Before the
DEPARTMENT OF COMMERCE
National Telecommunications and Information Administration
and the
DEPARTMENT OF AGRICULTURE
Rural Utilities Service

In the Matter of	)	
	)	
American Recovery and Reinvestment Act of 2009 Broadband Initiatives	)	Docket No. 090309298-9299-01
	)	
	)	

Comments of CostQuest Associates / LinkAMERICA Alliance

James Stegeman – CostQuest Associates
Christopher A. McClain – e-Copernicus
Greg L. Rohde – e-Copernicus
Jim Hines – CostQuest/The Enterprise Group
Mark Guttman – CostQuest Associates
Mike Wilson – CostQuest Associates
Dr. William Gillis – EFRsource
Dr. Matt Mitchell – EFRsource
Robert L. Martin – e-Copernicus
Carla A. Anderson – e-Copernicus

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Cincinnati, Ohio 45211

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Department of Agriculture

CostQuest Associates

and the LinkAMERICA Alliance

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Broadband Technology Opportunities Program

(BTOP)

Joint Request for Information and

Notice of Public Meetings

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Executive Summary

CostQuest Associates and the LinkAMERICA Alliance believe the advancement of (a) broadband deployment on the supply-side and (b) broadband-based applications on the demand-side are vital enablers to the economic opportunity and quality of life for all Americans. As such we stand in strong support of the Broadband Technology Opportunity Program (BTOP) advanced by this proceeding.

CostQuest Associates and the LinkAMERICA Alliance are experienced broadband mapping and assessment firms that encompass all key disciplines including but not limited to broadband mapping, technology deployment assessment, modeling of likely deployment costs, and the identification and assessment of demand-side broadband applications.

The American Recovery and Reinvestment Act (ARRA) offers an extraordinary opportunity to bring much needed reliable data on broadband availability, cost, and use to the national effort to connect all Americans to the 21st Century information economy.

Our input to this proceeding is grounded in two core beliefs. First is that while standardization of data and minimum data requirements are essential to the successful implementation of the mapping provisions of the ARRA, a cookie cutter approach to mapping is not sufficient to help states, localities and federal policy makers, service providers and consumers solve long standing challenges related to broadband deployment and use. Second is that the end-to-end process from granting awards to monitoring outcomes is best served by a comprehensive, consistent and economically rational analytical framework.

The implementation of ARRA must be structured to serve the national interest in standardization of data formats and basic data sets, but should also allow State and local leaders gain the information that they need to solve often highly localized issues.

Mapping grants should be State[1] oriented. States should have the discretion to apply directly for mapping funds or to permit vendors or organizations to apply to on behalf of a state mapping project. By orienting mapping grants towards States, the NTIA can ensure that *local leadership* can deal with *local priorities* in ways that make sense in those *local communities*.

To be fully useful, broadband mapping should not be limited to an inventory of availability. In addition to a host of supply-side issues, important demand-side characteristics must be addressed as well. Topography and environmental factors, radio signal propagation, cost, and demographics are all relevant to seamlessly address the broadband decision making.

With standardization, State broadband maps should easily assemble into the national broadband map that NTIA is charged with developing under the ARRA. The core data set will allow federal decision makers to have access to comparable data regardless of a state's mapping vendor or data gathering technique.

[1] For purposes of this filing, the term "States" is intended to extend fully to the District of Columbia, territories, possessions and similar State-like governments which are part of the United States of America.

The results of the mapping projects should be sufficiently accurate and provide appropriate data to be used by federal agencies. For example, the Rural Utilities Service (RUS) needs a reliable source of data for metrics the Congress added to broadband loan program's eligibility requirements. The data should create a rebuttable presumption of accuracy for agencies and applicants. It should also provide policy-makers information that can inform decisions related to the affordability of service, the sufficiency of universal service support and the objective way to measure results of policy initiatives.

NTIA funding should support Broadband Mapping and the adoption of a Broadband Assessment Model (BAM).

Broadband Mapping primarily focuses on the map's ability to serve multiple related needs. Broadband maps funded by NTIA should:

- clearly represent un-served and underserved areas (via display techniques that recognize technology-specific coverage characteristics)
- support consumer's understanding of available providers and available speeds and prices,
- support a host of policy related overlays (poverty, education, employment, etc.),
- support downstream economic modeling (required by public funding and related commercial issues),
- support the ability to consume or be consumed by other data processes or mapping applications.

The Broadband Assessment Model is a recommended analytical framework (and discipline) designed to serve both (a) public policy considerations (e.g., the prioritization of alternative programs) and (b) commercial sustainability of alternative solutions. Key capabilities should:

- establish a minimum data set that will enable the assessment of an initiative's Net Present Value (NPV) (with and/or without grant support)
- support the prioritization of competing alternatives
- support the measurement and assessment of program results over time

Introduction

CostQuest Associates and the LinkAMERICA Alliance[2] are pleased to comment on the above mentioned proceeding sponsored by the Department of Commerce and the Department of Agriculture (the Departments). We stand in strong support of the mandate given to the Departments' to "…*establish the Broadband Technology Opportunities Program (BTOP). The purposes of the BTOP include accelerating broadband deployment in unserved and underserved areas and ensuring that strategic institutions that are likely to create jobs or provide significant public benefits have broadband connections.*" Given our experience in the communications industry across the US (and international markets) we believe the advancement of (a) broadband deployment on the supply-side and (b) broadband-based applications on the demand-side are vital enablers to the economic opportunity and quality of life for ALL Americans.

The American Recovery and Reinvestment Act (ARRA) offers an extraordinary opportunity to bring much needed reliable data on broadband availability, cost, and use to the national effort to connect all Americans to the 21st Century information economy.

The implementation of ARRA must be structured to serve the national interest in standardization of data formats and basic data sets, but should also allow State and local leaders gain the information that they need to solve often highly localized issues.

Mapping grants should be State[3] oriented. States should have the discretion to apply directly for mapping funds or to permit vendors or organizations to apply to on behalf of a state mapping project. By orienting mapping grants towards States, the NTIA can ensure that *local leadership* can deal with *local priorities* in ways that make sense in those *local communities*.

America is a diverse and complex nation. While we can unite behind the national idea of improving broadband deployment and adoption, the strategies to achieve the national broadband goal are highly localized. Cookie-cutter solutions and a selective / biased analysis will not help the United States of America transform its economy through the deployment, adoption and use of broadband.

The mapping and data gathering work sponsored by ARRA funding must meet local needs and inform and motivate local actors including those who build, service, manage, use, desire, finance and are beneficiaries of modern broadband infrastructure. In administering the mapping provisions of the ARRA, funds should be oriented toward State-based projects. Specifically, NTIA and RUS should allow States to apply directly or allow private entities to apply either in conjunction with a State, with the endorsement of a particular State or on behalf of a State mapping project. One single, nationwide award for broadband mapping or awards without a State's input and direction should not be made. Awards should be made on a state-by-state basis.

[2] The LinkAmerica Alliance is made up of CostQuest Associates, EFRsource, e-Copernicus, and Kimball Corp..

[3] For purposes of this filing, the term "States" is intended to extend fully to the District of Columbia, territories, possessions and similar State-like governments which are part of the United States of America.

The fifteen (15) NTIA and five (5) RUS questions identified in this proceeding are far reaching. These comments focus on two cornerstone issues. Mapping as highlighted in NTIA question No. 8 and the concept of a Broadband Assessment Model (BAM) focused largely on NTIA question No. 2. The assessment approach and discipline (model) we propose also supports a number of related questions raised throughout this proceeding.

Broadband Mapping

NTIA Issue No. 8

Map Uses (Item 8.a.)

The Broadband Map should provide NTIA, RUS and other federal agencies, States, local policy makers, users and service providers an objective source of information about the availability of broadband and the use of broadband. It should provide a clear illustration of coverage and the gaps (both in underserved and unserved areas) that exist with respect to broadband service.

A map is of minimal value unless it is accurate and integrates well with other data. It needs to effectively inform a myriad of downstream decisions. The map must both inform national policy and be useful to local decision makers from individual users to investors to government entities. While there needs to be a standard data set, a common format and derivation approach and an ability to interact with data produced by multiple parties, broadband mapping must fundamentally address local issues and local barriers to deployment, adoption and use. To be an informative tool on the national level and a motivating tool on the local level, State mapping projects need to be designed from the ground up. Successful mapping projects are also an integral part of developing an overall broadband supply and demand strategy.

Mapping projects should combine supply and demand facts with localized information such as service mapping, costs of deployment, demographics, topography, radio signal propagation and spectrum utilization and other pertinent information to inform policy and investment decisions.

To meet these needs the map should have the following minimum capabilities including the:

- Ability to clearly visualize un-served and underserved areas
- Ability to support consumers' understanding of providers in their area and the speeds available at what price
- Ability to support public policy-oriented overlays (e.g., poverty, employment, education levels, and other demographic layers)
- Ability to support downstream economic cost modeling (for both policy and commercial purposes)
- Ability to support downstream econometric demand-side modeling
- Ability to consume or be consumed by other data sources or mapping applications
- Include some level of data assurance measures including assessment of availability and speeds

Mapping data cannot exist in isolation. The data must be capable of being shared, enhanced, or melded with other information. The data must be of sufficient accuracy and currency that agencies can rely on the data to administer their broadband related programs.

Specific Information and Different Info for Different Users (Item 8.b.)

ARRA supported mapping projects should produce a map that contains information required to support a comprehensive analysis to assist policy makers, investors and consumers in understanding the broadband marketplace under development. NTIA needs weigh the need for detailed mapping with the recognition that the data requests should not unduly burden providers in their response. With that said, the map should include at least the following data:

- **Broadband coverage -** Broadband coverage by provider, by speed, and by technology makes up the critical baseline of mapping information. There must be a clear understanding on how that coverage is derived. Is the coverage a function of customers now receiving service or is the coverage a function of where infrastructure exists that can support the service. Standards should be provides so that vendors who implement mapping projects and the providers who provide the coverage information understand how coverage should be inferred from imperfect data. For example, if a cable provider only provides the location of their fiber nodes, what distance should the mapping vendor use to construct the coverage map. Do we want Vendor A using 12,000 feet and Vendor B using 6,000 feet? As an added issue, how do mapping vendors capture and display that the coverage area is based on the known shape of the area served by the node versus a simple drawing of a fixed distance circle around the service node. In the end, NTIA needs to assure users of the Broadband maps that information from different vendors in different states has the same underlying standards so that proper conclusions can be drawn.
- **Speed / Service Attributes -** A minimum and consistent definition (or a smaller set of definitions) of broadband service attributes should be maintained across all Federal agencies. While state projects may include and capture additional measurements, the minimum standard captures pertinent information for national analysis and comparison. For example, speed tiers provide a discrete measurement system and should be designed to identify end user capability[4]. One key issue in establishing speed standards is of course is the time and method of measurement. The NTIA should require all grantees to at least provide speed data based on a standardized measurement at a standardized time or times. The measurement should also capture both standardized up and down speeds. In some commentary, definitions of broadband also include requirements as to a Quality of Service—is the bandwidth burstable or sustained, are there bandwidth caps, etc. The minimum standards should, at least, make all of these service attributes comparable to make inter-state comparisons accurate.
- **Technologies -** To be fair and open to all public policy and commercial interests, broadband deployment initiatives must encompass all relevant technologies[5].

[4] For example, at 25Mb and above video services can be provided. Speeds between 10 and 25 provide support for streaming video and other bandwidth intensive applications. Speeds between 6 and 10 are also capable of supporting video conferencing. At the lower tier, speeds below 6Mb are effective for more today's straightforward applications but will increasingly limit applications coming on line in the future.

[5] Relevant technologies include but are not limited to traditional telecom/wireline, cable, WISP (both WIMAX and WiFi), mobile wireless, broadband over power, fiber to the home, etc.

- **Infrastructure Elements -** Maps should include all major components of broadband infrastructure[6] (e.g., fiber, towers, etc.). Key infrastructure utilized for public safety programs must also be included. To be sensitive to critical infrastructure needs, mechanisms should be established to get infrastructure information into the policy debate but protect that information where there exists security concerns.
- **Demand and Demographic Data -** This would include not only residential and business locations but also a host of public sector elements including schools, libraries, hospitals/clinics, doctor offices, government locations, public computer centers, etc. In terms of demographic information the map should facilitate a variety of census demographics (income, age, education levels, etc.) and support a robust understanding of demand-side issues. Keep in mind that many of these mapping layers may already be available. We do not recommend the recreation of the data. Rather, as noted later, we recommend that the Mapping layers be made available for public consumption so that users can determine the appropriate information for each specific need.
- **Price -** Retail broadband price is a driver in the pace and scale of any resulting growth in demand. As such it is an important component to a broadband map and the assessment it supports.
- **Coverage Representation –** As there are a number of different technologies which can supply broadband access, there are a number of different ways in which coverage can be portrayed. This could range from an assumption which covers a ZIP Code area[7] if a provider has customers in that ZIP code to deriving coverage maps based upon RF propagation studies. The point is that coverage representation, today, ranges from simple circles on a map, to ZIP code areas, to covered road segments—each of these representations may or may not be more fair to an underlying broadband technology. To have comparability across each of these coverage representations, there need to be consistent methods for dealing with how coverage data are manipulated and displayed.
- **Deployment Costs -** Projected costs to augment service are also critical to the decisions at hand. Understanding where gaps in broadband exist is only the starting point. To act on the gaps (with commercial confidence) and to understand the funding requirements (from a public policy perspective) requires one to know the likely costs to deploy[8].

[6] Many times a rural provider will have the capacity to provide broadband 'last mile' access but not have sufficient information on how the middle mile / backhaul can be acquired. Knowing where the "on-ramps" to the internet exist provides important insight in the relevant commercial decisions at hand.

[7] The notion of ZIP code area is convenient but it is not necessarily meaningful as ZIP codes represent a point, a linear section of a road or number of roads. ZIP codes may be administratively convenient but they are not always representative over what we may presume them to be.

[8] CostQuest has the market's leading loop cost model; CostPro. CostPro has been used to project costs for landline telco (including fiber to the home), cable, fixed wireless, and mobility and is an excellent example of a tool that is available to help policy makers and private industry quickly assemble the business case to determine if funding is needed – and how much. CostPro is summarized in Appendix A.

Figure 1-Wireline Cost Variance in Unserved Areas By Census Block Group, near Cheyenne Wyoming (basemap image, Google Earth Professional)

- **USF and current RUS support –** To understand the full economic picture of an area one needs to understand the various sources of funding used and available in that area. For example the entities that participate in federal or state support programs may have obligations attached to that participation. Also, the presence of an RUS financed service provider may, under current rules affect the ability of another entity to access RUS financing for the same area. It will also be useful to know the level of utilization of low income support programs, particularly when compared to available income data. More broadly, to understand the full economic picture of an area and to optimize the benefits of the ARRA funds, one needs to understand all the various sources of funding available and how those play into the assessment of the level of impairment for an area and the evaluation of opportunities to advance broadband deployment and use.

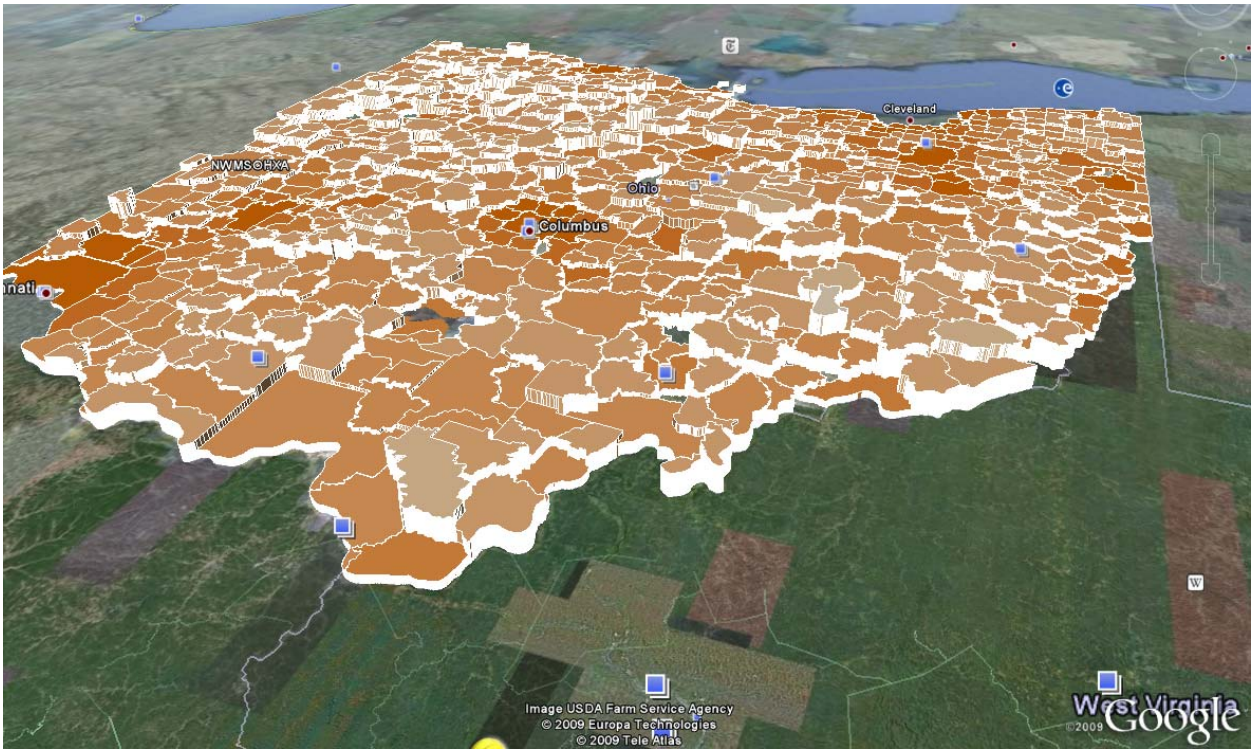

Figure 2--Relative Elevation representing Fed USF Support Per Line Less Estimated Cost Per Line (basemap imagery Google Professional)

Two final points on the issue of what the broadband maps should include or accommodate would be as follows. In terms of mapping, it might be that these issues are best inventoried / displayed as auxiliary information by county or smaller area since they are not driven by geography per se.

- Take Rates / Penetration – Current demand needs to be understood in order to improve upon take rates in areas where demand is low.
- Reported Barriers to Access – Site issues, right-of-way, deployment costs, O&M costs, geography/topography and other issues need to be identified.

Additional information regarding certain data distinctions:

- Distinctions between technologies: The broadband map should delineate between the availability by technology type. Each technology may have unique attributes that appeal to a consumer. As such, the greater the availability of information will allow consumers and policy makers to make more informed decisions.

- Distinctions between availability and adoption: The twin goals of the ARRA broadband provisions are to encourage both broadband deployment and adoption. Supply information is not enough. By providing both broadband availability and broadband adoption, users of the data can investigate all sides of the broadband opportunity.

- Distinctions between residential, business and government availability: To the extent feasible, the assessment should distinguish between residential and commercial/business/government availability and adoption. While residential access is key to the lives of all Americans, the economic health of the country is dependent on the viability of businesses.

- Relationship with key community service entities: The broadband map should include some detail on the availability of broadband services for public safety agencies and first responders that is provided by commercial providers as well as State or local operated communications systems. Other important institutions that serve a community's educational and health care needs should be included in the assessment.

The FCC, RUS and NTIA should work closely together to ensure to the greatest extent practicable that the minimum federal mapping requirements produce metrics which are required by current federal programs and federal universal service programs. For example the 2008 Farm bill introduced new terms and metrics to the RUS broadband loan program relevant to program eligibility such as "incumbent service provider;" and a new definition of "rural." The ARRA will introduce new terms for "served," "unserved" and all three agencies have to define "broadband." The ARRA mapping initiative should at a minimum produce data and uses and nomenclature that inform these federal programs. Every effort should be given to give common meaning to common terms.

Level of Geographic Display / Granularity (Item 8.c.)

In terms of the practical issues of broadband mapping, there is a predictable need to weigh the concerns of the commercial interests of (a) providers wishing to protect their proprietary information, (b) certain security considerations for protecting critical infrastructure and (c) the public policy information which the BTOP seeks to display on a map. Experience suggests that it will be impossible to reconcile all of these competing interests into one methodology that can satisfy everyone absolutely every time.

For this reason we outline, at a high level, our suggested method of developing and displaying data on broadband maps. We do not presume to suggest a perfect methodology, since most likely the maps will be based on imperfect data. Rather our goal is to suggest a methodology that has a scientific basis following well known methods, tailored to the local data needs of stakeholders, that will smooth out known imperfections in the data, and that will be flexible to the NTIA/RUS goals and timeline.

At the end of the day, data must be reliable, open to use, sufficient to support sound decision making and verifiable to support auditing intentions. As important, the process of collecting data must be transparent, fair and free from bias (as is true with the accompanying analysis). To the greatest extent practicable nomenclature, measurement methods and basic data sets and format should be standard among all NTIA mapping grantees. However, State-centric projects should be permitted to collect additional data and provide for alternate display to suit local needs. Effectively, all non-proprietary data collected under NTIA grants should be capable of being assembled into a national map as required by the ARRA and available to the public. Finally, proprietary data should be offered the full and complete protection warranted, but should be accessible by mapping vendors to allow them to create

derivative works that can be displayed which safely protect the interest of the data provide but while allowing users of the derivative data to make informed decisions.

Broadband Map Data Development (Item 8.d)

We would suggest implementing a geographic methodology which is anchored in four points

Sampling - First, whatever objective definition of broadband is used, the NTIA must understand that how it will get measured is going to be a 'sample' of the world. When we are trying to measure broadband presence in some area we will likely need to obtain sample measurements of that area or imply coverage information from providers into a sampled region.

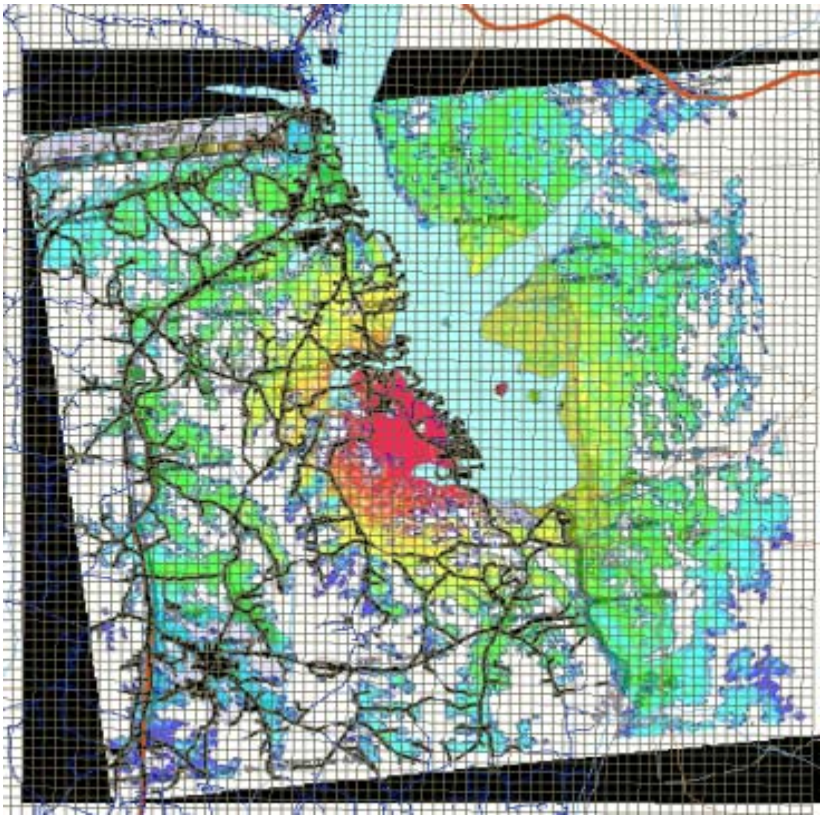

Figure 3--Wireless Internet Coverage Within a 1/2 km Grid used to determine covered road segments

In the timeline provided and limitations on resources it will be impossible to Census all locations. This means that a sampling approach will be used and will necessarily have Error. This is not a bad thing; it is simply the recognition that we don't have unlimited resources to collect perfect data. Knowing there is Error in a process, documenting it and having it stated objectively, seems to be better than where we are today—we can now show coverage but we seem to have little measure of comparability of how that coverage was generated or what the Error in that process involves.[9]

[9] Even when you do have exact coverage information, you are still working with a sample of the real world at a given time. For example a wireless provider may have RF studies for their line of sight technology good to 10m; they may also have a non line of sight offering where

Geographic sciences understand how to use sampling, understand how to convey error and understand how to develop fair maps based upon sampling. We simply need to need to understand how to incorporate it into the Broadband maps. We also point out as a potential reference that sampling methods are used to support a myriad of analyses for large scale land use / land change phenomenon; to which broadband mapping is quite comparable.

Census Geography - Second, whatever coverage determination is made, that coverage determination needs to be compatible with the fundamental geographies related to what the broadband coverage will be used for. In other words, there needs to be a standard geographic area to make all national broadband mapping output fold into the fundamental geographic units of the country. Our recommendation would be that whatever broadband coverage geographies are derived—these geographies need to fold into a US Census geography. This would mean that if an organization is sampling broadband coverage within 1 km area—these 1 km areas need to roll into an agreed to vintage of US Census Geography.

Our suggestion is to make the Census Block the standard unit of geography and to make sure that areas sampled are smaller than a Census Block. Although it is possible to take a very broad survey and apply that coverage into Census Blocks, we believe that would be inappropriate. Rather, just as the US Census builds from Census Block or Census Block Group up—the broadband map should follow a common metaphor.

There will be many detractors to the use of Census Geographies—but the fundamental truth is those geographic areas are used to produce demographics, report economic statistics and allocate funding on a variety of fronts. They may be imperfect, but they are a fact of life and they are freely available…and we suggest quite relevant to and appropriate for broadband mapping.

coverage is simply a radius from their tower. Is the coverage you display the 1ft RF, the line of sight radius, the 10m RF study, a combination? What the true coverage actually is would only be known by standing at the spot you want covered and measuring it—and then the coverage is only known at that point in time. These are not simple questions

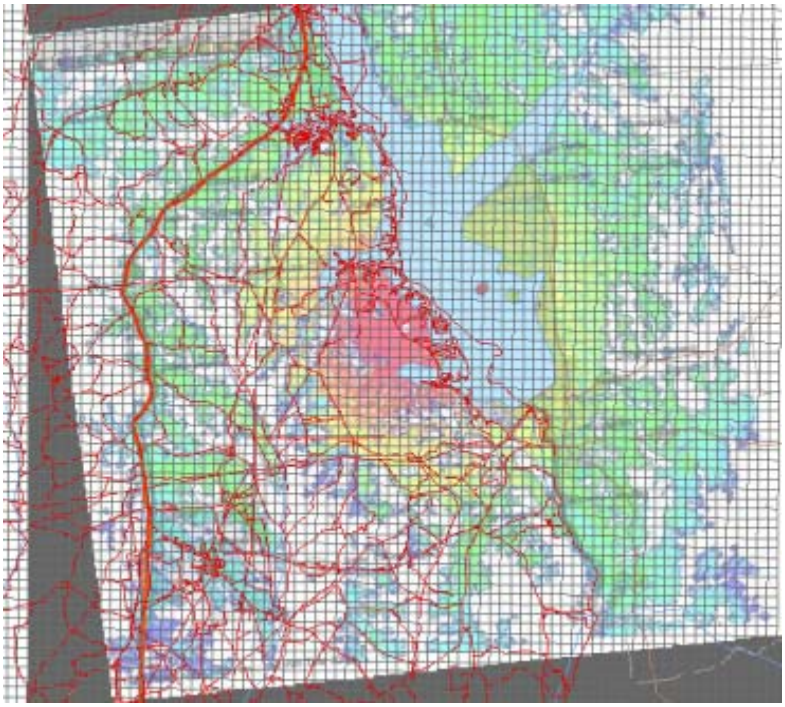

Figure 4--Same Area Showing Census Block Boundaries (red) with sampling grid

Road Segments - Third in terms of public map representations, our suggestion is that broadband coverage needs to be conveyed in terms of roads. Roads reflect where we live and how we travel; we believe that using roads give map viewers the context from which they can understand how the broadband coverage impacts their lives. A road or a portion of a road are meaningful to our life experiences more so than are arbitrary coverage polygons like circles or even municipal boundaries. Roads –as paths—represent where and how much infrastructure flows and are therefore suited to the modeling of deployment costs.

As the US Census maintains Census Blocks it also maintains those roads and their membership in particular Census Blocks. So it is neat and possible to transfer understanding of broadband coverage at a Census Block level to road coverage.

Separating how the coverage data is developed from how the coverage data is displayed also provides a second possibility. Insofar as a provider may wish to mask their coverage data, using a road visualization method will allow the broadband covered areas to be further masked to protect proprietary information. Again, this will introduce error in the visualized map, but the error may be the trade off to get the data necessary to achieve the task at hand.

Transparency - Finally, and perhaps most critically, as ARRA views broadband as an enabler of social welfare it is critical that the national broadband map be entirely in the public domain and open for review. Specifically this means that

1. Any information shown on a public map should be available to the public for download and

review

2. As information is gathered and mapped into Census Blocks, there must be information about the number of providers supplying data and how many suppliers provided actual information, how many suppliers required masking for public disclosure and how many providers were assigned to this Census Block based upon third party data sources.[10]

The mapping project should not unwittingly create incentives for service providers to be less accurate with their data, especially in policy decisions flow from that data. Disclosure to the user of the level of accuracy is critical.

While data collection should be designed to produce metrics which policymakers can reasonably rely upon, agencies using this data to make eligibility determinations or funding decisions should provide those affected by the data results an opportunity to rebut the presumption of accuracy. There are cases of previous mapping endeavors which produced maps which projected service where it was demonstrably unavailable. When eligibility or funding decisions hinge on metrics such as the number of incumbent service providers offering a level of broadband service to a geographic area, the applicant should have a fair opportunity to demonstrate the inaccuracy of the map.

To the extent federal agencies have data that is non-proprietary or can be used in a manner which does not threaten proprietary interests of program participants, that data should be made available to state based mapping projects. For example, RUS has in the past based funding decisions based on the service territory of existing RUS borrowers. Those service territories should be made available to mapping projects.

Other factors that need to be considered in the development of broadband maps include the following:

- **Federal/International Standards for data sharing and metadata** production should be honored. We would reference the Federal Geographic Data Committee.
- **Assessment of licensed spectrum** use for licensed bands for mobile and fixed broadband service. This assessment should be comprehensive and provide enough detail to accurately identify coverage gaps in licensed spectrum.
- **Assessment of availability and adoption** of broadband (landline as well as mobile wireless) for public safety, health care, and educational entities in each state.

Broadband Mapping Model Programs (Item 8.e.)

We would cite the **ConnectingALABAMA** program currently underway in the Alabama Broadband Initiative (ALBI) as a good example of how a high caliber and comprehensive mapping initiative should be designed and executed. The key drivers to the ALBI program include the ability to link maps to relevant demand-side issues, a reliance on existing state / regional planning processes and a grass roots / local strategy development / execution program. Another important element of the work program is the design and execution of provider NDAs. Reference

[10] We are not advocating disclosure of who is providing information rather we are advocating for information accessible which gives someone context about how the data was gathered.

www.connectingalabama.gov for additional introductory information.

Minimum Grant Information Standards (Item 8.f.)

To echo points made above we suggest the items below serve as the minimum elements of data received by the State for each successful grantee organization. In line with our earlier comments we believe that each grantee must provide the information the following information with the Census Block level of accuracy.

- Broadband coverage – by carriers/providers
- Speed
- Technologies
- Infrastructure elements (presence of Fiber cable, Towers, Internet Exchange or Peering Points, and key infrastructure with appropriate concern for public safety)
- Demand / demographic data
- Price
- USF and current RUS support / funding
- Basis of coverage area (simply arc, viewshed, etc..)

Further we suggest a minimum required analysis for each studied area that includes the following.

- Deployment Costs
- Current Support (USF, State Funds, Municipal Support)
- Take Rates / Penetration
- Reported Barriers to Access
- Demographics, if more accurate than current federal data.

Technical Specs for Roll Up to a Searchable National Database (Item 8.g.)

Requiring submission of information to NTIA at a Census Block level will support at least a common geographic format which can be built into a searchable database. We have outlined those data attributes which are important for searching attributes—but these attributes must be weighed against provider confidentiality concerns.

With respect to important technical attributes of the geographies submitted, we suggest the following

- Common file formats should be used—SHP files or KML
- Data should be in geographic coordinates (WGS84)
- Data should be clearly described in terms of production. Common problems involving error, coverage assumptions and production methods must be communicated with metadata following Federal or ISO standards
- Data that requires protection should be indicated.
- Rely on standards based technologies for data sharing; Once data are produced, they should be distributed using a common stack of open standards endorsed by a neutral body such as the Open

Geospatial Consortium (OGC).

- Temporal status for sample data and underlying geography should be captured.

We also note that some technology providers can perform data searches directly from geographic file formats.[11]

Other conditions attached to statewide inventory grants. (Item 8.h.)

Other conditions need to address the following issues.

- Non Disclosure Agreements (NDA) – Data should be obtained from providers in order to present a realistic and informative view of an area's broadband inventory and service areas without compromising the locations of key infrastructure with concern for public safety, and without compromising the proprietary business data of service providers. NDA's should include a "Data Classification Scheme" showing the potential uses of data and data derivatives by data type and output type.
- Technology Agnostic – An inventory must be exhaustive. All terrestrial broadband technologies and carrier classes / types should be included. Inventory efforts should not be allowed to be "sponsored" or financially supported directly by service providers or their associations.
- Availability and adoption for public safety, educational, and health care entities in the State should be required for every grant awarded for broadband mapping. In addition, each application should be able to provide the most comprehensive assessment of wireless broadband services in licensed spectrum bands and identify the coverage gaps.

Information key to a comprehensive nationwide map (Item 8.i.)

Information important to a nationwide comprehensive map includes the following:

- The minimum layers as identified above. Our recommendation is to make the broadband deployment information specific to broadband issues and then let downstream users apply their specific data sets to this broadband data. For example if you look at the National Map it consumes data from a variety of sources but it only shows the information you, as a user want. And again, our suggestion would be to keep the broadband data displayed in a format consistent with a viewer like the National Map so that a user can build the analysis and download information in the way that they want to.
- Standards for determining coverage from the variety or assumed sources and the variety of quality. As noted earlier, how is coverage to be determined from the location of a fiber node, a tower, etc.. And once collected and created, how should the user of the data be informed about the quality of coverage shown.
- Assessment of mobile and fixed wireless services in licensed spectrum bands for both broadband as well as CMRS services. In addition, each State broadband map should assess the availability

[11] From Google, See: http://googlemapsapi.blogspot.com/2007/02/search-for-kml-in-google-earth.html. There are also possibilities to use geographic search engines or a variety of online services from GIS vendors.

and adoption of broadband services for public safety, educational and health care entities.

- The resulting map should be of sufficient detail and precision that federal agencies like the RUS can rely on the data provided to establish competitive and unserved metrics part of the eligibility requirements of the 2008 broadband loan program amendments. The NTIA should require a standardization of data sets and data format so that all maps developed by states, regardless of vendor, can be assembled into the national map NTIA is required to develop.

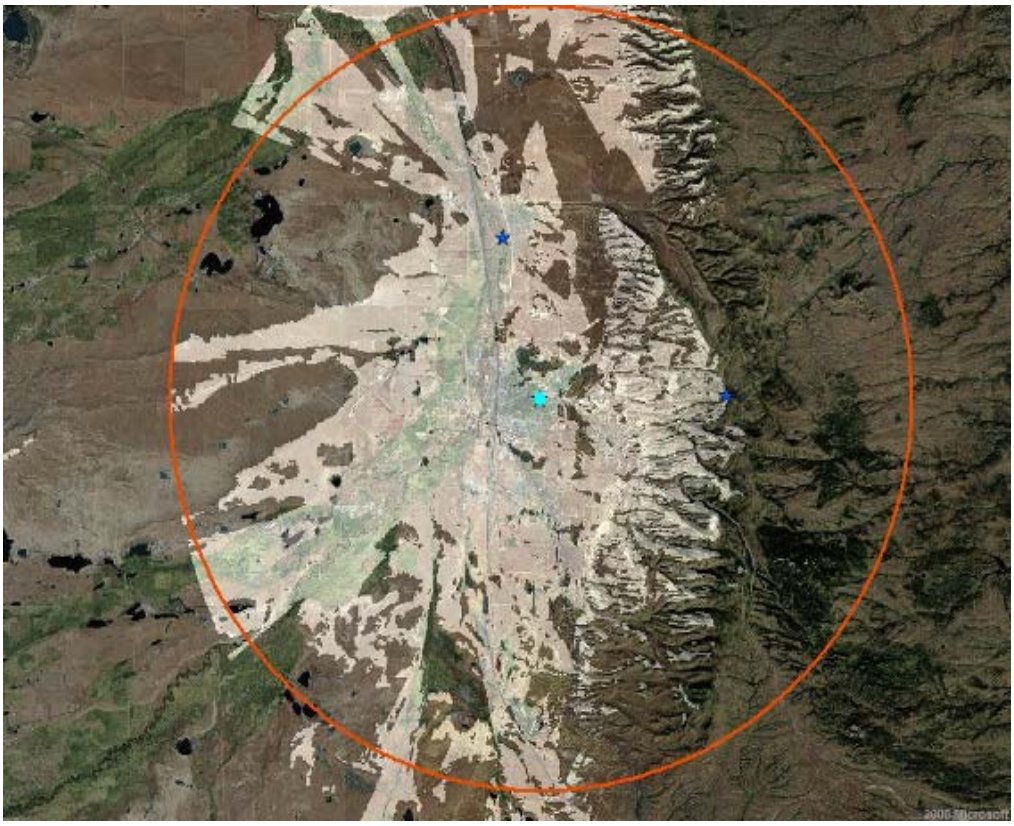

Figure 5--On the one hand wireless coverage can be derived through a viewshed or it can be a geographic circle? Which is more representative and accurate to the program goals?

NTIA/RUS / FCC Coordination (Item 8. j.)

The FCC, RUS and NTIA should work closely together to ensure to the greatest extent practicable that the minimum federal mapping requirements produce metrics which are required by current federal programs and federal universal service programs. Every effort should be given to give common meaning to common terms.

We suggest the NTIA and RUS work to ensure consistent and transparent standards, consistent definitions, and consistent assessment criteria in their consideration of grants made under the BTOP. Further, the NTIA should establish the criteria for assessing broadband availability and use based on the policy goals of the Administration. The FCC has unique expertise as a regulator and should be consulted by NTIA in establishing the criteria.

Broadband Assessment Model

NTIA Issue No. 2.

Role of States and Project Assurance

Separate from the requirements of the broadband mapping provisions, we offer comments on a tool which can both complement a mapping project and be used to evaluate project sustainability, assess needed levels of support and help the states and federal government prioritize grant projects based on a number of variable inputs. Members of the LinkAmerica Team (CostQuest in particular) have extensive experience building, operating and evaluating economic models to assist policymakers and investors evaluate and analyze the impact of proposed telecommunications policy. Our team welcomes the opportunity to work with States and the federal government to develop a model for ARRA grants.

In considering the role of the States NTIA/RUS should look for ways that the states and Federal agencies can help ensure that ARRA funded projects are well executed and produce worthwhile measureable results. In this regard, we suggest the use of an unbiased evaluation methodology that can help assure intended benefits are clear (at the beginning) and realized (at the end). This notion supports the principle of "merit based decision-making" which is one of the principles of stimulus implementation set forth by the Obama administration. This was highlighted in the Administration's memorandum guiding implementation of the ARRA[12].

"In implementing the Recovery Act, we have undertaken unprecedented efforts to ensure the responsible distribution of funds for the Act's purposes and to provide public transparency and accountability of expenditures. We must not allow Recovery Act funds to be distributed on the basis of factors other than the merits of proposed projects…"

According to the Obama Administration memorandum, these ARRA projects need to deliver programmatic results, achieve economic stimulus, and achieve long-term public benefits. In order to rank projects in a manner that supports these principles, the NTIA and RUS will need to develop and adopt a set of scoring criteria that can be used to differentiate project proposals. The ARRA also offers states the opportunity to comment on the state's priorities and the allocation of funds within the state.

The NTIA, RUS and States should consider using a Broadband Assessment Model (BAM) to evaluate competing projects and priorities. The BAM is simply an analytical approach and discipline that links to the mapping output and utilizes available data to create a set of standard meaningful measurements for use in evaluating applications.

It is our suggestion that the goal of advancing broadband deployment and utilization can be aided if the NTIA and RUS develop and adopt a minimum set of recommended scoring attributes that can be tied into an overall Broadband Assessment Model (BAM). Given the timeframe of the ARRA,

[12] See http://www.govexec.com/pdfs/032009e1.pdf

we are not suggesting the creation of a complex computer application. Rather, we suggest the BAM as simply an analytical framework that parties could use to pull in key attributes from the mapping exercise and related activities and create a set of standard meaningful measures for use in scoring and ranking proposals

In addition, the BAM can establish a minimum data set that will support important implementation decisions as ARRA funded initiatives are executed in the field.

The BAM can be designed to capture the expected net present value (NPV) of the build out in an unserved / underserved area as a key indicator of the viability of broadband in an area. This if akin to the recent FCC TRO modeling in which competing carriers were required to demonstrate they were impaired (inability to make a profit) without access to the incumbent carriers' network elements.

The key inputs into this any broadband business case will be the economic cost to build out broadband, the expected take rates and resulting end-user revenue, and any other sources of federal and state funding (USF, RUS loans, etc.). If the NPV is positive, it would seem to imply that the build out will occur if BTOP funding is made available or not, albeit the building may occur sooner with the funding. If the NPV is negative, it facilitates the further evaluation of funding required in an area.

Quite simply the BAM analytical approach could (a) determine if the build would not have occurred otherwise, (b) determine the requisite funding needed from BTOP and the funding the provider should kick in and (c) maximize the benefit of BTOP by not overfunding any particular area.

Also, as with any traditional business case, the resulting BAM NPV will be based on a number of assumptions (level of demand, amount of investment required, retail price structures, relevant cost of capital, etc.). As such, a range for the NPV should be developed and used in the analysis to capture the known variability of future results.

The BAM could also consider the level of demand broken out by the various types: residential, business, schools, libraries, etc. Required funding per unit of demand would provide important insight in prioritizing competing interests. In addition to the financial measures, the BAM could summarize key attributes of an area such as rurality, poverty, or overall demand. As such, all key drivers of scoring could be identified and collected.

Establishing Selection Criteria

The BAM approach is also relevant to NTIA Item No. 4. (Establishing Selection Criteria) in that it provides an excellent approach to assist the agency in making an assessment of the long-term feasibility of the investment and it directly facilitates the prioritization of BTOP proposals. In addition, we recommend that the BAM derived NPV be used as a key factor in determining whether proposals will encourage sustainable adoption of broadband service.

Financial Contributions by Applicants

Finally regarding NTIA Item 9 and as noted above the BAM approach can provide key insight into the consideration of financial contributions required and if the proposal would not have been implemented without Federal assistance.

Other Comments

We close our comments with observations relative to NTIA Items No. 6, No. 7 and No. 14 and RUS Item 1 as outlined below.

NTIA Item 6

Grants for Expanding Public Computer Center Capacity: The Recovery Act directs that not less than $200,000,000 of the BTOP shall be awarded for grants that expand public computer center capacity, including at community colleges and public libraries. To this issue specifically, the consideration of public computer center capacity should be brought purposefully into the mapping component of the BTOP to help identify centers in the areas that need this assistance most.

In terms of additional institutions that should be considered, we suggest that eligibility be extended to non-profit and public re-granting programs for the purposes of community technology adoption programs reaching vulnerable populations. We further encourage support for coalitions and networks of organizations that help aggregate and disseminate best practices in broadband deployment and adoption, promote quality evaluation methods and data collection, provide community capacity building training, and foster partnerships and research on barriers to adoption.

NTIA Item 7

Grants for Innovative Programs to Encourage Sustainable Adoption of Broadband Service: The Recovery Act directs that not less than $250,000,000 of the BTOP shall be awarded for grants for innovative programs to encourage sustainable adoption of broadband services.

As it relates to this item and NTIA Item 4 as well, in establishing criteria for grant awards we suggest In terms of selection criteria, funded projects should demonstrate, as an outcome, the increased digital literacy among un-served and underserved populations.

Regarding selection criteria we suggest the following:

- Give priority to projects that address affordability, especially for families for whom the cost of broadband is likely to be a barrier to obtaining service.
- Set forth broad criteria for states to use in reviewing and ranking applications, while allowing states the flexibility to factor in specific factors reflecting state and local conditions.
- Support state advisory groups to assist in review and ranking. These state advisory groups should be composed of a broad group of stakeholders with expertise in broadband deployment and adoption, including barriers to adoption, to include, at a minimum, representatives from community technology organizations, state government, technology industry, telecommunications providers, K-12 and higher education institutions, public health institutions, local and regional government, the justice system and legal field, and community economic development entities.

Further we suggest the BTOP program allow eligible entities to include new types of partnerships between public, non-profit and for-profit entities either to provide broadband infrastructure or to stimulate or aggregate demand for services. Such partnerships may be to create leverage and linkages

between different infrastructure providers or demand-side entities to target certain un-served and underserved areas better, or offer higher speeds or more services or greater affordability in existing areas.

NTIA Item No 14.

Monitoring the success of programs funded via the BTOP program should be purposefully anchored in the data submitted for the grant in the first place. Grant recipients should be required to submit periodic reports updating both their broadband service maps and their BAM forecasts. An analysis over time focused on how coverage has changed (supply-side) and how residential and business subscriber counts have increased (demand-side) will provide key benchmarks.

ARRA financed infrastructure should be accurately mapped and entered into the State broadband mapping data base to demonstrate a before and after impact of federal investment and to ensure that broadband maps remain current, relevant and accurate

RUS Item No 1.

Simplicity and speed will be critical to meet the job and infrastructure creation goals of the ARRA. The BAM approach provides the RUS and NTIA a fact-based discipline in evaluating the sustainability and grant levels required to complete and sustain the project. More specifically, the BAM approach facilitates an analysis of the mix of potential low interest loans and grants that could be provided toward any particular proposal. These input factors can be balanced to arrive at a positive NPV and thus help ensure funding options are appropriately aligned within any given grant.

Conclusion

CostQuest and LinkAmerica are committed to the national mission of accelerating broadband deployment, adoption and use. We are acutely aware from work on supply, demand and mapping projects that achieving the national goal will require diverse, innovative and customized local actions. The ARRA mapping program needs to be designed to meet both national and local means.

The success of ARRA broadband investments can be enhanced if evaluators and applicants have a clear understanding of the scoring criteria and the way projects will be ranked and evaluated. A Broadband Assessment Model (BAM) can provide an objective, standardized way to evaluate and rank projects.

Attachment A

CostPro Implementation Overview

CostPro represents the next generation of "bottom-to-top" engineering/economic telecommunication network costing methodologies.

Over the last 13 years, we have developed code and methodologies to calculate the forward looking costs for all major portions of the telecommunications network. Beginning 9 years ago, we began the program of implementing this code and methodology into a consistent, robust, open, transparent platform that we refer to as CostPro. The design approach for the CostPro platform is to utilize economically rational costing approaches, a consistent user interface, dynamic reporting, input management, security management, encryption methodologies, and storage tool modules to tailor the CostPro platform for a specific application and/or client.

CostPro Introduction

CostQuest believes that the value of a complete network investment and cost model can be maximized when each component works together as part of an integrated analysis suite. To this end, CostQuest Associates designed the platform as an integrated suite of products. The ultimate goal is to provide clients with comprehensive and accurate telecommunications network information while decreasing the amount of manual analysis and effort.

The use of a common platform has a variety of advantages. First, our client's educational and training requirements are reduced. There is only one interface to learn regardless of the component being modeled. Also, all training and operation questions can be directed to a single source. Second, the common platform allows the user to quickly generate reports for services that use multiple components of the communications network. Rather than the error prone method of "cutting and pasting" from disparate studies or models, data from a common platform can be transparently calculated and reported through a single "Wizard" driven interface. Third, the common platform allows the user to input and share data between modules without the need to re-key input data.

Each of these characteristics saves our clients time and cost in initial setup and ongoing operation. In addition, the common platform decreases CostQuest's development and maintenance costs. These

savings will be passed on to the client in reduced operating expenses. The CostPro platform thus provides our clients with a lower total cost of ownership than competing products.

CostPro Platform

CostPro is designed to accommodate a user's expanding modeling needs. The base platform was architected to allow for uniform security, input management, processing and reporting while allowing the addition or removal of code modules, reporting tools or external applications.

This brief section will illustrate some of the base platform's features.

CostPro Interface

The CostPro interface uses a standard Windows look and feel.

Users are guided through application processing with consistent, intuitive controls. The screen shot below shows a processing window. In this case a user would be running a process for a given state and scenario.

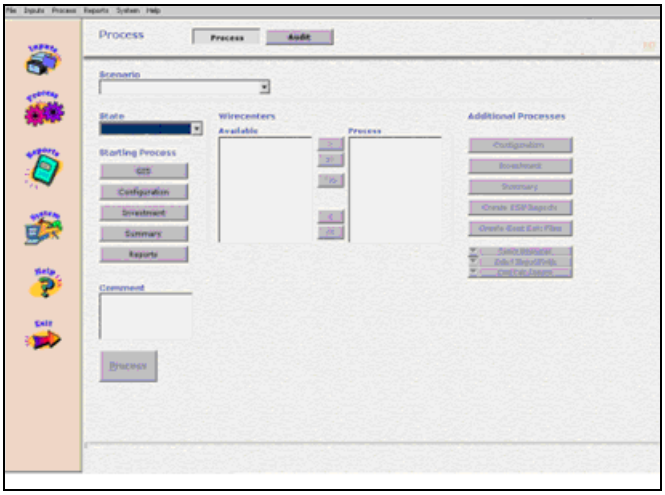

Figure 6--CostPro Processing

Clicking on any of the icons in the tool bar shifts the working frame. For example if a user clicked the inputs button they would see a neatly organized "tree" of input tables organized into logical categories.

Figure 2, below, shows a close up view of how input categories are presented as a tree of folders and how individual input values are presented by CostPro. In this circumstance, a user has elected to view the Labor Rate table, which is found in the Labor Rates and Loadings table category. A user can make changes to values in this "grid".

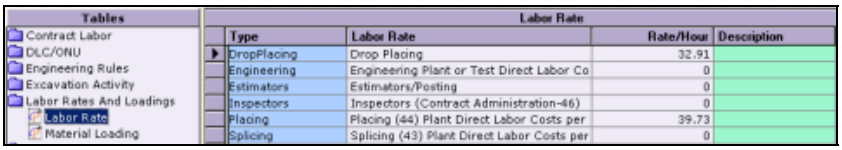

Figure 7--CostPro Input Manipulation

Scenario Management

CostPro categorizes inputs into scenarios. A scenario is simply a way to organize a group of inputs specific to a calculated result.

Based on the size of the computer's hard drive, CostPro allows you to create as many scenarios as you wish. .

CostPro also warns the user when he or she is making a change to an input that will affect the validity of a calculated result. This can occur when the scenario contains a fully calculated model run and someone goes back after the fact and changes a cost input. If a user does this, before the change is committed, the application will present a warning message indicating the problem and giving the user the option to ignore the change or accept the change and start processing over.

Figure 8--Input Change warnings

Security

CostPro enforces application security in three ways. Each user must login to the system with a UserID and password, as shown in the figure below.

Figure 9--Application Login

Second, the application allows an administrator to assign User Classes. Certain user classes can modify inputs, for example, other classes cannot.

CostPro can also encrypt sensitive data. And, databases and spreadsheets which support the application are locked with passwords to prevent access.

Reporting

CostPro was designed with a dynamic and flexible reporting system. Rather than having a series of predefined reports, CostPro allows the user to create the report to see information they need. This is done through either an “Rservice” report or Key Statistics report.

An Rservice is simply a user defined “template”. In this template a user can select various network components, services, and attributes to report upon. After creating the Rservice, it is possible to report out attributes such as total investment, TELRIC investment, units, grouped by geographic area or service. An Rservice report can be created at the region, wirecenter or sub wirecenter level. Figure 6 shows how an Rservice is defined.

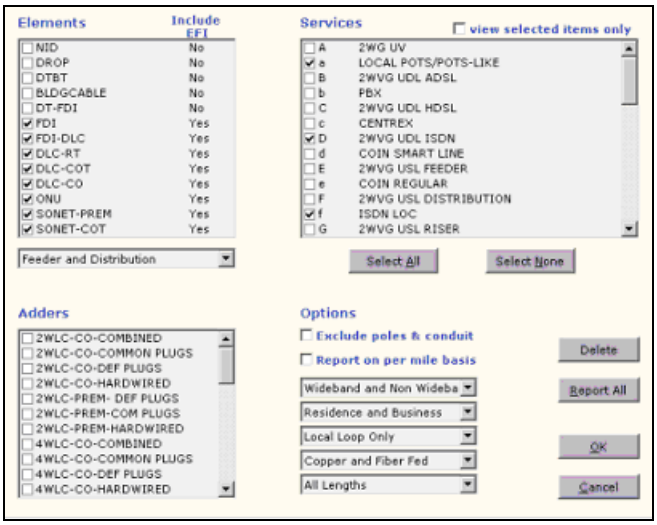

Figure 10--Rservice Definition

The second type of report available is the Key Statistics report. The Key Statistics report allows a user to view physical statistics of the modeled network. This includes information on the number of plant items placed, distance of fiber/copper cable in service and so on. The Key Statistics report, shown below, illustrates the type of data that can be extracted from CostPro.

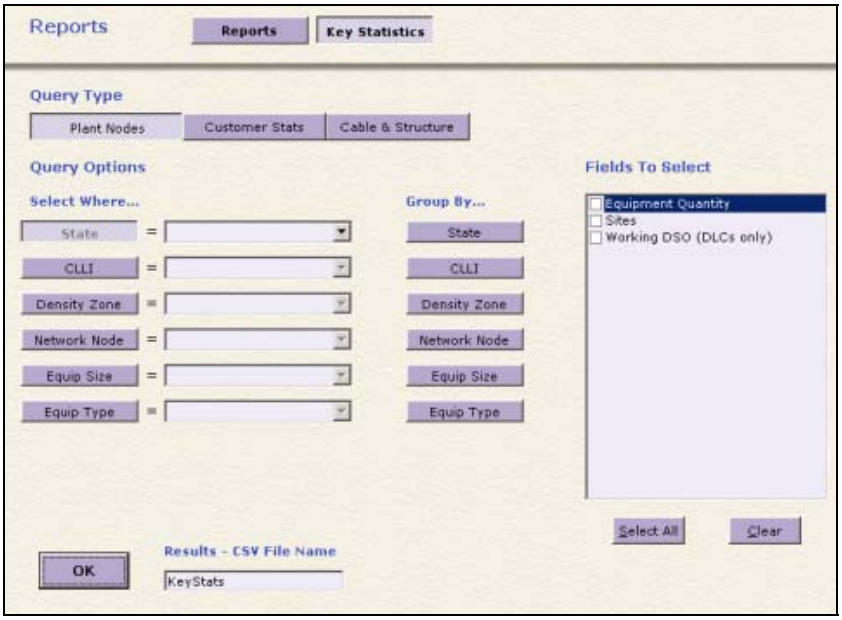

Figure 11--Key Statistics Interface

Auditing

CostPro was designed to be open and auditable. From the use of Microsoft Excel, to CostPro's ability to "dump" out every input and every intermediate file created in processing—there should be no problem with calculation transparency. As a first audit, the user can select various intermediate files that form the basis of the CostPro results and export them as CSV files.

Further, from the same Auditing screen the model also provides a view of how the wireline network is routed in each service area—as shown below.

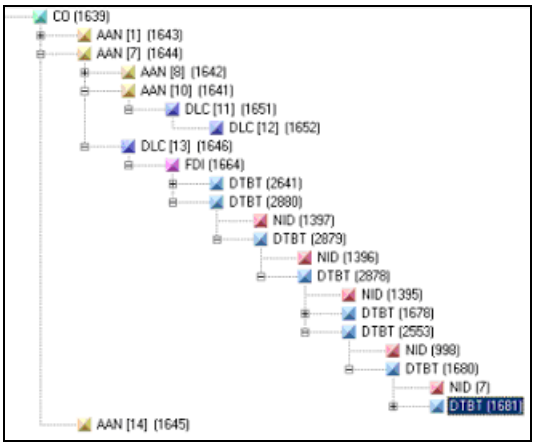

Figure 12—Service Area node routing

For each node shown, CostPro also presents a summary of known information for that network node, as illustrated in Figure 10.

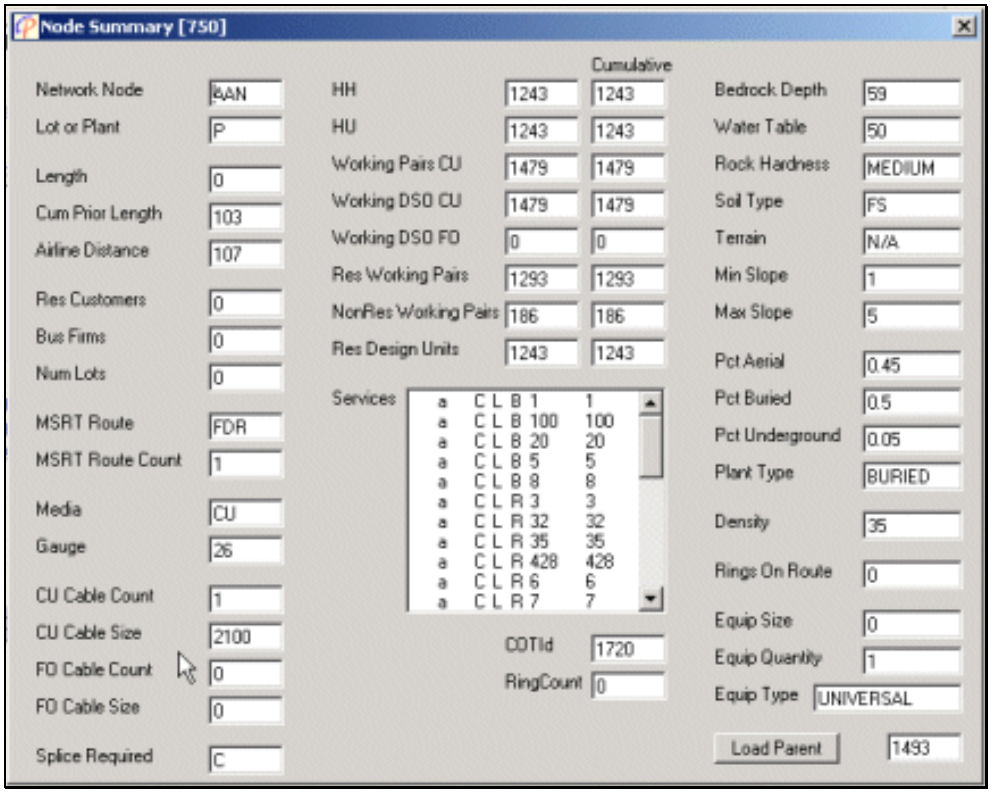

Figure 13--Node Summary