
Director, Product Marketing	Responsible for building marketing relationships with BroadMap's partners, and will work on marketing programs for the states and territories, corporate and partner projects.
Product Manager	Product Manager will ensure BroadMap follows a holistic, structured product management process to assure that products meet requirements.
Mapping Specialist	Responsible for using broadband availability source data to update and correct the BroadMap core database. Edits may be prompted by updated data inputs, QA results, or any other specific requests. The Mapping & Support Technician will be in direct contact with customers, supporting BroadMap's products and services.
Data Sourcing Specialist	Responsible for managing the relationship with all data providers that are utilized as part of the State Broadband Mapping program.
Data Analyst	Responsible for the identification, acquisition and analyses of source material used for the broadband mapping initiative.
Mapping - Field Specialist	Responsible for capturing data in the field using specialized GIS equipment, software, and techniques. Collection will include initial survey of newly mapped areas and/or revisions of existing map data. All collection will be done using highly accurate and precise techniques as described by BroadMap instructions. The Data Collection Technician will interact with local residents and businesses to ensure understanding of local geography and support for the mapping effort.
QA Specialist	Responsible for the development, documentation and implementation of Quality procedures and testing plans as it relates to GIS data procurement, software development, and commercial release of GIS data products and software applications including web-based products, services, and infrastructure. The Quality Specialist will also ensure that quality requirements are clearly articulated and agreed upon by all relevant parties.

Expedient Data Delivery:

1. Please explain the purpose, use and estimated cost of integrating Form 477 data into the initial set of data.



Form 477 data is readily available, standardized data that contains the basic components to satisfy some, though not all, NTIA requirements. Despite lacking the granularity necessary, Form 477 data provides a good baseline for where coverage exists and provides a basis for quickly understanding the wider broadband landscape. Estimated costs are 1 week Engineering and 3 weeks technician.

2. Please provide substantially greater detail in your timeline. For example, what is the expected timeline for provider outreach? When will on-the-ground verification and sampling activities take place? What is the expectation in regard to the development of NDAs?

Project Timeline	
Tasks	Timeframe (From Grant Award Date)
Initiation - Concept, Stakeholder List, Project Charter, Project Contract	10 Days
Planning - Work Plan, Training Plan, Project Management Plans, Data Source Plans & Designs	20 Days
Acquisition of hardware, software and data sources	1 Month
Finalize NDAs with Providers	1Month
Provider Outreach Completed	3 Months
Requirements Definition - High-Level Functional Requirements, Federal & State Reporting Requirements, Functional Use Cases, Data Requirements, Technical Requirements	15 Days
Initial config, integration, implementation, data ETL, output definition	1 Month
Generation of initial analysis and results	45 Days
Refinement of analysis and results, sampling, on-the-ground verification and integration of additional sources & capabilities	3 Months
Completion of the development of dynamic mapping platform. Full integration of all carrier serviceability data and third party source data	4 Months
Data Updates 1 - Verified broadband service provider updates, Community Anchor Institutions updates; public access data updates, newly licensable data as they become available; core digital map updates; state, regional and municipal agencies updates; key demographic information updates; updated reports and datasets as required by the NTIA	10 Months
Data Updates 2 - Verified broadband service provider updates, Community Anchor Institutions updates; public access data updates, newly licensable data as they become available; core digital map updates; state, regional and municipal agencies updates; key demographic information updates; updated reports and datasets as required by the NTIA	16 Months
Data Updates 3 - Verified broadband service provider updates, Community Anchor Institutions updates; public access data updates, newly licensable data as they become available; core digital map updates; state, regional and	22 Months



municipal agencies updates; key demographic information updates; updated reports and datasets as required by the NTIA	
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3. What is meant by “Broadband Data Sampling interface will be launched to allow Carriers data sampling”

This web interface provides carriers a view into our representation of their coverage. It allows the carrier to visually sample data within that coverage to ensure accuracy. This step helps control against partial data delivery, corrupt data delivery, or translation and ingestion issues that can occur during processing.

4. How will the Applicant encourage consumers and other stakeholders to take speed tests? What specific information will be captured in each test?

We will take the following steps to encourage consumers and other stakeholders to take speed tests:

- To make the public aware of the existence of the website, we are already working actively with the State and their communications and marketing teams to do public outreach.
- We have create a media outreach program that includes press releases and public forums
- We are working with our partners to development a Broadband Portal that will illustrate Broadband serviceability within the partner’s territory. Additionally, the Broadband Portal will provide useful information and education on Broadband services and other related content
- We are leveraging social media websites (Facebook, Twitter) with all of our partners including One Economy and New America to discuss Broadband and encourage the public to visit the Broadband Portal and to take a speed test. We will work with Google on an adwords campaign to drive users to our website
- We will work with experts to place Op-Ed pieces in technical forums and contribute to suitable blogs.
- We will link the Broadband Portal to existing partners websites
- We will work with experts we have within the State to place Op-Ed pieces in technical forums and contribute to suitable blogs.

The base level data that will be captured with the crowd sourcing program are: Verified Location, Technology of Transmission, Service Provider, Upload Speed, and Download Speed.

5. In the description of the Complete Set of Data (March 1), what is meant by “Full automation of Wireless Spectrum and Serviceability Data”?

The ability to have full access to wireless Spectrum and Serviceability data as well as tools built and used for automatic ingestion of the data. It is estimated that all the tools will be implemented to automatically ingest all the incoming wireless spectrum and serviceability data.

6. Please provide more detail on the “crowd sourcing ingestion tool”

The crowd sourcing tool includes a web access front end that enables internet speed testing and location verification, and includes a serviceability questionnaire as well as tools built and used for automatic ingestion of the data. We will be implementing the ingestion tool roll-out to automatically



ingest the entire incoming crowd sourcing data that is being accumulated by Google, MLabs and New America.

Process for Repeated Data Updating:

1. Please explain how your method will account for construction of new middle-mile and last mile infrastructure and access to new areas?

We partner with 3rd party data providers to ensure that regular maintenance plans are in place to update our data sets with new information. We will allow for providers to provide us with addition and deletion files on a continuous basis that will be ingested into our database. We anticipate that, at a minimum, we will receive updates on a quarterly basis but will work with the partners to do it on a monthly or twice monthly basis. In addition, we will be leveraging our relationships with each individual carrier to create the same updates processes and update timetables to provide consistent and reliable updates.

2. Please clarify whether your primary sources of data for repeated data updating are FCC 477 data and crowd sourcing?

Through our relationships with all data providers, we establish regular ongoing maintenance plans whereby we receive regular updates of data to maintain complete and up to date maps. These providers include carriers, 3rd party sources, surveys, Form 477 data, and crowd sourcing.

Planning and Collaboration:

Collaboration

1. Have all of the potential partners already been contacted and engaged in the project, or is this process ongoing?

Many of the key stakeholders have already been contacted; yet this remains an ongoing process.

2. Please provide a summary of outreach to Indian Tribes regarding this project.

According to the Bureau of Indian Affairs website, there are no federally recognized Indian tribes in American Samoa.

Planning:

1. Much of the text in the “problems to be addressed” section include action items rather than a description of problems. Please integrate all actions into the “proposed solution” section and mention which problems the individual actions address. You will also need to ensure that your planning budget narrative accounts for the activities described in your solution.

An attached version of the revised Planning proposal is attached below. See underlined items for new additions and changes.

Broadband Planning Proposal

Problems to Be Addressed



One Economy plans to address several problems through the use of the planning funds from the NTIA as a first step towards creating policies that will lead to wide-scale broadband availability and usage. The problems to address are to:

Identify the areas with low levels of broadband deployment for residences and business.

Secondly, One Economy plans to identify areas with low levels of broadband adoption and to learn what the barriers to adoption are.

Thirdly, One Economy plans to take the identified barriers towards adoption and design the best programs and possible solutions so that the State will have a clear glidepath towards achieving goals of higher Broadband adoption.

Proposed Solution – Broadband Planning Process

The American Samoa Broadband Planning Project will combine the comprehensive supply-side view of broadband deployment and level-of-service availability with demand-side data on the adoption and utilization of broadband services in the state. This data will enable the development of a coordinated Broadband Plan.

- **Broadband Availability:** The project will utilize the specified supply-side data collected for American Samoa Broadband Data Collection and Mapping Project to conduct an effective gap analysis of broadband service quality and availability.
- **Barriers to Broadband Adoption:** The project will collect demand-side data, with a focus on unserved and underserved communities to identify and understand the barriers to broadband adoption. A Broadband Planning Report will be prepared from this data that will include comprehensive and highly localized short, medium, and long term recommendations for increasing Broadband adoption and utilization throughout the state. Targeted action will then be taken with periodic monitoring of results. The Plan will be adjusted based on prior success.
- **Computer ownership and access programs:** The project vendor has extensive experience and a record of success in creating programs to increase broadband adoption and computer access among unserved and disadvantaged communities which will greatly assist American Samoa in increasing computer access and use in targeted areas. The project vendor will also establish an affordable hardware acquisition program for the underserved and unserved communities in American Samoa. Results will be monitored through the evaluation of broadband adoption rates of targeted communities.
- **Small Business Adoption:** The project will collect demand-side data on the adoption and utilization of broadband by small businesses, the state's greatest source of job creation, to assess barriers to adoption and identify unmet needs

Through information gathering, planning and collaboration, American Samoa can facilitate and stimulate the activities required to bring broadband to all areas of the state, rural and urban. Through planning and collaboration, the deployment and usage of broadband will be increased and American Samoa's economy and quality of life will be improved.

Stakeholder input will be solicited in the assessment of broadband opportunities and development of a plan to address gap analysis findings. These stakeholders include but are not limited to:

- State residents
- Healthcare providers and consumers



- Pre-K-16+ educators and students
- Government (includes cities, counties, state agencies and Tribal Sovereignities)
- Libraries
- Public Safety agencies (law enforcement, fire, emergency medical technicians, public health)
- Community-Based Organizations
- Seniors
- Business Sectors
- Underserved populations, i.e., minorities, persons with disabilities, low income, seniors
- Telecommunications service providers (telephony and broadband)
- Potential investors for broadband infrastructure/services and economic development

Proposed Solution – Personnel

Consistent with American Samoa’s approach on leveraging technology to promote economic growth, the project vendor will create and develop a customized “Digital Connector” program for this project. Digital Connectors are a task force, who live in underserved areas, who are exposed to the benefits of information technology through a comprehensive curriculum, and further trained to be technology ambassadors in their communities. In the first summer, the Connectors will learn the basics of computer technology and then give back to their communities in basic ways—through education and general help. The main responsibility for the Digital Connectors after their second year of the program will be to aggregate survey data at the street level, conduct and gather data through town hall meetings, and to present communities with the project vendor’s affordable hardware acquisition program. The energy and commitment of Digital Connectors have proven to be unmatched in terms of their willingness to train and assist underserved populations in technology use, as well as serve as living testaments to the power of technology and its ability to change lives.

American Samoa will work with the project vendor on a team of community and research experts to ensure expedient and quality delivery of the data analysis and report generation. The project vendor brings eight years of broadband adoption blueprint development experience and verified success as noted through independent studies by SRI International and the Knight Foundation. Supporting its program manager, the project vendor will leverage the insight and knowledge of its Director of Research/Evaluation/Documentation, Chief Program Officer, Head of Access Services, Head of Public-Purpose Media, and Head of Community Planning.

In American Samoa, Digital Connectors will be deployed to serve multiple functions. Although the project vendor has Digital Connectors focusing solely on data aggregation for one year in large states, for the island states and territories, the project vendor will have American Samoa’s Digital Connectors focusing on demand side data aggregation and understanding the barriers to adoption, learning about technology and the core competencies of digital literacy over the course of two years. They will serve as technology ambassadors to encourage further deployment and utilization of broadband services. In the first year, Digital Connectors will learn basic digital literacy with a focus on 12 core competencies. In the second year, they will focus on data aggregation and learning survey methods. By having Digital Connectors blanket the communities to teach residents how to use technology to manage their lives through financial literacy, health information, and communicating with remote family members, the effects of widespread technology use will be met. Based on our estimates of populations and densities, we recommend having the following breakdown:

For year 1, 45 full program Digital Connectors will be dispatched in the following breakdown:

Tualauta 13



Ma'oputasi	6
Lealataua	2
Ituau	2
Sua	2
Tualatai	2
Vaifanua	2
Leasina	2
Sa'ole	2
Faleasao	2
Ofu	2
Olosega	2
Ta'u	2
Fitiuta	2
Swains	2

For year 2, 90 mapping focused Digital Connectors will be dispatched in the following breakdown:

Tualauta	35
Ma'oputasi	19
Lealataua	6
Ituau	5
Sua	4
Tualatai	3
Vaifanua	2
Leasina	2
Sa'ole	2
Faleasao	2
Ofu	2
Olosega	2
Ta'u	2
Fitiuta	2
Swains	2

Timeline

February 2010 - Identification of Need Counties

As American Samoa prepares the first deliverable map to the NTIA, the project vendor will assess and prioritize the counties that show the lowest levels of service availability and broadband adoption. The program manager will assemble the Digital Connectors based on this assessment, with higher concentrations being placed on the communities with the greatest need.

May 2010 - Launch of Digital Connectors program

The Digital Connectors will begin their training which focuses on teaching them 12 core computing skills, as well as, more broadly, leadership and teamwork. They will use teach these newly –learned skills to members of their community.

September 2010 – Status Check of Digital Connectors Program



The Digital Connectors will have completed and done the majority of its outreach efforts to encourage broadband adoption. At this point, the Connectors will report back and give an inventory of perceived underserved and unserved areas to help focus the efforts for year 2 of the project. Throughout the fall, the Connectors will continue to hold training sessions, educational workshops on broadband use.

May 2011 – Beginning of Year 2 Training

The Digital Connectors will undergo their training curriculum. Beyond the leadership curriculum, they will learn the process of data aggregation and be trained to aggregate demand data at the ground level.

August 2011 – Beginning of Data Analysis and Report Generation

The team will ensure consistent data aggregation, quality and insightful data analysis, and the generation of the strategic recommendations document.

October 2011 – Report Delivery

The final Digital Inclusion / Adoption Blueprint covering data findings, key insights and methodologies to achieve increased adoption along with a sustainability plan for the programs designed to ensure ongoing increases in broadband adoption and economic growth will be delivered to the state.

Anticipated Outcomes of the Project

The functional deliverables will include a Digital Inclusion / Adoption Blueprint, that serves as a comprehensive study of our findings on both the mapping data and adoption/demand factors, the environment of the State, the next steps to increasing higher adoption rates, and a plan to acquire further non-governmental funding to continue adoption efforts and implement customized programs that are seen as necessary to grow adoption.

The second deliverable is a comprehensive data set, comprised of the efforts of the Digital Connectors conducting demand side surveys, data aggregated from townhall meetings and information gathered by our staff. This data set will be converted to a data format that can be placed as an additional data layer onto our state broadband map. This will allow the State and residents to see how demand side factors affect the acquisition and long-term use of Broadband for differing populations.

Particularly in the island states, our focus will to facilitate increases in broadband service utilization. The Digital Connectors will be working to increase deployment and use of services, and the project vendor staff will monitor these results and deliver performance measures through its Digital Blueprint.

2. Please clearly list the BDIA related purposes of the planning project.

Per BDIA

- 1) Identify and track the areas with low levels of deployment, the rate at which residential and business users adopt broadband service and other related information technology services, and possible suppliers of such services;
- 2) Identify barriers to the adoption of broadband service and information technology services;



- 3) Establish computer ownership and Internet access programs in unserved and areas with lower than average penetration on a national basis;
- 4) Collaborate with broadband service providers and information technology companies to encourage deployment and use

Technology Base Training - Digital Connectors will learn how to use computers, utilize search engines, and other basics that enable them to be savvy consumers of the Internet.

Customer Service - Instructors will teach the Digital Connectors how to interact with people who they are serving. They will learn best practices of surveying, patience, and the language with which to survey the population.

Making presentations - The Digital Connectors will learn how to use Microsoft Powerpoint to make presentations that will prepare them for the business world.

Leadership - The students will learn valuable leadership skills because they will learn team-building and technical skills. In addition to this, helping communities will that will make them into young leaders.

Obstacles of Broadband Adoption - The Digital Connectors will be taught about the various obstacles to broadband adoption, how to identify them, and how to prescribe the best possible solutions.

Evaluation and Data Aggregation Standards and Processes - Each Digital Connector will learn best practice surveying methods. They will learn how to ask the questions, proper follow-up questions, and standardized aggregation methods to ensure the greatest accuracy and surveyer experience.

Budget Information

1. In-Kind Match – Google Imagery and 3D Buildings – Please describe this in-kind dataset in more detail, both in terms of how it will be used and how the value of the dataset was calculated.

Google is supplying infrastructure, resources, marketing and connectivity for the crowd-sourcing efforts made as part of this program. Their commitment to the states is for the full five years of the grant. The crowd-sourcing solution is

2. *BB Planning and Mapping Budgets and Narratives:*
Please provide additional detail to the budget spreadsheets and narratives such that the information below is completed for the first two years of your proposed budget. Please retain a separate budget narrative and spreadsheet for mapping and planning. **A sample spreadsheet is attached to this email.** We have attached a spreadsheet that you may use as a guide to delineate this information in a spreadsheet format. If your budget already provides the information needed for the tabs “Detailed Mapping Budget,” “Detailed Planning Budget,” “Contracts Budget,” please still complete the “Overview” tab.



The key points for a budget are that (a) Federal and non-Federal funds are separated, (b) Planning and Mapping budgets are distinct, (c) All line items are broken out by year, and (d) Sufficient granularity of each line item... such as demonstrated in the attached template where personnel costs are distinct and broken down by individual, etc. Additionally, your budget narrative should provide narrative detail (such as description of position or calculation of travel costs), while your revised spreadsheet should include detail for all budget areas. More description of narrative requirements follows.

Narrative Information:

Personnel Salaries: For each position allocated to the projects, provide a description of the position responsibilities, annual salary, and percentage of time dedicated to this project for Year 1 and Year 2. Please ensure that costs are clear for both Years 1 and 2, as opposed to both years cumulatively. Be sure to clearly indicate if a portion of time is paid through an in-kind match (i.e. clear federal vs. match distinction). If a contractor is providing personnel support this should be listed in the subcontracts section, not in this section.

There are four positions that will be funded by the planning grant. The first is a Senior Project Manager who will be paid \$50,000 from a half of full time employment (.5FTE) of \$100,000. The second is an American Samoa Planning Coordinator; a local who will lead the community outreach and who will be paid \$50,000 FTE for 18 months. The third will be a Digital Connector Director who will direct the training of the trainers and oversee all Digital Connector activities who will be paid \$25,000 at .5FTE of \$50,000. These salaries total \$125,000.

Personnel Fringe Benefits: For each position allocated to the projects, provide the cost for fringe benefits, if available. As above, benefits for contractor support should be clearly delineated in the project section.

Personnel Fringe Benefits make up the next area of costs. The Senior Project Manager is allotted 20% of the salary as fringe pay, so that comes to \$10,000. The ASCC Planning Coordinator is allotted \$4,350. The Digital Connector Director is allotted \$2,800. These come to a total of \$17,150.

Travel: Provide additional information such that the basis for all figures is clear. For example, if assuming airplane travel, provide an estimated cost for each roundtrip ticket and how many trips are expected. For mileage, provide an estimate of how many miles are expected and how many trips, etc. Be sure to distinguish between federal funds and any matching funds. Please provide additional information about partner meetings.

Travel is a necessary component for the staff that travels from a home base close to the area to town meetings around the state. One Economy will need \$9000 for travel and the local ASCC Coordinator will need \$5,000. This comes to a total of \$14,000.

BroadMap has detailed its travel budget in the accompany spreadsheet. We have broken out the expenses into four different sections including airfare/rail, hotel, transportation and meal per diem. BroadMap will be making a minimum of six trips to American Samoa. Current airfare/rail and hotel rates were utilized to determine costs for this section. Where possible, BroadMap has incorporated trips to multiple partners to decrease the overall expense of the flights/rail. For American Samoa, we are able to lower the overall airfare expense by merging that trip into a Hawaii trip. This provides us with substantial saving flying a direct flight from Hawaii to American Samoa.



We have included a quarterly trip to Washington DC into the travel cost section. The expense for that trip has been shared across our seven partners. We have broken the expense out into four different sections including airfare/rail, hotel, transportation and meal per diem. Our final trip to American Samoa will be used for Shipping, installing and setting up the Broadband data server and its software for American Samoa. We have broken the expense out into four different sections including airfare/rail, hotel, transportation and meal per diem.

American Samoa			
	Nights Stayed	Daily Cost	Total Costs
Client Visits (Shared with Hawaii)			
Airfare			\$1,880
Hotel	6	\$180	\$1,080
Transportation	6	\$75	\$450
Meals	6	\$75	\$450
Trips Per Year			6
Cost Per Year			\$23,160
Washington DC Trip (Shared Expense)			
Airfare/ Rail			\$43
Hotel	5	\$240	\$171
Transportation	5	\$75	\$54
Meals	5	\$75	\$54
Trips Per Year			4
Cost Per Trip			\$1,286
Transition of Hardware and Software			
Airfare			\$1,880
Hotel	6	\$180	\$1,080
Transportation	6	\$75	\$450
Meals	6	\$75	\$450
Trips Per Year (2nd Year Only)			1
Cost Per Trip			\$3,860
Total Costs Per Year:			\$28,306

Equipment: For hardware costs, provide a detailed description of all equipment to be purchased, when it will be purchased in the first two years, and the basis for the figures used. Be sure to distinguish between federal funds and any matching funds. Also please explain how you estimated the hardware requirements for this project, and who the owner of the hardware will be.

Handheld device and software for each of the 50 connectors (\$250/unit). Current plans are to purchase iTouch and proprietary software that will allow the DC to collect information. Unit is \$220 + \$30/software and load. Netbooks will be purchased for the first cohort 45 Digital Connectors (\$300). This comes to a total of \$26,000.



BroadMap has worked with our Partners to create a robust, yet affordable server and platform solution for American Samoa. The server includes all hardware and software that are needed to manage the Broadband project. Our solution includes the following:

Category	Item	Qty	Price	Total
Server	Dell PowerEdge R710 Dual Quad-core Intel® Xeon® X5550, 2.66Ghz, 32GB RAM 600GB, 2 x 300GB 15K SAS	1	\$35,000	\$35,000
Storage	Dell PowerVault MD1000 Direct-Attach Storage 3.0 Terabytes 5 x 600GB 15K SAS	1	\$7,000	\$7,000
Plotter / Scanner	HP Designjet T1120 HD MFP (Plotter/scanner)	1	\$24,000	\$24,000
Shipping for Above				\$500
	Hardware Subtotal			\$66,500
	Software	Qty	Price	Total
OS	Windows Server 2008 Standard R2 (5 CALs)	1	\$700	\$700
RDBMS	SQL Server 2008 Licensing (4 sockets)	1	\$25,000	\$25,000
Map Server	ArcGIS Server Standard (\$20K+ \$5K per additional core)	1	\$40,000	\$40,000
Desktop GIS	ArcEditor	1	\$7,000	\$7,000
	Software Subtotal			\$72,700
	Mobile Mapping Hardware/Software	Qty	Price	Total
GPS Receiver	Trimble GPS Pathfinder ProXT Receiver	2	\$2,450	\$4,900
Desktop GIS	ArcView	2	\$1,350	\$2,700
GPS Software	Trimble Terra Sync GPS Analyst Extension	2	\$2,900	\$5,800
Laptop	Dell Latitude E6400 XFR Rugged Laptop w/Windows 7	3	\$4,200	\$12,600
	TruPulse 360B Laser Range Finder	2	\$1,695	\$3,390
	External HD	2	\$200	\$400
	Power converter / back up	1	\$500	\$500
	Trimble GeoXM Handheld GPS w/ArcPad	1	\$2,700	\$2,700
	Misc cables	1	\$2,000	\$2,000
	Mobile Mapping Subtotal			\$36,990
Hardware and Software Cost				\$174,190



Materials/Supplies:

- For software costs, provide a detailed description of all equipment to be purchased, when they will be purchased in the first two years, and the basis for the figures used. Be sure to distinguish between federal funds and any matching funds.
- For all supplies expected to be purchased, please provide the information such that the basis for figures is clear. Be sure to distinguish between federal funds and any matching funds.

Data Licensing – We have incorporated all data licensing and software costs into the materials section of the budget. These costs are recurring costs that are associated with gaining access to and ingesting relevant Broadband Serviceability, Anchor Institution and business data and demographical data for the Broadband Project. These data sources and their associated costs are reflected in the attached budget spreadsheet. All costs have been negotiated utilizing any discounting that can be provided based upon the number of partners that we will be servicing.

Map and Information Data	Yearly Cost
Digital Baseline Maps	\$0
Digital Baseline Maps for Server	\$0
Satellite Imagery	\$22,000
Satellite Imagery Server Edition	\$6,000
Anchor Institution and Business Listing & Survey Data	\$9,500
Household Demographic Data	\$4,500
Educational Database	\$3,000
US Zip Code and Zip+4 data	\$0
Map and Information Data Total	\$45,000
Broadband Data	
Cable DSL and Fiber Data	\$0
Fiber Networks	\$0
Fiber Lit Buildings	\$0
Spectrum Holdings for Wireless Providers	\$2,000
Geographic Boundary Data For All Cable Systems	\$0
Wireless Marketed Coverage Patterns	\$5,200
Wire Center Boundaries	\$500
Central Office Locations	\$800
Carrier Exchange Information	\$2,000
Carrier Information	\$750
Crowd Sourcing Data	\$5,000
Tower Maps	\$500
Wireless Internet Service Provider Data	\$3,500
Broadband Data Total	\$20,250
Software and Platform	
Proxix - Geo-coder	\$10,000
Proxix - Online Mapping Geocoder	\$5,000
State Website Template	\$10,000
Crowd-Sourcing Platform	\$32,000



Software and Platform Total \$57,000

\$122,250

Google Connectivity – The State Broadband Solution and our crowd sourcing tools will require several dozen servers placed throughout the United States and its territories. These servers must be robust enough to handle the traffic from our partners but also must be able to provide the constituents with reliable speed tests results. To ensure that this happens, Google co-locates these servers at their facilities. The cost to provide these services includes the purchase of computers and networking equipment, staffing and on-going co-location and connectivity resources. Google is providing all of these items to American Samoa for a period of five years. The costs for each of the items list above are:

- Computers and Networking Equipment - \$150,000
- Staffing - \$50,000 per year x 5 years = \$250,000
- Co-location and Connectivity - \$720,000 per year x 5 years = \$3,600,000

All of these costs are being provided to all of One Economy's partners. The In-kind contribution per partner is determined based upon need. For those partners who have other resources to utilize for in-kind then those resources are utilized first and then supplemented with the Google in-kind if needed. For those partners that do not have other resources to utilize for in-kind, their entire matching contributions will come from Google.

Subcontracts: For any significant subcontract, please provide the cost allocation in a format similar to the one listed directly above. Your current contractor budget only allocates personnel hours. If the contractor will be purchasing any equipment, performing any travel, etc. that should be clearly delineated.

There are two allotments for Sub-contractual work. The first is \$32,500 for the time for a Senior Data Analyst. The second is \$7,500 for a Contractual Report Writer who will work with the entire project team to complete the planning report. Three part-time instructors who will provide 200+ hours of training will be paid \$7500/contract. In the second year, 5 camp trainers will be hired for 4 weeks for \$750/instructor/week. The Digital Connectors in their second year will each receive a stipend of \$200, which is a total of \$9,000. These positions combine to cost \$86,500.

Other: For training purposes not related to travel, please describe in detail and provide a calculation of the cost. For other activities or existing data sets, provide the value and calculation of such value. Be sure to distinguish between federal funds and any matching funds.

There are some miscellaneous costs as well. \$7,125 will be spent on apparel and bookbags for the Digital Connectors as a uniform for them while they are on the ground collecting data. Program supplies cost \$15,000. This comes to a total of \$22,125.

The curriculum for Digital Connector training costs \$200 per Digital Connector for a total of \$18,000. The training itself will cost \$135,000 total for three regional camps that will train the Digital Connectors. This should cover the training costs and any remaining cost will be the responsibility of the Digital Connector. These three costs come to a total of \$153,000.

Indirect Cost: (Administrative Overhead) Please provide a clear description of the costs attributed to administrative overhead.



The above constitute the entirety of the direct costs, which come to a total of \$419,806. One Economy's indirect rate is 19%, which comes to \$81,087. This is the calculation of the overhead costs associated with this project, which includes the time of One Economy's senior management team, rent, financial reporting and administrative costs, basic office supplies, and general work expenses. Adding the Direct and Indirect costs together comes to a total of \$500,894.

NOTE: Any requested pre-award costs should be allocated to the respective categories above. Be sure to indicate whether something is a pre-award cost.



Addendum: One Economy & BroadMap Personnel Resumes

SONYA MURRAY

336-692-8221

smurray@one-economy.com

PROFESSIONAL EXPERIENCE

One Economy Corporation, Washington, DC

Senior Vice President, Chief Program Officer

- Manage 40 full time and part time staff that execute and deliver One Economy's field programs in the United States.
- Manage the execution of \$72 million in grants which provide computers, internet and training for low income families nationwide.
- Oversee a national volunteer program which includes 1000+ youth and young adults who bring technology into underserved communities.
- Manage and support 35 AmeriCorps*VISTA members.
- Responsible for expanding the company's work nationally through creation of business development opportunities and partnership development.
- Assist in the creation of the marketing plans for new products and campaigns.

Habitat for Humanity Forsyth County

Chief Operating Officer and Director of Development

- Managed ten staff members.
- Raised more than \$7.5 million to support the building of more than 100 houses.
- Managed federal and state grants, including reporting.
- Created community partnerships that generated more than 5,000 volunteers annually.
- Responsible for the organization's public relations.
- Responsible for the organization's marketing and communications including the quarterly newsletters.

Wake Forest University

Director of Annual Support

- Managed five staff members
- Raised funding for the College, Law and Business Schools totaling \$3.5 million annually.
- Responsible for the directing the university's major gift clubs. Negotiated the university's first affinity program with a national company generating more than \$1.0 million annually in additional resources for university.

EDUCATION: MS in Business Administration – Wake Forest University

BS in Arts – Wake Forest University



TONY HOOK, PMP

502-220-9007

tony.hook@broadmap.com

- Proven leadership in Project Management Office development and improvement including tools, processes and people.
- Led the development and implementation of an internal Project Management certification program within an Information Technology (IT) organization. Improved the overall project management maturity and increased the number of Project Management Professional (PMP) Certifications from 4 to 21.
- Led a Process Improvement/PMO group responsible for developing, implementing and maintaining desktop applications in support of airline finance and accounting functions.
- Oversee enterprise project management application, develop and implement project management methodology, guides, best practices and metrics.
- Certified Project Management Professional with additional training in IT Infrastructure Library (ITIL) best practices and Prosci Change Management Methodology.
- A Master of Science Degree in Applied Information Technology from Bellarmine University and Bachelor of Science Degree in Business Administration majoring in Finance from the University of Louisville.
- Leveraged root cause analysis techniques to determine causes of business process problems and develop solutions targeted at resolving those problems.

PROFESSIONAL EXPERIENCE

BroadMap

Senior Director – Program Management Center of Excellence

- Oversee enterprise project management application, develop and implement project management methodology, guides, best practices and metrics.
- Coach and mentor team of project managers and business analysts to support organizations project management objectives, programs, and functional analysis needs.
- Coordinate the development of project initiation documentation, charter, contracts and stakeholder identification with clients and project team members.
- Coordinate the development of project schedules, work plans, budgets, and project management plans.
- Coordinate management of multiple related projects which are directed toward a common objective. Work with Project Managers to monitor cost, schedule, and technical performance of component projects and operations, while working to ensure the ultimate success of the program. Generally responsible for determining and coordinating the sharing of resources among their constituent projects to the overall benefit of the program. Responsible for internal and external stakeholder management.
- Lead and coordinate the functional side of a product development team. Manage and define the functional specifications; define how the product will work; prioritize, plan and drive features to completion.
- Lead the writing of functional specifications to ensure the team has a clear direction and understanding of the requirements.
- Monitor and control project schedule, budget, scope and quality commitments are adhered to. Interact with technical staff to understand the project status. Interact with various internal and external teams to review the progress towards meeting stated objectives.



- Coordinate the closeout of completed projects ensuring that all activities are formally closed, resources are released, contracts are settled, open items are resolved, and final reporting and acceptance are completed.

Brown-Forman Corporation

Lead Project Management Analyst

- Led upgrade of enterprise project portfolio management application, Planview, from version 7.3.2 to 9.0. Primarily focused on user pilot, user testing, delta training, and go-live support. Application was successfully upgraded with no major issues.
- Led initiative to improve Project Office processes. Primary objectives were to improve and formalize project governance processes and the project management methodology – processes, templates, techniques, and best practices. Led planning, executing, monitoring and controlling phases. Developed and delivered training in support of new processes. Governance, initiation, charter, change management and status reporting processes were successfully implemented and integrated with Planview.
- Led Project Management Training and Certification Program. Primary objectives were to improve overall project management maturity of IT organization and increase the number of certified Project Management Professionals. Worked with contracted training vendor to develop basic and intermediate project management training content. Coordinated all training sessions. Monitored targeted participants' progress. Of those targeted, 95% attained basic project management certification and 92% attained intermediate project management certification. Increased number of certified Project Management Professionals over 500% from 4 to 21.
- Responsible for Project Administration Metrics. Primary objectives of Project Administration Metrics were to improve relationships with business units by improving time required to commit to project estimates and deadlines, accuracy of estimates and resource allocations. Exceeded goals for all metrics by monitoring performance monthly and implementing corrective actions as needed.

United Parcel Service - Air Group

Business System Analyst

- Coordinated internal process improvement efforts for business analysis, quality assurance, and release management groups focusing on improving processes, skills, and tools utilizing enterprise solutions.
- Developed requirements, use case documentation and time and attendance pay rules with end users and technical staff to facilitate design of new applications.
- Developed and executed test plan for system and user acceptance testing.
- Trained end users on new time and attendance system.
- Coordinated software quality assurance efforts to ensure project documentation conformed to CMM Level 2 & 3 standards.
- Performed root cause analysis to determine causes of payroll errors within legacy environment.

Supervisor/Analyst – Process Improvement / Payroll / Aircraft Costing

- Supervised Finance and Accounting Process Improvement/PMO department and payroll department.
- Coached Process Improvement Analysts on developing and implementing new processes and desktop applications utilizing structured analysis methodologies and project management best practices to identify opportunities for improvement and solutions to problems.
- Supervised the support of applications developed by the Process Improvement Group.



- Supervised 8 Payroll Administrators and 2 Financial Analysts responsible for weekly and monthly payroll for approximately 6,000 airline employees.
- Performed payroll cost analysis in support of various business functions.
- Managed projects to migrate critical department applications from non-Y2K compliant applications.
- Led cross-functional team update of aircraft costing procedure and maintained aircraft costing procedures.
- Developed and implemented new aircraft costing methodology/application and application to track passenger project start-up costs.

Capital Budgeting Coordinator / Cost, Budget & Financial Analyst

- Coordinated quarterly reporting of airline capital expenditures and airline Board of Directors report.
- Developed and implemented line maintenance gateway cost application including gateway cost statements, expense detail reports, and expense tracking procedures.
- Prepared the following line maintenance reports: Budget Variance Analysis, Indirect Mechanic Hours, Payroll Summary, and Outside Repairs Summary.

EDUCATION: **MS in Applied Information Technology** – Bellarmine University
 BS in Business Administration/Finance – University of Louisville



QUAN VU

408-373-917:

Quan Vu@broadmap.com

Chief Technology Officer

- Forward thinking in business and product innovator with over 20 years of global business experience in content and software development in business to business sector and business to consumer sector.
- I have direct experience in product development, product management, product marketing, global sales and business development, team building, partner management, and contract negotiation.
- I have in dept knowledge of GIS mapping, technologies, applications and services related to content and digital maps. With that perspective, I'm capable of guiding both large and small enterprise organizations into new, dynamic and uncharted markets.
- My operational and development experience, presence and communication style inspire confidence and respect from peers and senior leaders.
- Through mutual trust and respect, I lead from the front in motivating and stretching my employees to innovate and develop breakthrough products, lower costs and improved profitability.
- My hands-on style of management and balanced approach to problem solving allow me to perform at the highest levels and the results are reflected in a proven track record of achieving positive results in diverse environments and challenging markets.

PROFESSIONAL EXPERIENCE

BroadMap

Chief Technology Officer

- Responsible for high level strategy setting regarding technology, engineering development, mapping and support development, and GIS mapping web services
- Managed a team of Senior Directors responsible for all local and remote infrastructure development, mapping, broadband mapping, sourcing, quality assurance, product development, web hosting services, and technical support.
-
- Manage a team of engineers responsible for the tools development of GIS database production / analysis.
- Responsible for the creation, design, load, and maintenance of the production and product RDBMS.
- Responsible for the creation of database data models, functional data specifications for all production level databases.
- Responsible for all geocoding aspects of all input sources.
- Responsible for the process and procedural design and management of the customer / technical support team.
- Responsible for RDBMS database administration (DBA) of all BroadMap's database assets.

Tele Atlas

Global Vice President – Business Development



- Responsible for the development and execution of global and area business development strategies, revenue goals, and forming strategic alliances to meet overall company objectives.
- Managed a global team of VPs and Senior Directors responsible for the execution of business development in their geographic area (EMEA, AM, APAC).
- Coordinated with Sales to provide overarching account strategies focused on large global accounts that are “Must Win” for the company.

Vice President Sales – North American Consumer PND Market

- Responsible for annual revenue goal setting, revenue generation, strategic and tactical objectives
- Developed and executed annual Sales strategies to meet and exceed revenue goals.

Etak, Inc.

Senior Director Product Marketing – GIS, Tools, and Consumer Products

- Responsible for product ideas, feasibility analysis, marketing requirements document (MRD), marketing plans, and product launch programs for 5 product families which resulted in 11 commercial product lines, 2 on-line product services, 2 consumer product lines, and 2 SDK / Internet Map Server products. These products and services generated 2/3 of the company's revenue.
- Managed a group of Senior Product Marketing Managers and Sales Engineer responsible for “cradle to grave” product marketing activities consisted of MRDs, product pricing, product positioning, product launch and distribution, and on-going market analysis.
- Developed routine SWOTs to support existing products and to provide inputs on requirements for new products.
- Functioned as a liaison between Marketing and Engineering to coordinate and support sales force in pre-sales and post-sales activities.
- Responsible for the creation and execution of marketing campaign to support product launches. Activities consist of working with Marketing Communication to create advertisement programs for various media, creative art, product brochures, collateral, press release, sales demo, on-line web content, and sales training.
- Responsible for trade show lead generation and providing qualified leads to sales force for revenue opportunities.
- Developed and implemented a tiered Business Partner Program to support and maximize company's business model.

EDUCATION: BA in Computer Science Engineering - San Jose State University



MICHAEL G. EVERS

703-819-3533

michael.evers@broadmap.com

GLOBAL SALES, MARKETING & BUSINESS DEVELOPMENT STRATEGY EXECUTIVE

Converging Business Development, Multi-Channel Strategic Partnering, Marketing & Product/Service Launches to Drive Revenue, Profit & Growth for Next Generation Technology Products & Services

- Demonstrated exceptional ability to move across technology manufacturers, service providers and distributors/retail sectors, quickly and effectively launching new lines of business that have resulted in significant revenue and profits.
- Communicated a vision and value of new initiatives to senior management, sales and partners, earning full commitment/support.
- Built top-flight product development, marketing and sales teams through both direct and matrix-based leadership and applied proven strategic/tactical skills to launch first to market product lines and newly formed market segments.
- Leveraged competitive analysis, market research and performance measurements to ensure appropriate allocation of personnel and capital to generate optimal sales and profit outcomes.
- Created multi-faceted, ROI-based marketing strategies and multimedia programs that differentiate companies and brands from competitors, influence buying behaviors and drive strong market position across diverse worldwide business and consumer channels.
- Forged "C-level" relationships and captured multi-million dollar contracts based on innate ability to understand real and perceived needs, balancing the interest of the business and the customer, and structuring "win win" agreements.

PROFESSIONAL EXPERIENCE

BroadMap

President and COO

- Manage daily operations with all functional areas reporting directly including finance, legal, product management, marketing and human resources.
- One of three company founders responsible for all internal operations and management of investment partners.
- Responsible for the recruiting of all executive positions including CTO, CMO, CFO
- Oversight of company's strategic direction and business strategies
- Senior contact for all partnership

TELE ATLAS

Geographic database and digital map marketing/distribution division formed in 2004 following the \$100M acquisition of Geographic Data Technology by the European market leader and parent company Tele Atlas, NV. Following the 2008 \$4.2 billion acquisition Tele Atlas became part of TomTom NV.

Vice President Global Marketing & Business Development,

Named the top marketing executive for the America's and charged with building a global marketing organization and integrated go-to-market strategies and partner relationships. Built and currently leads a 30-person team through 5 VP/Director level reports overseeing 5 business segments, global communications, the retail channels and business development. Administer a \$20M



annual budget and \$5M in agency/3rd party services contracts. Serve as a member of a 6-person executive leadership team reporting to the President and global CEO.

Marketing & Business Leadership

- Established a sophisticated strategic marketing and best practices organization. Defined team building, business interaction and talent management structures. Recruited, trained and developed multi-disciplined talent.
- Spearheaded the formation and start-up of a global business development team to develop long-range revenue opportunities and forge strategic relationships with multinational clients, including Dell, Jentro, Qualcomm, Yahoo, Wal-Mart, Best Buy, Circuit City, and others.
- Defined and executed a holistic, integrated marketing strategy with common branding and messaging, yet customized product positioning and promotions to reflect the unique nature of target customers and industry/market demands.
- Instilled a stronger, consumer-focused corporate image and strategic positioning statement with broader touch points to reach a larger, more diversified business and consumer audience. Served as a corporate spokesperson at major industry trade shows and conferences.

Market Segment Development & Strategic Partnerships

- Outlined channel strategies for consumer, wireless, enterprise, state/local government and automotive. Forged partnerships and demonstrated how each segment could monetize assets as a turnkey solution and/or value-added component.
- Developed and executed an aggressive market strategic business plan, and delineated go-to-market initiatives, product/solution offerings, pricing/positioning tactics and integrated marketing campaigns. Organized and led international conferences, events and analyst calls.
- Managed international relationships with BMW, TomTom, MITAC, Best Buy and others, and structured one-of-a-kind partnerships and distribution agreements with automotive, hand-held device manufacturers, Internet/wireless content/service providers and retailers.
- Leveraged Tele Atlas' innate understanding of market trends and next-generation technology advances as a key differentiator in helping partners build customized "sell-thru"/turnkey marketing programs that resonate with a wide range of audiences.
- Opened the door or managed C-level relationships with Best Buy, BMW, Cingular, Circuit City, The Source, CompUSA, DASH, Motorola, MITAC, Pioneer Target, Tom-Tom, Walmart, Yahoo and others.

Business Development & Channel Management

- Shared insights on matters where technology, content and markets intersect, enabling the business to capitalize on rampant growth in the personal navigation and wireless Internet sectors by forging market-leading partnerships to dominate a burgeoning consumer marketplace.
- Took consumer market share from ~3% to 28-32% and working aggressively to take over dominant US position. Launched targeted, market-specific initiatives that drove 7% market share / true share gain over 3 years for a category representing 38%+ of total business mix.
- Managed direct and matrix teams in North America, Europe and Asia to further channel and partner relationships, as well as development of South American channel strategy.
- Devised channel and market-specific strategies to capitalize on new opportunities in enterprise and government sectors, laying a foundation for significant growth within the business intelligence, fleet services and other niche segments offering significant growth potential.

COMPUSA

\$5B privately held consumer electronics and PC products retailer with 300+ locations operated as CompUSA and GoodGuys



Consumer Services Director

In a new position, oversaw a \$250-\$350M services portfolio – the most significant growth area and key element of a corporate initiative to become a consumer electronics/services enterprise. Evaluated products/services, store marketing/merchandising and partner relationships, and outlined strategic plans to accelerate performance. Led a staff of 3, managed \$3M budget, and reported to the Vice President and DMM.

- Devised a new direction/focus to leverage consumer services as a competitive differentiator. Changed advertising, merchandising, pricing and promotions to achieve better alignment and positioned consumer services to generate 15-20% of total 2005 corporate profit.
- Initiated transformation of master agreements with service aggregators to direct contracts with major Broadband providers including cable MSOs (Comcast, Time Warner, Cable Vision, Cox, Adelphia), ISPs (Earthlink, AOL) and telecoms (SBC, Bell South).
- Engaged Satellite TV/Radio, DVD/Music and Wireless market leaders, and established new relationships with DirectTV, XM and Sirius in 60 days. Leveraged prior AOL affiliation to strengthen rapport for CompUSA's single largest partnership and highest contributor to ISP sales.
- Positioned CompUSA to secure exclusive test marketing and first to launch programs based on ability to generate the same volume of broadband service activations as leading competitors with nearly 3X more stores/points of sale.

MOTOROLA: BROADBAND COMMUNICATIONS SECTOR / CONSUMER SOLUTIONS

\$26B leading manufacturer of technology equipment for the wireless, networking, automotive and consumer products industries

National Sales & New Business Development Manager

Successfully transitioned into a world-leading manufacturer concurrent with their creation of a new consumer-direct business. Provided strategic and tactical leadership to drive retail channel business development, product roadmaps, and communications/promotions.

- Conceived and launched Motorola's first consumer direct retail program, a channel projected to become a \$750M business in 3-5 years. Personally drove 33% of division's growth in 2002/03.
- Created a value-based business development/partnering model to build industry-leading alliances, and captured the first of such relationships with Wal-Mart, Radio Shack, and numerous others, demonstrating Motorola's commitment as a retail supplier/partner.
- Outlined a comprehensive product marketing template for Networking, Home Automation and Video/Digital product introductions.
- Served as a "go-between" business/operational functions and field personnel/partners to forge better collaboration, and gain insight into retail and consumer market trends. Designed/led training for Motorola employees, a major MSO and 2 partner groups.

AMERICA ONLINE, INC.

\$9B world's largest Internet access provider with more than 30M subscribers

Senior Account Manager / Partner Marketing

- Developed major retail relationships (Wal-Mart, Office Depot, Target, Best Buy, Circuit City). Negotiated deals to capture 15% growth in registrations 8 months, and position the retail segment to represent 48% of all new business.



- Turned around adversarial Wal-Mart relationship and drove forward stalled contract renewal, resulting in 33% registration increase.
- Brought together product development, marketing, and sales and devise a “go to market” strategy. Co-created the 1st uniform Broadband promotion strategy and product roadmap, achieving universal corporate/partner sponsorship.
- Developed the first-ever multimedia “how to” guide, enabling retail sales associates to accelerate sales and competitive positioning.

CIRCUIT CITY STORES INC.

\$10B national consumer electronics and entertainment products retailer with 630 locations

Buyer Internet / Broadband Services & Hardware, / National Pricing Manager,

Product Manager – Express Division, / Store Manager – Express Division

- Forged/expanded Fortune 100 company alliances, and promoted a “win win” proposition to secure 15+ first time partnerships, and lucrative Modem, Software, Satellite, Digital Imaging supplier contracts for what became the \$4.2B Technology Division.
- Helped form and manage the first retail Internet services alliance with AOL, driving an immediate \$1B increase in Circuit City’s market cap.
- Drove design and launch of the 1st electronic kiosks/web stations, which grew Broadband to \$100M with 55% margins in 1 year.
- Crafted and led training for 1.7K associates from 325 locations during a 2-month national rollout of Internet products/services.
- Collaborated with 6 cross-functional groups to accelerate sales cycle 50%, reduce activation costs 120% and increase sales 40%.
- Facilitated compensation redesign and 10% spending decrease while category sales representing 40% of total revenue increased.
- Contributed to sales growth at margins \$21M higher than prior years by aligning pricing/promotional strategies to market conditions.
- Exceeded sales goals as much as 30% while leading the #2 volume and #1 profit generating store in the \$100M Express division.

EARLY CAREER – Advanced on the fast track through management development programs with two major retail chains and as a trainer for a government contractor. Gained hands-on experience in team building, people development, sales and marketing.

EDUCATION: BS in Management – Northeastern University



BRIAN SCAFFIDI

603-219-395

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Senior Director, Quality Assurance & Sourcing

- An accomplished technical and management professional with heavy focus on sound Quality principles.
- Strong technical background in GIS, navigation and related products with proven success in the development, design, and production phases of product lifecycle management.
- Natural ability to recognize and offer technical, creative solutions both internally and with customer base.
- A hands-on manager capable of providing long term vision and leadership

PROFESSIONAL EXPERIENCE

BroadMap

Senior Director, Quality Assurance and Sourcing

- Manage a team of quality assurance and sourcing specialist.
- Responsible for the overall design of quality metrics which includes measurement criteria, definition of quality requirements, development of quality tools, and quality & certification processes.
- Responsible for conducting and executing quality control / assurance programs to ensure that all input data sources and generated map data meet quality control specifications and requirements.
- Responsible for implementing source code control programs and procedures.
- Responsible for the source acquisition of broadband data sources ranging from private to government entities.
- Responsible for ISO certification program for BroadMap should the company chooses to implement such program.
- Responsible for implementation of quality assurance programs and methodologies across all functional teams, from business to technology development to ensure consistent and reliable through put.

Tele Atlas

Director, Global Quality

- Responsible for defining and deploying Global Quality division focused on internal improvement programs and a professional external quality interface
- Managed a diversified team of Quality Professionals with presence in North America, Europe and Asia with emphasis on technical GIS capabilities
- Quality liaison for high profile Global Customer base rooted in Automotive, Internet-Wireless, Personal Navigation, and traditional GIS markets
- Responsible for all Quality-related activities for Tele Atlas North America
- Implemented and maintained QMS development and deployment to sustain registration to ISO 9001 certification
- Introduced innovative quality techniques enabling company to achieve new targets with delivery respect rates, first time right, and customer satisfaction
- Responsible for all aspects of day-to-day operations for Quality Department including resource management, department objectives, budget responsibilities, and employee development



Tele Atlas

Senior Manager, Data Sourcing

- Developed Tele Atlas' Field Testing program and Testing Laboratory in Lebanon, NH facility

EDUCATION: BA in Geography - State University of New York, College at Geneseo



MARK NEWCOMB

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Senior Director, Engineering and Design

- Advance knowledge of GIS applications, tools, and programming languages unique to GIS environments such as, ESRI and MapInfo.
- Advance knowledge of web based enable development tools and environment such as Java, XML, and other web based tools and scripts.
- Advance knowledge with Google and Bing APIs to enable the publishing of products and services via ASP delivery or using local browser to access products.
- Advance knowledge of PostgreSQL RDBMS and its query languages.

PROFESSIONAL EXPERIENCE

BroadMap

Senior Director, Engineering and Design

- Manage a team of engineers responsible for the tools development to create / generate GIS products and web based ASP services.
- Responsible for the creation and development of all product technical specifications.
- Responsible for the publishing of GIS products using either Google and or Microsoft Bing APIs to deliver products as live ASP services.
- Responsible for product development and creation of all GIS products published in either an ESRI format and or MapInfo format.
- Responsible for product development and creation of all printed medium products ranging from standard paper map product to customized paper map products.
- Responsible for the management of the RDBMS product server.

Tele Atlas

Senior Product Manager/Technical Product Manager

- Worked with key accounts/customers to develop market requirements and product requirements for GIS, Wireless, Internet, and Personal Navigation markets.
- Interpreted product requirements to guide the development of product specifications and database updates/changes.
- Created and maintained product specifications.
- Managed or assisted in the management of Multi-Net product creation from internal database updates to product release.
- Created product components and database inputs for database updates.
- Prioritized issues and helped coordinate issue resolution (database and product extract).
- Primary and backup support on technical development for key accounts/customers.
- Developed product launch plans.

Etak, Inc

GIS Project Manager/Sales Engineer & Tele LBS Project Manager/Sales Engineer

- Led development of global shapefile specification.



- Developed prototypes of ArcView extensions.
- Supported pre-sales calls to key customers.
- Developed demonstration applications for use at trade shows.
- Led engineering project to create map service on ESRI's Geography Network
- Assisted with responses to RFPs.
- Assisted with creation of Marketing collateral.
- Assisted with development and QA of shapefile products.
- Primary technical contact in developing projects and products with ESRI. These include Geography Network services, SDC data development, and ArcLogistics Route data development.

Etak, Inc

GIS Engineering Manager

- Managed GIS Engineer, GIS Specialists, and Process Coordinator.
- Assisted with builder development, product build, testing, packaging, and documentation of the Etak Shapefile 2.0 product.
- Developed specifications, developed product build tools, ran product build, wrote QA test plans, assisted with QA, developed ArcView extensions, and wrote documentation for the Etak Shapefile 3.0 product.
- Generated statistics using ARC/INFO spatial analysis to support planning.
- Managed and continued to develop Informix relational databases.
- Maintained and developed ARC/INFO AML tools for plot production.
- Produced ARC/INFO plots for planning, marketing, and presentations

EDUCATION: BA in Geography - University California at Santa Barbara



JESSE SHERIDAN

603-369-8774

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Senior Director, GIS Mapping and Support

- Demonstrated ability to trouble shoot and resolve GIS spatial and analysis challenges.
- Advanced knowledge of GIS applications, tools, and programming languages unique to GIS environments such as, ESRI and MapInfo.
- Advanced knowledge of geocoding methodologies, postal and geo-political architectures.
- Advanced knowledge of PostgreSQL RDBMS and its query languages

PROFESSIONAL EXPERIENCE

BroadMap

Senior Director, GIS Mapping and Support

- Manage a team of engineers responsible for the tools development of GIS database production / analysis.
- Responsible for the creation, design, load, and maintenance of the production and product RDBMS.
- Responsible for the creation of database data models, functional data specifications for all production level databases.
- Responsible for all geocoding aspects of all input sources.
- Responsible for the process and procedural design and management of the customer / technical support team.
- Responsible for RDBMS database administration (DBA) of all BroadMap's database assets.

Tele Atlas

Director of Strategic Research & Director of Global Specifications

- Coordinated global product, database, and quality design teams
- Managed team of 20+ professionals in 4 countries
- Ensured design alignment with strategic customers/partners
- Exploring new technologies
- Developing prototypes for cutting edge designs
- Interfacing closely with strategic technology partners across the globe

Tele Atlas

Director of Database Development

- Defined and oversaw documentation of database design
- Researched and presented to executive management and strategic clients
- Spearheaded all internal transportation product-related efforts
- Trained and managed GIS specialists throughout the company

EDUCATION: BA in Geography and Pure Mathematics - Dartmouth College



CLARA HOOK

502-384-2877

clara.hook@broadmap.com

PROFESSIONAL EXPERIENCE

BroadMap

Resource Specialist

- Research and acquire spatial data sets as it relates to broadband availability, types of Broadband access, Broadband quality, and demographic related information.
- Research and acquire contextual spatial data as it relates to national, local state and regional level infrastructure.
- Analyze and evaluate sample spatial data sets to determine if that data needs to be acquired for the data repository.
- Develop relationships with national, state and local agencies as well as commercial entities in order to understand the depth and breadth of the available Broadband and other related spatial data.
- Maintain accurate records for potential and existing spatial data providers.
- Develop new and innovative sourcing techniques regarding web-scraping and community input programs to compliment standard resourcing approaches.
- Manage daily operations with all functional areas reporting directly including finance, legal, product management, marketing and human resources.
- One of three company founders responsible for all internal operations and management of investment partners.
- Responsible for the recruiting of all executive positions including CTO, CMO, CFO
- Oversight of company's strategic direction and business strategies
- Senior contact for all partnership

Humana, Inc.

Project Manager Application Development, Corporate Systems

- Managed the implementation of a new reconciliation tool called TRecs Enterprise for Financial Systems
- Analyzed the existing hardware needs and coordinated with the Vendor to ensure adequate hardware was obtained
- Responsible for writing the Statement of Work and ensuring all aspects of the contract was adhered to
- Coordinated efforts to ensure all known errors were defined and captured in the new testing utility to ensure speedy resolutions
- Prepared and presented weekly status and technical reports to the project team
- Prepared and presented monthly status to Executive Steering Committee

Project Manager Application Development, Corporate Systems

- Managed the implementation of Oracle Infrastructure updates, which included migrating to SLES 10, upgrading database to 11g and implementing all mandatory financial and HR patches
- Worked with multiple technical and business teams to ensure all requirements were documented and tested
- Responsible for ensuring the project updates had no system degradation
- Prepared and presented weekly status report to the Project Team and Project Sponsor



Project Manager Application Development, Corporate Systems

- Managed Implementation of a new Oracle Chart of Accounts structure within the Financial System. Oversaw multiple teams' (on, Enterprise Security, Enterprise Architecture, HR, Finance, Corporate Systems Development.) development efforts to ensure an accurate and timely implementation was achieved
- Coordinated the effort to ensure all known errors were defined and captured in a usable format to ensure speedy resolutions were implemented
- Prepared and presented status and technical reports to senior IT management

Program/Project Manager Medicare Sales & Marketing

- Managed Program Management of IT Medicare initiatives for new development and enhancements of existing applications.
- Captured and paid compensable events for all Medicare Sales Agents
- Oversaw new development for reporting of both delegated and captive agents' commissionable history to ensure all regulator/legislative requirements were met
- Worked with vendors, consultants and business personnel to ensure an enterprise solution was documented and achieved
- Ensured all Business Support personnel accurately documented and tested all applications utilizing the defined methodology
- Responsible for ensuring all regulatory and audit requirements
- Responsible for ensuring the project updates had no system degradation
- Managed a staff of 12 members and support of a user base of 1000+ users

Kindred Healthcare, Inc. /Previously Vencor, Inc. Louisville, KY

Manager Financial Systems Customer Support/Sr.Project Manager

- Managed a 24 x 7 Financial Systems Customer Support Group of 12 employees in a team environment that consistently achieved customer satisfaction ratings of 85% or higher
- User base supported included 250 + nursing centers, 60 hospitals, 25 Pharmacies, 500 Rehab Contracts and Corporate Users
- Supported over 100 financial applications including SAP, Meditech, HPAS, Kronos Work Force Central, and Kronos TKC
- Analyzed problem management tickets for trends and root causes and implemented needed corrective actions
- Coordinated and communicated support activities with end users and other IT unit managers (e.g., database, telecommunications, operations, NT, UNIX, and hardware support.)
- Prepared and presented status and technical reports to senior IT management. Ensured compliance with Sarbanes-Oxley requirements
- Coordinated testing of monthly Microsoft patch releases to minimize impact to financial systems

Manager Financial Systems Customer Support/Sr.Project Manager

- Managed the HP Open View Service Desk implementation project which utilized the ITIL framework for Service Desk, Incident, Problem, Configuration and Service Level Management for 450+ users
- Worked with all levels of the IT organization to define and catalog services to ensure issues could be resolved quickly
- Coordinated the effort to ensure all known errors were defined and captured in a usable format to ensure speedy resolutions by Customer Support
- Coordinated the continuity planning efforts for Financial System Development to be utilized in case of disaster
- Managed all project within Financial Systems Development through the full systems development lifecycle
- Presented all phases of the projects to Executive Management



Manager Financial Systems Development – HSD AR, Internet/Intranet Development, Business Support

- Managed HSD Patient Accounting, Internet/Intranet Development and Business Support Groups
- Managed diverse group of 45 employees, including programmers, business analysts, and project managers. Customer base included 250 + nursing centers, 60 hospitals, 25 Pharmacies, Accounts Receivable, Treasury, Tax, Reimbursement, Payroll, Accounts Payable, Finance, Corporate Communications, Legal, Corporate Accounting and all budget contributors
- Prepared and supervised project budgets, estimates, and timelines in excess of \$6M
- Prepared organizational budgets, reviewed financial reports, and managed cost control
- Consulted with senior business management to develop IT solutions to meet strategic business objectives and comply with regulatory requirements
- Consulted with senior business management on the development of the SDLC methodology utilized by the company
- Ensured all Business Support personnel accurately documented and tested all applications utilizing the defined SDLC methodology
- Prepared and presented status and technical reports to senior IT management

Project Manager

- Managed the Maine Medicaid Billing upgrade and implementation of ProComm and Hi-Tech software
- Planned and managed software upgrades for 5 sites and 30 corporate users
- Evaluated technology infrastructure and streamlined billing process to receive Medicaid payments more timely

Programmer Analyst

- Designed and wrote a Reimbursement Utility for State Medicare/Medicaid reporting in Visual Basic 6.0
- Designed and created databases for financial services in SQL Server 6.5 and 7.0
- Imported and exported data loads to and from SAP

Vencor, Inc.

Financial System Support Analyst

- Developed and tested business process procedures for SAP FI/CO modules for 2000+ users in the Healthcare industry
- Developed training documentation for both corporate and field users
- Trained corporate and field users on FI/CO and MM modules. Configured FI/CO modules
- Served as Team Lead for Go-Live Customer Support hotline
- Designed and implemented process flow and procedures for hotline operations

EDUCATION: MS in Applied Information Technology - Bellarmine University
BS in Computer Information Systems – Sullivan University



VINCENT ULFIG

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- GIS software, application & data product design, development, implementation and marketing
- GIS Website and Web Service design, development, implementation and administration
- Spatial database design, development, loading and administration
- 3D Terrain Data Processing and Visualization Systems for US Military simulation systems
-

PROFESSIONAL EXPERIENCE

BroadMap

Sr. Web Applications Engineer

- Responsible for creating and maintaining all web based product technical specifications.
- Responsible for the publishing of GIS products using Google, Microsoft Bing Maps, or similar large-scale web mapping APIs to deliver products as live ASP services.
- Assist with the product design and development of all GIS products published in either an ESRI format and or MapInfo format.
- Assist with the product design and development of all printed medium products ranging from standard paper map product to customized paper map products.
- Responsible for the design, development, and management of the RDBMS on the product server.
- Participate as needed in development meetings with key partners & customers
- Responsible for setting up and maintaining product server.

Total Immersion Software

GIS Team Lead

- Research, analyze, document, choose, develop, customize and integrate open source, GOTS and COTS technologies to create a system that prepares spatial data for use in 3D simulations.
- Develop terrain data generation pipeline with many spatial data technologies including ESRI ArcGIS, Terrex Terra Vista, MultiGen Creator, FME, GRASS, MapWindow GIS, Proj4, GDAL, RUGUD, U2MG, OpenSceneGraph, Blender, 3DS Max, Remo3D, Okino NuGraf, Python, JavaScript, VBA, Google Earth, Google Maps, Sketchup, Collada, Openflight and Gamebryo.
- Research, analyze and document military simulation use cases and data to create terrain system functional requirements, prototypes and solutions for a DARPA project named RealWorld.

San Francisco Enterprise GIS (SFGIS), City of San Francisco, CA

Senior GIS Developer



- Design, develop, implement, administer and support GIS web applications with ArcIMS, ArcGIS, ArcSDE, ASP, Cold Fusion, JavaScript, DHTML, Python, VBScript, C#, and .Net.
- Design, specify, implement, analyze, improve & administer GIS hardware, software and apps.
- Interview City department employees, analyze GIS / IS requirements, design, propose, develop and implement systems and applications, and design, create and publish maps.
- Design, develop, sell and implement SFGIS online services and apps to City departments.

Tele Atlas North America

GIS Software Coordinator

- Plan, coordinate and track GIS product engineering and QA team resources and activities.
- Recruit, interview and hire GIS product engineer candidates.
- Create GIS product engineering team job descriptions and conduct performance reviews.
- Design and write GIS product specifications and documentation.
- Design and write procedural and functional requirements for GIS product production software.
- Task, motivate and coordinate product engineering team members.
- Perform the work described in the GIS Product Engineer position below

GIS Product Engineer

- Conceive, propose, architect, develop, purchase, implement and administer website, content, applications, software, hardware, network, and security on a website that demonstrates and disseminates Tele Atlas' spatial data products and web services.
- Coordinate and collaborate with ESRI: Tele Atlas' most important partner.
- Coordinate the purchase, admin and use of all ESRI software for Tele Atlas North America.
- Design, develop, build, document and demonstrate new spatial data product formats.
- Conceive, design, develop and implement quality control systems and applications.
- Design, develop, build, document and demonstrate real-time traffic applications.
- Configure spatial data, RDBMS, ArcSDE and ArcIMS software and hardware for performance.

Washington Suburban Sanitation Commission

GIS Application Developer and Consultant

- Design, develop and implement GIS applications using ArcGIS, ArcSDE, ArcInfo & ArcView.
- Founded GIS consulting corporation for direct & efficient business relationships with clients

State of Nevada Department of Transportation (NDOT)

GIS Application Developer and Consultant



- Design Oracle 8i linear referencing system database for pavement management.
- Convert and load legacy GIS data into Y2K-compliant linear referencing system database.
- Design, develop, and implement pavement management applications with Visual Basic 6 GUI, Oracle PL/SQL, Oracle and Access databases, and VB, Access and Crystal reports.
- Design and implement IS department strategy for moving from Novell to NT network application development and deployment structure and procedure.

Environmental Systems Research Institute (ESRI) World Headquarters, Application Division

GIS Applications Developer / Release Manager

- Design, develop & implement an efficient, robust and generic spatial data editing application for NGA (National Geospatial Intelligence Agency) database production system, named PLTS.
- Integrate data editing application and several existing disparate NGA database development applications into a cohesive product named PLTS.
- Create and implement PLTS application development and release structure & procedure.
- Develop UNIX shell and Windows WISE application installation programs for PLTS.
- Write online and hardcopy application software user documentation for PLTS.

GIS Project Engineer

- Design, develop and install all GIS applications for the City of Philadelphia Department of Records land info system at four customer and data production sites in the US and India.
- Design, develop, and implement ArcView public land parcel lookup application.
- Document application functionality, and teach subcontractors and clients application use.
- Write and review specifications, proposals and contracts associated with this project.

GIS Project Engineer

- Conceptualize, design, and code tests to ensure quality in Database Services products.
- Propose, develop, and implement departmental QA and QC software and procedures.

Environmental Systems Research Institute (ESRI)

GIS Software Sales & Marketing Engineer

- Design, develop, and demonstrate prototype GIS applications for sales and marketing of ESRI products and services to current & potential US Federal Government clients.
- Design, develop, and demonstrate prototype applications and benchmark tests in Applications Prototype group, (Benchmarks), for procurement of Federal Govt. contracts.



Wisconsin Department of Transportation GIS Unit

GIS Data Broker

- Implement and promote spatial data sharing procedures, between eight DOT regional GIS offices, other DOT departments and other State and local GIS agencies.
- Design, disseminate, and implement data quality standards for State and local GIS agencies.
- Develop and implement ArcInfo AML data quality tests on state government spatial data.
- Document and report state spatial data quality and metadata to data providers & users.

Dane County Land Information Office

GIS Application Developer

- Design, and develop land records database creation & maintenance application with AML.
- Implement local county coordinate system for seamless integration with land surveys.
- Integrate parcel maintenance application with customized ArcTools COGO tools.

EDUCATION: BS in GIS and Computer Cartography – University of Wisconsin - Madison



MICHAEL A. DAVERN

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PROFESSIONAL EXPERIENCE

BroadMap

GIS Tools Engineer

- Develop and document accurate, efficient, and flexible conflation tools.
- Develop and document automated, semi-automated, and manual editing tools and associated processes
- Build tools and processes in conjunction with other engineering and product teams for the on-time, quality release of data products, services, and applications.
- Gain and maintain modern best practice coding skills
- Evaluate and recommend different platforms as they become available, both commercial and open-source
- Proactively adhere to the quality policies set forth by the Quality team
- Participate as needed in development meetings with key partners & customers

Abalta Technologies

Consultant, Test and Field Services

- Created and executed competitive analysis bench and field test plans for GPS devices for vehicle/pedestrian navigation (PND, OEM, after-market, hand-held), as well as recreational navigation (golf, hiking, etc.).
- Designed and created a relational database and user interface to serve as Abalta's proprietary test case management system for the Lighthouse™ test platform. Application supported route/scenario entry and query, test plan generation, entry of test results, and report generation. Application allowed for offline data entry via replicas of the master database, the ability to synchronize changes back to the master database, and the capability to resolve any database conflicts. Developed tools to import existing test route/scenarios from legacy test plans, saving data entry time and avoiding possible typographical errors during entry.
- Developed and documented Perl script to automate and standardize the GDF to SDL database compilation process.
- Developed and documented Linux shell scripts to utilize Amazon Cloud Computing (EC2 and S3 technology) to shorten GDF to SDL compile process from 3 days to 20 hours.
- Conducted analysis of NAVTEQ Technical Notification Memorandums to determine impact on customer database compilers.
- Provided analysis and technical support to the Abalta team to expedite root cause analysis of data issues and process failures.
- Provided mentoring and leadership to the junior members of the Test and Field Services team.

Tele Atlas North America



Programmer/Analyst

- Worked with functional teams to design, analyze, and implement data enhancement processes.
- Tested and debugged software programs and systems in order to ensure that alpha testing is compatible with project and process requirements.
- Worked closely with software developers to resolve conflicts between code and specifications, system processes, and the editing environment.
- Developed tools and workflows to streamline and automate workflows, while insuring data quality and consistency.
- Created tools and processes to test and validate incoming data prior to integration into the core database, preventing potential degradation.
- Responsible for resolution of cross-functional implementation issues prior to system releases.
- Analyzed data integrity issues that effected data quality. The analysis process often included root cause analysis, implementation of corrective measures, and application of preventative measures to assure the problems did not arise again.

Geographic Data Technology

Spatial Data Analyst – Coordinator

- Coordinated the evaluation, qualification, and conversion of available spatial data sets for use in the improvement of GDT's core database, primarily vector and attribute conflation activities.
- Developed and implemented analytical procedures and spatial data format conversion tools and procedures, to support the Geometry Enhancement Program.
- Managed GDT's imagery efforts. Including evaluations, loading, archiving, and delivery of images to outsource vendors and internal staff. Evaluated and qualified digital imagery. Troubleshoot and resolved imagery issues.
- Worked with Product Development to prototype new products and processes.
- Developed workflows, documentation, and training in support of departmental activities.
- Tracked, reported, and provided statistics that show group productivity levels, realignment efforts, and positional accuracy of GDT's core database.

Geographic Data Technology

Spatial Data Analyst

- Evaluated, qualified, and converted available spatial data sets for use in GDT's Geometry Enhancement Program, primarily vector conflation activities.
- Developed and implemented analytical procedures and spatial data format conversion tools and procedures, to support the Geometry Enhancement Program.
- Worked with Product Development to prototype new products and processes.
- Evaluated and qualified digital imagery.
- Developed workflows, documentation, and training in support of departmental activities.

Geographic Data Technology



Customer Support Representative

- Performed customer support activities for GDT's geographical data products. This included both pre and post-sales technical support.
- Maintained a strong working knowledge of hardware, operating systems, and software as needed to provide technical support to potential and current customers. Stayed abreast of GIS industry trends.
- Disseminated customer feedback to support GDT's marketing and sales efforts.
- Performed quality assurance functions from a customer perspective; provided input into the product development process based on the use of the various products.
- Assisted in the training of personnel (both internal and external) in the use of GDT data in the supported formats.

Intergraph Corporation

Senior Applications Engineer

- Provided technical support for Intergraph's MGE and GeoMedia product family. This included both phone, and on-site support.
- Pre-Sales and post-sales support including product demonstrations, technical sales calls, trade show support, benchmarks, existing customer support, and technical content creation such as demos, workshops, presentations, and AVIs.
- Provided training tailored to customer's needs and workflows.
- Replied to Requests for Proposals.
- Provided consulting to customers to include needs assessment, workflow design/setup, customization, implementation, software installation/setup, and workflow automation.

Rand McNally & Company

Technical Development Specialist

- Analyzed short and long-term software and hardware needs for production staff in an effort to reduce costs and increase production.
- Provided training to production staff in UNIX, Windows NT, MicroStation, Geographics, SQL, and EdG.
- Maintained contact for daily support of a 60 member production staff.
- Acted as the backup System Manager in his absence. Support revolved around network maintenance, archiving, backups, software installation, and file maintenance.
- Analyzed, developed, and documented workflows for use in both a technical, and production environment.
- Tested, evaluated, and recommend 3rd party software for possible utilization in the department.
- Developed UNIX and PC based applications to increase productivity for both production and technical staff.

Rand McNally & Company



Digital Cartographer

- Performed interactive graphics/database manipulations to create and maintain cartographic databases and products.
- Participated in editorial and map composition tasks.
- Executed, monitored, and verified computer processes to ensure data integrity.
- Supported project communication and documentation efforts; maintained logs and other tracking mechanisms.
- Assisted in the training of new employees in proprietary cartographic tools.
- Assisted in the development, testing, debugging and documentation of workflows.
- Performed Quality Control checks to assure product is of highest possible quality.

EDUCATION: MA in Geography-Physical Environmental Systems – Binghamton University

BS in Geography – State University of New York, College at Cortland



CHRISTOPHER R. MABEY

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PROFESSIONAL EXPERIENCE

BroadMap

Mapping & Support Technician

- Edit detailed broadband data in tabular and spatial forms using standard and customized GIS tools
- Interfacing with state and federal government partners and customers both proactively and reactively to support BroadMap products and services
- Provide detailed feedback to peers on data trends and specific situations
- Keep a detailed log of work on all issues, including involved parties, datasets, dates, etc.
- Proactively adhere to the quality policies set forth by the Quality team
- Participate as needed in development meetings with key partners & customers

Tele Atlas North America, Inc.

Manager, Mapping Service

- Oversaw the operations of a Geographic Information Systems (GIS) department. Duties included hire/fire and reviews of over 20 staff members, budget, forecasting, quoting, intra-departmental interactions, business development, and community outreach projects.
- Utilized MS OFFICE extensively, including WORD, EXCEL, Outlook, PowerPoint, Project, and ACCESS.

Supervisor, Mapping Services

- Led over 25 technicians in creating maps utilizing high end software.
- Distributed work, monitored quality kept inventory, and shipped product.

Manager, Customer Support

- Directed a staff of 3 to provide technical support for GDT's product and services for customers and sales.



EarthRight Institute

Administrative Manager

- Duties include the daily management of a non-profit organization's office. From updating databases to preparation for Board meetings, this position kept me in constant contact with the public, government agencies, and a whole network of environmental organizations.
- Coordinated a fund raising auction, for EarthRight, from 9/94 to 10/94.
- Served on ERI Board from 1/95 to 1/96.

Denali National Park and Preserve

Supervisor Park Ranger

- Supervised a staff of park rangers for the Visitor Services Division of Denali N.P. and Pre.
- Oversaw the operating procedures of a large visitor center, including emergency services, training, data input, and actual visitor center layout design.

Saint-Gaudens National Historical Site

Acting Supervisor Park Range

- Duties involved directing staff to interpret an American sculptor's work, compiling data for visitor impact reports and emergency plans, scheduling, security, and numerous other daily tasks. Position started as Park Ranger, but was promoted to Lead Park Ranger, then Acting Supervisor.

Tele Atlas North America, Inc.

Customer Support Technician

- Provided technical support for GDT's product and services. Including understanding product specifications and layout in multiple formats. Phone, computer, and in-person support. Example GIS software supported included ESRI's ArcMap, ArcInfo, ArcViewGIS, and MapInfo.

Database Improvement Coordinator

Digital Mapping Technician (DMT)



- Duties involved proprietary Geographic Database construction, work flow distribution, and digital cartography. Bulk of duties resided on an UNIX platform, but other OS included DOS and Windows.

Merriam-Graves Corporation

Driver Technician

- Set-up and maintained home medical equipment. Gained great experience, communicating with elderly individuals, as well as, with mechanical devices.
- Possessed a CDL which included HAZMAT transportation authorization.

Denali National Park and Preserve,

Park Ranger

- Communicated with the public on every aspect about Denali N.P. and Pre. From general information on campgrounds and shuttle buses, to maintaining a wilderness check station that reduced visitor impact on the environment. Fought in the 1989 forest fires in Idaho and Montana, and was the only medic for an entire crew.

Lost River Reservation

Guide

- Gave guided tours of glacial caves and caverns. Assisted with general maintenance and repair of facilities, and responded to any emergency situation.

Orange-Windsor Supervisory Union

Substitute Teacher

- Substitute elementary and middle classrooms, as well as, for special education aids.
- Participating in the Chelsea public school and Newton Elementary school.

Great Smoky Mountains National Park

Resource Manager Assistant



- Received hands-on experience with natural resource management. Including vegetation restoration, exotic species control, soil erosion prevention, and fire management. This job was through an internship from The Student Conservation Assoc. in which I received honors.

Suicide Six Ski Area

Maintenance

- Supervised snow-making crews, maintained ski lift areas, while keeping in constant communication with the public.

EDUCATION: BA in Environmental Studies – Johnson State College



SUDHA MAHESHWARI, PH.D.

OPERATIONS MANAGER

Dr. Maheshwari has more than 12 years of experience in the GIS and mapping industry which includes managing a diverse range of projects in the public sector, private sector and research. She has both academic training and extensive experience in the use of GIS for urban planning and disaster management. Ms. Maheshwari has more than four years of experience managing parts of a large enterprise GIS for Oakland County, MI, the largest county in Michigan with over a million population. At Oakland County, Ms. Maheshwari led several projects including data migration, data collection for critical infrastructure, acquisition of orthoimagery for the county, and development of applications related to water resources, planning, emergency management, tax assessment and equalization. Customer relationship management is her forte and she has managed relationship with 61 Oakland County local units of government and their GIS needs including liaison with FEMA and these agencies for new county-wide flood insurance rate maps production. At Sanborn, she has been involved in developing semi-automated land use and land cover products for large areas and has managed these projects. She also has experience developing proposals and managing projects

over a range of geospatial technologies. She has worked nationwide. Ms. Maheshwari has also co-chaired the Annual IMAGIN conference for two years and is well-known in the GIS community in Southeast Michigan. Ms. Maheshwari teaches a 3-credit graduate level class introducing GIS to Urban Planning graduate students at University of Michigan, Ann Arbor.

Education

- ◆ Ph.D., Urban Planning and Policy Development, Rutgers University, New Brunswick, NJ, Thesis Title: "Disaster Damage Assessment Models: Data Needs vs. Ground Reality", 2007
- ◆ MRP (Master of Regional Planning), University of Massachusetts, Amherst, MA, 1996
- ◆ B. Arch (Bachelor of Architecture), Jadavpur University, Calcutta, India, 1993

Affiliations and Certifications

- ◆ Urban and Regional Information Systems Association (URISA), 1996
- ◆ Improving Michigan's Access to Geographic Information Networks, IMAGIN Annual Conference, 2001.
- ◆ Conference Co-chair, IMAGIN Annual Conference, 2005 & 2006

PROJECT EXPERIENCE

- ◆ **State of Michigan.** Ms. Maheshwari undertook detailed needs assessment based on existing systems and processes for the migration of the Michigan Geographic Framework data to an Oracle Spatial format for Center for Shared Solutions, Michigan Dept of Information Tech.
- ◆ **Commonwealth of Massachusetts.** Ms. Maheshwari is managing the creation of a land use map using an innovative semi-automated process that combines GIS and remote sensing to cut the production time by half and cost by two thirds over manual delineation.
- ◆ **State of Rhode Island.** Ms. Maheshwari is managing the creation of a land use map and statewide impervious that pioneered the semi-automated process.
- ◆ **Commonwealth of Kentucky.** Ms. Maheshwari is managing a NASA-funded project to develop tools for user communities ranging from local governments to forestry organizations. The tools involve stand alone GIS applications and OGC compliant web services.

◆ **USGS GAP Program.** Ms. Maheshwari managed a GAP project encompassing 11 states to map ownership of all federal and state lands in the 11 state region.



- ◆ “OGC-Compliant Web Mapping and Change Detection Portal for KY.” Paper presented at the KY GIS Conference, Louisville, KY, July 30-August 1, 2007
- ◆ “Floodplain Redelineation for Oakland County, MI: Process and Impacts” 2005. Paper presented at the ESRI User Conference, San Diego, July 24-29, 2005.
- ◆ “Bringing it all together”, ASPRS, November 2006.
- ◆ “GIS-Based Damage Assessment Models: Using Data from Local Sources, Case of Seattle, WA.” Paper presented at the Annual Conference of American Collegiate Schools of Planning, Baltimore, MD, November 21-24, 2002.
- ◆ “The State of GIS Implementation in Large Cities for Disaster Management: A Survey of 20 Cities.” Paper presented at the Annual URISA Conference, Chicago, IL, October 26-30, 2002.
- ◆ “ArcGIS Migration in Steps: Strategy for Large Enterprise System Migration in Oakland County, MI.” Paper presented jointly with Scott Oppmann at the URISA, Chicago, IL, October 26-30, 2002.

Recent Publications

- ◆ “Diversification of Defense Based Industries in India.” In A. Markusen and S. DiGiovanna eds. From Defense to Development: International Perspectives on Realizing the Peace Dividend. Routledge. New York, 2003.
- ◆ “Simulating Earthquake Damage to the Electric-Power

WORK HISTORY

Operations Manager, Sanborn, Ann Arbor, MI, July 2006–Present. Responsible for all projects run in the Ann Arbor office and key client relations. Responsible for developing new concepts and products to solve client needs using imagery and GIS and bringing new clients and jobs. Responsible for supervising staff to ensure on time and on budget deliveries.

Supervisor, Land Management, Department of Information Technology, Oakland County, Pontiac, MI, Jan 2005–July 2006. Supervised a team of about 10-12 staff including 3-4 project managers and other customer support specialists and contractors in implementing land management technologies (both spatial and non-spatial) in various departments in Oakland County and local municipalities in Oakland County.

Project Manager, GIS Utility, Department of Information Technology, Oakland County, Pontiac, MI, Dec 2001–Jan 2005. Worked with the GIS Utility Supervisor to manage the GIS program with 12-14 staff. Responsible for overall program management, particularly for implementation of GIS across County Departments and 61 local Cities, Villages and Townships (CVTs), and appropriate technology deployment.

Project Manager, Urban Data Solutions, Manhattan, NY May 2000–April 2001. Managed a team of about 10 GIS and CAD professionals in creating 3D digital models of major cities in the US (e.g. Chicago, Los Angeles, and Manhattan). Responsible for meeting project deadlines, coordinating with other teams for process optimization and improvement, business development and offshore contracting.

Graduate Research Assistant, Los Alamos National Laboratory, Los Alamos, NM, September 1998–August 1999. Assisted in GIS-based computer modeling of the possible impacts of a large earthquake on the urban system of Los Angeles, CA. Particular emphasis on electrical infrastructure system and on integrating decision-makers in the modeling process.



BECCA HEARTWELL
GIS Analyst

Years of Experience – 5 years
Years with the Company – 3.5 years

Ms. Heartwell's current responsibilities as an Associate GIS Analyst with Sanborn include providing assistance to the project manager for the Midwest Stewardship Mapping project. For this, Ms. Heartwell primarily used ArcGIS to assist in managing and editing stewardship data, using a geodatabase format, from multiple state and federal agencies. Ms. Heartwell is also the onsite IT manager for the Portland Office, dealing with ongoing system management needs. Ms. Heartwell also has valuable cartography skills that would be valuable for this project.

Education

- ◆ M.S., Geography, Portland State University, Portland, OR, 2007
- ◆ B.S., Geography, Portland State University, Portland, OR, 2003
- ◆ B.S., Chemistry, Oregon State University, Corvallis, OR, 1985

Project Experience

- ◆ **Midwest Stewardship Mapping Project, USGS – GAP program, From September 2007 to November 2008.** Ms. Heartwell is collecting and managing state and federal data within a geodatabase to create an 11-state stewardship map – Arkansas, Illinois, Indiana, Iowa, Louisiana, Michigan, Minnesota, Missouri, North Dakota, South Dakota, and Wisconsin. She is also gathering documents and information from each agency describing management policy which is used to classify lands into preservation/conservation status categories.
- ◆ **Southeast Land Cover Change Mapping, NOAA, Zones 55 and 58, From July 2006 to September 2007.** Ms. Heartwell used ERDAS Imagine, Definiens (e-Cognition), and ArcGIS to assist in modeling and editing land cover classifications in Florida, Georgia, South Carolina and North Carolina.
- ◆ **Western States Expansion Hazard Layer Development, Insurance Services Office, Arizona, California, Colorado, Idaho, Nevada, New Mexico, Oregon, Utah, and Washington, From December 2006 to September 2007.** Ms. Heartwell assisted the project manager on this project to generate output layers for various hazard attributes, using ArcMap and ArcInfo Workstation, for the eight western states.
- ◆ **Southeast Land Cover Change Mapping, NOAA, Zones 55 and 58, From July 2006 to September 2007.** Ms. Heartwell used ERDAS Imagine, Definiens (e-Cognition), and ArcGIS to assist in modeling and editing land cover classifications in Florida, Georgia, South Carolina and North Carolina.
- ◆ **Southern Wildfire Risk Assessment, Southern Group of State Foresters, 13 Southern States and Federal Agencies, From January 2006 to November 2006.** Ms. Heartwell worked as a GIS technician downloading datasets, running and monitoring AML process models using ArcGIS. She also created large format maps of final outputs.



- ◆ **USGS Landfire Impervious and Tree Canopy, various US locations, From September 2004 to June 2006.** Ms. Heartwell was a Technician on this project. Her responsibilities include image and classification preparation, geocorrection, digitizing, editing, and quality control using ArcGIS and ERDAS Imagine.

Work History

Associate GIS Analyst, Sanborn, Portland, OR, November 2007 to present.

GIS Technician, Sanborn, Portland, OR, March 2005 to November 2007.

GIS Technician, Space Imaging, LLC, Portland, OR, September 2004 to February 2005.

Cartographic Technician, Natural Resources Conservation Service, USDA, Portland, OR, From November 2003 to November 2004. Ms. Heartwell used USDA mapping software to digitize, edit, and label soil maps. To prepare for the generation of digital soil maps, she was involved in the conversion of mylar field maps into digital templates. Ms. Heartwell was also involved in the creation of procedure documentation to be used as training materials. She helped in the process of uploading approved digital soil maps to the SSURGO website as well as migrating the SSURGO data to the Soil Data Mart website.

GIS Intern, Space Imaging, LLC, Portland OR, From April 2002 to November 2002. Ms. Heartwell worked on two projects: first, the Airport Mapping Database – digitizing airport features for 83 international airports and second, the APFO CLU, project for the USDA, mapping agricultural fields, property and farm boundaries, using ArcVIEW 3.x. She also assisted in quality control on the final maps.



JANET HOYT PROJECT MANAGER

Ms. Hoyt has over seventeen years experience in the GIS/Mapping industry utilizing remote sensing and GIS technology to deliver innovative and quality land cover classifications and data analysis to clients. During the past seventeen years, Ms. Hoyt has worked with Sanborn, Inc., GeoSpatial Resources, Inc. and Space Imaging (formerly Pacific Meridian Resources) providing state-of-the-art applications of remote sensing and GIS to real world issues. Ms. Hoyt is currently Acting Operations Manager for Sanborn's Portland office. She is responsible for handling day to day activities and ensuring that all projects are meeting their goals. Ms. Hoyt is also a Senior Analyst for Sanborn and manages several large scale projects for the company. While at Space Imaging/Pacific Meridian Resources, Ms. Hoyt served as a Remote Sensing Analyst, GIS Analyst, Project Coordinator, Project Manager, and for two years was GIS Manager of the Portland, Oregon office. Ms. Hoyt also worked as an independent consultant for GeoSpatial Resources, Inc providing geospatial services to both private and government organizations.

Education

- ◆ Post Graduate Studies, Department of Forestry, Virginia Polytechnic Institute and State University, Blacksburg, VA, 1990-1992
- ◆ B.S., Geological Engineering, Michigan Technological University, Houghton, MI, 1989

PROJECT EXPERIENCE

- ◆ **United States Geological Survey – LANDFIRE Program, September 2008–Present).** Ms. Hoyt is Project Manager on the Alaska–Hawaii LANDFIRE project to develop fuel variables for the States of Alaska and Hawaii.
- ◆ **State of Florida, FRACIP Project, January 2008–Present).** Ms. Hoyt is Project Manger for the project to map canopy fuels for Florida.
- ◆ **Forestry Business Improvement Initiative – Business Process Modeling Assessment, Oregon Department of Forestry, May 2008–March 2009.** Ms. Hoyt was the project manager for this high level assessment of current business processes in the ODF. Ms. Hoyt was responsible for day to day management of the Sanborn team on this project.
- ◆ **Southeast Land Cover Change Mapping, NOAA, Zones 55 and 58 July 2006– September 2007).** Ms. Hoyt was the project manager and analyst for mapping close to 100 million acres in the southeast states of Florida, Georgia, South Carolina and North Carolina. The project methodology incorporated multiple date imagery for classifying 23 land cover types. A 5-year change detection was also part of the project.
- ◆ **Land Cover and Fuels Change Analysis of Post Hurricane Gulf Coast, American Forests, Gulf Coast, July 2006–August 2007).** Ms. Hoyt was the project manager and lead analyst for mapping over 30,000 square miles of the Hurricane Katrina and Hurricane Ivan impact areas along the Gulf Coast.
- ◆ **Impervious Surface Mapping, City of Longview, Longview, WA, September 2005–March 2006.** As a private consultant with GeoSpatial Resources, Inc., Ms. Hoyt teamed with Spatial Solutions, Inc., to complete a pervious/impervious surface map for the city of Longview, Washington.
- ◆ **Change Detection Analysis and Mapping Project, The Nature Conservancy, Minnesota, September 2005–March 2006.** As a private consultant with GeoSpatial Resources, Inc., Ms. Hoyt teamed with Spatial Solutions, Inc., to complete the mapping of aspen loss/reduction and encroachment for The Nature Conservancy in Minnesota. This was a two phase project.



- ◆ **Accuracy Assessment Field Data Collection, National Forest Service, Ochoco National Forest, February 2005–September 2005).** As a private consultant with GeoSpatial Resources, Inc., Ms. Hoyt teamed with Spatial Solutions, Inc. to collect accuracy assessment field data for the Ochoco National Forest. Ms. Hoyt was responsible for navigating to and collecting field data in all areas of the Ochoco National Forest.
- ◆ **Surface Fuels Mapping for Crook County, OR, Spatial Solutions, Inc., Crook County Oregon, April 2003–September 2004.** As a private consultant with GeoSpatial Resources, Inc., Ms. Hoyt classified surface fuels for portions of Crook County Oregon using Landsat TM imagery.
- ◆ **Surface Fuels Mapping for Clackamas County, OR, Spatial Solutions, Inc., Clackamas County, Oregon, June 2002–February 2003.** As a private consultant with GeoSpatial Resources, Inc., Ms. Hoyt classified surface fuels for over 1800 square miles in Clackamas County using Landsat TM imagery.
- ◆ **Automated Image Classification Methods Development, USGS, September 2000–June 2001.** Ms. Hoyt was in charge of managing this project, which developed improved methods for incorporating segmentation and shape information into image classification. eCognition was utilized to develop and refine segments for this analysis.

WORK HISTORY

Acting Operations Manager/Senior Remote Sensing Analyst, Sanborn, Portland, OR, July 2006–Present. As Operations Manager: responsible for monitoring all projects in the Portland Office to ensure that they are meeting goals and standards; responsible for running day to day operations in the Portland Office. As Senior Remote Sensing Analyst: responsible for managing individual projects and providing remote sensing analysis and expertise to various projects; responsible for assisting on proposal development.

President/Remote Sensing Specialist, GeoSpatial Resources, Lake Oswego, OR, June 1992–July 2006. Responsible for all aspects of business operations from marketing and proposal development to financing and payroll. Responsible for the timely and successful completion of multiple projects. Responsible for all aspects of a project to include technical design, scheduling, field data collection, remote sensing analysis, and final documentation and reporting.

Remote Sensing Analyst, Space Imaging (formerly Pacific Meridian Resources), Portland OR, February 1992–May 2002. Responsible for the timely and successful completion of multiple projects. Responsible for all aspects of a project to include technical design, scheduling, field data collection, remote sensing analysis, accuracy assessment, and final documentation and reporting.



DARIAN KRIETER GIS ANALYST

Ms. Krieter is primarily responsible for compiling fire behavior and fire history data to support wildfire risk modeling. She works directly with fire behavior specialists as well as with federal, state, and local government personnel to develop datasets related to wildfire and wildfire risk. In addition, Ms. Krieter has experience working on forestry, hydrology, transportation, and land cover/land use related GIS projects. Ms. Krieter has worked in the GIS/Mapping industry for more than 10 years and is proficient in Arc/Info Workstation including AML and GRID. She is experienced with Desktop Arc/Info including Python.

Education

- ◆ M.S., Natural Resources, 2002, Humboldt State University, Arcata, CA
- ◆ B.S., Biological Sciences, 1993, California State University Sacramento, Sacramento, CA

Affiliations and Certifications

- ◆ Geoprocessing and Scripting in ArcGIS, ESRI Training, Salem, OR
- ◆ Women in GIS, Portland, OR Chapter member 2002–2005

PROJECT EXPERIENCE

- ◆ **Texas Fire Occurrence Areas.** Ms. Krieter is currently updating the fire occurrence areas data layer for the state of Texas. This data layer is an integral input layer for developing the Wildfire Susceptibility Index in the Southern Fire Risk Assessment System (SFRAS). Ms. Krieter is responsible for integrating historical fire location data from both State and Federal agencies and using that to calculate fire ignition rates across the landscape.
- ◆ **CA Wildfire Risk Assessment.** Ms. Krieter assisted with mapping wildfire threat, hazard, and susceptibility for the state of California. Her responsibilities involved developing a historical fire database, mapping fire ignition rates, and compiling surface fuel models and canopy cover data layers.
- ◆ **Southern Wildfire Risk Assessment.** Ms. Krieter assisted with the development of a wildfire risk assessment for the Southern Group of State Foresters in cooperation with the Texas Forest Service. She was involved in various aspects of this project including the development of an initial dispatch locations database, fire ignition rate model, and surface fuels model and canopy cover data layers. Development of these layers involved the compilation and integration of multiple spatial data layers including historical fire locations, vegetation and canopy cover, census housing information, and topographic data.
- ◆ **Comparison of Historical and Current Timber Volume Estimates.** Ms. Krieter is working with Oregon Forests Industry Council to map current timber volume in western Oregon and compare it to historical mapped timber volume.
- ◆ **Oregon's Forestland GeoBook.** Ms. Krieter developed a Visual Basic application for the Oregon Forests Resources Institute in cooperation with Oregon Forests Industry Council. The application was part of a public outreach project to provide accurate information about forestland protection.
- ◆ **Vegetation and Canopy Change Detection for NE Georgia Resource Development Center.** Ms. Krieter was involved with developing a Landsat-derived classification of vegetation and forest canopy for the NE Georgia RDC as well as a canopy change detection analysis. This process involved advanced image segmentation techniques with complex modeling routines.
- ◆ **Development of High Resolution National Hydrography Dataset, US Geological Survey.** Ms. Krieter conflated 1:100,000 scale NHD data to 1:24,000 scale NHD data. She attended a 5-day training



course for this with the USGS. Ms. Krieter managed the NHD conversion project at along with providing training and technical support to other analysts in the development high resolution NHD data.

- ◆ **Update Tool for Washington Department of Natural Resources.** Ms. Krieter designed a customized application to allow the Washington DNR to perform automated updates of their transportation databases. The application was developed using AML to access the DNR's SDE/ORACLE database.
- ◆ **Dynamic Segmentation Models for Washington Department of Natural Resources.** Ms. Krieter managed a data conversion project for the WA Department of Natural Resources. The transportation vector datasets were converted to routed networks and data attributes were converted to event tables.
- ◆ **Accuracy Assessment for the Natural Imaging and Mapping Agency.** Ms. Krieter assisted with the land use/land cover accuracy assessment project for NIMA. Her responsibilities included reviewing error matrixes for quality control, assurance and generating final accuracy assessment reports.
- ◆ **Land Use/Land Cover Mapping for the U.S. Geological Survey.** Ms. Krieter assisted with mapping land use and land cover in Northern California and Nevada using Landsat Thematic Mapper satellite imagery and spatial modeling techniques. This project involved field data collection, GIS database management, spatial analysis and map editing.
- ◆ **Forest Land Cover Mapping for the U.S. Forest Service Region 5.** Ms. Krieter assisted in the development of a forest land cover classification of the Stanislaus National Forest. The classification was developed using modeling techniques that incorporated Landsat Thematic Mapper satellite imagery and terrain variables.
- ◆ **Accuracy Assessment of a Landsat Derived Vegetation Classification.** Ms. Krieter completed her master's thesis project, using fuzzy subset logic to perform an accuracy assessment of a Landsat-derived vegetation classification.

WORK HISTORY

GIS Analyst, Portland Office Sanborn Solutions (Pacific Meridian Resources, Space Imaging), 1999–Present.

GIS Technician, Geographic Resource Solutions, Arcata, CA, 1998–1999

GIS/Remote Sensing Technician, Pacific Meridian Resources, Sacramento, CA, 1997–1998.

Graduate Student/GIS/Remote Sensing Technician, CA Department of Fish and Game, Humboldt State University, Arcata, CA, 1995–1997.

Student Aide/GIS Technician, CA Department of Fish and Game, Sacramento, CA, 1993–1995.



MapConnect™ 1.0 Specification

File Geodatabase Feature Layers and Tables			
General	<ul style="list-style-type: none"> - FGDC Meta Data Compliant -- FGDC Content Standards for Digital Geospatial Metadata (FGDC-STD-001-1998) - Character Set: UTF-8 - Names are in proper case. - Projected coordinate system name: WGS_1984_Web_Mercator - Geographic coordinate system name: GCS_WGS_1984_Major_Auxiliary_Sphere 		
Source Use B=Broadband D=Demographic G=Addr Geo Ref M=Map Display Q=Query	Layer/Table Name	Abbrev	Layer/ Table
M,G,Q	Streets	<u>Streets</u>	Polyline
G,Q	Additional Street Names and Addresses	<u>AddStreets</u>	Polyline
M	Major Highways	<u>MaiHwys</u>	Polyline
M	Secondary Highways	<u>SecHwys</u>	Polyline
M,Q	Named Places	<u>NamedPlaces</u>	Point
M,Q	Point Landmarks	<u>LmkPoint</u>	Point
M,G,Q	Point Addresses	<u>PointAddress</u>	Point
M	State	<u>State</u>	Polygon
M	State Line	<u>StateLine</u>	Polyline
M,Q	County	<u>County</u>	Polygon
M,Q	Place	<u>Place</u>	Polygon
D,M,Q	Census Tract	<u>Tract</u>	Polygon
D,M,Q	Census Block Group	<u>BlockGroup</u>	Polygon
D,M,Q	Census Block	<u>Block</u>	Polygon
M,Q	Urban	<u>Urban</u>	Polygon
M,Q	Islands	<u>Islands</u>	Polygon
M,Q	Railroads	<u>Railroads</u>	Polyline
M,Q	Land Use Features	<u>LandUse</u>	Polygon
M,Q	ZIP Code Polygons	<u>ZIP_Poly</u>	Polygon
M,Q	ZIP Code Points	<u>ZIP_Point</u>	Point
M,Q	Waterway Polygons	<u>WaterPoly</u>	Polygon
M,Q	Waterway Lines	<u>WaterLine</u>	Polyline
M	Oceans	<u>Oceans</u>	Polygon

MapConnect™ 1.0 Specification

Streets			
Polyline Layer with Meta Data			
Description	<ul style="list-style-type: none"> - Street segments with primary street name, address ranges, display attributes, and base routing attributes. - No duplicate geometry. - Non-planar geometry. - A street name is a route name if the street name is an Interstate, US Highway, State Highway, or County Highway name. - If the primary street name is a route name, then the route type, route number, and route direction are related to the primary street name. - If the primary street name is not a route name, then the route type, route number, and route direction are based on the primary route for the street segment from the AddStreets layer if applicable. - Street features are fully defined by a combination of the street segments in the Streets and AddStreets layers. - The street segments in the Streets layer combined with the street segments in the AddStreets layer provide the complete set of street names and addresses for address range based address geocoding. 		
Keys	- Primary Key: STREET_ID		
<u>Streets Fields</u>			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Line	Shape
Street ID	STREET_ID	Long(4)	Unique identifier for the street segment
Feature ID	FEAT_ID	Long(4)	Unique identifier for the street feature
Name	NAME	Text(80)	Full street name
Name on Road Sign	SIGN_NAME	Short(2)	Name on road sign: 0 = not applicable 1 = Name on road sign
Postal Name	POSTALNAME	Short(2)	Postal name: 0 = not applicable 1 = Postal name
Stale Name	STALE_NAME	Short(2)	Stale name identifies old names that are still in use but not intended for map display: 0 = not applicable 1 = Stale name
Vanity Name	VANITYNAME	Short(2)	Vanity name identifies an alternative name (specific to a business, settlement, location, etc.) other than the official street name: 0 = not applicable 1 = Vanity name
Exit Number	EXIT_NAME	Short(2)	Exit Number identifies a name that is an (alpha)numeric exit name. 0 = not applicable 1 = Exit name
Scenic Route Name	SCENIC_NM	Short(2)	Official name for a scenic route: 0 = not applicable 1 = Scenic route name
Street Name Prefix			
Direction	PRE_DIR	Text(2)	Street name prefix direction
Street Type Prefix	PRE_TYPE	Text(30)	Street name prefix type
Street Name Base	NAME_BASE	Text(35)	Street name body
Street Type Suffix	SUF_TYPE	Text(30)	Street name suffix type

MapConnect™ 1.0 Specification

Streets Fields			
Attribute	Field Name	GDB Format	Description
Street Name Suffix Direction	SUF_DIR	Text(2)	Street name suffix direction
Route Name	ROUTE_NAME	Short(2)	Identifies street names that are route names: 0 = not applicable 1 = Route name
Route Type	ROUTE_TYPE	Short(2)	Route type: 0 = not applicable 1 = Interstate 2 = US Highway 3 = State Highway 4 = County Highway
Route Number	ROUTE_NUM	Text(10)	Route number for highway shield
Route Direction On Sign	ROUTE_DIR	Text(1)	Route direction on sign: null = not applicable E = East N = North S = South W = West
Address Type	ADDR_TYPE	Text(1)	Address type
Left Side From Address	L_F_ADDR	Text(10)	Left side from address
Left Side To Address	L_T_ADDR	Text(10)	Left side to address
Left Address Scheme	L_ADDR_SCH	Text(1)	Left side address scheme: null = not applicable E = Even M = Mixed O = Odd U = Unkown
Left Address Format	L_ADDRFORM	Text(1)	Left side address format
Right Side From Address	R_F_ADDR	Text(10)	Right side from address
Right Side To Address	R_T_ADDR	Text(10)	Right side to address
Right Address Scheme	R_ADDR_SCH	Text(1)	Right side address scheme: null = not applicable or unknown E = Even M = Mixed O = Odd U = Unkown
Right Address Format	R_ADDRFORM	Text(1)	Right side address format
Left ZIP Code	L_ZIP	Text(5)	Right ZIP code
Right ZIP Code	R_ZIP	Text(5)	Left ZIP code
Functional Class	FUNC_CLASS	Short(2)	Functional class: 1 = Level 1 2 = Level 2 3 = Level 3 4 = Level 4 5 = Level 5
Enhanced Geometry	ENH_GEOM	Short(2)	Positional Accuracy is +/- 5 metres: 0 = not applicable 1 = Enhanced geometry
Direction of Travel	ONEWAY	Text(1)	Direction of travel: null = Not Applicable B = Both directions F = From node through to node T = To node through from node

MapConnect™ 1.0 Specification

Streets Fields			
Attribute	Field Name	GDB Format	Description
Paved	PAVED	Short(2)	Describes roads that are paved: 0 = not applicable 1 = Paved
Private	PRIVATE	Short(2)	Identifies roads not maintained by an organization responsible for maintenance of public roads: 0 = not applicable 1 = Private road
Frontage Road	FRONTAGE	Short(2)	Frontage roads (aka service roads) are local roads that run parallel to and usually contain the name(s) and addresses of an associated road with a higher traffic flow: 0 = not applicable 1 = Frontage road
Bridge	BRIDGE	Short(2)	Bridge: 0 = not applicable 1 = Bridge
Tunnel	TUNNEL	Short(2)	Tunnel: 0 = not applicable 1 = Tunnel
Ramp	RAMP	Short(2)	Ramps are connectors that provide access between roads that do not cross at grade: 0 = not applicable 1 = Ramp
Tollway	TOLLWAY	Short(2)	Tollway: 0 = not applicable 1 = Tollway
POI Access Road	POI_ACCESS	Short(2)	POI access roads provide the only means of entrance or exit from a POI to a public road: 0 = not applicable 1 = POI access
Roundabout	ROUNDAABOUT	Short(2)	A roundabout is a contiguous loop with consistent one-way traffic throughout the circle that controls the traffic flow from converging roads: 0 = not applicable 1 = Roundabout
Ferry Type	FERRY_TYPE	Text(1)	Ferry type: null = not applicable B = Boat Ferry R = Rail Ferry
Multiple Carriageway	MULTI_CARR	Short(2)	Part of a multiple carriageway road: 0 = not applicable 1 - Part of a multiple carriageway road
Urban	URBAN	Short(2)	Any area, as confirmed by the latest decennial census of the Bureau of the Census, which is not located within: i) A city, town, or incorporated area that has a population of greater than 20,000 inhabitants; or ii) an urbanized area contiguous and adjacent to a city or town that has a population of greater than 50,000 inhabitants. For purposes of the definition of rural area, an urbanized area means a densely populated territory as defined in the latest decennial census of the U.S. Census Bureau. Identifies roads in an urban area: 0 - Road in rural area 1 - Road in urban area

MapConnect™ 1.0 Specification

Streets Fields			
Attribute	Field Name	GDB Format	Description
Four-Wheel Drive	FOURWD_RD	Short(2)	Identifies roads which are only suitable for four-wheel drive vehicles: 0 = not applicable 1 = four-wheel drive road
Parking Lot Road	PK_LOT_RD	Short(2)	Identifies roads internal to parking lot areas: 0 = not applicable 1 = Parking lot road
Carpool Road	CARPOOL_RD	Short(2)	The carpool road attribute identifies a link where at some point all lanes serve as carpool lane: 0 = not applicable 1 = Carpool road
Scenic Route	SCENIC_RTE	Short(2)	Identifies roads that are part of a scenic route: 0 = not applicable 1 = Part of a scenic route
Left State	L_STATE	Text(2)	Left state FIPS code
Left County	L_COUNTY	Text(5)	Left county code (FIPS state code + FIPS county code)
Left Place	L_PLACE	Text(7)	Left place code (FIPS state code + FIPS 55 place code)
Right State	R_STATE	Text(2)	Right state FIPS code
Right County	R_COUNTY	Text(5)	Right county code (FIPS state code + FIPS county code)
Right City	R_PLACE	Text(7)	Right place code (FIPS state code + FIPS 55 place code)
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter

MapConnect™ 1.0 Specification

AddStreets - Additional Street Names and Addresses			
Polyline Layer with Meta Data			
Description	<ul style="list-style-type: none"> - This layer contains alternate street names and address information for street segments. - Geometry exists for each alternate name and/or each set of address information. - Street features are fully defined by a combination of the street segments in the Streets and AddStreets layer. - The street segments in the Streets layer combined with the street segments in the AddStreets layer provide the complete set of street names and addresses for address range based address geocoding. 		
Keys	<ul style="list-style-type: none"> - Primary Key: ADD_ST_ID - Foreign Key 1: STREET_ID to Streets.STREET_ID 		
AddStreets Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Line	Shape
Additional Street ID	ADD_ST_ID	Long(4)	Unique identifier for the additional street segment record
Street ID	STREET_ID	Long(4)	Unique identifier for the street segment
Feature ID	FEAT_ID	Long(4)	Unique identifier for the street feature
Name	NAME	Text(80)	Full street name
Name on Road Sign	SIGN_NAME	Short(2)	Name on road sign: 0 = not applicable 1 = Name on road sign
Postal Name	POSTALNAME	Short(2)	Postal name: 0 = not applicable 1 = Postal name
Stale Name	STALE_NAME	Short(2)	Stale name identifies old names that are still in use but not intended for map display: 0 = not applicable 1 = Stale name
Vanity Name	VANITYNAME	Short(2)	Vanity name identifies an alternative name (specific to a business, settlement, location, etc.) other than the official street name: 0 = not applicable 1 = Vanity name
Exit Number	EXIT_NAME	Short(2)	Exit Number identifies a name that is an (alpha)numeric exit name. 0 = not applicable 1 = Exit name
Scenic Route Name	SCENIC_NM	Short(2)	Official name for a scenic route: 0 = not applicable 1 = Scenic route name
Street Name Prefix			
Direction	PRE_DIR	Text(2)	Street name prefix direction
Street Type Prefix	PRE_TYPE	Text(30)	Street name prefix type
Street Name Base	NAME_BASE	Text(35)	Street name body
Street Type Suffix	SUF_TYPE	Text(30)	Street name suffix type
Street Name Suffix			
Direction	SUF_DIR	Text(2)	Street name suffix direction
Address Type	ADDR_TYPE	Text(1)	Address type
Left Side From Address	L_F_ADDR	Text(10)	Left side from address
Left Side To Address	L_T_ADDR	Text(10)	Left side to address

MapConnect™ 1.0 Specification

AddStreets Fields			
Attribute	Field Name	GDB Format	Description
Left Address Scheme	<u>L_ADDR_SCH</u>	Text(1)	Left side address scheme: null = not applicable E = Even M = Mixed O = Odd U = Unkown
Left Address Format	<u>L_ADDRFORM</u>	Text(1)	Left side address format
Right Side From Address	<u>R_F_ADDR</u>	Text(10)	Right side from address
Right Side To Address	<u>R_T_ADDR</u>	Text(10)	Right side to address
Right Address Scheme	<u>R_ADDR_SCH</u>	Text(1)	Right side address scheme: null = not applicable E = Even M = Mixed O = Odd U = Unkown
Right Address Format	<u>R_ADDRFORM</u>	Text(1)	Right side address format
Number of Address Ranges	<u>NUM_RANGES</u>	Short(2)	Number of address ranges for the street name on the street segment
Left ZIP Code	<u>L_ZIP</u>	Text(5)	Right ZIP code
Right ZIP Code	<u>R_ZIP</u>	Text(5)	Left ZIP code
Route Type	<u>ROUTE_TYPE</u>	Short(2)	Route type: 0 = not applicable 1 = Interstate 2 = US Highway 3 = State Highway 4 = County Highway
Route Number	<u>ROUTE_NUM</u>	Text(10)	Route number for highway shield
Route Direction On Sign	<u>ROUTE_DIR</u>	Text(1)	Route direction on sign: null = not applicable E = East N = North S = South W = West
SHAPE_Length	<u>SHAPE_Length</u>	Double(8)	Shape perimeter

MapConnect™ 1.0 Specification

MajHwys - Major Highways			
Polyline Layer with Meta Data			
Description	<ul style="list-style-type: none"> - Primary display layer for "Major Highways" (Functional Class = 1 or 2) - No duplicate geometry. - Dissolve of street segments from the Streets layer with the associated attributes defined in this layer. - If the highway name is a route name, then the route type, route number, and route direction are related to the primary street name. - If the highway name is not a route name, then the route type, route number, and route direction are based on the primary route for the highway feature if applicable. 		
Keys	- Primary Key: HWY_ID		
<u>MajHwys Fields</u>			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID(4)	Object ID
Shape	Shape	Line	Shape
Highway ID	HWY_ID	Long(4)	Unique identifier for the highway feature
Name	NAME	Text(80)	Highway name
Route Name	ROUTE_NAME	Short(2)	Identifies highway names that are route names: 0 = not applicable 1 = Route name
Route Type	ROUTE_TYPE	Short(2)	Route type: 0 = not applicable 1 = Interstate 2 = US Highway 3 = State Highway 4 = County Highway
Route Number	ROUTE_NUM	Text(10)	Route number for highway shield
Route Direction On Sign	ROUTE_DIR	Text(1)	Route direction on sign: null = not applicable E = East N = North S = South W = West
Functional Class	FUNC_CLASS	Short(2)	Functional class: 1 = Level 1 2 = Level 2
Ferry Type	FERRY_TYPE	Text(1)	Ferry type: null = not applicable B = Boat Ferry R = Rail Ferry
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter

MapConnect™ 1.0 Specification

SecHwys - Secondary Highways			
Polyline Layer with Meta Data			
Description	<ul style="list-style-type: none"> - Primary display layer for "Secondary Highways" (Functional Class = 3 or 4) - No duplicate geometry. - Dissolve of street segments from the Streets layer with the associated attributes defined in this layer. - If the highway name is a route name, then the route type, route number, and route direction are related to the primary street name. - If the highway name is not a route name, then the route type, route number, and route direction are based on the primary route for the highway feature if applicable. 		
Keys	- Primary Key: HWY_ID		
SecHwys Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Line	Shape
Highway ID	HWY_ID	Long(4)	Unique identifier for the highway feature
Name	NAME	Text(80)	Highway name
Name	NAME	Short(2)	Highway name language code: null = not applicable ENG = English
Route Type	ROUTE_TYPE	Short(2)	Route type: 0 = not applicable 1 = Interstate 2 = US Highway 3 = State Highway 4 = County Highway
Route Number	ROUTE_NUM	Text(10)	Route number for highway shield
Route Direction On Sign	ROUTE_DIR	Text(1)	Route direction on sign: null = not applicable E = East N = North S = South W = West
Functional Class	FUNC_CLASS	Short(2)	Functional class: 3 = Level 3 4 = Level 4
Ferry Type	FERRY_TYPE	Text(1)	Ferry type: null = not applicable B = Boat Ferry R = Rail Ferry
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter

MapConnect™ 1.0 Specification

NamedPlaces			
Point Layer with Meta Data			
Description	- Populated named places and villages		
Keys	- Primary Key: PLACE_ID - Foreign Key 1: ADDRESS_ID to PointAddress.ADDRESS_ID		
NamedPlaces Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Point	Shape
Named Place ID	PLACE_ID	Long(4)	Unique identifier for the named place.
Name	NAME	Text(80)	Named place name
Named Place Type	PLACE_TYPE	Short(2)	Named place type: 1 = Named place 2 = Village
Point Address ID	ADDRESS_ID	Long(4)	Unique identifier for the associated point address
Population	POPULATION	Long(4)	Population count
Population Class	POP_CLASS	Short(2)	1 = 5,000,000 or more 2 = 2,000,000 – 4,999,999 3 = 1,000,000 – 2,499,999 4 = 500,000 – 999,999 5 = 250,000 – 499,999 6 = 100,000 – 249,999 7 = 50,000 – 99,999 8 = 25,000 – 49,999 9 = 10,000 – 24,999 10 = 5,000 – 9,999 11 = Less than 5,000
Capital	CAPITAL	Short(2)	Capital of the administrative area: 0 = not applicable 1 = Administrative Level 1 (Country) 2 = Administrative Level 2 (State)

MapConnect™ 1.0 Specification

LmkPoint - Point Landmarks			
Point Layer with Meta Data			
Description	- This layer contains all landmark points.		
Keys	- Primary Key: LMKPT_ID - Foreign Key 1: ADDRESS_ID to PointAddress.ADDRESS_ID		
LmkPoint Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Point	Shape
Landmark Point ID	LMKPT_ID	Long(4)	Unique identifier for the landmark point.
Landmark Type	LMKPT_TYPE	Text(5)	Landmark point type
Name	NAME	Text(80)	Landmark name
Point Address ID	ADDRESS_ID	Long(4)	Unique identifier for the associated point address
Airport Terminal	TERMINAL	Short(2)	Airport terminal: 0 = not applicable 1 = Airport terminal

MapConnect™ 1.0 Specification

PointAddress - Point Addresses			
Point Layer with Meta Data			
Description	- The Point Addresses layer contains the individual addresses for a street segment. - The full address is in space-delimited in standardized Postal Service form. See http://pe.usps.gov/cpim/ftp/pubs/Pub28/pub28.pdf		
Keys	- Primary Key: ADDRESS_ID - Foreign Key 1: STREET_ID to Streets.STREET_ID - Relationship 1: FEATURE_ID to Streets.FEATURE_ID - Relationship 2: FEATURE_ID to AddStreets.FEATURE_ID		
PointAddress Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Point	Shape
Point Address ID	ADDRESS_ID	Long(4)	Unique identifier for the point address.
Street ID	STREET_ID	Long(4)	Unique identifier for the associated street segment
Side	SIDE	Text(1)	The side of the street segment the point address is located along: null = not applicable L = Left side R = Right side
Feature ID	FEAT_ID	Long(4)	Feature identifier of the associated street feature.
Full Address	ADDRESS	Text(254)	Full address
House Number	HOUSE_NUM	Text(10)	House number (full address component)
Street Name Prefix Direction	PRE_DIR	Text(2)	Street name prefix direction (full address component)
Street Type Prefix	PRE_TYPE	Text(30)	Street name prefix type (full address component)
Street Name Base	NAME_BASE	Text(35)	Street name body (full address component)
Street Type Suffix	SUF_TYPE	Text(30)	Street name suffix type (full address component)
Street Name Suffix Direction	SUF_DIR	Text(2)	Street name suffix direction (full address component)
Secondary Unit Designator	SEC_UNIT_D	Text(10)	Secondary unit designator (full address component)
Secondary Unit Name/Number	SEC_UNIT_N	Text(100)	Secondary unit name/number (full address component)
Place Name	PLACE_NAME	Text(100)	Place name (full address component)
State Abbreviation	STATE_ABBR	Text(2)	Two-letter state postal abbreviation (full address component)
ZIP+4 Code	ZIP_4_CODE	Text(10)	ZIP code or ZIP+4 code (full address component)
Address Type	ADDR_TYPE	Text(1)	Address type. B = Base C = City D = County O = Old T = Commercial A = Actual H = Alternate base
Building Name	BLDG_NAME	Text(60)	The building name associated with the point address
Geocoded Location	GEO_LOC	Short(2)	Geocoded point location: 0 = not applicable 1 = Geocoded location

MapConnect™ 1.0 Specification

State			
Polygon Layer with Meta Data			
Description	- The State layer contains the state boundary, state codes, and state level attribution. - Each state is a single feature and is a multi-part feature if the state is composed of discontinuous parts.		
Keys	- Primary Key: STATE_ID		
State Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
State ID	STATE_ID	Long(4)	Unique identifier for the state feature.
Name	NAME	Text(100)	State name
Area Description/Entity	ENTITY	Text(40)	State area description/entity
State Abbreviation	STATE_ABBR	Text(2)	Two-letter state postal abbreviation
State Code	STATE_CODE	Text(2)	FIPS 2 digit state code
Population	POPULATION	Long(4)	State population count
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

StateLine			
Polyline Layer with Meta Data			
Description	- The State line layer contains the state boundary lines excluding those state boundary lines that are coincidental with international water lines. - Each state line feature carries left and right side state names and state codes		
Keys	- Primary Key: STATE_ID		
<u>StateLine Fields</u>			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Line	Shape
State ID	STATE_ID	Long(4)	Unique identifier for the state line feature.
Left Name	L_NAME	Text(100)	Left state name
Left Area Description/Entity	L_ENTITY	Text(40)	Left state area description/entity
Left State Abbreviation	L_ST_ABBR	Text(2)	Left two-letter state postal abbreviation
Left State Code	L_ST_CODE	Text(2)	Left FIPS 2 digit state code
Right Name	R_NAME	Text(100)	Right state name
Right Area Description/Entity	R_ENTITY	Text(40)	Right state area description/entity
Right State Abbreviation	R_ST_ABBR	Text(2)	Right two-letter state postal abbreviation
Right State Code	R_ST_CODE	Text(2)	Right FIPS 2 digit state code
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter

MapConnect™ 1.0 Specification

County			
Polygon Layer with Meta Data			
Description	- The County layer contains the county boundaries, county codes, and county level attribution. - Each county is a single feature and is a multi-part feature if the county is composed of discontinuous parts.		
Keys	- Primary Key: COUNTY_ID		
County Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
County ID	COUNTY_ID	Long(4)	Unique identifier for the county feature.
Name	NAME	Text(100)	County name
Area Description/Entity	ENTITY	Text(40)	County area description/entity
County Code	COUNTY_CODE	Text(3)	FIPS 3 digit county code
Feature Code	FEAT_CODE	Text(5)	Complete feature code for county (FIPS state code + FIPS county code)
Population	POPULATION	Long(4)	County population count
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

Place			
Polygon Layer with Meta Data			
Description	<ul style="list-style-type: none"> - The Place layer contains the place boundaries, place codes, and place level attribution. - Each place is a single feature and is a multi-part feature if the county is composed of discontinuous parts. 		
Keys	- Primary Key: PLACE_ID		
Place Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
Place ID	PLACE_ID	Long(4)	Unique identifier for the place feature.
Name	NAME	Text(100)	Place name
Area Description/Entity	ENTITY	Text(40)	Place area description/entity
Place Code	PLACE_CODE	Text(5)	FIPS 55 5 digit place code
Feature Code	FEAT_CODE	Text(7)	Complete feature code for place (FIPS state code + FIPS 55 place code)
Population	POPULATION	Long(4)	Place population count
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

Tract - Census Tract			
Polygon Layer with Meta Data			
Description	<ul style="list-style-type: none"> - The Census Tract layer contains all Census Tract polygon features. - Each Census Tract is a single feature and is a multi-part feature if the Census Tract is composed of discontinuous parts. 		
Keys	- Primary Key: Tract_ID		
Tract Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	ObjectID (4)	Object ID
Shape	Shape	Poly	Shape
Census Tract ID	TRACT_ID	Long(4)	Unique identifier for the Census tract feature.
Feature Code	FEAT_CODE	Text(11)	Complete feature code for Census tract (FIPS state code + FIPS county code + Census 200 tract code)
Population	POPULATION	Long(4)	Census tract population count
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

BlockGroup - Census Block Group			
Polygon layer with Meta Data			
Description	<ul style="list-style-type: none"> - The Census Block Group layer contains all Census Block Group polygon features. - Each Census Block Group is a single feature and is a multi-part feature if the Census Block Group is composed of discontinuous parts. 		
Keys	- Primary Key: BLOCKGP_ID		
<u>BlockGroup Fields</u>			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
Census Block Group ID	BLOCKGP_ID	Long(4)	Unique identifier for the Census block group feature.
Feature Code	FEAT_CODE	Text(12)	Complete feature code for Census block group (FIPS state code + FIPS county code + Census 200 tract code + Census 2000 block group code)
Population	POPULATION	Long(4)	Census block group population count
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

Block - Census Block			
Polygon Layer with Meta Data			
Description	- The Census Block layer contains all Census Block polygon features. - Each Census Block is a single feature and is a multi-part feature if the Census Block is composed of discontinuous parts.		
Keys	- Primary Key: BLOCK_ID		
Block Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
Census Block ID	BLOCK_ID	Long(4)	Unique identifier for the Census block feature.
Feature Code	FEAT_CODE	Text(16)	Complete feature code for Census block (FIPS state code + FIPS county code + Census 2000 tract code + Census 2000 tabulation block number + current block suffix)
Urban	URBAN	Short(2)	Urban: 0 - Rural area 1 - Urban area
Unserved and Underserved	UNSERVED	Short(2)	Unserved and underserved: 0 = not applicable 1 = Underserved 2 = Unserved
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

Urban			
Polygon Layer with Meta Data			
Description	<p>- MapConnect: Derived from the Census 2000 Urban/Rural Indicator for urban areas at the Census Block level</p> <p>- NOFA: Any area, as confirmed by the latest decennial census of the Bureau of the Census, which is not located within:</p> <p>i) A city, town, or incorporated area that has a population of greater than 20,000 inhabitants; or</p> <p>ii) an urbanized area contiguous and adjacent to a city or town that has a population of greater than 50,000 inhabitants.</p> <p>For purposes of the definition of rural area, an urbanized area means a densely populated territory as defined in the latest decennial census of the U.S. Census Bureau.</p>		
Keys	- Primary Key: URBAN_ID		
Urban Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
Urban ID	URBAN_ID	Long(4)	Unique identifier for the urban polygon.
Urban	URBAN	Short(2)	Urban: 1 = Urban area
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

Islands			
Polygon Layer with Meta Data			
Description	- The Islands layer contains the island features.		
Keys	- Primary Key: ISLAND_ID		
Islands Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
Islands ID	ISLANDS_ID	Long(4)	Unique identifier for the island feature.
Name	NAME	Text(100)	Island name
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

Railroads			
Polyline Layer with Meta Data			
Description	<ul style="list-style-type: none"> - Railroad segments with railroad names, as well as, bridge and tunnel flags. - Duplicate geometry is present for a railroad segment if multiple railroad names apply to that railroad segment. - Non-planar geometry. 		
Keys	- Primary Key: RAIL_ID		
Railroads Fields			
Attribute	Field Name	Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Line	Shape
Railroad ID	RAIL_ID	Long(4)	Unique identifier for the railroad segment
Name	NAME	Text(80)	Railroad name
Bridge	BRIDGE	Short(2)	Bridge: 0 = not applicable 1 = Bridge
Tunnel	TUNNEL	Short(2)	Tunnel: 0 = not applicable 1 = Tunnel
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter

MapConnect™ 1.0 Specification

LandUse			
Polygon Layer with Meta Data			
Description	- The Land Use layer contains all land use feature types. - Land use features can overlap other land user features. Display order is listed in the code list for Land Use Type.		
Keys	- Primary Key: LANDUSE_ID		
<u>LandUse Fields</u>			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
Land Use Polygon ID	LANDUSE_ID	Long(4)	Unique identifier for the land use featuere
Land Use Type	LU_TYPE	Text(5)	Land use feature type
Name	NAME	Text(80)	Land use feature name
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

ZIP_Poly - ZIP Code Polygons			
Polygon Layer with Meta Data			
Description	- The ZIP polygon layer contains all ZIP codes that can be represented as polygons. - Each ZIP code is a single feature and is a multi-part feature if the Census Tract is composed of discontinuous parts.		
Keys	- Primary Key: ZIP_CODE		
<u>ZIP_Poly Fields</u>			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
ZIP Code	ZIP_CODE	Text(5)	5 digit ZIP code
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

ZIP_Point - ZIP Code Points			
Point Layer with Meta Data			
Description	- The ZIP point layer contains ZIP code centroid for all ZIP codes.		
Keys	- Primary Key: ZIP_CODE		
<u>ZIP_Point Fields</u>			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Point	Shape
ZIP Code	ZIP_CODE	Text(5)	5 digit ZIP code

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WaterPoly			
Polygon Layer with Meta Data			
Description	- The Waterway polygon layer contains all ocean water area features.		
Keys	- Primary Key: WATER_ID		
WaterPoly Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
Waterway Polygon ID	WATER_ID	Long(4)	Unique identifier for the waterway feature
Waterway Type	WA_TYPE	Text(5)	Waterway feature type (MTFCC code)
Name	NAME	Text(80)	Waterway feature name
Display Class	DISP_CLASS	Short(2)	Waterway display class in order of importance. 1 = First class 2 = Second class 3 = Third class 4 = Fourth class 5 = Fifth class 6 = Sixth class 7 = Seventh class 8 = Eighth class
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

WaterLine			
Polyline Layer with Meta Data			
Description	- The Waterway line layer contains all waterway line features.		
Keys	- Primary Key: WATER_ID		
WaterLine Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Line	Shape
Waterway Line ID	WATER_ID	Long(4)	Unique identifier for the waterway feature
Waterway Type	WA_TYPE	Text(5)	Waterway feature type (MTFCC code)
Name	NAME	Text(80)	Waterway feature name
Display Class	DISP_CLASS	Short(2)	Waterway display class in order of importance. 1 = First class 2 = Second class 3 = Third class 4 = Fourth class 5 = Fifth class 6 = Sixth class 7 = Seventh class 8 = Eighth class
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter

MapConnect™ 1.0 Specification

Oceans			
Polygon Layer with Meta Data			
Description	- The Waterway polygon layer contains all ocean water area features.		
Keys	- Primary Key: WATER_ID		
Oceans Fields			
Attribute	Field Name	GDB Format	Description
OBJECTID	OBJECTID	Object ID (4)	Object ID
Shape	Shape	Poly	Shape
Waterway Polygon ID	WATER_ID	Long(4)	Unique identifier for the waterway feature
Waterway Type	WA_TYPE	Text(5)	Waterway feature type (MTFCC code)
Name	NAME	Text(80)	Waterway feature name
Display Class	DISP_CLASS	Short(2)	Waterway display class in order of importance. 1 = First class 2 = Second class 3 = Third class 4 = Fourth class 5 = Fifth class 6 = Sixth class 7 = Seventh class 8 = Eighth class
SHAPE_Length	SHAPE_Length	Double(8)	Shape perimeter
SHAPE_Area	SHAPE_Area	Double(8)	Shape area

MapConnect™ 1.0 Specification

Street Type Code Definitions		
Code	Name	Description
ABEY	ABBAY	
ACC	ACCESS	
ACRS	ACRES	
ALCV	ALCOVE	
ALY	ALLEY	
ANX	ANNEX	
APPR	APPROACH	
ARC	ARCADE	
AVE	AVENUE	
BAY	BAY	
BCH	BEACH	
BDY	BOUNDARY	
BELT	BELTWAY	
BG	BURGS	
BLF	BLUFF	
BLVD	BOULEVARD	
BND	BEND	
BR	BRANCH	
BRG	BRIDGE	
BRK	BROOK	
BTM	BOTTOM	
BYP	BYPASS	
BYPS	BY-PASS	
BYU	BAYOU	
BYWY	BYWAY	
C	CALLE	
CHAS	CHASE	
CHRT	CHART	
CIR	CIRCLE	
CIRT	CIRCUIT	
CLB	CLUB	
CLFS	CLIFFS	
CLOS	CLOSE	
CNRS	CORNERS	
CNTR	CENTRE	
COM	COMMON	
CONC	CONCESSION	
COR	CORNER	
CORS	CORS	
CP	CAMP	
CPE	CAPE	
CRES	CRESCENT	
CRFT	CROFT	
CRK	CREEK	
CRSE	COURSE	
CRVE	CURVE	
CSWY	CAUSEWAY	

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Street Type Code Definitions		
Code	Name	Description
CT	COURT	
CTR	CENTER	
CTS	COURTS	
CV	COVE	
CYN	CANYON	
DELL	DELL	
DL	DALE	
DM	DAM	
DR	DRIVE	
DRWY	DRIVEWAY	
DV	DIVIDE	
DVSN	DIVERSION	
DWNS	DOWNNS	
END	END	
EST	ESTATES	
EXP	EXPRESS	
EXPY	EXPRESSWAY	
EXT	EXTENSION	
FARM	FARM	
FL	FALL	
FLD	FIELD	
FLDS	FIELDS	
FLS	FALLS	
FLT	FLATS	
FRD	FORD	
FRG	FORGE	
FRK	FORK	
FRNT	FRONT	
FRST	FOREST	
FRY	FERRY	
FT	FORT	
FWY	FREEWAY	
GATE	GATE	
GDNS	GARDENS	
GLAD	GLADE	
GLN	GLEN	
GRDS	GROUNDS	
GRN	GREEN	
GRV	GROVE	
GTWY	GATEWAY	
HBR	HARBOR	
HILN	HIGHLANDS	
HL	HILL	
HLS	HILLS	
HOLW	HOLLOW	
HRBR	HARBOUR	
HTS	HEIGHTS	

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Street Type Code Defintions		
Code	Name	Description
HVN	HAVEN	
HWY	HIGHWAY	
INLT	INLET	
IS	ISLAND	
ISLE	ISLE	
ISS	ISLANDS	
JCT	JUNCTION	
KEEP	KEEP	
KNLS	KNOLLS	
KNOL	KNOLL	
KY	KEY	
LCKS	LOCK	
LDG	LODGE	
LF	LOAF	
LGT	LIGHT	
LINE	LINE	
LINK	LINK	
LK	LAKE	
LKOT	LOOKOUT	
LKS	LAKES	
LMTS	LIMITS	
LN	LANE	
LNDG	LANDING	
LOOP	LOOP	
MALL	MALL	
MAZE	MAZE	
MDOW	MEADOW	
MDWS	MEADOWS	
MEWS	MEWS	
ML	MILL	
MLS	MILLS	
MNR	MANOR	
MOOR	MOOR	
MSN	MISSION	
MT	MOUNT	
MTN	MOUNTAIN	
MTS	MNTNS	
MTWY	MOTORWAY	
NCK	NECK	
ORCH	ORCHARD	
OTLK	OUTLOOK	
OVL	OVAL	
OVPS	OVERPASS	
PARD	PARADE	
PARK	PARK	
PASS	PASS	
PATH	PATH	

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Street Type Code Definitions		
Code	Name	Description
PIKE	PIKE	
PKY	PARKWAY	
PL	PLACE	
PLN	PLAIN	
PLNS	PLAINS	
PLZ	PLAZA	
PNES	PINES	
PR	PRAIRIE	
PROM	PROMENADE	
PRT	PORT	
PSGE	PASSAGE	
PT	POINT	
PTWY	PATHWAY	
PVT	PRIVATE	
QUAY	QUAY	
RADL	RADIAL	
RAMP	RAMP	
RD	ROAD	
RDG	RIDGE	
RISE	RISE	
RIV	RIVER	
RNCH	RANCH	
RNGE	RANGE	
ROW	ROW	
RPDS	RAPID	
RST	REST	
RUN	RUN	
SDRD	SIDEROAD	
SHL	SHOAL	
SHLS	SHOALS	
SHR	SHORE	
SHRS	SHORES	
SKWY	SKYWAY	
SMT	SUMMIT	
SPG	SPRING	
SPGS	SPRINGS	
SPUR	SPUR	
SQ	SQUARE	
ST	STREET	
STA	STATION	
STRM	STREAM	
SUBD	SUBDIVISION	
TABT	TURNABOUT	
TER	TERRACE	
TFWY	TRAFFICWAY	
THKT	THICKET	
THWY	THROUGHWAY	

MapConnect™ 1.0 Specification

Street Type Code Defintions		
Code	Name	Description
TLIN	TOWNLINE	
TLPK	TRAILER PARK	
TOLL	TOLL	
TPKE	TURNPIKE	
TRAK	TRACK	
TRCE	TRACE	
TRL	TRAIL	
TRLR	TRAILER	
TUNL	TUNNEL	
TURN	TURN	
TWRS	TOWERS	
UN	UNION	
UNP	UNDERPASS	
VALE	VALE	
VIA	VIA	
VIAD	VIADUCT	
VIS	VISTA	
VL	VILLE	
VLG	VILLAGE	
VLY	VALLEY	
VW	VIEW	
WALK	WALK	
WALL	WALL	
WAY	WAY	
WHRF	WHARF	
WLS	WELL	
WOOD	WOOD	
WYND	WYND	
XING	CROSSING	

MapConnect™ 1.0 Specification

Address Type Code Definitions		
Code	Name	Description
A	Actual	Address range represents the actual address range on a link.
B	Base	Address range that is most commonly used. Street names with one address range are set to Address Type = B. Street names with multiple address ranges must have one range set to Base and the others set to any combination of the other values. A street name cannot contain two Base address ranges.
C	City	Address range assigned by the city government.
D	County	Address range assigned by the county government.
H	Alternate Base	Address range without a hyphen. For every link/Road Element with Address Format = Hyphenated or Alpha-Hyphenated, an additional address range will be published without the hyphen as Address Type = H with the corresponding Address Format. Actual Address Ranges (Address Type = Actual) and Point Addresses will not have the corresponding non-hyphenated addresses published.
O	Old	Address range to indicate a more recent address range has been assigned to the link.
T	Commercial	Address range applied to commercial establishments along the link.

MapConnect™ 1.0 Specification

Address Scheme Code Defintions		
Code	Name	Description
null	Unaddressed	
E	Even	Only the even numbers of the address range are valid.
M	Mixed	Both the even and odd numbers of the address range are valid.
O	Odd	Only the odd numbers of the address range are valid.
U	Unknown	Address scheme is unknown or not yet applied

MapConnect™ 1.0 Specification

Address Format Code Defintions		
Code	Name	Format example
null	Unaddressed	
A	ALPHANUMERIC-N	12N123
B	BLOCK	A123
C	ALPHANUMERIC-1	2M89
E	ALPHANUMERIC-E	12E123
H	HYPHENATED	123-123
I	ALPHANUMERIC-NW	N123W12312
J	ALPHANUMERIC-NE	N123E12312
K	ALPHANUMERIC-SW	S123W12312
L	ALPHANUMERIC-SE	S123E12312
N	NUMERIC	123456
O	ALPHANUMERIC-ES	E123S12312
P	ALPHANUMERIC-EN	E123N12312
Q	ALPHANUMERIC-WS	W123S12312
R	ALPHANUMERIC-WN	W123N12312
S	ALPHANUMERIC-S	12S123
U	Unknown	Address format is unknown or not yet applied
W	ALPHANUMERIC-W	12W123
Z	LEADING ZERO	012345
1	ALPHAHYPHENATED-5	AB-12
3	ALPHANUMERIC 3	AH34
4	NUMERIC ALPHA	12A

MapConnect™ 1.0 Specification

Functional Road Class Code Definitions

Functional Class can be used to determine sets of links that form connected graphs. Each link has at least one connection in the network to every other link with the same Functional Class via a link with the same or higher functionality.

Code	Name	Description
1	Level 1 Roads	Allow for high volume, maximum speed traffic movement between and through major metropolitan areas.applied to roads with very few, if any, speed changes. Access to the road is usually controlled.
2	Level 2 Roads	Level 2
3	Level 3 Roads	Level 3
4	Level 4 Roads	Level 4
5	Level 5 Roads	Level 5

MapConnect™ 1.0 Specification

Direction of Travel Code Defintions		
Code	Name	Description
null	Not Applicable	
B	Both Directions	
F	From Reference Node	
T	To Reference Node	

MapConnect™ 1.0 Specification

Landmark Point Type Code Definitions		
Code	Name	Description
K2451	Airport	A manmade facility maintained for the use of aircraft. [including airstrip, landing field and landing strip]
K2456	Airport—Intermodal Transportation Hub/Terminal	A major air transportation facility where travelers can board and exit airplanes and connect with other (i.e. non-air) modes of transportation. ANCHOR INSTITUTION
K2564	Amusement Center	A facility that offers entertainment, performances or sporting events. Examples include arena, auditorium, theater, stadium, coliseum, race course, theme park, fairgrounds and shooting range.
K9995	Border Crossing	An international border crossing associated with a major highway.
C3079	Boundary Monument Point	A material object placed on or near a boundary line to preserve and identify the location of the boundary line on the ground.
K2453	Bus Terminal	A place where travelers can board and exit mass motor vehicle transit, including associated ticketing, freight, and other commercial offices. ANCHOR INSTITUTION
K1228	Campground	An area used for setting up mobile temporary living quarters (camp) or holding a camp meeting, sometimes providing utilities and other amenities.
K2582	Cemetery	A place or area for burying the dead. [including burying ground and memorial garden]
K2146	Community Center	A meeting place used by members of a community for social, cultural, or recreational purposes. ANCHOR INSTITUTION
K2167	Convention Center	An exhibition hall or conference center with enough open space to host public and private business and social events.
K2186	County Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a county government.
K2187	County Subdivision Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a minor civil division (town/township) government.
K1237	Federal Penitentiary, State Prison, or Prison Farm	An institution that serves as a place for the confinement of adult persons in lawful detention, administered by the federal government or a state government. ANCHOR INSTITUTION
K2454	Ferry Terminal	A place where travelers can board and exit water transit or where cargo is handled, including associated ticketing, freight, and other commercial offices. ANCHOR INSTITUTION
K2561	Golf Course	A place designed for playing golf.
K2165	Government Center	A place used by members of government (either federal, state, local, or tribal) for administration and public business.
K9996	Highway Exit	A highway exit from a limited access highway.
K1231	Hospital/Hospice/Urgent Care Facility	One or more structures where the sick or injured may receive medical or surgical attention. [including infirmary] ANCHOR INSTITUTION
K1227	Hotel, Motel, Resort, Spa, Hostel, YMCA, or YWCA	A structure providing transient lodging or living quarters, generally for some payment.
K2188	Incorporated Place Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a municipal government.
K1236	Local Jail or Detention Center	One or more structures that serve as a place for the confinement of adult persons in lawful detention, administered by a local (county, municipal, etc.) government. ANCHOR INSTITUTION
K2424	Marina	A place where privately owned, light-craft are moored.
K2110	Military Installation	Facility owned and/or occupied by the Department of Defense for use by a branch of the armed forces (such as the Army, Navy, Air Force, Marines, or Coast Guard), or a state owned facility for the use of the National Guard.

MapConnect™ 1.0 Specification

C3078	Monument or Memorial	A manmade structure to educate, commemorate, or memorialize an event, person, or feature.
K2545	Museum, Visitor Center, Cultural Center, or Tourist Attraction	An attraction of historical, cultural, educational or other interest that provides information or displays artifacts.
K2182	National Forest or Other Federal Land	Land under the management and jurisdiction of the federal government, specifically including areas designated as National Forest, and excluding areas under the jurisdiction of the National Park Service.
K2181	National Park Service Land	Area—National parks, National Monuments, and so forth—under the jurisdiction of the National Park Service.
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of some other type of government or agency such as an independent park authority or commission.
K2458	Park and Ride Facility/Parking Lot	A place where motorists can park their cars and transfer to other modes of transportation.
K3544	Place of Worship	A sanctified place or structure where people gather for religious worship; examples include church, synagogue, temple, and mosque. ANCHOR INSTITUTION
K2189	Private Park, Forest, or Recreation Area	A privately owned place or area set aside for recreation or preservation of a cultural or natural resource.
K2185	Regional Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a regional government.
K9997	Rest Area	Named rest areas associated with limited access highways.
K2543	School or Academy	A building or group of buildings used as an institution for preschool, elementary or secondary study, teaching, and learning. [including elementary school and high school] ANCHOR INSTITUTION
K2455	Seaplane Anchorage	A place where an airplane equipped with floats for landing on or taking off from a body of water can debark and load.
K2361	Shopping Center or Major Retail Center	A group of retail establishments within a planned subdivision sharing a common parking area.
K9998	Ski Resort	Nationally or regionally recognized downhill ski resorts (i.e. larger resorts with multiple ski lifts and lodge facilities).
K2184	State Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a state government.
K2452	Train Station, Trolley or Mass Transit Rail Station	A place where travelers can board and exit rail transit lines, including associated ticketing, freight, and other commercial offices. ANCHOR INSTITUTION
K2183	Tribal Park, Forest, or Recreation Area	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of an American Indian tribe.
K2540	University or College	A building or group of buildings used as an institution for post-secondary study, teaching, and learning. [including seminary] ANCHOR INSTITUTION
K2586	Zoo	A facility in which terrestrial and/or marine animals are confined within enclosures and displayed to the public for educational, preservation, and research purposes.

MapConnect™ 1.0 Specification

Secondary Unit Designator Code Defintions		
Code	Name	Description
Apt	Apartment	
Bsmt**	Basement	
null	Blank, unable to determine*	
Bldg	Building	
Dept	Department	
Fl	Floor	
Frnt**	Front	
Hngr	Hanger	
Key	Key	
Lbby**	Lobby	
Lot	Lot	
Lowr**	Lower	
Ofc**	Office	
Ph**	Penthouse	
Pier	Pier	
Rear**	Rear	
Rm	Room	
Side**	Side	
Slip	Slip	
Spc	Space	
Stop	Stop	
Ste	Suite	
Trlr	Trailer	
Unit	Unit	
Uppr**	Upper	

* Requires the pound sign (#) to be used on the mailpiece.

** Does not require a Secondary RANGE to follow.

MapConnect™ 1.0 Specification

Land Use Type Code Definitions			
Code	Name	Display Order	Description
K2459	Runway/Taxiway	1	A fairly level and usually paved expanse used by airplanes for taking off and landing at an airport.
K2456	Airport—Intermodal Transportation Hub/Terminal	2	A major air transportation facility where travelers can board and exit airplanes and connect with other (i.e. non-air) modes of transportation. ANCHOR INSTITUTION
K2451	Airport	3	A manmade facility maintained for the use of aircraft. [including airstrip, landing field and landing strip]
K2453	Bus Terminal	4	A place where travelers can board and exit mass motor vehicle transit, including associated ticketing, freight, and other commercial offices. ANCHOR INSTITUTION
K9990	Beach	5	Public and private beach areas. All polygons are unnamed.
K1228	Campground	6	An area used for setting up mobile temporary living quarters (camp) or holding a camp meeting, sometimes providing utilities and other amenities.
K2582	Cemetery	7	A place or area for burying the dead. [including burying ground and memorial garden]
K2146	Community Center	8	A meeting place used by members of a community for social, cultural, or recreational purposes. ANCHOR INSTITUTION
K2167	Convention Center	9	An exhibition hall or conference center with enough open space to host public and private business and social events.
K1234	County Home or Poor Farm	10	One or more structures administered by a local government that serve as living quarters for the indigent. ANCHOR INSTITUTION
K1237	Federal Penitentiary, State Prison, or Prison Farm	11	An institution that serves as a place for the confinement of adult persons in lawful detention, administered by the federal government or a state government. ANCHOR INSTITUTION
K2454	Ferry Terminal	12	A place where travelers can board and exit water transit or where cargo is handled, including associated ticketing, freight, and other commercial offices. ANCHOR INSTITUTION
K2561	Golf Course	13	A place designed for playing golf.
K2165	Government Center	14	A place used by members of government (either federal, state, local, or tribal) for administration and public business.
K1231	Hospital/Hospice/Urgent Care Facility	15	One or more structures where the sick or injured may receive medical or surgical attention. [including infirmary]
K1227	Hotel, Motel, Resort, Spa, Hostel, YMCA, or YWCA	16	A structure providing transient lodging or living quarters, generally for some payment.
K2362	Industrial Building or Industrial Park	17	One or more manufacturing establishments within an area zoned for fabrication, construction, or other similar trades.
K1235	Juvenile Institution	18	A facility (correctional or non-correctional) where groups of juveniles reside; this includes training schools, detention centers, residential treatment centers and orphanages. ANCHOR INSTITUTION
K1236	Local Jail or Detention Center	19	One or more structures that serve as a place for the confinement of adult persons in lawful detention, administered by a local (county, municipal, etc.) government. ANCHOR INSTITUTION
K2424	Marina	20	A place where privately owned, light-craft are moored.
K2545	Museum, Visitor Center, Cultural Center, or Tourist Attraction	21	An attraction of historical, cultural, educational or other interest that provides information or displays artifacts.

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K1233	Nursing Home, Retirement Home, or Home for the Aged	22	A structure to house and provide care for the elderly. ANCHOR INSTITUTION
K2363	Office Building or Office Park	23	One or more structures housing employees performing business, clerical, or professional services.
K2458	Park and Ride Facility/Parking Lot	24	A place where motorists can park their cars and transfer to other modes of transportation.
K3544	Place of Worship	25	A sanctified place or structure where people gather for religious worship; examples include church, synagogue, temple, and mosque. ANCHOR INSTITUTION
R1011	Railyard	26	Railyard represents a major hub for freight trains where freight is transferred to/from cargo ships and/or trucks.
K2543	School or Academy	27	A building or group of buildings used as an institution for preschool, elementary or secondary study, teaching, and learning. [including elementary school and high school] ANCHOR INSTITUTION
K2455	Seaplane Anchorage	28	A place where an airplane equipped with floats for landing on or taking off from a body of water can debark and load.
K9991	Seaport/Harbor	29	Seaport/Harbour represents a location where large container ships dock to load/unload their cargo.
K1229	Shelter or Mission	30	A structure providing low-cost or free living quarters established by a welfare or educational organization for the needy people of a district. ANCHOR INSTITUTION
K2361	Shopping Center	31	One or more manufacturing establishments within an area zoned for fabrication, construction, or other similar trades.
K2452	Train Station, Trolley or Mass Transit Rail Station	32	A place where travelers can board and exit rail transit lines, including associated ticketing, freight, and other commercial offices. ANCHOR INSTITUTION
K2586	Zoo	33	A facility in which terrestrial and/or marine animals are confined within enclosures and displayed to the public for educational, preservation, and research purposes.
K2564	Amusement Center	34	A facility that offers entertainment, performances or sporting events. Examples include arena, auditorium, theater, stadium, coliseum, race course, theme park, fairgrounds and shooting range.
K2540	University/College	35	A building or group of buildings used as an institution for post-secondary study, teaching, and learning. [including seminary]
K2110	Military Base	36	An area owned and/or occupied by the Department of Defense for use by a branch of the armed forces (such as the Army, Navy, Air Force, Marines, or Coast Guard), or a state owned area for the use of the National Guard.
K2181	National Park Service Land	37	Area—National parks, National Monuments, and so forth—under the jurisdiction of the National Park Service.
K2182	National Forest or Other Federal Land	37	Land under the management and jurisdiction of the federal government, specifically including areas designated as National Forest, and excluding areas under the jurisdiction of the National Park Service.
K2183	Tribal Park, Forest, or Recreation Area	37	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of an American Indian tribe.
K2184	State Park, Forest, or Recreation Area	37	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a state government.
K2185	Regional Park, Forest, or Recreation Area	37	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a regional government.

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K2186	County Park, Forest, or Recreation Area	37	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a county government.
K2187	County Subdivision Park, Forest, or Recreation Area	37	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a minor civil division (town/township) government.
K2188	Incorporated Place Park, Forest, or Recreation Area	37	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of a municipal government.
K2189	Private Park, Forest, or Recreation Area	37	A privately owned place or area set aside for recreation or preservation of a cultural or natural resource.
K2190	Other Park, Forest, or Recreation Area (quasi-public, independent park, commission, etc.)	37	A place or area set aside for recreation or preservation of a cultural or natural resource and under the administration of some other type of government or agency such as an independent park authority or commission.
K9992	Park in water	37	National, State, County or City park boundaries that encompass whole or partial water features.
G2100	Native American Reservation	38	A legally defined state- or federally recognized reservation and/or off-reservation trust land (excludes statistical American Indian areas).

MapConnect™ 1.0 Specification

Water Type Code (MTFCC) Definitions		
Code	Name	Description
H2025	Swamp/Marsh	A poorly drained wetland, fresh or saltwater, wooded or grassy, possibly covered with open water. [includes bog, cienega, marais and pocosin]
H2030	Lake/Pond	A standing body of water that is surrounded by land.
H2040	Reservoir	An artificially impounded body of water.
H2041	Treatment Pond	An artificial body of water built to treat fouled water.
H2051	Bay/Estuary/Gulf/Sound	A body of water partly surrounded by land. [includes arm, bight, cove and inlet]
H2053	Ocean/Sea	The great body of salt water that covers much of the earth.
H2060	Gravel Pit/Quarry filled with water	A body of water in a place or area from which commercial minerals were removed from the Earth.
H2081	Glacier	A body of ice moving outward and down slope from an area of accumulation; an area of relatively permanent snow or ice on the top or side of a mountain or mountainous area. [includes ice field and ice patch]
H3010	Stream/River	A natural flowing waterway. [includes anabranch, awawa, branch, brook, creek, distributary, fork, kill, pup, rio, and run]
H3013	Braided Stream	A natural flowing waterway with an intricate network of interlacing channels.
H3020	Canal, Ditch or Aqueduct	An artificial waterway constructed to transport water, to irrigate or drain land, to connect two or more bodies of water, or to serve as a waterway for watercraft. [includes lateral]

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Display Class Code Defintions		
Code	Name	Description
1	First class	Most important display class (show at all scales)
2	Second class	Second to most important display class
3	Third class	Third to most important display class
4	Fourth class	Fourth to most important display class
5	Fifth class	Fifth to most important display class
6	Sixth class	Sixth to most important display class
7	Seventh class	Seventh to most important display class
8	Eighth class	Least important display class

SERVER			4 core		8 core	
GSA Pricing			license	maint*	license	maint*
ArcGIS Server	Enterprise	Advanced	\$ 32,643	\$ 10,373	\$ 65,286	\$ 20,745
	- unlimited users	Standard	\$ 16,322	\$ 5,187	\$ 32,644	\$ 10,375
	Workgroup	Advanced	\$ 16,320	\$ 5,187	na	na
	- maximum ten users	Standard	\$ 8,160	\$ 2,593	na	na
DESKTOP			concurrent			
GSA Pricing			license	maint*		
ArcGIS ArcInfo			\$ 7,295	\$ 2,528		
ArcGIS ArcEditor			\$ 5,713	\$ 1,556		
ArcGIS ArcView			\$ 2,857	\$ 726		
- all above include ArcMap, ArcCatalog, ArcToolbox						
extensions			\$ 2,040	\$ 519		
- Spatial Analyst, 3D Analyst, Network Analyst, others						
* annual maintenance includes technical support and free software updates						
* first year maintenance is included with initial license						

SG-ELA	ELA
Small Government Enterprise License	\$50,000 per year for three years
<ul style="list-style-type: none"> - includes unlimited use of most ESRI ArcGIS software (see list below) - includes technical support and free software updates - covers all ASG agencies (except National Guard who have a nationwide agreement) - \$10,000 per year in ESRI Virtual Campus training 	
PARTIAL LIST OF SOFTWARE INCLUDED	
<ul style="list-style-type: none"> - ArcGIS Server Enterprise Advanced: unlimited numbers of servers and cores - ArcGIS Desktop ArcInfo: unlimited number of users - ArcGIS Desktop extensions (Spatial, 3D, Network): unlimited number of users 	

BroadMap

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INVOICE

INVOICE #091228001
DATE: DECEMBER 31, 2009

11543-A Nuckols Road
Glen Allen, VA 23059
Phone 804.767.1567
Fax 804.201.9288

TO:

U.S. Department of Commerce / NTIA
Attn: Anne Neville
Herbert C. Hoover Building (HCHB)
1401 Constitution Avenue, N.W.
Washington, D.C. 20230

FOR:

American Samoa Broadband Mapping and Planning Project
Pre-Award Costs

AREA	BUDGETED HOURS (Yr1)	HOURS	% HOURS	BLENDED RATE	TOTAL
Project Planning, Management and Collaboration	796	439.30	55%	\$68.25	\$29,982.95
Application Development – Map Connect	1,209	597.46	49%	\$72.00	\$43,017.43
Data including Data Gathering, Accuracy and Verification, Accessibility, Security and Confidentiality	3,539	807.60	23%	\$67.34	\$54,381.33
Repeated Data Delivery	0	0	0%	n/a	\$0.00
Broadband Web Portal and Database Development – Map Connect Live	2,449	83.89	3%	\$65.86	\$5,524.73
Digital Mapping	2,625	87.02	3%	\$73.34	\$6,382.10
Hardware and Software Purchase – ESRI license and software costs divided equally across American Samoa, CNMI and Guam					\$10,089.93
TOTAL	10,618	2,015.27	19%		\$149,378.47

Please make all checks payable to BroadMap LLC
Terms: Upon Grant Award

Please contact Melissa Hipes with any questions.
Direct: 804.477.1951 Email: melissa.hipes@broadmap.com
Thank you for your business.

In an effort to establish and achieve a sustainable local broadband mapping capacity, the American Samoa Department of Commerce (in cooperation with the Governor's Office of American Samoa) and the American Samoa Community College (ASCC) will work in conjunction with Broadmap to improve, promote and develop a comprehensive Geographic Information Systems (GIS) curriculum under the Institute of Trades and Technology that will enable the college to enhance local specialized mapping skills and expertise with influence on broadband.

As the Broadband Mapping Project Lead, the American Samoa Department of Commerce will work with ASCC to implement a GIS curriculum/program that will ensure the long-term sustainability of broadband mapping capability and capacity in American Samoa. The curriculum requirements and standards will be largely be based on the technical assistance that will be provided by BroadMap. ASCC will also utilize the college's current GIS introductory course standards as a roadmap to facilitate in the development of a comprehensive curriculum that will offer students a basic understanding of fundamental GIS applications at an introductory level and the ability to assess system architecture, perform maintenance of equipment and datasets in addition to acquiring the full certification and technical expertise on mapping upon completion of the program.

The GIS program will be implemented by the ASCC Institute of Trades & Technology as part of its overall curricula ITT will offer a Certificate of Proficiency to students who successfully complete the GIS requirements. Acquiring this certification means that students will emerge from the program as trained specialists in the utilization of GIS applications and state-of-the-art mapping technology. As the information infrastructure in American Samoa improves, it is expected that there will be a significant increase in demand for GIS services and skills Internet Service Providers (ISP's) and utilities will become considerably reliant on GIS Services to facilitate in determining the actual location of utility lines and fiber cables throughout the territory and implementing strategic marketing plans to remote unserved and underserved areas.

This program will start in the second year of the Broadband Mapping Program, this is due to the fact the grant award is so late in the current school year. Broadmap and ASDOC will work together with ASCC to work towards designing a curriculum for the 2010-2011 school year.