

# **WEST VIRGINIA BROADBAND MAPPING PROGRAM**

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## **ABSTRACT**

The purpose of this program is to develop a statewide broadband coverage map to provide a comprehensive picture of current infrastructure deployment and availability of broadband service in the State of West Virginia (State). This project will gather data at the address level from service providers, including broadband availability, technology, infrastructure, speed, ARPU and the spectrum used if wireless service. In addition to broadband data collected from providers, this project will identify and collect additional data from private and public sources to meet the project objectives described in the technical appendix of the NOFA. This additional data will include community-anchor institution data layers, such as schools, libraries, universities, colleges, hospitals, emergency and public safety installations, and all public buildings. Most important among these datasets are the continually updated structures and street/roads centerlines datasets created by the State's Statewide Addressing and Mapping Board (SAMB) containing geospatial information and address attributes for every structure in the State. The SAMB structures layer is key to address accuracy and verification. Data obtained from service providers will be cross-referenced with the SAMB layer for automated address and broadband availability verification. This automated verification followed by on the ground verification inspections and consumer surveys will further ensure the desired accuracy.

The project will provide layers of current infrastructure, indicating transmission speeds, levels and type of service in an electronic format compatible with both ESRI software and the Google Earth Visualization platform compliant with all the requirements of the NOFA for review and use by federal, state and local agencies/institutions and the public. Analysis of these layers will provide the State with an accurate depiction of unserved and underserved areas. State staff will be working with a private contractor to ensure completion of all project tasks within the required datelines and for delivery to NTIA for inclusion in the National Broadband Map.

Confidential information obtained from service providers and the State's datasets will not be included in publicly accessible versions of the final product. A mandatory Non-Disclosure Agreement will further reinforce data security and confidentiality.

The use of existing and readily available datasets and coordination between multiple agencies, providers and other stakeholders together with work by the State's contractor ensures the successful completion of the project and expedient data delivery.

Because the data will come from different sources and will change with time, there will be a need for update management and oversight at the State level. The data will be maintained through data stewardship program in which State staff will assume responsibility for the maintenance of the datasets used in this project. Funds made available through the grant will initially be used for this stewardship program. The State will research alternate funding sources to continue the maintenance and updating of the data after all grant funds are spent.

WEST VIRGINIA BROADBAND MAPPING PROGRAM

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PROGRAM

NARRATIVE

Opportunity No. 0660-ZA29

CFDA 11.558

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## INTRODUCTION

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In fulfillment of the application procedures for the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program 0660-ZA29, the Office of the GIS Coordinator, authorized by Governor Joe Manchin III of West Virginia as the single eligible entity to receive a grant under this program, respectfully submits this program narrative for the State of West Virginia.

## EXECUTIVE SUMMARY

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The State of West Virginia (State) proposes to develop a statewide broadband coverage mapping program to provide a comprehensive picture of current infrastructure deployment and availability of broadband service in the State. The program will allow for the use of the broadband data and mapping to be used in support of infrastructure build-out and maintenance as well as sustainable demand and adoption programs. While the initial thrust of this program is aimed at assuring that ARRA funding is targeted, prioritized and spent efficiently in the State, ultimately the goal is to establish networks and programs that are sustainable long after the ARRA funding is spent. Working with providers to supply service coverage updates that will be used to further identify unserved and underserved areas and encourage the provision of service in those areas, and engaging local entities to analyze current use of the technology and educate on service expansion opportunities. The State currently does not have an accurate and up to date map of unserved and underserved areas. State staff will be working with a private contractor to ensure completion of all project tasks within the required datelines and for delivery of an accurate and up to date dataset to NTIA for inclusion in the National Broadband Map. For this purpose, the Office of the State GIS Coordinator requests \$2.59 million in funding to map broadband service and availability with a contracted mapping company partner and other interested stakeholders in the State.

## BACKGROUND

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West Virginia Governor's Executive Order 04-93 authorized a state-level Geographic Information System (GIS) program in the State. A funding proposal for GIS implementation was presented to the State Legislature and approved under House Bill 2222 in February 1995. This funding provided for the establishment of a GIS State Coordinator's office, the State GIS Technical Center, and a GIS Pilot Demonstration project. The program's fiscal, administrative and managerial responsibilities reside with the State Geological and Economic Survey (WVGES). The GIS State Coordinator reports directly to the Director and State Geologist of the WVGES.

The overall mission of the Office of the GIS State Coordinator is to implement a statewide GIS program that will develop a comprehensive, standardized and public domain computerized digital cartographic datasets to be shared and used by government agencies, the public, and the business community in order to modernize develop and improve decision-making processes at all levels for the benefit of the State's society.

The Broadband Deployment Council (BDC) was envisioned by Governor Joe Manchin III and under his leadership was created by legislation in 2007. The stated purpose of the legislation is to provide broadband accesses to all West Virginia citizens by the end of 2010. A systematic and organized approach is because of the state's challenging topographical and demographic challenges. The state regards broadband as necessary infrastructure on par with water, sewer, and roads. The state modeled the legislation after existing bodies that plan, finance and regulate that infrastructure while recognizing that broadband is so unique that it required its own specialized treatment. The BDC is made up of state officials and industry representatives, including cable operators, telecommunications companies, fiber providers, representatives of employees, and equipment manufacturers.

The legislation imbeds the state's belief that broadband build-out should be technology agnostic and sets the minimum bandwidth that qualifies as broadband in west Virginia, which was specifically designed to follow FCC guidelines. The legislation also includes reporting requirements for government entities so that the state has accurate, annual assessment of broadband infrastructure and utilization by public entities. The development of programs that encourage demand is also addressed by the BDC (see *WV Broadband CODE* in the *Optional Attachments Section*).

In order to accomplish that goal, the legislation sets forth specific responsibilities and duties. First the BDC is required to retain a third party expert consultant to assess the status of broadband deployment and then provide strategies to provide service to unserved areas (defined by legislation that is below 200 kbps). These strategies are to be technology agnostic and designed to encourage private investment for the build-out. Through a competitive process completed in the spring of 2009, L. Robert Kimball & Associates, Inc. was selected as the state's consultant for broadband mapping and development.

The missions of the BDC and the GIS Coordinator's Office intersect in this broadband mapping project. The BDC is committed to fostering the creation of ubiquitous broadband access throughout the State through targeted investments in broadband infrastructure and public-private partnerships. The BDC will focus on the expansion of broadband deployment to unserved citizens and businesses at the outset. The State intends to invest in broadband infrastructure in ways that leverage new investments and services from broadband providers.

The GIS Coordinator's Office will be responsible for supporting the development of GIS broadband data mapping required for the deployment and tracking of new broadband infrastructure and services. The coordinator will act as project manager responsible for the development, creation and updating of maps that show broadband availability on a granular level and will work closely with the consultant and other state agencies to achieve all the goals of the NTIA State Broadband Data and Development Grant Program and the BDC.

## CRITERIA 1 DATA

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### A. DATA GATHERING

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It is the State's role to implement procedures, provide guidance and to resolve issues to allow for a timely turn-around on the vital information according to the NOFA.

The State has found that the data-gathering component of any broadband mapping effort is heavily reliant on obtaining data from service providers. The basic process starts with the establishment of relations with providers. Providers will then be engaged with a non-disclosure agreement (NDA), a provider survey and then data will be standardized. Provider's data will be supplemented with third-party data from reliable industry sources, as needed.

The State currently has access to several statewide GIS datasets that will be used during the project. A listing of these datasets will be attached in the *Other Attachment Files Section* of the application under the title *Data Catalog*. The key contributing datasets will be the statewide GIS building structure layer and street centerlines created by the State's Statewide Addressing and Mapping Board (SAMB). By having access to these layers the State will be able to achieve accurate address level analysis. Updates will be made to these and any other current State GIS dataset used in support of the Broadband Mapping Program to achieve the highest level of accuracy possible.

#### NDA/Provider Engagement

As noted above, the methodology engages the provider community from the very outset as we work together to reach clarity and consensus on why the maps are being developed, what data is required, how results will be displayed and who will be able to access the maps (including how maps will be made available to local, state and federal policymakers).

The methodology includes close work with the provider community beginning with the negotiated design of a relevant NDA. The State's NDA is a balanced tool that helps obtain and display information useful to consumers while protecting proprietary data.

The main goal regarding provider data is to obtain and present a realistic and informative view of broadband inventory and service areas 1) without compromising the locations of key infrastructure with concern for public safety and 2) without compromising the proprietary business data of service providers.

This is accomplished by using a unique approach that allows providers to see how their data submissions will be used. Providers will be provided with a data classification scheme that shows how their data will be treated and shared by data type. Working closely with providers at the start of the project to educate them on how their data submissions help will create a derivative output they can use. Experience shows that if providers understand exactly how their data will be used and displayed in the public domain, they are more likely to participate in the survey process. It is our opinion that the State's NDA is the keystone to the data gathering effort, we believe our NDA is a clearly balanced and effective document.

### Provider Survey

The NOFA's Technical Appendix is very specific on the type and format of data required from state mapping efforts. The State's mapping efforts will be geared around the collection of data consistent with the Technical Appendix so that the State is in compliance and providers have a robust data source that identifies unserved and underserved areas so that the State can maximize its share of the funding. As mentioned before this task will be performed by the State's private contractor.

The specific data elements identified in the NOFA Technical Appendix that will be requested from providers include (details on the file formats can be found in the NOFA):

- Broadband service availability in provider's service area
  - Availability by service address for service associated with specific addresses (typically wireline providers)
  - Availability by shapefile—wireless services not provided to a specific address
- Residential broadband average revenue per end user and weighted average speed by county in the provider's service area
- Last mile connection points for broadband infrastructure in the provider's service area (e.g., DSLAMs, fiber nodes, towers, etc.)
- Middle mile and backbone interconnection points for broadband infrastructure in the provider's service area

The contractor will work with the State's Office of the GIS State Coordinator and other government agencies to meet the specific data elements identified in the NOFA Technical Appendix, such as community anchor institutions.

The NOFA Technical Appendix is very clear on the data they will require, through research we have found that some providers will be more capable than others in providing the requested data. As such, the State and its contractor will provide alternative paths for data submissions for those providers who cannot exactly meet the requirements or provide within the necessary period required by NOFA.

For those providers who cannot meet the NOFA technical requirements and provide alternative sources, the GIS State Coordinator and the contractor will work with NTIA on developing acceptable alternative approaches.

For those providers who refuse to respond, the contractor will work with the State's Office of the GIS State Coordinator on the best way to move forward. While the contractor can attempt to approximate the broadband coverage, however, it is preferred to rely on actual provider data. As such, the contractor may request that the State issue an order to specific providers to compel them to respond.

Given an alternative approach to data development or the lack of a decision of acceptability from NTIA/RUS, the State will use its best efforts to develop a fair and representative coverage pattern.

## B. ACCURACY AND VERIFICATION

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Verification efforts will begin by utilizing the State's current SAMB structure GIS layer that consists of updated resident address information. A comparison will be performed between the broadband provider's service information and this building structure layer. The broadband provider supplied availability information will then be overlaid over the updated building structure layer (see attached titled Broadband Overlay on Structures). To supplement verification efforts the State's current digital cadastral mapping will be used as an added layer to ensure accuracy along with the SAMB street centerlines. This will then provide mapping that allows identification of issues with provider supplied information. Questionable areas and results will then be field verified to obtain and correct erroneous and/or missing information.

First, with respect to submitted broadband coverage data, requests for both a serving area boundary and the equipment location and type that support this boundary are made. This helps judge if there is broadband equipment available to serve the reported coverage area. Using equipment location, industry-engineering criteria to create theoretical service areas can then be used. Comparing the two, a lack of equipment or significant mismatch in the provided service area as compared to the theoretical serving area would raise questions about broadband coverage quality and/or accessibility. Data, which does not pass this test, will be returned for review.

Second, the addresses of current broadband available locations will be requested from the providers. The contractor will geocode the locations and maps the points against the provided coverage and the SAMB structures GIS layer. From this, a determination can be made if significant differences exist between coverage areas and service locations. Again, clarification on any deviations discovered during the process will be requested from the providers.

Third, a list of customer phone numbers will be requested from providers. The contractor's team will randomly survey a set of these customers across all providers to gather information about service availability, experience and quality.

Fourth, the contractor will select sample areas and request providers to supply internal 'line' qualification testing of selected addresses to verify coverage and service attributes.

Fifth, the contractor will perform limited on the ground sampling of coverage designed to comply with specific RUS/NTIA language. This is the most expensive type of data assurance and potentially the most difficult information to use. The contractor will select sample areas and verify the presence and attributes of the provider's service. This will involve both a rural and urban sampling and determination of serviced addresses or points relative to the presence of provisioning equipment.

The results of the verification steps will lead to follow-up requests with the providers to clarify and clear up any noted significant issues. Issues not addressed by the provider will be noted in the output to the State.



## C. ACCESSIBILITY

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The NDA, in part, will guide what data and how the data can be shared with and between state agencies. At a minimum, the State will have access to broadband maps at a technology and speed level for selected geographies. These maps will not only show served areas but will also call out underserved and unserved areas (as defined within the NOFA). The association of the provider's name with any information will be the decision of the provider. The State will at a minimum provide generalized information on broadband availability through the State's GIS Web portal.

### State Map Creation

The objective is to develop a geographic inventory of broadband service areas and the associated infrastructure used to support broadband services relative to Census Geographies and compliant with all the NOFA technical requirements.

Before discussing the visualization approach, a discussion of how data will be normalized across providers has to come first. To develop and assess the presence of broadband supply and infrastructure, the contractor will begin with an appropriately granular sampling method to determine where coverage exists. This approach is grounded in a survey across service providers, which will allow receipt of coverage back in a number of analog and digital formats to make the data collection process as easy as possible for a wide range of providers, while still achieving the policy objectives. It is important to understand that formats will not be consistent and accuracy will vary amongst the submissions. For this reason, each response will be treated distinctly and a sampling mechanism to standardize the coverage will be used.

Given the sampling cells as well as the existence of Census block data the contractor can quickly determine if a sampling cell is covered, what the Census characteristics of that cell are and what types of broadband coverage exist in that cell. This way, a determination, at a very granular and standardized level, a number of key metrics will be performed. We use this same sampling process for each speed-coverage layer we are provided.

If the providers supply the NOFA defined coverage data in tabular address level format, the contractor will convert that data into a spatial format. For the address data, this will start with a geocoding process to assign a latitude and longitude to each address record. Overlaying the grids will determine which grid, preliminarily, will be "lit". With the proposed collection of other provider information (e.g., shapefile coverage maps), an identification of potentially faulty geocoded<sup>1</sup> data and removal of those points can be performed. Identified grids can be augmented by the geocoding process with grids "lit" from alternative provider sources (e.g., shapefiles of the broadband areas). As a note, it is through the collection of multiple sources of provider information that a layer of verification will be added to the process.

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<sup>1</sup> Geocoding may not always provide 100m street level accuracy. In some cases, the Geocoded point will be at the center point of a much larger geography (referred to as a centroid point). While it is an accurate geocode, it is not an adequately precise identification of a served customer. As such, these points need to be compared to the SAMB Structures layer to correct it, if this cannot be done the point will be discarded in the process.

Once sampling is complete across all provider data, the contractor will have a uniform data set for mapping and analysis. At this point analysis will begin analyzing broadband information with various economic development, public health, demographic, education and public service information and data. For the visualization approach, the State recommends the use of SAMB street centerlines dataset as the visualization layer. Roads are easily identifiable by consumers, they represent where they live and how they commute, and allow the layering of other datasets.

#### D. SECURITY AND CONFIDENTIALITY

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As noted above, NDAs will be signed with all information providers to the project to protect their data and to define how the data will be used and shared with the State and the public. In addition to the NDA process, the State will also implement a secured environment for the creation, manipulation and storage of broadband data. Changes in IT and GIS processes will be shared with all State staff responsible for the maintenance of the statewide broadband data.

### CRITERIA 2 PROJECT FEASIBILITY

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#### A. APPLICATION CAPABILITIES

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The State has extensive experience in working with NTIA grant programs and other federal programs that require non-federal matching requirements.

Concerning in-kind contributions, we believe that we are deeply skilled to maximize the value that can help satisfy the matching requirement. The State will be using our efforts in developing broadband related GIS datasets as our 20 percent match for the project. Our estimated value of our statewide structures dataset is \$5 million. The estimated value is derived at the cost of \$4 per structure verified multiplied by an estimated 1.25 million structures. This value exceeds the required 20 percent in-kind match.

For a more detailed breakout of the costs associated with the project, see the *Budget Narrative* of the application.

#### B. APPLICANT CAPACITY, KNOWLEDGE AND EXPERIENCE

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The following personnel from several State agencies will be directly involved in different capacities performing administrative, coordination, communication, technical, logistical and clerical tasks for the broadband mapping project.

1. Office of the GIS State Coordinator  
Tony Simental M.S., GIS State Coordinator  
Leigh Cielinsky, Executive Assistant
2. The State of West Virginia Geological and Economic Survey (WVGES)  
John May, Deputy Director of Finance & Administration
3. Division of Homeland Security and Emergency Management (DHSEM)

Jennings Starcher M.A., GIS Manager  
Maria Simental M.S., GIS Programmer Analyst II  
David Philips, GIS Technician

The following are stakeholders who will also participate in the project in different stages and different capacities.

1. Jimmy Gianato, Director, DHSEM
2. Michael Hohn, Director and State Geologist, WVGES
3. Pat White, GISP., Manager, GIS Section Property Tax Division
4. Kurt Donaldson, GISP., Manager, GIS Technical Center
5. Sean Litteral M.S., Manager GIS Unit, Department of Transportation
6. Sang Yoo M.S., GIS Project Manager, Rahall Transportation Institute

In order to produce the required deliverables in the given time frame and due to the State's limited GIS staff the State has selected a qualified contractor that is experienced with telecommunications technology, broadband services and GIS. The State selected contractor that will perform the work on the broadband mapping project is L. Robert Kimball & Associates, Inc. (Kimball). Kimball is currently under contract with the State to perform technology and broadband services and has the capacity, resources and expertise to complete the work detailed in this application.

Detailed information on State staff and Kimball's experience can be found in the *Optional Attachments* section of this application in documents titled *West Virginia Staff Resumes* and *L. Robert Kimball & Associates, Inc. Statement of Qualifications*.

### **CRITERIA 3 EXPEDIENT DATA DELIVERY**

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Given the time frames laid out in the NOFAs, time is of the essence. To that end, Kimball will begin work as the preferred vendor on the project once it has been selected and contract efforts have begun, well before the award of the project funds are made by NTIA. While this puts payment for these initial work efforts at risk, we are confident that the State's application will be fully funded by NTIA. Even with this jump-start, Kimball will be pressed to turn the required data around without unique project approaches and with the help of the GIS State Coordinator's office.

On the project approach side, we can see no other alternative than employing a time box method of data development. We believe that in order to produce maps by November 1, 2009 the data must be gathered from source providers by no later than October 1, 2009. In the methodology below, we are proposing some steps, which providers can take to produce data in this time frame. Our belief is that we need to require them to make a decision about how they will provide data; the next step is to put the provider on an expedited time frame to release data.

We do not have nor did the NOFA provide any manner of compelling compliance with our data requests. As such, in addition to our efforts to cajole the providers, we believe that the GIS State Coordinator's office will need to leverage all available resources, both political and regulatory to receive this data in the necessary time frame, including compelling providers to return the

requested data in an expedient manner. In the end, the State will put great pressure on the provider community to obtain the data in the required timeline.

Concerning the data components, the emphasis within NOFA on address level data provides a number of different response paths from the providers, which we will outline.

The suggested data collection approach to create the first maps is as follows. First, we suggest that the GIS State Coordinator's office start immediately on working with available State entities and provider industry groups to create a list of all service providers (telco, cable, wireless, broadband over power line and WISP). Once Kimball is on board, they will augment these efforts to finalize a complete list within the first week of the project. These identified providers will then be asked if they can supply address level data for all subscribers in NOFA compliant format by the end of week three. A response is required in three days. If the carrier does not reply or says they cannot meet the deadline, we present two alternatives:

- Ask if the provider can supply the most recent address level data used as the basis for FCC 477 filings. If the provider cannot supply this data by the end of week five or does not respond.
- Request the broadband service areas and/or an address level listing of all equipment used to support broadband services (this could also include the shapefile for the engineering boundaries of these broadband nodes). If only broadband nodes are provided, the provider would have to supply standard engineering rules on service distance from these nodes. In addition to the boundary data, we would request a listing of all service addresses (ideally working and non-working). The address data would be geocoded and then overlaid on the broadband boundaries. From this data, the NOFA address list can be created.

If by the end of week two a provider feels that they cannot comply with either the NOFA request or the two alternatives, we would present them with an estimate of their service area based upon public data. In other words, present an estimate and let the provider correct it. Estimated coverage patterns could be derived via commercial coverage or they may be based upon engineering judgments of subject matter experts. Our timeline would be to have these estimates in place by the end of week four. The provider has two weeks to correct them or they are considered accepted.

For a provider who does not provide data, their coverage areas will be based upon estimates. Efforts will then ensue (including compel orders) to collect their data by the end of project week nine (end of September assuming an August start date). Clearly relying on estimated data is not ideal, but the converse of allowing providers unlimited time response path would jeopardize the development of data required for the first NOFA filings.

Despite the ambitious NTIA schedule, the State is confident in the following goals:

- November 1, 2009 provide NTIA a complete set of available data.
- February 1, 2010 completion of draft statewide broadband mapping data
- March 1, 2010 completion of final statewide broadband mapping data

## CRITERIA 4      PROCESS REPEATED DATA UPDATING

Creation, import or conversion of individual coverage data will be a process that varies from provider to provider. While this process will be much easier to address once we have knowledge of the status and format of the provider data, the State will document the input data received, the process steps applied and any special considerations or requirements for each provider's coverage map. It is anticipated that the individual coverage footprints, once processed and normalized, will be used to populate a merged grid model.

The update process will therefore consist of two discrete steps. Step one will be to collect updated information from each identified provider still operating in the State, making sure to update any changes in the source data and processing steps required, while adding information from any new providers. Step two will be to run the fresh data through the grid merge modeling process. This process will be captured and recorded in ArcGIS tools during the original inventory data processing, and saved for update cycle modification and re-use.

From a timing perspective, our expectation is that at a minimum we will resurvey the providers starting three months after a new semi-annual map is released. With the survey, we will include the latest static map for the provider. The providers will have one month to respond. The State will process the data within one month, and then providers will have one month to suggest any clean up efforts to the maps.

As part of our interactive map work effort, we will include an interactive portal, which will allow providers to securely upload and download information. This portal will be maintained by the State. If the data is address based, it will be easy to refresh our data based upon all new service addresses from the provider (as does the FCC for its 477 automated reporting).

The State's budget request for this application covers a five-year time span. During the project the State will also develop a maintenance plan and funding source to continue maintenance beyond the five years.

## CRITERIA 5      PLANNING AND COLLABORATION

The State's mapping and planning process relies strongly on the engagement with, and collaboration by, local agencies, authorities and stakeholders from the State. During the mapping of infrastructure process, the State formalizes collaboration with the provider community through NDAs and surveys. Beyond the provider community, we utilize the demand-side assessment process to directly engage local agencies, authorities and stakeholders regarding what they need in terms of broadband (both access and adoption), how they envision that need being met and how meeting the need will result in beneficial impacts for residents, businesses and governments. Once demand for broadband is assessed, the results are shared back with relevant stakeholders through a collaborative method involving a visioning workshop, a Web-interface and a household/business survey.

Where close collaboration with local agencies and authorities is essential is the formation and work of the regional technology planning teams, which will utilize the data. It is through these regional teams that local action is clearly defined around priority programs designed to respond

to local broadband challenges discovered during the mapping. Experience has shown regional and local implementation of priority programs requires the moderate-to-strong collaboration with key leadership, often coming from local agencies and authorities. The goal of this type of collaboration is to assure the priority programs are consistent with what is needed, what is possible and what is sustainable. More specifically, the State seeks to advance sustainable solutions to local broadband demand by 1) enhancing or augmenting currently implemented initiatives to include broadband as an enabling component, and 2) suggesting, where needed, new initiatives that directly respond to the local challenges if no existing initiative is available.

Previous efforts by the State to advance innovative solutions to address broadband challenges indicate that enhancing and augmenting existing efforts is preferred because they are already in place and supported; however, there are instances where new initiatives are needed. All of this is made possible by strong engagement with, and collaboration by, local agencies and authorities.

Coordination of State level agencies including the Department of Homeland Security, Department of Transportation, Department of Commerce and the Property Tax Division will be required to properly distribute or share information. Interaction with non-profit organizations like the Rahall Transportation Institute and the West Virginia GIS Technical Center will also be conducted to aid in the data collection and mapping effort. The State GIS Coordinator's office will be the primary steward of all statewide broadband mapping data and will coordinate efforts with the federal government to support the development of the National Broadband Map.

**BUDGET INFORMATION - Non-Construction Programs**

OMB Approval No. 4040-0006  
Expiration Date 07/30/2010

**SECTION A - BUDGET SUMMARY**

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. Data Collection	11.558	\$ 0.00	\$ 0.00	\$ 342,918.00	\$ 0.00	\$ 342,918.00
2. Data Verification	11.558	0.00	0.00	330,000.00	0.00	330,000.00
3. Data Analysis	11.558	0.00	0.00	420,000.00	0.00	420,000.00
4. Data Maintenance	11.558	0.00	0.00	105,000.00	0.00	105,000.00
<b>5. Totals</b>		\$	\$	\$ 1,197,918.00	\$	\$ 1,197,918.00

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**SECTION B - BUDGET CATEGORIES**

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1) Data Collection	(2) Data Verification	(3) Data Analysis	(4) Data Maintenance	
<b>a. Personnel</b>	\$ 5,566.00	\$ 5,566.00	\$ 5,566.00	\$ 5,566.00	\$ 22,264.00
<b>b. Fringe Benefits</b>	1,546.50	1,546.50	1,546.50	1,546.50	6,186.00
<b>c. Travel</b>	3,096.00	1,548.00	0.00	1,548.00	6,192.00
<b>d. Equipment</b>	0.00	0.00	20,000.00	20,000.00	40,000.00
<b>e. Supplies</b>	500.00	500.00	0.00	500.00	1,500.00
<b>f. Contractual</b>	325,000.00	300,000.00	400,000.00	75,000.00	1,100,000.00
<b>g. Construction</b>	0.00	0.00	0.00	0.00	
<b>h. Other</b>	0.00	0.00	10,000.00	10,000.00	20,000.00
<b>i. Total Direct Charges (sum of 6a-6h)</b>	335,708.50	309,160.50	437,112.50	114,160.50	\$ 1,196,142.00
<b>j. Indirect Charges</b>	444.00	444.00	444.00	444.00	\$ 1,776.00
<b>k. TOTALS (sum of 6i and 6j)</b>	\$ 336,152.50	\$ 309,604.50	\$ 437,556.50	\$ 114,604.50	\$ 1,197,918.00
<b>7. Program Income</b>	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$

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SECTION C - NON-FEDERAL RESOURCES					
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS	
8. In-kind Contribution SAMB Structures Dataset Data Verification Analysis Maintenance and Collection see Budget Narrative	\$ 5,000,000.00	\$ 0.00	\$ 0.00	\$ 5,000,000.00	
9.					
10.					
11.					
12. TOTAL (sum of lines 8-11)	\$ 5,000,000.00	\$	\$	\$ 5,000,000.00	
SECTION D - FORECASTED CASH NEEDS					
	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13. Federal	\$ 1,197,918.00	\$ 400,000.00	\$ 300,000.00	\$ 300,000.00	\$ 197,918.00
14. Non-Federal	\$	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
15. TOTAL (sum of lines 13 and 14)	\$ 1,197,918.00	\$ 400,000.00	\$ 300,000.00	\$ 300,000.00	\$ 197,918.00
SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT					
(a) Grant Program	FUTURE FUNDING PERIODS (YEARS)				
	(b) First	(c) Second	(d) Third	(e) Fourth	
16. Data Collection	\$ 137,918.00	\$ 143,274.00	\$ 126,274.00	\$ 141,274.00	
17. Data Verification	\$ 85,000.00	\$ 87,500.00	\$ 86,000.00	\$ 86,000.00	
18. Data Analysis	\$ 95,000.00	\$ 97,500.00	\$ 96,000.00	\$ 96,000.00	
19. Data Maintenance	\$ 15,000.00	\$ 50,000.00	\$ 20,000.00	\$ 30,000.00	
20. TOTAL (sum of lines 16 - 19)	\$ 332,918.00	\$ 378,274.00	\$ 328,274.00	\$ 353,274.00	
SECTION F - OTHER BUDGET INFORMATION					
21. Direct Charges:		22. Indirect Charges:	0.1739		
23. Remarks:					

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WEST VIRGINIA BROADBAND MAPPING PROGRAM

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BUDGET

NARRATIVE

Opportunity No. 0660-ZA29

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## INTRODUCTION

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In fulfillment of the application procedures for the National Telecommunications and Information Administration (NTIA) State Broadband Data and Development Grant Program 0660-ZA29, the Office of the GIS Coordinator, authorized by Governor Joe Manchin III of West Virginia as the single eligible entity to receive a grant under this broadband mapping program, respectfully submits this program budget narrative for the State of West Virginia.

## STATE BUDGET

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Total Budget Costs:	\$7,590,698
State In-kind Contribution:	\$5,000,000
Total Funding Amount Requested:	\$2,590,658

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IN KIND CONTRIBUTIONS:	\$5,000,000
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The level of geographic granularity is easily achievable by integrating several locally produced, high resolution, spatially and temporally accurate structure and transportation data. This locally produced 1:4,800 scale data from the State of West Virginia (State) Statewide Addressing and Mapping Board (SAMB) now serves as the foundation for the structures and road centerline GIS layers in the State. County-level maintenance of these locally produced structure layers is performed by the county E-911 offices, while the State Division of Homeland Security and Emergency Management perform state-level integration of county E-911 data. The dataset contains address and resident information that will be of great value to the broadband mapping effort. The structure and road centerline data themes can be integrated into other nationwide databases as was done with the newly re-aligned TIGER roads released by Census in December 2008. The State Department of Transportation reviewed the technical issues regarding the feasibility of a shared road network in the State and helped incorporate linear referencing, addressing, and routing capabilities. A primary goal of the SAMB was to integrate locally produced structures and transportation data into nationwide databases. Another intended goal was the development of long-term partnerships with organizations to act as data stewards for structures and for transportation data within West Virginia. A third goal was to create a bulk geocoding service derived from the SAMB addressable structures and road centerline themes. The achievement of these goals not only demonstrates the State's extensive experience in GIS layer creation, management and stewardship but also provides a very valuable in-kind contribution.

As mentioned before we believe that we are deeply skilled to maximize the value of the SAMB structures that can help satisfy the matching requirement. The State will be using SAMB mapping efforts in developing all broadband related GIS datasets as the State's 20 percent match for the project. Our estimated value of the statewide structures dataset is \$5 million. The estimated value is derived at the cost of \$4 per structure verified and multiplied by an estimated 1.25 million structures. This value exceeds the required 20 percent in-kind match.

We know the project will benefit with the improved utilization of the structures and centerline data by creating a bulk geocoding service for addresses to be used during the mapping process. The State will be using other results of previous SAMB mapping efforts in developing GIS datasets that can and will enhance the Broadband Mapping Program (sample maps located in the optional requirements folder). The use of these datasets will help the State meet all datelines and technical requirements outlined in the NOFA and its Technical Appendix. The State and its contractor will also be using the Division of Highway road centerline dataset and the SAMB 2003 imagery to satisfy the NTIA State Broadband Data and Development Grant Program information requirements and provide a substantially complete set of all broadband mapping data on or before February 1, 2010 and to complete such data collection by or before March 1, 2010.

SALARIES AND WAGES: \$111,320

Salaries	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
	\$22,264	\$22,264	\$22,264	\$22,264	\$22,264	\$111,320

**GIS State Coordinator:** The coordinator will be responsible for overall project management and administration, including aiding the contractor in gathering, analyzing and verifying the data required for the successful completion of the project. The coordinator will be responsible for the communications with NTIA in matters, including written and oral progress reports and updates, regarding this project and will ensure adherence to all standards listed on the NOFA. The coordinator will also coordinate among the various Federal, State, and Local agencies, and with the providers to promote, maximize, and ensure their participation, and will administer licensing agreements, memorandum of understanding between agencies, marketing agreements, and data use agreements. The coordinator will develop and implement a strategic long-term plan for data maintenance and will pursue alternate funding sources for data stewardship and maintenance after the grant funds are depleted. The coordinator will devote approximately 10 percent of his time during the five years of the project.

**GIS Manager:** The manager will ensure the quality of GIS data, to include currency, geographic and content accuracy, completeness, and registration amount of the various map layers. The manager will direct, the activities associated with the maintenance of the Broadband Mapping data including, but not limited to, updates made by providers and local agencies and will provide written and oral progress reports and updates to the GIS State Coordinator. It is estimated that the GIS Manager will spend about 10 percent of his time on this project.

**GIS Programmer Analyst:** Together with the GIS Manager, the GIS Programmer Analyst will review the data delivered by the contractor to ensure its accuracy and will create, update and maintain geographic databases related to this project. This person will create, and maintain information for display on the Broadband GIS Web portal and will provide data for inclusion in reports for NTIA and other stakeholders. It will also analyze information and evaluate its accuracy before it's posted to the Web portal or delivered to NTIA. It is estimated that the GIS Programmer Analyst will spend about 10 percent of the time during the five years of the project.

**GIS Technician:** The GIS Technician will create and maintain relevant map layers using automated GIS tools. Under the Analyst supervision, the technician will create and maintain GIS layers to meet project needs. The GIS Technician will spend about 10 percent of his time during the five years of the project.

**Office Assistant:** The assistant will be responsible for assisting the coordinator in the gathering of information and maintaining communication with project stakeholders, and assistant will perform administrative and general office duties required by this project. The assistant will devote to this project about 10 percent of its work time during the five years.

FRINGE BENEFITS: \$30,930

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
Benefits	\$6,186	\$6,186	\$6,186	\$6,186	\$6,186	\$30,930

Fringe benefits are calculated as direct costs in accordance with the State of West Virginia Cost Rate. Full State benefits are charged on the employee's salary. Statutory fringe benefits (FICA) are charged on the salary amounts, in accordance with standard State practice and at the federally negotiated rate.

EQUIPMENT: \$60,000

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
Equipment	\$40,000	\$0.00	\$20,000	\$0.00	\$0.00	\$60,000

A total of \$60,000 is requested to purchase the following items of equipment: one server, two workstations, one plotter, one large format scanner.

*Specific equipment purposes*

The server and the workstations are necessary for the maintenance, updating and quality control of the data. The plotter is necessary to print, produce, and distribute maps made with the Broadband data. Since some of the data will come in hard copy a large format scanner is needed to convert the hard copy to a digital format for geo-referencing. The plotter and scanner will be purchased during the first year as well as the server and the workstations. It is estimated that on year three the server and/or computers will need to be replaced with faster newer machines.

TRAVEL: \$9,768

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	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
Travel	\$3,552	\$3,552	\$888	\$888	\$888	\$9,768

A total of \$9,768 is requested for the GIS Coordinator and/or his assistant and/or GIS manager to attend meetings with multiple stakeholders and technical workshops related to the project. It is estimated that during the first two years travel will be more frequent than the following three years. Travel includes costs for airfare, hotel/meals, registration, and incidentals for average overnight trips. Current GSA CONUS rates: \$70 per day lodging, \$39 per day meals: Total lodging years one and two = \$70 x 24 overnights = \$1,680, plus meals = \$39 x 48 field days = \$1,872 per year. Total lodging years three, four and five = \$70 x 6 overnights = \$420, plus meals = \$39 x 12 field days = \$468 per year.

VEHICLE EXPENSES: \$7,260

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	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
Vehicle Expense	\$2,640	\$2,640	\$660	\$660	\$660	\$7,260

A total of \$2,640 per year is requested for the GIS Coordinator vehicle use while performing duties related to the project. This includes gas and regular maintenance. Current GSA POV rate: \$.55/mile: 48 travel days x 100 average miles/trip = \$2,640 on years one and two. 12 travel days x 100 average miles/trip = \$660 on years three, four and five.

COMPUTER SUPPLIES: \$5,000

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	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
Computer Supplies	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$5,000

A total of \$1,000 per year is requested for computer supplies. This includes computer accessories/peripherals, which require replacement.

SOFTWARE: \$55,000

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	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
Software	\$20,000	\$5,000	\$20,000	\$5,000	\$5,000	\$55,000

A total of \$55,000 is requested for GIS software. Several licenses will need to be purchased including but not limited to one ArcGIS Server license and two ArcGIS licenses. Due to the constant upgrades and releases ESRI makes on its software, these licenses will need to be updated every year hence the \$5,000 on years two, four and five. Since ESRI delivers a new version of its ArcGIS platform every two years it is estimated that the software will have to be replaced on year three.

OFFICE SUPPLIES: \$2,500

Office Supplies	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
	\$500	\$500	\$500	\$500	\$500	\$2,500

A total of \$500 per year is requested for materials, supplies and consumables needed to carry out the program. Such supplies might include items like paper, ink, paperclips, pens, etc.

INDIRECT COSTS: \$8,880

Indirect Cost	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
	\$1,776	\$1,776	\$1,776	\$1,776	\$1,776	\$8,880

Indirect costs are calculated in accordance with a rate of 0.1739.

TOTAL STATE COSTS \$290,658 (NOT INCLUDING \$5,000,000 IN-KIND CONTRIBUTION)

YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	Total
\$97,918	\$42,918	\$73,274	\$38,274	\$38,274	\$290,658

CONTRACTUAL BUDGET: \$2,300,000

L. Robert Kimball & Associates, Inc. (Kimball) has supplied the following work tasks and estimated costs. Below you will find a breakdown and summary of costs associated with the primary tasks of the Broadband Mapping project. The four primary phases of the project include data collection, data verification, data analysis and data maintenance. The costs and tasks cover a five-year period.



**DATA COLLECTION: \$835,000**

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During this phase of the project, the key tasks of gathering data, execution of NDAs, surveying broadband service providers and developing interactive mapping will be completed by Kimball. Kimball will begin the project by gathering relevant, existing broadband data from various sources in various formats.

Information and data that will be collected ranges in subject matters including broadband, economic development, technology development, education, government, healthcare, etc. Kimball engages the provider community from the very outset as we work together to reach clarity and consensus as to why the maps are being developed, what data is required, how results will be displayed and who will be able to access the maps.

The NDA process sets clear expectations on how data will transfer between project stakeholders. The provider surveys are then performed.

The surveys will assist in collecting pertinent information from providers relating to questions involving past, current and future broadband development. This information will be the key to many determinations made throughout the project. A Web-based interactive mapping application will also be developed during this phase of the project. The interactive mapping application will give data providers an efficient way to supply Kimball and the State with needed broadband data and information.

Costs associated with this project phase will be high in year one of the broadband mapping project and lower in years two through five because the workflow data gathering and maintenance will be clearly defined. Travel will be required during this phase of the project as trips to providers and project stakeholders will be necessary in executing the data gathering, NDA and provider surveys. Kimball will need to purchase general office supplies and limited hardware/software/equipment during this phase of the project to carry out project tasks. The estimated breakdown of costs for this phase of the project over a five-year period is as follows.

Task	Year One	Year Two	Year Three	Year Four	Year Five
Data Gathering	\$100,000	\$10,000	\$10,000	\$10,000	\$10,000
NDA	\$50,000	\$10,000	\$10,000	\$10,000	\$10,000
Provider Surveys	\$100,000	\$75,000	\$75,000	\$75,000	\$75,000
Interactive Mapping	\$75,000	\$25,000	\$40,000	\$25,000	\$40,000
<b>Totals per Year</b>	<b>\$325,000</b>	<b>\$120,000</b>	<b>\$135,000</b>	<b>\$120,000</b>	<b>\$135,000</b>
<b>Total Phase Cost</b>	<b>\$835,000</b>				

**DATA VERIFICATION: \$600,000**

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During this phase of the project, the key tasks of data verification and data manipulation will be completed by Kimball. Data and information gathered in the data collection phase of the project will be formatted to work within a single GIS-based environment. Information provided in tabular format that includes addresses will be linked to spatial features within the GIS so that data analysis could be performed. Since data and information will be received from many sources a database design will be developed to aid in the organization of data and information.

A data verification plan will be developed to aid in the determination of data accuracy level assignment. Data that is assigned a low accuracy rate will be either re-collected or used in limited capacity during the project. Spatial accuracy issues will be determined while working within the GIS.

Data manipulation of base GIS datasets such as road centerlines, building structure points and land parcel information will also be verified and corrected as needed to improve the overall accuracy of the broadband mapping data. The purpose of this project phase is to assure that the most accurate information possible has been collected or created so that the data analysis phase can be conducted. Datasets created from sensitive and confidential data sources will be handled in a discrete and secure manner following processes defined in the NDA. In addition, access to the sensitive data will be limited to only authorized Kimball staff members and monitored by Kimball's Technology Department.

Like the data collection phase, the highest cost to complete the data verification phase will occur in year one with reduced costs occurring in years two through five. Travel will be required during this phase of the project as trips to project stakeholders and limited data field verification tasks will be performed. Kimball will need to purchase general office supplies and limited hardware/software/equipment during this phase of the project to carry out project tasks. The estimated breakdown of costs for this phase of the project over a five year time period is as follows:

Task	Year One	Year Two	Year Three	Year Four	Year Five
Data Verification	\$200,000	\$50,000	\$50,000	\$50,000	\$50,000
Data Manipulation	\$100,000	\$25,000	\$25,000	\$25,000	\$25,000
<b>Totals per Year</b>	<b>\$300,000</b>	<b>\$75,000</b>	<b>\$75,000</b>	<b>\$75,000</b>	<b>\$75,000</b>
<b>Total Phase Cost</b>	<b>\$600,000</b>				

**DATA ANALYSIS: \$740,000**

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During this phase the project, the key tasks of data analysis, demand mapping and broadband assessment modeling will be performed by Kimball. All key analysis tasks requested by the *National Telecommunications and Information Administration (NTIA)* through this grant application will be performed and associated mapping data created. Key aspects of determining geographic areas in which broadband service is available, technology used to provide broadband services in those areas, spectrum used for the provision of wireless broadband services, broadband service speeds, customer cost for broadband service and availability of broadband services for public schools, libraries, hospitals, universities and all public buildings will be completed. Analysis for this project will be completed at an address level and final deliverables from this phase will be searchable by address. All data created will be shared with the NTIA and will be developed to best coordinate with adjoining states to aid in building the *National Broadband Map*.

In addition to NTIA's requirements, Kimball will also use U.S. Census 2000 data to identify demand-influencing factors including residential population, households, businesses, schools, hospitals and other demand points. Kimball will also detail the number of housing units, median income, educational attainment and racial characteristics within unserved areas.

Broadband assessment modeling will also occur in this project phase. The model created will aid the State on decision making with broadband planning and development by assessing supply/demand assessment, job creation/economic impact, cost assessment, demographic assessment and funding possibilities.

The highest cost to complete the data analysis phase will occur in year one with reduced costs occurring in years two through five. Limited travel will be required during this phase of the project. Kimball will need to purchase general office supplies and limited hardware/software/equipment during this phase of the project to carry out project tasks. The estimated breakdown of costs for this phase of the project over a five-year period is as follows.

Task	Year One	Year Two	Year Three	Year Four	Year Five
Data Analysis	\$250,000	\$50,000	\$50,000	\$50,000	\$50,000
Demand Mapping	\$25,000	\$10,000	\$10,000	\$10,000	\$10,000
Broadband Assessment Modeling	\$125,000	\$25,000	\$25,000	\$25,000	\$25,000
<b>Totals per Year</b>	<b>\$400,000</b>	<b>\$85,000</b>	<b>\$85,000</b>	<b>\$85,000</b>	<b>\$85,000</b>
<b>Total Phase Cost</b>	<b>\$740,000</b>				

**DATA MAINTENANCE: \$125,000**

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During this final phase, of the project the key task of maintaining the broadband mapping data will be implemented by Kimball with the State performing overall daily maintenance duties. During this project phase Kimball will develop an overall maintenance plan for the State. This maintenance plan will cover all aspects relating to the maintenance of the broadband mapping data including the data update process and staff and equipment needs that may exist. The plan will also include details on how the State will continue with the maintenance of their broadband mapping data beyond the five years covered in this project. Kimball will oversee the State's maintenance process throughout years two through five. Kimball will perform new provider surveys every six months to assure that the broadband mapping dataset remains updated and accurate. Information received back from these surveys will be formatted to work within the State's broadband mapping database. This updated data will then be provided to State staff to incorporate into the database. The interactive mapping Website will also be maintained throughout the five years of the project as it will remain a key element in receiving and sharing data amongst project stakeholders. Costs associated with the interactive mapping can be found in the data collection budget.

The highest cost to complete the data maintenance phase will occur in year one with reduced costs occurring in years two through five. Limited travel will be during this phase of the project regarding visits to the State for assistance with maintenance issues. Kimball will need to purchase general office supplies during this phase of the project to carry out project tasks. The estimated breakdown of costs for this phase of the project over a five-year period is as follows.

Task	Year One	Year Two	Year Three	Year Four	Year Five
Data Maintenance	\$75,000	\$10,000	\$10,000	\$10,000	\$20,000
<b>Totals per Year</b>	<b>\$75,000</b>	<b>\$10,000</b>	<b>\$10,000</b>	<b>\$10,000</b>	<b>\$20,000</b>
<b>Total Phase Cost</b>	<b>\$125,000</b>				

**TOTAL CONTRACTOR BUDGET: \$2,300,000**

Phase	Year One	Year Two	Year Three	Year Four	Year Five
Data Collection	\$325,000	\$120,000	\$135,000	\$120,000	\$135,000
Data Verification	\$300,000	\$75,000	\$75,000	\$75,000	\$75,000
Data Analysis	\$400,000	\$85,000	\$85,000	\$85,000	\$85,000
Data Maintenance	\$75,000	\$10,000	\$10,000	\$10,000	\$20,000
<b>Totals per Year</b>	<b>\$1,100,000</b>	<b>\$290,000</b>	<b>\$305,000</b>	<b>\$290,000</b>	<b>\$315,000</b>
<b>Total Project Cost</b>	<b>\$2,300,000</b>				

**PROGRAM BUDGET TOTAL: \$2,590,658**

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Type	Year One	Year Two	Year Three	Year Four	Year Five	Total
<b>Total Contractual</b>	<b>\$1,100,000</b>	<b>\$290,000</b>	<b>\$305,000</b>	<b>\$290,000</b>	<b>\$315,000</b>	<b>\$2,300,000</b>
<b>Total State</b>	<b>\$97,918</b>	<b>\$42,918</b>	<b>\$73,274</b>	<b>\$38,274</b>	<b>\$38,274</b>	<b>\$290,658</b>
<b>Total</b>	<b>\$1,197,918</b>	<b>\$332,918</b>	<b>\$378,274</b>	<b>\$328,274</b>	<b>\$353,274</b>	<b>\$2,590,658</b>

The above table does not include the \$5,000,000 in-kind Contribution by the State of West Virginia

**IN-KIND CONTRIBUTION: \$5,000,000**

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