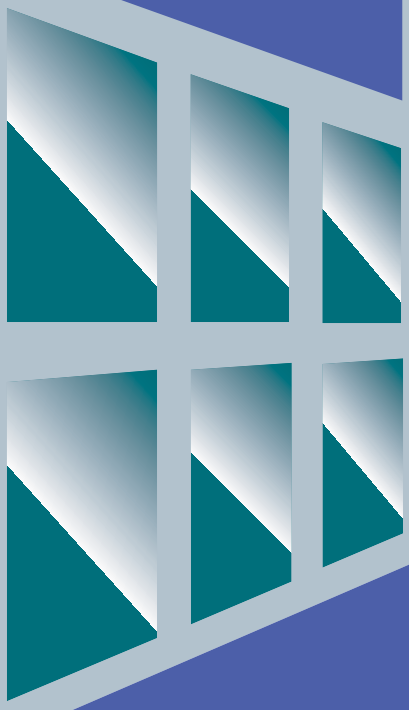

Multifamily Building Conformance With the Fair Housing Accessibility Guidelines

U.S. Department of Housing and Urban Development
Office of Policy Development and Research

MULTIFAMILY BUILDING CONFORMANCE WITH THE FAIR HOUSING ACCESSIBILITY GUIDELINES

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Office of Policy Development and Research

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PREFACE

In 1988, Congress passed the Fair Housing Amendments Act of 1988 (the Act), which requires that most newly constructed multifamily dwellings occupied after March 13, 1991 be designed and constructed to include certain features of accessible design. The Department of Housing and Urban Development undertook this study as the first attempt to estimate conformance with the accessibility requirements of the Act. This project examined data from inspections of a nationally representative sample of multifamily developments constructed between 1991 and 1997. It represents an important starting point for understanding the extent of conformance with HUD's Accessibility Guidelines of the Fair Housing Act.

The Accessibility Guidelines establish minimum standards that must be met to comply with the Act. For example, these standards require that dwellings be constructed so that at least one building entrance is on an accessible route; that public and common areas are readily accessible to persons with disabilities; and that all units conform to certain standards related to wheelchair accessibility and adaptive design. This study surveyed 291 separate elements that constitute these requirements. For example, an accessible route into and through the dwelling is measured by a series of questions including: the minimum clear width of the route, changes in level throughout the unit, obstructions, and elevator service to the unit. The questions on the requirement that kitchens and bathrooms be usable for individuals in wheelchairs include: clear space within the bathroom relating to lavatory and tub/shower access; clear floor space at the range or cooktop, sink, oven, dishwasher, refrigerator, and between counters; and clear floor space at all opposing base cabinets, countertops, appliances or walls.

The study involved taking actual measurements of buildings as they were constructed as well an assessment of the architectural plans. The study estimated the proportion of building elements related to accessibility that are in conformance. Over 80 percent of surveyed elements were in conformance for a large majority of buildings. Conformance in architectural plans was slightly higher than for the actual buildings. However, the data do not suggest that builder deviation from plans is a substantial cause of non-conformance. This also suggests that educating both builders and architects could lead to improvements in conformance with the Act.

This report is a useful baseline assessment of conformance levels at a national level.

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EXECUTIVE SUMMARY

The Fair Housing Act (the Act) requires that "covered multifamily dwellings" built for first occupancy after March 13, 1991, be designed and constructed to include certain features of accessible design. Covered multifamily dwellings are found in buildings consisting of four or more units, if such buildings have one or more elevators, and ground floor units in other buildings consisting of four or more units. The Act's design and construction requirements apply to privately owned housing, federally or publicly assisted housing, and to all types of housing when the housing is located in buildings containing four or more dwelling units, including, for example, single-family homes, apartments, condominiums, dormitories, assisted living developments, time-sharing properties, and homeless shelters when used as a residence. The requirements do not apply to multi-story town homes that do not have elevators or to single-family detached houses. As part of its obligation to provide technical assistance to states, units of local government, and others, the U.S. Department of Housing and Urban Development (HUD) published the Fair Housing Accessibility Guidelines (the Guidelines) in l991. The Guidelines are intended to provide a safe harbor for compliance with the accessibility requirements of the Fair Housing Act. Although these Guidelines are not the only method of complying with the Act, they are the most commonly known and utilized by the industry.

In 1997, HUD commissioned this study to obtain a quantitative assessment of the extent of conformance with the Guidelines and to suggest explanations for patterns of conformance and nonconformance. The study was developed in part because evidence from the field, complaints filed with HUD, and private litigation suggested that some architects, contractors, and building owners were either ignorant of, or were avoiding, the law and were building multifamily projects that did not comply with the Act's design and construction requirements. There was also a need for HUD to have baseline information on the extent to which covered multifamily dwellings were in compliance in order to measure the effects of its technical assistance and enforcement efforts. It was hoped that the results of the study could provide HUD with a better understanding of the level of compliance across the United States, as well as provide some guidance on how to improve compliance with the Act's requirements.

The study is descriptive in nature: it provides a statistical picture of multifamily housing conformance with the Guidelines. The study gives a broad national view of conformance but cannot be used to extrapolate about local conditions. Building design and construction are regulated at the local and/or state level; as a result, localities are subject to different building code and/or local accessibility requirements. This can have an impact on conformance at the local level, and as a result, the report's findings may differ with local reports of conformance in cities and states around the country.

The data gathered and analyzed for this report do not answer the question of *why* housing either meets or does not meet the Guidelines. The study does present possible explanations for the statistical findings; however, it is important to note that the survey did not allow for "shades of gray" in determining conformance with the Guidelines. The survey gathered data on whether certain elements of multifamily housing either met or did not meet the Guidelines, not the degree of overall conformance. The survey consisted of 291 separate questions about technical items relating to accessibility. Neither the questions nor the results were weighted, and all items were treated equally. Some readers may appraise one item as "more important" than another, but the

survey does not offer value judgments on the nature of conformance. Moreover, the degree of nonconformance was not considered, so that a 1-inch deviation from a requirement was treated equally to a 10-inch deviation. Thus, the survey measured and recorded levels of nonconformance that might not warrant enforcement action in the field, and the result is a report that simply describes the rates of conformance for multifamily housing in meeting the Guidelines.

Survey Design

The research approach for this project was to gather data on conformance via a survey of a nationally representative probabilistic sample of multifamily developments. A statistical formula was used to determine a sample size of 397 multifamily housing projects, distributed across the 10 HUD regions of the country, and projects were drawn randomly from the F. W. Dodge construction reports data set of multifamily projects completed for first occupancy between April 1, 1991 and March 31, 1997.

The survey included a review of site and building plans, on-site inspections of buildings, and tabulations of individual building evaluations to obtain detailed data on the degrees of conformance and nonconformance.

The analysis of the survey data also included follow-up discussions with 20 architects and builders to obtain their perspectives on the reasons behind the types and degrees of conformance and nonconformance. The discussions also gathered suggestions on how HUD could assist architects and builders in developing housing that conforms to the Guidelines. These views are not representative of the architectural and building community at large and solely reflect the opinions of the 20 discussants.

Cluster Analysis

The amount of data collected in the survey was large. Questions were asked about 291 separate building elements, though not all elements are applicable to all buildings. To aid in interpretation, the data were summarized in two ways. First, the percentage of surveyed dwelling units that were observed to be in conformance with each of the survey elements was calculated. This information was used to identify elements for which uniformly high levels of conformance exist nationwide. The conformance percentages by item are presented in Appendix B, pages B-1 to B-43.

Second, statistical analysis was used to construct summary scales or clusters of elements that showed similar patterns of conformance. To prepare the raw percentage data for clustering, those items for which conformance showed little variance (had standard deviations of less than .10), or items that were not applicable to large numbers of projects or units, were removed from the sample. (A full listing of these items is found in Section 3.1 of this report.) A total of 78 variables were excluded from this part of the analysis. The reason for this was to focus on those items that showed the most variance and which were relevant to large numbers of units and projects.

After the appropriate variables were selected, statistical analysis was used to identify clusters of items that showed similar patterns of conformance. The seven design and construction

requirements of the Act (see Table A, below, for a list of the requirements and composite measures) were used to form 16 **"composite conformance measures"** from the clustered data. A listing of all 16 composite conformance measures, and all of the items that make up each measure, is found in Section 4.2 of this report. (A detailed explanation of the method used to develop the clusters may be found in Appendix B.) For every project in the sample, a score is calculated for each of the 16 composite conformance measures. The score is the proportion of the individual items in a measure that were in conformance with the Guidelines.

An example will be used to illustrate how to interpret the clusters. The "Accessible Route" composite conformance measure, which reflects the level of conformance with Requirement 4, is a summary of five elements from the survey:

- A minimum clear width through the unit of 36 inches.
- Changes in level within the dwelling unit are beveled.
- Changes in level no more than 1/2 inch.
- No obstruction by a design feature throughout the dwelling.
- Elevator access to the primary entry of the unit.

If a unit has all five of these features and all conform to the Guidelines, the unit would receive a score of 100. If four of the five were in conformance, it would receive a score of 80. If one or more of the elements were not applicable (for example, if the building had no elevator) the score would be calculated on the basis of the four applicable elements. Thus, if "elevator" were inapplicable and the unit were in conformance with three of the four remaining elements, it would receive a score of 75. When translating the unit score to a building score, where more than one unit was examined, the building score would be the average of the unit scores. The 16 composite conformance measures, grouped by requirement, may be seen in Table A.

As can be seen in Table A, there are two sets of scores—one for "plan" and one for "field." Plan refers to measurements taken from architectural drawings; field refers to the actual buildings that were surveyed in the field. In most cases, plan and field data were available, but for some of the sites the architectural plans were not obtained. A few things should be noted about the approach to the data; first, any lack of conformance is treated similarly. For example, on the requirement for a minimum clear width of 36 inches for the accessible route, a width of 35 inches would count as much a failure to conform as would a width of 24 inches. Second, all elements are equally weighted. For example, a unit that failed two elements—because it had a clear width of only 35 inches and a single unbeveled change in level—would score a 60. A unit that failed only the element on design obstructions would score an 80—even though the obstruction could be a much greater accessibility problem than the unit with two instances of nonconformance. Thus, the composite scores do not shed light on the degree of nonconformance found, nor are judgments made about levels of variation from conformance.

Table A: Composite conformance measures by requirement

Requirement	Composite measure (# of items used to form measure)	Average Score	
		Plan	Field
1: Accessible Building Entrance on an Accessible Route	1. Building Entrance (2)	94	92
2: Accessible and Usable Public and Common Use Areas	2. Elevators (31)	76.6	91.3
	3. Public Accessible Routes (27)	95.5	89.5
	4. Safety Features of Accessible Routes (6)	97.2	91.2
	5. Public Facilities (18)	97.6	93.1
	6. Ramps and Obstructions (19)	96.9	93.8
	7. Curb Ramps (6)	96.4	92.3
	8. Clearance and Reach (5)	98.4	93.7
3: Usable Doors	9. Usable Doors (37)	96	90
4: Accessible Route Into and Through the Dwelling Unit	10. Accessible Route (5)	98	95
5: Light Switches, Electrical Outlets, Thermostats, and Environmental Controls in Accessible Locations	11. Access to Obstructed Switches (5)	97.4	88.7
	12. Height of Switches and Controls (3)	87.5	72.3
6: Reinforced Walls for Grab Bars	13. Reinforced Walls for Grab Bars (5)	85	73
7: Usable Kitchens and Bathrooms	14. Wheelchair Mobility in Bathrooms (15)	81.2	79.3
	15. Usability of Kitchen Appliances and Fixtures (6)	92.4	92.5
	16. Clear Spaces in Bath and Kitchen (7)	88.8	84.1

In most cases, plans have higher conformance scores than were found in the field. It appears that builders sometimes do not properly execute architectural plans. However, the plan and field scores are close, which suggests that the builders usually do execute the plans and that if elements are included in plans, builders will follow them.[1] The only measure for which conformance was higher in the field than in the plans was measure 2, Elevators. The explanation in this instance is most likely that elevators are delivered from the manufacturer built to predetermined standards.

[1] There are some statistically significant differences between the scores, however the magnitude of the differences is small.

Regression Analysis

To further investigate patterns of conformance and nonconformance, regression analysis (a standard statistical analysis tool) was used to examine whether variations in conformance levels were due to such distinctions as age of building, building size, and whether it was an elevator building. The dependent variables (data) used in the statistical analyses were the scores for the 16 composite conformance measures. This was done to explore whether particular characteristics of projects can provide any insight into whether projects will show high conformance with the clusters of elements included in these measures.

Study Findings

- The percentage of conformance for individual items in the survey ranged from 33.2 percent to 100 percent for projects surveyed in the field, with the bulk of items displaying conformance percentages in excess of 80 percent. Conformance percentages ranged from 24.1 percent to 100 percent for architectural plans.

- Of the 291 items included on the survey, 130 items showed conformance percentages of 95 percent and above for architectural plans for which they were applicable; 79 items showed conformance percentages of 95 percent and above for dwelling units and buildings in the field to which they were applicable. Overall, architectural plans showed slightly higher levels of conformance than did projects in the field.

- Conformance scores were uniformly high for Requirement 1 (Accessible Building Entrance on an Accessible Route); Requirement 2 (Accessible and Usable Public and Common Use Areas); Requirement 3 (Usable Doors); and Requirement 4 (Accessible Route Into and Through the Covered Unit).

- Conformance scores were somewhat lower for Requirement 5 (Light Switches, Electrical Outlets, Thermostats, and other Environmental Controls) and Requirement 7 (Usable Kitchens and Bathrooms).

- Conformance scores were lowest overall for Requirement 6 (Reinforced Walls for Grab Bars).

- Scores on the 16 composite conformance measures are generally similar for architectural plans and the projects built from them.

In summary, levels of conformance with accessibility requirements on the 16 composite measures were relatively high. Still, differences in conformance level were observed among the sample of completed dwelling units surveyed in this study, with reported levels of conformance ranging from 0 to 100. Regression analyses designed to examine the extent to which relevant building features—age of building, building size, and whether it was an elevator building—can account for differences in conformance level suggested that, indeed, some of these differences appear to be related to features of buildings and the building environment. Further examination of the underlying reasons for nonconformance with accessibility regulations should include a consideration of the particular disincentives and challenges to conformance behavior that may operate in different regions of the country.

1.0 INTRODUCTION

The purpose of this report is to present the findings of a nationwide survey of multifamily housing designed to determine conformance with the accessible design and construction requirements of the Fair Housing Act (the Act). The report contains a quantitative assessment of the extent of conformance and attempts to provide explanations for patterns of conformance and nonconformance. The report also contains recommendations for further research into this area.

Background

Title VIII of the Civil Rights Act (the Fair Housing Act), 42 U.S.C. §§ 3601 et seq., originally prohibited discrimination in housing and housing related transactions based on race, color, religion, national origin, and sex. In l988, Congress extended the protections of the Fair Housing Act (the Act) to families with children and persons with disabilities (42 U.S.C. § 3604). In response to the serious lack of accessible housing in the United States, Congress provided that all "covered multifamily dwellings" built for first occupancy after March 13, 1991, must include certain features of accessible design (42 U.S.C. § 3604(f)(3)(C)). These requirements are known as the Fair Housing Act's design and construction requirements.

The Act mandates that all such dwellings shall be designed and constructed so that: (1) the public and common use portions of such dwellings are readily accessible to and usable by persons with disabilities; (2) all the doors designed to allow passage into and within all premises within such dwellings are sufficiently wide to allow passage by disabled persons in wheelchairs; and (3) all premises within such dwellings contain the following features of adaptive design: (a) an accessible route into and through the dwelling; (b) light switches, electrical outlets, thermostats, and other environmental controls in accessible locations; (c) reinforcements in bathroom walls to allow later installation of grab bars; and (d) usable kitchens and bathrooms such that an individual in a wheelchair can maneuver about the space (42 U.S.C. § 3604(f)(3)(C)).

The Act's design and construction requirements apply only to "covered multifamily dwellings," which means "buildings consisting of 4 or more units if such buildings have one or more elevators; and ground floor units in other buildings consisting of 4 or more units" (42 U.S.C. § 3604(f)(7)). These requirements apply to privately owned and federally or publicly assisted housing, and they apply to all types of housing when the housing is located in buildings of four or more units, including, for example, single-family homes, apartments, condominiums, dormitories, assisted living, time-sharing properties, and homeless shelters when used as a residence. The requirements do not apply to alterations or renovations to multifamily dwelling units or to single-family detached houses.

The Act does not set forth specific technical design criteria that have to be followed in order to comply with the design and construction requirements. It does provide, however, that compliance with the appropriate requirements of the American National Standards Institute (ANSI) for buildings and facilities providing accessibility and usability for physically handicapped people, commonly known as ANSI A117.1, satisfies the Act's technical requirements. At the time the law was passed, the 1986 ANSI A117.1 standard was the edition in effect; therefore, the U.S. Department of Housing and Urban Development's (HUD's) regulations implementing the Act specified this edition of the ANSI standard for this purpose.

Congress directed the Secretary of HUD to "provide technical assistance to states and units of local government and other persons to implement [the design and construction requirements]" (42 U.S.C. § 3604(f)(5)(C)). To this end, on March 6, l991, HUD published the "Fair Housing Accessibility Guidelines," (Guidelines) at 56 FR 9472–9515. The Guidelines set forth specific technical guidance for designing covered multifamily dwellings to be consistent with the Fair Housing Act. Section I of the Guidelines states:

> These guidelines are not mandatory, nor do they prescribe specific requirements which must be met, and which, if not met, would constitute unlawful discrimination under the Fair Housing Act. Builders and developers may choose to depart from these guidelines and seek alternate ways to demonstrate that they have met the requirements of the Fair Housing Act. These guidelines are intended to provide a safe harbor for compliance with the accessibility requirements of the Fair Housing Act (56 FR at 9499).

On June 24, 1994, HUD published its "Supplement to Notice of Fair Housing Accessibility Guidelines: Questions and Answers about the Guidelines," at 59 FR 33362–33368 (Questions and Answers About the Guidelines). HUD also published a Fair Housing Act Design Manual (HUD Design Manual) in 1996 that was reissued in 1998 with minor changes. The Design Manual provides technical guidance along with illustrations and suggestions on how to comply with the Guidelines.

HUD and the U.S. Department of Justice (DOJ) are responsible for enforcement of all the provisions of the Fair Housing Act, including the design and construction requirements. Nothing in the Act gives HUD or DOJ the authority to require an enforcement mechanism at the state or local level, although the Act specifies that HUD may encourage review and approval of building plans at the state or local level to assess compliance with the Act's requirements.

The Study and its Limitations

The study consisted of a survey of a nationally representative sample of multifamily developments to ascertain whether the sample conformed to the Guidelines. The data collection activities included a review of site and building plans, on-site inspections of buildings, and tabulations of individual building data to estimate conformance with the Guidelines. After statistical analysis of the possible reasons for conformance was completed, discussions with a group of 20 architects and builders were conducted to yield a qualitative understanding of some of the reasons for the types and degrees of conformance and nonconformance. The discussions also solicited suggestions as to how HUD could assist architects and builders in designing and building housing that meets the Guidelines.

The study was developed in part because evidence from the field, complaints filed with HUD, and private litigation suggested that some architects, contractors, and building owners were either ignorant of, or were avoiding, the law and were building multifamily projects that did not comply with the Act's design and construction requirements. There was also a need for HUD to have baseline information on the extent to which covered multifamily dwellings were in compliance in order to measure the effects of its technical assistance and enforcement efforts. It

was hoped that the results of the study could provide HUD with a better understanding of the level of compliance across the United States, as well as provide some guidance on how to improve compliance with the Act's requirements.

At the outset, it was determined that the data collected in this effort would not be used for enforcement purposes. In order to ensure the full cooperation of builders, building owners, and architects, it was agreed that the information collected for this study would be kept confidential.

The survey questions were developed in 1997, and the data were collected during 1998–99. At the time the survey questions were developed and the survey was conducted, the Guidelines and the Fair Housing Act Design Manual were approved "safe harbors" for compliance with the design and construction requirements of the Act. In addition, at that time, the 1986 ANSI A117.1 standard was a safe harbor for meeting the Act's technical criteria. The Guidelines and the 1986 edition of the A117.1 standard were used to design the survey questions.

In 2000 HUD completed a review of four model building codes (1996 *Building Officials/Code Administrators (BOCA) National Building Code*, 1997 *Uniform Building Code*, 1997 *Standard Building Code*, and the *International Building Code* (*IBC*) (certain drafts)). As a part of this review, HUD reviewed the 1992 and 1998 editions of the A117.1 standard. Based on HUD's findings, which are contained in its final report on this review (65 FR 15740–15794, March 23, 2000), HUD provided technical assistance to members of the industry and disability advocacy groups to amend the International Code Council's (ICC's) International Building Code. The 2001 supplement to the *IBC* incorporates these amendments. In addition, HUD provided technical assistance to these same organizations to develop the *Code Requirements for Housing Accessibility* (*CRHA*), published by ICC in 2000. The *CRHA* is a compilation of all accessibility provisions contained in the 2000 *IBC*, along with the amendments incorporated into the 2001 supplement. Thus, the 1992 and 1998 editions of the A117.1 standard, when used in conjunction with the Act, HUD's Fair Housing Act regulations, and the Guidelines for the scoping requirements; the *IBC* as amended by the *2001 Supplement to the International Codes*; and the *CRHA* are now all recognized by HUD as additional safe harbors for compliance.

At the time the survey was designed in 1997, it was determined that buildings would be selected in each of HUD's 10 regions so that a nationally representative sample could be obtained. However, the sample taken in any particular region is too small to make regional or local generalizations. We are confident, however, that the sampling method produced valid national level estimates.

Practical considerations and funding constraints also prevented inclusion in the survey of questions about whether states or localities had building codes in effect that may have included accessibility requirements similar to those in the Act. During the course of HUD's 2000 model codes analysis, it became clear that a regionally based approach to assessing Fair Housing Act compliance would be useful for providing rates of compliance in different parts of the nation because some states and localities have no building codes, some have building codes without accessibility provisions, others have no building codes but do have accessibility laws that affect building design, and still others have codes that may conform to the Act's requirements. It is now well understood that the presence or absence of these codes may have an effect on whether

architects and builders comply with the Act's requirements. Therefore, HUD recognizes that, to the greatest extent possible, future research should take into account state and local code requirements and state and local accessibility laws.

It is also important to note that this survey did not allow for "shades of gray" in determining conformance with the Guidelines. In order to avoid surveyor bias, the questions were phrased to determine whether an element met a minimum standard of conformance. Dimensions were given as precise minimums and maximums, with the understanding that hallway clearance, for example, was not in conformance if it did not meet a minimum dimension, whether that dimension fell below the minimum by an inch or by a foot. In addition, neither the questions nor the results were weighted, and all items were treated equally. The failure to conform to a minor requirement was treated equally to the failure to conform to a major requirement. Thus, in some cases, the survey measured and recorded levels of nonconformance that may not constitute a finding of noncompliance in an enforcement action. Rather, the survey simply describes the rates of conformance for multifamily housing in meeting the Guidelines.

2.0 SURVEY DESIGN AND IMPLEMENATION

2.1 SAMPLE SELECTION

Population Size

Approximately 130,000 buildings built in the period from April 1991 through March 1997 were subject to the Act when this study was initiated. The law applies only to covered multifamily dwellings built for first occupancy after March 13, 1991. A review of Census data found that approximately 108,000 privately owned new multifamily buildings (4 units or more) were built in the calendar years 1991 through 1996. The inclusion of public housing and other non-privately-owned multifamily housing developments brings the total to approximately 130,000.

Sample Size and Distribution

A standard formula was used to determine the value for the sample size. The purpose of this calculation is to decide how many buildings should be selected in order for the sample to be representative of the population of all multifamily building built during the period of interest (1991–97). The sample selection process must maximize the representativeness of the sample but constrain the sample size to a reasonable number. Because there are no previous studies, an estimate must be used for the value of "*p*." The value of *p* is the best guess of the proportion of buildings that are actually in conformance with the Guidelines. Any number chosen is, by definition, arbitrary. In this case, *p* was set to equal .5, which has the effect of maximizing the sample and is the most conservative assumption. After calculating the formula, the minimum sample size that will give a 95-percent confidence interval (an error rate of ±2.5 percent) is determined to be approximately 384 (although, for pragmatic reasons, the actual number of projects sampled is slightly higher).[2]

A national sample was drawn by selecting projects from each of HUD's regions. It was important to ensure that each region be represented proportionately. The data support conclusions at the national level, but the sample size for any particular region is too small to conduct independent analysis for smaller geographic units. A sample was drawn at random from

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[2] The appropriate size of a representative sample of the estimated population of 130,000 newly constructed multifamily buildings subject to the Act was derived using the following formula from *Basic Business Statistics* (Mark L. Berenson and David Levine, Prentice-Hall):

$$n = \frac{Z^2 p(1-p)}{e^2}$$

where n = sample size
Z = confidence level
p = proportion of buildings needing to conform with the Act
e = sampling error

Without a prior estimate of multifamily conformance with the Guidelines based on past data or experience, a value of p was chosen that makes the quantity $p(1 - p)$ as large as possible (and, as a result, the sample size as large as possible). It can be shown mathematically that when $p = .5$, then $p(1 - p)$ is at its maximum value (.25). For a 95-percent confidence level ($Z = 1.96$), an estimated population proportion (p) of .5, and a projected margin of error of ±2.5 percent, this formula results in an estimated sample size.

each of the 10 HUD regions as they were defined at the time of the study in late 1997, in direct proportion to total housing starts (between 1991 and 1996) in those regions (see Table 2.1.1).

Table 2.1.1: Sample by region

Region		Number of Selected Dodge Reports	Target Sample Size
1.	New England	20	4
2.	NY/NJ	175	35
3.	Mid Atlantic	145	29
4.	Southeast	315	63
5.	Midwest	275	55
6.	Great Plains	160	32
7.	Southwest	225	45
8.	Rocky Mountain	85	17
9.	Pacific	355	71
10.	Northwest	175	35
Total		**1,930**	**386***

* The survey sample drawn from the Dodge data set totaled **386** projects. However, 11 of these represented multiple-site projects (the project was split between two sites). Each of these 11 sites was surveyed independently and assigned a separate project number. Thus, in all, a total of **397** projects were surveyed.

The sample was obtained by requesting a random selection of construction project information reports ("Dodge Reports") on multifamily housing (four units or more in a project or building, coinciding with Fair Housing Act criteria) from the F.W. Dodge Division of McGraw-Hill Companies (Dodge). Dodge Reports contain useful descriptors for this study, including: a) date of construction start; b) number of dwelling units; c) number of floors in building; d) whether or not buildings have elevators; and e) names, addresses, and phone numbers of the owner, architect, engineer, and builder/contractor.

Dodge had 90,761 multifamily housing construction start reports on file for the period between April 1991 and March 1997. Dodge had the capability of drawing from its database the majority of multifamily buildings built since April 1991, by county, state, or region, and of taking any randomly selected sample size from that population. For each region, projects were drawn at random from the Dodge Report data set of multifamily projects completed for first occupancy between April 1, 1991 and March 31, 1997.

It was anticipated that a significant number of the sampled projects would prove to be unavailable for inspection for a variety of reasons, such as: a) the development was never actually completed; b) entrance to the project is denied to surveyors; c) project plans are unavailable; d) the buildings were damaged or destroyed by fire or flood, or demolished. As a precaution, Dodge was requested to provide four additional sites for each one sampled, through

random selection, to supply substitute projects in case a site was not available for inspection. Therefore, a total of 1,930 Dodge Reports were drawn from McGraw-Hill archives, five times the target sample size, to provide a margin of safety in obtaining the appropriate number of projects for inspection. These randomly selected projects were batched by region, in five equal groups in each region. If a project proved to be unavailable for inspection, an available standby project would be substituted (see Table 2.1.1).

The statistical approach described above was presented to a Statistical Advisory Group convened to review the study methodology and to offer guidance in the statistical elements of the project. The Statistical Advisory Group consisted of:

- Sandra J. Newman, Ph.D., Institute for Policy Studies, Johns Hopkins University.
- George Galster, Ph.D., Wayne State University.
- Mitchell LaPlante, Ph.D., Disabilities Statistics Center, University of California at San Francisco.
- Kermit Baker, Ph.D., Joint Center for Housing Studies, Harvard University.

This procedure was designed to yield an array of multifamily developments including both elevator and non-elevator buildings. The sample also included developments with a variety of site conditions, such as urban/rural projects, large/small builders, high-rise elevator, and low-rise walk-up buildings.

Both plans (referred to as “architectural plans,” “building plans,” or “drawings”) and buildings (referred to as “field,” “field projects,” or “built projects”) were examined. The surveyors examined the drawings and visited actual buildings to collect data for this study. It was recognized that actual construction might be different from designs as drawn. Such discrepancies might point to failure of the architect to understand the Act, failure of the contractor to identify nonconformance in the architect’s design, or failure of the contractor to carry out Fair Housing Act-conforming designs in the field. Understanding how discrepancies between drawings and built projects come about might indicate areas where further education may be recommended for those in the building industry.

Selection of Units Within the Sample Set

Within each of the 397 multifamily housing projects, one, or more, example of each dwelling unit subject to the requirements of the Act was surveyed. These units were selected to represent different housing layouts that exist within the housing project, based on a review of the building plans and specifications. A total of 988 dwelling units were surveyed. Accessibility of common areas in the 397 survey projects was also assessed.

Projects subject to the accessibility requirements of the Act that were surveyed could have contained any number of dwelling units. For example, an elevator building subject to the accessibility requirements of the Act could have contained 400 units, all of which are required to meet the Guidelines. Another elevator building could have contained only 40 units, and so on. Similarly, all non-elevator buildings subject to the Guidelines could have contained any number of units. For the most part, the number of units contained in buildings not served by elevators was significantly less than those in buildings with elevators. Surveyors were required to survey

one unit of each type in buildings subject to the Guidelines. For example, if an elevator building contained 100 two-bedroom units that had the same layout and 100 one-bedroom units that had the same layout, only 1 two-bedroom unit and 1 one-bedroom unit were required to be surveyed. It is possible that some units specially designated as "handicapped" were included in the survey. Such units would, by definition, meet the Guidelines. It is not likely that all of the units included in the survey were of this type, but if some were included, it would be a source of bias in favor of higher levels of conformance.

In elevator buildings, only accessible routes to surveyed units were measured in the field, rather than accessible routes to all units in a building. Because the number of units in non-elevator buildings was relatively low, accessible routes to all ground floor units in non-elevator buildings subject to requirements of the Act were surveyed. In these cases, all of the routes to covered units were surveyed, but only the interior of one unit of each type was surveyed. Accessible routes to all units in all buildings were recorded from the architectural plans. In each case, surveyors examined the available floor plans for all units subject to the Guidelines and their associated accessible routes.

Surveyors were instructed that in some rare instances, due to extremes of terrain or unusual site characteristics, accessible entrances on accessible routes may be impractical to provide. Surveyors were instructed to consult the HUD Design Manual or to call Steven Winter Associates, Inc. (SWA) project staff for the technical guidance if a question about site impracticality came up. There were no instances where surveyors believed a project subject to the Guidelines was on an impractical site.

2.2 INSPECTION PROCEDURES

The review of the properties was conducted in two phases. The first consisted of evaluation of site and building plans, specifications, and construction documents. The other phase was an on-site physical inspection of developments, including sites, buildings, common areas, and units.

Plan reviews afford a distinct and necessary perspective for the study. In general, access to plans was more easily gained than access to properties. Permission to review was not required. Plans were obtained through sources such as building departments, architects, engineers, and contractors.

Plan reviews have the potential to identify unit and building characteristics that are not obvious during physical inspections. Examples of these characteristics include:

- Non-visible building elements, such as blocking inside walls for grab bars (if shown on plans).
- Dimensions of clearances, slopes, and other data.
- Indications of insufficient or faulty knowledge of the Act by architects, designers, and contractors.

Plan reviews also have some shortcomings in determining conformance, such as:

- The buildings may not have been completed or may not have been built in accordance with filed plans.
- Plans sometimes did not accurately show such details as thresholds, ramps, etc.
- Plans sometimes did not indicate such site elements as contours, outdoor walkways, paths, steps, ramps, etc.
- Plans do not often show the heights of electrical switches, thermostats, and electrical outlets.

Site inspections were conducted to verify and complement the preliminary insight gained from plan reviews.

Inspection Teams

Teams of undergraduate and graduate architecture students from architecture schools across the country were used to conduct the plan and field surveys of the 397 properties. A faculty member headed each school team. Architecture students were particularly well suited for this because of their familiarity with and interest in building design, architectural drawings, building codes, and Fair Housing Act issues. It was not possible to find a firm or school in Region IX, so teams in nearby regions were assigned to survey properties in this area.

A university school of architecture in each of the 10 HUD regions was requested to participate in the inspection phase. Each school was selected for its location as well as for its research and analysis capabilities, its experience with Fair Housing Act and Americans with Disabilities Act Accessibility Guidelines issues, and its experience with surveys. Seven schools agreed to participate:

- City University of New York, School of Architecture, New York, NY (Region II).
- University of Pennsylvania, School of Architecture, Philadelphia, PA (Region III).
- University of Florida, School of Architecture, Gainesville, FL (Region IV).
- University of Minnesota, College of Architecture, Minneapolis, MN (Region V).
- Washington University, School of Architecture, St. Louis, MO (Region VII).
- University of Utah, School of Architecture, Salt Lake City, UT (Region VIII).
- University of Oregon, School of Architecture, Portland, OR (Region X).

In the three cases where a school did not participate in the survey, professional property inspectors provided survey support. The companies were selected based on their previous work with HUD in property inspection. Three inspection companies participated in the survey:

- DFW Group, Inc., Arlington, TX (Region VI).
- Management Solutions of America, Inc., Atlanta, GA (Region IV).
- Parsons Brickerhoff, Herndon, VA (Region III).

SWA personnel conducted surveys of the four properties in the New England area (Region I).

Confidentiality
The details of the multifamily properties selected for this survey have been kept confidential. A letter from a HUD Deputy Assistant Secretary to property owners, architects, and builders stressed that their involvement was voluntary and that their identities and the location of the properties would remain confidential. The names and locations of the 397 properties surveyed were not revealed to HUD staff. Surveyors were required to sign a confidentiality form.

2.3 SURVEY INSTRUMENT AND FIELD PROCEDURES

The survey was designed to gather data on completed buildings and architectural plans. The instrument was based strictly on the structure of the Fair Housing Accessibility Guidelines and was organized around the Fair Housing Act's seven requirements (see sample survey instrument in Appendix A). The ANSI A117.1 design standard was used for question wording. It was determined that the easiest and most reliable method to use would be a question and answer checklist, which would require a minimum of interpretation on the part of the surveyor. The survey instrument consisted of 255 questions; the total number of data entries for questions on the survey instrument was 291, accounting for several multi-part questions (several questions recorded answers for conditions both "inside" the building and "outside" the building). Each question had only three possible answers: "yes," "no," and "not applicable." Each question recorded conditions in the plan survey and the field survey. The questions were phrased so that a "yes" answer indicated strict conformance with the Guidelines. The survey instrument also contained a cover sheet to record reference information such as building size, number of units, number of floors, date of certificate of occupancy, and the surveyor's identity.

This approach was in keeping with the goal that the surveyors not make value judgments about the nature of conformance. All items in the survey were treated equally. The survey instrument allowed surveyors to gather data on whether elements of multifamily housing either met or did not meet the Guidelines. This was in keeping with the study's descriptive nature of rates of multifamily housing conformance with the Guidelines.

The survey was developed with input from personnel in HUD's Office of Policy Development and Research (PD&R) and HUD's Office of Fair Housing & Equal Opportunity (FHEO). The development of the survey tool was also reviewed by a Disability Advisory Group (DAG), composed of individuals selected for their background and experience in disability issues. The three people who agreed to serve on the DAG were:

- David Hanson, Chicago Mayor's Office for People with Disabilities.
- Eleanor Smith, Concrete Change.
- Rebecca Ingram, New Mexico Governor's Committee for People with Disabilities.

It is important to note that this survey did not allow for "shades of gray" in determining conformance. The questions were phrased to determine whether an element met a minimum standard of conformance. Dimensions were given as precise minimums and maximums, with the understanding that hallway clearance, for example, was not in conformance if it did not meet a minimum dimension, whether that dimension was off by an inch or a foot.

Site Inspection Tool Kit
In addition to the survey instrument, inspectors were provided with a "tool kit" to assist them in data gathering. The kit included the Survey Handbook, which provided inspectors an illustrated guide with detailed instructions on how to complete the survey. The handbook was organized according to the seven requirement areas of the Act and covered which measurements were sought, how to collect the data, and how to complete the survey instrument. The other items in the kit were:

- HUD's *Fair Housing Act Design Manual*.
- Acetate overlay to be used in the review of plans to determine adequate clearances for wheelchair maneuverability.
- A plastic, full-scale T-turn template made from a polyethylene sheet, which could be unfolded and positioned on the floor to determine adequate clearances where required.
- A battery-powered sonic stud finder to determine whether there is wood blocking or plywood reinforcing present in bathroom walls for the installation of grab bars (if grab bars were not already installed).
- A door pressure indicator to measure the opening or closing force needed to operate a door.
- A legal-sized clipboard to record survey data onto the survey instrument, with a slope indicator, found on the back of the clipboard, used to determine whether slopes on accessible routes are no greater than required.
- A 25-foot retractable metal measuring tape to determine all field measurements.

Survey Implementation
Before commencing inspections, the surveyors were trained by project team members from Steven Winter Associates (SWA) via a teleconferencing session. The 4-hour training session, which was telecast from the HUD Training Center at national headquarters to regional HUD offices across the United States, ensured that every inspector was exposed to exactly the same training. The content of the training session was based on the survey instrument and organized according to the Survey Handbook. Before the training session, the survey instruments were distributed to the inspectors, who could then follow the handbook with the trainers. The telecast allowed time for the inspectors to call in with questions, which could be heard, along with the answers, by other inspection teams around the country. The teleconferencing session was videotaped, and copies of the tapes were distributed to the inspection teams so that they could be viewed later as refresher training.

Following the training session, staff from SWA and the National Conference of States on Building Codes and Standards (NCSBCS) visited inspector teams around the country and accompanied them on a sample inspection, answered questions, and made clarifications. Regular updates and clarification of the material in the survey handbook were made and distributed to the inspection teams.

Simultaneously with the training of surveyors, the survey instrument and proposed survey procedures were submitted for clearance to the Office of Management and Budget (OMB), as required by the Paperwork Reduction Act of 1995. OMB clearance for the project was granted in April 1998, and a control number was assigned to the survey (OMB No. 2528–0193). Following

OMB clearance, surveyor teams commenced plan reviews and site visits for field reviews. Surveys of the 397 projects took place between April and December 1998.

SWA maintained close contact with the inspection teams as the surveys were conducted. To ensure quality control, surveys were selected at random and compared with working drawings of the survey property by SWA staff. As noted above in Section 2.1, survey teams were provided with randomly selected back-up projects if a project in their list of survey properties was not available for inspection. SWA estimated that less than 10 percent of the projects identified for survey could not be inspected.

Data Entry

As each of the 397 surveys was completed, copied, and submitted to SWA, it was reviewed in detail, question by question, by SWA project staff for completeness and accuracy. If questions of veracity arose based on the information recorded on the survey form, or missing from the form, SWA staff contacted the survey team leaders or the survey teams for clarification. Following the quality control check, each completed survey form was copied and then sent to a subcontractor for data entry. Several times during the data-entry phase of the project, SWA requested sample analysis reports to ensure quality control.

3.0 DATA ANALYSIS METHODOLOGY

The data analysis is intended, primarily, to summarize levels of conformance on a variety of regulated building features and to examine variations in conformance rates. The data were analyzed element by element, rather than building by building. Because data were collected on a very large number of individual conformance items, it was unlikely that any particular building would conform to each of the 255 separate items included in the survey. Thus, the analysis examined conformance across buildings, not within buildings, for each survey item.[3] The dependent variables in the statistical analyses were the conformance rates for each Guideline, which provide a national level assessment of multifamily housing conformance. The data were further analyzed to assess the effect on conformance of such factors as the year the building was built, the size of the building, and geographic region. It should be noted that this study is descriptive in nature: it provides a statistical picture of multifamily housing conformance with the Guidelines. The analysis of the data does not provide a definitive answer for why the survey elements either conform or do not conform to the Guidelines. It also provides no assessment of the extent to which the developments may be out of compliance with the Act.

3.1 CLUSTERING

Overview

The challenge for the data analysis was the large number of elements that were surveyed. The final data set contained 291 separate variables[4] on all aspects of the building's design and construction as they pertained to the Act. Conformance with each individual item was assessed and is presented in this report. It was determined that the best approach to understanding patterns of conformance would be to "cluster" the data so that items that were conceptually and statistically related could be considered together. For example, the survey included five questions on "reinforced walls for grab bars." Although each item speaks to a slightly different aspect of conformance with grab-bar reinforcing, the data from these questions were analyzed as a single cluster, or "composite conformance measure." This makes it easier to understand the level of conformance for all issues relating to reinforcements in walls for grab bars, instead of reporting the conformance rates for each individual question regarding grab-bar reinforcements. Clustering the data allows a smaller number of composite conformance measures to be examined in detail. (The full Data Clustering Report, with supporting tables, is found in Appendix B.)

Composite Conformance Measures

The task of managing and interpreting the data was carried out in two stages that focused on somewhat different issues. In the first stage, the percentage of conformance with each individual item (survey question) was calculated for the entire sample. This provides an indication of the level and variability in rates of conformance across the broad array of items that were included in the survey. A number of items were observed to have very high rates of conformance (100 percent); this indicates that most architects and builders conform to those elements in the design and construction of multifamily housing projects. A listing of these items is presented in Table 3.1.1 at the end of this chapter.

In the second stage, in order to generate clusters of composite conformance measures some items were excluded from further analysis. The composite conformance measures were intended to

[3] Examination of within-building conformance rates is an area with great potential for future research.

[4] The variables were coded from the original pool of 255 survey questions.

represent aspects of housing accessibility for which there are differences in levels of conformance. The composite measures did *not* include several elements for which there was a consistently high level of conformance and many items that were not applicable to large numbers of units. Thus, scores on the composite conformance measures slightly under-represent actual conformance levels. Appendix B gives the percentage of units that are in conformance on each of the 290 items for both field (Table B2) and plan (Table B3) (exact wording of questions may be found in Appendix A and in Table B4, Appendix B). For a comprehensive picture of conformance levels, conformance scores on the 16 composite conformance measures should be considered in conjunction with the individual items that were identified as "high conformance" items throughout the sample.

After the selected items were excluded due to low variance or low proportion of units to which an item was applicable, analysis focused specifically on the subset of items for which conformance varied among the dwelling units and projects that were surveyed, and on elements that applied to a relatively large proportion of the sample. For those items, statistical analysis was used to identify clusters of items that showed similar patterns of conformance. Sixteen "composite conformance measures" were formed from the clustered data and structured along the seven design and construction requirements of the Act. A detailed discussion of all 16 composite conformance measures is found in Section 4.2 of this report. For each composite conformance measure, the items included can be found in Section 4.2 and in Table B4 in Appendix B.

Data Preparation

Data files were converted for use by standard statistical analysis software (SPSS-X V. 10.0) and were screened for unusual values and response patterns. Corrections were made when it was determined that there was an error in data entry, out-of-range variables were recoded as missing data, and some variables were recoded to increase interpretability of the results of data analysis.

It should be noted that "missing data," or failure to provide a response to an item, is a normal feature of survey data. It may occur for a number of reasons, including recording errors on the part of the individual completing the survey or difficulty determining the appropriate response to a question. It may also occur when an item is intentionally left unanswered because it is not applicable. The proportion of non-responses to items in this survey was fairly high (non-responses to individual items ranged from 20 percent to 50 percent for completed dwelling units). However, SWA's analysis of the patterns of non-response indicated that many of the non-responses reflected surveyor judgments that the individual item was not applicable to the building or dwelling unit being surveyed. For this reason, non-responses (missing) and explicit "not applicable" responses were combined for the analysis. (In Appendix B, "not applicable" and "missing" responses are distinguished in Tables B2 and B3.) The number of dwelling units or projects included in conformance scores and each analysis is the number of units/projects for which the element was considered applicable. Some elements were applicable to most units and buildings; others were applicable to a fairly small number of units and buildings. As such, the sample size on which conformance levels and other analyses are based varies considerably. Complete details may be found in Appendix B.

Formation of Composite Conformance Measures

In order to learn more about factors associated with variations in conformance, clusters of items that are empirically related were used to form a smaller number of composite conformance measures that could be examined in greater detail. This proceeded in four steps.

Step 1: Two criteria were used to identify field items that were excluded from consideration in the development of composite conformance measures. First, to ensure sufficient sample size to carry out statistical analyses, items that were not applicable to most buildings (i.e., items judged applicable to fewer than 100 units) were excluded. A total of 71 items were excluded for this reason. Second, for statistical reasons, items for which there was little or no variance in conformance (sample standard deviation less than .10) were excluded. An additional seven items were excluded for this reason. It is important to recognize that items excluded on the basis of the second criterion should *not* be ignored in descriptions of the level of conformance with housing accessibility requirements and regulations. Invariably, these were items for which the rate of conformance among applicable units was close to 100 percent. (This can be seen readily from a perusal of Table B2 in Appendix B.) The composite conformance measures were intended to represent aspects of housing accessibility for which there are differences in levels of conformance. Thus, they did *not* include elements for which there was a constant high level of conformance. Tables 3.1.2 and 3.1.3, at the end of this section, list, respectively, the 71 items (survey questions) that were excluded because they were applicable to fewer than 100 units in the survey, and the 7 items that were excluded because there was little or no variance in conformance (sample standard deviation less than .10).

Step 2: Each of the seven major sections of the survey (labeled Requirements 1–7, respectively) represents a logically distinct set of items pertaining to a particular category of requirements. The remaining items in each section were included in a series of multivariate analyses designed to identify groups of related items. Some items did not closely relate to any of the clusters; they were dropped from further consideration.

Step 3: The items (survey questions) comprising each component (i.e., an identified "cluster" of items) were combined to form 16 new measures of field conformance. The results of these analyses were also used to form a parallel set of 16 composite conformance measures for the architectural plan items in each section of the survey. Each measure produced scores on a 100-point scale. Scores were assigned in the following way: For each cluster of items used to define a composite conformance measure, a surveyed dwelling unit was assigned a score from 0 to 100 that indicated the proportion of applicable items with which the dwelling unit was in conformance. For example, if a composite conformance measure included a cluster of 10 items, a surveyed unit that conformed with 8 of those items would be assigned a score of 80. The score of a surveyed unit was only based on the items in the cluster that were applicable to that unit. So, for example, if 3 of the items in the cluster were not applicable to that unit and the unit conformed with the remaining 7 items, it was assigned a score of 100

Step 4: A score on each of the 16 composite conformance measures was calculated for every dwelling unit surveyed. For each measure, the scores for all dwelling units in a project

were averaged, and that conformance score was assigned to the project. These are referred to as aggregate scores. Unless otherwise noted, levels of conformance presented in this report are based on the aggregate scores calculated for projects that were sampled for the study.

The 16 composite conformance measures that emerged from the analysis, grouped by relevant Fair Housing Act requirement and listed with the number of items included in each measure, are as follows:[5]

Composite conformance measures by requirement*	
Requirement	**Composite measure (# of items used to form measure)**
1: Accessible Building Entrance on an Accessible Route	1. Building Entrance (2)
2: Accessible and Usable Public and Common Use Areas	2. Elevators (31)
	3. Public Accessible Routes (27)
	4. Safety Features of Accessible Routes (6)
	5. Public Facilities (18)
	6. Ramps and Obstructions (19)
	7. Curb Ramps (6)
	8. Clearance and Reach (5)
3: Usable Doors	9. Usable Doors (37)
4: Accessible Route Into and Through the Dwelling Unit	10. Accessible Route (5)
5: Light Switches, Electrical Outlets, Thermostats, and Environmental Controls in Accessible Locations	11. Access to Obstructed Switches (5)
	12. Height of Switches and Controls (3)
6: Reinforced Walls for Grab Bars	13. Reinforced Walls for Grab Bars (5)
7: Usable Kitchens and Bathrooms	14. Wheelchair Mobility in Bathrooms (15)
	15. Usability of Kitchen Appliances and Fixtures (6)
	16. Clear Spaces in Bath and Kitchen (7)

***The first number indicates the requirement, and the second number indicates the composite measure.**

[5] For the specific items clustered to form the composite measures, please note tables 4.2.1–4.2.16, which follow section 4.2.

TABLES FOR SECTION 3.1

In this and all other tables, "inside" refers to conditions inside the building; "outside" refers to conditions outside the building.

Table 3.1.1: PLAN ITEMS WITH 100 PERCENT CONFORMANCE

Survey Item #	Item Wording from Survey Instrument
10 plan inside	If the passing space in question (above) is an intersection of two corridors or walks, does it have a T-shaped turning space?
11 plan outside	Is the carpet or carpet tile used on a ground or floor surface securely attached with either a firm cushion, pad, or backing, or no cushion or pad?
12 plan inside	Does the carpet or carpet tile have a pile height of no more than ½"?
13 plan outside	Are exposed edges of carpets fastened to floor surfaces with trim along the entire length of the exposed edge?
14 plan inside	Are any changes in floor level between ¼" high minimum and ½" high maximum beveled?
16 plan inside	Do gratings on accessible routes and spaces have openings no greater than ½" wide in one direction, and are gratings with elongated openings placed so that the long dimension is perpendicular to the dominant direction of travel?
22 plan outside	Are gripping surfaces of handrails continuous, without interruption by newel posts, other construction elements, or obstructions?
24 plan inside	Are handrails, and any wall or other surfaces adjacent to them, free of any sharp or abrasive elements?
24 plan outside	Are handrails, and any wall or other surfaces adjacent to them, free of any sharp or abrasive elements?
25 plan inside	Are handrails securely fastened to their fittings?
25 plan outside	Are handrails securely fastened to their fittings?
27 plan inside	Do such extensions return to a wall guard or the walking surface, or are they continuous to the handrail of an adjacent ramp run?
54 plan	Do bottoms of diagonal curb ramps have 48" minimum clear space?
57 plan	Do raised islands in crossings have a cut-through level with the street or have curb ramps at both sides, and a level area 48" long minimum by 36" wide minimum, in the part of the island intersected by the crossing?
61 plan	Is the landing width at least as wide as the widest ramp run leading to it?
65 plan	Are the cross slopes of ramp surfaces level?
69 plan	Do outdoor ramps and approaches to them appear to be designed so that water will not accumulate on walking surfaces?
77 plan	Do outdoor stairs and approaches to them appear to be designed so that water will not accumulate on walking surfaces?
132 plan	Toilet rooms and bathing facilities: Are grab bars and any wall surfaces adjacent to grab bars free of sharp or abrasive elements?
133 plan	Toilet rooms and bathing facilities: Are grab bars securely fastened to their fittings?
152 plan	Laundry rooms: Are operable parts of at least one appliance within the high side reach of 54" maximum and the low side reach of 15" minimum above the floor?
160 plan	Doors on accessible routes and in public and common use areas: *Latch-side approach to push side of swinging door with closers:* Is there maneuvering space that extends 24" minimum parallel to the doorway beyond the latch side of the door and 48" minimum perpendicular to the doorway?

Table 3.1.1: PLAN ITEMS WITH 100 PERCENT CONFORMANCE (continued)

Survey Item #	Item Wording from Survey Instrument
162 plan	Doors on accessible routes and in public and common use areas: *Front approach to sliding doors and folding door:* Is there maneuvering space that is the same width as the door opening that extends 48” minimum perpendicular to the doorway?
163 plan	Doors on accessible routes and in public and common use areas: *Slide-side approach to sliding and folding doors:* Is there maneuvering space of 54” minimum, parallel to the doorway, and 42” minimum, perpendicular to the doorway?
164 plan	Doors on accessible routes and in public and common use areas: *Latch-side approach to sliding and folding doors:* Is there maneuvering space that extends 24” minimum beyond the latch side of the door that extends 42” minimum perpendicular to the doorway?
167 plan	Doors on accessible routes and in public and common use areas: Do hinged or pivoted doors in a series swing either in the same direction or away from the space between doors?
171 plan	Doors on accessible routes and in public and common use areas: Is door hardware mounted within a high forward reach of 48” maximum and a low forward reach of 15” minimum above the floor; and within a high side reach of 54” maximum and low side reach 15” minimum above the floor?
172 plan	Doors on accessible routes and in public and common use areas: When sliding doors are in the fully open position, is operating hardware exposed and usable from both sides?
173 plan	Doors on accessible routes and in public and common use areas: Is the pushing or pulling force required to open hinged doors 5.0 lbs. maximum?
174 plan	Doors on accessible routes and in public and common use areas: Is the pushing or pulling force required to open sliding or folding doors 5.0 lbs. maximum?
175 plan	Doors on accessible routes and in public and common use areas: Is the time for power-operated doors to fully open 3 seconds or more?
189 plan	Primary entry door to accessible units: Is the space between two hinged or pivoted doors in a series 48” minimum plus the width of any door swinging into the space?
190 plan	Primary entry door to accessible units: Do hinged or pivoted doors in a series swing either in the same direction or away from the space between doors?
194 plan	Primary entry door to accessible units: Is door hardware mounted within a high forward reach of 48” maximum and a low forward reach of 15” minimum above the floor; and within a high side reach of 54” maximum and low side reach 15” minimum above the floor?
195 plan	Primary entry door to accessible units: Is the pushing or pulling force required to open hinged doors 5.0 lbs. maximum?
200DR plan	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the dining room?
200LR plan	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the living room?
207 plan	Where a single-story dwelling unit has a special design feature, are all portions of the single-story unit, except the loft or the sunken or raised area, on an accessible route?

Table 3.1.1a: FIELD ITEMS WITH 100 PERCENT CONFORMANCE

Survey Item #	Item Wording from Survey Instrument
12 field outside	Does the carpet or carpet tile have a pile height of no more than ½"?
21 field inside	Is the clear space between handrail and wall 1½" minimum?
25 field inside	Are handrails securely fastened to their fittings?
25 field outside	Are handrails securely fastened to their fittings?
190 field	Primary entry door to accessible units: Do hinged or pivoted doors in a series swing either in the same direction or away from the space between doors?
194 field	Primary entry door to accessible units: Is door hardware mounted within a high forward reach of 48" maximum and a low forward reach of 15" minimum above the floor; and within a high side reach of 54" maximum and low side reach 15" minimum above the floor?
200DR field	Doors within units: Do the doors within the individual dwelling units provide a nominal 32" clear opening of at least 31-5/8" when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the dining room?
200LR field	Doors within units: Do the doors within the individual dwelling units provide a nominal 32" clear opening of at least 31-5/8" when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the living room?

Table 3.1.2: SURVEY ITEMS APPLICABLE TO FEWER THAN 100 UNITS (71 items)

Survey Item #	Item Wording from Survey Instrument
11 outside	Is the carpet or carpet tile used on a ground or floor surface securely attached with either a firm cushion, pad, or backing, or no cushion or pad?
12 inside	Does the carpet or carpet tile have a pile height of no more than ½"?
12 outside	Does the carpet or carpet tile have a pile height of no more than ½"?
13 outside	Are exposed edges of carpets fastened to floor surfaces with trim along the entire length of the exposed edge?
16 inside	Do gratings on accessible routes and spaces have openings no greater than ½" wide in one direction, and are gratings with elongated openings placed so that the long dimension is perpendicular to the dominant direction of travel?
16 outside	Do gratings on accessible routes and spaces have openings no greater than ½" wide in one direction, and are gratings with elongated openings placed so that the long dimension is perpendicular to the dominant direction of travel?
17 inside	Are handrails provided on both sides of stairs and ramps?
18 inside	Are handrails continuous within the full length of each stair flight or ramp run?
19 inside	Are inside handrails on switchback or dogleg stairs or ramps continuous between flights or runs?
20 inside	Are the tops of gripping surfaces of handrails mounted 34" minimum and 38" maximum vertically above stair nosings and ramp surfaces and at a consistent height above stair nosings and ramp surfaces?
21 inside	Is the clear space between handrail and wall 1½" minimum?
22 inside	Are gripping surfaces of handrails continuous, without interruption by newel posts, other construction elements, or obstructions?
23 inside	Do handrails have a circular cross section with an outside diameter of between 1¼" and 1½"?
24 inside	Are handrails, and any wall or other surfaces adjacent to them, free of any sharp or abrasive elements?
25 inside	Are handrails securely fastened to their fittings?
26 inside	At ramps (except for continuous handrails at the inside turn of ramps) do handrails extend horizontally 12" minimum beyond the top and bottom of ramp runs?
26 outside	At ramps (except for continuous handrails at the inside turn of ramps) do handrails extend horizontally 12" minimum beyond the top and bottom of ramp runs?
27 inside	Do such extensions return to a wall guard or the walking surface, or are they continuous to the handrail of an adjacent ramp run?
28 inside	At the top of stair flights, except for continuous handrails at the inside turn of stairs, do either of these conditions apply: handrails extend horizontally above the landing for 12" minimum beginning directly above the first riser nosing and return to a wall guard; handrails are continuous to the handrail of an adjacent stair flight?
29 inside	At the bottom of stair flights, except for continuous handrails at the inside turn of stairs, do either of these conditions apply: handrails extend 12" minimum horizontally beginning directly above the last riser nosing and return to a wall guard or the walking surface; handrails are continuous to the handrail of an adjacent stair flight?
30 inside	Are accessible parking spaces located on accessible routes provided for at least 2 percent of covered dwelling units?

Table 3.1.2: SURVEY ITEMS APPLICABLE TO FEWER THAN 100 UNITS (71 items) (continued)

Survey Item #	Item Wording from Survey Instrument
31 inside	Are necessary site provisions such as parking and curb cuts available at the public or common use facility?
63	For ramps that change direction at landings, is the landing 60” by 60” minimum?
68	If curbs or barriers at least 4” high are not provided, do the ramps or landings protrude at least 12” beyond the inside surface of the railing?
71	If a ramp or other means of access is not located within sight from stairs, is there directional signage to a ramp or other means of access?
109	If all elevators are not accessible, are the accessible elevators clearly identified with the international symbol of accessibility?
110	If the building has a platform lift, does it comply with the relevant requirements above and provide the minimum 30” x 40” clear floor space?
117	Do freestanding or built-in drinking fountains and water coolers have a clear floor space at least 30” x 48” to allow for a parallel approach?
119	Do transfer-type shower stalls have a 36” x 36” inside finished dimension?
120	Do transfer-type shower stalls provide a clear floor space of at least 36” wide by 48” long measured from the control wall?
121	Do roll-in type shower stalls have a 30” x 60” inside finished dimension?
122	Do roll-in type shower stalls provide a clear floor space of at least 36” wide by 60” long?
124	Is a folding or non-folding L-shaped seat provided in transfer-type shower stalls that is mounted 17” to 19” above the bathroom floor extending the full depth of the stall?
125	Is the rear edge of the seat 2 ½” maximum and the front edge 15” to 16” from the seat wall?
126	Is the “L” portion of the seat 1 ½” maximum from the back wall and 14” to 15” from the back wall to the inner edge of the seat?
127	Is the front edge of the “L” 22” to 23” from the seat wall?
128	Is the seat on the wall opposite the controls?
135	For transfer type showers, do grab bars extend across the control wall and back wall to a point 18” from the control wall?
136	For roll-in type showers, are grab bars provided on the three walls of the shower?
137	Can controls be operated with one hand without the need to grasp tightly, pinch, or twist the wrist?
138	Are controls in roll-in showers located on the back wall 38” to 48” above the shower floor?
139	In transfer-type shower stalls, are controls, faucets, and the shower unit mounted on the side wall opposite the seat 38” to 48” above the shower floor?
140	Are thresholds in shower stalls no higher than ½”?
141	Are threshold heights between ¼” and ½” beveled?
142	Do enclosures for shower stalls obstruct controls or obstruct transfer from wheelchairs onto shower seats?
144	If benches are provided, are they 20” to 24” wide by 42” to 48” long fixed to a wall along the longer dimension, mounted 17” to 19” above the floor?
145	Is a 30” x 48” clear floor space provided at accessible benches?

Table 3.1.2: SURVEY ITEMS APPLICABLE TO FEWER THAN 100 UNITS (71 items) (continued)

Survey Item #	Item Wording from Survey Instrument
146	If benches are installed in wet locations, is the surface of the bench slip resistant?
162	Doors on accessible routes and in public and common use areas: *Front approach to sliding doors and folding door:* Is there maneuvering space that is the same width as the door opening that extends 48” minimum perpendicular to the doorway?
163	Doors on accessible routes and in public and common use areas: *Slide-side approach to sliding and folding doors:* Is there maneuvering space of 54” minimum, parallel to the doorway, and 42” minimum, perpendicular to the doorway?
164	Doors on accessible routes and in public and common use areas: *Latch-side approach to sliding and folding doors:* Is there maneuvering space that extends 24” minimum beyond the latch side of the door that extends 42” minimum perpendicular to the doorway?
172	Doors on accessible routes and in public and common use areas: When sliding doors are in the fully open position, is operating hardware exposed and usable from both sides?
174	Doors on accessible routes and in public and common use areas: Is the pushing or pulling force required to open sliding or folding doors 5.0 lbs. maximum?
175	Doors on accessible routes and in public and common use areas: Is the time for power-operated doors to fully open 3 seconds or more?
176	Doors on accessible routes and in public and common use areas: Is the force required to stop power-operated door movement 15 lb. maximum?
189	Primary entry door to accessible units: Is the space between two hinged or pivoted doors in a series 48” minimum plus the width of any door swinging into the space?
190	Primary entry door to accessible units: Do hinged or pivoted doors in a series swing either in the same direction or away from the space between doors?
200	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the powder room?
200	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the kitchen?
200	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the dining room?

Table 3.1.2: SURVEY ITEMS APPLICABLE TO FEWER THAN 100 UNITS (71 items) (continued)

Survey Item #	Item Wording from Survey Instrument
200	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the living room?
200	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop for other doors 1?
200	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop for other doors 2?
202	If an exterior deck, patio, or balcony surface is constructed of non-impervious materials (such as sand, wood, or gravel), is it no more than ½” or less below the floor level of the interior floor level of the dwelling unit?
206	If changes in level are greater than ½”, is a ramp or other means of access provided?
207	Where a single-story dwelling unit has a special design feature, are all portions of the single-story unit, except the loft or the sunken or raised area, on an accessible route?
216	Is the reach to operable parts of thermostats over an obstruction between 20” and 25” in depth (such as a protruding shelf)?
217	Is the reach to operable parts of other environmental controls over an obstruction between 20” and 25” in depth (such as a protruding shelf)?
239	When two or more lavatories in a bathroom are provided, is one made accessible?
250	If the shower stall is the only bathing facility provided in the covered dwelling unit, or on the accessible level of a covered multistory unit, and it measures a nominal 36” x 36”, does it have reinforcing to allow for installation of an optional wall-hung bench seat?
252 trash compactor	A 30” by 48” clear floor space must be provided at ovens, dishwashers, refrigerators, freezers, and trash compactors. It can be oriented in either a parallel or a perpendicular position and must be centered on the appliance.

Table 3.1.3: Survey items excluded because of little or no variance in conformance (7 items)

Survey Item #	Item Wording from Survey Instrument
25 outside	Are handrails securely fastened to their fittings?
54	Do bottoms of diagonal curb ramps have 48” minimum clear space?
57	Do raised islands in crossings have a cut-through level with the street or have curb ramps at both sides, and a level area 48” long minimum by 36” wide minimum, in the part of the island intersected by the crossing?
59	Is the clear width of the ramp 36” minimum?
61	Is the landing width at least as wide as the widest ramp run leading to it?
179	Do doorways have a clear opening of 32” minimum with door open 90 degrees measured between the face of the door and the stop?
194	Is door hardware mounted within a high forward reach of 48” maximum and a low forward reach of 15” minimum above the floor; and within a high side reach of 54” maximum and low side reach 15” minimum above the floor?

3.2 CONFORMANCE DISCUSSIONS

In November 2000, after the survey data analysis was completed, discussions were held with professionals involved in the design and construction of multifamily housing to understand the qualitative reasons why the Guidelines are adhered to or ignored. They focused on such issues as:

- Size of firm.
- Experience with multifamily housing.
- Familiarity with the Fair Housing Act, as amended in 1988.
- Likely areas of nonconformance.
- Why builders sometimes deviate from plans.
- Steps that might be taken to promote conformance.

SWA conducted telephone discussions with 11 architects and 9 contractors who were selected randomly from the projects in the conformance study. The identity of the discussion participants is confidential. The goal of the discussions was to solicit comments that would reflect the respondents' understanding of the design and construction requirements of the Act and their role in the process of ensuring that projects are compliant. Discussants were also asked for their suggestions on how HUD might be of assistance to architects and builders in the design and construction of housing that meets the Guidelines. Summaries of the discussions may be found in Appendix C. The information collected in the discussions was used to suggest reasons why conformance rates for different requirements may have varied and to formulate ideas for ways to raise conformance through professional education. These discussions are not representative of the larger community of architects and builders. The comments should only be read to reflect the opinions of the 20 discussants. The contents of Appendix C are solely the views of the 20 architects and contractors with whom discussions were held and do not reflect the views or policies of HUD.

4.0 RESEARCH FINDINGS

This chapter is divided into several distinct sections in order to discuss the results of the analysis. The findings in Section 4.1 are presented as per-item (individual question) conformance scores. The findings presented in Section 4.2 are organized according to "clusters" or "composite conformance measures" (as discussed in Section 3.1 above) and by Fair Housing Act Requirement. The advantages of this organization are that it allows for a discussion of conformance measures in a form familiar to those with a working knowledge of the accessible design requirements of the Act. Section 4.3 presents comparisons of architectural plans and the field (actual projects built from the plans), and Section 4.4 briefly summarizes regional differences in conformance. The impact of building characteristics (project age, size, presence of an elevator) on the composite conformance measures is covered in Section 4.5.

It should be noted that for each of the survey items, both for plan and field, there is a great deal of missing data, as discussed in Section 3.1. Some of the missing data is expected because not all items were applicable to all units or buildings. There are instances, however, where it appears that an item should be applicable to a particular building or plan, yet the data is still missing. In the case of plans, it was not possible to obtain plans for all buildings; in some instances, plans were incomplete. Thus, it was not always possible to assess if the plan was in conformance for a particular item—there was simply insufficient information. It is more difficult to explain this phenomenon in the field, but it may be the case that not all surveyors were successful in assessing some of the necessary measures, that items were purposefully or inadvertently skipped, or that the surveyors misunderstood the survey instructions. It is also possible that survey teams ran out of time and were unable to complete all items.

4.1 SUMMARY OF INDIVIDUAL ITEMS

Tables B2 (field) and B3 (plan) in Appendix B contain the percentage of answers that were in conformance for each survey question. Conformance for individual items ranged from 33.2 percent to 100 percent for the field. There were 225 field items with conformance scores in excess of 80 percent. Table 3.1.1a lists the questions with 100-percent conformance in the field. For plans, conformance ranged from 24.1 percent to 100 percent. Table 3.1.1, in the previous section, lists all of the questions with 100-percent conformance for plans. Many more items have 100-percent conformance on the plans than in the field.

Conformance rates of 100 percent were observed for a total of 38 plan and 8 field items. Of these 46, 24 of the items also apply to fewer than 100 units (see Table 3.1.2). Quite a few of these items are not directly related to accessibility and are simply examples of standard building practices or items that would require compliance based on safety codes. For example, items 11 and 12, dealing with carpet being firmly attached to the floor and having exposed edges fastened with trim for the full length of the carpet; item 16, dealing with openings in gratings no greater than ½ inch; and items 24, 25, 132, and 133, dealing with handrails or grab bars being free of sharp surfaces and firmly attached to the wall, are all things that would be done as standard practice and do not indicate any special attention to accessibility issues.

Of the 291 conformance items included in the survey, 130 items showed conformance of 95 percent and above for architectural plans for which they were applicable; 79 items showed conformance scores of 95 percent and above for dwelling units to which they were applicable. It

appears that conformance with the requirements identified in those items (which can be found in Tables B2 and B3 in Appendix B) can be expected as a matter of course in units to which they are applicable. Note again, however, that some of these items, similar to those scoring 100 percent, are not solely related to accessibility and are factors where conformance may be attributed to standard building practices or adherence to building code requirements.

4.2 MEAN COMPOSITE CONFORMANCE SCORES

This section presents the composite conformance scores for each of the 16 measures, following the structure of the Fair Housing Act accessibility requirements. Scores on each of the 16 composite conformance measures can be interpreted as the average proportion of *applicable* items with which surveyed units were in conformance. Examining mean conformance scores for buildings provides a way to assess conformance in the field. This assessment provides an overview of the level of conformance nationally. The tables that show each of the questions that formed a particular composite measure may be found at the end of this section, beginning on page 34, organized by requirement. The following table lists each of the composite conformance measures, ranked by score[6]:

Composite Conformance Measure*	**Score (Field)**	**Score (Plan)**
4:10 Accessible Route	95.0	98.0
2:6 Ramps and Obstructions	93.8	96.9
2:8 Clearance and Reach	93.7	98.4
2:5 Public Facilities	93.1	97.6
7:15 Usability of Appliances and Fixtures	92.5	92.4
2:7 Curb Ramps	92.3	96.4
1:1 Accessible Building Entrance on an Accessible Route	92.0	94.0
2:2 Elevators	91.3	76.6
2:4 Safety Features of Accessible Routes	91.2	97.2
3:9 Usable Doors	90.0	96.0
2:3 Public Accessible Routes	89.5	95.5
5:11 Access to Obstructed Switches	88.7	97.4
7:16 Clearance Spaces in Bathroom and Kitchen	84.1	88.8
7:14 Wheelchair Mobility in Bathroom	79.3	81.2
6:13 Reinforced Walls for Grab Bars	73.0	85.0
5:12 Height of Switches and Controls	72.3	87.5

*The first number indicates the requirement, and the second number indicates the composite measure.

REQUIREMENT 1: Accessible building entrance on an accessible route

"Under section 100.205(a), covered multifamily dwellings shall be designed and constructed to have at least one building entrance on an accessible route, unless it is impractical to do so because of terrain or unusual characteristics of the site."

[6] Details on the calculation of the mean scores may be found in Appendix B.

There is one composite conformance measure for Requirement 1. The specific items that were clustered to form this composite conformance measure may be seen in Table 4.2.1, following Section 4.2. The mean composite conformance measure scores for both plan and field are as follows:

Composite Conformance Measure	Score (Plan)	Score (Field)
1:1 Accessible Building Entrance on an Accessible Route[7]	94	92

When individual items are considered, high scores (95 and above) were not observed for any of the conformance items in Requirement 1 for field projects; for architectural plans, 1 of the 2 individual conformance items used to form the composite measure had a score of 95 or above.

Discussion

In elevator buildings, for the most part, only accessible routes to surveyed units were measured in the field. In the field, only one unit of each type was surveyed. In non-elevator buildings, which usually had far fewer units than in elevator buildings, accessible routes to all ground floor units were surveyed. However, accessible routes to all covered units in elevator and non-elevator buildings were surveyed on the available plans.

The relatively high scores for Requirement 1 suggest that one of the key elements of accessibility—getting into the building or the unit—is an issue to which most architects and builders are attentive. However, it is unclear whether this is due to their familiarity with the Guidelines or other Federal accessibility requirements, such as the Americans with Disabilities Act. Multifamily buildings sometimes share certain characteristics such as size and scale with commercial structures; thus, architects and builders may be meeting Requirement 1 because they are aware of comparable accessibility requirements applicable to commercial structures, not the Guidelines.

REQUIREMENT 2: Accessible and usable public and common use areas

"Section 100.205(c)(1) provides that covered multifamily dwellings with a building entrance on an accessible route shall be designed in such a manner that the public and common use areas are readily accessible to and usable by handicapped persons."

There are seven composite conformance measures for Requirement 2. The specific items that were clustered to form this composite conformance measure may be seen in Tables 4.2.2–4.2.8, following Section 4.2. The mean composite conformance measure scores for both plan and field are as follows:

Composite Conformance Measure	Score (Plan)	Score (Field)
2:2 Elevators[9]	76.6	91.3
2:3 Public Accessible Routes[10]	95.5	89.5

[7] Note Table 4.2.1.
[9] Note Table 4.2.2.
[10] Note Table 4.2.3.

2:4 Safety Features of Accessible Routes[11]	97.2	91.2
2:5 Public Facilities[12]	97.6	93.1
2:6 Ramps and Obstructions[13]	96.9	93.8
2:7 Curb Ramps[14]	96.4	92.3
2:8 Clearance and Reach[15]	98.4	93.7

Discussion

The comparison of scores for the seven composite conformance measures of Requirement 2 indicates that architectural plans are usually in greater conformance than the projects built from the plans. This was true for six out of the seven measures. With the exception of the elevators measure, architectural plans showed a higher level of conformance than the projects in the field. However, the range of variation between scores for plan and field was not dramatic.

There is marked variation in the scores for elevators. Elevators as shown in architectural plans scored only 76.6, while buildings scored 93.1 for elevator conformance. This might be explained by the nature of how elevators are shown on plans and how architects specify them. Most commonly, elevators are not shown in great detail on plans. Elevators are considered pieces of "equipment" that come from the factory ready for installation. The architect should specify that the elevator must meet the Guidelines. Elevator companies design and construct their products to be in compliance with code requirements, and they may claim code conformance as part of their marketing strategy. Therefore, if the architect specifies the correct model, they can be reasonably assured that the installed elevator will be in conformance, and there is no need to indicate all of the conformance features on the drawings. This may explain the divergence in conformance scores between architectural plans and projects.

REQUIREMENT 3: Usable doors

"Section 100.205(c)(2) provides that covered multifamily dwellings with a building entrance on an accessible route shall be designed in such a manner that all the doors designed to allow passage into and within all premises are sufficiently wide to allow passage by handicapped persons in wheelchairs."

There is one composite conformance measure for Requirement 3. The specific items that were clustered to form this composite conformance measure may be seen in Table 4.2.9, following section 4.2. The mean composite conformance measure scores for both plan and field are as follows:

Composite Conformance Measure	**Score (Plan)**	**Score (Field)**
3:9 Usable Doors[16]	96	90

[11] Note Table 4.2.4.
[12] Note Table 4.2.5.
[13] Note Table 4.2.6.
[14] Note Table 4.2.7.
[15] Note Table 4.2.8.
[16] Note Table 4.2.9.

Discussion
The conformance score for Usable Doors is relatively high for the field; it approached 100 in the plans. The reasons for these high scores may be related to how doors are specified by the architects and installed by the builders. Doors are a standard product that are designed and manufactured according to standards that are applied universally throughout the industry. Like elevators, they might also be marketed to feature their conformance with the Guidelines. Doors specified by the architect and ordered by the builder arrive at the site pre-assembled and pre-hung, with holes for door hardware already bored. It is usually not necessary for the builder in the field to make a decision about the placement of the door hardware or the side on which the door will swing.

REQUIREMENT 4: Accessible route into and through the covered unit
"Section 100.205(c)(3)(i) provides that all covered multifamily dwellings with a building entrance on an accessible route shall be designed and constructed in such a manner that all premises within covered multifamily dwelling units contain an accessible route into and through the covered dwelling unit."

There is one composite conformance measure for Requirement 4. The specific items that were clustered to form this composite conformance measure may be seen in Table 4.2.10, following Section 4.2. The mean composite conformance measure scores for both plan and field are as follows:

Composite Conformance Measure	Score (Plan)	Score (Field)
4:10 Accessible Route[17]	98	95

Discussion
Because of the methodology used in the survey, all items relating to width of interior doors were not included as part of the composite conformance measure for Requirement 4, even though conformance or lack of conformance with those items would have an impact on whether or not there actually is an accessible route throughout a unit. This should be kept in mind when drawing conclusions based on this composite measure.

REQUIREMENT 5: Light switches, electrical outlets, thermostats, and other environmental controls in accessible locations
"Section 100.205(c)(3)(ii) requires that all covered multifamily dwellings with a building entrance on an accessible route shall be designed and constructed in such a manner that all premises within covered multifamily dwelling units contain light switches, electrical outlets, thermostats, and other environmental controls in accessible locations."

There are two composite conformance measures for Requirement 5. The specific items that were clustered to form this composite conformance measure may be seen in Tables 4.2.11–4.2.12, following Section 4.2. The mean composite conformance measure scores for both plan and field are as follows:

[17] Note Table 4.2.10.

Composite Conformance Measure	Score (Plan)	Score (Field)
5:11 Access to Obstructed Switches[18]	97.4	88.7
5:12 Height of Switches & Controls[19]	87.5	72.3

Discussion
The relatively lower scores for the composite conformance measures in Requirement 5, especially for measure 5:12, are most likely a reflection of how multifamily housing is designed and constructed in the United States. Conformance discussions indicated that the locations, but not the actual height, of switches and controls are often indicated on floor plans. Additionally, the height of switches and controls generally is not indicated on room elevation drawings. Notwithstanding, architectural plans showed a higher level of conformance than with projects in the field. This may be due to subcontractors (electricians) using conventional heights rather than referring to plans for specific instructions. Because the Guidelines are not part of National Electrical Code (NEC), electricians may not be aware of the Guidelines' requirements with respect to switch and control heights.

REQUIREMENT 6: Reinforced walls for grab bars
"Section 100.205(c)(3)(iii) requires that covered multifamily dwellings with a building entrance on an accessible route shall be designed and constructed in such a manner that all premises within covered multifamily dwelling units contain reinforcements in bathroom walls to allow later installation of grab bars around toilet, tub, shower stall, and shower seat, where such facilities are provided."

There is one composite conformance measure for Requirement 6. The specific items that were clustered to form this composite conformance measure may be seen in Table 4.2.13, following Section 4.2. The mean composite conformance measure scores for both plan and field are as follows:

Composite Conformance Measure	Score (Plan)	Score (Field)
6:13 Reinforced Walls for Grab Bars[20]	85	73

Discussion
This composite conformance measure showed one of the lowest overall conformance scores among the 16 measures (only Height of Switches and Controls scored slightly lower). Like switches and controls, reinforced walls are unlikely to be indicated on plans. In fact, "grab bars" has the third lowest conformance score on architectural plans, after elevator and wheelchair mobility in bath (see Table B6 in Appendix B).

As indicated by the low conformance scores, grab-bar reinforcing is probably not shown on plans frequently enough to achieve a higher conformance score in the field. Both architects and builders verified that this might be the case for grab-bar reinforcing during follow-up discussions. Architects and builders agreed that grab-bar reinforcing might be neglected

[18] Note Table 4.2.11.
[19] Note Table 4.2.12.
[20] Note Table 4.2.13.

"…because it is not commonly shown on the plans." As such, it is not part of conventional building practice and is thus overlooked.

Even if grab-bar reinforcing is indicated on the drawing, however, it is a prime candidate to be left out by the builder for several reasons. First, it is not part of standard building practice to install reinforcing unless the equipment (the grab bars) is to be installed during the time of construction. Second, it is an element that will be "hidden" after construction is complete, so it may be missed by building inspectors.

REQUIREMENT 7: Usable kitchens and bathrooms
"Section 100.205(c)(3)(iv) requires that covered multifamily dwellings with a building entrance on an accessible route shall be designed and constructed in such a manner that all premises within covered multifamily dwelling units contain usable kitchens and bathrooms such that an individual in a wheelchair can maneuver about the space."

There are three composite conformance measures for Requirement 7. The specific items that were clustered to form this composite conformance measure may be seen in Table 4.2.14–4.2.16, following Section 4.2. The mean composite conformance measure scores for both plan and field are as follows:

Composite Conformance Measure	Score (Plan)	Score (Field)
7:14 Wheelchair Mobility in Bathroom[21]	81.2	79.3
7:15 Usability of Appliances and Fixtures[22]	92.4	92.5
7:16 Clearance Spaces in Bathroom and Kitchen[23]	88.8	84.1

Discussion
Uniformly, across the three conformance measures for Requirement 7, scores were higher for usability of appliances and fixtures and clearance space in bathrooms and kitchens than for wheelchair mobility in the bathroom. Architectural plans showed a slightly higher level of conformance to the Guidelines than with projects in the field.

One possible explanation is that in most designs architects and developers want to devote more square footage in a residential project to living areas and less to utilitarian uses such as bathrooms. It might be the case that architects and developers believe that, with proper clearances, wheelchair mobility would be provided. It is also the case that the bathroom is usually the smallest space in a multifamily unit and that wheelchair mobility is apt to suffer.

Another possible explanation is that the issue of design and construction of accessible bathrooms is one of the most demanding and potentially one of the most confusing to those unfamiliar with addressing accessibility needs of persons using wheelchairs. Possibly, this lack of understanding, combined with the typically small spaces planned for bathrooms, is reflected in the lower conformance scores for wheelchair mobility.

[21] Note Table 4.2.14.
[22] Note Table 4.2.15.
[23] Note Table 4.2.16.

TABLES FOR SECTION 4.2

REQUIREMENT 1: Accessible building entrance on an accessible route

Table 4.2.1: Composite Conformance Measure: Accessible Building Entrance on an Accessible Route (2 items)	
Item #	**Item Wording from Survey Instrument**
4	Is there at least one accessible entrance on an accessible route that is without obstruction such as barrier curbs, steps, stepped walls, and ramps with a slope not greater than 8.33 percent (1:12)?
6	Is the slope of the finished grade between covered multifamily dwellings and a public or common use facility 8.33 percent (1:12) or less?

REQUIREMENT 2: Accessible and usable public and common use areas

Table 4.2.2: Composite Conformance Measure: Elevators (31 items)	
Item #	**Item Wording from Survey Instrument**
78	Are elevator cars automatically brought to floor landings within a tolerance of ½ inch?
79	Are raised character and Braille floor designations provided on both jambs of elevator entrances and centered at 60” above the floor?
80	Are the raised characters on the elevator jambs 5/8-inch high minimum, 2” maximum, and in uppercase?
81	Are the raised characters on the elevator jambs accompanied by Braille?
82	Do elevator doors remain fully open in response to a car call for 3 seconds minimum?
83	Do the inside dimensions of elevator cars provide space for people who use wheelchairs to enter the car, maneuver within reach of controls, and exit from the car?
84	Elevators and lifts: Is the clearance between the car platform sill and the edge of any hoistway landing 1-1/4 inch maximum?
85	Are floor surfaces in elevator cars stable, firm, and slip resistant?
86	Are carpets or carpet tiles used on elevator floors securely attached with either a firm cushion, pad, or backing or no cushion or pad?
87	Is the pile height on carpet or carpet tiles provided in elevators ½ inch maximum?
88	Are the exposed edges of carpets used on elevator floors trimmed along the entire length of the exposed edges and fastened to floor surfaces?
89	Is the highest operable part of a two-way emergency communication device in the elevator located 54” maximum above the floor for a parallel approach 48” maximum above the floor for front approach?
90	Is the two-way emergency communication device identified by raised symbols and lettering located adjacent to the device?
91	If instructions for the car emergency signaling device are provided, are they presented in both tactile and visual form?
92	Is the top of the elevator hall call buttons located vertically between 35” and 54” above the floor?
93	Is the button that designates the up direction located above the button that designates the down direction?
94	Is a visible and audible signal provided at each elevator entrance to indicate which car is answering a call?
95	Are there in-car signals visible from the floor area adjacent to the hall call buttons?
96	Are the hall signal fixtures centered at 72” minimum above the floor?

Table 4.2.2: Composite Conformance Measure: Elevators (31 items) (continued)	
Item #	**Item Wording from Survey Instrument**
97	Do the audible signals sound once for up and twice for down, or do verbal annunciators state the words “up” and “down”?
98	Are elevator doors provided with a reopening device that stops and reopens a car door and hoistway door if the door becomes obstructed?
99	Are control buttons located on the elevator control panel ¾ inch minimum in their smallest dimension?
100	Is there contrast between characters/symbols and the background of the control panel?
101	Are characters and symbols on the control panel raised and in uppercase, 5/8 inch high minimum and 2” high maximum?
102	Are the raised characters and symbols on the control panel accompanied by Braille?
103	Are raised characters or symbols with Braille designations below located to the left of the control buttons?
104	Is the in-car call button for the main entry floor designated by a star?
105	Are floor buttons in the elevators provided with visible indicators to show that a call has been registered?
106	Do the visible indicators in the elevators cease when the call is answered?
107	Are the controls inside the elevator located on a front wall if cars have center opening doors and at the side wall or at the front wall next to the door if cars have side opening doors?
108	Does at least one accessible elevator provide access to all floors of the building?

Table 4.2.3: Composite Conformance Measure: Public Accessible Routes (27 items)	
Item #	**Item Wording from Survey Instrument**
7out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Is the clear width of the accessible route 36” minimum, except at doors?
7in	Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: Is the clear width of the accessible route 36” minimum, except at doors?
8out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Do accessible routes with turns around obstructions less than 48” wide have a clear space of 42” by 48” minimum?
8in	Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: Do accessible routes with turns around obstructions less than 48” wide have a clear space of 42” by 48” minimum?
9out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Do accessible routes with clear width less than 60” provide 60” by 60” passing spaces at intervals not more than 200 feet?
9in	Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: Do accessible routes with clear width less than 60” provide 60” by 60” passing spaces at intervals not more than 200 feet?
10out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: If the passing space in question (above) is an intersection of two corridors or walks, do they have a t-shaped turning space?

Table 4.2.3: Composite Conformance Measure: Public Accessible Routes (27 items) (continued)	
Item #	**Item Wording from Survey Instrument**
10in	Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: If the passing space in question (above) is an intersection of two corridors or walks, do they have a t-shaped turning space?
13in	Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: Are exposed edges of carpets fastened to floor surfaces with trim along the entire length of the exposed edge?
18out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are handrails continuous with the full length of each stair flight or ramp run?
19out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are inside handrails on switchback or dogleg stairs or ramps continuous between flights or runs?
20out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are the tops of gripping surfaces of handrails mounted 34” minimum and 38” maximum vertically above stair nosings and ramp surfaces and at a consistent height above stair nosings and ramp surfaces?
22out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are gripping surfaces of handrails continuous, without interruption by newel posts, other construction elements, or obstructions?
23out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Do handrails have a circular cross section with an outside diameter of between 1-1/4” and 1-1/2”?
24out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are handrails, and any wall or other surfaces adjacent to them, free of any sharp or abrasive elements?
28out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: At the top of stair flights, except for continuous handrails at the inside turn of stairs, do either of these conditions apply: Handrails extend horizontally above the landing for 12” minimum beginning directly above the first riser nosing and return to a wall guard; Handrails are continuous to the handrail of an adjacent stair flight?
29out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: At the bottom of stair flights, do either of these conditions apply: Handrails extend horizontally above the landing for 12” minimum beginning directly above the first riser nosing and return to a wall guard; Handrails are continuous to the handrail of an adjacent stair flight?
40	Parking and passenger loading zones: Are accessible parking spaces identified by a sign showing the international symbol of accessibility, which is not obscured by a vehicle parked in the space?

Table 4.2.3: Composite Conformance Measure: Public Accessible Routes (27 items) (continued)	
Item #	**Item Wording from Survey Instrument**
41	Parking and passenger loading zones: Do passenger loading zones provide an access aisle 60” wide minimum and 20 ft. long minimum adjacent and parallel to the vehicle pull-up space and at the same level as the roadway?
42	Parking and passenger loading zones: Is a vertical clearance of 114” minimum provided at accessible passenger loading zones and along vehicle access routes to such areas from site entrances?
43	Curb ramps: Are curb ramps provided where accessible routes cross curbs?
70	Stairs: Is there a ramp or other means of access located within sight from stairs?
72	Stairs: Are all stair risers between 4” and 7” high?
73	Stairs: Are all stair treads 11” deep minimum, measured from riser to riser?
74	Stairs: Do all stairs have closed risers?
75	Stairs: Is the thickness of stair treads no more than 1 inch?
76	Stairs: Do all nosings protrude 1-1/2” maximum?
77	Stairs: Do outdoor stairs and approaches to them appear to be designed so that water will not accumulate on walking surfaces?

Table 4.2.4: Composite Conformance Measure: Safety Features of Accessible Routes (6 items)	
Item #	**Item Wording from Survey Instrument**
14out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are any changes in floor level between ¼ inch high minimum and ½ inch high maximum beveled?
15out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are changes in level greater than ½ inch negotiated by a curb ramp, ramp, or elevator?
30out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are accessible parking spaces located on accessible routes provided for at least 2 percent of covered dwelling units?
31out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are necessary site provisions such as parking and curb cuts available at the public or common use facility?
37	Ground and floor surface treatment: Are ground and floor surfaces of accessible routes and in accessible rooms and spaces stable, firm, and slip resistant?
38	Parking and passenger loading zones: Are parking spaces for persons with disabilities 96” wide minimum with an adjacent access aisle 60” wide minimum?

Table 4.2.5: Composite Conformance Measure: Public Facilities (18 items)	
Item #	**Item Wording from Survey Instrument**
111	Drinking fountains and water coolers: Is the fountain or water cooler located at least 27” above the floor and not more than 80” above the floor?
112	Drinking fountains and water coolers: Does the fountain or water cooler protrude from the wall 4” or less?
113	Drinking fountains and water coolers: Is the spout outlet located 36” maximum above the floor?
114	Drinking fountains and water coolers: Are the spouts of drinking fountains and water coolers located at the front of the unit directing the water flow parallel or nearly parallel to the front of the unit?
115	Drinking fountains and water coolers: Do wall-mounted and post-mounted cantilevered drinking fountains and water coolers have a clear knee space between the bottom of the apron and floor or ground at least 27” high, 30” wide, and 17” to 19” deep?
116	Drinking fountains and water coolers: Do wall-mounted and post-mounted cantilevered drinking fountains and water coolers have a clear floor space 30” x 48” to allow for a forward approach?
118	Drinking fountains and water coolers: Can the operable parts located at or near the front edge of the fountain or water cooler be operated with one hand without the need to grasp tightly, pinch, or twist the wrist?
123	Toilet rooms and bathing facilities: Are lavatories mounted with the rim 34” maximum above the floor with a clearance of 29” minimum from the floor to the bottom of the front edge of the apron?
129	Toilet rooms and bathing facilities: Is the diameter or width of the gripping surfaces of a grab bar 1-1/4 to 1-1/2 inch or does the shape provide an equivalent gripping surface?
130	Toilet rooms and bathing facilities: If grab bars are mounted adjacent to a wall, is the space between the wall and the grab bar at least 1-1/2 inch?
131	Toilet rooms and bathing facilities: Are grab bars mounted in a horizontal position 33” to 36” above the floor except where a supplemental grab bar is installed in relation to a fixture rim or surface?
132	Toilet rooms and bathing facilities: Are grab bars and any wall surfaces adjacent to grab bars free of sharp or abrasive elements?
133	Toilet rooms and bathing facilities: Are grab bars securely fastened to their fittings?
134	Toilet rooms and bathing facilities: Do grab bars mounted horizontally at 33” to 36” above the floor remain free of the required clear floor space?
143	Seating, tables, or work surfaces: Do accessible seating spaces provided at tables and work surfaces for people in wheelchairs have a 30” x 48” minimum clear floor space that does not overlap knee space by more than 19”?
147	Seating, tables, or work surfaces: Does the accessible seating have knee spaces at least 27” high, 30” wide, and 19” deep?
148	Seating, tables, or work surfaces: Are the tops of accessible portions of tables and work surfaces from 28” to 34” from the floor?
149	Places of assembly: Are there spaces large enough for two wheelchairs to fit side by side, located at a variety of viewing positions within the assembly space?

Table 4.2.6: Composite Conformance Measure: Ramps and Obstructions (19 items)	
Item #	**Item Wording from Survey Instrument**
17out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are handrails provided on both sides of stairs and ramps?
27out	Accessible routes within the boundary of the site: Do such extensions (of ramps) return to a wall guard or the walking surface or are they continuous to the handrail of an adjacent ramp run?
32	Do objects with leading edges located between 27” and 80” above the floor protrude from the wall no more than 4”?
33	Do free-standing objects mounted on posts or pylons overhang no more than 12” maximum when located more than 27” above the ground or floor?
34	Where a sign or other obstruction is mounted between posts or pylons more than 12” apart, is the lowest edge of such sign or obstruction between 27” and 80” above the adjacent ground or floor surface?
45	Are curb ramps located or protected to prevent their obstruction by parked vehicles?
50	Are curb ramps with returned curbs located where pedestrians cannot walk across the ramps?
51	Are built-up curbs located so that they do not protrude into vehicular traffic lanes or into parking space access aisles?
52	Excluding any flared sides, are curb ramps at marked crossings wholly contained within the markings?
53	Do diagonal or corner-type curb ramps with returned curbs or other well-defined edges have the edges parallel to the direction of pedestrian flow?
55	Do diagonal curb ramps provided at marked crossings provide the 48” minimum clear space within the markings?
56	At marked crossings, do diagonal curb ramps with flared sides have a segment of straight curb 24” long minimum located on each side of the curb ramp and within the marked crossing?
58	Do all ramp runs rise 30” or less with a slope not greater than 8.33 percent (1:12)?
60	Do ramps have level landings at the bottom and top of each run?
62	Ramps: Is the landing length 60” minimum clear?
64	Do ramps with a rise greater than 6” or a run longer than 72” have handrails?
65	Are the cross slopes of ramp surfaces level?
66	Do ramps and landings have curbs, walls, or railings that prevent people from traveling off the ramp or landing?
69	Do outdoor ramps and approaches to them appear to be designed so that water will not accumulate on walking surfaces?

Table 4.2.7: Composite Conformance Measure: Curb Ramps (6 items)	
Item #	**Item Wording from Survey Instrument**
21out	Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Is the clear space between handrail and wall 1-1/2” minimum?
39	Parking and passenger loading zones: Is an accessible circulation route maintained without interference by vehicle overhangs?
44	Are the slopes of curb ramps no steeper than 8.33 percent (1:12)?
46	Curb ramps: Are transitions from ramps to walks, gutters, or streets flush?
47	Are curb ramps 36” wide minimum, exclusive of flared sides?
49	Curb ramps: Where the width of the walking surface at the top of the ramp and parallel to the run of the ramp is less than 48” wide, do the flared sides have a slope not steeper than 8.33 percent (1:12)?

Table 4.2.8: Composite Conformance Measure: Clearance and Reach (5 items)	
Item #	**Item Wording from Survey Instrument**
35	Protruding objects: Is there at least 80” minimum headroom clearance on accessible routes?
36	Protruding objects: Is the clear width of an accessible route maintained throughout that route with no interference from protruding objects?
150	Is there clear floor space of 30” by 48” adjacent to at least one washer and one dryer that allows for a forward or parallel approach?
151	Are operable parts of at least one appliance within the high forward reach range of 48” maximum and the low forward reach range of 15” minimum above the floor?
152	Are operable parts of at least one appliance within the high side reach of 54” maximum and the low side reach of 15” minimum above the floor?

REQUIREMENT 3: Usable doors

Table 4.2.9: Composite Conformance Measure: Usable Doors (37 items)	
Item #	**Item Wording from Survey Instrument**
153	Doors on accessible routes and in public and common use areas: Do doorways have a clear opening of 32” minimum with door open 90 degrees measured between the face of the door and the stop?
154	Doors on accessible routes and in public and common use areas: Front approach to the pull side of swinging door: is there maneuvering space that extends 18” beyond the latch side of the door and 60” minimum perpendicular to the doorway?
155	Doors on accessible routes and in public and common use areas: Front approach to the push side of swinging doors with both closer and latch: is there maneuvering space that extends 12” beyond the latch side of the door and 48” minimum perpendicular to the doorway?
156	Doors on accessible routes and in public and common use areas: Hinge-side approach to the pull side of swinging door: Is there maneuvering space that extends 36” beyond the latch side of the door if 60” minimum is provided perpendicular to the doorway, or is there maneuvering space that extends 42” beyond the latch side of the door if 54” minimum is provided perpendicular to the doorway?
157	Doors on accessible routes and in public and common use areas: Hinge-side approach to the push side of swinging doors equipped with both latch and closer: Is there maneuvering space of 54” minimum parallel to the doorway and 48” maximum perpendicular to the doorway?

Table 4.2.9: Composite Conformance Measure: Usable Doors (37 items) (continued)	
Item #	**Item Wording from Survey Instrument**
158	Doors on accessible routes and in public and common use areas: Latch-side approach to the pull side of swinging doors with closers: Is there maneuvering space that extends 24" beyond the latch side of the door and 54" minimum perpendicular to the doorway?
159	Doors on accessible routes and in public and common use areas: Latch-side approach to the pull side of swinging doors without closers: Is there maneuvering space that extends 24" beyond the latch side of the door and 48" minimum perpendicular to the doorway?
160	Doors on accessible routes and in public and common use areas: Latch-side approach to the push side of swinging door with closers: Is there maneuvering space that extends 24" minimum parallel to the doorway beyond the latch side of the door and 48" minimum perpendicular to the doorway?
161	Doors on accessible routes and in public and common use areas: Latch-side approach to the push side of swinging door without closers: Is there maneuvering space that extends 24" minimum parallel to the doorway beyond the latch side of the door and 42" minimum perpendicular to the doorway?
165	Doors on accessible routes and in public and common use areas: Is the floor or ground surface within the required maneuvering spaces of all doors on accessible routes and in public and common use areas clear and virtually flat?
166	Doors on accessible routes and in public and common use areas: Is the space between two hinged or pivoted doors in a series 48" minimum plus the width of any door swinging into the space?
167	Doors on accessible routes and in public and common use areas: Do hinged or pivoted doors in a series swing either in the same direction or away from the space between doors?
168	Are thresholds at doorways ½" high maximum (for exterior sliding door thresholds, ¾" high maximum)?
169	Doors on accessible routes and in public and common use areas: Are changes in level between ¼" and ½" high beveled?
170	Doors on accessible routes and in public and common use areas: Do handles, pulls, latches, locks, and other operable parts of accessible doors have a shape that is easy to grasp with one hand without the need to grasp or pinch tightly, or twist the wrist?
171	Doors on accessible routes and in public and common use areas: Is the door hardware mounted within a high forward reach of 48" maximum and a low forward reach of 15" minimum above the floor; and within a high side reach of 54" maximum and a low side reach of 15" above the floor?
173	Doors on accessible routes and in public and common use areas: Is the pushing or pulling force required to open interior hinged doors 5.0 lbs. maximum?
177	Doors on accessible routes and in public and common use areas: Does the bottom 12" of all doors except automatic doors, power doors, and sliding doors have a smooth, uninterrupted surface to allow the door to be opened by a wheelchair footrest without creating a trap or hazardous condition?
178	Doors on accessible routes and in public and common use areas: When narrow stile and rail doors are used, is there a 12" high minimum, smooth panel, extending the full width of the doors, installed on the push side of the doors, which will allow the doors to be opened by a wheelchair footrest without creating a trap or hazardous condition?
180	Primary entry door to accessible units: Front approach to the pull side of swinging door: is there maneuvering space that extends 18" beyond the latch side of the door and 60" minimum perpendicular to the doorway?

Table 4.2.9: Composite Conformance Measure: Usable Doors (37 items) (continued)	
Item #	**Item Wording from Survey Instrument**
181	Primary entry door to accessible units: Front approach to the push side of swinging doors with both closer and latch: Is there maneuvering space that extends 12” beyond the latch side of the door and 48” minimum perpendicular to the doorway?
183	Primary entry door to accessible units: Hinge-side approach to push side of swinging doors equipped with both latch and closer: Is there maneuvering space of 54” minimum parallel to the doorway and 48” minimum perpendicular to the doorway?
186	Primary entry door to accessible units: Latch-side approach to push side of swinging doors with closers: Is there maneuvering space that extends 24” minimum parallel to the doorway beyond the latch side of the door and 48” minimum perpendicular to the doorway?
188	Primary entry door to accessible units: Does the floor or ground surface within the required maneuvering spaces of all primary entry doors have a slope that is virtually flat?
191	Primary entry door to accessible units: Are thresholds at doorways ½ inch high maximum (for exterior door thresholds, ¾ inch high maximum)?
192	Primary entry door to accessible units: Are changes in floor level 0” between pervious exterior materials and no more than ½ inch for impervious materials?
193	Primary entry door to accessible units: Do handles, pulls, latches, locks, and other operable parts of accessible doors have a shape that is easy to grasp with one hand without the need to grasp or pinch tightly, or twist the wrist?
195	Primary entry door to accessible units: Is the pushing or pulling force required to open interior hinged doors 5.0 lbs. maximum?
196	Primary entry door to accessible units: Does the bottom 12” of all primary entry doors have a smooth, uninterrupted surface to allow the door to be opened by a wheelchair footrest without creating a trap or hazardous condition?
198	Primary entry door to accessible units: For the primary entry doors to dwelling units with direct exterior access, are the outside landing surfaces constructed of impervious materials such as concrete, brick, or flagstone?
199	Primary entry door to accessible units: Are the outside landing surfaces of impervious materials no more than ½” below the floor level of the interior of the dwelling unit?
200BR	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the bedroom?
200BA	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the bathroom?
200WI	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the walk-in closet?
200UR	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop in the utility room?
200PA	Doors within units: Do the doors within the individual dwelling units provide a nominal 32” clear opening of at least 31-5/8” when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop for the patio door?
201	Surfaces of balconies, terraces, patios, and decks outside units: If an exterior deck, patio, or balcony surface is constructed of impervious materials (such as concrete, brick, or flagstone) is it no more than 4” or less below the interior floor level of the dwelling unit?

REQUIREMENT 4: Accessible route into and through the covered unit

Table 4.2.10: Composite Conformance Measure: Accessible Route (5 items)	
Item #	**Item Wording from Survey Instrument**
203	Does the accessible route within the unit have a minimum clear width of 36”?
204	Are changes in level, including thresholds, within the dwelling unit with heights between 1/4 inch and 1/2 inch beveled with a slope no greater than 1:2?
205	Except for design features, such as a loft or an area on a different level within a room (e.g., a sunken living room), are the changes in level no more than 1/2 inch?
208	Is the accessible route through the remainder of the dwelling maintained without obstruction by a design feature?
209	Is the story of the unit served by the elevator the primary entry to the unit?

REQUIREMENT 5: Light switches, electrical outlets, thermostats, and other environmental controls in accessible locations

Table 4.2.11: Composite Conformance Measure: Access to Obstructed Switches (5 items)	
Item #	**Item Wording from Survey Instrument**
212	Is the horizontal centerline of operable parts of thermostats in the unit located between 15” and 48” above the floor?
214	Is the reach to operable parts of light switches over an obstruction between 20” and 25” in depth (such as a protruding shelf)?
215	Is the reach to operable parts of electrical outlets over an obstruction between 20” and 25” in depth (such as a protruding shelf)?
218	Is the maximum height of operable parts of light switches located no higher than 44” for a forward approach; or 46” for a side approach, provided the obstruction (such as a kitchen base cabinet) is no more than 25” in depth?
219	Is the maximum height of operable parts of electrical outlets located no higher than 44” for a forward approach; or 46” for a side approach, provided the obstruction (such as a kitchen base cabinet) is no more than 25” in depth?

Table 4.2.12: Composite Conformance Measure: Height of Switches and Controls (3 items)	
Item #	**Item Wording from Survey Instrument**
210	Is the horizontal centerline of operable parts of light switches in the unit located between 15” and 48” above the floor?
213	Is the horizontal centerline of operable parts of other environmental controls in the unit located between 15” and 48” above the floor?
221	Is the maximum height of operable parts other environmental controls located no higher than 44” for a forward approach; or 46” for a side approach, provided the obstruction (such as a kitchen base cabinet) is no more than 25” in depth?

REQUIREMENT 6: Reinforced walls for grab bars

Table 4.2.13: Composite Conformance Measure: Reinforced Walls for Grab Bars (5 items)	
Item #	**Item Wording from Survey Instrument**
222	Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the toilet?
223	Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the tub?
224	Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the shower stall?
225	Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the shower seat?
226	Are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the toilet, tub, shower stall, and shower seat, where such facilities are provided?

REQUIREMENT 7: Usable kitchens and bathrooms

Table 4.2.14: Composite Conformance Measure: Wheelchair Mobility in Bathroom (15 items)

(Note: Type A and Type B refer to the two options available under Requirement 7 of HUD's Fair Housing Accessibility Guidelines for design of usable bathrooms.)

Item #	Item Wording from Survey Instrument
227	Usable bathrooms in units, Type A: Where the door swings into the bathroom, is there a clear space (30" x 48") within the room to position a wheelchair or other mobility aid clear of the path of the door as it is closed and to permit use of fixtures? This clear space can include any kneespace and toespace available below bathroom fixtures.
228	Usable bathrooms in units, Type A: Where the door swings out, is a clear space provided within the bathroom for a person using a wheelchair or other mobility aid to position the wheelchair such that the person is allowed use of fixtures and the ability to reopen the door and exit?
229	Usable bathrooms in units, Type A: Is clear floor space provided at the toilet (clear floor space at fixtures may overlap)?
230	Usable bathrooms in units, Type A: Is clear floor space provided at the lavatory (clear floor space at fixtures may overlap)?
231	Usable bathrooms in units, Type A: Is clear floor space provided at the tub (clear floor space at fixtures may overlap)?
232	Usable bathrooms in units, Type A: Is clear floor space provided at the shower stall (clear floor space at fixtures may overlap)?
234	Usable bathrooms in units, Type A: If a parallel approach to the lavatory by a person in a wheelchair is not possible within the space, are cabinets provided designed to be removable to afford the necessary knee clearance for forward approach?
235	Usable bathrooms in units, Type A: Is a 30" x 48" clear floor space provided for parallel approach to the lavatory and centered on the lavatory?
236	Usable bathrooms in units, Type B: Where the door swings into the bathroom, is there a clear space (30" x 48") within the room to position a wheelchair or other mobility aid clear of the path of the door as it is closed and to permit use of fixtures? This clear space can include any kneespace and toespace available below bathroom fixtures.
237	Usable bathrooms in units, Type B: Where the door swings out, is a clear space provided within the bathroom for a person using a wheelchair or other mobility aid to position the wheelchair such that the person is allowed use of fixtures and the ability to reopen the door and exit?
238	Usable bathrooms in units, Type B: When both tub and shower fixtures are provided in the bathroom, is at least one made accessible?
241	Usable bathrooms in units, Type B: In locations where toilets are adjacent to walls or bathtubs, is the centerline of the fixture exactly 18" from the wall or bathtub?
244	Usable bathrooms in units, Type B: If the vanity and lavatory are designed for a parallel approach, is the centerline of the fixture a minimum of 24" measured horizontally from an adjoining wall or fixture?
248	Usable bathrooms in units, Type B: Do the bathtubs and tub/showers located in the bathroom provide a clear access aisle to the lavatory that is at least 30" wide and extends for a length of 48", measured from the foot (control end) of the bathtub?
249	Usable bathrooms in units, Type B: Is a minimum clear floor space of 30" wide by 48" available outside a shower stall?

Table 4.2.15: Composite Conformance Measure: Usability of Kitchen Appliances and Fixtures (6 items)	
Item #	**Item Wording from Survey Instrument**
251R	Usable kitchens in units: Clear floor space at range or cooktop?
251S	Usable kitchens in units: Clear floor space at sink?
252O	Usable kitchens in units: Clear floor space at oven?
252D	Usable kitchens in units: Clear floor space at dishwasher?
252FR	Usable kitchens in units: Clear floor space at refrigerator?
253	Usable kitchens in units: Is the clearance between counters and all opposing base cabinets, countertops, appliances, or walls at least 40”?

Table 4.2.16: Composite Conformance Measure: Clearance Spaces in Bathroom and Kitchen (7 items)	
Item #	**Item Wording from Survey Instrument**
240	Usable bathrooms in units, Type B: Are toilets located within bathrooms in a manner that permits a wall-mounted or folding grab bar to be installed on one side of the fixture?
242	Usable bathrooms in units, Type B: Is the other (non-grab bar) side of the toilet fixture a minimum of 15” from the finished surface of adjoining walls, vanities, or from the edge of a lavatory?
243	Usable bathrooms in units, Type B: If the lavatory is designed with removable base cabinets, is the centerline of the fixture a minimum of 15” horizontally from an adjoining wall or fixture?
246	Usable bathrooms in units, Type B: If kneespace is provided below the vanity, is the bottom of the apron at least 27” above the floor?
247	Usable bathrooms in units, Type B: If kneespace is provided below the vanity, is it between 17” and 19” deep?
254	Usable kitchens in units: If the kitchen is U-shaped and has the sink, range, or cooktop located at the base of the “U”, is a 60-inch-diameter turning radius provided to allow parallel approach to the base of the “U”?
255	Usable kitchens in units: If the kitchen is U-shaped and has the sink, range, or cooktop located at the base of the “U”, are base cabinets designed to be removable at that location to allow knee space for a forward approach?

4.3 SUMMARY COMPARISONS OF ARCHITECTURAL PLANS AND PROJECTS

A major area of interest was the extent to which architectural plans and buildings in the field might differ with respect to conformance. Such a comparison might shed light on the sources of nonconformance. For instance, if plans show a higher rate of conformance than buildings constructed from those plans, one might conclude that the responsibility for nonconformance lies with the builders, not the architects. This information may provide a focus for educational efforts. In order to assess if an observed difference in scores was meaningful, a standard statistical procedure was used to compare each composite measure (e.g., the conformance score on Reinforced Walls for Grab Bars for a particular dwelling unit with the Reinforced Walls for Grab Bars conformance score of the plans for that unit). A statistically significant difference means that the observed difference is not due to random chance.[24] It should be noted, though, that even when a statistical difference is observed, the actual difference in the scores is quite small.

Nine of the 16 composite conformance measures (as discussed in Section 4.2) showed a statistically significant difference between plan and field: Public Accessible Routes, Public Facilities, Clearance and Reach, Usable Doors, Accessible Route, Access to Obstructed Switches, Heights of Switches and Controls, Reinforced Walls for Grab Bars, and Clearance Spaces in Bathroom and Kitchen (see Table 4.3.1 below). In each case, plans had higher conformance levels than field projects. Because comparisons could only be made for buildings that had complete data for both field conformance and plan conformance, each pair of means is based on the subset of cases for which data were available on both field and plan measures. The number of pairs available for comparison raged from 26 (Elevators) to 260 (Usability of Appliances and Fixtures) (see Appendix B). In most of the cases, the chance is very low (less than 5 percent) that the observed differences are due to chance.

Table 4.3.1: Measures with a statistically significant difference between plan and field

Composite Conformance Measure*	Plan	Field
2:3 Public Accessible Routes*	95.3	94.1
2:5 Public Facilities*	97.6	95.3
2:8 Clearance and Reach*	98.7	96.0
3:9 Usable Doors*	95.9	95.3
4:10 Accessible Route+	97.8	97.0
5:11 Access to Obstructed Switches*	97.3	94.0
5:12 Height of Switches and Controls*	87.5	84.4
6:13 Reinforced Walls for Grab Bars*	86.1	79.2
7:16 Clearance Spaces in Bathroom and Kitchen+	88.8	84.1

*For a detailed explanation of how these means were calculated, see Appendix B.
*Highly statistically significant (p=. 05 or less)
+Modestly statistically significant (p=. 10)

[24] The statistical procedure used for comparing pairs of scores in this study is the "paired t-test." A t-test is a standard statistical tool that indicates whether scores on two measures are statistically different from one another. Paired t-tests were used to compare the 16 conformance measures for each set of architectural plans and the projects built from those plans. Complete results for these tests may be found in Appendix B.

Discussion
Plans consistently show higher conformance with the Guidelines than completed buildings. In almost every case, even when statistical significance was not found, plans have higher mean composite scores than buildings in the field. The one notable exception is for Elevators. However, the magnitude of the differences is always quite small, even when statistically significant.

This sample suggests that builders are unlikely to correct for deficiencies in building plans with respect to Fair Housing Act requirements. Thus, technical assistance may best be directed to architects and designers of multifamily housing to ensure that building plans meet the Guidelines, and secondarily directed to builders to stress elements of building plans that must be followed exactly to ensure conformance with the Guidelines.

4.4 IMPACT OF BUILDING CHARACTERISTICS

The impact of several features of buildings on conformance was investigated in a series of statistical analyses.[25] The analysis should be interpreted as applying to conformance only during the survey period, April 1, 1991 thru March 31, 1997. The purpose of this part of the analysis was to see if any particular factor had an effect on the level of conformance, as measured by the 16 composite measures. The main features considered were the age of the building (as indicated by its completion date) and size of the project (as indicated by the number of units or whether the building had an elevator). Region was also used as a control variable but will not be directly interpreted in this section. A test of the relationship between age of the building and the conformance measures could indicate higher conformance rates for recently completed projects versus lower rates for older projects. Using these results, one might speculate that architects and builders were becoming more aware of the Act over time. The project's size might be a predictor of higher levels of conformance if the architects or builders involved in their design have more experience in the housing industry or have larger staffs with more expertise in code conformance. Because some of the features examined in this phase were unique to particular dwelling units (i.e., they were not common to all dwelling units in a project), all analyses in this phase were carried out with dwelling unit as the unit of analysis.

The following features were identified as being of particular interest with respect to conformance with accessibility regulations and requirements:

[25] Multiple regression analysis will test the relationships between conformance scores and various factors that may be associated with higher or lower levels of conformance. Regression analysis is a set of statistical procedures that is commonly used to help understand the relationships between a criterion measure (for example, conformance level) and other factors (for example, characteristics of the building or the environment in which construction took place). An advantage of using this procedure is that it allows researchers to determine whether or not factors they have identified are useful in estimating the level of the criterion. For example, it might be useful to know whether the level of conformance with the Guidelines depends, in part, on the size of buildings. If that were the case, educational and enforcement activities could be focused more heavily on buildings in the size range that is associated with higher levels of nonconformance. Regression analysis can help to answer this question. A particular advantage of multiple regression analysis is the fact that it allows the simultaneous assessment of the impact of several different factors that may be related to the criterion measure. The 16 composite conformance measures described above formed the basis for analyses of conformance using multiple regression analysis (the full Regression Analysis Report, with supporting tables, is found in Appendix B).

Building characteristics
Elevator (the presence of an elevator in the building)
Building size (number of units in the building)

Building and regulatory environment at the time of construction
Age of building (between 1–8 years, based on year of occupancy)
Region (where the project was built) (control variable)

Analyses were designed to answer three questions:
1. What is the impact of each factor singly on each of the conformance scores?
2. What is the impact of each factor on conformance scores when the other characteristics of the building, builder, or environment are statistically controlled?
3. Overall, what can be said about the total and relative impact of these building features on conformance scores?

Elevator
When other building characteristics are not considered, the presence or absence of an elevator is significantly related to conformance on 7 of the 16 composite conformance measures. For Building Entrance, Elevators, Usable Doors, Access to Obstructed Switches, Reinforced Walls for Grab Bars, and Clear Spaces in Kitchen and Bath, units in buildings with elevators showed higher conformance with these accessibility requirements than units in buildings without elevators. For the other two measures—Access to Obstructed Switches and Usability of Appliances and Fixtures—the presence of an elevator in the building was associated with lower levels of conformance. (See Table B11, Appendix B.) Among these, the proportion of variance in conformance accounted for by the presence/absence of an elevator (as indicated by the adjusted R^2 value) ranged from .01 to .76. Elevator has a fairly dramatic impact on the score for one of the composite measures: Elevators, which is not surprising.

When the building size, region, and age of building were statistically controlled, the impact of Elevator was similar, but there were two changes. Elevator no longer had a significant impact on conformance for Usability of Appliances and Fixtures. In addition, the presence of an elevator in the building was associated with lower levels of conformance with Building Entrance requirements. (See Table B12, Appendix B.)

Building Size
Building Size was significantly related to conformance behavior for 7 of the 16 composite measures. The proportion of variance in conformance behavior accounted for by Building Size ranged from .01 to .09. When other building features are not considered, larger buildings showed higher levels of conformance than smaller buildings for the following six composite measures: Building Entrance, Elevators, Public Accessible Routes, Usable Doors, Reinforced Walls for Grab Bars, and Clear Spaces in Kitchen and Bath. Buildings with fewer dwelling units showed higher levels of conformance for Usability of Appliances and Fixtures. (See Table B13, Appendix B.)

When elevator, region, and age of building are statistically controlled, Building Size only continued to have a unique impact on two composite conformance measures: Elevators and

Reinforced Walls for Grab Bars. For both of these measures, larger buildings showed higher levels of conformance than did smaller buildings.

Larger building size may indicate that the architect and the builder have greater experience in multifamily housing and with the Act. It is also possible that larger buildings are given greater scrutiny by local building inspectors and code enforcement agencies.

Age of Building

When other building features are not considered, Age of Building accounted for significant variance in conformance behavior for three measures, all of them concerned with Requirement 2: Elevators, Public Facilities, and Curb Ramps (see Table B16, Appendix B). More recently occupied buildings showed lower levels of conformance for Elevator than older buildings did and showed higher levels of conformance for Public Facilities and Curb Ramps than was observed for older buildings.

However, when elevator, building size, and region were statistically controlled (see Table B17, Appendix B), Age of Building only accounted for unique variance in one conformance measure: Curb Ramps. Higher levels of conformance with Curb Ramps were observed for dwelling units in more recently constructed buildings.

It is possible that the higher levels of conformance with curb ramps in more recently constructed buildings could be attributed to some influence from implementation of the Americans with Disabilities Act (ADA) requirements, as opposed to just the Fair Housing Act. Although the ADA does not, in most cases, apply to residential facilities, some states and cities may be giving more attention to areas such as curb ramps in their state and local code enforcement activities due to the ADA's applicability to public streets and sidewalks. Likewise, architects and builders may also be incorporating curb ramps into the design of public streets and sidewalks, including those on residential sites.

Total and Relative Impact of Elevator, Building Size, and Age of Building on Conformance Scores

Levels of conformance with accessibility guidelines on 16 measures of conformance were relatively high on average. Differences in extent of conformance were observed among the sample of completed dwelling units surveyed in this study, with reported levels of conformance ranging from 0 to 100 for most measures. Regression analyses designed to examine the extent to which relevant building features can account for differences in conformance level suggested that, indeed, some of these differences appear to be related to features of buildings and the building environment. Further examination of the underlying reasons for nonconformance with accessibility guidelines should include a consideration of the particular disincentives and challenges to conformance behavior that may operate in different regions of the country.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The findings of this report are based on a nationwide survey of multifamily housing conformance with the Fair Housing Accessibility Guidelines. This study gives a broad national summary of conformance but cannot be used to extrapolate about local conditions. Building design and construction are regulated at the local and/or state level; as a result, localities are subject to different building code and/or local accessibility requirements. This can have an impact on conformance at the local level, and the report's findings may differ with local reports of conformance in cities and states around the country.

The study describes the degree to which multifamily housing, built for first occupancy between April 1, 1991 and March 31, 1997, is in conformance with the Guidelines. The survey was not designed to gather data on the possible causes of conformance or nonconformance but, rather, to develop baseline knowledge about the level of conformance in general. The survey did not offer value judgments on the nature of conformance; it merely gathered data on whether or not the Guidelines were met to a certain standard. It may be possible to appraise one item of conformance as more or less important than another, but that was not the purpose of this study. The survey measured and recorded levels of nonconformance that may or may not warrant enforcement action in the field, and the result is a report that simply presents the rates of conformance for multifamily housing during the study period.

Overall, levels of conformance with the Guidelines, by element, were fairly high. Conformance scores were uniformly high for Requirement 1 (Accessible Building Entrance on an Accessible Route); Requirement 2 (Accessible and Usable Public and Common Use Areas); Requirement 3 (Usable Doors); and Requirement 4 (Accessible Route into and through the Covered Unit). Scores were somewhat lower for Requirement 5 (Light Switches, Electrical Outlets, Thermostats, and other Environmental Controls); and Requirement 7 (Usable Kitchens and Bathrooms). Conformance scores were lowest overall for Requirement 6 (Reinforced Walls for Reinforced Walls for Grab Bars).

In most cases, plans have higher conformance scores than were found in the field. It appears that builders sometimes do not properly execute architectural plans. However, the plan and field scores are close, which suggests that the builders usually do execute the plans and that if elements are included in plans, builders will follow them. The only measure for which conformance was higher in the field than in the plans was measure 2, Elevators. The explanation in this instance is, most likely, that elevators are delivered from the manufacturer built to predetermined standards.

In summary, levels of conformance with accessibility requirements on the 16 composite measures were relatively high. Still, differences in conformance level were observed among the sample of completed dwelling units surveyed in this study, with reported levels of conformance ranging from 0 to 100. Regression analyses designed to examine the extent to which four relevant building features can account for differences in conformance level suggested that, indeed, some of these differences appear to be related to features of buildings and the building environment. Further examination of the underlying reasons for nonconformance with accessibility regulations should include a consideration of the particular disincentives and challenges to conformance behavior that may operate in different regions of the country.

APPENDIX A: SURVEY QUESTIONS AND PERCENTAGES

What follows are the exact questions used in the survey. The survey form has not been replicated in its entirety because of its rather complex formatting. For each question on the form, a check box was included to aid the surveyors in the recording of the data. For example, the first question on the survey appeared as follows:

For all questions below, check + for yes, - for no, and 0 if the questions does not apply.

1. Does the multifamily building have an elevator?

BUILDING A						BUILDING B						BUILDING C						BUILDING D						BUILDING E					
PLAN			FIELD			PLAN			FIELD			PLAN			FIELD			PLAN			FIELD			PLAN			FIELD		
+	-	0	+	-	0	+	-	0	+	-	0	+	-	0	+	-	0	+	-	0	+	-	0	+	-	0	+	-	0

This Appendix contains a list of the survey questions along with the response rates for the data that was collected. The wording of the questions is presented exactly as it was found on the survey.

Requirement 1: Accessible building entrance on an accessible route

Section A: Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

1. Does the multifamily building have an elevator?

2. Is a building elevator provided only as a means of creating an accessible route to dwelling units on a ground floor only?
NOTE: If the answer to this question is yes, the building is not considered an elevator building for purposes of the Fair Housing Guidelines; hence, only the ground floor dwelling units need to be accessible.

3. Is a building elevator provided as a means of access to dwelling units other than dwelling units on a ground floor?
NOTE: If the answer to this question is yes, then the building is an elevator building which is covered by the requirements. The elevator in that building must provide accessibility to all dwelling units in the building.

4. Is there at least one accessible entrance on an accessible route that is without obstruction such as barrier curbs, steps, stepped walls, and ramps with a slope not greater than 8.33% (1:12)?

	Plan	Field
Number of buildings for which this question is applicable:	409	596
Percent of buildings that complied with this question:	90.50	88.80

Sections B and C are addressed on the survey cover sheet and discussed in the Survey Handbook.

Section D: Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

5. If there is an elevated walkway between a building entrance and a vehicular or pedestrian arrival point, is the slope of the elevated walkway 8.33% (1:12) or less?

	Plan	Field
Number of buildings for which this question is applicable:	162	247
Percent of buildings that complied with this question:	24.10	33.20

6. Is the slope of the finished grade between covered multifamily dwellings and a public or common use facility 8.33% (1:12) or less?

	Plan	Field
Number of buildings for which this question is applicable:	325	533
Percent of buildings that complied with this question:	95.40	94.60

Requirement 2: Accessible and usable public and common use areas

Section E: Accessible route(s) within the boundary of the site:

Requirement

Outside: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances.

Inside: Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility.

For all questions below, check the appropriate boxes for the plan and field survey of each building. Check + for yes, - for no, and 0 if the questions does not apply. A yes answer will indicate compliance. For questions 7 through 31 the row marked O should be used to record answers that apply to the outside requirement (above). The row marked I should be used to record answers that apply to the inside requirement.

7. Is the clear width of the accessible route 36 in. minimum, except at doors?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	470	609	378	444
Percent of buildings that complied with this question:	99.60	97.20	99.70	98.40

8. Do accessible routes with turns around obstructions less than 48 in. wide have a clear space of 42 in. by 48 in. minimum?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	260	322	225	267
Percent of buildings that complied with this question:	99.60	96.90	96.40	95.90

9. Do accessible routes with clear width less than 60 in. provide 60 in. by 60 in. passing spaces at intervals not more than 200 ft?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	276	364	212	256
Percent of buildings that complied with this question:	95.70	93.40	96.70	94.90

10. If the passing space in question (above) is an intersection of two corridors or walks, do they have a T-shaped turning space?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	226	286	158	191
Percent of buildings that complied with this question:	99.10	96.20	100.00	96.90

11. Is the carpet or carpet tile used on a ground or floor surface securely attached with either a firm cushion, pad, or backing, or no cushion or pad?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	16	34	147	333
Percent of buildings that complied with this question:	100.00	88.20	99.30	98.50

12. Does the carpet or carpet tile have a pile height of no more than ½ in?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	16	33	138	323
Percent of buildings that complied with this question:	93.80	100.00	100.00	99.70

13. Are exposed edges of carpets fastened to floor surfaces with trim along the entire length of the exposed edge?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	12	31	142	330
Percent of buildings that complied with this question:	100.00	90.30	98.60	95.20

14. Are any changes in floor level between ¼ in. high minimum and ½ in. high maximum beveled?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	108	337	164	370
Percent of buildings that complied with this question:	98.10	88.70	100.00	97.60

15. Are changes in level greater than ½ in. negotiated by a curb ramp, ramp or elevator?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	230	401	134	179
Percent of buildings that complied with this question:	91.30	84.80	96.30	93.30

16. Do gratings on accessible routes and spaces have openings no greater than ½ in. wide in one direction, and are gratings with elongated openings placed so that the long dimension is perpendicular to the dominant direction of travel?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	21	55	10	16
Percent of buildings that complied with this question:	90.50	70.90	100.00	93.80

17. Are handrails provided on both sides of stairs and ramps?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	139	216	55	74
Percent of buildings that complied with this question:	90.60	76.40	89.10	85.10

18. Are handrails continuous within the full length of each stair flight or ramp run?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	130	201	47	69
Percent of buildings that complied with this question:	95.40	90.00	97.90	95.70

19. Are inside handrails on switchback or dogleg stairs or ramps continuous between flights or runs?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	96	127	38	52
Percent of buildings that complied with this question:	99.00	91.30	97.40	88.50

20. Are the top of gripping surfaces of handrails mounted 34 in. minimum and 38 in. maximum vertically above stair nosings and ramp surfaces and at a consistent height above stair nosings and ramp surfaces?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	121	189	41	67
Percent of buildings that complied with this question:	97.50	89.90	95.10	95.50

21. Is the clear space between handrail and wall 1 ½ in. minimum?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	98	144	42	71
Percent of buildings that complied with this question:	98.00	97.90	95.20	100.00

22. Are gripping surfaces of handrails continuous, without interruption by newel posts, other construction elements, or obstructions?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	118	189	42	69
Percent of buildings that complied with this question:	100	96.80	97.60	98.60

23. Do handrails have a circular cross section with an outside diameter of between 1 ¼ in. and 1 ½ in?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	118	184	41	70
Percent of buildings that complied with this question:	90.70	78.80	78.00	81.40

24. Are handrails, and any wall or other surfaces adjacent to them, free of any sharp or abrasive elements?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	110	188	39	73
Percent of buildings that complied with this question:	100.00	98.90	100	97.30

25. Are handrails securely fastened to their fittings?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	111	193	33	70
Percent of buildings that complied with this question:	100.00	100.00	100.00	100.00

26. At ramps (except for continuous handrails at the inside turn of ramps) do handrails extend horizontally 12 in. minimum beyond the top and bottom of ramp runs?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	61	99	24	30
Percent of buildings that complied with this question:	88.50	72.70	91.70	73.30

27. Do such extensions return to a wall, guard or the walking surface, or are they continuous to the handrail of an adjacent ramp run?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	80	113	26	31
Percent of buildings that complied with this question:	96.30	92.00	100.00	93.50

28. At the top of stair flights, except for continuous handrails at the inside turn of stairs, do either of these conditions apply:
Handrails extend horizontally above the landing for 12 in. minimum beginning directly above the first riser nosing and return to a wall, guard; Handrails are continuous to the handrail of an adjacent stair flight?

	Outside		Inside	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	74	122	31	44

Percent of buildings that complied with this question:	83.80	72.10	87.10	81.80

29. At the bottom of stair flights, except for continuous handrails at the inside turn of stairs, do either of these conditions apply: Handrails extend 12 in. minimum horizontally beginning directly above the last riser nosing and return to a wall guard, or the walking surface; Handrails are continuous to the handrail of an adjacent stair flight?

	Outside		**Inside**	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	70	121	29	44
Percent of buildings that complied with this question:	85.70	70.20	86.20	75.00

30. Are accessible parking spaces located on accessible routes provided for at least 2% of covered dwelling units?

	Outside		**Inside**	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	408	559	46	61
Percent of buildings that complied with this question:	90.90	86.90	78.30	72.10

31. Are necessary site provisions such as parking and curb cuts available at the public or common use facility?

	Outside		**Inside**	
	Plan	**Field**	**Plan**	**Field**
Number of buildings for which this question is applicable:	333	493	27	42
Percent of buildings that complied with this question:	94.00	91.50	88.90	90.50

Protruding Objects: Accessible routes or maneuvering space including, but not limited to halls, corridors, passageways, or aisles.

32. Do objects with leading edges located between 27 in. and 80 in. above the floor protrude from the wall no more than 4 in?

	Plan	**Field**
Number of buildings for which this question is applicable:	158	357
Percent of buildings that complied with this question:	89.20	75.60

33. Do free-standing objects mounted on posts or pylons overhang no more than 12 in. maximum when located more than 27 in. above the ground or floor?

	Plan	**Field**
Number of buildings for which this question is applicable:	117	176
Percent of buildings that complied with this question:	96.60	92.00

34. Where a sign or other obstruction is mounted between posts or pylons more than 12 in. apart, is the lowest edge of such sign or obstruction between 27 in. and 80 in. above the adjacent ground or floor surface?

	Plan	**Field**
Number of buildings for which this question is applicable:	104	144

Percent of buildings that complied with this question:	99.00	92.40

35. Is there at least 80 in. minimum headroom clearance on accessible routes?

	Plan	Field
Number of buildings for which this question is applicable:	309	573
Percent of buildings that complied with this question:	98.70	93.70

36. Is the clear width of an accessible route maintained throughout that route with no interference from protruding objects?

	Plan	Field
Number of buildings for which this question is applicable:	354	575
Percent of buildings that complied with this question:	98.00	92.50

Ground and Floor Surface Treatments: Accessible routes, rooms, and spaces, including floors, walks, ramps, stairs, and curb ramps.

37. Are ground and floor surfaces of accessible routes and in accessible rooms and spaces, stable, firm, and slip resistant?

	Plan	Field
Number of buildings for which this question is applicable:	272	597
Percent of buildings that complied with this question:	99.30	98.20

Parking and Passenger Loading Zones:

38. Are parking spaces for persons with disabilities 96 in. wide minimum with an adjacent access aisle 60 in. wide minimum?
NOTE: 2 spaces may share one access aisle.

	Plan	Field
Number of buildings for which this question is applicable:	392	574
Percent of buildings that complied with this question:	91.80	86.80

39. Is an accessible circulation route maintained without interference by vehicle overhangs?

	Plan	Field
Number of buildings for which this question is applicable:	369	574
Percent of buildings that complied with this question:	90.50	84.70

40. Are accessible parking spaces identified by a sign showing the international symbol of accessibility which is not obscured by a vehicle parked in the space?

	Plan	Field
Number of buildings for which this question is applicable:	357	589
Percent of buildings that complied with this question:	84.30	76.40

41. Do passenger loading zones provide an access aisle 60 in. wide minimum and 20 ft. long minimum adjacent and parallel to the vehicle pull-up space and at the same level as the roadway?

	Plan	Field
Number of buildings for which this question is applicable:	289	379
Percent of buildings that complied with this question:	92.00	88.90

42. Is a vertical clearance of 114 in. minimum provided at accessible passenger loading zones and along vehicle access routes to such areas from site entrances?

	Plan	Field
Number of buildings for which this question is applicable:	257	389
Percent of buildings that complied with this question:	97.30	93.80

Curb Ramps: Curb ramps must be provided on accessible routes that cross curbs.

43. Are curb ramps provided where accessible routes cross curbs?

	Plan	Field
Number of buildings for which this question is applicable:	288	448
Percent of buildings that complied with this question:	93.10	93.30

44. Are the slopes of curb ramps no steeper than 8.33% (1:12)?

	Plan	Field
Number of buildings for which this question is applicable:	233	444
Percent of buildings that complied with this question:	97.00	93.00

45. Are curb ramps located or protected to prevent their obstruction by parked vehicles?

	Plan	Field
Number of buildings for which this question is applicable:	266	434
Percent of buildings that complied with this question:	96.20	89.20

46. Are transitions from ramps to walks, gutters, or streets flush?

	Plan	Field
Number of buildings for which this question is applicable:	232	459
Percent of buildings that complied with this question:	95.30	93.00

47. Are curb ramps 36 in. wide minimum, exclusive of flared sides?

	Plan	Field
Number of buildings for which this question is applicable:	271	439
Percent of buildings that complied with this question:	99.60	97.70

48. Do curb ramps located where pedestrians must walk across the ramp have flared sides?

	Plan	Field
Number of buildings for which this question is applicable:	242	356
Percent of buildings that complied with this question:	97.10	96.90

49. Where the width of the walking surface at the top of the ramp and parallel to the run of the ramp is less than 48 in. wide, do the
flared sides have a slope not steeper than 8.33% (1:12)?

	Plan	Field
Number of buildings for which this question is applicable:	188	306
Percent of buildings that complied with this question:	94.70	91.20

50. Are curb ramps with returned curbs located where pedestrians cannot walk across the ramps?

	Plan	Field
Number of buildings for which this question is applicable:	150	201
Percent of buildings that complied with this question:	88.70	89.10

51. Are built-up curb ramps located so that they do not protrude into vehicular traffic lanes or into parking space access aisles?

	Plan	Field
Number of buildings for which this question is applicable:	185	249
Percent of buildings that complied with this question:	88.10	90.40

52. Excluding any flared sides, are curb ramps at marked crossings wholly contained within the markings?

	Plan	Field
Number of buildings for which this question is applicable:	181	282
Percent of buildings that complied with this question:	97.80	95.40

53. Do diagonal or corner-type curb ramps with returned curbs or other well-defined edges have the edges parallel to the direction of pedestrian flow?

	Plan	Field
Number of buildings for which this question is applicable:	117	157
Percent of buildings that complied with this question:	97.40	96.80

54. Do bottoms of diagonal curb ramps have 48 in. minimum clear space?

	Plan	Field
Number of buildings for which this question is applicable:	146	190
Percent of buildings that complied with this question:	100.00	99.50

55. Do diagonal curb ramps provided at marked crossings provide the 48 in. minimum clear space within the markings?

	Plan	Field
Number of buildings for which this question is applicable:	123	157
Percent of buildings that complied with this question:	99.20	98.70

56. At marked crossings, do diagonal curb ramps with flared sides have a segment of straight curb 24 in. long minimum located on each side of the curb ramp and within the marked crossing?

	Plan	Field
Number of buildings for which this question is applicable:	111	137
Percent of buildings that complied with this question:	97.30	98.50

57. Do raised islands in crossings have a cut-through level with the street or have curb ramps at both sides, and a level area 48 in. long minimum by 36 in. wide minimum, in the part of the island intersected by the crossing?

	Plan	Field
Number of buildings for which this question is applicable:	40	48
Percent of buildings that complied with this question:	100.00	95.80

Ramps: **Ramps must be provided on accessible routes with slopes not steeper than 8.33% (1:12).**

58. Do all ramp runs rise 30 in. or less with a slope not greater than 8.33% (1:12)?

	Plan	Field
Number of buildings for which this question is applicable:	208	303
Percent of buildings that complied with this question:	98.10	93.70

59. Is the clear width of the ramp 36 in. minimum?

	Plan	Field
Number of buildings for which this question is applicable:	222	304
Percent of buildings that complied with this question:	99.50	99.70

60. Do ramps have level landings at the bottom and top of each run?

	Plan	Field
Number of buildings for which this question is applicable:	200	290
Percent of buildings that complied with this question:	97.00	93.40

61. Is the landing width at least as wide as the widest ramp run leading to it?

	Plan	Field
Number of buildings for which this question is applicable:	208	286
Percent of buildings that complied with this question:	100.00	99.70

62. Is the landing length 60 in. minimum clear?

	Plan	Field
Number of buildings for which this question is applicable:	202	283
Percent of buildings that complied with this question:	99.00	97.90

63. For ramps that change direction at landings, is the landing 60 in. by 60 in. minimum?

	Plan	Field
Number of buildings for which this question is applicable:	62	90
Percent of buildings that complied with this question:	95.20	92.20

64. Do ramps with a rise greater than 6 in. or a run longer than 72 in. have handrails?

	Plan	Field
Number of buildings for which this question is applicable:	60	121
Percent of buildings that complied with this question:	83.30	71.90

65. Are the cross slopes of ramp surfaces level?

	Plan	Field
Number of buildings for which this question is applicable:	180	268
Percent of buildings that complied with this question:	100.00	97.40

66. Do ramps and landings have curbs, walls, or railings that prevent people from traveling off the ramp or landing?

	Plan	Field
Number of buildings for which this question is applicable:	178	259
Percent of buildings that complied with this question:	88.80	78.80

67. If curbs or barriers are provided, are they 4 in. high minimum?

	Plan	Field
Number of buildings for which this question is applicable:	141	179
Percent of buildings that complied with this question:	98.60	98.30

68. If curbs or barriers at least 4 in. high are not provided, do the ramps or landings protrude at least 12 in. beyond the inside surface of the railing?

	Plan	Field
Number of buildings for which this question is applicable:	47	85
Percent of buildings that complied with this question:	87.20	64.70

69. Do outdoor ramps and approaches to them appear to be designed so that water will not accumulate on walking surfaces?

	Plan	Field
Number of buildings for which this question is applicable:	195	298
Percent of buildings that complied with this question:	100.00	98.70

Stairs: **This section applies to stairs along accessible routes connecting levels not connected by an elevator. Consult the corresponding section in the Survey Handbook for guidance in answering these questions.**

70. Is there a ramp or other means of access located within sight from stairs?

	Plan	Field
Number of buildings for which this question is applicable:	106	155
Percent of buildings that complied with this question:	70.80	68.40

71. If a ramp or other means of access is not located within sight from stairs, is there directional signage to a ramp or other means of access?

	Plan	Field
Number of buildings for which this question is applicable:	30	59
Percent of buildings that complied with this question:	60.00	40.70

72. Are all stair risers between 4 in. and 7 in. high?

	Plan	Field
Number of buildings for which this question is applicable:	136	198
Percent of buildings that complied with this question:	97.80	92.40

73. Are all stair treads 11 in. deep minimum, measured from riser to riser?

	Plan	Field
Number of buildings for which this question is applicable:	136	193
Percent of buildings that complied with this question:	90.40	97.40

74. Do all stairs have closed risers?

	Plan	Field
Number of buildings for which this question is applicable:	128	192
Percent of buildings that complied with this question:	78.90	78.10

75. Is the thickness of stair treads no more than 1 in?

	Plan	Field
Number of buildings for which this question is applicable:	105	163
Percent of buildings that complied with this question:	97.10	91.40

76. Do all nosings protrude 1 ½ in. maximum?

	Plan	Field
Number of buildings for which this question is applicable:	115	181
Percent of buildings that complied with this question:	98.30	92.30

77. Do outdoor stairs and approaches to them appear to be designed so that water will not accumulate on walking surfaces?

	Plan	Field
Number of buildings for which this question is applicable:	118	188
Percent of buildings that complied with this question:	100.00	98.40

Elevators and Lifts:

78. Are elevator cars automatically brought to floor landings within a tolerance of ½ in?

	Plan	Field
Number of buildings for which this question is applicable:	53	161
Percent of buildings that complied with this question:	66.00	88.80

79. Are raised character and Braille floor designations provided on both jambs of elevator entrances and centered at 60 in. above the floor?

	Plan	Field
Number of buildings for which this question is applicable:	48	155
Percent of buildings that complied with this question:	60.40	85.80

80. Are the raised characters on the elevator jambs N in. high minimum, 2 in. maximum, and uppercase.

	Plan	Field
Number of buildings for which this question is applicable:	46	155
Percent of buildings that complied with this question:	60.90	84.50

81. Are the raised characters on the elevator jambs accompanied by Braille?

	Plan	Field
Number of buildings for which this question is applicable:	48	157
Percent of buildings that complied with this question:	60.40	87.30

82. Do elevator doors remain fully open in response to a car call for 3 seconds minimum?

	Plan	Field
Number of buildings for which this question is applicable:	44	154
Percent of buildings that complied with this question:	65.90	87.70

83. Do the inside dimensions of elevator cars provide space for people who use wheelchairs to enter the car, maneuver within reach of controls, and exit from the car? Consult the appropriate section of the handbook for minimum dimensions of elevator cars.

	Plan	Field
Number of buildings for which this question is applicable:	83	153
Percent of buildings that complied with this question:	78.30	81.00

84. Is the clearance between the car platform sill and the edge of any hoistway landing 1¼ in. maximum?

	Plan	Field
Number of buildings for which this question is applicable:	44	154
Percent of buildings that complied with this question:	63.60	85.70

85. Are floor surfaces in elevator cars stable, firm, and slip resistant?

	Plan	Field
Number of buildings for which this question is applicable:	42	152
Percent of buildings that complied with this question:	64.30	88.80

86. Are carpets or carpet tiles used on elevator floors securely attached with either a firm cushion, pad, or backing or no cushion or pad?

	Plan	Field
Number of buildings for which this question is applicable:	35	113
Percent of buildings that complied with this question:	57.10	86.70

87. Is the pile height on carpet or carpet tiles provided in elevators ½ in. maximum?

	Plan	Field
Number of buildings for which this question is applicable:	35	105
Percent of buildings that complied with this question:	57.10	85.70

88. Are the exposed edges of carpets used on elevator floors trimmed along the entire length of the exposed edges and fastened to floor surfaces?

	Plan	Field
Number of buildings for which this question is applicable:	35	106
Percent of buildings that complied with this question:	54.30	84.00

89. Is the highest operable part of a two-way emergency communication device in the elevator located 54 in. maximum above the floor for a parallel approach 48 in. maximum above the floor for front approach?

	Plan	Field
Number of buildings for which this question is applicable:	41	153
Percent of buildings that complied with this question:	65.90	90.80

90. Is the two-way emergency communication device identified by raised symbols and lettering located adjacent to the device?

	Plan	Field
Number of buildings for which this question is applicable:	41	153
Percent of buildings that complied with this question:	68.30	69.30

91. If instructions for the car emergency signaling device are provided, are they presented in both tactile and visual form?

	Plan	Field
Number of buildings for which this question is applicable:	38	132
Percent of buildings that complied with this question:	65.80	79.50

92. Is the top of the elevator hall call buttons located vertically between 35 in. and 54 in. above the floor?

	Plan	Field
Number of buildings for which this question is applicable:	41	154
Percent of buildings that complied with this question:	68.30	90.90

93. Is the button that designates the up direction located above the button that designates the down direction?

	Plan	Field
Number of buildings for which this question is applicable:	41	143
Percent of buildings that complied with this question:	63.40	88.10

94. Is a visible and audible signal provided at each elevator entrance to indicate which car is answering a call?

	Plan	Field
Number of buildings for which this question is applicable:	40	144
Percent of buildings that complied with this question:	67.50	83.30

95. Are there in-car signals visible from the floor area adjacent to the hall call buttons?

	Plan	Field
Number of buildings for which this question is applicable:	41	149
Percent of buildings that complied with this question:	68.30	81.90

96. Are the hall signal fixtures centered at 72 in. minimum above the floor?

	Plan	Field
Number of buildings for which this question is applicable:	40	139
Percent of buildings that complied with this question:	67.50	82.70

97. Do the audible signals sound once for up and twice for down, or do verbal annunciators state the words "up" and "down"?

	Plan	Field
Number of buildings for which this question is applicable:	40	149
Percent of buildings that complied with this question:	62.50	74.50

98. Are elevator doors provided with a reopening device that stops and reopens a car door and hoistway door if the door becomes obstructed?

	Plan	Field
Number of buildings for which this question is applicable:	41	155
Percent of buildings that complied with this question:	68.30	89.70

99. Are control buttons located on the elevator control panel ¾ in. minimum in their smallest dimension?

	Plan	Field
Number of buildings for which this question is applicable:	41	155
Percent of buildings that complied with this question:	68.30	90.30

100. Is there contrast between characters/symbols and the background of the control panel?

	Plan	Field
Number of buildings for which this question is applicable:	39	151
Percent of buildings that complied with this question:	64.10	91.40

101. Are characters and symbols on the control panel raised and in uppercase, N in. high minimum, and 2 in. high maximum?

	Plan	Field
Number of buildings for which this question is applicable:	40	153
Percent of buildings that complied with this question:	67.50	88.90

102. Are the raised characters and symbols on the control panel accompanied by Braille?

	Plan	Field
Number of buildings for which this question is applicable:	40	152
Percent of buildings that complied with this question:	65.00	90.10

103. Are raised characters or symbols with Braille designations below located to the left of the control buttons?

	Plan	Field
Number of buildings for which this question is applicable:	39	151
Percent of buildings that complied with this question:	64.10	88.70

104. Is the in-car call button for the main entry floor designated by a star?

	Plan	Field
Number of buildings for which this question is applicable:	39	151
Percent of buildings that complied with this question:	66.70	88.10

105. Are floor buttons in the elevators provided with visible indicators to show that a call has been registered?

	Plan	Field
Number of buildings for which this question is applicable:	38	148
Percent of buildings that complied with this question:	65.80	91.20

106. Do the visible indicators in the elevator cease when the call is answered?

	Plan	Field
Number of buildings for which this question is applicable:	38	149
Percent of buildings that complied with this question:	65.80	91.30

107. Are the controls inside the elevator located on a front wall if cars have center opening doors, and at the side wall or at the front wall next to the door if cars have side opening doors?

	Plan	Field
Number of buildings for which this question is applicable:	42	149
Percent of buildings that complied with this question:	66.70	91.30

108. Does at least one accessible elevator provide access to all floors of the building?

	Plan	Field
Number of buildings for which this question is applicable:	90	155
Percent of buildings that complied with this question:	83.30	89.00

109. If all elevators are not accessible, are the accessible elevators clearly identified with the international symbol of accessibility?

	Plan	Field
Number of buildings for which this question is applicable:	35	51
Percent of buildings that complied with this question:	60.00	70.60

110. If the building has a platform lift, does it comply with the relevant requirements above and provide the minimum 30 in. x 40 in. clear floor space?

	Plan	Field
Number of buildings for which this question is applicable:	31	42
Percent of buildings that complied with this question:	58.10	66.70

Drinking Fountains and Water Coolers: **If provided in the building or at the site, at least one accessible drinking fountain (per floor) must be provided.**

111. Is the fountain or water cooler located between 27 in. and 80 in. above the floor if it protrudes into the accessible route?

	Plan	Field
Number of buildings for which this question is applicable:	62	117
Percent of buildings that complied with this question:	82.30	82.10

112. Does the fountain or water cooler protrude from the wall into the accessible route 4 in. or less?

	Plan	Field
Number of buildings for which this question is applicable:	75	133
Percent of buildings that complied with this question:	81.30	77.40

113. Is the spout outlet located 36 in. maximum above the floor?

	Plan	Field
Number of buildings for which this question is applicable:	61	144
Percent of buildings that complied with this question:	88.50	90.30

114. Are the spouts of drinking fountains and water coolers located at the front of the unit directing the water flow parallel or nearly parallel to the front of the unit?

	Plan	Field
Number of buildings for which this question is applicable:	57	141
Percent of buildings that complied with this question:	87.70	87.90

115. Do wall-mounted and post-mounted cantilevered drinking fountains and water coolers have a clear knee space between the bottom of the apron and the floor or ground at least 27 in. high, 30 in. wide, and 17 in. to 19 in. deep?

	Plan	Field
Number of buildings for which this question is applicable:	54	134
Percent of buildings that complied with this question:	85.20	74.60

116. Do wall-mounted and post-mounted cantilevered drinking fountains and water coolers have a clear floor space 30 in. x 48 in. to allow for a forward approach?

	Plan	Field
Number of buildings for which this question is applicable:	71	134
Percent of buildings that complied with this question:	90.10	94.80

117. Do free-standing or built-in drinking fountains and water coolers have a clear floor space at least 30 in. x 48 in. to allow for a parallel approach?

	Plan	Field
Number of buildings for which this question is applicable:	49	70

Percent of buildings that complied with this question:	85.70	87.10

118. Can the operable parts located at or near the front edge of the fountain or water cooler be operated with one hand without the need to grasp tightly, pinch, or twist the wrist?

	Plan	Field
Number of buildings for which this question is applicable:	53	139
Percent of buildings that complied with this question:	84.90	95.00

Toilet Rooms and Bathing Facilities: Where provided in public-use and common-use areas, at least one of each fixture (water closet, toilet room and stall, urinal, lavatory, mirror, bathtub, shower stall, and sink) must be provided per room.

119. Do transfer-type shower stalls have a 36 in. x 36 in. inside finished dimension?

	Plan	Field
Number of buildings for which this question is applicable:	25	34
Percent of buildings that complied with this question:	84.00	82.40

120. Do transfer-type shower stalls provide a clear floor space of at least 36 in. wide by 48 in. long measured from the control wall?

	Plan	Field
Number of buildings for which this question is applicable:	25	35
Percent of buildings that complied with this question:	84.00	71.40

121. Do roll-in type shower stalls have a 30 in. x 60 in. inside finished dimension?

	Plan	Field
Number of buildings for which this question is applicable:	19	29
Percent of buildings that complied with this question:	89.50	79.30

122. Do roll-in type shower stalls provide a clear floor space of at least 36 in. wide by 60 in. long?

	Plan	Field
Number of buildings for which this question is applicable:	19	29
Percent of buildings that complied with this question:	94.70	93.10

123. Are lavatories mounted with the rim 34 in. maximum above the floor with a clearance of 29 in. minimum from the floor to the bottom of the front edge of the apron?

	Plan	Field
Number of buildings for which this question is applicable:	142	261
Percent of buildings that complied with this question:	97.90	89.70

124. Is a folding or non-folding L-shaped seat provided in transfer-type shower stalls that is mounted 17 to 19 in. above the bathroom floor extending the full depth of the stall?

	Plan	Field
Number of buildings for which this question is applicable:	15	31
Percent of buildings that complied with this question:	86.70	67.70

125. Is the rear edge of the seat 2 ½ in. maximum and the front edge 15 in. to 16 in. from the seat wall?

	Plan	Field
Number of buildings for which this question is applicable:	13	25
Percent of buildings that complied with this question:	92.30	84.00

126. Is the "L" portion of the seat 1 ½ in. maximum from the back wall and 14 in. to 15 in. from the back wall to the inner edge of the seat?

	Plan	Field
Number of buildings for which this question is applicable:	14	25
Percent of buildings that complied with this question:	92.90	76.00

127. Is the front edge of the "L" 22 in. to 23 in. from the seat wall?

	Plan	Field
Number of buildings for which this question is applicable:	18	28
Percent of buildings that complied with this question:	88.90	75.00

128. Is the seat on the wall opposite the controls?

	Plan	Field
Number of buildings for which this question is applicable:	21	32
Percent of buildings that complied with this question:	95.20	90.60

129. Is the diameter or width of the gripping surfaces of a grab bar 1 ¼ in. to 1 ½ in., or does the shape provide an equivalent gripping surface?

	Plan	Field
Number of buildings for which this question is applicable:	117	231
Percent of buildings that complied with this question:	99.10	98.70

130. If grab bars are mounted adjacent to a wall, is the space between the wall and the grab bar at least 1 ½ in?

	Plan	Field
Number of buildings for which this question is applicable:	130	252
Percent of buildings that complied with this question:	99.20	98.00

131. Are grab bars mounted in a horizontal position, 33 in. to 36 in. above the floor, except where a supplemental grab bar is installed in relation to a fixture rim or surface?

	Plan	Field
Number of buildings for which this question is applicable:	148	250
Percent of buildings that complied with this question:	98.60	96.40

132. Are grab bars and any wall surfaces adjacent to grab bars free of sharp or abrasive elements?

	Plan	Field
Number of buildings for which this question is applicable:	118	253
Percent of buildings that complied with this question:	100.00	98.00

133. Are grab bars securely fastened to their fittings?

	Plan	Field
Number of buildings for which this question is applicable:	105	251
Percent of buildings that complied with this question:	100.00	98.80

134. Do grab bars mounted horizontally at 33 to 36 in. above the floor remain free of the required clear floor space?

	Plan	Field
Number of buildings for which this question is applicable:	147	250
Percent of buildings that complied with this question:	99.30	98.40

135. For transfer type showers, do grab bars extend across the control wall and back wall to a point 18 in. from the control wall?

	Plan	Field
Number of buildings for which this question is applicable:	21	34
Percent of buildings that complied with this question:	90.50	79.40

136. For roll-in type showers, are grab bars provided on the three walls of the shower?

	Plan	Field
Number of buildings for which this question is applicable:	21	35
Percent of buildings that complied with this question:	90.50	77.10

137. Can controls be operated with one hand without the need to grasp tightly, pinch, or twist the wrist?

	Plan	Field
Number of buildings for which this question is applicable:	26	63
Percent of buildings that complied with this question:	84.60	81.00

138. Are controls in roll-in showers located on the back wall 38 in. to 48 in. above the shower floor?

	Plan	Field
Number of buildings for which this question is applicable:	23	38
Percent of buildings that complied with this question:	91.30	86.80

139. In transfer-type shower stalls, are controls, faucets, and the shower unit mounted on the side wall opposite the seat 38 in. to 48 in. above the shower floor?

	Plan	Field
Number of buildings for which this question is applicable:	19	28
Percent of buildings that complied with this question:	94.70	92.90

140. Are thresholds in shower stalls no higher than ½ in?

	Plan	Field
Number of buildings for which this question is applicable:	25	45
Percent of buildings that complied with this question:	76.00	82.20

141. Are thresholds heights between ¼ in. and ½ in. beveled?

	Plan	Field
Number of buildings for which this question is applicable:	22	73
Percent of buildings that complied with this question:	86.40	86.30

142. Do enclosures for shower stalls obstruct controls or obstruct transfer from wheelchairs onto shower seats?

	Plan	Field
Number of buildings for which this question is applicable:	18	35
Percent of buildings that complied with this question:	33.30	34.30

Seating, Tables, or Work Surfaces: If provided in accessible spaces, at least of one of each type must be accessible.

143. Do accessible seating spaces provided at tables and work surfaces for people in wheelchairs have a 30 in. x 48 in. minimum clear floor space that does not overlap knee space by not more than 19 in?

	Plan	Field
Number of buildings for which this question is applicable:	88	189
Percent of buildings that complied with this question:	96.60	93.70

144. If benches are provided, are they 20 in. to 24 in. wide by 42 in. to 48 in. long fixed to a wall along the longer dimension, mounted 17 in. to 19 in. above the floor?

	Plan	Field
Number of buildings for which this question is applicable:	32	53
Percent of buildings that complied with this question:	68.80	58.50

145. Is a 30 in. x 48 in. clear floor space provided at accessible benches?

	Plan	Field
Number of buildings for which this question is applicable:	37	56
Percent of buildings that complied with this question:	97.30	96.40

146. If benches are installed in wet locations, is the surface of the bench slip resistant?

	Plan	Field
Number of buildings for which this question is applicable:	28	53
Percent of buildings that complied with this question:	82.10	83.00

147. Does the accessible seating have knee spaces at least 27 in. high, 30 in. wide, and 19 in. deep?

	Plan	Field
Number of buildings for which this question is applicable:	64	170
Percent of buildings that complied with this question:	95.30	88.80

148. Are the tops of accessible portions of tables and work surfaces from 28 in. to 34 in. from the floor?

	Plan	Field
Number of buildings for which this question is applicable:	77	198
Percent of buildings that complied with this question:	92.20	87.90

Places of Assembly:

149. Are there spaces large enough for two wheelchairs to fit side by side, located at a variety of viewing positions within the assembly space?

	Plan	Field
Number of buildings for which this question is applicable:	226	295
Percent of buildings that complied with this question:	93.80	93.60

Laundry Rooms: **If provided, at least one of each type of appliance in each laundry area must be accessible, however, laundry rooms are not required to have front-loading washers.**

150. Is there clear floor space of 30 in. by 48 in. at least one washer and one dryer that allows for a forward or parallel approach?

	Plan	Field
Number of buildings for which this question is applicable:	188	240
Percent of buildings that complied with this question:	98.40	94.20

151. Are operable parts of at least one appliance within the high forward reach range of 48 in. maximum and the low forward reach range of 15 in. minimum above the floor?

	Plan	Field
Number of buildings for which this question is applicable:	103	243

Percent of buildings that complied with this question:	96.10	95.50

152. Are operable parts of at least one appliance within the high side reach of 54 in. maximum and the low side reach of 15 in. minimum above the floor?

	Plan	**Field**
Number of buildings for which this question is applicable:	98	253
Percent of buildings that complied with this question:	100.00	95.30

Requirement 3. Usable doors

Section F: **Doors on accessible routes and in public and common use areas**
Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

153. Do doorways have a clear opening of 32 in. minimum with door open 90 degrees measured between the face of the door and the stop?

	Plan	Field
Number of buildings for which this question is applicable:	340	414
Percent of buildings that complied with this question:	97.10	98.10

154. *Front approach to the pull side of swinging door:*
Is there maneuvering space that extends 18 in. minimum beyond the latch side of the door and 60 in. minimum perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	270	327
Percent of buildings that complied with this question:	96.70	90.80

155. *Front approach to the push side of swinging doors with both closer and latch:*
Is there maneuvering space that extends 12 in. minimum beyond the latch side of the door and 48 in. minimum perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	260	337
Percent of buildings that complied with this question:	92.70	93.80

156. *Hinge-side approach to pull side of swinging doors:*
Is there maneuvering space that extends 36 in. minimum beyond the latch side of the door if 60 in. minimum is provided perpendicular to the doorway, or is there maneuvering space that extends 42 in. minimum beyond the latch side of the door if 54 in. minimum is provided perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	138	163
Percent of buildings that complied with this question:	93.50	93.30

157. *Hinge-side approach to push side of swinging doors equipped with both latch and closer:*
Is there maneuvering space of 54 in. minimum, parallel to the doorway and 48 in. minimum perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	167	213
Percent of buildings that complied with this question:	99.40	98.59

158. *Latch-side approach to pull side of swinging doors with closers:*
Is there maneuvering space that extends 24 in. minimum beyond the latch side of the door and 54 in. minimum perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	147	175
Percent of buildings that complied with this question:	98.00	94.30

159. *Latch-side approach to pull side of swinging door without closers:*
Is there maneuvering space that extends 24 in. minimum beyond the latch side of the door and 48 in. minimum perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	111	131
Percent of buildings that complied with this question:	96.40	96.90

160. *Latch-side approach to push side of swinging door with closers:*
Is there maneuvering space that extends 24 in. minimum parallel to the doorway beyond the latch side of the door and 48 in. minimum perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	161	194
Percent of buildings that complied with this question:	100.00	98.50

161. *Latch-side approach to push side of swinging doors without closers:*
Is there maneuvering space that extends 24 in. minimum parallel to the doorway beyond the latch side of the door and 42 in. minimum perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	112	129
Percent of buildings that complied with this question:	95.50	96.90

162. *Front approach to sliding doors and folding door:*
Is there maneuvering space that is the same width as the door opening that extends 48 in. minimum perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	75	80
Percent of buildings that complied with this question:	100.00	98.80

163. *Slide-side approach to sliding and folding doors:*
Is there maneuvering space of 54 in. minimum, parallel to the doorway, and 42 in. minimum, perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	60	67
Percent of buildings that complied with this question:	100.00	94.00

164. *Latch-side approach to sliding and folding doors:*
Is there maneuvering space that extends 24 in. minimum beyond the latch side of the door that extends 42 in. minimum perpendicular to the doorway?

	Plan	Field
Number of buildings for which this question is applicable:	64	64
Percent of buildings that complied with this question:	100.00	98.40

165. Does the floor or ground surface within the required maneuvering spaces of all doors on accessible routes and in public and common use areas clear and virtually flat?

	Plan	Field
Number of buildings for which this question is applicable:	254	425
Percent of buildings that complied with this question:	99.60	96.90

166. Is the space between two hinged or pivoted doors in a series 48 in. minimum plus the width of any door swinging into the space?

	Plan	Field
Number of buildings for which this question is applicable:	101	116
Percent of buildings that complied with this question:	99.00	97.40

167. Do hinged or pivoted doors in a series swing either in the same direction or away form the space between doors?

	Plan	Field
Number of buildings for which this question is applicable:	93	111
Percent of buildings that complied with this question:	100.00	97.30

168. Are thresholds at doorways ½ in. high maximum (for exterior doors thresholds shall be ¾ in. high maximum)?

	Plan	Field
Number of buildings for which this question is applicable:	169	400
Percent of buildings that complied with this question:	97.60	91.50

169. Are changes in level between ¼ in. and ½ in. high beveled?

	Plan	Field
Number of buildings for which this question is applicable:	159	388
Percent of buildings that complied with this question:	99.40	95.60

170. Do handles, pulls, latches, locks, and other operable parts of accessible doors have a shape that is easy to grasp with one hand without the need to grasp or pinch tightly, or twist the wrist to operate?

	Plan	Field
Number of buildings for which this question is applicable:	164	411
Percent of buildings that complied with this question:	92.70	86.10

171. Is door hardware mounted within a high forward reach of 48 in. maximum and a low forward reach of 15 in. minimum above the floor; and within a high side reach of 54 in. maximum and low side reach 15 in. minimum above the floor?

	Plan	Field
Number of buildings for which this question is applicable:	159	408
Percent of buildings that complied with this question:	100.00	99.80

172. When sliding doors are in the fully open position, is operating hardware exposed and usable from both sides?

	Plan	Field
Number of buildings for which this question is applicable:	30	54
Percent of buildings that complied with this question:	100.00	98.10

173. Is the pushing or pulling force required to open hinged doors 5.0 lbs. maximum?

	Plan	Field
Number of buildings for which this question is applicable:	132	379
Percent of buildings that complied with this question:	100.00	86.50

174. Is the pushing or pulling force required to open sliding or folding doors 5.0 lbs. maximum?

	Plan	Field
Number of buildings for which this question is applicable:	55	95
Percent of buildings that complied with this question:	100.00	96.80

175. Is the time for power-operated doors to fully open 3 seconds or more?

	Plan	Field
Number of buildings for which this question is applicable:	19	46
Percent of buildings that complied with this question:	100.00	95.70

176. Is the force required to stop power-operated door movement 15 lb. maximum?

	Plan	Field
Number of buildings for which this question is applicable:	28	50
Percent of buildings that complied with this question:	96.40	94.00

177. Does the bottom 12 in. of all doors except automatic doors, power doors, and sliding doors have a smooth uninterrupted surface to allow the door to be opened by a wheelchair footrest without creating a trap or hazardous condition?

	Plan	Field
Number of buildings for which this question is applicable:	199	382
Percent of buildings that complied with this question:	88.90	78.30

178. When narrow stile and rail doors are used, is there a 12 in. high minimum, smooth panel, extending the full width of the doors, installed on the push side of the doors which will allow the doors to be opened by a wheelchair footrest without creating a trap or hazardous condition? .

	Plan	Field
Number of buildings for which this question is applicable:	82	134
Percent of buildings that complied with this question:	90.20	67.20

Section G: Primary Entry Door to Accessible Units
Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

179. Do doorways have a clear opening of 32 in. minimum with door open 90 degrees measured between the face of the door and the stop?

	Plan	Field
Number of units for which this question is applicable:	697	735
Percent of units that complied with this question:	98.90	99.20

180. *Front approach to the pull side of swinging door:*
Is there maneuvering space that extends 18 in. minimum beyond the latch side of the door and 60 in. minimum perpendicular to the doorway?

	Plan	Field
Number of units for which this question is applicable:	316	318
Percent of units that complied with this question:	88.30	88.40

181. *Front approach to the push side of swinging doors with both closer and latch:*
Is there maneuvering space that extends 12 in. minimum beyond the latch side of the door and 48 in. minimum perpendicular to the doorway?

	Plan	Field
Number of unit for which question is applicable:	440	501
Percent of units that complied with this question:	90.50	89.60

182. *Hinge-side approach to pull side of swinging doors:*
Is there maneuvering space that extends 36 in. minimum beyond the latch side of the door if 60 in. minimum is provided perpendicular to the doorway, or is there maneuvering space that extends 42 in. minimum beyond the latch side of the door if 54 in. minimum is provided perpendicular to the doorway?

	Plan	Field
Number of units for which this question is applicable:	192	202
Percent of units that complied with this question:	91.70	94.10

183. *Hinge-side approach to push side of swinging doors equipped with both latch and closer:*
Is there maneuvering space of 54 in. minimum, parallel to the doorway and 48 in. minimum perpendicular to the doorway?

	Plan	Field
Number of units for which this question is applicable:	287	342

Percent of units that complied with this question:	97.90	97.10

184. *Latch-side approach to pull side of swinging doors with closers:*
Is there maneuvering space that extends 24 in. minimum beyond the latch side of the door and 54 in. minimum perpendicular to the doorway?

	Plan	**Field**
Number of units for which this question is applicable:	148	165
Percent of units that complied with this question:	95.30	93.30

185. *Latch-side approach to pull side of swinging door without closers:*
Is there maneuvering space that extends 24 in. minimum beyond the latch side of the door and 48 in. minimum perpendicular to the doorway?

	Plan	**Field**
Number of units for which this question is applicable:	148	167
Percent of units that complied with this question:	93.90	94.00

186. *Latch-side approach to push side of swinging door with closers:*
Is there maneuvering space that extends 24 in. minimum parallel to the doorway beyond the latch side of the door and 48 in. minimum perpendicular to the doorway?

	Plan	**Field**
Number of units for which this question is applicable:	268	311
Percent of units that complied with this question:	98.10	97.40

187. *Latch-side approach to push side of swinging doors without closers:*
Is there maneuvering space that extends 24 in. minimum parallel to the doorway beyond the latch side of the door and 42 in. minimum perpendicular to the doorway?

	Plan	**Field**
Number of units for which this question is applicable:	165	219
Percent of units that complied with this question:	90.90	90.40

188. Does the floor or ground surface within the required maneuvering spaces of all primary entry doors have a slope that is virtually flat?

	Plan	**Field**
Number of units for which this question is applicable:	513	721
Percent of units that complied with this question:	99.60	98.10

189. Is the space between two hinged or pivoted doors in a series 48 in. minimum plus the width of any door swinging into the space?

	Plan	**Field**
Number of units for which this question is applicable:	52	59
Percent of units that complied with this question:	100.00	98.30

190. Do hinged or pivoted doors in a series swing either in the same direction or away form the space between doors?

	Plan	Field
Number of units for which this question is applicable:	32	37
Percent of units that complied with this question:	100.00	100.00

191. Are thresholds at doorways ½ in. high maximum (for exterior doors thresholds shall be ¾ in. high maximum)?

	Plan	Field
Number of units for which this question is applicable:	324	709
Percent of units that complied with this question:	94.10	89.40

192. Are changes in floor level 0 in. between pervious exterior materials and no more than ½ in. for impervious materials?

	Plan	Field
Number of units for which this question is applicable:	287	560
Percent of units that complied with this question:	97.60	93.20

193. Do handles, pulls, latches, locks, and other operable parts of the public-use side of doors have a shape that is easy to grasp with one hand without the need to grasp or pinch tightly, or twist the wrist to operate?

	Plan	Field
Number of units for which this question is applicable:	263	740
Percent of units that complied with this question:	95.80	83.20

194. Is door hardware mounted within a high forward reach of 48 in. maximum and a low forward reach of 15 in. minimum above the floor; and within a high side reach of 54 in. maximum and low side reach 15 in. minimum above the floor?

	Plan	Field
Number of units for which this question is applicable:	276	747
Percent of units that complied with this question:	100.00	100.00

195. Is the pushing or pulling force required to open hinged doors 5.0 lbs. maximum?

	Plan	Field
Number of units for which this question is applicable:	216	716
Percent of units that complied with this question:	100	97.30

196. Does the bottom 12 in. of all primary entry doors have a smooth uninterrupted surface to allow the door to be opened by a wheelchair footrest without creating a trap or hazardous condition?

	Plan	Field
Number of units for which this question is applicable:	376	738
Percent of units that complied with this question:	87.20	83.30

197. When narrow stile and rail doors are used, is there a 12 in. high minimum, smooth panel, extending the full width of the doors, installed on the push side of the doors which will allow the doors to be opened by a wheelchair footrest without creating a trap or hazardous condition?

	Plan	Field
Number of units for which this question is applicable:	132	178
Percent of units that complied with this question:	84.80	72.50

198. For the primary entry doors to dwelling units with direct exterior access, are the outside landing surfaces constructed of impervious materials such as concrete, brick, or flagstone?

	Plan	Field
Number of units for which this question is applicable:	307	439
Percent of units that complied with this question:	98.40	97.90

199. Are the outside landing surfaces of impervious materials no more than ½ inch below the floor level of the interior of the dwelling unit?

	Plan	Field
Number of units for which this question is applicable:	215	394
Percent of units that complied with this question:	96.30	91.40

Section H: Doors within units
Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

200. Do the following doors within the individual dwelling units provide a nominal 32 in. clear opening of at least 31N in. when the door is opened 90 degrees (including walk-in closet doors), measured between the face of the door and the stop.

- Bedroom entry door(s):

	Plan	Field
Number of units for which this question is applicable:	652	673
Percent of units that complied with this question:	89.90	87.40

- Bathroom door(s):

	Plan	Field
Number of units for which this question is applicable:	685	711
Percent of units that complied with this question:	84.80	81.30

- Powder room door(s):

	Plan	Field
Number of units for which this question is applicable:	69	68
Percent of units that complied with this question:	71.00	58.80

- Walk-in closet(s):

	Plan	Field
Number of units for which this question is applicable:	346	343
Percent of units that complied with this question:	75.70	70.80

- Utility room door(s):

	Plan	Field
Number of units for which this question is applicable:	204	186
Percent of units that complied with this question:	82.40	74.20

- Kitchen door(s):

	Plan	Field
Number of units for which this question is applicable:	35	52
Percent of units that complied with this question:	88.60	90.40

- Dining room door(s):

	Plan	Field
Number of units for which this question is applicable:	16	19
Percent of units that complied with this question:	100.00	100.00

- Living room door(s):

	Plan	Field
Number of units for which this question is applicable:	16	26
Percent of units that complied with this question:	100.00	100.00

- Patio/terrace/balcony door(s):

	Plan	Field
Number of units for which this question is applicable:	329	343
Percent of units that complied with this question:	94.80	91.00

- Other doors_____:

	Plan	Field
Number of units for which this question is applicable:	65	57
Percent of units that complied with this question:	52.30	52.60

- Other doors_____:

	Plan	Field
Number of units for which this question is applicable:	14	20

Percent of units that complied with this question:	50.00	60.00

Section I: Surfaces of Balconies, Terraces, Patios, and Decks Outside Units
Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

201. If an exterior deck, patio, or balcony surface is constructed of impervious materials (such as concrete, brick, or flagstone) is it no more than 4 in. or less below the interior floor level of the dwelling unit?

	Plan	Field
Number of units for which this question is applicable:	246	388
Percent of units that complied with this question:	97.60	92.50

202. If an exterior deck, patio, or balcony surface is constructed of non-impervious materials (such as sand, wood, or gravel) is it no more than ½ in. or less below the floor level of the interior floor level of the dwelling unit?

	Plan	Field
Number of units for which this question is applicable:	45	71
Percent of units that complied with this question:	77.80	70.40

Requirement 4. Accessible route into and through unit

Section J: Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

203. Does the accessible route within the unit have a minimum clear width of 36 in?

	Plan	Field
Number of units for which this question is applicable:	702	726
Percent of units that complied with this question:	97.20	93.10

204. Are changes in level, including thresholds, within the dwelling unit with heights between ¼ in. and ½ in. beveled with a slope no greater than 1:2?

	Plan	Field
Number of units for which this question is applicable:	292	646
Percent of units that complied with this question:	99.30	94.70

205. Except for design features, such as a loft or an area on a different level within a room (e.g., a sunken living room), are the changes in level no more than ½ in?

	Plan	Field
Number of units for which this question is applicable:	427	615
Percent of units that complied with this question:	98.80	96.60

206. If changes in level are greater than ½ in., is a ramp or other means of access provided?

	Plan	Field
Number of units for which this question is applicable:	43	73
Percent of units that complied with this question:	79.10	60.30

207. Where a single story dwelling unit has a special design feature, are all portions of the single story unit, except the loft or the sunken or raised area, on an accessible route?

	Plan	Field
Number of units for which this question is applicable:	26	35
Percent of units that complied with this question:	100.00	93.00

208. Is the accessible route through the remainder of the dwelling maintained without obstruction by a design feature?

	Plan	Field
Number of units for which this question is applicable:	289	347
Percent of units that complied with this question:	97.60	97.40

209. Is the story of the unit served by the elevator the primary entry to the unit?

	Plan	Field
Number of units for which this question is applicable:	275	293
Percent of units that complied with this question:	82.90	79.20

Requirement 5: Light switches, outlets, thermostats, environmental controls in units

Section K: Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

210. Is the horizontal centerline of operable parts of light switches in the unit located between 15 in. and 48 in. above the floor?

	Plan	Field
Number of units for which this question is applicable:	290	728
Percent of units that complied with this question:	97.90	94.80

211. Is the horizontal centerline of operable parts of electrical outlets in the unit located between 15 in. and 48 in. above the floor?

	Plan	Field
Number of units for which this question is applicable:	289	723
Percent of units that complied with this question:	97.60	91.30

212. Is the horizontal centerline of operable parts of thermostats in the unit located between 15 in. and 48 in. above the floor?

	Plan	Field
Number of units for which this question is applicable:	262	702
Percent of units that complied with this question:	77.50	50.40

213. Is the horizontal centerline of operable parts of other environmental controls in the unit located between 15 in. and 48 in. above the floor?

	Plan	Field
Number of units for which this question is applicable:	94	283
Percent of units that complied with this question:	91.50	64.70

214. Is the reach to operable parts of light switches over an obstruction between 20 and 25 in. in depth (such as a protruding shelf)?

	Plan	Field
Number of units for which this question is applicable:	175	303
Percent of units that complied with this question:	96.00	85.80

215. Is the reach to operable parts of electrical outlets over an obstruction between 20 and 25 in. in depth (such as a protruding shelf)?

	Plan	Field
Number of units for which this question is applicable:	275	454
Percent of units that complied with this question:	97.10	84.40

216. Is the reach to operable parts of thermostats over an obstruction between 20 and 25 in. in depth (such as a protruding shelf)?

	Plan	Field
Number of units for which this question is applicable:	61	80
Percent of units that complied with this question:	82.00	68.80

217. Is the reach to operable parts of other environmental controls over an obstruction between 20 and 25 in. in depth (such as a protruding shelf)?

	Plan	Field
Number of units for which this question is applicable:	57	75
Percent of units that complied with this question:	85.70	78.70

218. Is the maximum height of the operable parts of light switches located no higher than 44 in. for a forward approach; or 46 inches for a side approach, provided the obstruction (such as a kitchen base cabinet) is no more than 25 in. in depth?

	Plan	Field
Number of units for which this question is applicable:	200	477
Percent of units that complied with this question:	99.50	84.10

219. Is the maximum height of the operable parts of electrical outlets located no higher than 44 in. for a forward approach; or 46 inches for a side approach, provided the obstruction (e.g., a kitchen base cabinet) is no more than 25 in. in depth?

	Plan	Field
Number of units for which this question is applicable:	262	660
Percent of units that complied with this question:	98.50	83.00

220. Is the maximum height of the operable parts of thermostats located no higher than 44 in. for a forward approach; or 46 in. a side approach, provided the obstruction (e.g., a kitchen base cabinet) is no more than 25 in. in depth?

	Plan	Field
Number of units for which this question is applicable:	80	113
Percent of units that complied with this question:	95.00	79.60

221. Is the maximum height of the operable parts of other environmental controls located no higher than 44 in. for a forward approach; or 46 in. a side approach, provided the obstruction (e.g., a kitchen base cabinet) is no more than 25 in. in depth?

	Plan	Field
Number of units for which this question is applicable:	67	139
Percent of units that complied with this question:	92.50	77.00

NOTE: Obstructions should not extend more than 25 in. from the wall beneath a control. Controls or outlets that do not satisfy these specifications are acceptable provided that comparable controls or outlets that perform the same functions are provided within the same area and are accessible, in accordance with this guideline for Requirement 5.

Requirement 6. Reinforced walls for grab bars in unit bathrooms

Section L: **Consult the corresponding section in the Survey Handbook for guidance in answering these questions.**

NOTE: Where the toilet is not placed adjacent to a side wall, the bathroom would comply if provision was made for installation of floor mounted, foldaway, or similar alternative grab bars. Where the powder room (a room with a toilet and sink) is the only toilet facility located on an accessible level of a multistory dwelling unit, it must comply with the requirement for reinforced walls for grab bars.

222. Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the toilet?

	Plan	Field
Number of units for which this question is applicable:	507	699
Percent of units that complied with this question:	87.00	72.80

223. Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the tub?

	Plan	Field
Number of units for which this question is applicable:	460	593
Percent of units that complied with this question:	84.80	75.20

224. Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the shower stall?

	Plan	Field
Number of units for which this question is applicable:	177	255
Percent of units that complied with this question:	75.10	70.20

225. Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the shower seat?

	Plan	Field
Number of units for which this question is applicable:	150	204
Percent of units that complied with this question:	70.70	67.60

226. Are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the toilet, tub, shower stall and shower seat, where such facilities are provided?

	Plan	Field
Number of units for which this question is applicable:	484	670
Percent of units that complied with this question:	81.60	69.60

Requirement 7: Usable kitchens and bathrooms in units

Section M: **Usable bathrooms in Units**
Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

NOTE: All bathrooms in covered units must be on an accessible route (Requirement 4), have 32 in. clear width at doorways (Requirement 3), have switches, outlets, and controls in accessible locations (Requirement 5), have reinforcing around toilets, tubs, and showers (Requirement 6), and meet either Type A or Type B specifications of Requirement 7.

Powder rooms must be on an accessible route (Requirement 4), have a 32 in. clear width at doorways (Requirement 3), and have switches, outlets, and controls in accessible locations (Requirement 5). When the powder room is the only toilet facility on the entry level of a multistory unit in an elevator building, it must comply with Requirements 3 - 7.

Type A: All bathrooms in the dwelling unit must comply with questions 227-235.

- or -

Type B: If all bathrooms in the dwelling unit do not comply with questions 227-235 (Type A), then at least one bathroom in the dwelling unit must comply with questions 236-250, and all other bathrooms in the unit must comply with the above note.

Type A Specifications:

227. Where the door swings into the bathroom, is there a clear space (30 in. x 48 in.) within the room to position a wheelchair or other mobility aids clear of the path of the door as it is closed and to permit use of fixtures? This clear space can include any kneespace and toespace available below bathroom fixtures.

	Plan	Field
Number of units for which this question is applicable:	424	457
Percent of units that complied with this question:	76.40	79.40

228. Where the door swings out, is a clear space (30 in. x 48 in.) within the bathroom for a person using a wheelchair or other mobility aid to position the wheelchair such that the person is allowed use of fixtures and the ability to reopen the door and exit?

	Plan	Field
Number of units for which this question is applicable:	256	242
Percent of units that complied with this question:	95.70	94.60

NOTE: Doors may swing into the clear floor space provided at any fixture if the maneuvering space is provided. Maneuvering spaces may include any kneespace or toespace available below bathroom fixtures

229. Is one of three clear floor spaces provided at the toilet (clear floor space at fixtures may overlap)?

	Plan	Field
Number of units for which this question is applicable:	608	635
Percent of units that complied with this question:	82.20	84.90

230. Is 30 in. X 48 in. clear floor space provided at the lavatory (clear floor space at fixtures may overlap)?

	Plan	Field
Number of units for which this question is applicable:	602	635
Percent of units that complied with this question:	85.90	86.90

231. Is one of two clear floor spaces provided at the tub (clear floor space at fixtures may overlap)?

	Plan	Field
Number of units for which this question is applicable:	531	546
Percent of units that complied with this question:	86.60	86.80

232. Is 30 in. by 48 in. clear floor space provided at the shower stall (clear floor space at fixtures may overlap)?

	Plan	Field
Number of units for which this question is applicable:	213	221
Percent of units that complied with this question:	86.90	87.30

233. If the shower stall is the only bathing facility provided in the covered dwelling unit does it measure at least 36 in. x 36 in. and provide a 30 in. by 48 in. clear floor space?

	Plan	Field
Number of units for which this question is applicable:	115	132
Percent of units that complied with this question:	90.40	78.00

234. If a parallel approach to the lavatory by a person in a wheelchair is not possible within the space, are cabinets provided designed to be removable to afford the necessary knee clearance for forward approach?

	Plan	Field
Number of units for which this question is applicable:	204	284
Percent of units that complied with this question:	72.50	61.60

235. Is a 30 in. x 48 in. clear floor space provided for parallel approach to the lavatory and centered on the lavatory?

	Plan	Field
Number of units for which this question is applicable:	549	596
Percent of units that complied with this question:	70.50	73.50

Type B Specifications

236. Where the door swings into the bathroom, is there a clear space (30 in. x 48 in.) within the room to position a wheelchair or other mobility aids clear of the path of the door as it is closed and to permit use of fixtures? This clear space can include any kneespace and toespace available below bathroom fixtures.

	Plan	Field
Number of units for which this question is applicable:	387	433
Percent of units that complied with this question:	80.90	82.90

237. Where the door swings out, is a clear space provided within the bathroom for a person using a wheelchair or other mobility aid to position the wheelchair such that the person is allowed use of fixtures and the ability to reopen the door and exit?

	Plan	Field
Number of units for which this question is applicable:	220	225

Percent of units that complied with this question:	94.50	94.70

238. When both tub and shower fixtures are provided in the bathroom, is at least one made accessible?

	Plan	Field
Number of units for which this question is applicable:	147	184
Percent of units that complied with this question:	93.90	87.50

239. When two or more lavatories in a bathroom are provided, is one made accessible?

	Plan	Field
Number of units for which this question is applicable:	65	84
Percent of units that complied with this question:	90.80	90.50

240. Are toilets located within bathrooms in a manner that permits a wall-mounted or folding grab bar to be installed on one side of the fixture?

	Plan	Field
Number of units for which this question is applicable:	534	584
Percent of units that complied with this question:	96.40	93.00

241. In locations where toilets are adjacent to walls or bathtubs, is the center line of the fixture exactly 18" from the wall or bathtub?

	Plan	Field
Number of units for which this question is applicable:	521	584
Percent of units that complied with this question:	81.80	76.40

242. Is the other (non-grab bar) side of the toilet fixture a minimum of 15" from the finished surface of adjoining walls, vanities or from the edge of a lavatory?

	Plan	Field
Number of units for which this question is applicable:	528	583
Percent of units that complied with this question:	90.90	89.90

243. If the lavatory is designed with removable base cabinets, is the centerline of the fixture a minimum of 15 in. horizontally from an adjoining wall or fixture?

	Plan	Field
Number of units for which this question is applicable:	193	240
Percent of units that complied with this question:	90.20	88.30

244. If the vanity and lavatory are designed for a parallel approach, is the centerline of the fixture a minimum of 24 in. measured horizontally from an adjoining wall or fixture?

	Plan	Field
Number of units for which this question is applicable:	435	485
Percent of units that complied with this question:	75.40	72.80

245. Is the top of the lavatory rim a maximum height of 34 in. above the finished floor.

	Plan	Field
Number of units for which this question is applicable:	383	598
Percent of units that complied with this question:	98.20	97.30

246. If kneespace is provided below the vanity, is the bottom of the apron at least 27 in. above the floor?

	Plan	Field
Number of units for which this question is applicable:	133	183
Percent of units that complied with this question:	95.50	90.20

247. If kneespace is provided below the vanity, is it between 17 in. and 19 in. deep?

	Plan	Field
Number of units for which this question is applicable:	117	182
Percent of units that complied with this question:	97.40	95.10

248. Do the bathtubs and tub/showers located in the bathroom provide a clear access aisle adjacent to the lavatory that is at least 30 in. wide and extends for a length of 48 in., measured from the foot (control end) of the bathtub?

	Plan	Field
Number of units for which this question is applicable:	488	528
Percent of units that complied with this question:	80.70	80.70

249. Is a minimum clear floor space of 30 in. wide by 48 in. available outside a stall shower?

	Plan	Field
Number of units for which this question is applicable:	190	212
Percent of units that complied with this question:	88.90	86.80

250. If the shower stall is the only bathing facility provided in the covered dwelling unit, or on the accessible level of a covered multistory unit, and it measures a nominal 36 in. x 36 in, does it have reinforcing to allow for installation of an optional wall hung bench seat?

	Plan	Field
Number of units for which this question is applicable:	70	94
Percent of units that complied with this question:	91.40	79.80

Section N: **Usable Kitchens in Units**

Consult the corresponding section in the Survey Handbook for guidance in answering these questions.

251. A 30 in. by 48 in. clear floor space must be provided at sinks, ranges and cooktops to allow for a parallel approach. The clear floor space must be centered on the bowl or appliance. Do the following comply with the requirements for clear floor space and centering:

- the range or cooktop:

	Plan	Field
Number of units for which this question is applicable:	662	696
Percent of units that complied with this question:	91.70	93.10

- the sink:

	Plan	Field
Number of units for which this question is applicable:	678	712
Percent of units that complied with this question:	86.60	87.10

252. A 30 in. by 48 in. clear floor space must be provided at ovens, dishwashers, refrigerators, freezers, and trash compactors. It can be oriented in either parallel or a perpendicular position and must be centered on the appliance. Do the following comply with the requirements for clear floor space and centering:

- the oven:

	Plan	Field
Number of units for which this question is applicable:	572	621
Percent of units that complied with this question:	96.20	96.80

- the dishwasher:

	Plan	Field
Number of units for which this question is applicable:	411	429
Percent of units that complied with this question:	94.60	94.20

- the refrigerator/freezer:

	Plan	Field
Number of units for which this question is applicable:	687	717
Percent of units that complied with this question:	91.30	93.30

- the trash compactor:

	Plan	Field
Number of units for which this question is applicable:	13	15
Percent of units that complied with this question:	76.90	73.30

253. Is the clearance between counters and all opposing base cabinets, countertops, appliances or walls at least 40 in?

	Plan	Field
Number of units for which this question is applicable:	660	685
Percent of units that complied with this question:	94.20	91.70

254. If the kitchen is U-shaped and has the sink, range, or cooktop located at the base of the "U", is a 60-inch diameter turning radius provided to allow parallel approach to the base of the "U"?

	Plan	Field
Number of units for which this question is applicable:	168	183
Percent of units that complied with this question:	74.40	72.10

255. If the kitchen is U-shaped and has the sink, range, or cooktop located at the base of the "U", are base cabinets designed to be removable at that location to allow knee space for a forward approach?

	Plan	Field
Number of units for which this question is applicable:	110	162
Percent of units that complied with this question:	52.70	48.10

APPENDIX B: DATA ANALYSIS AND INTERPRETATION

OVERVIEW

The key findings are briefly summarized below. Analytic procedures and results of data analyses are described in more detail in the Data Clustering and Data Analysis sections that follow.

Sample Characteristics and Item-Level Conformance Analysis

- A total of 397 housing projects were surveyed, representing a sample of multifamily housing projects completed between April 1, 1991 and March 31, 1997 in ten geographic regions of the country. Each completed survey included information regarding the characteristics and conformance behavior of one to six individual units. There were a total number of 988 individual sampled dwelling units available for analysis.
- Conformance rates for individual items ranged from 33.2 percent to 100 percent for completed buildings, with the bulk of items displaying conformance rates in excess of 80 percent. Conformance rates ranged from 24.1 percent to 100 percent for building plans.
- Conformance rates at and approaching 100 percent were observed for a number of items. Of the 291 conformance items included in the survey, 130 items had conformance rates of 95 to 100 percent for building plans to which they were applicable; 79 items had conformance rates of 95 to 100 percent for completed dwelling units and buildings to which they were applicable. It appears that conformance with those items can be expected as a matter of course in units to which they are applicable. They constitute a group of individual items for which conformance appears to be a well-entrenched practice among builders constructing buildings of all sizes and characteristics, throughout all regions sampled in this study (see Table 3.1.1).

Clustering and Formation of Composite Conformance Measures

- Items in the survey that showed variations in conformance behavior were distilled into clusters of items that were conceptually and statistically related. These were used to form 16 composite measures of conformance that represented the 7 major accessibility requirements addressed in the survey. The results of these analyses were also used to form a parallel set of 16 composite measures for the architectural plan items in the survey. The 16 measures and the requirements to which they apply are summarized below:

  <u>Requirement 1: Accessible building entrance on an accessible route</u>
  * Building Entrance (2 items)

  <u>Requirement 2: Accessible and usable public and common use areas</u>
  * Elevators (31 items)
  * Public Accessible Routes (27 items)
  * Safety Features of Accessible Routes (6 items)
  * Public Facilities (18 items)
  * Ramps and Obstructions (19 items)
  * Curb Ramps (6 items)
  * Clearance and Reach (5 items)

  <u>Requirement 3: Usable Doors</u>
  * Usable Doors (37 items)

Requirement 4: Accessible route into and through unit
* Accessible Route (5 items)

Requirement 5: Light switches, electrical outlets, and thermostats
* Access to Obstructed Switches (5 items)
* Height of Switches and Controls (3 items)

Requirement 6: Reinforced walls for grab bars in units
* Grab Bars (5 items)

Requirement 7: Usable kitchens and bathrooms in units
* Wheelchair Mobility in Bath (15 items)
* Usability of Kitchen Appliances and Fixtures (6 items)
* Clear Spaces in Bath and Kitchen (7 items)

- Each surveyed dwelling unit was assigned a score from 0 to 100 that indicated the proportion of applicable items with which the dwelling unit was in conformance. The scores of surveyed dwelling units in each project included in the study were aggregated to produce project conformance scores for each measure. The distributions of scores for the 16 respective measures of field conformance and architectural plan conformance indicated that there was variation in the extent of conformance with the clusters of requirements represented by each of the composite measures.

Conformance Behavior for Sampled Projects

- Mean scores on a 100-point scale were above 70 for all 16 composite conformance measures. Mean extent of conformance scores for completed buildings in the projects surveyed ranged from 72 to 95 for the 16 measures. The overall mean extent of conformance (averaged across all 16 measures) was 86. Thus, conformance with at least 80 percent of the relevant accessibility items was typical of completed buildings in the projects sampled for this study.
- Conformance with applicable items was highest for Accessible Route (Requirement 4: Accessible route into and through unit). Conformance was lowest for Height of Switches (Requirement 5: Light switches, electrical outlets, and thermostats) and Grab Bars (Requirement 6: Reinforced walls for grab bars in units).

Comparisons of Conformance for Architectural Plans and Completed Buildings

- Levels of conformance were quite similar for building plans and completed buildings, although several statistically significant differences are observed. The largest difference observed was for Grab Bars (Requirement 6: Reinforced walls for grab bars in unit), in the direction of higher conformance in building plans than in completed units. In general, plans were more likely to be in conformance than buildings in the field.
- These findings suggest two things. First, builders appear to be fairly consistent in executing plans involving conformance with accessibility guidelines, although the differences observed suggest that they may deviate from plans, especially with regard to Grab Bar items. Second, they suggest that builders are unlikely to correct for deficiencies in building plans with respect to accessibility guidelines; as such, it is critical that problem areas, with respect to conformance, be addressed with architects and planners.

Regional Differences in Conformance Behavior

- Differences in conformance behavior among geographic regions are widespread. For completed projects, region had a significant effect on conformance behavior for 12 of the 16 composite conformance measures; geographic regional differences were also observed for 6 of the 16 composite conformance measures for architectural plans. The only requirement for which no regional differences were observed was Requirement 1: Accessible building entrance on an accessible route.
- Regional differences do not appear to represent simple, across-the-board differences among regions. Instead, it appears more likely that particular regions may have "pockets" of deficiency with respect to conformance.

Impact of Building Characteristics on Conformance Behavior

- The impact of several features of buildings (presence of an elevator and building size) and the building environment (geographic region and age of building) on conformance behavior was investigated in a series of multiple regression analyses.
- A statistically significant proportion of the variance in all of the conformance measures could be accounted for by the set of predictors examined here. On the other hand, the total impact of the four building/building environment features on conformance behavior was relatively modest.
- Composite conformance measures most strongly affected by the predictors under consideration were Public Accessible Routes (adj. $R^2 = .36$), Curb Ramps (adj. $R^2 = .16$), Access to Obstructed Switches (adj. $R^2 = .26$), and Grab Bars (adj. $R^2 = .16$). These represent areas in which it may be fruitful to pay close attention to the particular building features associated with conformance behavior and investigate the reasons for the differences that were observed.
- In contrast, the other building features accounted for less than 10 percent of the variance in the following four composite conformance measures: Building Entrance, Safety Features of Accessible Routes, Clearance and Reach, and Accessible Route. Composite conformance with accessibility guidelines represented by these measures appears to be relatively independent of large-scale building features such as building size, presence/absence of an elevator, and year of construction. Even regional differences in conformance appear to be fairly small for these measures.
- The relative importance of the four predictor variables, considered across the set of 16 composite conformance measures, was also examined. It was clear that Region is pervasively related to conformance behavior, both in terms of the number of composite conformance measures with which it is uniquely associated and in terms of the magnitude of its effect relative to other predictors for most composite conformance measures. Building Size and Elevator each represent features that are related to conformance for a smaller subset of composite conformance measures. Age of Building is the feature that is least informative regarding the level of conformance that can be expected.

DATA CLUSTERING

In order to form summary measures to examine conformance behavior for building plans and completed dwelling units surveyed by SWA, the items in the survey were distilled into 16 clusters of items that were conceptually and statistically related. Statistical analysis of the data to identify clusters and form composite conformance measures proceeded in three phases:

(1) Data Preparation;

(2) Summary of Sample Characteristics and Item-Level Conformance Analysis; and

(3) Formation of Composite Conformance Measures.

Analytic procedures and highlights of the outcomes of each phase are described in the following sections.

PHASE 1: Data Preparation.

Data files were converted for use by standard multivariate statistical analysis software (SPSS-X V. 10.0) and were screened for unusual values and response patterns. Corrections were made when it was determined that there was an error in data entry. Out-of-range variables were recoded as missing data and some variables were recoded to increase interpretability of the results of data analysis. Of particular note:

- Despite the availability of a "Not Applicable" response option on survey items dealing with conformance, all conformance items had significant rates of non-response. Non-response to items dealing with architectural plans was understandable and expected because complete plans were not always available for review. Furthermore, plans often did not provide sufficient information to allow a determination of applicability or conformance with respect to many items on the survey. However, proportions of item non-response for field conformance were also fairly high, ranging from 20 percent to 50 percent for individual items.

  In order to respond to a conformance item, it was necessary for surveyors to determine: (a) if an item was applicable and (b) if applicable, whether it was in conformance. To minimize the possibility of non-responses for those reasons, surveyors were trained to be familiar with the conditions under which each item was applicable; and questions were designed to minimize the amount of inference required to determine whether a unit or feature was in conformance. An examination of the patterns of non-response led us to the conclusion that most of the missing responses for items relating to observation of units in the field represented responses of "Not Applicable." For example, rather than checking the Not Applicable response option, surveyors frequently simply did not complete entire sets of items pertaining to conformance with access to elevators for units located in single-story buildings. Similarly, some items were presented in pairs such that if one item was applicable, the other item was not applicable. The following item pairing is typical of this situation:

  - Item a: "If main bathroom in unit has shower and no bathtub, does it meet item xx?"
  - Item b: "If main bathroom in unit has shower with bathtub, does it meet item yy?"

Some surveyors responded by providing conformance behavior for one item and leaving the other—non-applicable—item blank. As suggested above, it is also possible that some non-responses represented units for which surveyors judged the item to be applicable, but could not determine whether the unit was in conformance with the item.

- The focus of this survey was the extent to which units and plans conformed to a variety of accessibility guidelines. For any particular unit, some guidelines were not applicable to the unit. Thus, no actions were taken to conform to the item.

  In calculating conformance rates for each item, it was inappropriate to characterize a building as out of conformance if the builder or architect failed to conform with an item that did not apply to the unit. However, characterizing buildings for which an item was judged to be "Not Applicable" as "in conformance" with that item would artificially inflate the proportion of units in conformance. Furthermore, it could mask possible conformance problems among units for which builders had conformance responsibilities pertaining to that item.

  The analyses reported here are designed to summarize the extent to which architects and builders conformed to *applicable* guidelines. In the case of non-response to an item, it was not possible to conclusively determine that a guideline was applicable to an item; furthermore, as noted above, the most reasonable interpretation of most non-responses on field conformance items is that the item was *not* applicable to the unit being surveyed. In the case of a Not Applicable response to an item, it was possible to confidently conclude that the item was not applicable. For this reason, both non-responses and Not Applicable responses were excluded from all analyses of conformance behavior.

  Thus, for each item, the proportion of surveyed units in conformance with a particular item represents the proportion of units judged to be in conformance *among those units for which the item was determined to be applicable*. The number of units for which individual items were clearly applicable varied fairly dramatically among the items in the survey (range = 15 to 747).

- For ease of interpretation, all conformance variables were recoded so that 0=not in conformance, 1=in conformance. As noted above, Not Applicable and non-responses were excluded from analyses involving conformance. Mean scores for each item can be directly interpreted as the percentage of units in conformance among those units for which the item was judged to be applicable.

PHASE 2: Summary of Sample Characteristics and Item-Level Conformance Analysis.

A total of 397 housing projects were surveyed, drawn from a sample of multifamily housing projects completed between April 1, 1991 and March 31, 1997. The number of projects surveyed in each of 10 regions in the country was proportional to the percent of multifamily housing starts represented by that region during the period 1991 to 1996. Each completed survey included information regarding the characteristics and conformance behavior of one to six individual units. There were 988 individual dwelling units available for analysis. The percentage of sampled dwelling units per region roughly corresponded to the regional distribution of sampled projects, although some regions were slightly over- or under-represented at the dwelling unit level. Total numbers of projects and dwelling units sampled in each geographic region are shown in Table B1. Descriptive information regarding the characteristics of individual dwelling units surveyed is also displayed in Table B1.

Conformance rates for architectural plans and field observations were calculated for each of the 291 items in the survey. Information about item-level conformance behavior can be seen in Table B2 (Field Conformance) and Table B3 (Plan Conformance). The number of valid observations indicating conformance or non-conformance with an applicable guideline ranged from 15 to 747 for field items; it ranged from 10 to 698 for plan items. Thus the rate of conformance for an item sometimes reflects behavior on the part of many builders; at other times, it describes conformance for a relatively small proportion of the units observed. It should also be noted that the number of valid observations for many plan items was fairly low (well under 100). Results of analyses including these items should be interpreted with caution; the analyses in this report focus primarily on conformance of completed buildings.

Conformance rates for individual items ranged from 33.2 percent to 100 percent for completed buildings, with the bulk of items displaying conformance rates in excess of 80 percent; conformance rates ranged from 24.1 percent to 100 percent for building plans. As noted below, examination of Tables B2 and B3 shows that conformance rates at and approaching 100 percent were observed for a number of items (see Table 3.1.1). It appears that conformance with the items identified can be expected as a matter of course.

PHASE 3: Clustering and Formation of Composite Conformance Measures.

In order to learn more about factors associated with variations in conformance, clusters of items that are empirically related were used to form a smaller number of composite conformance measures that could be examined in greater detail. This proceeded in four stages.

- Stage 1: Two criteria were used to identify field items that were excluded from consideration in the development of composite conformance measures. First, to ensure sufficient sample size to carry out the proposed analyses, field items that were not relevant to most buildings (i.e., items judged applicable to fewer than 100 units) were excluded (see Table 3.1.2). Second, for statistical reasons, items for which there was little or no variance (sample standard deviation < .10) in conformance were identified and excluded from this phase of data analysis (see Table 3.1.3). A total of 78 field items were excluded from further consideration because they met one or both of these criteria. It should be noted that items excluded on the basis of the second criterion should *not* be ignored in descriptions of the level of conformance with accessibility guidelines. Invariably they were items for which the rate of conformance among applicable units approached 100 percent. (This can be seen readily from a perusal of Table B2.) They constitute a list of individual items for which conformance appears to be a well-entrenched practice among builders constructing buildings of all sizes and characteristics, throughout all regions sampled in this study.
- Stage 2: The remaining field items were included in a series of multivariate analyses designed to identify groups of related items. Each of the seven major sections of the survey (labeled Requirements 1-7, respectively) represents a logically distinct set of items pertaining to a particular category of requirements. A separate analysis was carried out for the items in each major Requirement, using Categorical Principal Components Analysis procedures (Categorical PCA).[1]

[1] Initially, traditional principal components analysis factor analytic techniques were applied to the full data set and to the conceptual subsets of items identified above. The structure of responses to items in the data set did not allow a computational solution using these approaches. Categorical PCA is a generalization of more familiar PCA

The results of the Categorical PCA were used to identify one or more field conformance components (i.e., "clusters") in each Requirement. Final component solutions ranging from one component (Requirements 1, 3, 4, and 6) to seven components (Requirement 2) were produced for the subsets of items comprising the seven requirements. The components, coefficient alpha, and component loadings of items pertaining to each requirement are displayed in Appendix 1. Coefficient alpha for the 16 components retained ranged from .65 to .98. Components were reviewed for interpretability and a name was assigned to each retained component based on an examination of items that loaded highly on the component.

For purposes of this study, Categorical PCA was used only as a vehicle to identify the number and item content of empirical clusters represented in the data structure. It was judged that the frequent occurrence of Not Applicable responses for items within a cluster would make the use of optimal scaling procedures to form composite scores inappropriate and misleading. Items that loaded highly (minimum component loading of .32) on each component were selected for inclusion in a series of composite conformance measures corresponding to these components. Formation of the composite conformance measures based on these clusters used a simple unweighted combination strategy, as described in Stage 3 below.

The results of stages one and two in this process are summarized in Table B2, which indicates one of three possible outcomes for each field variable: (1) exclusion of the item from the components analysis due to low sample size, low variance, or both; (2) exclusion of the item from further consideration because it did not load strongly on any of the components identified in the components analysis; and (3) assignment to a component (the name of the component with which it was identified is listed).

Table B3 displays similar information for plan items. The relatively high level of missing data for many items pertaining to building plans precluded conducting separate component analyses for plan conformance items. As such, inclusion or exclusion of plan items in a component is based on the behavior of their companion field items.

- Stage 3: The items comprising each component were combined to form 16 new composite conformance measures of field conformance, which are shown below. For additional detail about the kinds of conformance represented by each composite conformance measure, see Table B4, which identifies the content of the individual items that contribute to each composite conformance measure.

  Requirement 1: Accessible building entrance on an accessible route was represented by a single composite conformance measure based on a cluster of 2 items.

  * Building Entrance (2 items)

  Requirement 2: Accessible and usable public and common use areas was represented by 7 composite conformance measures based on clusters ranging from 6 items to 31 items.

  * Elevators (31 items)

  * Public Accessible Routes (27 items)

  * Safety Features of Accessible Routes (6 items)

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procedures; its distinguishing feature is that it can be applied to categorical and ordinal data as well as numerical data. Like PCA, it provides information about the number of dimensions (components) needed to represent most of the information in a set of items, and information about the items that comprise each component.

* Public Facilities (18 items)

* Ramps and Obstructions (19 items)

* Curb Ramps (6 items)

* Clearance and Reach (5 items)

Requirement 3: Usable Doors was represented by a single composite conformance measure based on a cluster of 37 items.

* Usable Doors (37 items)

Requirement 4: Accessible route into and through unit was represented by a single composite conformance measure based on a cluster of 5 items.

* Accessible Route (5 items)

Requirement 5: Light switches, electrical outlets, and thermostats was represented by 2 composite conformance measures based on clusters of 3 and 5 items respectively.

*Access to Obstructed Switches (5 items)

* Height of Switches and Controls (3 items)

Requirement 6: Reinforced walls for grab bars in units was represented by a single composite conformance measure based on a cluster of 5 items.

* Grab Bars (5 items)

Requirement 7: Usable kitchens and bathrooms in units was represented by 3 composite conformance measures based on clusters ranging from 6 to 15 items.

* Wheelchair Mobility in Bath (15 items)

* Usability of Kitchen Appliances and Fixtures (6 items)

* Clear Spaces in Bath and Kitchen (7 items)

The results of these analyses were also used to form a parallel set of 16 composite conformance measures for the architectural plan items in each section of the survey.

For each cluster of items used to define a composite conformance measure, a surveyed dwelling unit was assigned a score from 0 to 100 that indicated the proportion of applicable items with which the dwelling unit was in conformance. For example, if a composite conformance measure included a cluster of 10 items, a surveyed unit that conformed with 8 of those items would be assigned a score of 80. The score of a surveyed unit was only based on the items in the cluster that were relevant to that unit. So, for example, if three of the items in the cluster were not applicable and the unit conformed with the remaining 7 items, it was assigned a score of 100. If a surveyed building had missing data for 50 percent or more of the items in a composite conformance measure, a score was not calculated.

Interpretation of scores on all composite conformance measures is the same: Scores indicate the extent of conformance with applicable accessibility guidelines. High scores indicate that dwelling units conform with most applicable items in the cluster of items that form the composite conformance measure. Low scores indicate non-conformance with most of the applicable items in the cluster. It should be kept in mind that conformance scores for individual projects can shift fairly dramatically on the basis of conformance/non-conformance with a single item when the number of applicable items in a composite conformance measure is small. This is not a problem for interpretation of mean conformance

levels when estimates are based on observations of many individual projects, but caution should be used in interpreting mean conformance levels for small subsets of projects (e.g., conformance levels in geographic regions that only had small numbers of surveyed projects).

- Stage 4: Scores on all composite conformance measures were calculated for each dwelling unit surveyed (n = 988) and aggregate scores were calculated for each project sampled in the study (n = 397). Tables B5 and B6 provide summary information for calculated scores on the 16 composite conformance measures of field conformance and the 16 composite conformance measures of plan conformance.

  Descriptive statistics for all composite conformance measures with dwelling units as the unit of analysis are reported in Table B5. Summary scores on each composite conformance measure can be interpreted as the average proportion of *applicable* items with which surveyed units were in conformance. (For example, a score of 80 for the entire sample or for any sub-sample means that, on average, surveyed units were in conformance with 80 percent of the relevant items in that cluster.) The number of valid scores for the composite conformance measures ranged from 152 (Elevators) to 713 (Height of Switches and Controls) for observed dwelling units; the number of valid scores for architectural plans of individual dwelling units ranged from 40 (Elevators) to 666 (Usability of Appliances and Fixtures). As seen in Table B5, scores were observed across the entire range (0 - 100) for most composite conformance measures of field conformance. Standard deviations ranged from 11.5 to 40.5, indicating substantial variability in conformance among the surveyed units on all composite conformance measures for completed dwelling units. In general, architectural plans showed somewhat less variability in conformance scores. Scores on all composite conformance measures were negatively skewed.

  Finally, aggregate scores for each project sampled in the study were calculated for all composite conformance measures. For each composite conformance measure, the score assigned to a project was the unweighted average of scores on that measure for all surveyed dwelling units in the project. Table B6 summarizes aggregate scores on all composite conformance measures. When scores were aggregated to the project level, the number of valid composite scores ranged from 121 to 352 for surveys of completed units and ranged from 27 to 279 for surveys of architectural plans. The pattern of scores was similar to that seen for individual dwelling units. A wide range of scores was observed for all measures, and scores on all measures were negatively skewed. As seen in Table B6, mean scores on a 100-point scale were above 70 for all composite conformance measures; mean scores were in 80's and 90's on most measures. However, the distributions of scores for the 16 respective composite conformance measures of field conformance and plan conformance indicated that there was variation in the extent of conformance with the clusters of items represented by each of the composite conformance measures.

  All subsequent analyses of conformance behavior for planned and completed dwelling units were based, respectively, on the 16 field composite conformance measures and the 16 architectural plan composite conformance measures described above. As pointed out earlier, these composite conformance measures summarize conformance behavior for survey items on which there was variability among projects with respect to architect and builder conformance with accessibility guidelines. They do *not* reflect conformance behavior for the few individual items (identified in Tables B2, B3, and Table 3.1.1) excluded on the basis of extremely high conformance observed among all surveyed dwelling units.

DATA ANALYSIS

Examination of conformance proceeded in four phases:

(1) Assessment of Field Conformance with Accessibility Guidelines;

(2) Comparisons of Conformance Behavior for Architectural Plans and Completed Buildings;

(3) Examination of Regional Differences in Conformance Behavior; and

(4) Examination of the Impact of Building Characteristics on Conformance Behavior.

Analytic procedures and highlights of the outcomes of each phase are described in the following sections.

PHASE 1: Assessment of Field Conformance with Accessibility Guidelines

As noted earlier, scores on each of the 16 composite conformance measures can be interpreted as the average proportion of *applicable* items with which surveyed units were in conformance. Table B6, which summarizes the distribution of aggregate project scores on all composite measures, provides information about the extent of conformance observed for projects that were surveyed. Field conformance was assessed by examining mean conformance scores for completed projects on the 16 composite measures described above.[2]

Mean levels of conformance observed for completed buildings were fairly high for all composite conformance measures. Examination of Table B6 shows that mean conformance scores for surveyed projects ranged from a low of 72 to a high of 95; they were 90 or above for 11 of the 16 measures.

Overall levels of conformance for each project were also computed. An overall conformance score – the mean score for the 16 composite measures – was calculated for each project. Mean overall field conformance for projects in the study was 86.3 (SD = 12.9; range = 27, 100) (see Table B6).

Despite relatively high levels of conformance across the board, the distributions of scores on each conformance measure indicated that there was variation among individual projects in the extent of conformance. This is indicated by the range and standard deviation of conformance scores observed on each measure. For every composite conformance measure, there were many projects that were in conformance with all applicable items in the measure, but there were also a number of projects that were not in conformance with a substantial proportion of applicable items.

The relative extent of conformance with each of the major classes of requirements addressed in the survey can also be identified in Table B6. Conformance with the first four major

[2] The sampling procedure for this study was designed to identify a random sample of multifamily housing projects representative of the geographic distribution of housing starts during the sampling frame. For many projects, several individual dwelling units were observed in order to maximize the variety of dwelling unit configurations included in the survey. Because the number of dwelling units was not constant across projects, reports of the extent of conformance based on dwelling unit-level analyses may not be representative of the population sampled in the study. For this reason, all discussions of analyses that describe the extent of conformance are based on data that have been aggregated to the project level. Because the aggregation process has the potential to obscure information on within-project differences in extent of conformance, dwelling unit analyses of conformance behavior were also carried out. These are presented in appendices as noted.

requirements was uniformly high. In particular, conformance with Requirement 1: Accessible building entrance on an accessible route was 92. Conformance with Requirement 2: Accessible and usable public and common use areas ranged from 90 to 94 on the 7 measures that represented the requirement. Conformance with Requirement 3: Usable Doors and Requirement 4: Accessible route into and through unit were 90 and 95, respectively. Conformance on the 2 composite conformance measures representing Requirement 5: Light switches, electrical outlets, and thermostats was lower, ranging from 72 to 89. Likewise, conformance with Requirement 6: Reinforced walls for grab bars in units was somewhat low relative to the extent of conformance observed for the other major requirements. Conformance with the single composite conformance measure representing this requirement was 73. Finally, conformance with Requirement 7: Usable kitchens and bathrooms in units ranged from 79 to 93 on the 3 composite conformance measures that represented the requirement.

In summary, conformance with applicable items was highest for Accessible Route (Requirement 4: Accessible route into and through unit), which showed a mean conformance level of 95. In contrast, Requirements 5 and 6 represent areas of conformance behavior with the greatest potential for improvement. Among the surveyed projects, conformance was lowest for Height of Switches (Requirement 5: Light switches, electrical outlets, and thermostats, mean conformance = 72) and Grab Bars (Requirement 6: Reinforced walls for grab bars in units, mean conformance = 73).

PHASE 2: Comparisons of Conformance Behavior for Architect Plans and Completed Buildings

One question of interest was the extent to which architects' plans and completed buildings differ with respect to conformance. In order to investigate this question, paired t-tests comparing the conformance levels of architects' plans and completed buildings were conducted for each of the 16 composite measures. As with the assessment of field conformance, this analysis was carried out with data aggregated to the level of sampled projects (n = 397).[3] Because the number of comparisons was fairly large, a conservative p-level ($p < .01$) was used as a criterion for identifying statistically significant differences between field conformance (i.e., completed buildings) and plan conformance (architects' building plans). Table B7 summarizes the results of these comparisons.[4]

As seen in Table B7, rates of conformance are generally similar for building plans and completed buildings. The most statistically significant difference observed between building plans and completed buildings was for Grab Bars (Requirement 6). The observed difference was in the direction of higher conformance in building plans than in completed units. There are several

[3] The same analysis was conducted with dwelling units as the unit of analysis (n = 988). The results of this analysis are in Table B7a.

[4] Note that the mean levels of conformance reported in Table B7 are somewhat different from those reported in Table B6 for some composite measures of conformance. Because comparisons could only be made for buildings that had complete data for both field conformance and plan conformance, each pair of means in Table B7 is based on the subset of cases for which data were available on both field and plan measures. The number of pairs available for comparison ranged from 26 (Elevators) to 260 (Usability of Appliances and Fixtures). The mean conformance levels for field conformance and plan conformance reported in Table 6 are systematically based on substantially larger sample sizes.

statistically significant differences between plans and field observations, all in the direction of high conformance for plans. However, the actual difference is usually quite small.

These findings suggest two things: First, builders appear to be fairly consistent in executing plans involving conformance with accessibility guidelines, although the differences observed suggest that they may deviate substantially from plans with regard to Grab Bar items. Second, they suggest that builders are unlikely to *correct* for deficiencies in building plans with respect to accessibility guidelines. As such, it is critical that problem areas with respect to conformance be addressed with architects and planners.

PHASE 3: Examination of Regional Differences in Conformance Behavior

A second general concern addressed during initial investigations of conformance behavior was the possibility of systematic differences in conformance behavior among the ten geographic regions sampled for this project. Each of the 16 composite measures was examined for evidence of regional differences in conformance. A series of one-way analyses of variance (ANOVAs), specifying geographic region as a fixed independent variable and each of the 16 composite field conformance measures as dependent variables, was conducted with data aggregated to the level of sampled projects.[5]

The number of projects sampled in some regions was quite small. (This is consistent with regional differences in number of housing starts during the sample time frame.) Furthermore, for some composite conformance measures and some regions, the number of projects for which a valid conformance score could be calculated was extremely low (zero in some cases). This problem was exacerbated in examinations of conformance behavior for architects' plans. As noted in the Data Clustering discussion, the amount of missing data was systematically higher for survey responses describing conformance of architects' plans than it was for survey responses describing completed dwelling units. Furthermore, it has already been pointed out that levels of conformance were highly similar for field conformance and architectural plan conformance. For this reason, regional analyses were limited to examination of field conformance. In addition, caution should be exercised in interpreting the information regarding observed regional differences in conformance among surveyed projects because of the low sample sizes in some areas.

Geographic region had a significant effect on conformance behavior for 11 of the 16 composite conformance measures of field conformance. As seen in Table B8, eta-squared values ranged from .04 to .26. To locate the source of regional differences in conformance, post hoc multiple comparisons among mean levels of conformance were planned. However, low and zero observed sample sizes for a number of cells of these comparisons precluded the calculation of inferential statistics for many of these comparisons and could be misleading for other comparisons. Nonetheless, visual inspection of regional mean conformance levels for each composite conformance measure is instructive. Means, standard deviations, and ranges of field conformance scores for each region are summarized in Table B8. The number of observations on which each mean conformance score is based is also included. Examination of mean conformance levels in each row of the table can be used to identify particular aspects of field

[5] The same analyses were carried out with dwelling units as the unit of analysis. The results are shown in Table B8a.

conformance that may merit additional attention for each geographic region included in the survey.

To make the pattern of regional differences clearer, Table B9 displays the breakdown of regional field conformance levels for each composite conformance measure with regions presented in order of their ranked mean conformance levels. Thus, each column of Table B9 displays a rank-ordering of regions from highest field conformance to lowest field conformance. When the data are examined in this way, it is immediately apparent that the rank ordering of regions is not consistent across the set of 16 composite conformance measures. As noted above, extreme caution should be used in interpreting apparent differences in extent of conformance levels among regions for mean scores that are based on small numbers of observations. With this caveat in mind, information presented in Table B9 can be used to identify geographic regions that might be targeted for educational efforts or other interventions aimed at increasing the extent of conformance for particular accessibility guidelines.

The results of the ANOVAs, in conjunction with careful examination of Tables B8 and B9, suggest that regional differences in conformance behavior are widespread among the composite conformance measures that were included here. On the other hand, these effects do not appear to represent simple, across-the-board differences among regions in tendency to build units that are in conformance with all major accessibility guidelines. Instead, it appears more likely that particular regions may have "pockets" of deficiency with respect to conformance with accessibility guidelines.

PHASE 4: Impact of Building Characteristics on Conformance Behavior.

The impact of several features of buildings and the building environment on conformance behavior was investigated in a series of multiple regression analyses. Because some of the features examined in this phase were unique to particular dwelling units (i.e., they were not common to all dwelling units in a project), all analyses were carried out with individual dwelling units as the unit of analysis (n = 988). The choice to focus on conformance of completed dwelling units was based on two observations about survey responses. First, the amount of missing data was systematically higher for survey responses describing conformance of architects' plans than it was for survey responses describing completed dwelling units. Second, as noted in the comparison of conformance behavior for architect plans and completed buildings, rates of conformance were generally similar for building plans and completed buildings.

The following four features were identified as being of particular interest with respect to conformance with accessibility guidelines (see Table B1):

<u>Building characteristics</u>

* Elevator: The presence of an elevator in the building (1=yes, 2=no)
* Building size (Number of units): The size of the building in which the unit was located. Buildings were classified into one of eleven categories, rank ordered in terms of the total number of units in the building (1= 4-10 units; 2=11-20 units; … ;11=101+ units)

<u>Building and regulatory environment at the time of construction</u>

* Region: Geographic region of country in which the unit was built. Each unit was categorized into one of ten geographic regions.
* Age of building: Measured in years (at time of survey), calculated on the basis of year of occupancy (1=1998 occupancy, 8=1991 occupancy)

These four factors served as the target predictor variables and control variables in the series of conformance analyses outlined below. Distributions of these variables for the sample of dwelling units surveyed in this study are summarized in Table B1. Examination of the relationships among these factors indicated that Age of Building was unrelated to Region, Building Size, or Elevator. However, the remaining characteristics were associated to some degree. As might be expected, elevators were more common among units located in large buildings. In addition, there were regional differences in the average size of buildings constructed and the likelihood that an elevator would be present in the building.

Analyses were designed to answer three questions:

- What is the impact of each factor on conformance (without respect to other characteristics of the building or the building environment)?
- What is the impact of each factor on conformance when other characteristics of the building, builder, or environment are statistically controlled?
- Overall, what can be said about the total and relative impact of these four building features on measures of conformance?

Hierarchical multiple regression analysis was used to address these questions. The general procedure is summarized below.

- First, for each of the *n* (n = 16) conformance measures (Building Entrance, Elevators, Public Accessible Routes, etc.), four simple regression analyses were conducted -- one for each of the predictors of interest, as follows:

  (a) Model 1a: Conformance_n = Elevator
  (b) Model 1b: Conformance_n = Building size
  (c) Model 1c: Conformance_n = Region
  (d) Model 1d: Conformance_n = Age of building

  Thus, a total of (16 x 4) 64 simple regression analyses were conducted in the first stage. Tests of Model 1 can be interpreted as follows: If the model accounts for significant variance in Conformance (as indicated by R^2), the predictor has a measurable impact on Conformance. The standardized regression coefficient (beta) for the predictor provides an indication of the strength and direction of this relationship.

  The results of the simple regressions are presented in Tables B10, B12, B14, and B16. Table B10 presents the results of testing Model 1a for each of the 16 conformance measures; Table B12 presents the results of testing Model 1b for each of the 16 conformance measures; Table B14 presents the results of testing Model 1c for each of the 16 conformance measures; and Table B16 presents the results of testing Model 1d for each of the 16 conformance measures. Each line in these tables represents the test of a simple, univariate regression model.

  The results of this stage were used to answer the question: *What is the impact of each factor on conformance, without respect to other characteristics of the building or the building environment?* It was also done to cull the data set for relationships that were worth examining in more detail. Models 2 and 3 (the hierarchical analysis) and Model 4 (the full model) were not calculated for a dependent variable unless Model 1 was significant.

- During the next stage, a hierarchical regression model was constructed to test the effect of a predictor when other relevant variables were controlled. Model 2 represents the first step in the hierarchy, entry of the control variables (as such it is referred to as Step 1 in each of the tables); Model 3, which provided the information of real interest, adds the predictor variable that is being investigated to the equation (it is referred to as Step 2 in each of the tables). Each of the predictors that were being investigated served as the "Target Predictor" in Step 2 for one set of (up to 16) hierarchical analyses. It also served as a control variable in the three sets of hierarchical analyses that investigated the impact of the other predictors of interest. To summarize, the models that were tested were as follows:

  (e) Model 2a: Conformance_n = (Building size + Region + Age of building)
  (f) Model 3a: Conformance_n = (Building size + Region + Age of building) + Elevator
  (g) Model 2b: Conformance_n = (Elevator + Region + Age of building)
  (h) Model 3b: Conformance_n = (Elevator + Region + Age of building) + Building size
  (i) Model 2c: Conformance_n = (Elevator + Building size + Age of building)
  (j) Model 3c: Conformance_n = (Elevator + Building size + Age of building) + Region
  (k) Model 2d: Conformance_n = (Elevator + Building size + Region)
  (l) Model 3d: Conformance_n = (Elevator + Building size + Region) + Age of building

  Thus, there was the potential to conduct 128 multiple regression analyses (16 composite conformance measures x 4 predictors x 2 steps) during this stage. However, as noted above, the 2-step hierarchical model was only tested if Model 1 was significant for that predictor-conformance measure combination.

  The increment in R^2 between steps 2 and 3 provides a test of the additional impact of a predictor variable when other variables are controlled. The standardized regression weight for a Target Predictor in Step 2 provides an indication of its importance relative to other characteristics that serve as statistical control variables in the analysis.

  The results of the hierarchical regression analyses that were conducted are presented in Tables B11, B13, B15, and B17. Table B11 presents the results of testing Models 2a (Step 1) and 3a (Step 2) for each of the composite conformance measures that showed a significant impact of Elevator in Model 1. Table B13 presents the results of testing Models 2b (Step 1) and 3b (Step 2) for each of the composite conformance measures that showed a significant impact of Building size in Model 1. Table B15 presents the results of testing Models 2c (Step 1) and 3c (Step 3) for each of the composite conformance measures that showed a significant impact of Region in Model 1. Table B17 presents the results of testing Models 2d (Step 1) and 2d (Step 2) for each of the conformance measures that showed a significant impact of Building age in Model 1. Each line in these tables represents a summary of the two multiple regression models (a 3-predictor model and a 4-predictor model) that comprised the hierarchical regression analysis for each composite conformance measure. (Lines are left blank if the hierarchical analysis was not conducted because Model 1 was not significant for that predictor-conformance measure combination.)

  The results of this stage were used to answer the question: *What is the impact of each factor on conformance when other characteristics of the building, builder, or environment are statistically controlled?*

- In the final stage of the regression analyses, a single multiple regression model was tested for each of the *n* (n = 16) composite conformance measures, including Elevator, Building size, Region, and Building age as predictors in the model, as follows:

  (m) Model 4: Conformance_n = Elevator + Building size + Region + Age of building

  Thus, a total of 16 regression models were tested at this stage. (These were not actually "new" regressions, since each of these models had been produced at some point during the tests of Model 3 for each composite conformance measure.)

  For each regression model tested, the total percentage of variance accounted for in the full model (as indicated by R^2 and Adjusted R^2 for the model) indicates the extent to which the measure of conformance is predictable from information about the building characteristics and building environment variables that served as predictors in this study. Standardized regression weights provide information about the relative importance of each building feature relative to the other building features under examination.

  The results of testing Model 4 for each of the 16 composite conformance measures are presented in Tables B18 and B19. Table B18 presents the overall results of testing Model 4 for each conformance measure, that is, the total impact of the combination of four predictors on each conformance measure. Each line in Table B18 represents the test of a four-predictor regression model and reports the overall test of model fit. Table B19 summarizes the standardized regression weights for each of the predictors in Model 4 so that the relative importance of each predictor in the model can be examined. Each line in Table B19 represents the final standardized regression weights of all predictors for a single composite conformance measure.

  The results of this stage of the analyses were used to answer the question: *Overall, what can be said about the total and relative impact of these four building features on measures of conformance with accessibility guidelines?*

The results of these analyses, with respect to each of the four target predictor features are described below, followed by a consideration of the total impact of these features on conformance with the accessibility guidelines.

- <u>Elevator</u>

  Table B10 summarizes the results of testing Model 1 with Elevator as the target predictor. As seen in Table B10, when other building characteristics are not considered, the presence or absence of an elevator as a building feature was significantly related to conformance on 7 of the 16 composite conformance measures: Building Entrance, Usable Doors, Grab Bars, Usability of Appliances and Fixtures, Clear Spaces in Kitchen and Bath, and Elevator. With the exception of Elevator conformance, which is discussed below, the proportion of variance in conformance behavior accounted for by the presence/absence of an elevator (as indicated by the adjusted R^2 value) was quite modest, ranging from .01 to .04. For four of these measures -- Building Entrance, Usable Doors, Access to Obstructed Switches, Grab Bars, and Clear spaces in Kitchen and Bath -- units in buildings with elevators showed higher conformance with these accessibility items than units in buildings without elevators. For the other two measures -- Access to Obstructed Switches and Usability of Appliances and Fixtures -- the presence of an elevator in the building was associated with lower levels of conformance.

Table B11 summarizes the results of testing Models 2 and 3 for the impact of Elevator. When the other three predictor variables (building size, region, and age of building) were statistically controlled, the impact of Elevator was generally the same. There were two changes. Elevator no longer had a significant impact on conformance for Usability of Appliances and Fixtures when other building features were controlled. In addition, after other features were controlled, the presence of an elevator in the building was associated with lower levels of conformance with Building Entrance items.

The impact of Elevator on one of the composite measures of conformance – Elevators – deserves special mention. It is quite noticeable that the presence or absence of an elevator in the building has a fairly dramatic impact on the conformance score for Elevators (adjusted $R^2 = .76$). It is certainly not surprising to observe that dwelling units in buildings with elevators were systematically more likely to conform with elevator items than were dwelling units in buildings without elevators; beyond the failure to conform with the basic guideline of providing elevator access, the absence of an elevator precludes the possibility of conforming with many of the specific items of elevator accessibility. Nonetheless, it is important to keep in mind that analyses of Elevator conformance are only based on the conformance behavior of projects for which Elevator conformance items were applicable -- that is, projects in which it was judged that an elevator was required for the dwelling units surveyed. (Analyses of the impact of Elevator on conformance with other accessibility guidelines were *not* limited to projects in which an elevator was a required accessibility feature. For those analyses, the presence or absence of an elevator simply represented a building feature, not necessarily a required building feature.) This suggests that some projects that were determined to be "elevator buildings" were not in conformance with the most basic aspect of Elevator conformance: presence of an elevator. It is also important to recognize that conformance with Elevator items was not solely a function of the presence or absence of an elevator in the building. Almost 25 percent of the variance in Elevator conformance scores remained unaccounted for by the presence or absence of an elevator in the building. As pointed out in the following sections, when this basic building feature was statistically controlled, variation in the remaining aspects of Elevator conformance were associated with other building features, notably Building Size.

- <u>Building Size</u>

  As seen in Table B12, which summarizes the tests of Model 1 with Building Size as the target predictor, Building Size was significantly related to conformance behavior for 7 of the 16 composite measures of conformance. The proportion of variance in conformance behavior accounted for by Building Size ranged from .01 to .09. When other building features are not considered, larger buildings showed higher levels of conformance than buildings with smaller numbers of dwelling units for the following six composite conformance measures: Building Entrance, Elevators, Public Accessible Routes, Usable Doors, Grab Bars, and Clear Spaces in Kitchen and Bath. Smaller buildings showed higher levels of conformance for Usability of Appliances and Fixtures.

  Table B13 summarizes tests of Models 2 and 3 for the impact of Building Size when other building features (elevator, region, and age of building) are statistically controlled. Inspection of Table B13 shows that Building Size only continued to have a unique impact on two composite conformance measures: Elevators and Grab Bars. For both of these measures,

the extent of conformance was higher among larger buildings than it was among smaller buildings.

- Region

  Geographic region was systematically related to conformance behavior for all composite measures of conformance, with adjusted R^2 values for tests of Model 1 ranging from .02 to .33 (see Table B14).[6] These results are consistent with the findings already described in Phase 3, which summarized the results of analyses of variance that provided direct comparisons among the ten geographic regions with respect to conformance behavior.

  As shown in Table B15, when other building features (elevator, building size, and age of building) were statistically controlled, Region still accounted for unique variance in conformance for 14 of 16 composite conformance measures. However, other building unit features could account for differences among dwelling units with respect to conformance with Building Entrance and Elevators, without invoking information about the geographic region in which the dwelling unit was located.

  Nonetheless, it is clear that geographic regional differences in conformance behavior are fairly pervasive in the survey data for completed dwelling units, independent of the year in which the unit was built, the number of units in the building, and the presence/absence of an elevator in the building.

  In addition to the project-level analyses of variance for Region already described in Phase 3 and summarized in Tables B8 and B9, a series of analyses of covariance were carried out using each of the composite conformance variables, in turn, as the dependent variable, Region as an independent variable, and Elevator, Building Size and Building Age as covariates. The results of these analyses mirrored those presented in Table B8 and B9. When levels of conformance for the ten geographic regions were compared with the effects of Elevator, Building Size and Building Age statistically controlled, differences in the extent of conformance are still observed among the ten geographic regions. However, there is *not* a consistent geographic pattern of conformance that pervades all measures of conformance behavior. The nature and number of regional differences depends upon the composite conformance measure being examined.

- Age of Building

  Table B16 summarizes tests of Model 1 with Age of Building (Year of Occupancy) as the target predictor. When other building features are not considered, Age of Building accounted for significant variance in conformance behavior for three measures -- all of them concerned with Requirement 2 (Accessible and usable public and common use areas). The measures for which Age of Building had a significant impact were: Elevators, Public Facilities, and Curb Ramps. Adjusted R^2 values ranged from .01 to .03 for these measures. Standardized

[6] Note: Standardized regression coefficients are not reported for geographic region because they are not informative about the strength and direction of the effect of Region per se. Because there is no inherent ordering to the ten regions into which the surveyed units were categorized, Region was represented in the regression models as a set of nine dummy-coded variables. The regression weights for the individual dummy variables only have meaning with respect to their reference variables. However, the R^2 value for the set of nine dummy variables does represent the joint effect of all ten geographic regions, so it provides a meaningful index of the extent to which conformance behavior depends, in part, on the geographic region being surveyed.

regression weights indicated that more recently occupied buildings showed lower levels of conformance with Elevator guidelines than older buildings did, and higher levels of conformance for Public Facilities and Curb Ramps than was observed for older buildings.

However, when elevator, building size, and region were statistically controlled in Models 2 and 3 (see Table B17), Age of Building only accounted for unique variance in one composite conformance measure: Curb Ramps. The extent of conformance with Curb Ramps items was higher for dwelling units in more recently constructed buildings.

- Total and relative impact of Elevator, Building Size, Region, and Age of Building on measures of conformance with accessibility guidelines

  In order to provide a larger sense of the results of these analyses, full models (Model 4) were calculated for each of the composite conformance measures in turn. These models provide an indication of the extent to which this set of predictor variables provides valuable information about levels of conformance behavior for the sample of completed dwelling units surveyed in this study. It also provides information about the relative importance of the four building features considered here, and may be useful in identifying issues on which to focus further information gathering.

  Table B18 summarizes the extent to which conformance behavior can be predicted on the basis of information about Elevator, Building Size, Region, and Age of Building. It can be seen in Table B18 that a statistically significant proportion of the variance in all of the composite conformance measures could be accounted for by the set of predictors included in the full model. On the other hand, with the exception of the composite measure of Elevator conformance, which was largely (adj. $R^2 = .76$) explained by the presence or absence of an elevator in the building, the total impact of these four building features was relatively modest. Adjusted R^2 values ranged from .05 to .36 for the remaining composite conformance measures. Composite conformance measures most strongly affected by the building features under consideration were Public Accessible Routes (adj. $R^2 = .36$), Curb Ramps (adj. $R^2 = .16$), Access to Obstructed Switches (adj. $R^2 = .26$), and Grab Bars (adj. $R^2 = .16$). These represent areas in which it may be fruitful to pay close attention to the particular building features associated with conformance behavior and to investigate the reasons for the differences that were observed.

  In contrast, the full model accounted for less than 10 percent of the variance in the following four composite conformance measures: Building Entrance, Safety Features of Accessible Routes, Clearance and Reach, and Accessible Route. Conformance with accessibility guidelines represented by these measures appears to be relatively independent of large-scale building features, such as building size, presence/absence of an elevator, and year of construction. Even regional differences in conformance appear to be fairly small for these measures.

  It is also instructive to consider the importance of the four target predictor variables relative to one another, considered across the set of 16 composite conformance measures. Table B19 summarizes standardized regression weights for each predictor variable when all predictors are included in the model of conformance behavior. Standardized regression weights that are statistically significant ($p < .05$) are highlighted in the table. Considered in this fashion, it is relatively clear that Region is pervasively related to conformance behavior, both in terms of the number of composite conformance measures with which it is uniquely associated and in

terms of the magnitude of standardized regression weights relative to other predictors in the model for most composite conformance measures. Building Size and Elevator each represent features that are related to conformance for a smaller subset of conformance measures. Age of Building is the feature that is least informative regarding the level of conformance that can be expected with accessibility guidelines.

- Summary

  Levels of conformance with accessibility guidelines on 16 measures of conformance were relatively high on average. Differences in extent of conformance were observed among the sample of completed dwelling units surveyed in this study, with reported levels of conformance ranging from 0 to 100 for most measures. Regression analyses designed to examine the extent to which four relevant building features can account for differences in conformance level suggested that, indeed, some of these differences appear to be related to features of buildings and the building environment. Further examination of the underlying reasons for nonconformance with accessibility guidelines should include a consideration of the particular disincentives and challenges to conformance behavior that may operate in different regions of the country.

Table B1. Selected Characteristics of Sampled Dwelling Units (988 dwelling units located in 397 surveyed projects)

Distribution of projects and dwelling units by geographic region

Region (5 projects and 18 dwelling units could not be coded for region)	Number of Projects Observed	Percentage of Sample	Number of Units Observed	Percentage of Sample
New England	4	1.0	11	1.1
New York/New Jersey	34	8.6	127	13.1
Mid-Atlantic	28	7.1	56	5.8
Southeast	66	16.6	175	18.0
Midwest	55	13.9	110	11.3
Great Plains	32	8.1	86	8.9
Southwest	49	12.3	145	14.9
Rocky Mountains	17	4.3	36	3.7
Pacific	72	18.1	156	16.1
Northwest	35	8.8	68	7.0

Age of building (mean age = 4.02 years)

Year of construction (2 units not coded)	Percentage
1998	8.1
1997	20.6
1996	15.9
1995	15.6
1994	14.6
1993	9.6
1992	12.0
1991	3.3

Total number of units in building

Number of units (120 units not coded)	Percentage
4-10	37.2
11-20	19.7
21-30	12.1
31-40	6.9
41-50	4.7
51-60	6.1
61-70	2.0
71-80	3.9
81-90	1.5
91-100	1.8
101+	4.0

Unit features

	No	Yes
Elevator in the building (23 units not coded)	64.1	33.6
Serviced by elevator (155 units not coded)	65.2	34.8
		Percentage
Stories in building (66 units not coded)	Single story	28.0
	Multi-story	72.0
Location of unit (160 units not coded)	Ground floor	78.3
	Non-ground floor	21.7
Type of unit (153 not coded)	Studio	7.1
	1 Bedroom	41.6
	2 Bedroom	39.9
	3+ Bedroom	11.5

Other building characteristics

	Mean	Range
Total number of buildings on survey site	2.65	1-18
Total number of units in building	29.3	1-308
Number of stories in building	2.61	1-25

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (N=988)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD4	1	Building Entrance	596	88.80	0.32		20	372
FIELD5	1	NA	247	33.20	0.47	Does not load on component	382	359
FIELD6	1	Building Entrance	533	94.60	0.23		98	357
FIELD7OUT	2	Safety Features of Accessible Routes	609	97.20	0.16		16	363
FIELD7IN	2	Public Accessible Routes	444	98.40	0.12		159	385
FIELD8OUT	2	Public Accessible Routes	322	96.90	0.17		299	367
FIELD8IN	2	Public Accessible Routes	267	95.90	0.20		341	380
FIELD9OUT	2	Public Accessible Routes	364	93.40	0.25		254	370
FIELD9IN	2	Public Accessible Routes	256	94.90	0.22		354	378
FIELD10OUT	2	Public Accessible Routes	286	96.20	0.19		330	372
FIELD10IN	2	Public Accessible Routes	191	96.90	0.17		415	382
FIELD11OUT	2	NA	34	88.20	0.33	Low N	584	370
FIELD11IN	2	NA	333	98.50	0.12	Does not load on component	281	374
FIELD12OUT	2	NA	33	100.00	0.00	Low N/ Zero SD	581	374
FIELD12IN	2	NA	323	99.70	0.05	Low N/ Zero SD	287	378
FIELD13OUT	2	NA	31	90.30	0.30	Low N	583	374
FIELD13IN	2	Public Accessible Routes	330	95.20	0.22		280	378
FIELD14OUT	2	Safety Features of Accessible Routes	337	88.70	0.32		287	364

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD14IN	2	NA	370	97.60	0.15	Does not load on component	244	374
FIELD15OUT	2	Safety Features of Accessible Routes	401	84.80	0.36		223	364
FIELD15IN	2	NA	179	93.30	0.25	Does not load on component	435	374
FIELD16OUT	2	NA	55	70.90	0.46	Low N	569	364
FIELD16IN	2	NA	16	93.80	0.25	Low N	598	374
FIELD17OUT	2	Ramps & Obstructions	216	76.40	0.43		405	367
FIELD17IN	2	NA	74	85.10	0.36	Low N	538	376
FIELD18OUT	2	Public Accessible Routes	201	90.00	0.30		418	369
FIELD18IN	2	NA	69	95.70	0.21	Low N	539	380
FIELD19OUT	2	Public Accessible Routes	127	91.30	0.28		492	369
FIELD19IN	2	NA	52	88.50	0.32	Low N	556	380
FIELD20OUT	2	Public Accessible Routes	189	89.90	0.30		434	365
FIELD20IN	2	NA	67	95.50	0.21	Low N	546	375
FIELD21OUT	2	Curb Ramps	144	97.90	0.14		478	366
FIELD21IN	2	NA	71	100.00	0.00	Low N/ Zero SD	542	375
FIELD22OUT	2	Public Accessible Routes	189	96.80	0.18		431	368
FIELD22IN	2	NA	69	98.60	0.12	Low N	541	378
FIELD23OUT	2	Public Accessible Routes	184	78.80	0.41		434	370
FIELD23IN	2	NA	70	81.40	0.39	Low N	539	379
FIELD24OUT	2	Public Accessible Routes	188	98.90	0.10		433	367
FIELD24IN	2	NA	73	97.30	0.16	Low N	536	379
FIELD25OUT	2	NA	193	100.00	0.00	Zero SD	430	365
FIELD25IN	2	NA	70	100.00	0.00	Low N/ Zero SD	540	378
FIELD26OUT	2	NA	99	72.70	0.45	Low N	523	366
FIELD26IN	2	NA	30	73.30	0.45	Low N	580	378
FIELD27OUT	2	Ramps & Obstructions	113	92.00	0.27		508	367

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD27IN	2	NA	31	93.50	0.25	Low N	577	380
FIELD28OUT	2	Public Accessible Routes	122	72.10	0.45		499	367
FIELD28IN	2	NA	44	81.80	0.39	Low N	563	381
FIELD29OUT	2	Public Accessible Routes	121	70.20	0.46		501	366
FIELD29IN	2	NA	44	75.00	0.44	Low N	563	381
FIELD30OUT	2	Safety Features of Accessible Routes	559	86.90	0.34		62	367
FIELD30IN	2	NA	61	72.10	0.45	Low N	535	392
FIELD31OUT	2	Safety Features of Accessible Routes	493	91.50	0.28		134	361
FIELD31IN	2	NA	42	90.50	0.30	Low N	556	390
FIELD32	2	Ramps & Obstructions	357	75.60	0.43		266	365
FIELD33	2	Ramps & Obstructions	176	92.00	0.27		449	363
FIELD34	2	Ramps & Obstructions	144	92.40	0.27		481	363
FIELD35	2	Clearance	573	93.70	0.24		52	363
FIELD36	2	Clearance	575	92.50	0.26		48	365
FIELD37	2	Safety Features of Accessible Routes	597	98.20	0.13		30	361
FIELD38	2	Safety Features of Accessible Routes	574	86.80	0.34		59	355
FIELD39	2	Curb Ramps	574	84.70	0.36		58	356
FIELD40	2	Public Accessible Routes	589	76.40	0.42		43	356
FIELD41	2	Public Accessible Routes	379	88.90	0.31		253	356
FIELD42	2	Public Accessible Routes	389	93.80	0.24		245	354
FIELD43	2	Public Accessible Routes	448	93.30	0.25		184	356
FIELD44	2	Curb Ramps	444	93.00	0.26		185	359
FIELD45	2	Ramps & Obstructions	434	89.20	0.31		194	360
FIELD46	2	Curb Ramps	459	93.00	0.25		171	358

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD47	2	Curb Ramps	439	97.70	0.15		190	359
FIELD48	2	NA	356	96.90	0.17	Does not load on component	273	359
FIELD49	2	Curb Ramps	306	91.20	0.28		322	360
FIELD50	2	Ramps & Obstructions	201	89.10	0.31		427	360
FIELD51	2	Ramps & Obstructions	249	90.40	0.30		380	359
FIELD52	2	Ramps & Obstructions	282	95.40	0.21		346	360
FIELD53	2	Ramps & Obstructions	157	96.80	0.18		473	358
FIELD54	2	NA	190	99.50	0.07	Low SD	440	358
FIELD55	2	Ramps & Obstructions	157	98.70	0.11		473	358
FIELD56	2	Ramps & Obstructions	137	98.50	0.12		492	359
FIELD57	2	NA	48	95.80	0.20	Low N	581	359
FIELD58	2	Ramps & Obstructions	303	93.70	0.24		331	354
FIELD59	2	NA	304	99.70	0.05	Low SD	330	354
FIELD60	2	Ramps & Obstructions	290	93.40	0.25		339	359
FIELD61	2	NA	286	99.70	0.05	Low SD	339	363
FIELD62	2	Ramps & Obstructions	283	97.90	0.14		342	363
FIELD63	2	NA	90	92.20	0.27	Low N	538	360
FIELD64	2	Ramps & Obstructions	121	71.90	0.45		506	361
FIELD65	2	Ramps & Obstructions	268	97.40	0.16		359	361
FIELD66	2	Ramps & Obstructions	259	78.80	0.41		368	361
FIELD67	2	NA	179	98.30	0.13	Does not load on component	449	360
FIELD68	2	NA	85	64.70	0.48	Low N	544	359
FIELD69	2	Ramps & Obstructions	298	98.70	0.12		332	358
FIELD70	2	Public Accessible Routes	155	68.40	0.47		472	361
FIELD71	2	NA	59	40.70	0.50	Low N	567	362
FIELD72	2	Public Accessible Routes	198	92.40	0.27		428	362

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD73	2	Public Accessible Routes	193	97.40	0.16		430	365
FIELD74	2	Public Accessible Routes	192	78.10	0.41		428	368
FIELD75	2	Public Accessible Routes	163	91.40	0.28		460	365
FIELD76	2	Public Accessible Routes	181	92.30	0.27		443	364
FIELD77	2	Public Accessible Routes	188	98.40	0.13		436	364
FIELD78	2	Elevators	161	88.80	0.32		466	361
FIELD79	2	Elevators	155	85.80	0.35		468	365
FIELD80	2	Elevators	155	84.50	0.36		469	364
FIELD81	2	Elevators	157	87.30	0.33		467	364
FIELD82	2	Elevators	154	87.70	0.33		471	363
FIELD83	2	Elevators	153	81.00	0.39		473	362
FIELD84	2	Elevators	154	85.70	0.35		469	365
FIELD85	2	Elevators	152	88.80	0.32		474	362
FIELD86	2	Elevators	113	86.70	0.34		513	362
FIELD87	2	Elevators	105	85.70	0.35		520	363
FIELD88	2	Elevators	106	84.00	0.37		518	364
FIELD89	2	Elevators	153	90.80	0.29		473	362
FIELD90	2	Elevators	153	69.30	0.46		473	362
FIELD91	2	Elevators	132	79.50	0.40		494	362
FIELD92	2	Elevators	154	90.90	0.29		471	363
FIELD93	2	Elevators	143	88.10	0.32		483	362
FIELD94	2	Elevators	144	83.30	0.37		482	362
FIELD95	2	Elevators	149	81.90	0.39		476	363
FIELD96	2	Elevators	139	82.70	0.38		487	362
FIELD97	2	Elevators	149	74.50	0.44		477	362
FIELD98	2	Elevators	155	89.70	0.31		471	362
FIELD99	2	Elevators	155	90.30	0.30		471	362
FIELD100	2	Elevators	151	91.40	0.28		476	361
FIELD101	2	Elevators	153	88.90	0.32		474	361
FIELD102	2	Elevators	152	90.10	0.30		475	361
FIELD103	2	Elevators	151	88.70	0.32		476	361
FIELD104	2	Elevators	151	88.10	0.33		476	361
FIELD105	2	Elevators	148	91.20	0.28		476	364
FIELD106	2	Elevators	149	91.30	0.28		476	363
FIELD107	2	Elevators	149	91.30	0.28		474	365
FIELD108	2	Elevators	155	89.00	0.31		469	364

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD109	2	NA	51	70.60	0.46	Low N	572	365
FIELD110	2	NA	42	66.70	0.48	Low N	582	364
FIELD111	2	Public Facilities	117	82.10	0.39		506	365
FIELD112	2	Public Facilities	133	77.40	0.42		487	368
FIELD113	2	Public Facilities	144	90.30	0.30		476	368
FIELD114	2	Public Facilities	141	87.90	0.33		479	368
FIELD115	2	Public Facilities	134	74.60	0.44		485	369
FIELD116	2	Public Facilities	134	94.80	0.22		485	369
FIELD117	2	NA	70	87.10	0.34	Low N	548	370
FIELD118	2	Public Facilities	139	95.00	0.22		478	371
FIELD119	2	NA	34	82.40	0.39	Low N	589	365
FIELD120	2	NA	35	71.40	0.46	Low N	591	362
FIELD121	2	NA	29	79.30	0.41	Low N	596	363
FIELD122	2	NA	29	93.10	0.26	Low N	587	372
FIELD123	2	Public Facilities	261	89.70	0.31		363	364
FIELD124	2	NA	31	67.70	0.48	Low N	594	363
FIELD125	2	NA	25	84.00	0.37	Low N	601	362
FIELD126	2	NA	25	76.00	0.44	Low N	601	362
FIELD127	2	NA	28	75.00	0.44	Low N	596	364
FIELD128	2	NA	32	90.60	0.30	Low N	594	3621
FIELD129	2	Public Facilities	231	98.70	0.11		396	361
FIELD130	2	Public Facilities	252	98.00	0.14		376	360
FIELD131	2	Public Facilities	250	96.40	0.19		377	361
FIELD132	2	Public Facilities	253	98.00	0.14		376	359
FIELD133	2	Public Facilities	251	98.80	0.11		377	360
FIELD134	2	Public Facilities	250	98.40	0.13		377	361
FIELD135	2	NA	34	79.40	0.41	Low N	593	361
FIELD136	2	NA	35	77.10	0.43	Low N	590	363
FIELD137	2	NA	63	81.00	0.40	Low N	564	361
FIELD138	2	NA	38	86.80	0.34	Low N	589	361
FIELD139	2	NA	28	92.90	0.26	Low N	597	363
FIELD140	2	NA	45	82.20	0.39	Low N	581	362
FIELD141	2	NA	73	86.30	0.35	Low N	554	361
FIELD142	2	NA	35	34.30	0.48	Low N	590	363
FIELD143	2	Public Facilities	189	93.70	0.24		434	365
FIELD144	2	NA	53	58.50	0.50	Low N	572	363
FIELD145	2	NA	56	96.40	0.19	Low N	568	364
FIELD146	2	NA	53	83.00	0.38	Low N	573	362
FIELD147	2	Public Facilities	170	88.80	0.32		456	362
FIELD148	2	Public Facilities	198	87.90	0.33		429	361
FIELD149	2	Public Facilities	295	93.60	0.25		331	362
FIELD150	2	Clearance	240	94.20	0.23		375	373
FIELD151	2	Clearance	243	95.50	0.21		374	371
FIELD152	2	Clearance	253	95.30	0.21		366	369
FIELD153	3	Usable Doors	414	98.10	0.14		217	357

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD154	3	Usable Doors	327	90.80	0.29		303	358
FIELD155	3	Usable Doors	337	93.80	0.24		293	358
FIELD156	3	Usable Doors	163	93.30	0.25		464	361
FIELD157	3	Usable Doors	213	98.59	0.12		416	359
FIELD158	3	Usable Doors	175	94.30	0.23		453	360
FIELD159	3	Usable Doors	131	96.90	0.17		497	360
FIELD160	3	Usable Doors	194	98.50	0.12		432	362
FIELD161	3	Usable Doors	129	96.90	0.17		497	362
FIELD162	3	NA	80	98.80	0.11	Low N	547	361
FIELD163	3	NA	67	94.00	0.70	Low N	564	357
FIELD164	3	NA	64	98.40	0.13	Low N	565	359
FIELD165	3	Usable Doors	425	96.90	0.17		200	363
FIELD166	3	Usable Doors	116	97.40	0.16		514	358
FIELD167	3	Usable Doors	111	97.30	0.16		515	362
FIELD168	3	Usable Doors	400	91.50	0.41		226	362
FIELD169	3	Usable Doors	388	95.60	0.20		233	367
FIELD170	3	Usable Doors	411	86.10	0.35		212	365
FIELD171	3	Usable Doors	408	99.80	0.30		215	365
FIELD172	3	NA	54	98.10	0.14	Low N	563	371
FIELD173	3	Usable Doors	379	86.50	0.34		242	367
FIELD174	3	NA	95	96.80	0.18	Low N	532	361
FIELD175	3	NA	46	95.70	0.21	Low N	581	361
FIELD176	3	NA	50	94.00	0.24	Low N	576	362
FIELD177	3	Usable Doors	382	78.30	0.41		241	365
FIELD178	3	Usable Doors	134	67.20	0.47		490	364
FIELD179	3	NA	735	99.20	0.09	Low SD	28	225
FIELD180	3	Usable Doors	318	88.40	0.32		427	243
FIELD181	3	Usable Doors	501	89.60	0.31		262	225
FIELD182	3	NA	202	94.10	0.24	Does not load on component	556	230
FIELD183	3	Usable Doors	342	97.10	0.17		417	229
FIELD184	3	NA	165	93.30	0.25	Does not load on component	598	225
FIELD185	3	NA	167	94.00	0.24	Does not load on component	597	224
FIELD186	3	Usable Doors	311	97.40	0.16		455	222
FIELD187	3	NA	219	90.40	0.30	Does not load on component	544	225
FIELD188	3	Usable Doors	721	98.10	0.14		43	224
FIELD189	3	NA	59	98.30	0.13	Low N	703	226
FIELD190	3	NA	37	100.00	0.00	Low N/ Zero SD	718	233

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD191	3	Usable Doors	709	89.40	0.31		45	234
FIELD192	3	Usable Doors	560	93.20	0.25		199	229
FIELD193	3	Usable Doors	740	83.20	0.37		24	224
FIELD194	3	NA	747	100.00	0.00	Zero SD	18	223
FIELD195	3	Usable Doors	716	97.30	0.16		37	235
FIELD196	3	Usable Doors	738	83.30	0.37		27	223
FIELD197	3	NA	178	72.50	0.45	Does not load on component	577	233
FIELD198	3	Usable Doors	439	97.90	0.14		320	229
FIELD199	3	Usable Doors	394	91.40	0.28		364	230
FIELD200BR	3	Usable Doors	673	87.40	0.33		73	242
FIELD200BA	3	Usable Doors	711	81.30	0.39		34	243
FIELD200PR	3	NA	68	58.80	0.50	Low N	665	255
FIELD200WI	3	Usable Doors	343	70.80	0.46		396	249
FIELD200UR	3	Usable Doors	186	74.20	0.44		556	246
FIELD200KI	3	NA	52	90.40	0.30	Low N	693	243
FIELD200DR	3	NA	19	100.00	0.00	Low N/ Zero SD	723	246
FIELD200LR	3	NA	26	100.00	0.00	Low N/ Zero SD	717	245
FIELD200PA	3	Usable Doors	343	91.00	0.29		405	240
FIELD200O1	3	NA	57	52.60	0.50	Low N	348	583
FIELD200O2	3	NA	20	60.00	0.50	Low N	337	631
FIELD201	3	Usable Doors	388	92.50	0.26		369	231
FIELD202	3	NA	71	70.40	0.46	Low N	689	228
FIELD203	4	Accessible Route	726	93.10	0.25		32	230
FIELD204	4	Accessible Route	646	94.70	0.22		111	231
FIELD205	4	Accessible Route	615	96.60	0.18		138	235
FIELD206	4	NA	73	60.30	0.49	Low N	685	230
FIELD207	4	NA	35	93.00	0.24	Low N	723	230
FIELD208	4	Accessible Route	347	97.40	0.16		406	235
FIELD209	4	Accessible Route	293	79.20	0.41		462	233
FIELD210	5	Height of Switches	728	94.80	0.22		34	226
FIELD211	5	NA	723	91.30	0.28	Does not load on component	33	232
FIELD212	5	Access to Obstructed Switches	702	50.40	0.50		60	226

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD213	5	Height of Switches	283	64.70	0.48		480	225
FIELD214	5	Access to Obstructed Switches	303	85.80	0.35		442	243
FIELD215	5	Access to Obstructed Switches	454	84.40	0.36		291	243
FIELD216	5	NA	80	68.80	0.47	Low N	666	242
FIELD217	5	NA	75	78.70	2.04	Low N	673	240
FIELD218	5	Access to Obstructed Switches	477	84.10	0.37		268	243
FIELD219	5	Access to Obstructed Switches	660	83.00	0.38		87	241
FIELD220	5	NA	113	79.60	0.40	Does not load on component	633	242
FIELD221	5	Height of Switches	139	77.00	0.42		618	231
FIELD222	6	Grab Bars	699	72.80	0.45		54	235
FIELD223	6	Grab Bars	593	75.20	0.43		164	231
FIELD224	6	Grab Bars	255	70.20	0.46		502	231
FIELD225	6	Grab Bars	204	67.60	0.47		552	232
FIELD226	6	Grab Bars	670	69.60	0.46		86	232
FIELD227	7	Wheelchair Mobility in Bath	457	79.40	0.40		248	283
FIELD228	7	Wheelchair Mobility in Bath	242	94.60	0.23		466	280
FIELD229	7	Wheelchair Mobility in Bath	635	84.90	0.36		76	277
FIELD230	7	Wheelchair Mobility in Bath	635	86.90	0.34		70	283
FIELD231	7	Wheelchair Mobility in Bath	546	86.80	0.34		161	281
FIELD232	7	Wheelchair Mobility in Bath	221	87.30	0.33		486	281
FIELD233	7	NA	132	78.00	0.42	Does not load on component	573	283
FIELD234	7	Wheelchair Mobility in Bath	284	61.60	0.49		419	285
FIELD235	7	Wheelchair Mobility in Bath	596	73.50	0.44		110	282
FIELD236	7	Wheelchair Mobility in Bath	433	82.90	0.38		267	288

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD237	7	Wheelchair Mobility in Bath	225	94.70	0.23		473	290
FIELD238	7	Wheelchair Mobility in Bath	184	87.50	0.33		519	285
FIELD239	7	NA	84	90.50	0.30	Low N	615	289
FIELD240	7	Clear Spaces in Kitchen & Bath	584	93.00	0.26		115	289
FIELD241	7	Wheelchair Mobility in Bath	584	76.40	0.43		113	291
FIELD242	7	Clear Spaces in Kitchen & Bath	583	89.90	0.30		116	289
FIELD243	7	Clear Spaces in Kitchen & Bath	240	88.30	0.32		461	287
FIELD244	7	Wheelchair Mobility in Bath	485	72.80	0.45		214	289
FIELD245	7	NA	598	97.30	0.16	Does not load on component	105	285
FIELD246	7	Clear Spaces in Kitchen & Bath	183	90.20	0.30		519	286
FIELD247	7	Clear Spaces in Kitchen & Bath	182	95.10	0.22		521	285
FIELD248	7	Wheelchair Mobility in Bath	528	80.70	0.40		175	285
FIELD249	7	Wheelchair Mobility in Bath	212	86.80	0.34		485	291
FIELD250	7	NA	94	79.80	0.40	Low N	605	289
FIELD251R	7	Usability of Appliances and Fixtures	696	93.10	0.25		50	242
FIELD251S	7	Usability of Appliances and Fixtures	712	87.10	0.34		36	240
FIELD252O	7	Usability of Appliances and Fixtures	621	96.80	0.18		133	234
FIELD252D	7	Usability of Appliances and Fixtures	429	94.20	0.23		324	235
FIELD252FR	7	Usability of Appliances and Fixtures	717	93.30	0.29		38	233
FIELD252TR	7	Usability of Appliances and Fixtures	15	73.30	0.46	Low N	741	232
FIELD253	7	Usability of Appliances and Fixtures	685	91.70	0.28		68	235

Table B2. Items Pertaining to Field Conformance with Accessibility Requirements (continued)

Item	Requirement*	Component	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
FIELD254	7	Clear Spaces in Kitchen & Bath	183	72.10	0.45		571	234
FIELD255	7	Clear Spaces in Kitchen & Bath	162	48.10	0.50		590	236

NOTE: ("OUT" refers to surveyed elements outside the building; "IN" refers to surveyed elements inside a building). See copy of survey form (Appendix A) for wording of all individual survey items.

* Requirements:

1=Accessible building entrance on an accessible route
2=Accessible and usable public and common use areas
3=Usable doors
4=Accessible route into and through unit
5=Light switches, electrical outlets, and thermostats
6=Reinforced walls for grab bars in units
7=Usable kitchens and bathrooms in units

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (N=988)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN4	1	409	90.50	0.29	Accessible Building Entrance		94	485
PLAN5	1	162	24.10	0.43	NA	Corresponding field item excluded	355	471
PLAN6	1	325	95.40	0.21	Accessible Building Entrance		196	467
PLAN7OUT	2	470	99.60	0.06	Safety Features of Accessible Routes		53	465
PLAN7IN	2	378	99.70	0.05	Public Accessible Routes		140	470
PLAN8OUT	2	260	99.60	0.06	Public Accessible Routes		267	461
PLAN8IN	2	225	96.40	0.19	Public Accessible Routes		295	468
PLAN9OUT	2	276	95.70	0.20	Public Accessible Routes		248	464
PLAN9IN	2	212	96.70	0.18	Public Accessible Routes		308	468
PLAN10OUT	2	226	99.10	0.09	Public Accessible Routes		301	461
PLAN10IN	2	158	100.00	0.00	Public Accessible Routes		363	467
PLAN11OUT	2	16	100.00	0.00	NA	Corresponding field item excluded	510	462
PLAN11IN	2	147	99.30	0.08	NA	Corresponding field item excluded	372	469
PLAN12OUT	2	16	93.80	0.25	NA	Corresponding field item excluded	503	469
PLAN12IN	2	138	100.00	0.00	NA	Corresponding field item excluded	380	470
PLAN13OUT	2	12	100.00	0.00	NA	Corresponding field item excluded	509	467
PLAN13IN	2	142	98.60	0.12	Public Accessible Routes		375	471

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN14OUT	2	108	98.10	0.14	Safety Features of Accessible Routes		413	467
PLAN14IN	2	164	100.00	0.00	NA	Corresponding field item excluded	353	471
PLAN15OUT	2	230	91.30	0.28	Safety Features of Accessible Routes		293	465
PLAN15IN	2	134	96.30	0.19	NA	Corresponding field item excluded	383	471
PLAN16OUT	2	21	90.50	0.30	NA	Corresponding field item excluded	503	464
PLAN16IN	2	10	100.00	0.00	NA	Corresponding field item excluded	507	471
PLAN17OUT	2	139	90.60	0.29	Ramps & Obstructions		386	463
PLAN17IN	2	55	89.10	0.31	NA	Corresponding field item excluded	464	469
PLAN18OUT	2	130	95.40	0.21	Public Accessible Routes		391	467
PLAN18IN	2	47	97.90	0.15	NA	Corresponding field item excluded	463	478
PLAN19OUT	2	96	99.00	0.10	Public Accessible Routes		424	468
PLAN19IN	2	38	97.40	0.16	NA	Corresponding field item excluded	475	475
PLAN20OUT	2	121	97.50	0.16	Public Accessible Routes		398	469
PLAN20IN	2	41	95.10	0.22	NA	Corresponding field item excluded	471	476
PLAN21OUT	2	98	98.00	0.14	Curb Ramps		422	468
PLAN21IN	2	42	95.20	0.22	NA	Corresponding field item excluded	468	478
PLAN21IN	2	42	95.20	0.22	NA	Corresponding field item excluded	468	478
PLAN22OUT	2	118	100.00	0.00	Public Accessible Routes		401	469
PLAN22IN	2	42	97.60	0.15	NA	Corresponding field item excluded	471	475
PLAN23OUT	2	118	90.70	0.29	Public Accessible Routes		401	469
PLAN23IN	2	41	78.00	0.42	NA	Corresponding field item excluded	471	476

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN24OUT	2	110	100.00	0.00	Public Accessible Routes		410	468
PLAN24IN	2	39	100.00	0.00	NA	Corresponding field item excluded	473	476
PLAN25OUT	2	111	100.00	0.00	NA	Corresponding field item excluded	406	471
PLAN25IN	2	33	100.00	0.00	NA	Corresponding field item excluded	478	477
PLAN26OUT	2	61	88.50	0.32	NA	Corresponding field item excluded	459	468
PLAN26IN	2	24	91.70	0.28	NA	Corresponding field item excluded	489	475
PLAN27OUT	2	80	96.30	0.19	Ramps & Obstructions		439	469
PLAN27IN	2	26	100.00	0.00	NA	Corresponding field item excluded	486	476
PLAN28OUT	2	74	83.80	0.37	Public Accessible Routes		446	468
PLAN28IN	2	31	87.10	0.34	NA	Corresponding field item excluded	484	473
PLAN29OUT	2	70	85.70	0.35	Public Accessible Routes		446	472
PLAN29IN	2	29	86.20	0.35	NA	Corresponding field item excluded	481	478
PLAN30OUT	2	408	90.90	0.29	Safety Features of Accessible Routes		110	470
PLAN30IN	2	46	78.30	0.42	NA	Corresponding field item excluded	455	487
PLAN31OUT	2	333	94.00	0.24	Safety Features of Accessible Routes		191	464
PLAN31IN	2	27	88.90	0.32	NA	Corresponding field item excluded	483	478
PLAN32	2	158	89.20	0.31	Ramps & Obstructions		361	469
PLAN33	2	117	96.60	0.18	Ramps & Obstructions		403	468
PLAN34	2	104	99.00	0.10	Ramps & Obstructions		415	469
PLAN35	2	309	98.70	0.11	Clearance		212	467
PLAN36	2	354	98.00	0.14	Clearance		166	468

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN37	2	272	99.30	0.09	Safety Features of Accessible Routes		246	470
PLAN38	2	392	91.80	0.27	Safety Features of Accessible Routes		129	467
PLAN39	2	369	90.50	0.29	Curb Ramps		155	464
PLAN40	2	357	84.30	0.36	Public Accessible Routes		165	466
PLAN41	2	289	92.00	0.27	Public Accessible Routes		232	467
PLAN42	2	257	97.30	0.16	Public Accessible Routes		267	464
PLAN43	2	288	93.10	0.25	Public Accessible Routes		232	468
PLAN44	2	233	97.00	0.17	Curb Ramps		287	468
PLAN45	2	266	96.20	0.19	Ramps & Obstructions		252	470
PLAN46	2	232	95.30	0.21	Curb Ramps		288	468
PLAN47	2	271	99.60	0.06	Curb Ramps		247	470
PLAN48	2	242	97.10	0.17	NA	Corresponding field item excluded	277	469
PLAN49	2	188	94.70	0.23	Curb Ramps		331	469
PLAN50	2	150	88.70	0.32	Ramps & Obstructions		368	470
PLAN51	2	185	88.10	0.32	Ramps & Obstructions		334	469
PLAN52	2	181	97.80	0.15	Ramps & Obstructions		337	470
PLAN53	2	117	97.40	0.16	Ramps & Obstructions		402	469
PLAN54	2	146	100.00	0.00	NA	Corresponding field item excluded	372	470
PLAN55	2	123	99.20	0.09	Ramps & Obstructions		393	472
PLAN56	2	111	97.30	0.16	Ramps & Obstructions		409	468
PLAN57	2	40	100.00	0.00	NA	Corresponding field item excluded	481	467
PLAN58	2	208	98.10	0.14	Ramps & Obstructions		318	462
PLAN59	2	222	99.50	0.07	NA	Corresponding field item excluded	302	464
PLAN60	2	200	97.00	0.17	Ramps & Obstructions		319	469

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN61	2	208	100.00	0.00	NA	Corresponding field item excluded	312	468
PLAN62	2	202	99.00	0.10	Ramps & Obstructions		317	469
PLAN63	2	62	95.20	0.22	NA	Corresponding field item excluded	459	467
PLAN64	2	60	83.30	0.38	Ramps & Obstructions		460	468
PLAN65	2	180	100.00	0.00	Ramps & Obstructions		340	468
PLAN66	2	178	88.80	0.32	Ramps & Obstructions		342	468
PLAN67	2	141	98.60	0.12	NA	Corresponding field item excluded	381	466
PLAN68	2	47	87.20	0.34	NA	Corresponding field item excluded	475	466
PLAN69	2	195	100.00	0.00	Ramps & Obstructions		328	465
PLAN70	2	106	70.80	0.46	Public Accessible Routes		416	466
PLAN71	2	30	60.00	0.50	NA	Corresponding field item excluded	491	467
PLAN72	2	136	97.80	0.15	Public Accessible Routes		383	469
PLAN73	2	136	90.40	0.30	Public Accessible Routes		383	469
PLAN74	2	128	78.90	0.41	Public Accessible Routes		389	471
PLAN75	2	105	97.10	0.17	Public Accessible Routes		413	470
PLAN76	2	115	98.30	0.13	Public Accessible Routes		403	470
PLAN77	2	118	100.00	0.00	Safety Features of Accessible Routes		396	474
PLAN78	2	53	66.00	0.48	Elevators		470	465
PLAN79	2	48	60.40	0.49	Elevators		473	467
PLAN80	2	46	60.90	0.49	Elevators		474	468
PLAN81	2	48	60.40	0.49	Elevators		472	468
PLAN82	2	44	65.90	0.48	Elevators		475	469
PLAN83	2	83	78.30	0.41	Elevators		436	469
PLAN84	2	44	63.60	0.49	Elevators		474	470
PLAN85	2	42	64.30	0.48	Elevators		478	468

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN86	2	35	57.10	0.50	Elevators		486	467
PLAN87	2	35	57.10	0.50	Elevators		485	468
PLAN88	2	35	54.30	0.51	Elevators		485	468
PLAN89	2	41	65.90	0.48	Elevators		477	470
PLAN90	2	41	68.30	0.47	Elevators		478	469
PLAN91	2	38	65.80	0.48	Elevators		481	469
PLAN92	2	41	68.30	0.47	Elevators		477	470
PLAN93	2	41	63.40	0.49	Elevators		478	469
PLAN94	2	40	67.50	0.47	Elevators		479	469
PLAN95	2	41	68.30	0.47	Elevators		478	469
PLAN96	2	40	67.50	0.47	Elevators		479	469
PLAN97	2	40	62.50	0.49	Elevators		481	467
PLAN98	2	41	68.30	0.47	Elevators		480	467
PLAN99	2	41	68.30	0.47	Elevators		480	467
PLAN100	2	39	64.10	0.49	Elevators		482	467
PLAN101	2	40	67.50	0.47	Elevators		481	467
PLAN102	2	40	65.00	0.48	Elevators		481	467
PLAN103	2	39	64.10	0.49	Elevators		482	467
PLAN104	2	39	66.70	0.48	Elevators		481	468
PLAN105	2	38	65.80	0.48	Elevators		479	471
PLAN106	2	38	65.80	0.48	Elevators		479	471
PLAN107	2	42	66.70	0.48	Elevators		475	471
PLAN108	2	90	83.30	0.37	Elevators		425	473
PLAN109	2	35	60.00	0.50	NA	Corresponding field item excluded	480	473
PLAN110	2	31	58.10	0.50	NA	Corresponding field item excluded	484	473
PLAN111	2	62	82.30	0.39	Public Facilities		454	472
PLAN112	2	75	81.30	0.39	Public Facilities		441	472
PLAN113	2	61	88.50	0.32	Public Facilities		455	472
PLAN114	2	57	87.70	0.33	Public Facilities		459	472
PLAN115	2	54	85.20	0.36	Public Facilities		462	472
PLAN116	2	71	90.10	0.30	Public Facilities		446	471
PLAN117	2	49	85.70	0.35	NA	Corresponding field item excluded	468	471
PLAN118	2	53	84.90	0.36	Public Facilities		464	471
PLAN119	2	25	84.00	0.36	NA	Corresponding field item excluded	496	467
PLAN120	2	25	84.00	0.36	NA	Corresponding field item excluded	495	468
PLAN121	2	19	89.50	0.32	NA	Corresponding field item excluded	499	470
PLAN122	2	19	94.70	0.23	NA	Corresponding field item excluded	492	477
PLAN123	2	142	97.90	0.14	Public Facilities		377	469

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN124	2	15	86.70	0.35	NA	Corresponding field item excluded	504	469
PLAN125	2	13	92.30	0.28	NA	Corresponding field item excluded	505	470
PLAN126	2	14	92.90	0.27	NA	Corresponding field item excluded	506	468
PLAN127	2	18	88.90	0.32	NA	Corresponding field item excluded	500	470
PLAN128	2	21	95.20	0.22	NA	Corresponding field item excluded	499	468
PLAN129	2	117	99.10	0.09	Public Facilities		401	470
PLAN130	2	130	99.20	0.09	Public Facilities		390	468
PLAN131	2	148	98.60	0.12	Public Facilities		371	469
PLAN132	2	118	100.00	0.00	Public Facilities		401	469
PLAN133	2	105	100.00	0.00	Public Facilities		413	470
PLAN134	2	147	99.30	0.08	Public Facilities		371	470
PLAN135	2	21	90.50	0.30	NA	Corresponding field item excluded	500	467
PLAN136	2	21	90.50	0.30	NA	Corresponding field item excluded	500	467
PLAN137	2	26	84.60	0.37	NA	Corresponding field item excluded	494	468
PLAN138	2	23	91.30	0.29	NA	Corresponding field item excluded	498	467
PLAN139	2	19	94.70	0.23	NA	Corresponding field item excluded	501	468
PLAN140	2	25	76.00	0.44	NA	Corresponding field item excluded	495	468
PLAN141	2	22	86.40	0.35	NA	Corresponding field item excluded	498	468
PLAN142	2	18	33.30	0.49	NA	Corresponding field item excluded	502	468
PLAN143	2	88	96.60	0.18	Public Facilities		431	469
PLAN144	2	32	68.80	0.47	NA	Corresponding field item excluded	487	469
PLAN145	2	37	97.30	0.16	NA	Corresponding field item excluded	481	470
PLAN146	2	28	82.10	0.39	NA	Corresponding field item excluded	491	469
PLAN147	2	64	95.30	0.21	Public Facilities		455	469
PLAN148	2	77	92.20	0.27	Public Facilities		442	469
PLAN149	2	226	93.80	0.24	Public Facilities		296	466
PLAN150	2	188	98.40	0.13	Clearance		326	474
PLAN151	2	103	96.10	0.19	Clearance		414	471
PLAN152	2	98	100.00	0.00	Clearance		420	470
PLAN153	3	340	97.10	0.17	Usable Doors		183	465
PLAN154	3	270	96.70	0.21	Usable Doors		253	465
PLAN155	3	260	92.70	0.26	Usable Doors		265	463

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN156	3	138	93.50	0.25	Usable Doors		379	471
PLAN157	3	167	99.40	0.08	Usable Doors		352	469
PLAN158	3	147	98.00	0.14	Usable Doors		371	470
PLAN159	3	111	96.40	0.19	Usable Doors		407	470
PLAN160	3	161	100.00	0.00	Usable Doors		357	470
PLAN161	3	112	95.50	0.21	Usable Doors		404	472
PLAN162	3	75	100.00	1.41	NA	Corresponding field item excluded	444	469
PLAN163	3	60	100.00	0.00	NA	Corresponding field item excluded	459	469
PLAN164	3	64	100.00	0.00	NA	Corresponding field item excluded	458	466
PLAN165	3	254	99.60	0.06	Usable Doors		265	469
PLAN166	3	101	99.00	0.10	Usable Doors		422	465
PLAN167	3	93	100.00	0.00	Usable Doors		429	466
PLAN168	3	169	97.60	0.15			348	471
PLAN169	3	159	99.40	0.08	Usable Doors		355	474
PLAN170	3	164	92.70	0.41	Usable Doors		348	476
PLAN171	3	159	100.00	0.00	Usable Doors		353	476
PLAN172	3	30	100.00	0.00	NA	Corresponding field item excluded	486	472
PLAN173	3	132	100.00	0.00	Usable Doors		383	473
PLAN174	3	55	100.00	0.00	NA	Corresponding field item excluded	461	472
PLAN175	3	19	100.00	0.00	NA	Corresponding field item excluded	494	475
PLAN176	3	28	96.40	0.19	NA	Corresponding field item excluded	489	471
PLAN177	3	199	88.90	0.31	Usable Doors		313	476
PLAN178	3	82	90.20	0.30	Usable Doors		431	475
PLAN179	3	697	98.90	0.11	NA	Corresponding field item excluded	24	267
PLAN180	3	316	88.30	0.32	Usable Doors		389	283
PLAN181	3	440	90.50	0.29	Usable Doors		272	276
PLAN182	3	192	91.70	0.28	NA	Corresponding field item excluded	517	279
PLAN183	3	287	97.90	0.14	Usable Doors		423	278
PLAN184	3	148	95.30	0.21	NA	Corresponding field item excluded	567	273
PLAN185	3	148	93.90	0.24	NA	Corresponding field item excluded	570	270
PLAN186	3	268	98.10	0.14	Usable Doors		450	270
PLAN187	3	165	90.90	0.29	NA	Corresponding field item excluded	551	272
PLAN188	3	513	99.60	0.06	Usable Doors		200	275
PLAN189	3	52	100.00	0.00	NA	Corresponding field item excluded	670	266

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN190	3	32	100.00	0.00	NA	Corresponding field item excluded	688	268
PLAN191	3	324	94.10	0.23	Usable Doors		385	279
PLAN192	3	287	97.60	0.15	Usable Doors		422	279
PLAN193	3	263	95.80	0.20	Usable Doors		443	282
PLAN194	3	276	100.00	0.00	NA	Corresponding field item excluded	437	275
PLAN195	3	216	100.00	0.00	Usable Doors		493	279
PLAN196	3	376	87.20	0.33	Usable Doors		334	278
PLAN197	3	132	84.80	0.35	NA	Corresponding field item excluded	571	285
PLAN198	3	307	98.40	0.13	Usable Doors		399	282
PLAN199	3	215	96.30	0.19	Usable Doors		492	281
PLAN200BR	3	652	89.90	0.30	Usable Doors		60	276
PLAN200BA	3	685	84.80	0.36	Usable Doors		27	276
PLAN200PR	3	69	71.00	0.46	NA	Corresponding field item excluded	637	282
PLAN200WI	3	346	75.70	0.43	Usable Doors		362	280
PLAN200UR	3	204	82.40	0.38	Usable Doors		503	281
PLAN200KI	3	35	88.60	0.32	NA	Corresponding field item excluded	673	280
PLAN200DR	3	16	100.00	0.00	NA	Corresponding field item excluded	689	283
PLAN200LR	3	16	100.00	0.00	NA	Corresponding field item excluded	688	284
PLAN200PA	3	329	94.80	0.22	Usable Doors		382	277
PLAN200O1	3	65	52.30	0.50	NA	Corresponding field item excluded	331	592
PLAN200O2	3	14	50.00	0.52	NA	Corresponding field item excluded	331	643
PLAN201	3	246	97.60	0.15	Usable Doors		468	274
PLAN202	4	45	77.80	0.42	NA	Corresponding field item excluded	672	271
PLAN203	4	702	97.20	0.17	Accessible Route		22	264
PLAN204	4	292	99.30	0.08	Accessible Route		428	268
PLAN205	4	427	98.80	0.11	Accessible Route		294	267
PLAN206	4	43	79.10	0.41	NA	Corresponding field item excluded	678	267
PLAN207	4	26	100.00	0.00	NA	Corresponding field item excluded	693	269
PLAN208	4	289	97.60	0.15	Accessible Route		429	270
PLAN209	4	275	82.90	0.38	Accessible Route		446	267

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN210	5	290	97.90	0.14	Height of Switches		431	267
PLAN211	5	289	97.60	0.15	NA	Corresponding field item excluded	430	269
PLAN212	5	262	77.50	0.42	Access to Obstructed Switches		453	273
PLAN213	5	94	91.50	0.28	Height of Switches		624	270
PLAN214	5	175	96.00	0.20	Access to Obstructed Switches		532	281
PLAN215	5	275	97.10	0.17	Access to Obstructed Switches		437	276
PLAN216	5	61	82.00	0.39	NA	Corresponding field item excluded	651	276
PLAN217	5	57	85.70	1.13	NA	Corresponding field item excluded	649	282
PLAN218	5	200	99.50	0.07	Access to Obstructed Switches		503	285
PLAN219	5	262	98.50	0.12	Access to Obstructed Switches		445	281
PLAN220	5	80	95.00	0.22	NA	Corresponding field item excluded	625	283
PLAN221	5	67	92.50	0.26	Height of Switches		649	275
PLAN222	6	507	87.00	0.34	Grab Bars		198	283
PLAN223	6	460	84.80	0.36	Grab Bars		246	282
PLAN224	6	177	75.10	0.43	Grab Bars		535	276
PLAN225	7	150	70.70	0.45	Grab Bars		561	277
PLAN226	7	484	81.60	0.39	Grab Bars		229	275
PLAN227	7	424	76.40	0.42	Wheelchair Mobility in Bath		244	320
PLAN228	7	256	95.70	0.20	Wheelchair Mobility in Bath		414	318
PLAN229	7	608	82.20	0.38	Wheelchair Mobility in Bath		60	320
PLAN230	7	602	85.90	0.35	Wheelchair Mobility in Bath		56	330
PLAN231	7	531	86.60	0.34	Wheelchair Mobility in Bath		130	327
PLAN232	7	213	86.90	0.34	Wheelchair Mobility in Bath		448	327
PLAN233	7	115	90.40	0.30	NA	Corresponding field item excluded	544	329

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN234	7	204	72.50	0.45	Wheelchair Mobility in Bath		460	324
PLAN235	7	549	70.50	0.46	Wheelchair Mobility in Bath		111	328
PLAN236	7	387	80.90	0.39	Wheelchair Mobility in Bath		279	322
PLAN237	7	220	94.50	0.23	Wheelchair Mobility in Bath		443	325
PLAN238	7	147	93.90	0.24	Wheelchair Mobility in Bath		513	328
PLAN239	7	65	90.80	0.29	NA	Corresponding field item excluded	597	326
PLAN240	7	534	96.40	0.19	Clear Spaces in Kitchen & Bath		122	332
PLAN241	7	521	81.80	0.39	Wheelchair Mobility in Bath		133	334
PLAN242	7	528	90.90	0.29	Clear Spaces in Kitchen & Bath		130	330
PLAN243	7	193	90.20	0.30	Clear Spaces in Kitchen & Bath		464	331
PLAN244	7	435	75.40	0.43	Wheelchair Mobility in Bath		228	325
PLAN245	7	383	98.20	0.13	NA	Corresponding field item excluded	278	327
PLAN246	7	133	95.50	0.21	Clear Spaces in Kitchen & Bath		529	326
PLAN247	7	117	97.40	0.16	Clear Spaces in Kitchen & Bath		547	324
PLAN248	7	488	80.70	0.40	Wheelchair Mobility in Bath		178	322
PLAN249	7	190	88.90	0.32	Wheelchair Mobility in Bath		471	327
PLAN250	7	70	91.40	0.28	NA	Corresponding field item excluded	593	325
PLAN251R	7	662	91.70	0.28	Usability of Appliances and Fixtures		44	282
PLAN251S	7	678	86.60	0.34	Usability of Appliances and Fixtures		31	279
PLAN252O	7	572	96.20	0.19	Usability of Appliances and Fixtures		145	271
PLAN252D	7	411	94.60	0.23	Usability of Appliances and Fixtures		308	269
PLAN252FR	7	687	91.30	0.28	Usability of Appliances and Fixtures		30	271

Table B3. Items Pertaining to Architectural Plan Conformance with Accessibility Requirements (continued)

Item	Requirement*	Number of units for which item is applicable	Percentage of applicable units conforming with item	Standard Deviation	Component	Reason for excluding	Number of units for which item is NA	Number of units for which response is missing
PLAN252TR	7	13	76.90	0.45	NA	Corresponding field item excluded	707	268
PLAN253	7	660	94.20	0.23	Usability of Appliances and Fixtures		59	269
PLAN254	7	168	74.40	0.44	Clear Spaces in Kitchen & Bath		547	273
PLAN255	7	110	52.70	0.50	Clear Spaces in Kitchen & Bath		600	278

NOTE: ("OUT" refers to surveyed elements outside the building; "IN" refers to surveyed elements inside a building).
See copy of survey form (Appendix A) for wording of all individual survey items.
* Requirements:
1=Accessible building entrance on an accessible route
2=Accessible and usable public and common use areas
3=Usable doors
4=Accessible route into and through unit
5=Light switches, electrical outlets, and thermostats
6=Reinforced walls for grab bars in units
7=Usable kitchens and bathrooms in units

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis[a]

[a] Items presented here are the survey items concerned with conformance of the completed dwelling unit observed in the field. Parallel composite conformance measures for conformance of architectural plans were based on identically worded items; however, the reference for each question was building plans rather than completed dwelling unit.

Requirement 1: Accessible building entrance on an accessible route

Accessible Building Entrance: 2 items

Item #	Item wording
field4	Is there at least one accessible entrance on an accessible route to that is without obstruction such as barrier curbs, steps, stepped walls, and ramps with a slope not greater than 8.33% (1:12)
field6	Is the slope of the finished grade between covered multifamily dwellings and a public or common use facility 8.33% (1:12) or less

Requirement 2: Accessible and usable public and common use areas

Elevators: 31 items

Item #	Item wording
field78	Elevators and lifts: Are elevator cars automatically brought to floor landings within a tolerance of ½ in.
field79	Elevators and lifts: Are raised character and Braille floor designations provided on both jambs of elevator entrances and centered at 60 in. above the floor
field80	Elevators and lifts: Are the raised characters on the elevator jambs 5/8 in. high minimum , 2 in. maximum and uppercase
field81	Elevators and lifts: Are the raised characters on the elevator jambs accompanied by Braille
field82	Elevators and lifts: Do elevator doors remain fully open in response to a car call for 3 seconds minimum
field83	Elevators and lifts: Do the inside dimensions of elevator cars provide space for people who use wheelchairs to enter the car, maneuver within reach of controls and exit from the car
field84	Elevators and lifts: Is the clearance between the car platform sill and the edge of any hoistway landing 11/4 in. maximum
field85	Elevators and lifts: Are floor surfaces in elevator cars stable, firm, and slip resistant
field86	Elevators and lifts: Are carpets or carpet tiles used on elevator floors securely attached with either a firm cushion, pad, or backing or no cushion or pad
field87	Elevators and lifts: Is the pile height on carpet or carpet tiles provided in elevators ½ in. maximum
field88	Elevators and lifts: Are the exposed edges of carpets used on elevator floors trimmed along the entire length of the exposed edges and fastened to floor surfaces
field89	Elevators and lifts: Is the highest operable part of a two-way emergency communication device in the elevator located 54 in. maximum above the floor for a parallel approach 48 in. maximum above the floor for front approach
field90	Elevators and lifts: Is the 2-way emergency communication device identified by raised symbols and lettering located adjacent to the device
field91	Elevators and lifts: If instructions for the car emergency signaling device are provided, are they presented in both tactile and visual form
field92	Elevators and lifts: Is the top of the elevator hall call buttons located vertically between 35 in. and 54 in. above the floor
field93	Elevators and lifts: Is the button that designates the up direction located above the button that designates the down direction
field94	Elevators and lifts: Is a visible and audible signal provided at each elevator entrance to indicate which care is answering a call
field95	Elevators and lifts: Are there in-car signals visible from the floor area adjacent to the hall call buttons
field96	Elevators and lifts: Are the hall signal fixtures centered at 72 in. minimum above the floor

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis (continued)

Elevators (continued)

Item #	Item wording
field97	Elevators and lifts: Do the audible signals sound once for up and twice for down, or do verbal annunciators state the words “up” and “down”
field98	Elevators and lifts: Are elevator doors provided with a reopening device that stops and reopens a car door and hoistway door if the door becomes obstructed
field99	Elevators and lifts: Are control buttons located on the elevator control panel ¾ in. minimum in their smallest dimension
field100	Elevators and lifts: Is there contrast between characters/symbols and the background of the control panel
field101	Elevators and lifts: Are characters and symbols on the control panel raised and in uppercase, 5/8 in. high minimum and 2 in. high maximum
field102	Elevators and lifts: Are the raised characters and symbols on the control panel accompanied by Braille
field103	Elevators and lifts: Are raised characters or symbols with Braille designations below located to the left of the control buttons
field104	Elevators and lifts: Is the n-car call button for the main entry floor designated by a star
field105	Elevators and lifts: Are floor buttons in the elevators provided with visible indicators to show that a call has been registered
field106	Elevators and lifts: Do the visible indicators in the elevators cease when the call is answered
field107	Elevators and lifts: Are the controls inside the elevator located on a front wall if cars have center opening doors and at the side wall or at the front wall next to the door if cars have side opening doors
field108	Elevators and lifts: Does at least one accessible elevator provide access to all floors of the building

Public Accessible Routes: 27 items

Item #	Item wording
field7out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Is the clear width of the accessible route 36 in. minimum, except at doors
field7in	Accessible routes within the boundary of the site: Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: Is the clear width of the accessible route 36 in. minimum, except at doors
field8out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Do accessible routes with turns around obstructions less than 48 in. wide have a clear space of 42 in. by 48 in. minimum
field8in	Accessible routes within the boundary of the site: Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: Do accessible routes with turns around obstructions less than 48 in. wide have a clear space of 42 in. by 48 in. minimum
field9out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Do accessible routes with clear width less than 60 in. provide 60 in. by 60 in. passing spaces at intervals not more than 200 ft.
field9in	Accessible routes within the boundary of the site: Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: Do accessible routes with clear width less than 60 in. provide 60 in. by 60 in. passing spaces at intervals not more than 200 ft.
field10out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: If the passing space in question (above) is an intersection of two corridors or walks, do they have a t-shaped turning space
field10in	Accessible routes within the boundary of the site: Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: If the passing space in question (above) is an intersection of two corridors or walks, do they have a t-shaped turning space

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis (continued)

Public Accessible Routes (continued)

Item #	Item wording
field13in	Accessible routes within the boundary of the site: Routes that connect accessible building or facility entrances with accessible spaces and elements/spaces within the building or facility: Are exposed edges of carpets fastened to floor surfaces with trim along the entire length of the exposed edge
field18out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are handrails continuous with the full length of each stair flight or ramp run
field19out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are inside handrails on switchback or dogleg stairs or ramps continuous between flights or runs
field20out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are the top of gripping surfaces of handrails mounted 34 in. minimum and 38 in. maximum vertically above stair nosings and ramp surfaces and at a consistent height above stair nosings and ramp surfaces
field22out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are gripping surfaces of handrails continuous, without interruption by newel posts, other construction elements, or obstructions
field23out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Do handrails have a circular cross section with an outside diameter of between 11/4 in. and 11/2 in.
field24out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are handrails and any wall or other surfaces adjacent to them free of any sharp or abrasive elements
field28out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: At the top of stair flights, except for continuous handrails at the inside turn of stairs, do either of these conditions apply: Handrails extend horizontally above the landing for 12 in. minimum beginning directly above the first riser nosing and return to a wall guard; Handrails are continuous to the handrail of an adjacent stair flight
field29out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: At the bottom of stair flights, do either of these conditions apply: Handrails extend horizontally above the landing for 12 in. minimum beginning directly above the first riser nosing and return to a wall guard; Handrails are continuous to the handrail of an adjacent stair flight
field40	Parking and passenger loading zones: Are accessible parking spaces identified by a sign showing the international symbol of accessibility which is not obscured by a vehicle parked in the space
field41	Parking and passenger loading zones: Do passenger loading zones provide an access aisle 60 in. wide minimum and 20 ft. long minimum adjacent and parallel to the vehicle pull-up space and at the same level as the roadway
field42	Parking and passenger loading zones: Is a vertical clearance of 114 in. minimum provided at accessible passenger loading zones and along vehicle access routes to such areas from site entrances
field43	Curb ramps: Are curb ramps provided where accessible routes cross curbs
field70	Stairs: Is there a ramp or other means of access located within sight from stairs
field72	Stairs: Are all stair risers between 4 in. and 7 in. high
field73	Stairs: Are all stair treads 11 in. deep minimum, measured from riser to riser
field74	Stairs: Do all stairs have closed risers
field75	Stairs: Is the thickness of stair treads no more than 1 in.
field76	Stairs: Do all nosings protrude 11/2 in. maximum
field77	Stairs: Do outdoor stairs and approaches to them appear to be designed so that water will not accumulate on walking surfaces

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis (continued)

Safety Features of Accessible Routes: 6 items

Item #	Item wording
field14out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are any changes in floor level between ¼ in. high minimum and ½ in. high maximum beveled
field15out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are changes in level greater than ½ in. negotiated by a curb ramp, ramp, or elevator
field30out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are accessible parking spaces located on accessible routes provided for at least 2% of covered dwelling units
field31out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are necessary site provisions such as parking and curb cuts available at the public or common use facility
field37	Ground and floor surface treatment: Are ground and floor surfaces of accessible routes and in accessible rooms and spaces, stable, firm, and slip resistant
field38	Parking and passenger loading zones: Are parking spaces for persons with disabilities 96 in. wide minimum with an adjacent access aisle 60 in. wide minimum

Public Facilities: 18 items

Item #	Item wording
field111	Drinking fountains and water coolers: Is the fountain or water cooler located at least 27 in. above the floor and not more than 80 in. above the floor
field112	Drinking fountains and water coolers: Does the fountain or water cooler protrude from the wall 4 in. or less
field113	Drinking fountains and water coolers: Is the spout outlet located 36 in. maximum above the floor
field114	Drinking fountains and water coolers: Are the spouts of drinking fountains and water coolers located at the front of the unit directing the water flow parallel or nearly parallel to the front of the unit
field115	Drinking fountains and water coolers: Do wall-mounted and post-mounted cantilevered drinking fountains and water coolers have a clear knee space between the bottom of the apron and floor or ground at least 27 in. high, 30 in. wide, and 17 in. to 19 in. deep
field116	Drinking fountains and water coolers: Do wall-mounted and post-mounted cantilevered drinking fountains and water coolers have a clear floor space 30 in. x 48 in. to allow for a forward approach
field118	Drinking fountains and water coolers: Can the operable parts located at or near the front edge of the fountain or water cooler be operated with one hand without the need to grasp tightly, pinch, pr twist the wrist
field123	Toilet rooms and bathing facilities: Are lavatories mounted with the rim 34 in. maximum above the floor with a clearance of 29 in. minimum from the floor to the bottom of the front edge of the apron
field129	Toilet rooms and bathing facilities: Is the diameter or width of the gripping surfaces of a grab bar 11/4 in. to 11/2 in. or does the shape provide an equivalent gripping surface
field130	Toilet rooms and bathing facilities: If grab bars are mounted adjacent to a wall, is the space between the wall and the grab bar at least 11/2 in.
field131	Toilet rooms and bathing facilities: Are grab bars mounted in a horizontal position 33 in. to 36 in. above the floor except where a supplemental grab bar is installed in relation to a fixture rim or surface
field132	Toilet rooms and bathing facilities: Are grab bars and any wall surfaces adjacent to grab bars free of sharp or abrasive elements
field133	Toilet rooms and bathing facilities: Are grab bars securely fastened to their fittings
field134	Toilet rooms and bathing facilities: Do grab bars mounted horizontally at 33 to 36 in. above the floor remain free of the required clear floor space

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis (continued)

Public Facilities (continued)

Item #	Item wording
field143	Seating, tables, or work surfaces: Do accessible seating spaces provided at tables and work surfaces for people in wheelchairs have a 30 in. x 48 in. minimum clear floor space that does not overlap knee space by not more than 19 in.
field147	Seating, tables, or work surfaces: Does the accessible seating have knee spaces at least 27 in. high, 30 in. wide, and 19 in deep
field148	Seating, tables, or work surfaces: Are the tops of accessible portions of tables and work surfaces from 28 in. to 34 in. from the floor
field149	Places of assembly: Are there spaces large enough for two wheelchairs to fit side by side, located at a variety of viewing positions within the assembly space

Ramps and Obstructions: 19 items

Item #	Item wording
field17out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Are handrails provided on both sides of stairs and ramps
field27out	Accessible routes within the boundary of the site: Do such extensions (of ramps) return to a wall, guard or the walking surface or are they continuous to the handrail of an adjacent ramp run
field32	Protruding objects: Do objects with leading edges located between 27 in. and 80 in. above the floor protrude from the wall no more than 4 in.
field33	Protruding objects: Do free-standing objects mounted on posts or pylons overhang no more than 12 in. maximum when located more than 27 in. above the ground or floor
field34	Protruding objects: Where a sign or other obstruction is mounted between posts or pylons more than 12 in. apart, is the lowest edge of such sign or obstruction between 27 in. and 80 in. above the adjacent ground or floor surface
field45	Curb ramps: Are curb ramps located or protected to prevent their obstruction by parked vehicles
field50	Curb ramps: Are curb ramps with returned curbs located where pedestrians cannot walk across the ramps
field51	Curb ramps: Are built-up curbs located so that they do not protrude into vehicular traffic lanes or into parking space access aisles
field52	Curb ramps: Excluding any flared sides, are curb ramps at marked crossings wholly contained within the markings
field53	Curb ramps: Do diagonal or corner-type curb ramps with returned curbs or other well-defined edges have the edges parallel to the direction of pedestrian flow
field55	Curb ramps: Do diagonal curb ramps provided at marked crossings provide the 48 in. minimum clear space within the markings
field56	Curb ramps: At marked crossings, do diagonal curb ramps with flared sides have a segment of straight curb 24 in. long minimum located on each side of the curb ramp and within the marked crossing
field58	Ramps: Do all ramp runs rise 30 in. or les with a slop not greater than 8.33% (1:12)
field60	Ramps: Do ramps have level landings at the bottom and top of each run
field62	Ramps: Is the landing length 60 in. minimum clear
field64	Do ramps with a rise greater than 6 in. or a run longer than 72 in. have handrails
field65	Ramps: Are the cross slopes of ramp surfaces level
field66	Ramps: Do ramps and landings have curbs, walls, or railings that prevent people from traveling off the ramp or landing
field69	Ramps: Do outdoor ramps and approaches to them appear to be designed so that water will not accumulate on walking surfaces

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis (continued)

Curb Ramps: 6 items

Item #	Item wording
field21out	Accessible routes within the boundary of the site: Routes from public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances: Is the clear space between handrail and wall 11/2 in. minimum
field39	Parking and passenger loading zones: Is an accessible circulation route maintained without interference by vehicle overhangs
field44	Curb ramps: Are the slopes of curb ramps no steeper than 8.33% (1:12)
field46	Curb ramps: Are transitions from ramps to walks, gutters, or streets flush
field47	Curb ramps: Are curb ramps 36 in. wide minimum, exclusive of flared sides
field49	Curb ramps: Where the width of the walking surface at the top of the ramp and parallel to the run of the ramp is less than 48 in. wide, do the flared sides have a slope not steeper than 8.33% (1:12)

Clearance and Reach: 5 items

Item #	Item wording
field35	Protruding objects: Is there at least 80 in. minimum headroom clearance on accessible routes
field36	Protruding objects: Is the clear width of an accessible route maintained throughout that route with no interference from protruding objects
field150	Is there clear floor space of 30 in. by 48 in. at least one washer and one dryer that allows for a forward or parallel approach
field151	Are operable parts of at least one appliance within the high forward reach range of 48 in. maximum and the low forward reach range of 15 in. minimum above the floor
field152	Are operable parts of at least one appliance within the high side reach of 54 in. maximum and the low side reach of 15 in. minimum above the floor

Requirement 3: Usable Doors

Usable Doors: 37 items

Item #	Item wording
field153	Doors on accessible routes and in public and common use areas: Do doorways have a clear opening of 32 in. minimum with door open 90 degrees measured between the face of the door and the stop
field154	Doors on accessible routes and in public and common use areas: Front approach to the pull side of swinging door: is there maneuvering space that extends 18 in. beyond the latch side of the door and 60 in. minimum perpendicular to the doorway
field155	Doors on accessible routes and in public and common use areas: Front approach to the push side of swinging doors with both closer and latch: is there maneuvering space that extends 12 in. beyond the latch side of the door and 48 in. minimum perpendicular to the doorway
field156	Doors on accessible routes and in public and common use areas: Hinge-side approach to the pull side of swinging door: is there maneuvering space that extends 36 in. beyond the latch side of the door if 60 in. minimum is provided perpendicular to the doorway, or is there maneuvering space that extends 42 in. beyond the latch side of the door if 54 in. minimum is provided perpendicular to the doorway
field157	Doors on accessible routes and in public and common use areas: Hinge-side approach to the push side of swinging doors equipped with both latch and closer : is there maneuvering space of 54 in. minimum parallel to the doorway and 48 in. maximum perpendicular to the doorway
field158	Doors on accessible routes and in public and common use areas: Latch-side approach to the pull side of swinging doors with closers: is there maneuvering space that extends 24 in. beyond the latch side of the door and 54 in. minimum perpendicular to the doorway
field159	Doors on accessible routes and in public and common use areas: Latch-side approach to the pull side of swinging doors without closers: is there maneuvering space that extends 24 in. beyond the latch side of the door and 48 in. minimum perpendicular to the doorway
field160	Doors on accessible routes and in public and common use areas: Latch-side approach to the push side of swinging door with closers: is there maneuvering space that extends 24 in. minimum parallel to the doorway beyond the latch side of the door and 48 in. minimum perpendicular to the doorway

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis (continued)

Usable Doors (continued)

Item #	Item wording
field161	Doors on accessible routes and in public and common use areas: Latch-side approach to the push side of swinging door without closers: is there maneuvering space that extends 24 in. minimum parallel to the doorway beyond the latch side of the door and 42 in. minimum perpendicular to the doorway
field165	Doors on accessible routes and in public and common use areas: Does the floor or ground surface within the required maneuvering spaces of all doors on accessible routes and in public and common use areas clear and virtually flat
field166	Doors on accessible routes and in public and common use areas: Is the space between two hinged or pivoted doors in a series 48 in. minimum plus the width of any door swinging into the space
field167	Doors on accessible routes and in public and common use areas: Do hinged or pivoted doors in a series swing either in the same direction or away from the space between doors
field168	Are thresholds at doorways 1/2 in. high maximum (for exterior sliding door thresholds shall be 3/4 in. high maximum
field169	Doors on accessible routes and in public and common use areas: Are changes in level between ¼ in. and ½ in. high beveled
field170	Doors on accessible routes and in public and common use areas: Do handles, pulls, latches, locks and other operable parts of accessible doors have a shape that is easy to grasp with one hand without the need to grasp or pinch tightly, or twist the wrist
field171	Doors on accessible routes and in public and common use areas: Is the door hardware mounted within a high forward reach of 48 in. maximum and a low forward reach of 15 in. minimum above the floor; and within a high side reach of 54 in. maximum and a low side reach of 15 in. above the floor
field173	Doors on accessible routes and in public and common use areas: Is the pushing or pulling force required to open interior hinged doors 5.0 lbs. Maximum
field177	Doors on accessible routes and in public and common use areas: Does the bottom 12 in. of all doors except automatic doors, power doors, and sliding doors have a smooth uninterrupted surface to allow the door to be opened by a wheelchair footrest without creating a trap or hazardous condition
field178	Doors on accessible routes and in public and common use areas: When narrow stile and rail doors are used, is there a 12 in. high minimum, smooth panel, extending the full width of the doors, installed on the push side of the doors which will allow the doors to be opened by a wheelchair footrest without creating a trap or hazardous condition
field180	Primary entry door to accessible units: Front approach to the pull side of swinging door: is there maneuvering space that extends 18 in. beyond the latch side of the door and 60 in. minimum perpendicular to the doorway
field181	Primary entry door to accessible units: Front approach to the push side of swinging doors with both closer and latch: is there maneuvering space that extends 12 in. beyond the latch side of the door and 48 in. minimum perpendicular to the doorway
field183	Primary entry door to accessible units: Hinge-side approach to push side of swinging doors equipped with both latch and closer: is there maneuvering space of 54 in. minimum parallel to the doorway and 48 in. minimum perpendicular to the doorway
field186	Primary entry door to accessible units: Latch-side approach to push side of swinging doors with closers: is there maneuvering space that extends 24 in. minimum parallel to the doorway beyond the latch side of the door and 48 in. minimum perpendicular to the doorway
field188	Primary entry door to accessible units: Does the floor or ground surface within the required maneuvering spaces of all primary entry doors have a slope that is virtually flat
field191	Primary entry door to accessible units: Are thresholds at doorways ½ in. high maximum (for exterior doors thresholds shall be ¾ in. high maximum)
field192	Primary entry door to accessible units: Are changes in floor level 0 in. between pervious exterior materials and no more than ½ in. for impervious materials
field193	Primary entry door to accessible units: Do handles, pulls, latches, locks and other operable parts of accessible doors have a shape that is easy to grasp with one hand without the need to grasp or pinch tightly, or twist the wrist

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis (continued)

Usable Doors (continued)

Item #	Item wording
field195	Primary entry door to accessible units: Is the pushing or pulling force required to open interior hinged doors 5.0 lbs. maximum
field196	Primary entry door to accessible units: Does the bottom 12 in. of all primary entry doors have a smooth uninterrupted surface to allow the door to be opened by a wheelchair footrest without creating a trap or hazardous condition
field198	Primary entry door to accessible units: For the primary entry doors to dwelling units with direct exterior access, are the outside landing surfaces constructed of impervious materials such as concrete, brick, or flagstone
field199	Primary entry door to accessible units: Are the outside landing surfaces of impervious materials no more than ½ in. below the floor level of the interior of the dwelling unit
field200bedroom	Doors within units: Clear opening between face of the door and stop: bedroom entry door
field200bathroom	Doors within units: Clear opening between face of the door and stop: bathroom entry door
field200walkin	Doors within units: Clear opening between face of the door and stop: walk-in closet door
field200utilityroom	Doors within units: Clear opening between face of the door and stop: utility room door
field200patio	Doors within units: Clear opening between face of the door and stop: patio door
field201	Surfaces of balconies, terraces, patios, and decks outside units: If an exterior deck, patio, or balcony surface is constructed of impervious materials (such as concrete, brick or flagstone) is it no more than 4 in. or less below the interior floor level of the dwelling unit

Requirement 4: Accessible route into and through unit

Accessible Route: 5 items

Item #	Item wording
field203	Does the accessible route within the unit have a minimum clear width of 36 in.
field204	Are changes in level, including thresholds, within the dwelling unit with heights between 1/4 in. and 1/2 in. beveled with a slope no greater than 1:2
field205	Except for design features, such as a loft or an area on a different level within a room (e.g., a sunken living room), are the changes in level no more than 1/2 in
field208	Is the accessible route through the remainder of the dwelling maintained without obstruction by a design feature
field209	Is the story of the unit served by the elevator the primary entry to the unit

Requirement 5: Light switches, electrical outlets, and thermostats

Access to Obstructed Switches: 5 items

Item #	Item wording
field212	Is the horizontal centerline of operable parts of thermostats in the unit located between 15 in. and 48 in. above the floor
field214	Is the reach to operable parts of light switches over an obstruction between 20 and 25 in. in depth (such as a protruding shelf?)
field215	Is the reach to operable parts of electrical outlets over an obstruction between 20 and 25 in. in depth (such as a protruding shelf?)
field218	Is the maximum height of operable parts of light switches located no higher than 44 in. for a forward approach; or 46 in. for a side approach, provided the obstruction (such as a kitchen base cabinet) is no more than 25 in. in depth
field219	Is the maximum height of operable parts of electrical outlets located no higher than 44 in. for a forward approach; or 46 in. for a side approach, provided the obstruction (such as a kitchen base cabinet) is no more than 25 in. in depth

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis (continued)

Height of Switches & Controls: 3 items

Item #	Item wording
field210	Is the horizontal centerline of operable parts of light switches in the unit located between 15 in. and 48 in. above the floor
field213	Is the horizontal centerline of operable parts of other environmental controls in the unit located between 15 in. and 48 in. above the floor
field221	Is the maximum height of operable parts other environmental controls located no higher than 44 in. for a forward approach; or 46 in. for a side approach, provided the obstruction (such as a kitchen base cabinet) is no more than 25 in. in depth

Requirement 6: Reinforced walls for grab bars in units

Grab Bars: 5 items

Item #	Item wording
field222	Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the toilet
field223	Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the tub
field224	Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the shower stall
field225	Where such facilities are provided, are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the shower seat
field226	Are bathroom walls reinforced with plywood or solid blocking to allow later installation of grab bars around the toilet, tub, shower stall, and shower seat, ,where such facilities are provided

Requirement 7: Usable kitchens and bathrooms in units

Wheelchair Mobility in Bath: 15 items

Item #	Item wording
field227	Usable bathrooms in units, Type A: Where the door swings into the bathroom, s there a clear space (30 in. x 48 in.) within the room to position a wheelchair or other mobility aids clear of the path of the door as it is closed and to permit use of fixtures? This clear space can include any kneespace and toespace available below bathroom fixtures.
field228	Usable bathrooms in units, Type A: Where the door swings out, is a clear space provided within the bathroom for a person using a wheelchair or other mobility aid to position the wheelchair such that the person is allowed use of fixtures and the ability to reopen the door and exit
field229	Usable bathrooms in units, Type A: Is clear floor space provided at the toilet (clear floor space at fixtures may overlap)
field230	Usable bathrooms in units, Type A: Is clear floor space provided at the lavatory (clear floor space at fixtures may overlap)
field231	Usable bathrooms in units, Type A: Is clear floor space provided at the tub (clear floor space at fixtures may overlap)
field232	Usable bathrooms in units, Type A: Is clear floor space provided at the shower stall (clear floor space at fixtures may overlap)
field234	Usable bathrooms in units, Type A: If a parallel approach to the lavatory by a person in a wheelchair is not possible within the space, are cabinets provided designed to be removable to afford the necessary knee clearance for forward approach
field235	Usable bathrooms in units, Type A: Is a 30 in. x 48 in. clear floor space provided for parallel approach to the lavatory and centered on the lavatory
field236	Usable bathrooms in units, Type B: Where the door swings into the bathroom, s there a clear space (30 in. x 48 in.) within the room to position a wheelchair or other mobility aids clear of the path of the door as it is closed and to permit use of fixtures? This clear space can include any kneespace and toespace available below bathroom fixtures.
field237	Usable bathrooms in units, Type B: Where the door swings out, is a clear space provided within the bathroom for a person using a wheelchair or other mobility aid to position the wheelchair such that the person is allowed use of fixtures and the ability to reopen the door and exit

Table B4. Item Content for All Composite Conformance Measures Derived from Categorical Principal Components Analysis (continued)

Wheelchair Mobility in Bath (continued)

Item #	Item wording
field238	Usable bathrooms in units, Type B: When both tub and shower fixtures are provided in the bathroom, is at least one made accessible
field241	Usable bathrooms in units, Type B: In locations where toilets are adjacent to walls or bathtubs, is the center line of the fixture exactly 18” from the wall or bathtub
field244	Usable bathrooms in units, Type B: If the vanity and lavatory are designed for a parallel approach, is the centerline of the fixture a minimum of 24 in. measured horizontally from an adjoining wall or fixture
field248	Usable bathrooms in units, Type B: Do the bathtubs and tub/showers located in the bathroom provide a clear access aisle to the lavatory that is at least 30 in. wide and extends for a length of 48 in., measured from the foot (control end) of the bathtub
field249	Usable bathrooms in units, Type B: Is a minimum clear floor space of 30 in. wide by 48 in. available outside a shower stall

Usability of Kitchen Appliances and Fixtures: 6 items

Item #	Item wording
field251range	Usable kitchens in units: Clear floor space at range or cooktop
field251sink	Usable kitchens in units: Clear floor space at sink
field252oven	Usable kitchens in units: Clear floor space at oven
field252dishwasher	Usable kitchens in units: Clear floor space at dishwasher
field252refrigerator	Usable kitchens in units: Clear floor space at refrigerator
field253	Usable kitchens in units: Is the clearance between counters and all opposing base cabinets, countertops, appliances or walls at least 40 in.

Clear Spaces in Bath and Kitchen: 7 items

Item #	Item wording
field240	Usable bathrooms in units, Type B: Are toilets located within bathrooms in a manner that permits a wall-mounted or folding grab bar to be installed on one side of the fixture
field242	Usable bathrooms in units, Type B: Is the other (non-grab bar) side of the toilet fixture a minimum of 15” from the finished surface of adjoining walls, vanities, or from the edge of a lavatory
field243	Usable bathrooms in units, Type B: If the lavatory is designed with removable base cabinets, is the centerline of the fixture a minimum of 15 in. horizontally from an adjoining wall or fixture
field246	Usable bathrooms in units, Type B: If kneespace is provided below the vanity, is the bottom of the apron at least 27 in. above the floor
field247	Usable bathrooms in units, Type B: If kneespace is provided below the vanity, is it between 17 in. and 19 in. deep
field254	Usable kitchens in units: If the kitchen is U-shaped and has the sink, range or cooktop located at the base of the “U”, is a 60-inch diameter turning radius provided to allow parallel approach to the base of the “U”.
field255	Usable kitchens in units: If the kitchen is U-shaped and has the sink, range or cooktop located at the base of the “U”, are base cabinets designed to be removable at that location to allow knee space for a forward approach

Table B5. Descriptive Statistics for Conformance Behavior Composite Conformance Measures: Field and Plan (Dwelling Units, total n=988)

Field Composite Conformance Measures	Mean	SD	N	Min.	Max.
Requirement 1: Accessible building entrance on an accessible route					
Accessible Building Entrance (2 items)	92.48	21.66	505	0	100
Requirement 2: Accessible and usable public and common use areas					
Elevators (31 items)	87.56	27.35	152	0	100
Public Accessible Routes (27 items)	90.16	15.03	205	16	100
Safety Features of Accessible Routes (6 items)	93.10	17.68	568	0	100
Public Facilities (18 items)	93.52	11.52	198	10	100
Ramps and Obstructions (19 items)	94.51	12.84	212	18	100
Curb Ramps (6 items)	93.87	13.57	434	17	100
Clearance and Reach (5 items)	93.30	20.82	560	0	100
Requirement 3: Usable Doors					
Usable Doors (37 items)	90.35	12.64	263	39	100
Requirement 4: Accessible route into and through unit					
Accessible Route (5 items)	95.19	14.77	610	0	100
Requirement 5: Light switches, electrical outlets, and thermostats					
Access to Obstructed Switches (5 items)	89.41	27.10	328	0	100
Height of Switches & Controls (3 items)	72.44	29.12	713	0	100
Requirement 6: Reinforced walls for grab bars in units					
Grab Bars (5 items)	73.36	40.52	659	0	100
Requirement 7: Usable kitchens and bathrooms in units					
Wheelchair Mobility in Bath (15 items)	81.40	27.58	507	0	100
Usability of Appliances and Fixtures (6 items)	92.26	16.04	701	0	100
Clear Spaces in Bath and Bath (7 items)	85.37	22.96	283	0	100
Plan Composite Conformance Measures					
Requirement 1: Accessible building entrance on an accessible route					
Accessible Building Entrance (2 items)	93.46	19.99	306	0	100
Requirement 2: Accessible and usable public and common use areas					
Elevators (31 items)	66.71	46.93	40	0	100
Public Accessible Routes (27 items)	95.71	5.83	131	68	100
Safety Features of Accessible Routes (6 items)	97.54	11.48	271	0	100
Public Facilities (18 items)	98.09	7.70	75	50	100
Ramps and Obstructions (19 items)	97.44	7.96	156	50	100
Curb Ramps (6 items)	97.13	10.39	224	17	100
Clearance and Reach (5 items)	98.26	9.17	288	50	100
Requirement 3: Usable Doors					
Usable Doors (37 items)	96.01	7.68	104	65	100
Requirement 4: Accessible route into and through unit					
Accessible Route (4 items)	98.40	9.05	302	25	100
Requirement 5: Light switches, electrical outlets, & thermostats					
Access to Obstructed Switches (5 items)	97.78	10.16	173	25	100
Height of Switches & Controls (3 items)	87.38	24.68	268	0	100
Requirement 6: Reinforced walls for grab bars in units					
Grab Bars (5 items)	84.20	34.63	479	0	100
Requirement 7: Usable kitchens and bathrooms in units					
Wheelchair Mobility in Bath (15 items)	80.82	27.65	447	0	100
Usability of Appliances and Fixtures (6 items)	91.69	16.66	666	0	100
Clear Spaces in Bath and Kitchen (7 items)	87.83	19.65	209	0	100

Table B6. Descriptive Statistics for Conformance Behavior Composite Conformance Measures: Field and Plan (Project Aggregate Data, total n=397)

	Mean	SD	N	Min.	Max.
Field Composite Conformance Measures	86.3	12.9		27	100
Requirement 1: Accessible building entrance on an accessible route					
Accessible Building Entrance (2 items)	91.83	21.85	300	0	100
Requirement 2: Accessible and usable public and common use areas					
Elevators (31 items)	91.31	20.42	135	0	100
Public Accessible Routes (27 items)	89.52	13.66	123	16	100
Safety Features of Accessible Routes (6 items)	91.21	19.78	350	0	100
Public Facilities (18 items)	93.09	11.71	176	10	100
Ramps and Obstructions (19 items)	93.80	13.43	121	18	100
Curb Ramps (6 items)	92.29	15.47	254	27	100
Clearance and Reach (5 items)	93.66	19.19	342	16	100
Requirement 3: Usable Doors					
Usable Doors (37 items)	89.85	12.70	209	39	100
Requirement 4: Accessible route into and through unit					
Accessible Route (5 items)	95.16	13.73	301	0	100
Requirement 5: Light switches, electrical outlets, and thermostats					
Access to Obstructed Switches (5 items)	88.70	27.16	181	0	100
Height of Switches & Controls (3 items)	72.25	29.04	352	0	100
Requirement 6: Reinforced walls for grab bars in units					
Grab Bars (5 items)	72.60	38.93	329	0	100
Requirement 7: Usable kitchens and bathrooms in units					
Wheelchair Mobility in Bath (15 items)	79.32	29.00	248	0	100
Usability of Appliances and Fixtures (6 items)	92.51	14.92	345	0	100
Clear Spaces in Bath and Kitchen (7 items)	84.09	23.76	159	0	100
Plan Composite Conformance Measures					
Requirement 1: Accessible building entrance on an accessible route					
Accessible Building Entrance (2 items)	93.75	17.76	165	0	100
Requirement 2: Accessible and usable public and common use areas					
Elevators (31 items)	76.61	41.82	27	0	100
Public Accessible Routes (27 items)	95.46	5.98	69	68	100
Safety Features of Accessible Routes (6 items)	97.24	12.80	141	0	100
Public Facilities (18 items)	97.57	8.62	59	50	100
Ramps and Obstructions (19 items)	96.98	9.01	78	50	100
Curb Ramps (6 items)	96.42	11.92	116	17	100
Clearance and Reach (5 items)	98.39	8.65	166	50	100
Requirement 3: Usable Doors					
Usable Doors (37 items)	95.77	7.18	71	65	100
Requirement 4: Accessible route into and through unit					
Accessible Route (4 items)	97.87	9.63	136	25	100
Requirement 5: Light switches, electrical outlets, and thermostats					
Access to Obstructed Switches (5 items)	97.38	10.38	78	50	100
Height of Switches & Controls (3 items)	87.46	24.58	114	0	100
Requirement 6: Reinforced walls for grab bars in units					
Grab Bars (5 items)	84.89	32.69	205	0	100
Requirement 7: Usable kitchens and bathrooms in units					
Wheelchair Mobility in Bath (15 items)	81.15	26.82	187	0	100
Usability of Appliances and Fixtures (6 items)	92.43	15.07	279	0	100
Clear Spaces in Bath and Kitchen (7 items)	88.75	20.29	101	0	100

Table B7. Conformance Levels for Completed Buildings (Field) and Planned Buildings (Plan): Projects[a]

[a] Number of pairs available for comparison ranged from 26 (Elevators) to 260 (Usability of Appliances and Fixtures).

Composite Conformance Measure	Field		Plan		t	df	p
	Mean	SD	Mean	SD			
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	92.82	19.37	93.75	17.77	-1.073	164	0.15
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	76.65	41.83	76.61	41.82	0.618	26	0.30
Public Accessible Routes (27 items)	94.12	8.04	95.31	6.06	-2.555	64	0.01
Safety Features of Accessible Routes (6 items)	97.02	12.71	97.56	12.24	-0.895	138	0.20
Public Facilities (18 items)	95.33	13.80	97.57	8.62	-2.286	58	0.02
Ramps and Obstructions (19 items)	96.67	9.13	96.94	9.06	-1.730	76	0.05
Curb Ramps (6 items)	95.30	14.26	96.54	11.90	-1.106	114	0.15
Clearance and Reach (5 items)	95.99	15.77	98.65	7.92	-2.521	159	0.01
Requirement 3: Usable Doors							
Usable Doors (37 items)	95.26	7.69	95.85	7.19	-1.768	69	0.05
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)	96.98	10.63	97.77	9.84	-1.373	129	0.10
Requirement 5: Light switches, electrical outlets, and thermostats							
Access to Obstructed Switches (5 items)	94.02	19.54	97.31	10.51	-1.687	75	0.05
Height of Switches and Controls (3 items)	84.36	24.96	87.46	24.58	-2.003	113	0.03
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	79.19	36.28	86.05	32.16	-3.925	189	0.00
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)	82.85	25.41	83.21	25.17	-0.594	169	0.30
Usability of Appliances and Fixtures (6 items)	91.55	15.90	92.20	15.37	-1.154	260	0.15
Clear Spaces in Kitchen and Bath (7 items)	86.42	22.08	88.09	20.96	-1.393	90	0.10

Table B7a. Compliance Levels for Completed Buildings (Field) and Planned Buildings (Plan): Dwelling Units[a]

[a] Number of pairs available for comparison ranged from 40 (Elevators) to 567 (Usability of Appliances and Fixtures).

Compliance Component	Field		Plan		t	df	p<.01
	Mean	SD	Mean	SD			
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	93.21	20.67	93.38	20.11	-0.229	301	
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	66.74	46.95	66.71	46.93	0.620	39	
Public Accessible Routes (27 items)	94.86	7.1	95.54	5.90	-2.670	123	*
Safety Features of Accessible Routes (6 items)	97.45	11.48	97.70	11.17	-0.602	267	
Public Facilities (18 items)	96.82	12.12	98.09	7.7	-1.732	74	
Ramps and Obstructions (19 items)	97.39	7.82	97.57	7.74	-1.985	151	
Curb Ramps (6 items)	96.45	11.57	97.27	10.33	-1.309	221	
Clearance and Reach (5 items)	95.49	18.24	98.56	8.39	-3.209	276	*
Requirement 3: Usable Doors							
Usable Doors (37 items)	95.65	7.94	96.03	7.72	-1.578	101	
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)	97.95	9.64	98.30	9.32	-1.037	283	
Requirement 5: Light switches, electrical outlets, and thermostats							
Access to Obstructed Switches (5 items)	94.41	19.92	97.70	10.34	-2.436	166	
Height of Switches and Controls (3 items)	84.29	25.11	87.42	24.34	-3.070	260	*
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	77.23	39.59	84.11	35.39	-5.452	403	*
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)	83.67	25.28	84.27	25.52	-1.350	374	
Usability of Appliances and Fixtures (6 items)	91.61	16.73	91.59	16.92	0.040	566	
Clear Spaces in Kitchen and Bath (7 items)	86.97	21.09	87.66	20.85	-0.953	170	

Table B8. Mean Field Conformance Levels by Geographic Region (Projects n=397)

REGION		Building Entrance	Elevators	Public-Accessible Routes	Safety Features of Accessible Routes	Public Facilities	Ramps and Obstructions
	Eta-squared	0.04	0.12	**0.26***	**0.07***	**0.19***	**0.20***
1 New England	Mean	100.00	84.13	66.67	87.50		
	N	3	2	1	4	0	0
	Stand. Dev.	0.00	2.94		25.00		
	Minimum	100	82	67	50		
	Maximum	100	86	67	100		
2 New York/New Jersey	Mean	98.21	93.63	82.34	85.63	95.42	90.00
	N	28	22	6	29	21	4
	Stand. Dev.	9.45	4.91	9.97	30.45	5.43	14.14
	Minimum	50	80	67	0	80	70
	Maximum	100	100	94	100	100	100
3 Mid-Atlantic	Mean	86.67	94.87	82.10	86.87	78.27	100.00
	N	15	8	8	22	16	1
	Stand. Dev.	29.68	2.68	14.87	26.92	20.78	
	Minimum	0	90	55	0	10	100
	Maximum	100	97	95	100	100	100
4 Southeast	Mean	90.00	98.46	92.65	94.31	92.64	93.12
	N	60	16	28	60	26	31
	Stand. Dev.	21.24	4.27	6.65	14.76	8.52	17.02
	Minimum	0	86	78	50	73	27
	Maximum	100	100	100	100	100	100
5 Midwest	Mean	96.97	93.86	94.12	84.00	93.32	80.00
	N	28	20	2	50	30	1
	Stand. Dev.	13.11	6.45	8.32	23.56	8.19	
	Minimum	50	77	88	50	75	80
	Maximum	100	100	100	100	100	80
6 Great Plains	Mean	83.77	93.41	71.90	91.00	94.09	90.00
	N	19	7	9	29	8	2
	Stand. Dev.	28.11	5.68	26.00	18.27	7.30	14.14
	Minimum	0	87	16	50	82	80
	Maximum	100	100	100	100	100	100
7 Southwest	Mean	88.46	97.71	95.57	93.80	96.04	94.29
	N	39	6	26	43	25	31
	Stand. Dev.	29.16	4.24	9.92	15.86	13.54	11.74
	Minimum	0	89	56	50	33	50
	Maximum	100	100	100	100	100	100
8 Rocky Mountains	Mean	85.00	95.59	80.70	80.56	97.50	60.00
	N	10	6	5	12	4	1
	Stand. Dev.	24.15	2.74	15.81	24.45	5.00	.
	Minimum	50	93	65	50	90	60
	Maximum	100	100	100	100	100	60
9 Pacific	Mean	93.33	78.75	93.85	97.69	97.03	98.82
	N	70	31	27	65	33	41
	Stand. Dev.	22.41	39.39	12.14	10.98	9.05	5.02
	Minimum	0	0	55	33	50	70
	Maximum	100	100	100	100	100	100
10 Northwest	Mean	94.57	96.51	89.24	93.01	92.18	79.18
	N	23	14	10	31	9	8
	Stand. Dev.	14.99	4.98	9.65	16.54	10.08	18.67
	Minimum	50	82	77	50	71	46
	Maximum	100	100	100	100	100	100
Total	Mean	91.69	91.26	89.58	91.23	93.25	94.51
	N	295	132	122	345	172	120
	Stand. Dev.	22.01	20.63	13.70	19.78	11.74	13.38
	Minimum	0	0	16	0	10	27
	Maximum	100	100	100	100	100	100

Table B8. Mean Field Conformance Levels by Geographic Region (Projects n=397) (continued)

REGION		Curb Ramps	Clearance and Reach	Usable Doors	Accessible Route	Access to Obstructed Switches	Height of Switches and Controls
	Eta-squared	**0.19***	0.06	**0.17***	0.06	**0.22***	**0.13***
1 New England	Mean	100.00	100.00	92.59	100.00		79.63
	N	1	3	3	6	0	4
	Stand. Dev.	.	0.00	12.83	0.00		25.00
	Minimum	100	100	78	100		50
	Maximum	100	100	100	100		100
2 New York/New Jersey	Mean	90.09	95.59	88.14	92.20	100.00	62.33
	N	29	34	26	29	2	32
	Stand. Dev.	13.97	14.40	7.79	14.61	0.00	27.08
	Minimum	60	50	74	50	100	0
	Maximum	100	100	100	100	100	100
3 Mid-Atlantic	Mean	72.14	95.45	81.77	90.28	83.04	63.33
	N	20	22	15	18	14	20
	Stand. Dev.	29.94	14.71	13.06	16.73	22.79	36.01
	Minimum	17	50	48	50	50	0
	Maximum	100	100	96	100	100	100
4 Southeast	Mean	97.19	87.21	88.15	98.53	100.00	72.84
	N	35	61	27	49	14	56
	Stand. Dev.	7.67	26.84	14.78	5.64	0.00	27.35
	Minimum	67	0	48	67	100	0
	Maximum	100	100	100	100	100	100
5 Midwest	Mean	89.80	86.36	86.19	91.10	61.54	62.17
	N	30	44	32	41	13	55
	Stand. Dev.	16.26	29.26	16.46	20.53	50.64	27.16
	Minimum	40	0	39	0	0	0
	Maximum	100	100	100	100	100	100
6 Great Plains	Mean	93.65	96.76	86.93	93.94	88.97	76.75
	N	26	27	18	22	18	30
	Stand. Dev.	9.92	16.84	13.78	13.16	24.38	32.76
	Minimum	75	12	50	67	0	0
	Maximum	100	100	100	100	100	100
7 Southwest	Mean	96.30	96.25	96.19	94.26	97.06	84.59
	N	38	40	33	37	34	43
	Stand. Dev.	10.61	13.34	8.14	17.33	17.15	27.16
	Minimum	43	50	67	25	0	0
	Maximum	100	100	100	100	100	100
8 Rocky Mountains	Mean	86.30	96.87	82.37	95.83	84.38	52.22
	N	9	16	9	10	8	15
	Stand. Dev.	16.45	12.50	13.47	9.00	35.20	26.63
	Minimum	50	50	50	75	0	33
	Maximum	100	100	97	100	100	100
9 Pacific	Mean	96.60	98.09	97.76	99.35	98.64	85.75
	N	49	61	32	61	49	62
	Stand. Dev.	9.06	9.18	4.73	4.33	9.52	22.09
	Minimum	60	50	78	67	33	33
	Maximum	100	100	100	100	100	100
10 Northwest	Mean	91.30	98.28	85.52	95.83	69.75	65.10
	N	13	29	11	28	27	32
	Stand. Dev.	18.67	9.28	13.07	10.52	35.65	27.96
	Minimum	33	50	63	67	0	0
	Maximum	100	100	100	100	100	100
Total	Mean	92.17	93.81	89.72	95.36	88.58	72.21
	N	250	337	206	298	179	349
	Stand. Dev.	15.57	19.15	12.74	13.17	27.29	29.01
	Minimum	17	0	39	0	0	0
	Maximum	100	100	100	100	100	100

Table B8. Mean Field Conformance Levels by Geographic Region (Projects n=397) (continued)

REGION		Grab Bars	Wheelchair Mobility in Bath	Usability of Appliances and Fixtures	Clear Spaces in Bath and Kitchen
	Eta-squared	**0.20***	**0.10***	**0.17***	0.13
1 New England	Mean	75.00	50.00	95.00	93.25
	N	4	1	4	3
	Stand. Dev.	31.91		10.00	11.68
	Minimum	33	50	80	80
	Maximum	100	50	100	100
2 New York/New Jersey	Mean	93.91	64.26	84.89	90.21
	N	31	22	33	17
	Stand. Dev.	21.44	30.89	17.58	11.83
	Minimum	0	0	37	67
	Maximum	100	100	100	100
3 Mid-Atlantic	Mean	62.58	84.00	91.72	64.58
	N	20	15	20	6
	Stand. Dev.	44.79	24.29	15.47	27.86
	Minimum	0	9	50	25
	Maximum	100	100	100	100
4 Southeast	Mean	81.00	74.45	97.69	89.22
	N	54	51	55	25
	Stand. Dev.	27.93	30.38	5.17	16.10
	Minimum	0	0	83	50
	Maximum	100	100	100	100
5 Midwest	Mean	45.11	81.63	83.03	73.81
	N	50	5	50	15
	Stand. Dev.	40.72	10.87	20.41	26.71
	Minimum	0	65	20	0
	Maximum	100	100	100	100
6 Great Plains	Mean	73.58	82.74	89.71	84.58
	N	27	20	29	12
	Stand. Dev.	36.06	19.60	13.77	25.33
	Minimum	0	18	56	25
	Maximum	100	100	100	100
7 Southwest	Mean	60.49	91.29	95.36	77.41
	N	41	39	42	27
	Stand. Dev.	48.47	20.22	19.20	35.99
	Minimum	0	0	0	0
	Maximum	100	100	100	100
8 Rocky Mountains	Mean	52.38	45.77	83.23	62.50
	N	14	4	14	6
	Stand. Dev.	46.62	42.93	17.87	26.22
	Minimum	0	9	50	25
	Maximum	100	100	100	100
9 Pacific	Mean	94.12	82.42	98.85	90.08
	N	60	60	63	31
	Stand. Dev.	20.23	33.00	4.50	17.39
	Minimum	0	0	79	50
	Maximum	100	100	100	100
10 Northwest	Mean	66.77	78.83	97.58	93.33
	N	24	26	31	13
	Stand. Dev.	40.74	24.86	5.35	10.61
	Minimum	0	0	83	75
	Maximum	100	100	100	100
Total	Mean	72.44	79.24	92.56	84.03
	N	325	245	341	155
	Stand. Dev.	39.05	29.15	14.98	24.02
	Minimum	0	0	0	0
	Maximum	100	100	100	100

* Significant regional differences in conformance ($p<.01$) were observed for composite conformance measures indicated in bold type.

Table B8a. Mean Field Conformance Levels by Region (Dwelling Units n=988)

REGION*		Building Entrance	Elevators	**Public-Accessible Routes**	**Safety Features of Accessible Routes**	Public Facilities	**Ramps and Obstructions**
	Eta-squared	0.04	0.24	0.36	0.06	0.16	0.17
1 New England	Mean	100.00	83.43	66.67	93.75		
	N	7	3	2	8	0	0
	Stand. Dev.	0.00	5.21	0.00	17.68		
	Minimum	100	77	67	50		
	Maximum	100	87	67	100		
2 New York/New Jersey	Mean	98.89	93.76	82.34	87.39	93.78	90.00
	N	45	23	6	37	23	4
	Stand. Dev.	7.45	4.83	9.97	28.17	9.01	14.14
	Minimum	50	80	67	0	60	70
	Maximum	100	100	94	100	100	100
3 Mid-Atlantic	Mean	86.11	94.87	82.58	87.82	83.50	100.00
	N	18	8	9	26	16	2
	Stand. Dev.	28.73	2.68	13.98	25.19	10.39	0.00
	Minimum	0	90	55	0	64	100
	Maximum	100	97	95	100	100	100
4 Southeast	Mean	90.91	98.70	92.61	95.87	91.70	91.38
	N	121	19	61	125	30	61
	Stand. Dev.	24.15	3.94	7.26	13.50	8.58	17.51
	Minimum	0	86	75	50	73	18
	Maximum	100	100	100	100	100	100
5 Midwest	Mean	96.97	93.86	94.12	86.44	93.32	80.00
	N	33	20	2	59	30	1
	Stand. Dev.	12.12	6.45	8.32	22.42	8.19	.
	Minimum	50	77	88	50	75	80
	Maximum	100	100	100	100	100	80
6 Great Plains	Mean	81.25	93.41	64.00	90.63	94.75	86.67
	N	32	7	16	48	9	3
	Stand. Dev.	27.68	5.68	31.23	17.83	7.11	11.55
	Minimum	0	87	16	50	82	80
	Maximum	100	100	100	100	100	100
7 Southwest	Mean	90.24	99.71	95.57	93.22	97.86	95.38
	N	82	11	57	91	41	63
	Stand. Dev.	26.57	0.97	8.07	16.85	10.58	10.03
	Minimum	0	97	56	50	33	50
	Maximum	100	100	100	100	100	100
8 Rocky Mountains	Mean	85.00	95.59	80.17	82.05	97.50	60.00
	N	10	6	6	13	4	1
	Stand. Dev.	24.15	2.74	14.29	24.02	5.00	.
	Minimum	50	93	65	50	90	60
	Maximum	100	100	100	100	100	60
9 Pacific	Mean	94.74	65.16	95.11	98.62	97.12	99.30
	N	114	39	34	109	34	69
	Stand. Dev.	19.24	46.79	11.07	8.53	8.93	3.90
	Minimum	0	0	55	33	50	70
	Maximum	100	100	100	100	100	100
10 Northwest	Mean	95.45	96.51	90.82	93.50	92.18	79.18
	N	33	14	12	41	9	8
	Stand. Dev.	14.60	4.98	9.55	16.19	10.08	18.67
	Minimum	50	82	77	50	71	46
	Maximum	100	100	100	100	100	100
Total	Mean	92.32	87.56	90.16	93.06	94.03	94.51
	N	495	150	204	557	196	212
	Stand. Dev.	21.85	27.53	15.03	17.73	9.83	12.84
	Minimum	0	0	16	0	33	18
	Maximum	100	100	100	100	100	100

Table B8a. Mean Field Conformance Levels by Geographic Region (Dwelling Units n=988) (continued)

REGION*		Curb Ramps	Clearance and Reach	Usable Doors	Accessible Route	Access to Obstructed Switches	Height of Switches and Controls
	Eta-squared	0.16	0.08	0.19	0.06	0.26	0.13
1 New England	Mean	100.00	100.00	94.44	100.00		79.63
	N	1	5	4	7	0	9
	Stand. Dev.	.	0.00	11.11	0.00		20.03
	Minimum	100	100	78	100		50
	Maximum	100	100	100	100		100
2 New York/New Jersey	Mean	88.60	96.36	88.12	89.27	100.00	61.05
	N	44	55	29	80	4	95
	Stand. Dev.	15.11	13.10	7.73	22.90	0.00	28.72
	Minimum	50	50	74	0	100	0
	Maximum	100	100	100	100	100	100
3 Mid-Atlantic	Mean	75.05	96.00	82.25	89.17	79.76	63.98
	N	23	25	17	30	21	31
	Stand. Dev.	29.01	13.10	12.71	17.39	29.18	35.77
	Minimum	17	50	48	50	0	0
	Maximum	100	100	96	100	100	100
4 Southeast	Mean	93.36	87.40	88.28	98.09	100.00	71.28
	N	70	123	36	96	24	112
	Stand. Dev.	10.47	26.85	14.05	9.63	0.00	29.87
	Minimum	50	0	48	33	100	0
	Maximum	100	100	100	100	100	100
5 Midwest	Mean	92.16	80.39	86.19	91.91	52.38	62.41
	N	39	51	32	69	21	90
	Stand. Dev.	14.85	36.16	16.46	20.81	51.18	26.51
	Minimum	40	0	39	0	0	0
	Maximum	100	100	100	100	100	100
6 Great Plains	Mean	93.45	91.86	84.46	94.77	85.71	75.78
	N	43	43	24	51	42	75
	Stand. Dev.	9.96	26.57	15.99	12.24	30.15	30.55
	Minimum	67	0	50	67	0	0
	Maximum	100	100	100	100	100	100
7 Southwest	Mean	97.19	96.55	96.23	96.50	98.84	84.70
	N	84	87	67	107	86	110
	Stand. Dev.	8.27	12.74	8.13	13.50	10.78	26.05
	Minimum	43	50	67	25	0	0
	Maximum	100	100	100	100	100	100
8 Rocky Mountains	Mean	86.00	97.06	82.37	95.83	86.11	50.00
	N	10	17	9	14	9	25
	Stand. Dev.	17.41	12.13	13.47	10.72	33.33	21.52
	Minimum	50	50	50	67	0	33
	Maximum	100	100	97	100	100	100
9 Pacific	Mean	97.89	98.61	97.83	99.46	99.17	85.89
	N	90	108	33	108	80	111
	Stand. Dev.	7.26	8.26	4.67	3.99	7.45	22.16
	Minimum	60	50	78	67	33	33
	Maximum	100	100	100	100	100	100
10 Northwest	Mean	93.57	98.61	85.52	94.68	71.04	67.30
	N	20	36	11	47	40	53
	Stand. Dev.	15.53	8.33	13.07	11.97	34.69	26.95
	Minimum	33	50	63	67	0	0
	Maximum	100	100	100	100	100	100
Total	Mean	93.84	93.18	90.31	95.18	89.37	72.36
	N	426	550	262	609	327	711
	Stand. Dev.	13.67	20.99	12.65	14.78	27.14	29.12
	Minimum	17	0	39	0	0	0
	Maximum	100	100	100	100	100	100

Table B8a. Mean Field Conformance Levels by Geographic Region (Dwelling Units n=988) (continued)

REGION*		Grab Bars	Wheelchair Mobility in Bath	Usability of Appliances and Fixtures	Clear Spaces in Bath and Kitchen
	Eta-squared	0.16	0.13	0.16	0.13
1 New England	Mean	88.89	69.44	90.00	86.76
	N	9	2	8	8
	Stand. Dev.	23.57	27.50	15.12	17.74
	Minimum	33	50	60	50
	Maximum	100	89	100	100
2 New York/New Jersey	Mean	89.77	64.47	84.31	93.21
	N	88	60	97	50
	Stand. Dev.	28.75	30.44	20.47	10.27
	Minimum	0	0	20	67
	Maximum	100	100	100	100
3 Mid-Atlantic	Mean	58.94	87.38	92.71	70.00
	N	30	22	32	10
	Stand. Dev.	45.27	20.89	14.30	25.82
	Minimum	0	9	50	25
	Maximum	100	100	100	100
4 Southeast	Mean	80.08	73.64	97.30	86.87
	N	109	105	111	33
	Stand. Dev.	31.71	31.59	6.41	16.41
	Minimum	0	0	80	50
	Maximum	100	100	100	100
5 Midwest	Mean	46.57	82.53	82.72	73.64
	N	84	12	79	21
	Stand. Dev.	45.01	10.48	19.48	24.34
	Minimum	0	60	20	0
	Maximum	100	100	100	100
6 Great Plains	Mean	76.82	81.30	89.00	80.83
	N	64	44	73	18
	Stand. Dev.	36.69	23.56	14.40	29.12
	Minimum	0	18	50	25
	Maximum	100	100	100	100
7 Southwest	Mean	56.98	94.44	96.14	78.97
	N	106	107	114	58
	Stand. Dev.	48.90	13.30	18.60	32.29
	Minimum	0	0	0	0
	Maximum	100	100	100	100
8 Rocky Mountains	Mean	63.64	53.52	80.91	65.63
	N	22	7	22	8
	Stand. Dev.	47.04	44.23	20.61	26.52
	Minimum	0	9	25	25
	Maximum	100	100	100	100
9 Pacific	Mean	94.50	86.80	98.76	92.17
	N	106	107	112	53
	Stand. Dev.	21.42	28.45	6.72	16.39
	Minimum	0	0	40	50
	Maximum	100	100	100	100
10 Northwest	Mean	67.52	79.80	98.04	95.08
	N	37	41	51	21
	Stand. Dev.	40.24	24.39	5.42	9.21
	Minimum	0	0	83	75
	Maximum	100	100	100	100
Total	Mean	73.25	81.40	92.27	85.39
	N	655	507	699	280
	Stand. Dev.	40.60	27.58	16.04	22.95
	Minimum	0	0	0	0
	Maximum	100	100	100	100

* Significant regional differences in compliance ($p<.01$) were observed for compliance measures indicated in bold type.

Table B8b. Mean Plan Conformance Levels by Geographic Region (Dwelling Units n=988)

REGION*		Building Entrance	Elevators	Public-Accessible Routes	Safety Features of Accessible Routes	Public Facilities	Ramps and Obstructions
	Eta-squared	0.05	0.34	0.19	0.14	0.08	0.14
1 New England	Mean						
	N	0	0	0	0	0	0
	Stand. Dev.						
	Minimum						
	Maximum						
2 New York/New Jersey	Mean	96.43		86.96	70.00	100.00	
	N	28	0	1	5	1	0
	Stand. Dev.	18.90			44.72		
	Minimum	0		87	0	100	
	Maximum	100		87	100	100	
3 Mid-Atlantic	Mean	88.89		87.57	93.33	96.67	
	N	9	0	6	10	2	0
	Stand. Dev.	22.05		10.54	14.05	4.71	
	Minimum	50		68	67	93	
	Maximum	100		100	100	100	
4 Southeast	Mean	90.91	100.00	94.13	97.86	100.00	99.14
	N	77	2	38	70	8	38
	Stand. Dev.	22.55	0.00	4.77	10.20	0.00	4.21
	Minimum	0	100	79	50	100	75
	Maximum	100	100	100	100	100	100
5 Midwest	Mean	96.43		100.00	100.00	100.00	
	N	14	0	4	8	2	0
	Stand. Dev.	13.96		0.00	0.00	0.00	
	Minimum	0		100	100	100	
	Maximum	100		100	100	100	
6 Great Plains	Mean	86.84		93.97	100.00	100.00	
	N	19	0	4	21	1	0
	Stand. Dev.	22.62		7.60	0.00		
	Minimum	0		84	100	100	
	Maximum	100		100	100	100	
7 Southwest	Mean	99.71	99.71	96.65	96.88	99.43	95.08
	N	72	11	58	80	37	63
	Stand. Dev.	26.05	0.97	5.62	12.18	2.42	10.44
	Minimum	0	97	77	50	89	50
	Maximum	100	100	100	100	100	100
8 Rocky Mountains	Mean	87.50	93.33	100.00	100.00	92.31	
	N	4	1	1	1	1	0
	Stand. Dev.	25.00					
	Minimum	50	93	100	100	92	
	Maximum	100	93	100	100	92	
9 Pacific	Mean	100.00	43.32	98.54	100.00	97.50	100.00
	N	71	23	16	60	20	51
	Stand. Dev.	0.00	50.51	3.40	0.00	11.18	0.00
	Minimum	100	0	89	100	50	100
	Maximum	100	100	100	100	100	100
10 Northwest	Mean	91.67	96.00	96.91	100.00	91.67	85.83
	N	6	2	3	9	2	4
	Stand. Dev.	20.41	5.66	2.83	0.00	0.00	18.93
	Minimum	50	92	94	100	92	60
	Maximum	100	100	100	100	92	100
Total	Mean	93.33	66.12	95.71	97.66	98.62	97.44
	N	300	39	131	264	74	156
	Stand. Dev.	20.17	47.39	5.83	11.25	6.22	7.96
	Minimum	0	0	68	0	50	50
	Maximum	100	100	100	100	100	100

Table B8b. Mean Plan Conformance Levels by Geographic Region (Dwelling Units n=988) (continued)

REGION*		**Curb Ramps**	Clearance and Reach	Usable Doors	Accessible Route	**Access to Obstructed Switches**	Height of Switches and Controls
	Eta-squared	0.13	0.03	0.17	0.02	0.54	0.02
1 New England	Mean						
	N	0	0	0	0	0	0
	Stand. Dev.						
	Minimum						
	Maximum						
2 New York/New Jersey	Mean	80.00	100.00	95.00	96.30		93.33
	N	6	10	5	9	0	20
	Stand. Dev.	30.98	0.00	5.00	11.11		20.52
	Minimum	40	100	90	67		33
	Maximum	100	100	100	100		100
3 Mid-Atlantic	Mean	89.58	100.00	86.49	100.00	100.00	75.00
	N	8	16	6	13	5	4
	Stand. Dev.	29.46	0.00	10.70	0.00	0.00	50.00
	Minimum	17	100	65	100	100	0
	Maximum	100	100	95	100	100	100
4 Southeast	Mean	98.75	97.41	98.25	97.76	100.00	87.50
	N	40	59	9	52	9	40
	Stand. Dev.	7.91	11.08	5.26	11.45	0.00	21.93
	Minimum	50	50	84	33	100	50
	Maximum	100	100	100	100	100	100
5 Midwest	Mean	96.79	100.00		98.04	100.00	93.75
	N	13	17	0	17	4	8
	Stand. Dev.	8.01	0.00		8.08	0.00	17.68
	Minimum	75	100		67	100	50
	Maximum	100	100		100	100	100
6 Great Plains	Mean	94.86	100.00	87.38	100.00	100.00	89.29
	N	23	32	4	28	7	14
	Stand. Dev.	8.97	0.00	7.57	0.00	0.00	21.29
	Minimum	75	100	78	100	100	50
	Maximum	100	100	94	100	100	100
7 Southwest	Mean	97.68	96.10	96.53	97.25	100.00	85.28
	N	76	77	58	100	82	103
	Stand. Dev.	7.86	13.49	8.06	12.26	0.00	25.81
	Minimum	43	50	67	25	100	0
	Maximum	100	100	100	100	100	100
8 Rocky Mountains	Mean	80.00	100.00	100.00	100.00	100.00	100.00
	N	1	5	1	5	1	1
	Stand. Dev.		0.00		0.00		
	Minimum	80	100	100	100	100	100
	Maximum	80	100	100	100	100	100
9 Pacific	Mean	100.00	99.19	98.74	100.00	100.00	86.15
	N	51	62	16	62	51	65
	Stand. Dev.	0.00	6.35	3.56	0.00	0.00	27.25
	Minimum	100	50	88	100	100	0
	Maximum	100	100	100	100	100	100
10 Northwest	Mean	94.44	100.00	95.77	98.44	72.62	97.44
	N	6	9	5	16	14	13
	Stand. Dev.	8.61	0.00	4.12	6.25	24.98	9.25
	Minimum	83	100	91	75	25	67
	Maximum	100	100	100	100	100	100
Total	Mean	97.13	98.26	96.01	98.40	97.78	87.38
	N	224	287	104	302	173	268
	Stand. Dev.	10.39	9.19	7.68	9.05	10.16	24.68
	Minimum	17	50	65	25	25	0
	Maximum	100	100	100	100	100	100

Table B8b. Mean Plan Conformance Levels by Geographic Region (Dwelling Units n=988) (continued)

REGION*		Grab Bars	Wheelchair Mobility in Bath	Usability of Appliances and Fixtures	Clear Spaces in Bath and Kitchen
	Eta-squared	0.20	0.19	0.22	0.15
1 New England	Mean	100.00	63.89	100.00	75.00
	N	3	2	4	3
	Stand. Dev.	0.00	19.64	0.00	0.00
	Minimum	100	50	100	75
	Maximum	100	78	100	75
2 New York/New Jersey	Mean	100.00	66.23	80.02	89.68
	N	77	59	108	42
	Stand. Dev.	0.00	27.49	21.39	10.66
	Minimum	100	0	20	75
	Maximum	100	100	100	100
3 Mid-Atlantic	Mean	67.50	72.85	95.74	80.00
	N	32	34	45	5
	Stand. Dev.	38.79	30.55	11.60	27.39
	Minimum	0	9	50	50
	Maximum	100	100	100	100
4 Southeast	Mean	94.59	70.73	98.14	87.07
	N	69	109	122	29
	Stand. Dev.	18.59	31.49	6.23	17.19
	Minimum	0	0	60	50
	Maximum	100	100	100	100
5 Midwest	Mean	83.21	82.83	84.13	70.67
	N	54	13	84	15
	Stand. Dev.	35.93	15.44	17.72	23.06
	Minimum	0	44	20	25
	Maximum	100	100	100	100
6 Great Plains	Mean	85.71	81.02	90.90	79.23
	N	49	41	74	13
	Stand. Dev.	32.63	24.60	13.16	30.33
	Minimum	0	18	50	25
	Maximum	100	100	100	100
7 Southwest	Mean	60.00	96.28	96.12	85.49
	N	99	96	103	51
	Stand. Dev.	48.32	6.26	19.41	24.97
	Minimum	0	77	0	0
	Maximum	100	100	100	100
8 Rocky Mountains	Mean	62.50	47.22	77.08	100.00
	N	8	4	24	1
	Stand. Dev.	51.75	54.72	19.09	
	Minimum	0	0	25	100
	Maximum	100	100	100	100
9 Pacific	Mean	100.00	89.85	100.00	98.19
	N	66	74	75	36
	Stand. Dev.	0.00	27.13	0.00	7.76
	Minimum	100	0	100	60
	Maximum	100	100	100	100
10 Northwest	Mean	83.14	95.09	100.00	96.79
	N	17	15	24	14
	Stand. Dev.	35.36	13.14	0.00	8.23
	Minimum	0	50	100	75
	Maximum	100	100	100	100
Total	Mean	84.04	80.82	91.65	87.83
	N	472	447	664	209
	Stand. Dev.	34.77	27.65	16.69	19.65
	Minimum	0	0	0	0
	Maximum	100	100	100	100

* Significant regional differences (p<.01) in conformance measures are indicated in bold type.

Table B9. Field Conformance on all Measures, Rank Ordered by Regional Conformance Level (Projects n=397)

	Building Entrance		Elevators		**Public-Accessible Routes**		**Safety Features of Accessible Routes**	
	0.04		0.12		**0.26***		**0.07***	
	Region	**Confor-mance**	**Region**	**Confor-mance**	**Region**	**Confor-mance**	**Region**	**Confor-mance**
Mean	All Regions	91.69	All Regions	91.26	All Regions	89.58	All Regions	91.23
N		295		132		122		345
Stand. Dev.		22.01		20.63		13.70		19.78
Mean	New England	100.00	Southeast	98.46	Southwest	95.57	Pacific	97.69
N		3		16		26		65
Stand. Dev.		0.00		4.27		9.92		10.98
Mean	NY/NJ	98.21	Southwest	97.71	Midwest	94.12	Southeast	94.31
N		28		6		2		60
Stand. Dev.		9.45		4.24		8.32		14.76
Mean	Midwest	96.97	Northwest	96.51	Pacific	93.85	Southwest	93.80
N		28		14		27		43
Stand. Dev.		13.11		4.98		12.14		15.86
Mean	Northwest	94.57	Rocky Mtns.	95.59	Southeast	92.65	Northwest	93.01
N		23		6		28		31
Stand. Dev.		14.99		2.74		6.65		16.54
Mean	Pacific	93.33	Mid-Atlantic	94.87	Northwest	89.24	Great Plains	91.00
N		70		8		10		29
Stand. Dev.		22.41		2.68		9.65		18.27
Mean	Southeast	90.00	Midwest	93.86	NY/NJ	82.34	New England	87.50
N		60		20		6		4
Stand. Dev.		21.24		6.45		9.97		25.00
Mean	Southwest	88.46	NY/NJ	93.63	Mid-Atlantic	82.10	Mid-Atlantic	86.87
N		39		22		8		22
Stand. Dev.		29.16		4.91		14.87		26.92
Mean	Mid-Atlantic	86.67	Great Plains	93.41	Rocky Mtns.	80.70	NY/NJ	85.63
N		15		7		5		29
Stand. Dev.		29.68		5.68		15.81		30.45
Mean	Rocky Mtns.	85.00	New England	84.13	Great Plains	71.90	Midwest	84.00
N		10		2		9		50
Stand. Dev.		24.15		2.94		26.00		23.56
Mean	Great Plains	83.77	Pacific	78.75	New England	66.67	Rocky Mtns.	80.56
N		19		31		1		12
Stand. Dev.		28.11		39.39				24.45

Table B9. Field Conformance on all Measures, Rank Ordered by Regional Conformance Level (Projects n=397) (continued)

	Public Facilities		**Ramps and Obstructions**		**Curb Ramps**		Clearance and Reach	
	0.19*		**0.20***		**0.19***		0.06	
	Region	**Confor-mance**	**Region**	**Confor-mance**	**Region**	**Confor-mance**	**Region**	**Confor-mance**
Mean	All Regions	93.25	All Regions	94.51	All Regions	92.17	All Regions	93.81
N		172		120		250		337
Stand. Dev.		11.74		13.38		15.57		19.15
Mean	Rocky Mtns.	97.50	Mid-Atlantic	100.00	New England	100.00	New England	100.00
N		4		1		1		3
Stand. Dev.		5.00						0.00
Mean	Pacific	97.03	Pacific	98.82	Southeast	97.19	Northwest	98.28
N		33		41		35		29
Stand. Dev.		9.05		5.02		7.67		9.28
Mean	Southwest	96.04	Southwest	94.29	Pacific	96.60	Pacific	98.09
N		25		31		49		61
Stand. Dev.		13.54		11.74		9.06		9.18
Mean	NY/NJ	95.42	Southeast	93.12	Southwest	96.30	Rocky Mtns.	96.87
N		21		31		38		16
Stand. Dev.		5.43		17.02		10.61		12.50
Mean	Great Plains	94.09	NY/NJ	90.00	Great Plains	93.65	Great Plains	96.76
N		8		4		26		27
Stand. Dev.		7.30		14.14		9.92		16.84
Mean	Midwest	93.32	Great Plains	90.00	Northwest	91.30	Southwest	96.25
N		30		2		13		40
Stand. Dev.		8.19		14.14		18.67		13.34
Mean	Southeast	92.64	Midwest	80.00	NY/NJ	90.09	NY/NJ	95.59
N		26		1		29		34
Stand. Dev.		8.52				13.97		14.40
Mean	Northwest	92.18	Northwest	79.18	Midwest	89.80	Mid-Atlantic	95.45
N		9		8		30		22
Stand. Dev.		10.08		18.67		16.26		14.71
Mean	Mid-Atlantic	78.27	Rocky Mtns.	60.00	Rocky Mtns.	86.30	Southeast	87.21
N		16		1		9		61
Stand. Dev.		20.78				16.45		26.84
Mean	New England	NA	New England	NA	Mid-Atlantic	72.14	Midwest	86.36
N		0		0		20		44
Stand. Dev.						29.94		29.26

Table B9. Field Conformance on all Measures, Rank Ordered by Regional Conformance Level (Projects n=397) (continued)

	Usable Doors		Accessible Route		**Access to Obstructed Switches**		**Height of Switches and Controls**	
	0.17*		0.06		**0.22***		**0.13***	
	Region	**Confor-mance**	**Region**	**Confor-mance**	**Region**	**Confor-mance**	**Region**	**Confor-mance**
Mean	All Regions	89.72	All Regions	95.36	All Regions	88.58	All Regions	72.21
N		206		298		179		349
Stand. Dev.		12.74		13.17		27.29		29.01
Mean	Pacific	97.76	New England	100.00	NY/NJ	100.00	Pacific	85.75
N		32		6		2		62
Stand. Dev.		4.73		0.00		0.00		22.09
Mean	Southwest	96.19	Pacific	99.35	Southeast	100.00	Southwest	84.59
N		33		61		14		43
Stand. Dev.		8.14		4.33		0.00		27.16
Mean	New England	92.59	Southeast	98.53	Pacific	98.64	New England	79.63
N		3		49		49		4
Stand. Dev.		12.83		5.64		9.52		25.00
Mean	Southeast	88.15	Rocky Mtns.	95.83	Southwest	97.06	Great Plains	76.75
N		27		10		34		30
Stand. Dev.		14.78		9.00		17.15		32.76
Mean	NY/NJ	88.14	Northwest	95.83	Great Plains	88.97	Southeast	72.84
N		26		28		18		56
Stand. Dev.		7.79		10.52		24.38		27.35
Mean	Great Plains	86.93	Southwest	94.26	Rocky Mtns.	84.38	Northwest	65.10
N		18		37		8		32
Stand. Dev.		13.78		17.33		35.20		27.96
Mean	Midwest	86.19	Great Plains	93.94	Mid-Atlantic	83.04	Mid-Atlantic	63.33
N		32		22		14		20
Stand. Dev.		16.46		13.16		22.79		36.01
Mean	Northwest	85.52	NY/NJ	92.20	Northwest	69.75	NY/NJ	62.33
N		11		29		27		32
Stand. Dev.		13.07		14.61		35.65		27.08
Mean	Rocky Mtns.	82.37	Midwest	91.10	Midwest	61.54	Midwest	62.17
N		9		41		13		55
Stand. Dev.		13.47		20.53		50.64		27.16
Mean	Mid-Atlantic	81.77	Mid-Atlantic	90.28	New England		Rocky Mtns.	52.22
N		15		18		0		15
Stand. Dev.		13.06		16.73				26.63

Table B9. Field Conformance on all Measures, Rank Ordered by Regional Conformance Level (Projects n=397) (continued)

	Grab Bars		**Wheelchair Mobility in Bath**		**Usability of Appliances and Fixtures**		Clear Spaces in Bath and Kitchen	
	0.20*		**0.10***		**0.17***		0.13	
	Region	**Confor-mance**	**Region**	**Confor-mance**	**Region**	**Confor-mance**	**Region**	**Confor-mance**
Mean	All Regions	72.44	All Regions	79.24	All Regions	92.56	All Regions	84.03
N		325		245		341		155
Stand. Dev.		39.05		29.15		14.98		24.02
Mean	Pacific	94.12	Southwest	91.29	Pacific	98.85	Northwest	93.33
N		60		39		63		13
Stand. Dev.		20.23		20.22		4.50		10.61
Mean	NY/NJ	93.91	Mid-Atlantic	84.00	Southeast	97.69	New England	93.25
N		31		15		55		3
Stand. Dev.		21.44		24.29		5.17		11.68
Mean	Southeast	81.00	Great Plains	82.74	Northwest	97.58	NY/NJ	90.21
N		54		20		31		17
Stand. Dev.		27.93		19.60		5.35		11.83
Mean	New England	75.00	Pacific	82.42	Southwest	95.36	Pacific	90.08
N		4		60		42		31
Stand. Dev.		31.91		33.00		19.20		17.39
Mean	Great Plains	73.58	Midwest	81.63	New England	95.00	Southeast	89.22
N		27		5		4		25
Stand. Dev.		36.06		10.87		10.00		16.10
Mean	Northwest	66.77	Northwest	78.83	Mid-Atlantic	91.72	Great Plains	84.58
N		24		26		20		12
Stand. Dev.		40.74		24.86		15.47		25.33
Mean	Mid-Atlantic	62.58	Southeast	74.45	Great Plains	89.71	Southwest	77.41
N		20		51		29		27
Stand. Dev.		44.79		30.38		13.77		35.99
Mean	Southwest	60.49	NY/NJ	64.26	NY/NJ	84.89	Midwest	73.81
N		41		22		33		15
Stand. Dev.		48.47		30.89		17.58		26.71
Mean	Rocky Mtns.	52.38	New England	50.00	Rocky Mtns.	83.23	Mid-Atlantic	64.58
N		14		1		14		6
Stand. Dev.		46.62				17.87		27.86
Mean	Midwest	45.11	Rocky Mtns.	45.77	Midwest	83.03	Rocky Mtns.	62.50
N		50		4		50		6
Stand. Dev.		40.72		42.93		20.41		26.22

* Significant regional differences ($p < .01$) observed for field composite conformance measures are indicated in bold type.

Table B10. Model 1. Regression of Composite Conformance Measures for Completed Buildings on Elevator

Composite Conformance Measure	Adj. R-sq.	F	df1	df2	p	beta	Sig.
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	.02	9.44	1	489	.00	-.14	*
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	.76	478.96	1	148	.00	-.87	*
Public Accessible Routes (27 items)	-.00	0.75	1	196	.39	-.06	
Safety Features of Accessible Routes (6 items)	-.00	0.14	1	549	.71	.02	
Public Facilities (18 items)	-.00	0.24	1	184	.62	-.04	
Ramps and Obstructions (19 items)	.00	0.02	1	203	.90	.01	
Curb Ramps (6 items)	-.00	0.03	1	421	.87	.01	
Clearance and Reach (5 items)	-.00	0.27	1	545	.60	.02	
Requirement 3: Usable Doors							
Usable Doors (37 items)	.01	4.67	1	260	.03	-.13	*
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)	-.00	0.59	1	606	.44	.03	
Requirement 5: Light switches, electrical outlets, and thermostats							
Access to Obstructed Switches (5 items)	.01	5.74	1	324	.02	.13	*
Height of Switches and Controls (3 items)	.00	1.22	1	709	.27	.04	
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	.01	7.56	1	655	.01	-.11	*
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)	.01	3.51	1	504	.06	.08	
Usability of Appliances and Fixtures (6 items)	.01	10.27	1	697	.00	.12	*
Clear Spaces in Kitchen and Bath (7 items)	.04	13.73	1	280	.00	-.22	*

Table B11. Models 2 and 3. Regression of Composite Conformance Measures for Completed Buildings on Control Variables and Elevator

Step 1: Controls

Composite Conformance Measure	R-sq. change	F	df1	df2	p
Requirement 1: Accessible building entrance on an accessible route					
Building Entrance (2 items)	0.06	2.46	11	398	.01
Requirement 2: Accessible and usable public and common use areas					
Elevators (31 items)	0.26	4.16	11	132	.00
Public Accessible Routes (27 items)					
Safety Features of Accessible Routes (6 items)					
Public Facilities (18 items)					
Ramps and Obstructions (19 items)					
Curb Ramps (6 items)					
Clearance and Reach (5 items)					
Requirement 3: Usable Doors					
Usable Doors (37 items)	0.21	5.57	11	238	.00
Requirement 4: Accessible route into and through unit					
Accessible Route (5 items)					
Requirement 5: Light switches, electrical outlets, and thermostats					
Access to Obstructed Switches (5 items)	0.27	11.73	10	311	.00
Height of Switches and Controls (3 items)					
Requirement 6: Reinforced walls for grab bars in units					
Grab Bars (5 items)	0.18	12.38	11	632	.00
Requirement 7: Usable kitchens and bathrooms in units					
Wheelchair Mobility in Bath (15 items)					
Usability of Appliances and Fixtures (6 items)	0.16	11.38	11	673	.00
Clear Spaces in Kitchen and Bath (7 items)	0.15	3.10	11	194	.00

NOTE: Models 2 and 3 were only tested for those composite conformance measures that showed a significant impact for Elevator in Model 1 (as shown in Table 11). Control variables were Building Size, Region, and Age of Building.

Table B11. Models 2 and 3. Regression of Composite Conformance Measures for Completed Buildings on Control Variables and Elevators (continued)

Step 2: Elevator

Composite Conformance Measure	R-sq. change	F	df1	df2	p	beta	Sig.
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	0.01	3.95	1	397	.05	.05	*
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	0.53	317.8	1	131	.00	-.84	*
Public Accessible Routes (27 items)							
Safety Features of Accessible Routes (6 items)							
Public Facilities (18 items)							
Ramps and Obstructions (19 items)							
Curb Ramps (6 items)							
Clearance and Reach (5 items)							
Requirement 3: Usable Doors							
Usable Doors (37 items)	0.01	4.18	1	237	.04	-.16	*
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)							
Requirement 5: Light switches, electrical outlets, and thermostats							
Access to Obstructed Switches (5 items)	0.01	3.96	1	310	.05	.13	*
Height of Switches and Controls (3 items)							
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	0.00	0.02	1	631	.90	.01	
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)							
Usability of Appliances and Fixtures (6 items)	0.00	2.13	1	672	.15	.07	
Clear Spaces in Kitchen and Bath (7 items)	0.02	4.87	1	193	.03	-.21	*

NOTE: Models 2 and 3 were only tested for those composite conformance measures that showed a significant impact for Elevator in Model 1 (as shown in Table 11). Control variables were Building Size, Region, and Age of Building.

Table B12. Model 1. Regression of Composite Conformance Measures for Completed Buildings on Building Size (Number of Units)

Composite Conformance Measure	Adj. R sq.	F	df1	df2	p	beta	Sig.
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	.01	7.00	1	411	.01	.13	*
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	.09	15.83	1	143	.00	.32	*
Public Accessible Routes (27 items)	.02	4.60	1	169	.03	.16	*
Safety Features of Accessible Routes (6 items)	-.00	.58	1	466	.45	-.04	
Public Facilities (18 items)	-.00	.71	1	134	.40	.07	
Ramps and Obstructions (19 items)	.00	1.50	1	162	.22	.10	
Curb Ramps (6 items)	.00	1.07	1	353	.30	.06	
Clearance and Reach (5 items)	-.00	.05	1	464	.82	-.01	
Requirement 3: Usable Doors							
Usable Doors (37 items)	.02	4.98	1	250	.03	.14	*
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)	-.00	.06	1	594	.80	.01	
Requirement 5: Light switches, electrical outlets, and thermostats							
Access to Obstructed Switches (5 items)	-.00	.06	1	321	.82	.01	
Height of Switches and Controls (3 items)	-.01	.23	1	699	.63	-.02	
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	.01	10.33	1	644	.00	.13	*
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)	-.00	.07	1	492	.79	.01	
Usability of Appliances and Fixtures (6 items)	.01	5.86	1	685	.02	-.09	*
Clear Spaces in Kitchen and Bath (7 items)	.04	11.03	1	276	.00	.20	*

Table B13. Models 2 and 3. Regression of Composite Conformance Measures for Completed Buildings on Control Variables and Building Size

Step 1: Controls

Composite Conformance Measures	R-sq. change	F	df1	df2	p
Requirement 1: Accessible building entrance on an accessible route					
Building Entrance (2 items)	.07	2.83	11	398	.00
Requirement 2: Accessible and usable public and common use areas					
Elevators (31 items)	.78	41.37	11	132	.00
Public Accessible Routes (27 items)	.40	9.56	11	158	.00
Safety Features of Accessible Routes (6 items)					
Public Facilities (18 items)					
Ramps and Obstructions (19 items)					
Curb Ramps (6 items)					
Clearance and Reach (5 items)					
Requirement 3: Usable Doors					
Usable Doors (37 items)	.21	5.84	11	238	.00
Requirement 4: Accessible route into and through unit					
Accessible Route (5 items)					
Requirement 5: Light switches, electrical outlets, and thermostats					
Access to Obstructed Switches (5 items)					
Height of Switches and Controls (3 items)					
Requirement 6: Reinforced walls for grab bars in units					
Grab Bars (5 items)	.17	11.58	11	632	.00
Requirement 7: Usable kitchens and bathrooms in units					
Wheelchair Mobility in Bath (15 items)					
Usability of Appliances and Fixtures (6 items)	.16	11.5	11	673	.00
Clear Spaces in Kitchen and Bath (7 items)	.14	4.04	11	264	.00

NOTE: Models 2 and 3 were only tested for those composite conformance measures that showed a significant impact for Building Size in Model 1 (as shown in Table 13). Control variables were Elevator, Region, and Age of Building.

Table B13. Models 2 and 3. Regression of Composite Conformance Measures for Completed Buildings on Control Variables and Building Size (continued)

Step 2: Building Size

Composite Conformance Measures	R-sq. change	F	df1	df2	p	beta	Sig.
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	.00	0.162	1	397	.69	.03	
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	.01	4.91	1	131	.03	.10	*
Public Accessible Routes (27 items)	.01	1.98	1	157	.16	.12	
Safety Features of Accessible Routes (6 items)							
Public Facilities (18 items)							
Ramps and Obstructions (19 items)							
Curb Ramps (6 items)							
Clearance and Reach (5 items)							
Requirement 3: Usable Doors							
Usable Doors (37 items)	.01	1.79	1	237	.18	.10	
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)							
Requirement 5: Light switches, electrical outlets, and thermostats							
Access to Obstructed Switches (5 items)							
Height of Switches and Controls (3 items)							
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	.01	7.37	1	631	.01	.13	*
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)							
Usability of Appliances and Fixtures (6 items)	.00	1	1	672	.32	.05	
Clear Spaces in Kitchen and Bath (7 items)	.01	1.89	1	263	.17	.11	

NOTE: Models 2 and 3 were only tested for those composite conformance measures that showed a significant impact for Building Size in Model 1 (as shown in Table 13). Control variables were Elevator, Region, and Age of Building.

Table B14. Model 1. Regression of Composite Conformance Measures for Completed Buildings on Region

Composite Conformance Measures	Adj. R sq.	F	df1	df2	p	beta*	Sig.
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	.02	2.34	9	485	.01	N/A	*
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	.20	5.00	9	140	.00	N/A	*
Public Accessible Routes (27 items)	.33	12.02	9	195	.00	N/A	*
Safety Features of Accessible Routes (6 items)	.05	3.97	9	547	.00	N/A	*
Public Facilities (18 items)	.12	4.36	8	187	.00	N/A	*
Ramps and Obstructions (19 items)	.13	5.06	8	203	.00	N/A	*
Curb Ramps (6 items)	.15	9.02	9	414	.00	N/A	*
Clearance and Reach (5 items)	.06	5.12	9	540	.00	N/A	*
Requirement 3: Usable Doors							
Usable Doors (37 items)	.16	6.34	9	252	.00	N/A	*
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)	.04	4.14	9	599	.00	N/A	*
Requirement 5: Light switches, electrical outlets, and thermostats							
Access to Obstructed Switches (5 items)	.25	14.24	8	318	.00	N/A	*
Height of Switches and Controls (3 items)	.11	11.19	9	701	.00	N/A	*
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	.15	14.01	9	645	.00	N/A	*
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)	.12	8.52	9	497	.00	N/A	*
Usability of Appliances and Fixtures (6 items)	.15	14.01	9	689	.00	N/A	*
Clear Spaces in Kitchen and Bath (7 items)	.10	4.38	9	270	.00	N/A	*

* N/A = Not Applicable. Standardized regression weights are not reported for Region because Region was represented in the regressions model(s) as a set of nine dummy-coded variables.

Table B15. Models 2 and 3. Regression of Composite Conformance Measures for Completed Buildings on Control Variables and Region

Step 1: Controls

Composite Conformance Measures	R-sq. change	F	df1	df2	p
Requirement 1: Accessible building entrance on an accessible route					
Building Entrance (2 items)	.03	4.23	3	406	.00
Requirement 2: Accessible and usable public and common use areas					
Elevators (31 items)	.76	149.56	3	140	.00
Public Accessible Routes (27 items)	.03	1.95	3	166	.12
Safety Features of Accessible Routes (6 items)	.01	1.06	3	460	.37
Public Facilities (18 items)	.02	0.77	3	132	.51
Ramps and Obstructions (19 items)	.01	0.65	3	159	.59
Curb Ramps (6 items)	.02	2.06	3	347	.11
Clearance and Reach (5 items)	.01	0.73	3	460	.53
Requirement 3: Usable Doors					
Usable Doors (37 items)	.03	2.33	3	246	.08
Requirement 4: Accessible route into and through unit					
Accessible Route (5 items)	.00	0.52	3	591	.67
Requirement 5: Light switches, electrical outlets, & thermostats					
Access to Obstructed Switches (5 items)	.03	3.49	3	318	.02
Height of Switches and Controls (3 items)	.00	0.44	3	696	.73
Requirement 6: Reinforced walls for grab bars in units					
Grab Bars (5 items)	.02	3.80	3	640	.01
Requirement 7: Usable kitchens and bathrooms in units					
Wheelchair Mobility in Bath (15 items)	.02	2.88	3	489	.04
Usability of Appliances and Fixtures (6 items)	.01	3.27	3	681	.02
Clear Spaces in Kitchen and Bath (7 items)	.05	5.19	3	272	.00

NOTES: Models 2 and 3 were only tested for those composite conformance measures that showed a significant impact for Region in Model 1 (as shown in Table 15). Control variables were Elevator, Building Size, and Age of Building. Standardized regression weights are not reported for Region because Region was represented in the regressions model(s) as a set of nine dummy-coded variables.

Table B15. Models 2 and 3. Regression of Composite Conformance Measures for Completed Buildings on Control Variables and Region (continued)

Step 2: Region

Composite Conformance Measures	R-sq. change	F	df1	df2	p	beta	Sig.
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	.04	1.86	9	397	.06	N/A	
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	.02	1.42	9	131	.19	N/A	
Public Accessible Routes (27 items)	.37	10.98	9	157	.00	N/A	*
Safety Features of Accessible Routes (6 items)	.07	3.94	9	451	.00	N/A	*
Public Facilities (18 items)	.17	3.32	8	124	.00	N/A	*
Ramps and Obstructions (19 items)	.16	3.65	8	151	.00	N/A	*
Curb Ramps (6 items)	.17	8.06	9	338	.00	N/A	*
Clearance and Reach (5 items)	.07	3.91	9	451	.00	N/A	*
Requirement 3: Usable Doors							
Usable Doors (37 items)	.19	6.43	9	237	.00	N/A	*
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)	.06	4.37	9	582	.00	N/A	*
Requirement 5: Light switches, electrical outlets, & thermostats							
Access to Obstructed Switches (5 items)	.25	13.57	8	310	.00	N/A	*
Height of Switches and Controls (3 items)	.13	11.54	9	687	.00	N/A	*
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	.16	13.62	9	631	.00	N/A	*
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)	.14	8.70	9	480	.04	N/A	*
Usability of Appliances and Fixtures (6 items)	.15	12.90	9	672	.02	N/A	*
Clear Spaces in Kitchen and Bath (7 items)	.10	3.30	9	263	.00	N/A	*

NOTES: Models 2 and 3 were only tested for those composite conformance measures that showed a significant impact for Region in Model 1 (as shown in Table 15). Control variables were Elevator, Building Size, and Age of Building. Standardized regression weights are not reported for Region because Region was represented in the regressions model(s) as a set of nine dummy-coded variables.

Table B16. Model 1. Regression of Composite Conformance Measures for Completed Buildings on Age of Building (Year of Occupancy)

Composite Conformance Measure	Adj. R sq.	F	df1	df2	p	beta	Sig.
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	.00	1.59	1	503	.21	-.06	
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	.03	6.17	1	150	.01	.20	*
Public Accessible Routes (27 items)	.01	3.24	1	203	.07	-.13	
Safety Features of Accessible Routes (6 items)	.02	10.06	1	566	.00	-.13	*
Public Facilities (18 items)	.01	2.94	1	196	.09	-.12	
Ramps and Obstructions (19 items)	.00	0.95	1	210	.33	-.07	
Curb Ramps (6 items)	.01	4.11	1	432	.04	-.10	*
Clearance and Reach (5 items)	.00	1.54	1	558	.22	.05	
Requirement 3: Usable Doors							
Usable Doors (37 items)	-.00	0.07	1	261	.80	.02	
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)	-.00	0.06	1	608	.80	.01	
Requirement 5: Light switches, electrical outlets, & thermostats							
Access to Obstructed Switches (5 items)	.00	0.97	1	326	.33	.05	
Height of Switches and Controls (3 items)	-.00	0.61	1	711	.43	-.03	
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	.00	2.94	1	657	.09	-.07	
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)	.00	2.32	1	505	.13	.07	
Usability of Appliances and Fixtures (6 items)	-.00	0.56	1	699	.45	.03	
Clear Spaces in Kitchen and Bath (7 items)	-.00	0.3	1	281	.58	-.03	

Table B17. Models 2 and 3. Regression of Composite Conformance Measures for Completed Buildings on Control Variables and Age of Building

Step 1: Controls

Composite Conformance Measure	R-sq. change	F	df1	df2	p
Requirement 1: Accessible building entrance on an accessible route					
Building Entrance (2 items)					
Requirement 2: Accessible and usable public and common use areas					
Elevators (31 items)	.78	43.36	11	132	.00
Public Accessible Routes (27 items)					
Safety Features of Accessible Routes (6 items)	.07	3.25	11	452	.00
Public Facilities (18 items)					
Ramps and Obstructions (19 items)					
Curb Ramps (6 items)	.17	6.38	11	339	.00
Clearance and Reach (5 items)					
Requirement 3: Usable Doors					
Usable Doors (37 items)					
Requirement 4: Accessible route into and through unit					
Accessible Route (5 items)					
Requirement 5: Light switches, electrical outlets, & thermostats					
Access to Obstructed Switches (5 items)					
Height of Switches and Controls (3 items)					
Requirement 6: Reinforced walls for grab bars in units					
Grab Bars (5 items)					
Requirement 7: Usable kitchens and bathrooms in units					
Wheelchair Mobility in Bath (15 items)					
Usability of Appliances and Fixtures (6 items)					
Clear Spaces in Kitchen and Bath (7 items)					

NOTE: Models 2 and 3 were only tested for those composite conformance measures that showed a significant impact for Age of Building in Model 1 (as shown in Table 17). Control variables were Elevator, Building Size, and Region.

Table B17. Models 2 and 3. Regression of Composite Conformance Measures for Completed Buildings on Control Variables and Age of Building (continued)

Step 2: Age of Building

Composite Conformance Measure	R-sq. change	F	df1	df2	p	beta	Sig.
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)							
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	.00	0.01	1	131	.91	-.01	
Public Accessible Routes (27 items)							
Safety Features of Accessible Routes (6 items)	.01	2.95	1	451	.09	-.08	
Public Facilities (18 items)							
Ramps and Obstructions (19 items)							
Curb Ramps (6 items)	.02	8.2	1	338	.00	-.15	*
Clearance and Reach (5 items)							
Requirement 3: Usable Doors							
Usable Doors (37 items)							
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)							
Requirement 5: Light switches, electrical outlets, & thermostats							
Access to Obstructed Switches (5 items)							
Height of Switches and Controls (3 items)							
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)							
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)							
Usability of Appliances and Fixtures (6 items)							
Clear Spaces in Kitchen and Bath (7 items)							

NOTE: Models 2 and 3 were only tested for those composite conformance measures that showed a significant impact for Age of Building in Model 1 (as shown in Table 17). Control variables were Elevator, Building Size, and Region.

Table B18. Summary of Regressions for All Composite Conformance Measures of Field Conformance

Composite Conformance Measure	R	R Square	Adjusted R Square	F	df1	df2	p-value
Requirement 1: Accessible building entrance on an accessible route							
Building Entrance (2 items)	0.270	0.073	0.045	2.60	12	397	0.002
Requirement 2: Accessible and usable public and common use areas							
Elevators (31 items)	0.885	0.783	0.763	39.45	12	131	0.000
Public Accessible Routes (27 items)	0.638	0.407	0.362	8.99	12	157	0.000
Safety Features of Accessible Routes (6 items)	0.282	0.079	0.055	3.24	12	451	0.000
Public Facilities (18 items)	0.437	0.191	0.119	2.65	11	124	0.004
Ramps and Obstructions (19 items)	0.415	0.172	0.112	2.85	11	151	0.002
Curb Ramps (6 items)	0.437	0.191	0.162	6.65	12	338	0.000
Clearance and Reach (5 items)	0.277	0.077	0.052	3.13	12	451	0.000
Requirement 3: Usable Doors							
Usable Doors (37 items)	0.467	0.218	0.179	5.52	12	237	0.000
Requirement 4: Accessible route into and through unit							
Accessible Route (5 items)	0.256	0.066	0.046	3.41	12	582	0.000
Requirement 5: Light switches, electrical outlets, & thermostats							
Access to Obstructed Switches (5 items)	0.532	0.283	0.258	11.12	11	310	0.000
Height of Switches and Controls (3 items)	0.365	0.133	0.118	8.78	12	687	0.000
Requirement 6: Reinforced walls for grab bars in units							
Grab Bars (5 items)	0.421	0.177	0.162	11.33	12	631	0.000
Requirement 7: Usable kitchens and bathrooms in units							
Wheelchair Mobility in Bath (15 items)	0.394	0.155	0.134	7.34	12	480	0.000
Usability of Appliances and Fixtures (6 items)	0.399	0.159	0.134	10.62	12	672	0.000
Clear Spaces in Kitchen and Bath (7 items)	0.388	0.150	0.111	3.87	12	263	0.000

NOTE: Predictors included in model: Elevator, Building Size, Region, Age of Building.

Table B19. Prediction of Field Composite Conformance Measures: Standardized Regression Weights (Beta) for All Predictors in Full Model[a]

[a] Significant beta weights ($p < .05$) in the full model for each composite conformance measure are highlighted.

			Predictors											
					Region									
Composite Conformance Measure		**(Constant)**	**Elevator**	**Building Size**	DUM1	DUM2	DUM3	DUM4	DUM5	DUM6	DUM7	DUM8	DUM9	**Age of Building**
Requirement 1: Accessible building entrance on an accessible route														
Building Entrance (2 items)	Beta		-0.13	0.03	0.04	0.06	-0.07	-0.02	0.04	-0.15	-0.05	-0.06	0.00	-0.07
	t	13.20	-1.99	0.40	0.72	0.73	-1.09	-0.19	0.53	-2.24	-0.55	-1.05	-0.04	-1.30
	Sig.	0.00	0.05	0.69	0.47	0.47	0.28	0.85	0.60	0.03	0.58	0.30	0.97	0.19
Requirement 2: Accessible and usable public and common use areas														
Elevators (31 items)	Beta		-0.84	0.10	-0.07	-0.07	-0.03	0.06	-0.07	-0.03	0.02	-0.02	-0.05	-0.01
	t	26.70	-17.83	2.22	-1.66	-1.15	-0.69	1.05	-1.21	-0.64	0.45	-0.47	-0.70	-0.12
	Sig.	0.00	0.00	0.03	0.10	0.25	0.50	0.30	0.23	0.53	0.65	0.64	0.49	0.91
Public Accessible Routes (27 items)	Beta		-0.10	0.12	-0.16	-0.12	-0.12	0.10	-0.01	-0.45	0.22	-0.13	0.07	-0.08
	t	14.22	-1.13	1.41	-2.33	-1.64	-1.50	0.80	-0.12	-4.91	1.85	-1.73	0.66	-1.25
	Sig.	0.00	0.26	0.16	0.02	0.10	0.13	0.42	0.90	0.00	0.07	0.09	0.51	0.21
Safety Features of Accessible Routes (6 items)	Beta		-0.03	-0.01	0.00	-0.10	-0.06	0.09	-0.13	-0.05	0.06	-0.10	0.11	-0.08
	t	16.62	-0.49	-0.16	0.06	-1.64	-1.04	1.07	-1.80	-0.70	0.74	-1.83	1.41	-1.72
	Sig.	0.00	0.63	0.87	0.95	0.10	0.30	0.28	0.07	0.48	0.46	0.07	0.16	0.09
Public Facilities (18 items)	Beta		0.00	0.05		-0.08	-0.39	-0.05	-0.10	-0.04	0.07	0.03	0.08	-0.07
	t	17.06	-0.01	0.49		-0.49	-2.47	-0.39	-0.53	-0.30	0.37	0.31	0.53	-0.88
	Sig.	0.00	0.99	0.63		0.63	0.01	0.70	0.59	0.76	0.71	0.76	0.60	0.38
Ramps and Obstructions (19 items)	Beta		0.07	0.14		0.07	0.13	0.21	-0.02	0.04	0.39	-0.14	0.56	0.01
	t	10.03	0.77	1.52		0.76	1.55	1.17	-0.19	0.44	2.16	-1.72	3.09	0.19
	Sig.	0.00	0.45	0.13		0.45	0.12	0.24	0.85	0.66	0.03	0.09	0.00	0.85
Curb Ramps (6 items)	Beta		0.01	0.13	0.02	-0.20	-0.38	-0.02	-0.12	-0.07	0.03	-0.14	0.02	-0.15
	t	17.16	0.13	1.96	0.33	-2.34	-5.07	-0.19	-1.45	-0.83	0.34	-2.22	0.15	-2.86
	Sig.	0.00	0.90	0.05	0.74	0.02	0.00	0.85	0.15	0.41	0.73	0.03	0.88	0.00
Clearance and Reach (5 items)	Beta		0.03	0.02	0.00	-0.04	-0.03	-0.21	-0.27	-0.09	-0.07	-0.02	-0.01	0.06
	t	13.37	0.46	0.40	0.05	-0.50	-0.58	-2.50	-3.77	-1.36	-0.87	-0.36	-0.07	1.33
	Sig.	0.00	0.64	0.69	0.96	0.62	0.56	0.01	0.00	0.18	0.39	0.72	0.94	0.18
Requirement 3: Usable Doors														
Usable Doors (37 items)	Beta		-0.16	0.10	0.07	0.06	-0.03	0.14	0.04	0.04	0.44	-0.03	0.33	0.02
	t	17.80	-2.04	1.34	1.04	0.58	-0.29	1.23	0.37	0.36	3.38	-0.40	3.04	0.35
	Sig.	0.00	0.04	0.18	0.30	0.56	0.77	0.22	0.71	0.72	0.00	0.69	0.00	0.73
Requirement 4: Accessible route into and through unit														
Accessible Route (5 items)	Beta		0.04	0.10	0.04	-0.14	-0.09	0.08	-0.08	0.00	0.05	0.01	0.12	-0.01
	t	23.41	0.73	1.84	0.99	-2.26	-1.77	1.19	-1.31	0.04	0.77	0.12	1.76	-0.19
	Sig.	0.00	0.47	0.07	0.32	0.02	0.08	0.24	0.19	0.97	0.44	0.90	0.08	0.85

Table B19. Prediction of Field Composite Conformance Measures: Standardized Regression Weights (Beta) for All Predictors in Full Model (continued)

			Predictors											
					Region									
Composite Conformance Measure		**(Constant)**	**Elevator**	**Building Size**	DUM1	DUM2	DUM3	DUM4	DUM5	DUM6	DUM7	DUM8	DUM9	**Age of Building**
Requirement 5: Light switches, electrical outlets, and thermostats														
Access to Obstructed Switches (5 items)	Beta		0.13	0.13		0.13	0.05	0.25	-0.18	0.15	0.42	0.07	0.42	0.09
	t	6.13	1.99	2.11		2.66	0.93	4.25	-3.15	2.32	5.60	1.24	5.71	1.79
	Sig.	0.00	0.05	0.04		0.01	0.35	0.00	0.00	0.02	0.00	0.22	0.00	0.07
Height of Switches and Controls (3 items)	Beta		0.00	0.10	0.04	-0.10	-0.03	0.05	-0.07	0.10	0.22	-0.12	0.23	-0.01
	t	9.47	0.06	2.02	1.07	-1.76	-0.69	0.83	-1.30	1.79	3.81	-2.79	3.91	-0.40
	Sig.	0.00	0.95	0.04	0.29	0.08	0.49	0.41	0.19	0.07	0.00	0.01	0.00	0.69
Requirement 6: Reinforced walls for grab bars in units														
Grab Bars (5 items)	Beta		0.01	0.13	0.06	0.16	-0.05	0.12	-0.20	0.08	-0.07	-0.03	0.25	0.00
	t	6.07	0.12	2.71	1.52	2.48	-1.07	1.77	-3.13	1.40	-1.04	-0.67	3.72	0.08
	Sig.	0.00	0.90	0.01	0.13	0.01	0.29	0.08	0.00	0.16	0.30	0.50	0.00	0.94
Requirement 7: Usable kitchens and bathrooms in units														
Wheelchair Mobility in Bath (15 items)	Beta		0.13	0.21	-0.05	-0.23	0.03	-0.12	0.01	0.01	0.18	-0.13	0.08	0.05
	t	7.54	2.20	3.61	-1.16	-3.59	0.64	-1.64	0.27	0.15	2.58	-2.86	1.09	1.21
	Sig.	0.00	0.03	0.00	0.25	0.00	0.52	0.10	0.79	0.88	0.01	0.00	0.27	0.23
Usability of Appliances and Fixtures (6 items)	Beta		0.07	0.05	-0.06	-0.31	-0.08	-0.04	-0.32	-0.19	-0.07	-0.20	0.00	0.04
	t	24.29	1.46	1.00	-1.47	-5.33	-1.84	-0.63	-5.86	-3.56	-1.21	-4.67	0.04	1.09
	Sig.	0.00	0.15	0.32	0.14	0.00	0.07	0.53	0.00	0.00	0.23	0.00	0.97	0.28
Clear Spaces in Kitchen and Bath (7 items)	Beta		-0.07	0.11	-0.04	-0.08	-0.20	-0.12	-0.25	-0.14	-0.24	-0.21	-0.06	-0.04
	t	12.39	-0.90	1.37	-0.56	-0.79	-2.95	-1.33	-3.17	-1.78	-2.47	-3.18	-0.62	-0.65
	Sig.	0.00	0.37	0.17	0.58	0.43	0.00	0.19	0.00	0.08	0.01	0.00	0.54	0.52

APPENDIX C: CONFORMANCE DISCUSSION REPORT AND TABLES

1. How many people does your firm/company employ?			
Contractors		Architects	
C1	75	A1	3
C2	3	A2	15
C3	50	A3	65
C4	1	A4	1
C5	150	A5	42
C6	12	A6	5
C7	7	A7	4
C8	425	A8	11
C9	50	A9	2
		A10	2
		A11	12

2. Since 1991, can you estimate the number of multifamily housing projects (4 or more attached units) that your firm/company designed/built?			
Contractors		Architects	
C1	15	A1	15
C2	3	A2	2
C3	1500	A3	75
C4	600 (estimated number of units only, not projects)	A4	12
C5	3000 (estimated number of units only, not projects)	A5	12
C6	20	A6	50
C7	5	A7	90
C8	270	A8	30
C9	36	A9	3
		A10	20
		A11	4

3. Are you familiar with the design and construction requirements of the FHA (the Act)?			
Contractors		Architects	
C1	No	A1	Yes
C2	Somewhat	A2	Yes
C3	No	A3	Yes
C4	Yes	A4	Somewhat
C5	No	A5	Yes
C6	Somewhat	A6	Yes
C7	Yes	A7	Yes
C8	Yes	A8	Yes
C9	Yes	A9	Yes
		A10	No
		A11	No

3a. Do you systematically apply the design and construction requirements of the Act to your multifamily projects?	
Architects	
A1	Yes
A2	Yes
A3	Yes
A4	Yes
A5	Only when the project is funded with money from HUD
A6	No
A7	Yes
A8	Yes
A9	Yes
A10	No
A11	No

3b. Do you perform field inspections to ensure that your projects are built as designed?	
Architects	
A1	Yes
A2	No
A3	Yes
A4	Yes
A5	Yes
A6	Sometimes
A7	Sometimes
A8	Yes
A9	Yes
A10	Yes
A11	No

3c. Do you systematically make sure that the design and construction requirements of the Act are incorporated into multifamily buildings that you build or do you rely on the architect to do that?	
Architects	
C1	No; architect's responsibility
C2	No; architect's and building department's responsibility
C3	No; developer's responsibility
C4	Yes
C5	No; architect's responsibility
C6	No; architect's responsibility
C7	No
C8	Yes
C9	No; architect's responsibility

SUMMARY OF RESPONSES

SIZE OF FIRM:

1. How many people does your firm/company employ?

   Summary of Responses:
   Contracting firms employed between 1 and 425 employees. Four firms employed less than 13 employees. Two firms employed 50 people and three firms employed 75, 150, and 425 people, respectively. The average number of total employees from contracting firms was 86.

   Architecture firms employed between 1 and 65 employees. Nine firms employed no more than 15 people. Two firms employed 42 and 65 people, respectively.

EXPERIENCE WITH MULTIFAMILY HOUSING:

2. Since 1991, can you estimate the number of multifamily housing projects (4 or more attached units) that your firm/company designed/built?

   Summary of Responses:
   One contracting firm constructed approximately 1500 multifamily housing projects since 1991. Another firm constructed 270 multifamily projects. The remaining five contractors constructed between 3 and 36 multifamily projects.

   Six architecture firms designed no more than 15 multifamily housing projects since 1991. Three firms designed no more than 50 projects and two firms designed 75 and 90 projects respectively.

FAMILIARITY WITH THE ACT:

3. Are you familiar with the design and construction requirements of the Act?

   Summary of Responses:
   Three contractors interviewed were not familiar with the design and construction requirements of the Act. Two contractors were somewhat familiar with the requirements. The remaining four said that they were familiar with the Act's accessibility requirements.

   The majority of architects interviewed, i.e., 8 out of 11, were familiar with the design and construction requirements of the Act. Two contractors were not familiar with the requirements, and one architect said that he was somewhat familiar.

3a. Do you systematically apply the design and construction requirements of the Act to your multifamily projects?

Summary of Responses:
The majority of architects, i.e., 7 out of 11, said that they do systematically apply the design and construction requirements of the Act to multifamily projects. One architect said that he applies the requirements only when the project is funded with HUD money. This architect said that he was somewhat familiar with the Act's requirements (see results of Question 3 above). Three architects do not apply the requirements to their multifamily housing projects.

3b. Do you perform field inspections to ensure that your projects are built as designed?

Summary of Responses:
Most architects, i.e., 7 out of 11, do perform field inspections to ensure that projects are built as designed. Two architects sometimes perform field inspections. Of the two, one said that he performs field inspections only if he is paid to do so. Two architects said that they do not perform field inspections to ensure that projects are built as designed.

3c. Do you systematically make sure that the design and construction requirements of the Act are incorporated into multifamily buildings that you build, or do you rely on the architect to do that?

Summary of Responses:
Two contractors said that they always make sure that the design and construction requirements of the Act are incorporated into the multifamily projects they build. Seven contractors said that they do not systematically make sure the Act's accessibility requirements are incorporated into the buildings they build. Of those, five contractors said it was the architect's responsibility to make sure that the design and construction requirements of the Act are incorporated into the plans. One of those five also suggested that building departments have a responsibility to inspect for Act compliance. A sixth respondent said that responsibility for Act compliance lies with the developer.

CAN THEY PREDICT VIOLATIONS?

4. For the most part, we have found that what was indicated on plans by architects was correctly built by builders. As we know this does not always happen, what do you think were the main areas where builders seemed to deviate from plans?

Summary of Responses:
Six contractors had responses to Question 4. Of them, four contractors predicted that contractors deviate from slope indications on plans. Two of these four suggested that contractors deviate from plans when sloping grade. The other two of these four contractors suggested that slopes of sidewalks and ramps may be a common area where contractors deviate from plans. These two contractors also said that thresholds at front doors, sizes of doors, and maneuvering clearance at doors may be an area where

contractors deviate from what is indicated on plans. One contractor said that contractors may deviate from dimensions indicated on plans. He cited an example where he was asked by a building inspector to change toilet locations because they varied from what was indicated on the plans by ¾ of an inch. One contractor, who admitted that he was not familiar with the accessibility requirements of the Act, suggested that cabinetry construction is a common area where contractors deviate from plans.

Six of 11 architects surveyed responded to Question 4. Two of them suggested that contractors deviate from plans when it comes to site issues, i.e., cross slopes and site grading. The remaining four architects suggested that contractors deviate from plans when it comes to threshold heights and heights of controls, stair construction, kitchen cabinetry, and finish materials.

RESEARCH FINDINGS:

5. Identify actual areas of noncompliance, i.e., public accessible routes, clearance and reach ranges, controls in accessible locations, grab bar reinforcement.
Why would you think these areas might be in noncompliance? Solicit reaction.

Summary of Responses:
Eight contractors responded to Question 5. One contractor said that violations of the Act are the result of the requirements not being incorporated into the building code. Another contractor suggested that the lack of knowledge about code changes and changes in the Act's accessibility requirements is the reason for noncompliance. (This contractor admits that he is unfamiliar with the Act, see response from C1, Question 3. As a result, his suggestion that Act accessibility requirements may have changed is due to his lack of knowledge about the Act.) Four contractors suggested that noncompliance is a result of architectural plans that do not correctly incorporate the design and construction requirements of the Act. They stated that contractors follow plans; if plans are not compliant with the Act, then construction cannot be expected to be compliant with the Act. Three of these contractors suggested that dimensions for heights of controls and blocking for grab bars are usually not indicated on plans. They said that controls are located at conventional heights if dimensions are not shown on plans, and blocking is usually left out completely by contractors because it is commonly not shown on plans. Two contractors suggested that contractors do not pay attention to plans and install switches, for example, in conventional locations because that is what they are used to. Two contractors said that a general lack of knowledge and ignorance about the requirements is the cause for violations of the Act, especially when it comes to the requirements for accessible routes in public and common areas and heights of controls. One contractor suggested that unusual site constraints, i.e., steep grade, may be the cause for violations identified along public accessible routes. He also suggested that sloppy workmanship and poor inspections are often the cause for noncompliance.

Nine out of 11 architects responded to Question 5. Four architects said that noncompliance is a result of contractors being used to doing things in a conventional way. These architects said that contractors often do not pay attention to what is indicated

on plans because they are accustomed to conventional construction. As a result, when plan indications for heights of controls, for example, differ from conventional heights, noncompliance may be common because the contractor is not referring to the plan when locating controls. Five architects said that noncompliance in general is due to unfamiliarity with the requirements of the Act. One of these architects suggested that there is ignorance among inspectors. One of these architects suggested that general contractors are just now becoming familiar with Act requirements. Two of these architects said that site requirements are very confusing and, as a result, sites are often non-compliant. Four architects said that site violations are the result of lack of knowledge about Act accessibility requirements among civil engineers. They said that civil engineers are often involved in the site design. As a result, any site violations of the Act are a result of ignorance among civil engineers. One architect said that noncompliance is due to a lack of consistency in enforcement of the Act across the country, i.e., architects and contractors do not get a consistent message from HUD regarding the requirements of the Act. Another architect said that violations are the result of the owner making changes that are carried out by the contractor without the architect's knowledge.

5a. Can you predict why builders sometimes deviate from what is designed by architects?

Summary of Responses:
Eight contractors responded to Question 5a. The large majority of respondents indicated that contractors sometimes vary from what is indicated on plans to save money. Two contractors said that builders do not intentionally deviate from plans. Perceived deviation is due to contractors being used to building in a conventional way, i.e., they do not pay attention to plans.

Ten out of 11 architects responded to Question 5a. The large majority said that contractors sometimes deviate from plans to save money. Two architects said that contractors deviate from plans because they lack knowledge about requirements of the Act and, as a result, they continue to build as usual. One architect cited inadequate site visits by architects as the reason for contractor deviation. Another architect suggested that deviations are due to the contractor making changes ordered by the owner without the architect's knowledge.

WHAT NEXT?

6. Can you suggest what should be done by HUD, or other agencies or organizations, to ensure that all new multifamily housing is compliant with the Act?

Summary of Responses:
Eight out of nine contractors responded to Question 6. Two contractors suggested that HUD should provide inspectors to inspect projects for compliance with the Act. Another contractor said that HUD should provide plan review services and a checklist of the requirements. One contractor said that building codes and Federal requirements for accessibility should be consolidated into one source document. One contractor suggested that architects need more education because they are the project designers and contractors

only follow what architects have designed. Another contractor said that educating the building inspector is key to compliance with the Act. Two contractors said that brochures or pamphlets with many diagrams and photographs are needed to communicate the accessibility requirements. These contractors suggested that the brochures and pamphlets contain no text, only graphics.

Two architects said that "tool box" or preconstruction meetings should clearly define what is required by the Act to all of the players involved in a covered project. One of these architects said that the meetings are necessary because the plans alone cannot be relied upon to communicate the requirements of the Act. Up-front communication is most important, especially with laborers who may not be fluent in English. One architect suggested that banks should require proof of compliance with the Act before any payments from them are released to project owners or developers. Two architects said that one source document for accessibility is needed. They suggested consolidating building and State and local codes with Federal requirements. Two architects said that Fair Housing Act inspections should be required. One of these architects said that HUD should work with building officials and inspectors to make sure that they inspect for accessibility. Another architect said that if enforcement were more rigorous, projects would be more compliant. Two architects suggested that more public relations about the Act's accessibility requirements is needed. One stated that there is a lot of hype about the Americans with Disabilities Act (ADA) and not enough about the Fair Housing Act. One of these architects suggested that HUD should conduct accessibility seminars on the requirements of the Act.

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