2012 Rental Housing Finance Survey
Sample Selection, Response, Weighting, and Error Estimation

1. OVERVIEW

The Rental Housing Finance Survey (RHFS) is designed to be a sample of multifamily rental properties, wherein the term *property* is based on ownership or finance by a single entity, not on physical structure or structures. The ideal RHFS sample design would be to draw a random sample from a list that includes all possible residential rental properties in the United States. Unfortunately, no such list exists, even for individual states.

The RHFS sample design is built around the concept of a basic street address (BSA) of multiunit residential buildings. A BSA is the portion of the address, less the unit or apartment identifier. For instance, in the address "123 Main Street, Apartment 102," the "123 Main Street" portion is the BSA.

The RHFS sample design begins by selecting BSAs from the U.S. Census Bureau's Master Address File (MAF). The BSAs are merged with 2010 census information to extract BSAs where 80 percent of the units at that address are rental.

After sample selection, a Census Bureau field representative visits the sample BSA to collect information about the building(s) at the sample BSA and any other BSAs that are part of the property associated with the sample BSA. The Census Bureau field representative uses information collected during the interviews with owners and property managers in conjunction with other information sources to determine the scope of the property.

The final weight reflects properties, not units or buildings. Three important things remain, however, to know about the final weight. First, when multiple BSAs were on a property, the probability of selection for a property was the sum of the probabilities of selection for the BSAs on the property, which included the sample BSA plus any other *verified* BSAs. A BSA is verified when it can be found in the MAF.

Second, for a number of properties, the Census Bureau could not verify one or more of the BSAs associated with a property because either the Census Bureau field representative did not collect complete address information or the MAF simply did not include that particular BSA. To account for this issue, a "MAF unit adjustment factor" was applied to properties with BSAs that could not be verified.

Third, BSAs can and often do contain multiple buildings.[1] The RHFS sample design was not based on sampling buildings of various sizes; it was based on sampling BSAs of various sizes.[2] Unfortunately, no data source exists that contains a master list of buildings in the United States. RHFS, therefore, may not produce an accurate nationwide count of rental units in multiunit residential buildings *by building size*, such as those that are commonly published in the American Community Survey or the American Housing Survey (AHS).

[1] Based on raw counts, 42 percent of properties with two buildings have only one BSA. About 41 percent of properties with three buildings have only one BSA.
[2] The RHFS design assumed, however, that BSAs and buildings would correspond closely.

2. DEFINITIONS

For purposes of this document, the following definitions are provided:

- Basic street address—The street number and name, stripped of information regarding the residential unit number. Residential units in the same building typically have the same BSA, but a BSA can and often does include more than one building.
- Full address—The BSA plus "within structure identifier," which is the portion of an address that identifies the specific apartment, unit, suite, floor, trailer, or pad represented by the address record.
- Building—A separate physical structure identified by the respondent. In some instances, more than one building has the same BSA. Presently, no additional information is available in the MAF to determine if a BSA comprises more than one building.
- Property—A BSA or a collection of BSAs and/or other buildings owned by a single entity (person, group, leasing company, and so on). For example, an apartment complex may have several buildings with unique BSAs, but they are owned as one property.

3. SAMPLE SELECTION

The 2012 RHFS uses a two-stage sample process in which primary sampling units (PSUs)[3] are selected, then BSAs within the PSUs are selected.

Selection of Primary Sampling Units

The sample for RHFS is spread across 394 PSUs. These PSUs cover 878 counties and independent cities, with coverage in all 50 states and the District of Columbia.

1. If more than 100,000 housing units were in a PSU at the time of selection, the PSU is known as a self-representing PSU because it was removed from the probability sampling operation (it was in the sample with certainty.) The sample from the PSU represents only that PSU. In total, 170 PSUs are self-representing PSUs.
2. Census Bureau statisticians grouped the remaining PSUs into similar-sized strata, based on similarities in various socioeconomic characteristics within each stratum, and selected 1 PSU per stratum to represent all PSUs in the stratum. These selected PSUs are referred to as non-

[3] PSUs are areas of geography, generally counties or independent cities. Some rural counties with small populations may be combined. Because RHFS sends out field representatives to collect data, it is more efficient to create PSUs as the first stage of the sampling process—the stage at which PSUs are selected before selecting actual sample cases. Multistage sampling enables field representatives to travel less and collect more data, thus enhancing data collection efficiency. For operational efficiency purposes, RHFS uses the AHS PSUs. RHFS does not use AHS information to select sample buildings, however. Any building sampled for RHFS could have an AHS housing unit, but only by chance.

self-representing PSUs. The sample non-self-representing PSUs for RHFS are a subsample of the Current Population Survey, or CPS, sample areas based on the 1980 census.

Selection of Sample Basic Street Addresses

1. Within each of the sample PSUs, the universe of multiunit residential BSAs was extracted from the MAF.[4] As previously indicated, a BSA may contain multiple buildings (that is, one BSA for two or more buildings).

2. The multiunit residential BSAs were merged with the 2010 census to identify tenure (renter, owner, or vacant). The Census Bureau used this information to calculate the rental percentage for each BSA. Vacant-for-rent cases were included in the rental percentage; vacant-for-sale cases were considered part of the owner stock. For a BSA to be considered in scope (to remain on the sampling list), 80 percent or more of the units must have been identified as rental in the 2010 census. A BSA with buildings constructed after 2010 was considered in scope based only on number of units.

3. The BSAs remaining in scope were divided into eight groups, or strata (shown in Table 1), and the measure of size was calculated by counting the number of BSAs in each stratum.

4. Within each stratum, BSAs were sorted by geographic variables, including census region, state, urban/rural status, and county. The within-stratum sampling rates were determined to result in an expected coefficient of variation (CV)[5] of 6 percent at the national level. As such the selected sample would yield a CV of 6 percent when comparing national aggregated stratum estimates with the true national estimates.

Table 1 provides each stratum definition, the stratum universe size, and the stratum sample size.

[4] The MAF includes identifiers for both multiunit BSAs and residential BSAs. These identifiers are assumed to be accurate for purposes of sample selection.
[5] *CV* is defined as the stratum standard error divided by the stratum total.

Table 1. 2012 RHFS Sample Size by Stratum

Stratum	Stratum Universe Size (number of BSAs)	Stratum Sample Size (number of BSAs)	Take Every (second stage probability of selection)
2- to 4-unit BSAs, new construction	56,772	12	3,195
5- to 24-unit BSAs, new construction	17,685	15	967
25- to 49-unit BSAs, new construction	1,584	44	27
50 or more-unit BSAs, new construction	1,551	11	116
2- to 4-unit BSAs, existing	1,805,175	565	4,731
5- to 24-unit BSAs, existing	703,976	728	1,179
25- to 49-unit BSAs, existing	57,645	2,135	36
50 or more-unit BSAs, existing	60,320	520	141
TOTAL		**4,030**	

BSA = basic street address. RHFS = Rental Housing Finance Survey.

The sampling process begins with the assumption of a one-to-one relationship between BSAs and properties. For those properties that comprise multiple BSAs, the probability of selection of these properties was the sum of the probabilities of selection for each BSA. Refer to Section 5 for details on the creation of this factor.

4. SAMPLE RESPONSE RATE

For the sample, 4,030 BSAs were originally selected for interview. Recall, however, that RHFS is a survey of properties. During the interview, therefore, field representatives determined the eligibility of both the BSA and the property to which the BSA belonged. In some instances, the BSA was eligible, but the property was deemed ineligible, so the sample BSA was discarded. In other instances, a BSA was ineligible, but the property was deemed eligible, so the sample BSA remained in the sample.

All told, 14 percent (560) of the sample BSAs were removed from the sample. Following are the main scenarios in which a BSA was removed from the sample or remained in the sample despite being ineligible:

- Property was already in sample—If the sampled BSA was financed or owned with another BSA in the RHFS sample (part of same property), then the sampled BSA was ineligible but the property was eligible. The sample BSA was removed from the sample because another BSA in the sample already represented the property.

- Property was public housing—If the sampled BSA was operated by public housing, all BSAs within the property were assumed to be operated by public housing, and the property was deemed ineligible. The sample BSA was removed from the sample.

- Property did not meet minimum rental requirements—Recall that 2010 decennial census data were used to make an initial estimate of the rental percentage for each sample BSA. Only BSAs with 80 percent or more rental units were selected for interview. If during interview it

was discovered that the sampled BSA did not meet the threshold but the property did, then the property was eligible and the sample BSA remained in the sample.

- Building at BSA was under construction—If the building(s) at the sampled BSA was under construction, the property was deemed ineligible. The sample BSA was removed from the sample.

- Building at BSA was demolished—If the building(s) at the sampled BSA was demolished, the property was deemed ineligible. The sample BSA was removed from the sample.

- BSA was in a manufactured housing community—If the sample BSA was in a manufactured housing community, the property was deemed ineligible and the sample BSA was removed from the sample.

- Building was converted to business or storage—If the building(s) at the sampled BSA was converted to a permanent business or storage, the property was deemed ineligible. The sample BSA was removed from the sample.

- BSA was a duplicate of another BSA in survey—If the BSA was already in the sample, the property was eligible and the duplicated sample BSA was removed from the sample.

- Other reasons—If the BSA or property was ineligible for other reasons, the sample BSA was removed from the sample.

Of the 3,467 eligible BSAs, 1,203 were classified as "Type A" noninterviews because (1) no one was available for data collection after repeated visits, (2) the respondent refused to be interviewed, or (3) the interviewer was unable to find the address.

This classification produced an unweighted overall response rate of 65 percent. This unweighted response rate was calculated at the BSA level because final weights are calculated at the property level. The weighted overall response rate was 67 percent. This weighted response rate was calculated at the property level.

5. WEIGHTING

The RHFS weights were derived from the product of the inverse of the probability of selection for the BSAs on the property, the MAF unit adjustment factor, and nonresponse adjustment factors.[6]

Probability of Selection (Two Stages)

The overall probability of selection for a property was calculated as the product of the first- and second-stage probabilities of selection. The initial weight is defined as the inverse of the probability of selection for the property.

[6] The various components of the weight are available on the public use file or internal use file.

The first-stage probability of selection accounts for the selection of the sample PSU from all PSUs in the same first-stage stratum.

The second-stage probability of selection accounts for the selection of the property within the stratum. Properties that have multiple BSAs on the frame can be selected into the sample by the selection of any of the multiple BSAs associated with the property. To account for the multiplicity of BSAs on the frame, the probability of selection was calculated for a given property as the sum of the probabilities of selection for the BSAs associated with the property, taking into account the stratum of individual BSAs.

For instance:

- A property with three 4-unit BSAs (existing construction) would have a probability of selection equal to (1/4,731 + 1/4,731 + 1/4,731) = 1/1,577.
- A property with a 4-unit BSA, a 48-unit BSA, and a 60-unit BSA (all existing construction) would have a probability of selection equal to (1/4,731 + 1/36 + 1/141) = 1/28.51.

Master Address File Unit Adjustment Factor

After data collection, the Census Bureau identified problems with the collection of BSAs used to calculate the probability of selection for the sample property. In some cases, not all the BSAs were collected or the BSAs collected could not be matched to the MAF. In other cases, the number of units reported by the respondent was not consistent with the number of full addresses associated with the verified BSAs.[7] The net result was a probability of selection that was not consistent with the scope of the property. Most of the time, this inconsistency meant a probability of selection less than what it should be, leading to weights greater than what they should be.

The U.S. Department of Housing and Urban Development and the Census Bureau did not recollect or revise the address collection and match. Instead, the MAF unit adjustment factor was applied to the probability of selection. The factor was:

> Number of rental units reported by respondent/number of full addresses associated with verified BSAs.

This ratio adjusts the probability of selection for the difference between the number of respondent-reported rental units and the number of full addresses within the BSAs verified on the MAF. For most of the sample properties, and especially for some large properties, the MAF unit adjustment factor increased the probability of selection because the number of reported units was considerably greater than the number of full addresses within the BSAs.

For example, suppose a 4-unit BSA was selected from the 2- to 4-unit stratum, with a probability of selection of 1/4,731 (weight of4,731). The interview revealed two additional 4-unit BSAs and a 4-unit building that had no corresponding BSA in the MAF. The probability of selection for this property would be (1/4,731 + 1/4,731 + 1/4,731 = 1/1,577), for a final property weight of

[7] In other words, the Census Bureau's MAF was incorrect.

1,577. Because the interview revealed 16 units, however, this property would represent 25,232 housing units (16 units x 1,577).

The MAF unit adjustment factor is the count of MAF addresses within the verified BSAs divided by the number of units reported by the respondent. In the preceding example, the Census Bureau was able to verify three 4-unit BSAs, but the respondent reported 16 units. As such, the factor would be 16/12, leading to a new probability of selection of (16/12) * (1/1,577). The total weight would be 1,182.75, meaning the property would represent 18,924 units, 6,308 units fewer than the nonadjusted estimate.

Nonresponse Adjustments

To account for bias in the estimates because of nonresponse, the weights associated with the respondents were inflated using the weights associated with noninterviews in the eligible units for the following reasons:

- Respondent could not be found during the interview period.
- Respondent was temporarily absent.
- Respondent refused.
- Respondent had a language problem.
- Unit was owner occupied.

The adjusted base weight was multiplied by the following factor:

(Interviewed BSAs + not interviewed BSAs)/interviewed BSAs

This adjustment is done separately for groups defined by cross-classifying the following data items:

- Four census regions.
- Four BSA size strata.
- Urban or nonurban status.
- New construction as of 2010 or pre-2010 construction.

Groups were combined if a cell contained less than 20 properties or if the factor was more than 1.50.

6. SAMPLING ERROR AND ERROR ESTIMATION

Two types of possible errors are associated with RHFS data: sampling and nonsampling error. The sampling error arises because only a sample of all eligible BSAs or properties was selected

for interview. The nonsampling error is the result of all other errors that may occur during the data collection and processing phases of the survey.

The data are estimates based on a sample of BSAs, many of which were cumulated up to properties. These sample estimates may differ from the actual values that would have been obtained if every eligible property in the United States had been interviewed. The estimates may also differ from the population through repeated sampling, even when using the same sample design. An estimate of this sampling error can be obtained and used to construct a range around the population estimate that likely includes the actual value. This range around the population estimate is referred to as a *confidence interval*. The level of confidence corresponds to the probability that the actual value is within the range.

To construct a 90-percent confidence interval for a given estimate, compute the following:

$$\hat{\theta} \pm (1.645 \times \hat{\sigma}),$$

where $\hat{\theta}$ is the population estimate (the value in the publication table) and $\hat{\sigma}$ is the estimate of the sampling error, referred to here as the *standard error*. Standard errors can be obtained using either replicate weights or generalized variance functions (GVFs).

Replicate Weights

A file of replicate weights for the 2012 survey data may be merged with the public use file to calculate the errors used to construct confidence intervals. These replicate weights simulate the drawing of multiple samples from the population; these multiple simulations are used to estimate the variability observed in repeated sampling. Note that one year's replicate weight file is specific to that year, and the replicate weights are not used to calculate population estimates.

When replicate weights are used with the data tables, it is necessary to ensure that the reporting units of the population estimates match the reporting units of the standard errors. For instance, if the publication reports estimates in thousands, ensure that the standard errors are also expressed in thousands.

Generalized Variance Functions

The GVF is a formula used to estimate the standard error for a given population estimate in the data tables. It is derived through analysis of patterns observed after plotting replicate weight-based standard errors against the population estimates for which the standard errors were calculated. Additional analysis is conducted to determine whether patterns differ between different groups of estimates (for instance, nonmortgaged properties and properties financed with an adjustable-rate mortgage loan). Because the GVF is a model, the actual standard error (calculated with replicate weights) will vary slightly from the standard error estimated with the GVF.

The GVF uses two parameters, denoted as *B* and *A*, which are used in different formulae depending on the type of analysis being conducted. RHFS data users should use the values in Table 2 to determine the appropriate values of *A* and *B* for the characteristic.

Table 2. 2012 RHFS Generalized Variance Function Parameters

Number of Units in Property	Characteristic	Parameter *B*	Parameter *A*
All units	All	7	– 0.0004
2- to 4-unit Properties	Total nonmortgaged	15	– 0.0065
2- to 4-unit Properties	Total mortgaged, fully amortized, balloon, fixed ARM, other mortgaged	7	0
5- to 24-unit Properties	All	3	– 0.0001
25- to 49-unit Properties	All	0	0.0017
50 or more-unit Properties	All	0	0.0009

ARM = adjustable-rate mortgage. BSA = basic street address. RHFS = Rental Housing Finance Survey.

Counts

The standard error can be estimated using the following formula:

$$\hat{\sigma} = \sqrt{B\hat{\theta} + A\hat{\theta}^2}.$$

For example, suppose an estimated 1,000,000 total properties with mortgages. The 90-percent confidence interval for this estimate (in thousands) is:

$$1{,}000 \pm 1.645\sqrt{7(1{,}000) - 0(1{,}000^2)} = (862, 1138).$$

Thus, a 90-percent chance exists that the actual value is within the range of approximately 862,000 to 1,138,000 properties.

Differences

To determine if two estimates are significantly different from each other at the 90-percent confidence level, calculate the difference between the two estimates and the 90-percent confidence interval for the difference using the following formula. If the 90-percent confidence interval does not include 0, then the two estimates are different at the 90-percent confidence level.

$$\left(\hat{\theta}_1 - \hat{\theta}_2\right) \pm 1.645\sqrt{(\hat{\sigma}_1)^2 + (\hat{\sigma}_2)^2}.$$

Ratios

When a ratio *C*/*D* is computed where *C* is not a subgroup of *D* (for example, the number of 2-housing-unit properties as a ratio of the number of 4-housing-unit properties), the standard error for a ratio *C*/*D* is:

$$C/D\,\sqrt{(\hat{\sigma}_{\mathrm{C}}/C)^2 + (\hat{\sigma}_{\mathrm{D}}/D)^2}.$$

Percentages

Any subgroup can be shown as a percentage of a larger group. The standard error can be estimated using the following formula:

$$\sqrt{\frac{B \times p \times (1-p)}{\hat{\theta}_{\text{BASE}}}}.$$

For example, suppose that, from the previous example, of the estimated 1,000,000 properties with a mortgage, an estimated 20 percent of those properties have no off-street parking. The 90-percent confidence interval for this estimate (0.20) is—

$$0.20 \pm 1.645\sqrt{\frac{7 \times 0.20 \times (1-0.20)}{1{,}000}} = (0.14, 0.26).$$

Thus, a 90-percent chance exists that the actual value is within the range of approximately 14 to 26 percent.

Medians

Use the steps outlined in Table 3 to estimate the standard error for a median in the publication.

Table 3. How To Compute the Error From Sampling for a 90-Percent Confidence Interval for a Median

Steps for Calculations	The Formula	An Example
On how many total units is the median based (in thousands, exclude "not reported" and "don't know")?	$\hat{\theta}_{\text{BASE}}$	600
What is the estimated standard error of a 50% characteristic with a base equaling the total nonmortgaged properties?	$\hat{\sigma} = \sqrt{\frac{\text{B}(0.5)(1-0.5)}{\hat{\theta}_{\text{BASE}}}}$	$\sqrt{\frac{15(0.5)(1-0.5)}{600}} = 0.079$
What are the end points of the category that includes the median?	*X–Y*	$40,000–59,999
What is the width of this category (in dollars, rooms, or whatever the item measures)?	*W*	$20,000
How many housing units are in this median category (in thousands)?	$\hat{\theta}_{\text{SUBSET}}$	110
What is the estimated proportion of the total units falling in the category containing the sample median?	$P = \frac{\hat{\theta}_{\text{SUBSET}}}{\hat{\theta}_{\text{BASE}}}$	$\frac{110}{600} = 0.18$
Then the standard error from sampling for the median is approximately—	$se_{median} = \frac{\hat{\sigma} \times W}{P}$	$\frac{0.079 \times \$20{,}000}{0.18} = \$8{,}778$
The 90-percent confidence interval for the median is—	$Median \pm 1.645 \times se_{median}$	$\$41{,}080 \pm \$14{,}439$

7. NONSAMPLING ERROR

The four major sources of nonsampling error are nonresponse error, coverage error, measurement error, and processing error.

Nonresponse Error

Nonresponse error occurs when information is not collected during an attempted interview. The two types of nonresponse are unit nonresponse and item nonresponse. In unit nonresponse, no part of the interview is completed. Unit nonresponse occurred for RHFS when a respondent refused to complete the property questionnaire or when a sample BSA could not be located. In item nonresponse, part of the interview is completed, but some questions are not answered. It is common for respondents not to answer more personal questions, such as purchase price or market value; questions that will require research, such as mortgage information; or questions that are difficult to understand.

To reduce nonresponse, cognitive testing was performed before the RHFS data collection. As a result of this testing, some questions were reworded and definitions were added as needed.

The noninterview adjustment in the weighting lessened the effect of unit nonresponse. Information from the MAF and 2010 census was used to group the noninterviewed properties with similar properties that were interviewed.

It is likely that the methods used to account for unit and item nonresponse do not totally compensate for the nonresponse properties and the missing property and lender questionnaire data. As a result, an unknown level of error remains in these data because of both unit and item nonresponse.

Coverage Error

Undercoverage occurs when eligible BSAs are missing from the sample frame, and overcoverage occurs when duplicate BSAs exist on the sample frame. Because the RHFS sample was formed using the PSUs selected for the AHS, coverage errors for RHFS are likely related to the housing unit undercoverage and overcoverage that occurred during the AHS PSU selection process. In addition, any deficiencies in the MAF likely caused undercoverage errors.

In some surveys, the Census Bureau attempts to compensate for the deficiencies by adjusting the raw numbers from the survey proportionally so that the published numbers match independent estimates of the population total. The weighting procedures for RHFS did not include this adjustment to account for undercoverage.

Measurement Error

Measurement error occurs during data collection when the answer received from the respondent is different from the true answer. The four primary sources of measurement error were the questionnaire, the data collection method, the interviewer, and the respondent.

Questionnaire Effects

The design, content, wording, and length of the questionnaire can cause measurement error. Some questions on the RHFS forms may have been confusing. One important example is the definition of a property, because some respondents may not have realized that the questions applied to all the addresses considered part of that property. For properties with many addresses, it was often time consuming for the respondent to compile the financial information for all these addresses to determine the appropriate answer for the entire property. In addition, one person may not possess all the information required to fill out the form for these multiaddress properties. The respondents may have made mistakes when adding up the total information for the property or may have provided an incorrect response to a question they were not sure of rather than take the time to find out the correct answer.

To reduce the measurement error because of the questionnaire, cognitive testing was performed before the RHFS data collection. As a result of the testing, questions that were difficult to answer were rewritten or in some cases removed. After the data were collected, consistency edits were performed to reduce the effect of confusion that respondents may have had with the questions.

Data Collection Method Effects

Different types of data collection can often elicit different responses. RHFS was conducted using paper-and-pencil questionnaires designed either for administration by field representatives or the respondents themselves.

The Census Bureau sent advance letters to all BSAs in the sample. Then field representatives visited each property to obtain a referral to a knowledgeable respondent, usually a property owner. Field representatives would either complete the interviews with owners or leave questionnaires with owners to complete on their own.

Interviewer Effects

Interviewers were trained from common instructional materials to reduce interviewer bias. Still, different interviewers may have handled the RHFS data collection in different manners; in how they asked questions, in how they probed for answers, or in how they interacted with the respondents. As a result, some interviewers may have obtained different responses than others, and errors could have occurred. Either field representatives or self-reporting respondents may have given incorrect answers for one or several items on the questionnaire. In particular, respondents often gave different answers about the number of units in the property in the various questions (2a, 5, and 6) that asked about units.

Respondent Effects

Different respondents had different knowledge about their properties, and as such the quality of answers may have varied across respondents. In addition, respondents differed in the time and effort they were willing and able to give to complete the surveys.

Processing Error

RHFS included several stages of processing, and errors could be introduced in each stage.

All the completed questionnaires were keyed to create an electronic file of the data. It is possible that keyers transcribed answers incorrectly from the questionnaire.

For RHFS, the pre-edit step identified answers that seemed out of the reasonable range of responses. Computer edits were used to identify and correct unlikely and inconsistent answers on the questionnaires. Although editing can often improve the quality of the data, some errors may be missed, and other times edits can overwrite accurate data. Edits that try to fix a contradiction in the data may do so incorrectly.

The weighting enables statements to be made about the whole population from the data collected. Any of the steps of the weighting could introduce error. Incorrect assumptions in the design of the weighting will also introduce error in the results. In addition, the weights of individual properties vary significantly because of the characteristics of the property. Any mistakes made in characterizing the property will cause the weighting to be incorrect. A 10-unit property that is mistakenly classified as a 4-unit property on the sample data file will have a weight more than triple the correct weight. After final weights were assigned to each sample property, the weights were tabulated by different property and mortgage characteristics. All tabulations were performed by computer. Errors could occur when setting up the system to tabulate the data. Furthermore, any misclassification of properties will cause errors in these tabulations. Quality control checks and verification processes were used to minimize error during each phase of processing. Each step in the weighting was independently verified, and reasonability checks of the total weights were performed.