Task 1 Report to the Regulatory Commission of Alaska:
Affordability Factors and Affordability Standards

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I. INTRODUCTION
This is the Task 1 report on the development of Affordability Standards for Alaska Universal Services Support. The scope of work calls for ISER to address three elements.

First, we are to identify factors that contribute to differences in affordability of basic local telephone service among communities and regions of Alaska. The factors include those identified by the FCC, as well as others we may have identified in the course of our analysis. We have, in part, already addressed these factors in an interim report (January 26, 2006). Major portions of that discussion are incorporated into Section II of this Task 1 report.

The second component of the Task 1 report is identification of potential variables that might be used to measure the factors influencing affordability. This discussion is contained in Section III, and is organized around identified factors. Additional material is included in the appendix.

The third element of the Task 1 report is consideration of alternative affordability standards. We addressed this topic in our interim report. Portions of that discussion are incorporated in the present report, as well as suggestions we received from carriers, in their comments on the interim report. That material is included in Section IV. Summary comments and observations are presented in Section V.

II. FACTORS TO CONSIDER IN DETERMINING AFFORDABILITY
Because affordability is essentially an issue of fairness, or equity, it is ultimately the task of the public policymaker to define “affordability” and to indicate factors to be considered in measuring “affordability.” Economics can assist in this task in three ways. First, economics can suggest factors that might be taken into account when discussing affordability. Second, economics can provide input on the design of measures that might reflect changes in affordability. Third, economics can assist in the selection and compilation of data that may be used in the construction of affordability standards.

We look first at factors that might be considered in discussing affordability. The FCC has addressed the issue of affordable universal service in some detail and has suggested principles that should be taken into account when policymakers attempt to determine affordable rates for telephone service.

An affordable rate has an absolute component and a relative component. The absolute component simply means that the household has the means to pay for service if it chooses to do so. The fact that a household pays for service does not mean that the rate is, per se, affordable, nor does a household’s choice not to subscribe to service mean, by itself, that the rate is unaffordable. The relative component looks at the proportion of household income (or budget) needed to pay for the service, and whether or not the household must spend a disproportionate amount to acquire or maintain service.
It should be noted that the FCC talks about an affordable “rate.” However, the bill customers pay for basic service includes not only the local service rate, but other unavoidable fees, taxes, and surcharges. There may also be a front-end “connection fee” that may in some instances be quite large. In Section III, we identify a number of variables that address basic rates, other unavoidable costs to the subscriber, and various measures of household income, size, and distribution.

Affordable rates can be expected to vary geographically in response to local conditions—which means that local conditions need to be taken into account. We have focused on doing that. The database we are developing has data compiled at the community level. This community-level data will allow aggregation to several levels, including local calling areas, local exchange carrier service areas, and various geographic regions.

The percentage of connected households—the subscribership level—indicates affordability under the absolute component, but does not tell whether subscribers are paying a disproportionate amount of their income for service (the relative component). However, places with low subscribership may warrant special consideration. The data we are attempting to obtain from carriers will allow us to look closely at subscribership levels and variables that influence those levels. The data we need include the number of access lines by type and information on geographic coverage of local calling areas.

The FCC undertakes studies of subscribership levels and has found that, in addition to household size, a number of other socioeconomic variables are associated with differences in levels—including, for example, locale, gender and race of the household head, and employment status. These studies are conducted at the statewide and national level and do not provide any real insight at the local or regional level. We are also incorporating into our database information from the 2000 U.S. census that complements information we are seeking from carriers. That will allow us to explore determinants of subscribership levels.

A number of factors other than rates affect affordability. Those include the scope of the local calling area, household incomes, area costs of living, and population density.

The scope of the local calling area (i.e., the area reached by local calls) has several attributes that affect affordability. First is the total number of connections. In general, the more possible connections, the more valuable the service. Second, the greater the number of essential public services (public safety, health, education, and others) that can be reached with a local call, the greater the value of phone service. Third, the population density (or perhaps population dispersion) within the local calling area influences affordability. Presumably, the more isolated or remote a subscriber, the more valuable a connection is. Also, the more people in a given household, the greater the presumed value of the connection. We provide a detailed list of variables addressing these concerns in Section III.

Other attributes of the local calling area may also influence affordability. First, the FCC did not make direct reference to “800” numbers in defining the scope of the local calling
area. This raises the question of how 800 numbers might affect the definition of a local calling area. At this point, we do not have a way of dealing with this question.

A second issue the FCC did not directly address is the availability of communication technology substitutes and their effects on affordability. We have not directly addressed this issue, but discussed it with participants attending a workshop on March 3, 2006. There was no definitive solution proposed, other than to approach providers of substitute telecommunications services (primarily wireless carriers). Finally, basic local service is part of a broader bundle of telecommunications services. Affordability of local service may be influenced by what is in the overall bundle of available services and the prices of those other services.

Comments made at two public workshops held by the RCA (January 12 and March 3, 2006) highlighted the relationship between local service, availability of long-distance service, and the interpretation of how the scope of the local calling area affects affordability.

We are attempting to acquire data that will help us address these questions in a number of ways. Section III provides more insight into our efforts regarding the measurement of various dimensions of the definition and scope of calling areas.

Household income (and perhaps household size) has an important bearing on affordability. Higher household incomes suggest that higher rates are affordable. Since household incomes can vary substantially, the issue of which households should be included in the determination of affordability becomes important. Affordability can be expected to vary between households of a given income level, if household size differs.

The availability of “lifeline” subsidized rates for some low-income households also has implications for which segment of the income distribution affordability might focus on. This point has been addressed in comments on the interim report by GCI.

The U.S. Census provides a relatively rich source of information on household and individual income, including sources of income and distribution patterns. We incorporated a number of variables into the data base from this source.

Local costs of living also influence affordability. One aspect of this factor is that if two areas have the same average income level, but the absolute level of prices is higher in one area, the area with the lower price level has more affordable service, even if the budget shares are about the same in both places. The second aspect of this cost factor is relative differences in the price of specific budget items. Suppose that in the previous example the price of phone service was the same in both places, but that all other prices and income were as described. In that case, the absolute price is the same but budget shares will now differ, with the higher cost area spending a smaller proportion of income on phone service. However, this does not mean that service is more affordable in the area with higher living costs. The issue of cost of living measures is discussed in detail in Section III.
The FCC also found that affordability could depend on rate design. Essentially, the FCC recognized that the local service “price” is only one of several prices consumers pay for a bundle of phone services and that affordability of local service depends in part on the prices of other elements of phone service. We recognize the significance of this issue and are exploring measures of combined local and long-distance service prices.

III. POTENTIAL VARIABLES AND DATA SOURCES TO USE IN MEASURING FACTORS

Section III provides a listing and description of the variables for which we have acquired data or expect to acquire data, organized by factors. In general we provide the variable name and title, information on the unit of measurement, the period for which we have the data, the geographic area represented, and the source. We will also address the frequency of compilation, currency, and reliability in final documentation of the data base. The objective in our data compilation has been to acquire data at the 2000 U.S. Census “place” level. There are roughly 350 census designated places (CDPs) in that census. Place level data will allow us to aggregate to larger geographic areas as the need arises and will also allow us to make comparisons between places and groups of places. In concept, we are attempting to build a database where “place” is the record identifier and each record contains observations on the variables that are potential measures of identified factors. This can also be thought of as a spreadsheet, with the left-hand column containing the list of places, with each row representing a set of observations on the variables measuring factors for the given place.

Before looking at variables we also need to comment on some specific data collection tasks that are ongoing, and also talk about place/data matching activity. We are presently working with the RCA staff and Local Exchange Carriers (LECs) to match census places with places served by LECs; to match individual local calling areas (LCAs) to census places; and to identify and match extended area service to census places. We are also working on a number of specific measures of scope of service with the RCA staff and LECs.

It should also be noted that the set of variables we have identified so far will evolve as the study progresses. The list of variables identified in this report will be augmented as new information becomes available or gaps in present coverage become known. Below we now consider specific variables, grouped according to factors.

Variables Related To Scope of Service

*Residential single line rate for basic service (RATER)*

RATER is the monthly rate for single-line residential service ($/month). Data are taken from the annual rate summaries compiled by the RCA (single party access line monthly rate). Data are available for FY 2000 through FY 2005. Rates are listed for approximately 295 places. FY 2005 rates generally range from $9.15 - $39.60 per month. These data do not include mandatory taxes and surcharges or extended service area charges.
**Unavoidable Taxes plus Surcharges (TAXSUR)**
TAXSUR includes taxes and surcharges that must be paid by the subscriber on the basic monthly rate (RATER) in addition to the monthly rate. For example, in Anchorage, a basic line with monthly rate of $9.40 incurs an additional amount of taxes and surcharges of about $10.70. (These charges include nine separate items, the largest of which is the residential FCC subscriber line charge of $6.50). So the subscriber faces a monthly bill of $20.70 for basic single-line residential service. This total does not include charges for long-distance service nor extended calling area charges. We are in the process of gathering this information from LECs. We are asking each LEC to provide an estimate of each component of the total taxes, plus surcharges, that would accrue on RATER, by place. We need this data for the years 2000 and 2005.

**Extended Area Service Charge (EASCHG)**
In some instances, residential subscribers are required to pay an extended area service charge. The extended area service increases the scope of the local calling area, but is not optional. As such, it is part of the customer’s basic monthly cost of service. We are in the process of gathering information from LECs, to identify areas covered by extended area service and EAS charges. We need this data for the years 2000 and 2005.

**Total Residential single line monthly charge (TOTBILL)**
The total residential single-line monthly charge is the sum of RATER + TAXSUR+ EASCHG. This is the “amount” (dollars per month) that subscribers must be able to afford if they are to have a residential line. This does not include any charges for additional local services (voice mail, for example), long distance service, or Internet-related service.

The scope of service measures and subscribership level measures both depend on the number of access line in the calling area. We have data covering residential, single-line business and multi-line business access lines in 2000 for about 175 places and are seeking additional data from the LECs for 2000 and 2005. We are also seeking data on Basic Exchange Telephone Radio Service (BETRS) or equivalent service.

**Number of residential access lines (NRLINES)**
This is the number of residential access lines in a given place.

**Number of business single lines (NBSLINES)**
This is the number of business single line access lines.

**Number of multi-line business access lines (NBMLINES)**
This is the number of business multi-line access lines.
**Number of total access lines (NTOTLINES)**
This is the sum of residential and business lines and provides one indicator of the scope of the local calling area. The number of business lines (which presumably also include at least some public sector and essential public service lines) provide a separate measure of the scope of the local calling area.

**Number of Lifeline accounts (NLIFELINE)**
This is the number of lifeline accounts. The number of accounts, and the criteria for qualifying for lifeline accounts, may be factors in identifying income ranges we can use to assess affordability. Eligibility criteria include a general guideline of 135 percent of the applicable federal poverty guideline for Alaska. For a family of four, the current figure is $33,750. There are a number of other criteria by which individuals or households may qualify. We have limited data for 2005. Available data are compiled by LEC. We anticipate receiving data by place.

**Access to the Internet Variables**
Access to the Internet may be an important complementary service to local service. A number of variables related to availability and price of service are identified and included in the data base.

*Internet Local Dial-Up Access (ILDU)*
This variable indicates the availability of local dial-up internet service.

*Internet Local Dial-Up monthly rate (RILDU)*
This is the monthly rate for local dial-up service.

*Internet DSL access (IDSL)*
This indicates availability of DSL service.

*Internet DSL monthly rate (RDSL)*
This is the monthly rate for DSL service.

*Internet broadband access (IBB)*
This is internet broadband access, except for DSL service.

*Internet broadband access monthly charge (RBB)*
This is the monthly access rate for broadband service (other than DSL), including cable and wireless.

The primary source of data for Internet-related variables is a study on broadband Internet connectivity, conducted under the Regulatory Commission of Alaska’s Rural Alaska Broadband Internet Access Program. Data on over 300 places are presented, including type of Internet connectivity and price of service. The data are for 2005.

In addition to the variables described above, we are attempting to obtain some additional information on scope of service. Telephone usage (local, intrastate, and interstate) is indicative of the importance of the scope of the local calling area. Data on switched minutes of use for LEC company study areas for the year 2000 have been provided. However, these are provided only at the LEC study area level of aggregation and not at the place level. Also, this information does not appear to be available at the local calling area or for more recent periods. This is data the RCA might consider compiling on a more regular basis.
We are also attempting to put together some indicators of local calling area access to essential public services. One way we’re approaching this is by reviewing online directories.

**Household Income and Size Variables**

The FCC discussion of factors includes reference to both household income and size. The question of what income levels and household size, as well as what other characteristics of households should be considered, has been raised in carrier comments regarding the preliminary report on Task 1. Relevant variables are addressed below, in the listing of socioeconomic variables from the U.S. Census.

**Local Cost of Living Variables**

Data on the “cost of living” factor at the local level are scarce. The 2000 U.S. Census collected some data on household utility costs, including electricity, gas, water and sewer, and home heating. These data may allow us to look at utility costs as a percentage of household income. We are also incorporating into the database two studies that look at fuel costs.

The first study is the *Statistical Report of the Power Cost Equalization Program for FY 2005*. The data cover 183 communities and provide information on fuel prices and average residential rates. This information is compiled annually. We include two variables in our data base:

- *Power cost equalization fuel price (PCEFP)*
- *Power cost equalization average residential rate (PCEARR)*

The second fuel-cost study, *Current Community Conditions: Fuel Prices Across Alaska*, was conducted in November 2005 by the Division of Community Advocacy, Department of Commerce, Community, and Economic Development. This study surveyed local fuel retailers in 100 Alaska communities, collecting price data on heating fuel and gasoline. We are incorporating two variables in our database:

- *Alaska fuel prices heating fuel (AFPHFUEL)*
- *Alaska fuel prices gasoline (AFPGAS)*

There are a few other sources that include some cost-of-living information. In 2005, the Institute of Social and Economic Research conducted an analysis of geographic cost differentials among Alaska’s fifty-three school districts (*Alaska School District Cost Study Update*). While the resulting indexes are not specific to communities and do not reflect household consumption, the indexes do provide some indication of regional differences in costs. In addition, the Research and Analysis section of the Alaska Department of Labor and Workforce Development prepares an annual overview of the cost of living in Alaska (“The Cost of Living in Alaska,” *Alaska Economic Trends*) that looks at various aspects of the cost of living. The most recent such overview was published in June 2005. The Cooperative Extension Service (University of Alaska Fairbanks) prepares a quarterly report on the weekly cost of food at home for families in 18 Alaska communities or areas. The Alaska Housing Finance Corporation (AHFC) prepares an annual construction cost survey that covers eight urban and three rural
(Barrow, Bethel, and Nome) places in Alaska. AHFC also prepares an annual survey of residential rental markets that covers several boroughs but is not specific to most rural areas of the state.

In summary, there are only very limited community-specific data on the cost of living, there are more data that may be helpful for regional comparisons.

**Socio-Economic Variables**

Many socio-economic variables from the 2000 U. S. Census shed light on community economic and social conditions that relate to affordability. The list of variables below are compiled at the “census designated place” (CDP) level. For the most part CDPs can be thought of as communities. As is generally known, the census is taken once every ten years. There is also a substantial time lag in the release of major portions of the census results, particularly detailed socio-economic information. This means that census data can be useful in “benchmarking” an affordability standard, but will not necessarily be useful for frequently updating the benchmark. An important issue is what detailed decennial census variables can be linked to variables that are more frequently measured, either in other census programs or from other sources.

The census variables that are being compiled may be used in one of three ways. First, they may provide a basis for comparisons between places to examine questions of relative economic well-being or to help identify regions reflecting homogeneous socio-economic characteristics. Second, some of the identified variables may be used as measures of the affordability factors we discussed above. Finally, census variables may be used to establish benchmarks that can be updated with other variables that are measured more frequently. As indicated, the census variables are reported at the Census Designated Place (CDP) level. They reflect information for the year 2000, except for income data, which reflects the year 1999.

We have grouped the list of socio-economic variables into several categories. The variable name and what it represents are provided.

**Population Measures**

- **(POPTOT)** TOTAL POPULATION
- **(POPANAI)** POPULATION, ALASKA NATIVE/AMERICAN INDIAN
- **(POPW)** POPULATION, WHITE
- **(POPOTH)** POPULATION, OTHER
- **(POPFEM)** POPULATION, FEMALE
- **(POPMale)** POPULATION, MALE
- **(POVNUM)** NUMBER OF PERSONS IN POVERTY
- **(POVPCT)** PERCENT OF PERSONS BELOW POVERTY LINE
Housing Units and Household Size

HUTOT) TOTAL NUMBER OF HOUSING UNITS
(HUOCC) TOTAL NUMBER OF OCCUPIED HOUSING UNITS
(HOUSEHOLDS)
(HUVCAT) TOTAL NUMBER OF VACANT HOUSING UNITS
(HUVCATSEA) TOTAL NUMBER OF UNITS VACANT DUE TO SEASONAL
USE
(HOAVESIZ) AVERAGE HOUSEHOLD SIZE
(FAMUNITS) TOTAL NUMBER OF FAMILY UNITS
(POPINFAM) TOTAL POPULATION LIVING IN FAMILY UNITS
(FAMAVESIZ) AVERAGE FAMILY SIZE
(NFAMHUOCC) TOTAL NUMBER OF NON-FAMILY HOUSEHOLDS
(POPHOUS) POPULATION LIVING IN HOUSEHOLDS
(POPINQ) POPULATION LIVING IN GROUP QUARTERS

Housing Utility Costs

(HEATFUEL) FUEL MOST USED FOR HEATING
(UTILELEC) UTILITY COST, ELECTRIC
(UTILGAS) UTILITY COST, GAS
(UTILWS) UTILITY COST, WATER AND SEWER
(UTILOCKW) UTILITY COST, OIL, COAL, KEROSENE, WOOD, ETC.
(TELNUM) NUMBER OF HOUSEHOLDS FOR WHICH TELEPHONE SERVICE IS
AVAILABLE
(TELPCT) PERCENT OF HOUSEHOLDS FOR WHICH TELEPHONE SERVICE IS
AVAILABLE

Income Measures

(INCTOT) TOTAL HOUSEHOLD INCOME FOR “PLACE”
INCOME FROM ---
(INCWS) WAGE AND SALARY INCOME
(INCSELF) SELF-EMPLOYMENT INCOME
(INCDIV) INTEREST, DIVIDEND, NET RENTAL, ROYALTY—
(INCSOCSEC) SOCIAL SECURITY OR RAILROAD RETIREMENT
(INCSUPPSEC) SUPPLEMENTAL SECURITY INCOME
(INCPUBA) ANY PUBLIC ASSISTANCE OR WELFARE PAYMENTS FROM
STATE OR LOCAL WELFARE OFFICE
(INCRETSDIS) RETIREMENT, SURVIVOR, OR
DISABILITY PENSIONS (DOES NOT INCLUDE SOCIAL SECURITY)
(INCOTH) OTHER INCOME

(IAVE) AVERAGE HOUSEHOLD INCOME, TOTAL
AVERAGE HOUSEHOLD INCOME FROM -------
(IAVEWS) WAGE AND SALARY INCOME
(IAVESELF) SELF-EMPLOYMENT INCOME
(IAVEDIV) INTEREST, DIVIDEND, NET RENTAL, ROYALTY—
(IAVESOCSEC) SOCIAL SECURITY OR RAILROAD RETIREMENT
In summary, we have identified an extensive array of variables that address one or more of the factors that are to be considered in the measurement of affordability standards. As indicated above, we expect to augment (or trim) this list as the study progresses.

IV. POSSIBLE AFFORDABILITY STANDARDS

For purposes of this study, we define an affordability standard as a rule by which a numerical benchmark value is calculated. In other words, the affordability standard tells us how to calculate the dollar amount of the affordable rate.

Our interim report discussed two general affordability standard approaches. The first used “share of income” or “proportion of income” as the focus. The second approach used “subscribership level” as the target variable. Either approach required establishment of a “reasonable” level. This suggested that an external reference benchmark be established (picked) and then adjusted to reflect conditions specific to a particular standard.

In concept, the standard could be established based on individual or household socio-economic conditions (as is the case with the eligibility criteria for the lifeline program). Alternatively, the standard could be set with respect to some geographic area reflecting reasonably homogeneous socio-economic indicators, a local calling area, or other aggregations of places.
Comments by carriers at the public workshops indicated preferences focusing on two principles. The first was that there should be a relatively small number of benchmarks. A separate benchmark for each community or local calling area was viewed as being excessively complex and difficult to administer. The second principle was that of simplicity. If choosing between two standards that resulted in similar levels of “fairness,” the simpler standard would be preferred. Again, ease and consistency of administration was a concern.

**Share of Income Approaches**

The interim report also provided several illustrations of hypothetical affordability standards. The simplest example defined the affordability standard as “share of income.” It assumed that Anchorage would be the reference place, and that other places in Alaska were to have an affordable rate that reflected the same proportion, or share, of income as required in Anchorage. The numerical example was as follows.

Assume that the annual Anchorage LEC rate is $144 (not including taxes and surcharges) and median household income is $55,500. Then annual basic phone service is 0.26 percent of median household income (144/55500). Suppose that in community X median household income is $26,900. If we are using the Anchorage “share of income” as the reference amount, this implies that, assuming all other factors are equal, the rate in community X should be about $69.94 per year (0.26 percent of $26,900). Rates for other places would be computed in similar fashion.

As noted above, the FCC considered this approach, and it was found to be inadequate. The FCC indicated that a simple share of income standard should be adjusted to reflect local conditions, where the adjustments would reflect some or all of the “factors” explored in the previous section.

A variant of this approach was suggested in carrier comments on the interim report and in discussions at the March 3, 2006 public workshop. The first modification was to suggest that a place—or combination of places other than Anchorage—somehow more representative be used to establish the reference monthly rate. The second suggestion was to use an income level linked to eligibility for the lifeline program as the basis for the relevant share. It was also indicated that this measure might be modified to include some recognition of area cost-of-living differences. We will include these suggestions in our exploration and evaluation of affordability standards.

Affordability standards that address a broader spectrum of factors (such as scope of service, cost of living, or subscribership levels) can also be constructed. For example, the rate we calculated in the previous illustration could be further adjusted if there were other differences in factors between Anchorage and X. Suppose that the cost of living in X is 1.4 times that in Anchorage. This might imply that a further rate adjustment (downward) is warranted, since not only are incomes lower, but the purchasing power of income is also less. As another example, suppose that the scope of service in X is substantially less than in Anchorage. This could indicate a further adjustment. Other adjustments might be indicated when comparing other factors between the two places. In most instances, the
direction of the adjustment (up or down) will be indicated by economic considerations. Determining the appropriate magnitude of adjustment will be more of a problem and will require policy judgment at some point.

This share-of-income approach can be summarized as follows: A target, or benchmark, percentage of household income is set and is based on conditions in a designated reference region. This benchmark is then adjusted for conditions in a specific locality by comparing a set of specified factors in the locality with the same factors in the reference region. In general, the factors to be considered would include some or all of the factors discussed above, such as scope of service (probably with several dimensions), household income and size measures, cost of living, and other socioeconomic considerations.

**Subscribership Level Approach**

A second approach to determining affordable rates could be through subscribership level analysis. This approach looks at a subscribership level for a reference place. For that place, rates are deemed “affordable.” This subscribership level becomes the benchmark by which other places are judged. If subscribership levels in place X differ significantly, two questions arise. First, does an analysis of non-price factors suggest that a different subscribership level is appropriate in place X than the reference place? Second, given the “appropriate” subscribership level in place X, what phone rate will attain the appropriate subscribership level in place X?

This approach involves estimating a relationship between the subscribership level and a set of variables including phone rate (price), income measures, scope of service measures, cost of living, and other socio-economic variables. In some respects it is analogous to estimating a demand function for phone service.

**V. SUMMARY AND CONCLUSIONS**

This Task 1 report has addressed three issues: identification of factors to include in the determination of affordability; identification of variables that can be used to measure those factors; and possible affordability standards, including standards based on share of income and subscribership levels. We have identified a number of factors relating to affordability consideration, many of which have been set forth by the FCC. We have compiled an extensive set of variables that measure various attributes of the factors. Some significant data gaps remain, but we are addressing those. Finally, we have laid out several possible affordability standards. These will be the subject of analysis in the next phase (Task 2) of the study.
BIBLIOGRAPHY


