Status of HUD-Insured (or Held) Multifamily Rental Housing in 1995

HC-5964
Task Order #7

Final Report

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Prepared for

US Department of Housing
and Urban Development
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December 12, 1997

Mr. Laurent V. Hodes
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Dear Larry,

Enclosed is the revised ***Final Report*** for Task Order 7 under Contract DU100C000005964, Status of the HUD-Insured (or Held) Multifamily Stock in 1995, in fulfillment of the requirements under Task 7 of the Task Order. The ***Final Report*** includes two volumes: the main report including four appendixes, and a volume with four supplementary analyses. In addition to the Final Report, memoranda on the comparisons of Abt's data with E&Y's data were submitted, as were the model and model documentation.

We have addressed the comments to the October draft as best as possible. Please let me know if you have any further questions or comments.

I look forward to hearing from you.

Sincerely,

Meryl Finkel
Project Director

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1995 Status of the HUD-Insured (or Held) Multifamily Stock

Executive Summary

Overview

Two of the Department of Housing and Urban Development's (HUD's) main responsibilities are to enhance the availability and affordability of housing to lower-income households and to ensure the fiscal soundness of the Federal Housing Administration (FHA) insurance fund. These responsibilities are closely linked in that a major portion of HUD-assisted multifamily properties has mortgages insured or held by the FHA. (There are also many properties receiving subsidies through Section 8, Section 236, or Rental Assistance Payments (RAP) whose mortgages are not FHA-insured or held.) This close link between HUD assistance and insurance means that any reduction in assistance could increase claims on the insurance fund. HUD's involvement in FHA-insured multifamily housing frames the policy context for this study of the HUD-Insured multifamily housing stock.

- HUD provides mortgage insurance for this stock of over 12,000 properties. Over $30 billion of the original principal balance on these mortgages is still outstanding, representing a substantial contingent Federal liability.

- HUD is responsible for providing various forms of project-based assistance to over 10,000 of these properties, housing over one million families.

- Most of the over 1.4 million families living in the HUD-insured stock have low income.

- Many of the long-run, project-based Section 8 rental assistance contracts have recently been renewed, or will come up for renewal over the next five years.

- Current gross rents on a large portion of the assisted stock are above estimated market rents for comparable properties in their local areas. These properties are the focus of HUD's portfolio reengineering efforts that are aimed at bringing rents in line with market rent levels.

This study describes the current (1995) physical, financial, and market condition of these properties and changes in condition that have occurred since 1989. The study universe includes nearly all properties with mortgages insured as of 1989 that were still insured (or

held) in 1995. It does not include any properties that were insured after 1989, nor does it include properties outside the contiguous states, properties in remote rural locations, non-residential, non-rental, or single family properties, or HUD-acquired properties. The universe includes 10,019 assisted properties (none were insured after 1989), and 2,224 unassisted properties. To simplify presentation, the report discusses findings in terms of three categories of insured multifamily properties:

> ***Unassisted properties*** are insured under any HUD mortgage insurance program and receive no HUD subsidy (no rental assistance and no mortgage interest subsidy). Most unassisted properties have mortgages insured under the Section 221(d)(4) program. This category includes 2,224 properties housing about 354,000 families.
>
> ***Older assisted properties*** are insured under any HUD mortgage insurance program and receive either ***mortgage interest subsidies*** (under Section 236 or 221(d)(3) Below Market Interest Rate insurance programs) or ***rental assistance*** under the Section 8 Loan Management Set Aside, Rent Supplement, Rental Assistance Payment, Section 8 Property Disposition, or Preservation programs. This category includes 5,943 properties housing about 686,000 families.
>
> ***Newer assisted properties*** are insured under any HUD mortgage insurance program and receive rental assistance under one of the following Section 8 programs: New Construction, Substantial Rehabilitation, or Moderate Rehabilitation. Most newer assisted properties have mortgages insured under the Section 221(d)(4) program. This category includes 4,076 properties housing about 365,000 families.

This study is based on physical inspections, market rent assessments, and secondary data collected for a representative national sample of 621 multifamily properties. To facilitate comparing physical needs and financial variables across properties having different numbers of units and different sized units, all property costs were expressed per "2-bedroom equivalent" unit. To facilitate comparing costs over time, all costs were expressed in 1995 dollars.

Study Findings

The condition of the HUD-insured stock is complex and has many dimensions. The study's principal findings presented below, first focus on single dimensions including: (1) characteristics of tenants in assisted properties; (2) properties' physical condition; and (3) properties' financial condition. The next set of findings focus on measures that combine aspects of physical and financial condition, including: (4) properties' ability to cover current physical needs and future annual accruals of needs using internal resources; and (5) property risk profiles based on their backlogs of physical needs and annual net cash flow. The last set of findings, (6) shows how current property rents compare with local market rents and how

cash flow in assisted properties would change if rents and operating costs reverted to market levels.

1) Characteristics of Tenants in Assisted Properties

The assisted portion of the HUD-insured (or held) stock serves a very low income population, including many families with elderly and disabled members. Compared with older assisted properties, newer assisted properties tended to have a greater portion of units assisted through Section 8, lower tenant incomes, and a higher portion of elderly households.

- ***Income Distribution:*** Nearly all (95 percent) residents in newer assisted properties had very low incomes (defined as incomes below 50 percent of the local median for their household size) as did 67 percent of residents in older assisted properties. All the remaining residents in newer assisted properties, and most of the remaining residents in older assisted properties had low incomes (defined as incomes below 80 percent of the local median for their household size).

  Annual income of nearly three-fourths of the households in newer assisted properties and two-thirds of households in older assisted properties was below $10,000.

- ***Race and Ethnicity:*** Newer assisted and older assisted properties had similar racial and ethnic compositions. In the average property, most (58 percent) residents were white, while 37 percent were black. On average, 11 percent of residents were Hispanic, regardless of race.

- ***Other Demographic Characteristics:*** A higher proportion of households in newer assisted properties were classified as elderly -- 40 percent compared with 28 percent in older assisted properties. In both types of properties about 11 percent of households were classified as handicapped. Consistent with the high concentration of elderly households in newer assisted properties, nearly half the households in these properties (49 percent) included only 1 person.

2) Physical Condition-- Backlog of Physical Needs.

Each property was inspected to assess its ***total backlog of physical needs,*** which was defined as the cost of repairs and replacements, beyond ordinary maintenance, required to restore all property systems to original working condition. The physical needs backlog of the stock has increased substantially since 1989. In 1989, we found that many properties did not have sufficient funds to correct the full backlog of physical needs that existed at that time.

Properties were also not putting sufficient funds into their reserve for replacement accounts to cover annual accrual of future needs. Thus, while it is not surprising that the backlog of physical needs has increased between 1989 and 1995, it is nevertheless cause for concern.

- The mean backlog of physical needs across the whole stock of insured (and held) properties was $3,236 per unit, with a median of $1,452. The total estimated backlog for the stock was $4.17 billion, $3.5 billion of which was in assisted properties.

- The mean backlog was lowest in unassisted properties ($1,427 per unit) and highest in older assisted properties ($3,929 per unit). The mean in newer assisted properties, $3,214, was closer to that of older assisted properties.

- Consistent with their lower average backlogs, nearly two thirds of unassisted properties had backlogs of physical needs within the "normal" range of under $1,500 per unit. This range is considered normal because, on average, a property accrues about $1,500 per unit in repairs and replacements beyond ordinary maintenance each year, so that a backlog of less than this amount indicates little carryover from prior years. In contrast, only 42 percent of older assisted properties and 55 percent of newer assisted properties had backlogs in this range.
- At the other extreme, 30 percent of properties had serious physical backlogs of over $3,000 per unit -- twice the normal annual accrual of repairs and replacements. Older assisted properties were most likely to have serious backlogs of physical needs. Forty-one percent of older assisted properties had backlogs of over $3,000 compared with 25 percent of newer assisted and only 11 percent of unassisted properties.

- Physical needs backlogs have increased between 1989 and 1995. Even after controlling for inflation, the mean backlog rose by 50 percent in unassisted properties, by 40 percent in older assisted properties, and by 162 percent in newer assisted properties. Newer assisted properties had extremely low backlogs in 1989. It is not clear to what extent the increase in backlogs of newer assisted properties reflects their aging, and need for first time replacement of long lived systems such as roofs or boilers. It will be important for HUD to monitor their backlogs to be determine whether the backlog continues to increase as rapidly.

- The physical deterioration of newer assisted properties is also evident in the distribution of properties. In 1989, nearly three quarters of the newer assisted stock had backlogs below $1,500 (in 1995 dollars). By 1995, only slightly more than half did. At the other extreme, in 1989, only 10 percent of newer assisted properties had backlogs greater than $3,000 (in 1995 dollars), while by 1995, one quarter of the newer assisted stock did.

While in the short term, backlogs of physical needs may not always impinge directly on tenants or on property viability (e.g., a property may continue for years with a heavily patched old roof), continued deterioration could affect both tenants and property viability.

3) Financial Condition -- Annual Net Cash Flow

The study computed each property's ***annual net cash flow*** per unit, defined as total annual revenue (primarily from tenant paid rents and from subsidies) less annual expenses to cover operations and maintenance, mortgage payments, and deposits to the reserve for replacement account.

- The stock's financial condition of the stock has improved since 1989.
  - In 1995, annual net cash flow averaged $593 per unit, with a median of $388. Three quarters of all insured (or held) properties had positive annual net cash flows.
  - Across the full stock, average annual net cash flow improved or remained unchanged from 1989 to 1995.
- Unassisted properties experienced the largest improvement in annual net cash flow, which increased from a mean of $158 to $487, all in 1995 dollars. Furthermore, in 1989, 44 percent of unassisted properties had negative annual net cash flows, while by 1995 only 25 percent did.
  - Improvements in cash flow in unassisted properties resulted from increases in revenues that more than offset increases in expenses. Revenues increased by 6 percent as a result of substantial decreases in vacancy losses and small increases in tenant paid rents. Expenses in unassisted properties increased by only 2 percent on average, resulting from an increase in operating and maintenance expenses that was nearly offset by a decrease in the real value of mortgage payments. (Mortgage payments generally remained constant in nominal dollars.)
- Older assisted properties had the weakest annual net cash flows in both 1989 and 1995. While average annual net cash flow in older assisted properties increased by 6 percent from 1989 to 1995 (to $283 in constant 1995 dollars), the portion of properties with positive net cash flow declined from 59 percent to only 35 percent.
  - Because many older assisted properties receive budget-based rents, the increase in average revenues of 5 percent was just slightly higher than the

increase in expenses. Expenses increased as a result of increases in deposits to the reserve for replacement and in operating and maintenance expenses that more than offset the decrease in real debt service payments.

- Newer assisted properties had the strongest annual net cash flows in both 1989 and 1995, with an average of $1,105 per unit and 87 percent having positive cash flows.

  - The proportion of newer assisted properties with positive annual net cash flow stayed fairly stable between 1989 and 1995 (going from 90 percent to 87 percent), while the mean annual net cash flow per unit increased by 29 percent during this period. This increase in mean cash flow reflects an increase in the number of properties with very high annual net cash flows. While in 1989 one third of all newer assisted properties had annual net cash flows of over $1,000 per unit (expressed in 1995 dollars), by 1995, 44 percent of newer assisted properties did.

  - Improvements in cash flow in newer assisted properties resulted from increases in revenues and decreases in expenses. Revenues (in constant 1995 dollars) increased on average by 2 percent as a result of the annual adjustment factor applied to property rents. The percentage increase in revenues in newer assisted properties was smaller than in older assisted and unassisted properties. Expenses in newer assisted properties decreased by 1 percent because the increase in operating and maintenance expenses was more than offset by the decrease in the real value of mortgage payments (though they remained constant in nominal dollars).

- The components of revenue changed substantially between 1989 and 1995, particularly in assisted properties. In both older assisted and newer assisted properties higher assistance payments were needed to offset decreases in tenant paid rents. It is not clear whether the decreases in tenant paid rents reflect lower incomes of existing tenants or poorer residents moving into the properties upon turnover.

  - In older assisted properties tenant paid rents decreased by 10 percent. A 67 percent increase in assistance payments was required to cover this decrease in tenant paid rents and the increase in expenses.

  - In newer assisted properties, a 22 percent rise in assistance payments was required to offset the 26 percent decrease in tenant paid rents.

4) Properties' Ability to Cover Current Backlog of Physical Needs and Future Accruals of Needs Using Internal Resources

The study examined properties' financial ability to cover physical backlogs and ongoing accrual of physical needs using internal funds and annual net cash flow. As was the case in 1989, most properties did not have sufficient internal resources to cover their current backlogs of physical needs, nor were they depositing sufficient funds into their replacement reserve accounts to cover future needs.

Ability to Cover Current Backlog of Physical Needs. Properties generally have internal funds that may be used to cover their physical needs backlogs. These funds may be in any or all of the following accounts: reserve for replacement, other special purpose reserves such as painting reserves, and in some cases residual receipts accounts, which although not intended as repair funds, may be used for that purpose.

- A little over one third (35 percent) of the stock had sufficient resources to cover physical needs backlogs, including properties no physical needs backlog and others with backlogs of physical needs less than or equal to available resources.

- The remaining 65 percent of properties across all assistance categories lacked sufficient resources to cover their backlog of physical needs. This included 13 percent of properties with no available resources, and 30 another percent with insufficient resources to cover even one quarter of their backlogs.

- The problem was most severe in the older assisted properties where only 30 percent had sufficient resources to cover their backlogs of physical needs, and least severe in the newer assisted properties, where 42 percent had sufficient resources.

- Ability to cover backlogs has declined since 1989. While in 1989, 45 percent of could cover their backlogs, by 1995, only 35 percent of the stock could. Driving this decrease in the ability to cover backlog of physical needs was the increase in backlogs, rather than a decrease in resources. On average, available resources increased by over 40 percent, but backlogs increased by over 60 percent. This result held for each of the three assistance categories.

One measure of ability to cover backlog is the unfunded backlog of physical needs. This is the total backlog reduced by available resources for properties whose total backlogs exceeds available resources, and $0 for properties with sufficient resources. A minority of properties is responsible for a substantial portion of the unfunded backlog.

- While the mean unfunded backlog was $2,630, (or 81 percent of the total backlog), the median was only $684. This shows that a small portion of the stock was responsible for a large portion of the unfunded backlog.

- Almost a third of the stock (32 percent) had unfunded backlogs exceeding $2,000 per unit.

- As with most other resource problems, high unfunded backlogs were most common in older assisted properties.

    - The mean unfunded backlog for older assisted properties was $3,323 compared with $1,134 for unassisted and $2,437 for newer assisted.

    - Forty-four percent of older assisted properties had over $2,000 of unfunded backlog of physical needs per unit, compared with 15 percent of unassisted and 25 percent of newer assisted properties.

Ability to Cover Ongoing Annual Accrual of Physical Needs. A property's physical needs accruals are estimates of the average annual costs needed to cover repairs and replacements beyond ordinary maintenance for all systems over each of the next 20 years. A property's ability to cover the ongoing accrual of physical need is another important factor in its long-term viability. Accrual for the stock averaged $1,437 per unit per year, with little difference across assistance categories. There are two potential sources of funds available to cover these accrual costs: annual deposits to the reserve for replacement accounts and positive annual net cash flow. Properties that have positive net cash flow after covering operation and maintenance, mortgage debt service, and reserve fund deposits could use remaining funds to cover ongoing accruals.

- It appears that even if the current backlog of physical needs were addressed, only about one fourth of insured properties would be able to keep up with their ongoing accrual of physical needs.

- The average unfunded annual accrual was $610 per unit, and the median was $586.

- Compared with other two groups, older assisted properties contributed more on average to the reserve for replacement account, but had much lower annual net cash flow. Eighty-six percent of older assisted properties will not be able to cover ongoing accruals of physical needs with current resources.

- Many newer assisted and unassisted properties, too, will not be fully able to cover ongoing accrual. Fifty-nine percent of newer assisted properties have unfunded

accruals despite their high cash flows, and nearly three quarters of unassisted properties also lack sufficient resources to cover ongoing accruals.

5) Property Risk Profile

A second way the study incorporated both physical and financial measures into a single indicator of property condition was to place properties into four different ***risk profiles*** based on their annual net cash flow and their backlog of physical needs. As compared with the above measures that looked at the ***financial capacity*** of properties to cover their backlogs and accruals, this indicator focuses on what properties are ***actually*** doing. It provides valuable information by highlighting properties that have significant backlogs of physical needs and at the same time also have positive annual net cash flow that is not being used to address these needs.

- Forty percent of all properties were classified as "minimally risky -- they were both meeting current expenses and addressing their physical needs backlogs. These properties had both positive annual net cash flows and "normal" physical needs backlogs -- less than $1,500, approximating a year's accrual. About half of unassisted and newer assisted properties fell into this "minimal risk" category, as did 30 percent of older assisted properties.

- Another quarter of the stock (26 percent) was classified as "moderately risky. These properties either had low positive annual net cash flows of under $500 per unit along with above "normal" backlogs (over $1,500 per unit), or else they had negative cash flows but normal backlogs. Seventeen to eighteen percent of unassisted and newer assisted properties fell into this category, as did 37 percent of older assisted properties.

- Fifteen percent of the stock was classified as "high risk" -- they were both not meeting current expenses ***and*** not addressing their backlog of physical needs. These properties had both negative cash flows and above normal backlogs. Nine percent of unassisted and newer assisted properties fell into this category, as did 20 percent of older assisted properties.

- The final group of 18 percent of properties was categorized as "management risk" -- while these properties appeared to have resources available to address ***at least a portion*** of their backlogs, they were not doing so. They had high positive cash flows of over $500 and yet high backlogs of over $1,500. Over one quarter (26 percent) of newer assisted properties fell into this category as did 18 percent of unassisted properties and 13 percent of older assisted properties. While there may be valid reasons for an owner's temporarily deferring needed repairs, it will be

important for HUD's asset managers to assess these properties and, as necessary, take needed action.

6) Market Position- Property Rents Relative to Local Market Rents

Property Gross Rent Relative to Unrestricted Market Rent

For each property, the study's market analysts estimated local market rent for comparable, unrestricted properties. In identifying comparable properties, the analysts assumed that the current backlog of physical needs was repaired. Actual property gross potential rents (which equal tenant paid rents, plus utilities, subsidies, and vacancy losses added back in) were compared with these unrestricted rent estimates.

- Overall, the stock was evenly divided between properties with gross rents above or below estimated market levels.

- Nearly half the stock had gross rents close to their estimated market rents (between 75 percent and 120 percent of the properties' estimated market rent). As expected, a large majority (75 percent) of unassisted properties had rents in this range. (Not all unassisted properties had rents within this range for several potential reasons. The market rent estimates assume the backlog of physical needs is repaired. In addition, in the conventional market some people get better "deals" and some worse).

- Most (78 percent) older assisted properties had rents below their estimated market level, including 38 percent with rents below 75 percent of their estimated market level. Most older assisted properties have subsidized mortgages, which required owners to maintain low, affordable, rents.

- In contrast, the vast majority (86 percent) of newer assisted properties had rents above estimated market level, including 40 percent with rents above 140 percent of their estimated market level. When these properties were constructed, assisted rents were often set above their market levels as a way to promote housing development in locations where affordable housing was not being developed. Rents continued to rise annually based on HUD's Annual Adjustment Factor, which was often higher than inflation in expenses. These properties are the focus of the portfolio reengineering efforts that aim to bring property rents in line with rents in their surrounding markets.

Market Based Cash Flow Scenario

A modified cash flow measure was developed to assess the impact of a more "market-based" scenario on property finances. This alternative cash flow measure used estimated market rents and operating costs instead of actuals, and assumed that deposits to reserve for replacement accounts equal average annual accruals of capital needs. The full existing HUD-insured mortgage was assumed to continue. This market-based scenario provides a useful baseline comparison for the current situation.

- Under this market-based scenario, only half of the assisted stock would have positive cash flows.

- Only 10 percent of newer assisted properties would have positive annual net cash flows under this scenario, due to the ***decrease*** in revenues owners would receive at market rents.

- In contrast, over three quarters (78 percent) of older assisted properties would have positive annual net cash flows at market rents, due to ***increases*** in revenues owners would receive under a market rent scenario.

This scenario highlights the importance of the careful attention that needs to be paid to the process of adjusting rents and expenses in the portion of the stock that currently has above-market rents. Clearly, reductions in rents must be accompanied by reductions in expenses or else most of these properties would no longer remain financially viable. Similarly, careful attention would also need to be paid to the process of raising revenues in below-market properties. Raising revenues by allowing rents to increase to market levels would either increase tenant rent burdens or would require additional HUD subsidies.

Summary

Overall, between 1989 and 1995 the physical condition of the HUD-insured (or held) stock has worsened, while its financial condition has improved. Changes were most notable in the newer assisted and unassisted properties.

For newer assisted properties, mean backlog of physical needs increased by 162 percent, the proportion with low backlogs decreased from three quarters of the properties to just over half, and the proportion with high backlogs rose from 10 percent to 25 percent. At the same time, financial conditions of these properties improved, with average annual net cash flow rising by nearly 30 percent from $859 per unit to $1,105. Contributing to their strong financial condition is that fact that at present, the majority of these properties (78 percent) have rents above the estimated market levels for their local markets. As is clear from the "market-based"

cash flow scenario, reducing rents in these properties to market level will lead to very negative financial outcomes for these properties. Thus, the current portfolio reengineering efforts are aimed at reducing rents to market levels, while at the same time adjusting debt service payments downward so that properties can remain viable at market rent levels.

Older assisted properties remained in the weakest financial and physical condition over this period. For older assisted properties, mean backlog rose by 50 percent to $3,929 per unit, and the proportion with high backlogs increased from 34 to 42 percent of properties. Older assisted properties experienced very slight improvements in their financial condition, with average annual net cash flow rising by 6 percent from $265 to $281 per unit. These properties continue to have rents substantially below estimated market levels for their local markets, in large part due to their subsidized mortgages. Steps to address the financial and physical condition of older assisted properties will need to be balanced against costs to the FHA insurance fund should these properties fail.

For unassisted properties, mean backlog of physical needs rose by 40 percent from $960 to $1,427 between 1989 and 1995. However, the major change was the strong improvement in financial condition: average annual net cash flow more than tripled (from $158 to $487), and the proportion with positive cash flows increased from 56 percent to 75 percent.

1.0 Introduction

Two of HUD's main responsibilities are to enhance the availability and affordability of housing to lower-income households and to ensure the fiscal soundness of the FHA insurance fund. These responsibilities are closely linked in that a major portion of HUD-assisted multifamily properties has mortgages insured or held by the FHA[1]. This close link between HUD assistance and insurance means that any reduction in assistance could increase claims on the insurance fund. HUD's involvement in FHA-insured multifamily housing frames the policy context for this study of the HUD-Insured multifamily housing stock.

- HUD provides mortgage insurance for this stock of over 12,000 properties. Over $30 billion of the original principal balance on these mortgages is still outstanding, representing a substantial contingent Federal liability.

- HUD is responsible for providing various forms of project-based assistance to over 10,000 of these properties, housing over one million families.

- Most families living in the HUD-insured stock have low income.

- Many of the long-run, project-based Section 8 contracts have recently been renewed, or will come up for renewal over the next five years.

- Current gross rents on a large portion of the assisted stock are above estimated market rents for comparable properties in their local areas.

This study includes analysis of several aspects of the HUD-insured multifamily stock, including its physical and financial condition, its market position and value, and tenant characteristics. The current study updates an earlier study that collected and analyzed data on similar aspects of the stock.[2]

The specific goals of the study are to provide HUD with a series of analyses and supporting data including:

- Assessing the current (1995) status of the FHA-insured (or held) multifamily housing stock, including physical and financial condition, tenancy, and market context.

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1 There are also many properties receiving subsidies through Section 8, Section 236, or Rental Assistance Payments (RAP) whose mortgages are not FHA-insured or held.

2 See *Assessment of the HUD-Insured Multifamily Housing Stock. Final Report Volume I, Current Status of HUD-Insured (or Held) Multifamily Rental Housing,* HUD-1412-PD&R, September 1993.

- Providing measures of change in the stock's physical and financial condition over the period since 1989 when a similar study was conducted.

- Assessing the likely future status of the stock under alternative policy scenarios regarding Section 8 restructuring, preservation strategies, property disposition strategies, and asset management strategies generally.

This report focuses on the first two objectives, namely describing the status of the stock in 1995, and detailing changes that have occurred since 1989. Following an overview of the study, the remainder of this chapter provides some basic descriptors of the properties and their neighborhoods. Characteristics of tenants in the assisted portion of the stock are presented in Chapter 2. The physical condition of the stock is described in Chapter 3. Chapter 4 describes the financial condition of the stock, and Chapter 5 provides overall measures of property condition that take into account both the physical and financial condition. Finally, Chapter 6 describes its market position. Four appendices are attached, describing the sampling procedures used to estimate the current stock (Appendix A), the data collection methodology (Appendix B), the system used for estimating the physical needs backlog and accrual costs (Appendix C), and supplementary tables (Appendix D).

The study universe includes nearly all properties that were insured as of 1989 and were still insured in 1995. It does not include any properties that were insured after 1989, nor does it include properties outside the contiguous states, properties in remote rural locations, non-residential, non-rental or single family properties, or HUD-acquired properties. The universe includes 10,019 assisted properties (none were insured after 1989), and 2,224 unassisted properties. (Additional assisted properties have been insured since 1989. These properties are not covered by this study). As was done in the earlier study, this report discusses findings in terms of three categories of insured (or held) multifamily properties:

Unassisted properties are insured under any HUD mortgage insurance program and receive no HUD subsidy (no rental assistance and no mortgage interest subsidy). Most unassisted properties have mortgages insured under the Section 221(d)(4) program. This category includes 2,224 properties housing about 354,000 families.

Older assisted properties are insured under any HUD mortgage insurance program and also receive either ***mortgage interest subsidies*** (under Section 236 or 221(d)(3) Below Market Interest Rate insurance programs) or ***rental assistance*** under the Section 8 Loan Management Set Aside, Rent Supplement, Rental Assistance Payment, Section 8 Property Disposition, or Preservation programs. This category includes 5,943 properties housing about 686,000 families.

Newer assisted properties are insured under any HUD mortgage insurance program and also receive rental assistance under one of the following Section 8 programs: New Construction, Substantial Rehabilitation, or Moderate Rehabilitation. Most newer assisted properties have mortgages insured under the Section 221(d)(4) program. This category includes 4,076 properties housing about 365,000 families.

The findings are based on a combination of primary and secondary data collected for a representative national sample of 621 multifamily properties. This sample includes 504 properties that were also included in the 1990 Study and 117 additional properties. Appendix A describes the study sampling procedures. Data were extracted from existing HUD and Census computerized data systems whenever possible. These data were supplemented with primary data collected from on-site physical inspections and a series of telephone surveys aimed at assessing the unrestricted market rent and value of each property. Appendix B describes the study's data collection.

1.1 Attributes of the HUD-Insured Multifamily Housing Stock

Exhibit 1-1 provides descriptors of the stock collected from HUD computerized data systems.[3]

- ***Assistance Category:*** Overall, 82 percent of insured properties received some sort of HUD assistance beyond their mortgage insurance. Fifty-nine percent of the assisted properties, defined here as "older assisted", were assisted through Section 236, Section 221(d)(3)BMIR, Section 8 loan management set-aside (LMSA), Rent Supplement/Rental Assistance Payments (RAP), or property disposition Section 8. Forty-one percent of assisted properties, defined here as "newer assisted" were assisted through the Section 8 New Construction or Substantial Rehabilitation programs.[4]

3 Tests were conducted to determine whether differences between unassisted/assisted and older/newer were statistically significant. In all the tables we denote where significance tests were conducted with an "a". Where distributions were reported, we conducted tests of specific ranges. For example, looking at the distribution of property sizes we compared the proportion that were below 50 units, and the proportion above 200 units. In tests of a two-way variable (e.g. family/elderly occupancy) significance of the tested variable also means significance of the other option. Differences that were significant at the 95 percent confidence level were noted with "**" and those that were significant at the 90 percent level were noted with "*". Variables that were tested, but not found to be different, have an "a" next to the variable name or range, but no "*" or "**". The formula used for calculating significance between the mean values between two groups "x" and "y" was the was $t = (Mean_x - Mean_y)/\text{square root } [(Se_x)^2+(SE_y)^2]$. If $t>1.645$ the difference is significant at the 90 percent confidence level. If $t>1.96$ the difference is statistically significant at the 95 percent confidence level.

4 All tables show the stock total; then unassisted/assisted which total to the stock total; then older assisted/newer assisted which total to the assisted stock total.

Exhibit 1-1
ATTRIBUTES OF THE HUD-INSURED MULTIFAMILY HOUSING STOCK

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Sample Properties	621	81	540	364	176
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%	41%
Number of Units	1,405,240	354,083	1,051,157	686,309	364,848
Percent of Total Units	100%	25%	75%	65%[b]	35%[b]
Property Size					
<50 Units[a]	17%	6%**	19%	17%	22%
50-99 Units	35%	31%	36%	32%	43%
100-199 Units	36%	42%	35%	39%	29%
>=200 Units[a]	12%	21%*	10%	13%*	6%
Average # of Units[a]	115	159**	105	115**	90
Median # of Units	96	120	88	100	76
Unit Size					
<2.25 br[a]	80%	98%*	76%	73%*	80%
>=2.25br	20%	2%	24%	27%	20%
Average Unit Size (brs)[a]	1.7	1.6	1.8	1.8	1.7
Designated Occupancy Type					
Family[a]	75%	88%**	72%	80%**	61%
Elderly/disabled	25%	12%	28%	20%	39%
Sponsor Type					
Non-profit/coop[a]	18%	4%**	21%	35%**	2%
Limited Dividend	40%	6%	48%	62%	26%
For Profit[a]	42%	90%**	31%	3%**	72%
Production Method					
New Construction/ Subrehab[a]	87%	86%	87%	89%	84%
Existing	13%	14%	13%	11%	16%

Exhibit 1-1, *continued*

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Building Type					
High Rise[a]	26%	28%	25%	18%**	35%
Walk-up	44%	56%	42%	47%	33%
Single-Family Attached[a]	31%	16%*	33%	35%	32%
Mortgage Start Year					
Pre-1970[a]	5%	5%	5%	9%**	0%
1970-1979	55%	43%	57%	86%	15%
1980 or Later[a]	40%	52%*	37%	5%**	85%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: HUD FOMNS and MIDLIS systems, 1995 Physical Inspections.

- ***Property Size:*** The unassisted stock tended to consist of larger properties, with an average of 159 units; 21 percent had 200 or more units, and only 6 percent had fewer than 50 units. Assisted properties had 105 units on average; 10 percent had 200 or more units, and 19 percent had fewer than 50 units. Older assisted properties tend to be larger than newer assisted properties, but smaller than unassisted properties. Older assisted properties had 115 units on average compared with 90 units in the newer assisted portion of the stock on average.

- ***Unit Size:*** The units in unassisted properties tended to be smaller (fewer bedrooms) than those in assisted properties. Ninety-eight percent of unassisted properties had an average unit size of under 2.25 bedrooms, with an overall average unit size of 1.6 bedrooms.[5] In contrast only 76 percent of assisted properties had fewer than 2.25 bedrooms on average, and the average size was 1.8 bedrooms. Older assisted properties had the largest units on average (1.8 bedrooms) and more properties with an average size of at least 2.25 bedrooms (27 percent). Newer assisted properties averaged 1.7 bedrooms per unit, with 80 percent of properties having average unit sizes below 2.25 bedrooms.

5 For this study we defined properties with at least 2.25 bedrooms on average per unit as being able to house large families.

- ***Occupancy type:*** Unassisted properties were more likely to be designated as "family occupancy" at origination compared with assisted properties (88 percent versus 72 percent). The newer assisted stock has the highest concentration of properties designated as elderly/disabled, with 39 percent of properties being at least partially occupied by elderly or disabled residents. Twenty percent of older assisted properties were designated as wholly or partially elderly or disabled.[6]

- ***Sponsor type:*** Nearly all of the unassisted (96 percent) and newer assisted (98 percent) properties had profit-motivated or limited-dividend owners. In contrast, 35 percent of the older assisted stock was owned by non-profit entities.

- ***Production Method:*** The predominant production method across all assistance categories was new construction or substantial rehabilitation (87 percent). The remaining 13 percent were insured as part of the purchase of an existing property.

- ***Building Type:*** In both assisted and unassisted properties the predominant building type was walk-up. For fifty-six percent of unassisted properties and 42 percent of assisted properties the predominant building type was walk-ups. Newer assisted properties had the highest concentration of high-rise buildings (35 percent).

- ***Mortgage Start Year:*** Most of the HUD-insured stock was insured in 1970 or later. The mortgages of the unassisted properties are roughly equally spread across the 1970s and 1980s. The vast majority (86 percent) of older assisted properties were insured between 1970 and 1979, while the mortgages of the newer assisted properties—those insured in conjunction with property-based Section 8 New Construction or Substantial Rehabilitation assistance—date primarily from 1980 onward (85 percent).

6 The figures regarding designated occupancy type at origination are from HUD's MIDLIS system. They differ from the actual tenant characteristics reported in TRACS which was the source for Exhibit 2-1.

1.2 Neighborhoods of HUD-Insured (or Held) Properties)

Aside from the actual physical property itself, the local neighborhood plays an important role in the overall quality of life of the residents. This section describes several dimensions of the neighborhoods where the HUD-insured multi-family properties are located:

- Characteristics of the neighborhoods
- Conditions of the neighborhoods
- Neighborhood demographics
- Changes in the neighborhoods
- Vacancies in the neighborhoods

Neighborhood Characteristics

Data used to describe neighborhood characteristics were obtained from two sources: an Inspection Windshield Survey and the U.S. Census. The same inspectors who inspected the sample properties also rated the property neighborhoods using the Inspector Windshield Survey. Inspectors were instructed to drive around the neighborhood of the inspected property and describe the neighborhood on several measures such as land use, type of residential structure, age of most of the residential structures, and type of construction. Central city status was obtained from U.S. Census files on Central City tracts and MSA status.

The types of neighborhoods where insured properties were located were similar across assistance categories (Exhibit 1-2). The exhibit presents the following information on insured properties neighborhood characteristics:

- ***Land Use:*** Across all assistance categories, neighborhoods were primarily residential. At least 66 percent of the land was used for residential purposes.

- ***Residential Structure Type:*** The predominant structure type of residential properties in neighborhoods of HUD-Insured properties was single-family homes (49 percent on average). On average, twenty-two percent of residential structures were large multi-family structures, making them the second most common type of building found in the neighborhoods.

- ***Construction Type:*** The construction type was also similar across assistance categories, with wood structures being the dominant building type (46 percent).

- ***Residential Property Age:*** Unassisted properties tended to be located in neighborhoods with newer buildings compared with the assisted groups. On average, 70 percent of properties in the neighborhoods of unassisted properties were built after 1961, compared with 50 percent in the neighborhoods of assisted properties. In addition, one quarter of the properties in the neighborhoods of assisted properties were built prior to 1945 compared with 11 percent in neighborhoods of unassisted properties.

- ***Central City Status:*** Overall most of the properties (90 percent) were located in metropolitan statistical areas (MSAs). Unassisted properties were more likely to be located in non-central city portions of MSAs (59 percent) compared with assisted properties (46 percent). Unassisted properties were less likely to be located in non-MSA locations (5 percent) compared with newer assisted properties (14 percent) and older assisted properties (9 percent).[7]

7 The distribution of properties by MSA/non-MSA status understates the true universe of insured properties in non-MSA areas because the population for this study was properties in MSAs and in adjacent non-MSA counties.

Exhibit 1-2
NEIGHBORHOOD CHARACTERISTICS FOR HUD-INSURED PROPERTIES

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Land Use					
Residential[a]	66%	69%	66%	66%	66%
Commercial	21%	22%	21%	19%	22%
Industrial	5%	3%	5%	6%	4%
Institutional	6%	5%	6%	6%	6%
Other	2%	1%	2%	3%	2%
Residential Structure Type					
Single-Family Detached[a]	49%	47%	49%	49%	50%
Garden/Row/Townhouse	14%	16%	14%	16%	12%
Multifamily 2-4 Units	7%	6%	7%	7%	7%
Multifamily 5-10 Units	8%	5%	9%	9%	8%
Multifamily $\geq$ 11 Units	22%	26%	21%	19%	23%
Construction Type					
Wood Frame	46%	43%	47%	48%	44%
Masonry	34%	30%	34%	32%	38%
Mixed	20%	27%	19%	20%	18%
Residential Structure Age					
Pre-1945	23%	11%	25%	23%	28%
1946-1960	24%	19%	25%	25%	25%
1961- Present[a]	53%	70%**	50%	52%	47%
Central City Status					
MSA - Central City[a]	42%	36%	43%	46%*	38%
MSA - Not Central City	48%	59%	46%	45%	47%
Non-MSA[a]	10%	5%*	11%	9%*	14%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: Inspector Windshield Survey and Special Census Tabulation on Central City Status.

Neighborhood Conditions

The condition of the neighborhoods for HUD-insured stock are summarized in Exhibit 1-3. Data on neighborhood conditions were compiled from the Inspector Windshield Survey and from the Market Valuation Summaries. For the Market Valuation Summary, market analysts obtained a description of the neighborhood economy from discussions with local real estate professionals. For the Inspector Windshield Survey, inspectors rated each neighborhood on several dimensions such as condition of streets and curbs, street maintenance, owner housekeeping, and general condition of housing.

- Unassisted properties were much more likely to be located in neighborhoods that the study's market analysts described as having an economy that was "high" (43 percent). Only 11 percent of neighborhoods of assisted properties reportedly had a "high" economy. Similarly the analysts were far less likely to describe neighborhoods of unassisted properties as having a "depressed economy" (2 percent) compared with neighborhoods of assisted properties (20 percent).

- Across all the dimensions, the inspectors rated the neighborhoods of the unassisted properties as "better" than the neighborhoods of the assisted properties. Across most quality characteristics, the inspectors rated about ninety percent of the neighborhoods of unassisted properties as "good" or "excellent", whereas approximately one fourth of assisted properties neighborhoods were rated as "fair" or "poor".

- More than half of the neighborhoods of unassisted properties were considered "better quality" or "much better quality" than other residential neighborhoods in the local housing market. Assisted properties were more likely to be in neighborhoods considered of "poorer quality" or "much poorer quality" than other residential neighborhoods in the local housing market (38 percent).

There were no reported differences in the conditions of newer and older assisted property neighborhoods.

Exhibit 1-3
NEIGHBORHOOD CONDITIONS FOR HUD-INSURED PROPERTIES

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Description of Neighborhood Economy					
Depressed[a]	17%	2%**	20%	21%	18%
Average	38%	35%	39%	39%	40%
High[a]	17%	43%**	11%	11%	11%
Mixed	28%	20%	30%	29%	31%
General Condition of Housing					
Sound Condition[a]	68%	83%**	64%	64%	65%
Minor Deterioration	24%	14%	26%	27%	26%
Major Deterioration	6%	2%	7%	7%	6%
Dilapidated/Abandoned[a]	2%	1%**	3%	2%	3%
Condition of Streets/Curbs					
Excellent/Good[a]	80%	93%**	77%	76%	78%
Fair/Poor	20%	7%	23%	24%	22%
Street Maintenance					
Excellent/Good[a]	80%	96%**	77%	78%	76%
Fair/Poor	20%	4%	23%	22%	24%
Owner Housekeeping					
Excellent/Good[a]	76%	93%**	72%	71%	74%
Fair/Poor	24%	7%	28%	29%	26%
Quality as Residential Neighborhood					
Excellent/Good[a]	67%	90%**	62%	63%	61%
Fair/Poor	33%	10%	38%	37%	39%
Comparison of Neighborhood with Other Residential Areas in Local Housing Market					
Better or Much Better Quality[a]	24%	51%**	19%	17%	20%
About Average Quality	43%	38%	43%	44%	43%
Poor or Much Poorer Quality[a]	33%	11%**	38%	39%	37%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: Inspector Windshield Survey and Market Valuation Summaries.

Demographic Characteristics

Demographic data for the neighborhoods of HUD-insured properties were obtained from the 1990 Census at the census tract level (Exhibit 1-4).[8] While neighborhoods of unassisted properties differed from those of assisted properties, they did not differ between newer and older assisted properties. Exhibit 1-4 presents the following demographic information for property neighborhoods:[9]

- ***Race/Ethnicity:*** On average, insured properties were located in neighborhoods that were 63 percent white non-Hispanic, 24 percent black non-Hispanic, and 4 percent in other non-Hispanic groups. The average neighborhood percentage of Hispanic households regardless of race was 9 percent.

- Unassisted properties were generally in neighborhoods with higher concentrations of white non-Hispanic residents. Neighborhoods of unassisted properties were 77 percent white on average, compared with 60 percent in the neighborhoods of assisted properties.

- ***Income Distribution:*** Unassisted properties tended to be located in higher income areas compared with assisted properties, both in terms of absolute income levels, and in terms of income relative to the area median. The average median annual income (1990 Census figures reported in 1995 dollars) reported in neighborhoods where unassisted properties were located was much higher than the income in neighborhoods of assisted properties ($40,492 compared to $28,273).

- Twenty-eight percent of households in neighborhoods where assisted properties were located earned more than the local area median (as reported by HUD), compared with 39 percent in the unassisted properties' neighborhoods. At the other end of the income distribution, 45 percent of households in neighborhoods where assisted properties were located had incomes below fifty percent of the local median, compared with only 33 percent of households in unassisted property neighborhoods.

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8 All Census dollar values were inflated to 1995 dollars using the CPI for Urban Consumers. (i.e. multiplied by 153.4/126.1= 1.2173, the CPI-U for the end of 1995 divided by the CPI-U for the end of 1989) and then rounded to the nearest $1000. For example, the 1990 Census ranges for income distribution include "0 - $9,999". On average across the stock neighborhoods 25 percent of households fell into that income category. "0 - $9,999) translates into $12,172 in 1995 dollars (9999 x 1.2173), which gets rounded to $12,000. Thus the bottom income range in the table was "0-$12,000) and included 25% of households in the neighborhoods of the insured stock.

In later chapters of this report, we use the Housing Component of the CPI as the inflation factor, because we are dealing with housing costs and rents. Here, since the overall income distribution is used, the overall CPI is preferred.

9 The source for the neighborhood characteristics in the 1990 Study was the 1980 Census, thus there are reported differences in neighborhood characteristics across the two studies.

- The portion of the population that had incomes below the poverty level was higher in neighborhoods of assisted properties compared with unassisted properties. On average, 23 percent of the population in the neighborhoods of the assisted properties was in poverty compared with 13 percent of the population in the neighborhoods of unassisted properties.

- ***Other Demographic Characteristics:*** Average household size was slightly higher in neighborhoods where assisted properties were located (2.6 versus 2.5).

- Households in neighborhoods of assisted properties were also more likely to be headed by women (19 percent versus 12 percent) or the elderly (22 percent versus 19 percent) than unassisted properties' neighborhoods. Insured properties were located in neighborhoods that averaged 45 percent owner occupants. Neighborhoods of unassisted properties had the highest proportion of owner occupants (49 percent) and neighborhoods of older assisted properties had the lowest proportion (42 percent).

Exhibit 1-4
DEMOGRAPHIC CHARACTERISTICS OF PROPERTY NEIGHBORHOODS

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Neighborhood Race/Ethnicity					
White, non-Hispanic[a]	63%	77%**	60%	58%	61%
Black, non-Hispanic	24%	13%	26%	26%	26%
Other, non-Hispanic	4%	5%	4%	5%	4%
Hispanic (regardless of race)	9%	5%	10%	11%	9%
Neighborhood Income Distribution					
$0 - $11,999[a]	24%	16%**	26%	26%	26%
$12,000 - $17,999	10%	9%	11%	11%	11%
$18,000 - $29,999	18%	16%	19%	19%	18%
$30,000 - $42,999	15%	16%	14%	14%	14%
$43,000 - $60,999	16%	19%	15%	15%	15%
$61,000 +[a]	17%	24%**	15%	15%	15%
Average Median Income	$30,492	$40,492	$28,273	$27,569	$29,299

Exhibit 1-4, *continued*

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Average Median Renter Income	$21,236	$28,645	$20,001	$20,096	$19,863
Neighborhood Income Distribution					
Percent < 50% Median [a]	43%	33%**	45%*	46%	44%
Percent 50-80% Median	12%	11%	12%	12%	13%
Percent 80-100% Median	15%	17%	15%	15%	14%
Percent > Median	30%	39%	28%	27%	29%
Other Neighborhood Demographic Characteristics					
Average Household Size	2.5	2.5	2.6	2.6	2.6
% Population in Poverty[a]	21%	13%**	23%	23%	23%
Other Demographic Characteristics:					
% Households Headed by Women[a]	18%	12%**	19%	19%	18%
% Households Headed by Elderly[a]	22%	19%**	22%	21%*	23%
% Single Person Households[a]	30%	32%**	30%	30%	30%
% Owner Occupied[a]	45%	49%*	44%	42%*	47%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: 1990 U.S. Census Data, HUD Median Income Data for 1995.

Trends in the Neighborhoods

As part of the process of determining the market value of the HUD-insured properties, the study's market analysts discussed with local real estate professionals the kinds of changes that were occurring in the neighborhoods. These neighborhood changes are presented in Exhibit 1-5.

- Most neighborhoods of both assisted and unassisted properties were expected to either "stay the same" (58 percent) or "improve" (37 percent). Five percent of

neighborhoods with assisted properties were expected to "decline" compared with 1 percent of unassisted properties.

- Fifty-eight percent of the neighborhoods of the unassisted properties were experiencing new construction, compared with only 32 percent of the assisted properties' neighborhoods. On the other hand, significant rehabilitation was reported more often in neighborhoods with assisted properties (32 percent) than in neighborhoods with unassisted properties (26 percent).

- Neighborhoods of assisted properties were more likely to be showing evidence of disinvestment (17 percent) compared with neighborhoods of unassisted properties (1 percent).

Exhibit 1-5

NEIGHBORHOOD TRENDS FOR HUD-INSURED PROPERTIES

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Expected Neighborhood Change					
Improve[a]	37%	35%	38%	37%	39%
Stay the Same	58%	64%	57%	59%	54%
Decline	5%	1%	5%	4%	7%
Occurrence of Significant New Construction Evident					
Yes [a]	37%	58%**	32%	30%	35%
No	63%	42%	68%	70%	65%
Occurrence of Significant Rehabilitation Evident					
Yes[a]	31%	26%	32%	33%	31%
No	69%	74%	68%	67%	69%
Occurrence of Disinvestment Evident					
Yes[a]	14%	1%**	17%	17%	17%
No	86%	99%	83%	83%	83%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: Market Valuation Summaries.

Neighborhood Vacancy Rates

Exhibit 1-6 provides indicators of neighborhood vacancy rates that were collected by the study's market analysts through their discussions with local real estate professionals. The exhibit shows:

- Forty-six percent of properties were in low-vacancy neighborhoods (vacancy rates below 4 percent), 36 percent were in moderate-vacancy neighborhoods (vacancy rates between 4 and 7 percent), and 18 percent were in higher-vacancy neighborhoods (vacancy rates over 7 percent).

- Newer assisted properties were most likely to be located in low-vacancy neighborhoods (52 percent compared with 43 percent for both older assisted and unassisted).

- Older assisted properties were most likely to be located in higher-vacancy neighborhoods (21 percent compared with 14-16 percent for newer assisted and unassisted properties).

- Across all assistance categories the market analysts judged that most (82 percent) properties were in neighborhoods that had vacancy rates similar to or lower than rates in other parts of their jurisdictions. However, 23 percent of older assisted properties were in neighborhoods that had higher vacancy rates than other parts of their local housing markets compared with only 12 percent of unassisted, and 15 percent of newer assisted properties.

- Across all assistance categories, the market analysts felt that in the future vacancy rates in the neighborhoods would likely to remain the same (78 percent). Vacancy rates in unassisted property neighborhoods were considered more likely to increase (15 percent) compared with rates in neighborhoods of assisted properties (9 percent).

Exhibit 1-6
NEIGHBORHOOD VACANCY INDICATORS

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Neighborhood Vacancy Rates					
< 4%[a]	46%	43%	47%	43%*	52%
4% - 7%	36%	41%	35%	36%	34%
7% +[a]	18%	16%	18%	21%*	14%
Vacancy Rates in Neighborhood vs. Other Areas in Local Housing Market					
Above Average[a]	18%	12%*	20%	23%**	15%
Average	63%	62%	63%	61%	66%
Below Average[a]	19%	26%*	17%	16%	19%
Future Vacancy Trends					
Likely to Increase[a]	10%	15%	9%	8%	10%
Likely to Remain the Same	78%	74%	79%	80%	78%
Likely to Decrease[a]	12%	11%	12%	12%	12%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source: Market Valuation Summaries

2.0 Tenant Characteristics

This chapter first describes characteristics of tenants in assisted properties, and then presents several of the specific housing concerns facing low-income tenants in the stock as a whole. The assisted stock provides an important source of housing for low-income families and elderly households. Virtually all of the households living in these properties had very-low or low-incomes and on average one third of households were headed by the elderly. HUD assistance plays a crucial role in maintaining these units as affordable housing.

2.1 Tenants in Assisted Properties

Tenant characteristics for residents in the assisted portion of the stock were obtained from HUD's Tenant Rental Assistance Certification System (TRACS), which tracks tenant characteristics in assisted HUD-insured properties.[1]

Exhibit 2-1 presents characteristics of tenants by assistance category.

- ***Race and Ethnicity:*** The racial composition of properties was similar in newer and older assisted properties—on average 58 percent of residents were white and 37 percent were black. On average 11 percent of residents were Hispanic, regardless of race.

- ***Household Size:*** Nearly half the households in newer assisted properties (49 percent) included only 1 person, compared with 39 percent in older assisted properties.

- ***Income Distribution:*** Nearly all (95 percent) residents in newer assisted properties had very low incomes (below 50 percent of local median for their household size) compared with 67 percent of residents in older assisted properties. Virtually all remaining residents had low incomes (below 80 percent of local median for their household size).

- ***Other Income Characteristics:*** Sources of income also varied in the two types of properties. Although about one fourth of households in each type of property received some public assistance, residents in newer assisted properties were more

1 Data were received on 460 of the 540 assisted properties (150 newer assisted and 310 older assisted). These represent 8,536 of the 10,019 assisted properties in the study universe. Income, household size and elderly/handicap status of the remaining properties were imputed based on assistance category and occupancy type. Race and ethnicity were imputed based on assistance category, occupancy type and characteristics of the property's neighborhood.

likely to receive SSI income (55 percent versus 42 percent), and less likely to have wage income (23 percent versus 39 percent).

- ***Other Demographic Characteristics:*** A higher proportion of households in newer assisted properties were classified as elderly—40 percent compared with 28 percent in older assisted properties. In both types of properties about 11 percent of households were classified as handicapped.

Exhibit 2-1
TENANT CHARACTERISTICS IN ASSISTED PROPERTIES

	All Assisted	Older	Newer
Total Properties	10,019	5,943	4,076
Percent of Total Properties	100%	59%	41%
Race			
White [a]	58%	57%	60%
Black	37%	37%	37%
Native American	1%	1%	1%
Asian	4%	5%	3%
Ethnicity			
Hispanic [a]	11%	12%	9%
Non-Hispanic	89%	88%	91%
Household Size			
1 Person [a]	43%	39%*	49%
2 Person	24%	26%	22%
3 Person	17%	17%	16%
4 + Person	16%	17%	13%
Income Distribution			
Under $5,000	18%	17%	18%
$5,000-<$10,000	48%	43%	55%
$10,000-<$15,000	19%	20%	17%
$15,000-<$20,000	8%	9%	6%
$20,000-<$25,000	3%	4%	2%
$25,000+	4%	6%	1%

Exhibit 2-1, *Continued*

	All Assisted	Older	Newer
Other Income Characteristics			
Very low income[a] (<50% of median)	78%	67%**	95%
Low income (<80% of median)	20%	31%	5%
Not low income (>80% of median)	1%	2%	0
Percent with some public assistance income	24%	25%	24%
Percent with some SS/SSI income [a]	47%	42%**	55%
Percent with some wage income [a]	32%	39%**	23%
Other Demographic Characteristics			
Percent Elderly [a]	33%	28%**	40%
Percent Disabled [a]	11%	10%	12%

[a] Significance test conducted.

* Difference between older/newer assisted significant at the 90% level.

**Difference between older/newer assisted significant at the 95% level.

Note: Column sums may not add to 100% due to rounding.

Source: HUD TRACS

Housing Options for Low-Income Tenants

Exhibit 2-2 examines several specific issues facing low-income tenants across all assistance categories.

The exhibit first reports on the difficulty in finding Section 8 qualified units in neighborhoods where HUD-insured properties are located. This indicates how difficult it would be for low-income tenants in insured sample properties to find alternative housing if property-based subsidies were converted to tenant-based vouchers or certificates and they were required to seek Section 8 qualified housing in the private sector. This information was obtained by the study's market analysts through conversations with local Public Housing Agency (PHA) contacts.

The exhibit then compares the rents currently paid by tenants with the local Section 8 Fair Market Rent (FMR). This provides an indication of how housing costs would change if

tenants did not receive any housing assistance and rented units at the prevailing market rent levels. The FMR, which is set at the 40th percentile of market rents, is an indicator of rents for moderate priced units in the market.

Finally, the exhibit compares the optimal unrestricted market rent with the FMR, as an indication of whether the units in the insured stock would be affordable with tenant-based Section 8 assistance if owners were able to convert all units to optimal use. The optimal unrestricted market rent was computed as the rent that, after making required repairs and upgrades, would yield the highest net market value.[2]

Exhibit 2-2
OPTIONS FOR LOW-INCOME TENANTS

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Difficulty in Finding Section 8 Qualified Units					
Easy/Very Easy[a]	52%	50%	52%	55%	49%
Difficult/Very Difficult	48%	50%	48%	45%	51%
Change in Ease of Finding Units Over Last 5 Years					
Easier[a]	18%	18%	18%	21%**	13%
Same	41%	38%	42%	38%	48%
More Difficult[a]	41%	44%	40%	41%	39%
Tenant Paid Rents/ Local FMR					
< 0.25[a]	23%	0%**	28%	16%**	45%
0.25 - < 0.5	39%	2%	47%	53%	38%
0.5 - < 0.75	18%	7%	21%	27%	11%
0.75 - < 0.9	6%	22%	2%	3%	2%
0.9 - < 1	4%	21%	1%	1%	0%
1 - < 1.2	4%	19%	1%	0%	2%
1.2 - 1.4	3%	4%	1%	0%	2%
1.4 +	3%	15%	0%	0%	1%

2 See Section 6.3 for details on computing optimal unrestricted market rent.

Exhibit 2-2, *continued*

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Optimal Unrestricted Market Rent/Local FMR					
< 0.75[a]	12%**	1%**	14%	15%	13%
0.75 - < 0.9	24%	9%	27%	31%	21%
0.9 - < 1	20%	12%	22%	22%	21%
1 - < 1.2	27%	35%	25%	25%	25%
1.2 - 1.4	11%	22%	8%	3%	15%
1.4 - < 1.75	5%	10%	4%	3%	4%
1.75 +[a]	2%*	9%*	1%	0%	2%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: PHA Context Guide, Financial Data, FMR Data, Market Value Summary.

Section 8 Indicators

- Properties were split about evenly between neighborhoods where the PHA contact thought it was very easy or easy to find Section 8 qualified units and neighborhoods where it was thought be difficult or very difficult to find Section 8 units. The ratings were similar across assistance categories.

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- Forty-one percent reported that it had become more difficult to find Section 8 qualified units over the past five years and another 41 percent reported no change. Older assisted properties were more likely to be in neighborhoods where it was easier now to find units (21 percent) compared with newer assisted (13 percent) and unassisted (18 percent) properties.

Tenant Paid Rents Relative to FMR

- In unassisted properties, rents paid by tenants were generally less than or close to the Section 8 FMR. Nine percent were below 75 percent of FMR while 62 percent were between 75 and 120 percent of the local FMRs. Nineteen percent of rents were over 120 percent of FMR, and therefore not easily affordable to

moderate income households or households with Section 8 vouchers or certificates.

- In assisted properties, rents paid by tenants were almost always below 75 percent of the local Section 8 FMR (95 percent). Thus, it would be expected that these households would find it financially very difficult to rent market-rate units in their local neighborhoods without some sort of assistance.

- All tenant-paid rents were below the local FMR in older assisted properties, as they were in 95 percent of newer assisted properties.

- At the very low end of the distribution, tenant paid rents were below 25 percent of the FMR in 45 percent of newer assisted properties and in 16 percent of older assisted properties. Tenants in this group of 28 percent of assisted properties would face particular hardship without their assistance.

Optimal Unrestricted Use Rents Relative to FMR

- If rents in properties were set at their highest and best use, rents in 45 percent of all insured properties would be above the local FMR. Seventy-one percent would be between 75 and 120 percent of FMR.

- Rents in unassisted properties would be higher relative to FMR compared with rents in assisted properties. Seventy-six percent of unassisted properties would have rents above the FMR including 41 percent with rents above 120 percent of FMR. Only 38 percent of assisted properties would have rents above the FMR in their optimal market position, including 13 percent with rents above 120 percent of FMR.

- Optimal rents relative to FMR would be lower in older assisted properties compared with newer assisted properties. Sixty-nine percent of older assisted properties would have rents below the FMR, and another 25 percent would have rents between 100 and 120 percent of FMR. In contrast, 55 percent of newer assisted properties would have rents below the FMR, and another 25 percent would have rents between 100 and 120 percent of FMR.

- This means that if properties were allowed to operate at their optimal market level more than a third (38 percent) of assisted properties would not be affordable even with Section 8 tenant-based assistance provided at the FMR and 13 percent would not be affordable with rents allowed at 120 percent of the FMR.

3.0 Physical Condition of the Stock of Multifamily Housing

This chapter presents measures of the physical condition of the stock of HUD-insured (or held) multifamily properties. Two primary measures are discussed. Section 3.1 describes the current backlog of physical needs in the stock, and Section 3.2 describes the annual accrual of capital needs.

3.1 Current Backlog of Physical Needs

A property's current physical condition (physical needs backlog) was measured by the cost of repairs and replacements beyond ordinary maintenance required to restore a property to its original working condition. Property systems still in good working order (requiring "no action") by definition, had no associated costs.

The backlog of physical needs was computed using a standardized set of unit costs that were multiplied by the quantity and action level appropriate to a particular property (e.g., the number of windows in the property that the inspector determined needed replacement was multiplied by the cost of replacing a window of the appropriate size). The inspection protocol included observing conditions of 119 mechanical, electrical, and architectural systems, organized by major property elements (site, building, or unit). The 119 specific systems were combined into 17 major system groups for costing and reporting purposes. The systems and their groupings are presented in Exhibit 3-1. For each system, the inspector judged and recorded the level of remedial action. As with the 1990 Study, the A.M. Fogarty Company supplied the per-unit costs for each of the repair and replacement items. Property costs were then multiplied by location-specific adjustment factors to obtain the local cost of repair needs for each property. Using the same data sources (described in Appendix B) and costing procedures (described in Appendix C) helped to assure the consistency of cost comparisons between the 1989 and 1995 outcomes.

To compare costs across properties having different numbers of units, each property's costs were expressed on a "per-unit basis". Furthermore, to permit comparisons across properties having different sized units (since a property of predominantly efficiency units will have lower costs per unit than an otherwise identical property of 3-bedroom units), all property-level costs were normalized on the basis of unit square footage, using each property's

Exhibit 3-1
SYSTEM GROUPS AND KEY SYSTEMS INSPECTED

Site Areas- landscaping, roadways, parking, paved pedestrian areas, curbing, fencing, retaining wall, site drainage, pole mounted site lighting.

Site Amenities- site furniture, yards and enclosures, dumpsters, pool, tennis courts, basketball courts.

Site Distribution Systems- emergency generator, site electrical distribution, hot water distribution, domestic hot& cold water lines, main water service, gas lines, site sanitary lines, septic system, sewage ejectors, hydrants.

Building Mechanical & Electrical - heating risers, gas distribution, sanitary distribution, fire sprinkler system, sump pump, compactors, switchgear, building wiring, emergency lights, building smoke detector, communication system.

Building Heating & Cooling - central vent/exhaust, central air conditioning, furnace, boiler, boiler room piping, boiler room equipment, boiler room controls.

Building Elevators - shaftways, shaftway doors, cabs, machinery.

Building Exterior Closure - foundation, slab, exterior wall, insulation.

Building Roofs- roof covering, parapet wall, chimney, roof hatches, skylight, roof drainage.

Building Windows & Doors- windows, window security grates, exterior common doors, unit entry doors, storm/screen doors.

Building Exterior Features - canopies, exterior stairs, building mounted site lights, fire escapes, balconies, porches, decks, sheds.

Building Common Areas - vestibules, corridors, stairways, interior lights, mail facilities.

Unit Interior Construction - interior walls-partitions (excluding kitchen and bathroom), floor sub-base.

Unit Interior Finishes - interior walls-surface, floor covering, interior doors & frames, kitchen walls, kitchen floor, bathroom walls, bathroom floor.

Unit Kitchen Fixtures - kitchen cabinet/counter, range and hood, refrigerator, garbage disposal, dishwasher, microwave, trash compactor.

Unit Bathroom Fixtures - bathroom fixtures, bathroom accessories, vanities.

Unit Heating & Cooling - HVAC units, radiation, boiler (unit level), furnace (unit level), temperature control, wall air conditioner.

Unit Electrical - electrical panel, electrical wiring, bell/intercom, smoke detector.

"2-bedroom equivalent" rather than its actual number of units.[1] This serves to normalize data for comparisons across assistance categories that have different unit-size mixes. Throughout this report when per-unit values are presented, they are actually per 2-bedroom equivalent unit.

For ease of reference, the level of physical needs backlog has been divided into four categories. These categories are defined in relation to average annual normal physical needs accrual, which was estimated at $1,437 per unit per year.[2]

- No backlog: less than $10 per unit
- Normal backlog: $10 to $1,500 per unit
- Moderate backlog: $1,500 to $3,000 per unit
- Serious backlog: over $3,000 per unit

Exhibit 3-2 shows the backlog of physical needs for the full multifamily housing stock by assistance category.[3] Exhibit 3-3 shows this information graphically. The exhibits show that:

- The mean backlog of physical needs was $3,236 with a median of $1,452. The mean backlog was highest in assisted properties, averaging $3,638 (median $1,661) and lowest in unassisted properties, averaging $1,427 (median $545). The mean backlog was not statistically different between older and newer assisted properties ($3,929 and $3,214 respectively).

- The total estimated backlog for the stock was $4.17 billion, $3.5 billion of which was in assisted properties.

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1 The number of "2 bedroom equivalent" units was calculated by dividing the total square feet of living space by 844. This was the national average square footage of a 2 bedroom unit in the 1990 Study. For consistency we used the same number in the current study. The estimated numbers of 2BR units and actual units by assistance category are as follows:

	Number of 2-bedroom Equivalent Units	Number of Actual Units
Unassisted	350,815	354,083
Older Assisted	643,468	686,309
Newer Assisted	319,714	364,848
Total	**1,314,026**	**1,405,240**

Appendix Exhibit D-1 presents key statistics on a "per 2-bedroom unit" basis for the stock as a whole, while the tables in the body of the report present all data on a "per 2 BR" basis at the property level. In other words, the text tables answer questions such as what is the average backlog per 2-bedroom unit across *all properties*, while the appendix exhibit answers questions such as what is the average per 2-bedroom unit backlog across *all units* in the stock.

2 These categories are clearly somewhat arbitrary and other breaks could have been used.

3 In addition to comparing backlog to average accrual across the stock, we compared each property's backlog of physical needs to its own average annual accrual. Because average annual accruals were fairly similar across all properties, this did not yield very different results from comparisons with accruals stock-wide.

- Thirteen percent of the stock had virtually no backlog of physical needs (under $10 per unit). Unassisted properties were more likely to have no backlog. Twenty-one percent of the unassisted stock had no backlog. Fewer older assisted properties had no backlog (8 percent) than did newer assisted properties (15 percent).

- Thirty-eight percent of the properties had backlogs of physical needs that can be considered normal, in the range of about one year's worth of average accrual of physical needs. This level of physical need does not seem problematic, since it is within the normal cycle of accumulation of physical needs in a property. Again, more of the unassisted stock (45 percent) had normal backlogs of physical needs than did the assisted stock (36 percent). Newer assisted properties were more likely to have normal backlogs (40 percent) compared with older assisted properties (34 percent).

- Nineteen percent of the properties had moderate backlogs of physical needs, which is the equivalent of about one to two years' worth of average accrual of needs. This level of backlog may be a cause of concern, since it appears to exceed a normal annual accumulation of need.

- Thirty percent of properties had serious backlogs of physical needs (over $3,000 per unit). This is at least two years' worth of accrual of needs, and seems likely to indicate problems that will affect residents and the marketability of the property, and may ultimately threaten the financial viability of the property. The percentage of older assisted properties in this category far exceeded the percentage of unassisted and newer assisted properties in this category. Forty-one percent of older assisted properties had serious backlogs of physical needs. In contrast only 11 percent of unassisted properties had such high backlogs. Newer assisted properties were between these two extremes: one quarter had backlogs of physical needs of over $3,000 per unit.

- Fifty-eight percent of older assisted properties had moderate or serious backlogs (of over $1,500 per unit) compared with 46 percent of newer assisted properties and 33 percent of unassisted properties.

Exhibit 3-2

DISTRIBUTION OF BACKLOG OF PHYSICAL NEEDS BY ASSISTANCE CATEGORY (IN 1995 DOLLARS PER 2BR EQUIVALENT UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%[b]	41%[b]
Distribution of Backlog of Physical Needs					
No Backlog[a]	**13%**	**21%***	**11%**	**8%***	**15%**
<$10	13%	21%	11%	8%	15%
Normal Backlog	**38%**	**45%**	**36%**	**34%**	**40%**
$10 to <$500	15%	27%	13%	14%	11%
$500 to <$1,000	12%	6%	13%	11%	16%
$1,000 to <$1,500	11%	12%	10%	9%	13%
Moderate Backlog	**19%**	**22%**	**19%**	**17%**	**21%**
$1,500 to <$2,000	8%	11%	8%	7%	9%
$2,000 to <$2,500	6%	5%	6%	5%	7%
$2,500 to <$3,000	5%	6%	5%	5%	5%
Serious Backlog[a]	**30%**	**11%****	**35%**	**41%***	**25%**
$3,000 to <$4,000	7%	5%	7%	8%	6%
$4,000 to <$5000	5%	0%	7%	8%	5%
$5,000 to <$7,500	7%	2%	8%	10%	5%
>= $7,500	11%	4%	13%	15%	9%
Statistics on Backlog of Physical Needs					
Mean[a]	$3,236	$1,427**	$3,638	$3,929	$3,214
Standard Error	203	255	240	276	430
Median	$1,452	$545	$1,661	$2,096	$1,324

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

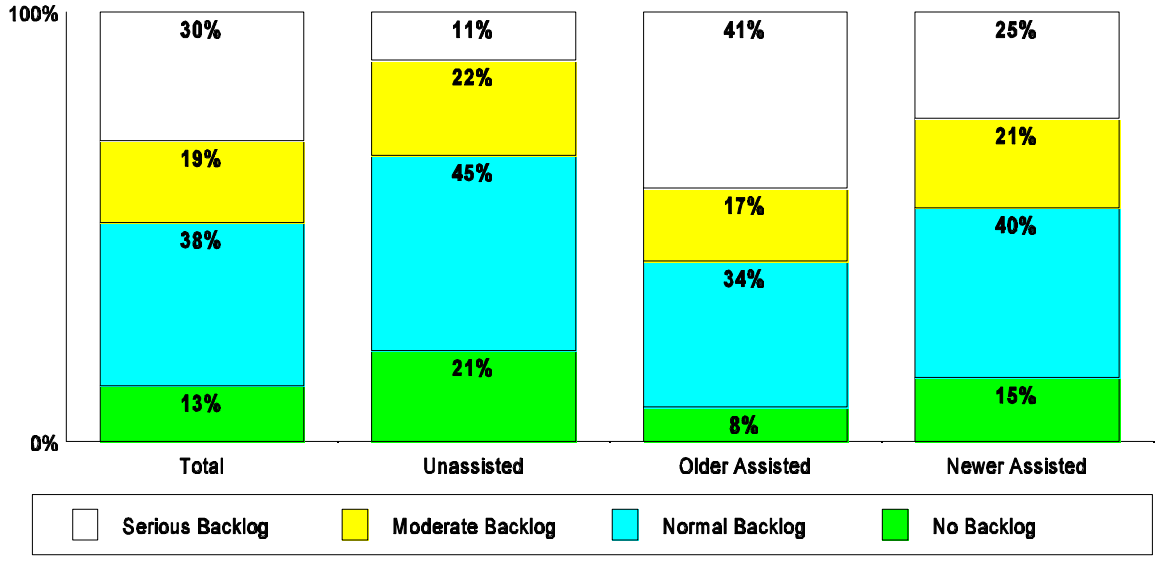
[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data and Costing Programs.

Exhibit 3-3
BACKLOG DISTRIBUTION BY LEVEL



Source: Exhibit 3-2

The medians backlogs of physical needs were far lower than the means, which indicates that some properties had extremely high backlogs.

- The median backlog for unassisted properties ($545) was well below one year's average accrual, meaning that most properties are keeping up with their repair needs.

- The median for older assisted properties was $2,096 -- much lower than the mean, but still well over the average annual accrual of physical needs.

- The median for newer assisted properties ($1,324) was approximately equal to one year's average accrual of physical needs.

Components of Backlog of Physical Needs

The inspection protocol included observing conditions of 119 mechanical, electrical, and architectural systems, organized by major property elements (site, building, or unit). The 119 specific systems were combined into 17 major system groups for costing and reporting purposes. (See Exhibit 3-1 above.) As can be seen in Exhibit 3-4, most of the repair costs

(54 percent) were attributed to unit-level systems. Building systems were the next largest component of physical needs backlog, accounting for 31 percent of needs overall. The smallest costs were those associated with sites, accounting for only 14 percent of all physical needs. The distribution of physical needs across property elements was similar across all assistance categories.

- The largest component of need was Kitchen Fixtures (23 percent of total backlog costs), which includes items such as cabinets, counters, ranges, and refrigerators. Kitchen Fixtures are subject to a high level of resident use and wear out relatively quickly.

- The second largest component of need, unit Interior Finishes, accounted for 21 percent of the mean physical need backlog. Interior Finishes are largely surface elements such as wall and ceiling surfaces and interior doors. These elements are also subject to a high level of resident use and generally wear out more quickly than most systems.

- The third largest component of backlog need was site areas (12 percent of backlog costs). Site areas include items such as landscaping, roadways, and other paved areas.

Exhibit 3-4

DISTRIBUTION OF BACKLOG OF PHYSICAL NEEDS BY SYSTEM GROUP[a]

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Site Costs	**14%**	**15%**	**14%**	**15%**	**14%**
Site Areas	12%	13%	11%	12%	11%
Site Amenities	3%	2%	3%	3%	3%
Site Distribution	0%	0%	0%	0%	0%
Building Costs	**31%**	**36%**	**31%**	**31%**	**30%**
Mechanical & Electric	1%	1%	2%	2%	1%
Heating & Cool	3%	5%	3%	3%	3%
Elevators	0%	0%	0%	0%	0%
Exterior Closure	6%	10%	5%	5%	6%
Roofs	7%	10%	7%	6%	7%

Exhibit 3-4, *continued*

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Windows & Doors	8%	5%	8%	10%	5%
Exterior Features	2%	1%	2%	2%	2%
Common Areas	4%	5%	4%	3%	4%
Unit Costs	**54%**	**49%**	**55%**	**54%**	**56%**
Interior Construction	1%	0%	1%	1%	0%
Interior Finishes	21%	18%	22%	21%	23%
Kitchen Fixtures	23%	26%	23%	21%	25%
Bath Fixtures	5%	3%	5%	5%	5%
Heating & Cooling	3%	1%	3%	4%	1%
Electrical	1%	1%	1%	1%	1%
Total	100%	100%	100%	100%	100%
Mean	$3,236	$1,427	$3,638	$3,929	$3,214

[a] Percents are calculated only for properties with backlog greater than 0.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data and Costing Program.

Unit interior finishes and kitchen fixtures were also the two largest cost components in 1989 (their shares were 37 percent and 14 percent respectively).

While the level of repair needs was higher in the older assisted properties than in either unassisted or newer assisted properties, the distribution of costs by system group was similar across assistance groups.

Costs Associated with Health and Safety Systems

The effect of a given backlog of physical needs depends on the types of systems affected and the repairs and replacements that are required. Backlogs that are in systems that directly affect resident health and safety—such as interior construction, heating and cooling, and building mechanical systems—are of special concern. The immediate threat to resident safety

is diminished to the extent that the needed repairs are in systems that are more cosmetic, such as site amenities or interior finishes.

For the purposes of this study, a subset of the systems groups was identified as most relevant to health and safety:

- Unit Interior Construction
- Unit Bathroom Fixtures
- Unit Heating and Cooling
- Unit Electrical
- Building Heating and Cooling
- Building Mechanical and Electrical

The mean costs for these Health and Safety Systems are shown in Exhibit 3-5. For all properties, 20 percent of all physical needs (an average of $659 and a median of $65 per 2BR equivalent unit) were in Health and Safety Systems.

This share of Health and Safety systems in the overall needs estimate was relatively constant across assistance categories, but as with other repair costs, older assisted properties had much higher Health and Safety needs (mean $850 and median of $150 per 2BR unit). Most unassisted properties had no backlog needs in Health and Safety Systems. (The median for this assistance category was $0.)

Exhibit 3-5
BACKLOG OF PHYSICAL NEEDS FOR HEALTH & SAFETY SYSTEMS
(IN 1995 DOLLARS PER 2BR EQUIVALENT UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Total Backlog (All Property Systems) Mean	$3,236	$1,427	$3,638	$3,929	$3,214
Backlog for Health and Safety Systems					
Mean[a]	$659	$273**	$745	$850*	$592
Standard Error	66	97	77	101	119
Median	$65	$0	$105	$150	$72
Health & Safety as a % of Total Backlog	20%	19%	20%	22%	18%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source: 1995 Physical Inspection Data and Costing Program.

While the dollar amount attributed to Health and Safety systems increased from $377 in 1989 to $659 in 1995, the percent of all physical needs that were attributed to Health and Safety Systems fell from 25 percent in 1989 to 20 percent in 1995. This decrease in the percent of all physical needs that are attributed to Health and Safety Systems can primarily be attributed to the change in the relative distribution of backlog of physical needs between unit-level and non unit-level systems from 1989 to 1995. Most of the Health and Safety systems are unit level systems, and in 1989 unit level systems accounted for 59 percent of the total backlog, whereas in 1995 unit level systems accounted for only 55 percent of the total backlog.

Changes in the Physical Condition of the Stock

One of the most significant findings of this study is that the physical condition of many HUD-insured properties has deteriorated between 1989 and 1995. The properties were aging, and apparently property owners and managers were not keeping up with repair needs. After controlling for inflation, the mean backlog of physical needs across the stock rose by over 60 percent between 1989 and 1995. As described below, across all categories of properties the average backlog increased, but the increase was largest by far in newer assisted properties.[4]

4 The study was not designed to provide reliable property-specific estimates of physical needs, but rather to provide reliable estimates at the level of assistance category. Thus, comparing changes in the backlog of physical needs of specific properties may be misleading and is not done here.

Exhibit 3-6
COMPARISON OF BACKLOG OF PHYSICAL NEEDS BETWEEN 1989 AND 1995
(IN 1995 DOLLARS PER 2BR EQUIVALENT UNIT)
(BASED ON OVERLAP SAMPLE)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
% of Properties	100%	18%	82%	59%[a]	41%[a]
Mean Backlog of Physical Needs					
1995	$3,058	$1,427	$3,420	$3,845	$2,800
1989	$1,882	$960	$2,086	$2,769	$1,091
Median Backlog of Physical Needs					
1995	$1,551	$545	$1,823	$2,280	$1,390
1989	$787	$117	$982	$1,580	$373
Percentage of Properties with Backlog of Physical Needs <$10					
1995	12%	21%	10%	8%	13%
1989	20%	37%	17%	11%	26%
Percentage of Properties with Backlog of Physical Needs between $10 and $1,500					
1995	37%	46%	35%	38%	39%
1989	43%	44%	42%	45%	49%
Percentage of Properties with Backlog of Physical Needs between $1,500 and $3,000					
1995	21%	22%	21%	19%	24%
1989	15%	9%	17%	18%	15%
Percentage of Properties with Backlog of Physical Needs over $3,000					
1995	31%	11%	35%	42%	25%
1989	22%	10%	24%	34%	10%

[a] Older assisted properties represent 59% of assisted properties and 49% the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source: 1995 Data: 1995 Physical Inspection Data and Costing Program.
1989 Data: 1990 Study Analysis File.

Exhibit 3-6 presents indicators of change in the mean, median and distribution of the backlog of physical needs in 1989 and in 1995. These numbers are slightly different from the numbers in Exhibit 3-2 because the results are based on the overlap sample of 504 properties that were included in both studies. Using only properties that were included in both studies eliminates

the possibility that changes in the estimated backlog of physical needs results from changes in the sample of properties used. All numbers were weighted to reflect the stock of properties that was still insured in 1995.[5]

- The mean backlog of physical needs across the entire stock in 1989 was $1,882 per unit (in 1995 dollars). The mean backlog rose to $3,058 per unit in 1995, a 62 percent increase from the 1989 mean.

- While the absolute backlog was highest in older assisted properties in both years, the percentage increase between 1989 and 1995 was smallest at 40 percent.

- The absolute backlog was lowest in unassisted properties in both years. The mean backlog use by about 50 percent between 1989 and 1995.

- These increases in mean backlog of physical needs are certainly cause for concern, but they are much smaller than the increase in mean backlog of physical needs in newer assisted properties. In that portion of the stock the mean backlog rose by over 150 percent during the same time period.

- Across the stock as a whole, the proportion of properties with no backlog of physical needs decreased from 20 percent in 1989 to 12 percent in 1995. At the other extreme, the proportion of properties with backlogs of physical needs over $3,000 per 2-bedroom unit increased from under a quarter of the stock (22 percent) in 1989 to nearly a third (31 percent) in 1995.

In all three categories of the stock, the proportion of properties with high levels of backlog increased between 1989 and 1995.

- Over one third (37 percent) of unassisted properties had no backlog of physical needs in 1989, compared with only 21 percent in 1995. In contrast, the proportion with backlogs between $1,500 and $3,000 per unit more than doubled from 9 percent to 22 percent. The proportion of unassisted properties with very high backlogs of over $3,000 per unit stayed nearly constant, going from 10 to 11 percent.

5 The overall reported differences in backlog reflect both changes in actual property condition and changes in several system definitions and costs (beyond controlling for inflation). Unit cost estimates for repairing some systems increased since 1989 and decreased for other systems. The definitions of actions associated with some systems changed as well. As shown in a separate analytic memorandum, the reported change in mean backlog appears to be a true result of deterioration in condition rather than a result of changes in specific cost components. Comparing the mean backlog of physical needs in 1989 with the calculated mean using 1989 condition and the 1995 cost files shows that the changes in costs had almost no effect on the estimated mean backlog of physical needs. The mean backlog of physical needs in 1989 was $1,882 per unit. Using the 1995 cost file, and 1989 condition yields an overall mean estimate of $1,876 per unit.

- Among older assisted properties, in both years very few properties had no backlogs of physical needs. However the proportion with backlogs between $10 and $1,500 per unit decreased from 45 percent to 38 percent of properties. At the other extreme, in 1995, 42 percent of older assisted properties had backlogs of over $3,000 per unit compared with about a third (34 percent) in 1989.

- As noted above, the deterioration in physical condition was most severe in newer assisted properties. In that portion of the stock, in 1989 three quarters of properties had backlogs of physical needs under $1,500 per unit, including over one quarter (26 percent) with no backlogs. Only 10 percent of newer assisted properties had backlogs over $3,000 per unit. In 1995 the situation was very different. Just over half (52 percent) the properties had backlogs of under $1,500 per unit, including only 13 percent with no backlog. One quarter of the properties had backlogs of over $3,000 per unit.

3.2 Projected Future Physical Needs - Physical Needs Accrual Costs

A property's physical needs accruals are estimates of the average annual costs needed to cover expected repairs and replacements beyond ordinary maintenance for all systems over each of the next 20 years. As with backlog costs, accrual costs were computed based upon inspectors' examination of each Observable System. For each system a set of standardized costs was applied, incorporating timing information based on the system's remaining useful life (or required action level in the case of systems, such as interior walls, which need periodic refurbishment rather than replacement of framing and plasterboard). Estimates of future accrual needs indicate a property's expected need for resources in the future.

Each system was assigned an expected useful life (or required action level) and an accrual cost. For systems requiring periodic replacement or major overhaul:

- Useful life is the age of a system when it must be replaced (or overhauled) because it has worn out or is approaching failure, and

- Accrual cost is the cost of replacing or overhauling the system.

For example, boilers are expected to last 25 years (useful life) and the associated accrual cost is the cost of a new boiler. A few items are not expected to wear out, but will need periodic major action. For these items, the "expected life" is the action interval, and the accrual cost is the repair cost. For example, brick chimneys or walls are not expected to wear out at any known interval, but must have the mortar joints raked out and repointed, and be waterproofed

every ten years. The associated accrual cost is the cost of raking and repointing mortar joints, as well as waterproofing.

Some systems were deemed inappropriate for accrual estimates because they were not expected to need replacement or overhaul over the 20-year horizon used for this study. An example is the Site-Level Domestic Hot Water Lines. Over time, a portion of the lines may need to be replaced, but this is not an expected occurrence. (Appendix Exhibit C-4 shows the expected useful life and accrual actions for all systems).

For most systems, the inspectors recorded system age as part of the on-site inspections; for other systems, the study assigned age equal to the age of the buildings. To prevent double-counting of a property's physical needs, age was set to zero for any system that needed replacement or overhaul as part of the physical needs backlog. In other words, for computing accrual, the study assumes that the physical needs backlog was fully remedied in year zero.

The study's accrual costing program determined, for each of the next 20 years, whether the observed system would reach the end of its useful life that year (based on its expected useful life and on the system age), and if so, added the repair/replacement cost to the accrual total for that year.

As shown in Exhibit 3-7, the mean annual accrual cost over the next 20 years was $1,437 per 2BR equivalent unit, with a median of $1,362 (expressed in 1995 dollars). As can be seen, three fourths of all properties are expected to have average annual accrual of needs between $1,000 and $2,000 per 2BR unit per year. There was no significant difference in the average annual accrual across assistance categories.[6]

6 The increase in accrual estimate is mainly due to a change in the estimation approach used to impute costs for uninspected units and buildings. This study estimated accrual costs for uninspected units based on the ratio of inspected unit square footage to total square feet, and accrual costs for uninspected buildings based on the proportion of the property's units that were in the inspected buildings. In 1989, both unit and building level accruals for uninspected units and buildings were computed based on the share of total backlog that the inspected units (or buildings) represented. Using data on the comparison sample of properties, the stockwide estimate of average 20-year annual accrual costs was $1,057 in 1989 (expressed in 1995 dollars) using the 1989 estimation approach. Using the 1995 methodology and the 1989 data yields an estimate of $1,448, which is very close to the 1995 estimate of $1,437 per unit.

Exhibit 3-7
PROJECTED AVERAGE ANNUAL ACCRUAL OF PHYSICAL NEEDS OVER 20 YEARS
(IN 1995 DOLLARS PER 2BR EQUIVALENT UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Average Annual Accrual					
<$1000	16%	9%	17%	19%	14%
$1000-$1499	45%	49%	44%	43%	45%
$1500-$1999	30%	32%	29%	26%	34%
$2,000-$2,499	7%	7%	7%	8%	5%
$2,000 or more	3%	2%	3%	4%	2%
Statistics on Annual Accrual					
Mean[a]	$1,437	$1,514	$1,420	$1,404	$1,443
Standard Error	19.6	54.1	20.7	28.2	29.8
Median	$1,362	$1,419	$1,331	$1,301	$1,399

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data and Costing Program.

4.0 Financial Condition of HUD-Insured and Held Properties

This section provides information on various aspects of property finances including annual net cash flow (Section 4.1), ability to cover the physical needs backlog and annual accrual of needs (Section 4.2), and Section 8 assistance (Section 4.3).

4.1 Annual Net Cash Flow

Annual net cash flow is a key indicator of a property's viability, showing whether it can meet its ongoing obligations. Specifically, annual net cash flow (before income taxes) shows the degree to which a property can cover current operations and routine maintenance, mortgage debt service, and annual deposits to its replacement reserve fund (to cover future physical replacements). Positive annual net cash flow is also requisite for making distributions to owners.

A property's annual net cash flow equals its revenues less expenses. The primary revenue source for most properties is apartment rents paid by residential tenants, and in assisted properties, subsidies paid by HUD. Other revenue sources may include commercial rent, financial revenue (such as interest income from reserve accounts), or forfeited tenant deposits. Property expenses include operating and maintenance costs, debt service, and deposits to the replacement reserve account. As was done in the section on physical needs, financial items and reported on a per 2-bedroom equivalent unit basis to allow comparisons across properties of different sizes (unit counts) and unit compositions (distribution of units by bedroom counts).

For this report we define annual net cash flow as:

1. Weighted average of property revenue over most recent three years

2. *Minus* Weighted average of operating expenses over most recent three years

3. *Minus* Weighted average deposits to replacement reserve account (maximum of actual and required deposit) over most recent two years

4. *Minus* Mortgage debt services (including interest and principal on mortgage and any supplementary loans and operating loss loans) and mortgage insurance premium.

Where:

1. The 3-year weighted average of property revenues includes actual rental income (which equals potential rent less any vacancy losses) from tenant paid apartment rents and tenant assistance payments (Section 8 assistance), plus any commercial or financial income.[1] A weighted average over the most recent 3 years was used, with the more recent years receiving higher weights.[2] By averaging over 3 years, the measure focused on long-term revenue flows in a property, and reduced the effect of one-time outliers. The application of a higher weight to more recent years incorporated trends into the measure.

2. The 3-year weighted average operating expenses equals the sum of the cost components reported in the project financial statements -- administrative expenses, utility expenses, operating and maintenance expenses, and tax and insurance expenses.[3]

3. The 2-year weighted average of deposits to the reserve for replacement account equals the maximum of actual deposits as reported on the annual financial statements and required deposits, either as reported on the annual financial statements or as 0.5 percent of the original mortgage amount.[4]

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1 Total Revenues come from HUD form 92410. The Total Revenue line from the form was adjusted when it appeared that tenants paid their own utilities. In order to have comparable income and expense numbers across properties, we added in utility costs to both the revenue and expense sides when it appeared, based on the value of utilities in the utility expense line that tenants paid their own utilities. Adjustments were based on the average cost per square foot reported in the 1996 IREM Income/Expense Analysis reports by receipt of assistance, region and building type. Financial data came from several sources. HUD supplied us with Annual Financial Statement files for 1993 - 1995. The 1993 and 1994 files contained more complete information (including reserves). We also obtained information from HUD's Data Warehouse for 1992 - 1994, and from backup HUD tapes for 1992-1994. Interest Reduction Payments (IRPs) in Section 236 properties are not reflected on form 92410. IRPs therefore, are not reflected in reported total revenues.

2 For properties with three years (or more) years of data, the most recent data received a weight of 0.5, the second most recent year 0.3 and the third most recent 0.2. When four years of data were available, only the most three years were used. For properties with two years of data, the most recent data received a weight of 0.6 and the oldest year a weight of 0.4. For properties with only one year of data, the weight was 1. For the properties that were missing financial data, values were imputed based on median values by assistance category and building type. HUD data files were fairly complete. For example, 354 sample properties had four years of total revenue data, 186 had three years, 53 had two years, 16 had one year, and 12 had no financial data. For other financial variables the coverage was similar. The most recent year of available data was 1995, for which 354 properties had at least some financial data.

3 Line 6200 and 6300 from HUD form 92410 for administrative expenses, Line 6400 for utilities, Line 6500 for operating and maintenance, and Line 6700 for taxes and insurance. As discussed above, for consistency across properties, utility expenses were adjusted when it appeared that tenants paid their own utilities for their apartments.

4 As of 1968 the required deposits to the replacement reserve account were 0.6 percent of the total replacement costs of structure for new construction properties, and 0.4 percent of the mortgage amount for rehab properties. Information on deposits to the reserve for replacement account were apparently not entered into HUD's automated data systems. These data are only available for 1993 and 1994, in the file provided by HUD. 563 properties had information for both years, 38 for one year, and 20 provided no information. Where two years of data were available the weights were 0.6 for the more recent year and 0.4 for the earlier year. For about 64 percent of properties the actual amount was used. For 9 percent, the reported required amount was used, and for 27 percent, .5 percent of the mortgage was used.

4. Debt service was computed from the mortgage amount, term and interest rate. Mortgage insurance premium (0.5 percent of the outstanding principal balance) was added to the debt service costs for all properties except Section 221(d)(3) BMIR properties and Section 236 properties. Section 221(d)3 BMIR properties pay no mortgage insurance premium. Section 236 properties make debt service payments based on a 1 percent interest rate. The remaining interest payments to the mortgagee are made by HUD. The debt service also includes payments for supplementary loans and operating loss loans.[5]

Property Revenues

Exhibit 4-1 shows the components of annual revenue by assistance category. All data are presented in 1995 dollars.[6] Total revenues include rent revenues, tenant assistance payments, commercial, financial and "other" revenues, net of vacancy losses. The exhibit shows that:

- Mean revenues for the HUD-insured properties were $7,646 per 2-bedroom unit per year, with a median of $6,541.

- On average, revenues for unassisted properties ($7,978) were about midway between revenues for older assisted ($5,868) and newer assisted ($10,057) properties.

- Tenant paid rents accounted for nearly all of the revenue in unassisted properties ($7,632 of the average revenue of $7,978). In assisted properties tenant paid rents accounted for about 40 percent of revenue, with most of the remaining revenue coming from tenant assistance payments from HUD.

- Consistent with the higher tenant incomes in older assisted properties, tenants paid rents in these properties were higher on average than in newer assisted properties, averaging $3,287 per 2-bedroom unit per year, compared with $2,593 in newer assisted properties.

5 Our sample included 4 properties that received operating loss loans (which are generally provided at or near the time of origination) and 21 properties that received Section 241 supplementary loans at some point after origination.

6 All values were converted to 1995 dollars using the CPI for Urban Consumers for Housing (1992 = 138.5, 1993 = 142.3, 1994=145.4, and 1995 = 149.7).

Exhibit 4-1
COMPONENTS OF PROPERTY REVENUES
(IN 1995 DOLLARS PER 2 BR EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%[b]	41%[b]
Total Revenues (Net of Vacancies)					
Mean[a]	$7,646	$7,978	$7,572	$5,868**	$10,057
Standard Error	156	562	144	150	279
Median	$6,541	$6,363	$6,663	$5,183	$9,128
Tenant Paid Rents					
Mean[a]	$3,846	$7,632**	$3,005	$3,287**	$2,593
Standard Error	121	584	84	89	161
Median	$3,213	$5,976	$2,791	$3,186	$2,124
Tenant Assistance Payments[c]					
Mean[a]	$3,730	0**	$4,558	$2,576**	$7,448
Standard Error	103	0	127	137	239
Median	$3,083	0	$3,868	$2,310	$7,106
Vacancy Loss (As a Percent of Rent Revenue)					
Mean[a]	3.12%	5.76%**	2.53%	3.37%**	1.30%
Standard Error	0.015	0.0059	0.0014	0.0022	0.001
Median	1.78%	4.50%	1.47%	2.28%	0.91%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

[c] Tenant Assistance Payments include only Section 8 assistance, and do not include interest reduction payments (IRP) on subsidized and below market interest rate loans.

Source: Annual Financial Statements for 1992 - 1995.

- Tenant assistance payments were significantly higher in newer assisted properties compared with older assisted properties, averaging $7,448 per 2-bedroom unit, compared with $2,576 per 2-bedroom unit in older assisted properties. This is because all newer assisted properties received Section 8 assistance compared with 71 percent of older assisted properties. In addition, the amount of assistance received was also higher averaging $7,448 per unit compared with $3,250 per unit in older assisted properties.[7]

- Vacancy losses were low across all categories of insured properties, averaging 3.12 percent (with a median of 1.78 percent).

- Vacancy losses were highest in the unassisted properties averaging 5.76 percent, and lowest in the newer assisted properties, averaging only 1.3 percent. These extremely low vacancy rates in assisted properties are expected because the project-based assistance these properties receive helps them attract lower-income renters.

Property Expenses

Exhibit 4-2 shows the components of total property expenses.

- Total annual expenses (including operating and maintenance expenses, replacement reserve deposits and debt service) averaged $7,052 per year. Expenses were highest in the newer assisted properties (averaging $8,952) and lowest in the older assisted properties (averaging $5,585).

- The differences in total annual expenses across assistance categories result primarily from differences in debt service costs. Debt service costs averaged $3,760 in the newer assisted properties, $2,930 in the unassisted properties, and only $859 in the older assisted properties. The difference in debt service costs reflects both the timing of the loans—newer assisted properties generally have higher mortgage principal and interest payments—and the interest subsidies and below market interest rates provided to most of the older assisted properties.[8]

- Operating and maintenance expenses were very close across all three categories of properties, averaging $4,540 per unit per year. As in 1989, however, operating

7 In this analysis interest reduction payments (IRPs) for the Section 236 properties were excluded both from revenues and expenses. If IRPs were included in tenant assistance payments the average tenant assistance payment across all older assisted properties would be $3,171 per unit rather than $2,576. Total revenues in older assisted properties would then average $6,462 per unit.

8 As indicated above, IRPs were excluded from both revenues and expenses. If they were included in expenses, debt service in older assisted properties would average $1,454 per unit instead of $859. Total expenses would average $6,179.

and maintenance expenses of newer assisted properties ($4,928) remained higher than those of older assisted ($4,349) or unassisted properties ($4,338).

Exhibit 4-2
COMPONENTS OF ANNUAL EXPENSES
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Total Annual Expenses					
Mean[a]	$7,052	$7,491	$6,955	$5,585**	$8,952
Standard Error	146	555	130	129	257
Median	$6,184	$6,019	$6,265	$5,071	$8,066
Operating and Maintenance Expenses					
Mean[a]	$4,540	$4,338	$4,585	$4,349**	$4,928
Standard Error	84	267	85	100	148
Median	$4,035	$3,751	$4,114	$3,901	$4,396
Replacement Reserve Deposit [max(actual, required)]					
Mean[a]	$311	$222**	$331	$376**	$264
Standard Error	11	25	12	19	13
Median	$219	$160	$244	$263	$230
Total Debt Service (including MIP, supplementary loans and op loss loans)[c]					
Mean	$2,201	$2,930*	$2,039	$859**	$3,760
Standard Error	80	359	57	36	130
Median	$1,512	$1,859	$1,334	$614	$3,359

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

[c] Debt Service was calculated based on mortgage interest rate and does not include interest reduction payments (IRP) on Section 236 properties.

Source: Annual Financial Statements for 1992-1995.

Annual Net Cash Flow

Exhibit 4-3 brings together revenues and expenses to display annual net cash flow which equals revenues less operating expenses, replacement reserve deposits, and debt service.

Exhibit 4-3
ANNUAL NET CASH FLOW
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Negative Net Cash Flow[a]	**25%**	**25%**	**25%**	**35%****	**13%**
<-$1,000	3%	9%	2%	3%	1%
-$1,000 to <-$500	4	6	4	6	1
-$500 to < -$250	6	6	5	6	4
-$250 to <$0	12	4	14	19	7
Positive Net Cash Flow [a]	**75%**	**75%**	**75%**	**66%****	**87%**
$0 to <$250	17	10	19	26	7
$250 to <$500	15	14	15	16	15
$500 to <$1,000	16	17	16	12	22
$1,000 to <$2,500	20	27	18	10	30
$2,500+	7	7	7	2	13
Statistics on Annual Net Cash Flow					
Mean[a]	$593	$487	$617	$283**	$1,105
Standard Error	74	341	49	47	98
Median	$388	$521	$347	$162	$742

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: Calculated from Financial Data.

Annual net cash flow averaged $593 per unit. However, there were substantial differences in cash flow across assistance categories. Newer assisted properties were in the best financial condition among the three categories of properties and older assisted properties were in the worst financial condition. In particular:

- Average annual net cash flow was highest in newer assisted properties averaging $1,105 (median $742) per unit. Eighty-seven percent of newer assisted properties had positive annual net cash flow, including over 40 percent with more than $1,000 annual net cash flow per unit.

- Annual net cash flow averaged $487 (median $521) per unit in unassisted properties. Three quarters of the unassisted properties had positive annual net cash flow.

- The financial condition of older assisted properties was the worst among the three categories, with cash flow averaging $283 (median $162) per unit. Over one third (35 percent) of older assisted properties had negative annual net cash flows.

Change in Cash Flow Since 1989

In this section, we examine the changes in financial condition of the stock between 1989 and 1995, using average annual net cash flow as the indicator of financial condition. Then, we analyze the components of revenue and expenses to identify the sources of change in cash flow between the two periods. The numbers differ slightly from Exhibit 4-3 because the analysis is based on the comparison sample, which includes only the 504 properties that were inspected in both 1989 and 1995. All data were weighted to reflect the universe of properties that were still insured in 1995, and all 1989 dollars were inflated to 1995 based on the change in the CPI over this interval.

Exhibit 4-4 shows annual net cash flow indicators for 1995 and 1989.[9] For both time periods, the table presents mean and median cash flow per 2-bedroom unit as well as the percentage of properties that had negative annual net cash flow, low positive annual net cash flow ($0-$500), high positive annual net cash flow ($500-$1,000), and very high positive annual net cash flow ($\geq$$1,000).

9 We have adjusted the 1989 data for inflation using an adjustment factor of 1.1986, which is based on changes in the housing component of the CPI from 1989 to 1995.

Exhibit 4-4
COMPARISON OF NET CASH FLOW
(IN 1995 DOLLARS BY ASSISTANCE CATEGORY)
BASED ON COMPARISON SAMPLE

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **% of Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[a]	4,076 41%[a]
Mean Cash Flow per 2 BR					
1995	$594	$487	$618	$281	$1,110
1989	$444	$158	$507	$265	$859
Median Cash Flow per 2 BR					
1995	$362	$521	$338	$144	$732
1989	$232	$57	$246	$69	$708
Percentage of Properties with Negative Cash Flow (<$0 per 2 BR)					
1995	25%	25%	24%	33%	13%
1989	30%	44%	27%	39%	10%
Percentage of Properties with Low Positive Cash Flow ($0-$500 per 2 BR)					
1995	32%	23%	34%	42%	23%
1989	36%	22%	38%	45%	29%
Percentage of Properties with High Positive Cash Flow ($500-$1,000 per 2 BR)					
1995	17%	17%	16%	14%	21%
1989	15%	9%	17%	9%	28%
Percentage of Properties with Very High Positive Cash Flow (≥$1,000 per 2 BR)					
1995	27%	35%	25%	12%	44%
1989	19%	25%	18%	7%	33%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 data: Annual financial statement data for 1992-1995.
1989 data: 1990 Study Analysis File.

Overall, the stock experienced an improvement in financial condition, with the mean annual net cash flow increasing by 34 percent from $444 to $594 and the median from $232 to $362 per unit. The percentage of properties with negative annual net cash flow dropped from 30 percent to 25 percent, and the percentage with very high positive annual net cash flow increased from 19 percent to 27 percent.

- The biggest improvement in financial condition was among unassisted properties. Mean annual net cash flow more than tripled from $158 to $487 and the median increased by more than ninefold from $57 to $521 per 2-bedroom unit. The percentage of properties with negative annual net cash flow dropped from 44 percent to 25 percent, and the percentage of properties with high and very high positive annual net cash flow increased from 9 percent to 17 percent and 25 percent to 35 percent, respectively.

- Older assisted properties saw a small increase (6 percent) in mean annual net cash flow (from $265 to $281 per 2-bedroom unit), along with a moderate decrease in the number of properties with negative annual net cash flow and substantial increases in properties with high and very high positive annual net cash flow.

- Newer assisted properties, on the other hand, showed an increase in properties with negative annual net cash flow (from 10 percent to 13 percent), and a decrease in properties with low and high positive annual net cash flow, but a sizable increase in properties with very high positive cash flow. At the same time, the mean cash flow among newer assisted properties rose from $859 to $1,110, while the median rose only from $708 to $732 per 2-bedroom unit, indicating that a small number of newer assisted properties were enjoying dramatically higher annual net cash flows.

The following table (Exhibit 4-5) shows the property-level change in net cash flow, adjusted for inflation.[10] Overall, 37 percent of properties experienced a decrease in net cash flow in the five-year period, while 63 percent saw an increase in net cash flow. Assisted properties were more likely to experience a decrease in net cash flow and less likely to experience an increase in net cash flow than were unassisted properties. Among assisted properties, older and newer assisted properties showed similar patterns of change in cash flow.

Assisted properties (both older and newer) were more likely to experience moderate change (either increase or decrease) in cash flow, while unassisted properties were more likely to experience more dramatic change, with 15 percent of unassisted properties showing decreases of over $800 per unit and 32 percent showing increases of $800 or more per unit, compared to 7 percent and 17 percent, respectively, for assisted properties.

10 As noted in Chapter 3, property-level physical condition data was not intended to be measured with sufficient precision to provide reliable property-level change estimates. In contrast, the financial data are based on actual data and thus, property-level change in financial condition can be analyzed.

Exhibit 4-5
CHANGE IN ANNUAL NET CASH FLOW FROM 1990 TO 1995
(PER 2 BEDROOM EQUIVALENT UNIT IN 1995 DOLLARS)
BASED ON COMPARISON SAMPLE

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **% of Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[a]	4,076 41%[a]
Annual Net Cash Flow Decreased	37%	30%	39%	40%	38%
By >$800 per 2 BR	9%	15%	7%	8%	6%
By $400-$800 per 2 BR	8%	6%	9%	8%	10%
By $200-$400 per 2 BR	8%	4%	9%	8%	9%
By <$200 per 2 BR	13%	5%	15%	16%	13%
Annual Net Cash Flow Increased	63%	70%	61%	60%	62%
By <$200 per 2 BR	15%	6%	17%	18%	14%
By $200-$400 per 2 BR	13%	10%	14%	11%	18%
By $400-$800 per 2 BR	15%	22%	14%	15%	13%
By $800 or more per 2 BR	29%	32%	17%	16%	18%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 data: Annual financial statement data for 1992-1995.
1989 data: 1990 Study Analysis File.

Changes in Components of Revenues and Expenses

In this section, we examine changes in the components of income and expenses to better understand the changes in cash flow. The following table (Exhibit 4-6) shows the percentage change in the mean values of components of revenues and expenses between 1989 and 1995.[11]

11 Percent changes were calculated using the comparison sample of properties that were included in both 1989 and 1995.

Exhibit 4-6
CHANGES IN COMPONENTS OF REVENUE AND EXPENSES BETWEEN 1989 AND 1995
BASED ON COMPARISON SAMPLE

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **% of Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[a]	4,076 41%[a]
Total Revenues (net of vacancies)					
Percent Change	4%	6%	3%	5%	2%
Tenant-Paid Rents					
Percent Change	-10%	5%	-16%	-10%	-26%
Tenant Assistance Payments					
Percent Change	35%	N/A	35%	67%	22%
Vacancy Loss (As a Percent of Rent Revenue)					
Percent Change	-7%	-27%	8%	10%	1%
Total Annual Expenses					
Percent Change	2%	2%	2%	5%	-1%
Operating and Maintenance Expenses					
Percent Change	14%	19%	13%	11%	16%
Replacement Reserve Deposit, max (actual, required)					
Percent Change	16%	4%	18%	29%	0%
Total Debt Service (including MIP, supplementary loans, and op loss loans) per 2 BR					
Percent Change	-17%	-16%	-19%	-25%	-17%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source: 1995 data: Annual financial statement data for 1992-1995.
1989 data: 1990 Study Analysis File.

Revenues

Across the entire stock average revenues rose (in real terms) by 4 percent between 1989 and 1995. This reflects a decrease in tenant-paid rents which was more than offset by increases in tenant assistance payments and decreases in vacancy losses.[12]

- Unassisted properties experienced an increase of 6 percent in average revenues, resulting from a 5 percent increase in tenant-paid rents and a 27 percent decrease in the average vacancy loss.

- Total revenues rose by 2 percent in newer assisted properties and by 5 percent in older assisted properties. In both cases this is a result of decreases in tenant paid rents, which was more than offset by increases in tenant assistance payments.

- The decrease in tenant paid rents was most dramatic in newer assisted properties, where on average they decreased by 26 percent, likely reflecting a decrease in real incomes among residents in these properties. In older assisted properties, tenant-paid rents decreased by 10 percent.

- The decreases in tenant-paid rents were more than offset by increases in tenant assistance payments in both older and newer assisted properties. Although tenant assistance payments were significantly higher in newer assisted properties in both periods, the percentage increase was higher in older assisted properties.

Expenses

Average total expenses (in real terms) stayed nearly the same over the period, increasing by 2 percent. This is a result of increases of about 15 percent in both operating and maintenance expenses and in deposits to the reserve for replacement account that were nearly offset by a 17 percent reduction in the real cost of debt service. Debt service payments dropped substantially in real terms even though remaining constant in nominal dollars. That is, the current value of debt service payments decreased in real dollars results from inflating 1989 payments to 1995 dollars even though actual debt services payments remained constant.

- Among unassisted properties, a large increase in operating and maintenance expenses (19 percent) and a small increase in deposits to the reserve for replacement (4 percent) more than offset the decrease in debt service (of 16 percent), resulting in a 2 percent increase in average total expenses.

12 For comparability to the 1995 study, interest reduction payments in the Section 236 properties were excluded in the calculation for the 1989 values. For the 1990 Report, they were included as part of the revenue and debt service.

- Among older assisted properties, the 11 percent increase in operating and maintenance expenses and the 29 percent increase in replacement reserve deposits exceeded the 25 percent decline in real debt service, resulting in a 5 percent increase in average total expenses.

- In contrast to the two other categories, among newer assisted properties, the real drop in debt service (of 17 percent) more than offset the 16 percent increase in operating and maintenance expenses, resulting in lower total expenses. There was no change in the average deposit to reserve for replacement account in newer assisted properties.

In summary, the stock as a whole showed a moderate increase in cash flow, with a decrease in the number of properties with negative cash flow and an increase in properties with high or very high positive cash flow. Nearly two-thirds (63 percent) of properties saw an increase in cash flow. The stronger cash flow was the result of increased total revenues (from higher tenant assistance payments and reduced vacancy loss) which outweighed a modest increase in expenses (primarily from higher operating and maintenance expenses).

Unassisted properties experienced the strongest increase in cash flow, with a large decrease in the percentage of properties with negative cash flow and a large increase in properties with high positive cash flow. Seventy percent of unassisted properties experienced increased cash flow. The higher cash flow resulted from an increase in revenues from higher tenant-paid rents and lower vacancy losses, which more than offset a small increase in expenses.

Older assisted properties saw a small increase in mean cash flow, with a moderate decrease in the number of properties with negative cash flow and an increase in properties with high or very high cash flow. The increased average cash flow was the result of higher revenues from higher tenant assistance payments, which offset higher expenses.

Among newer assisted properties, the mean cash flow increased moderately, with 62 percent of properties showing an increase in cash flow. However, the number of newer assisted properties with negative cash flow also increased. The increased cash flow resulted from increased revenues (which prevailed despite a large decrease in tenant rents because of an offsetting increase in tenant assistance payments) and a decrease in expenses from lower real debt service.

4.2 Resources Available to Cover the Current Backlog of Physical Needs and Annual Accrual of Needs

An important factor in a property's long-term viability is its having adequate reserve funds. This section examines the size of a property's reserve fund balances relative to its backlog of physical needs. There are three components of resources available to fund major repairs and replacements:

- **Reserve for Replacement:** All HUD-insured or held properties are required to establish and fund a reserve for replacements account. This is their primary resource for funding major repairs and replacements.

- **Other Reserves:** Some properties have established special-purpose reserve accounts such as painting reserves and general reserves. Few properties in our sample reported any such reserve accounts.

- **Residual Receipts Accounts:** Non-profit owners and certain for-profit owners are restricted by their mortgage regulatory (or other) contracts in their being able to take profits from the property's annual surplus cash after expenses. They are required to deposit non-distributable surplus cash into a residual receipts account. Non-profit owners, and certain owners who have received special remedial assistance or assistance under a workout, may not distribute any profit. Limited-dividend owners may distribute only a restricted amount, and only under stipulated conditions. While residual receipts accounts are not reserves for the property, HUD may require owners to contribute residual receipts funds (if any) for repairs in the case of physically deteriorated properties.

Exhibit 4-7 shows available balances in these funds.

- In most properties, the replacement reserve was the primary source of funds available to cover physical needs backlogs, with an average balance of $1,303 per unit. Average balances were lowest in the unassisted properties ($755 per unit) compared with the assisted properties ($1,424).[13]

- Residual Receipts apply to a minority of properties, so while their overall impact may be small (mean $206), they may be significant for particular properties.[14]

13 The values for all reserves balances were obtained using the most recent year of data available. Data were obtained from the Annual Financial Statement file provided by HUD. Reserve for replacement balances, other reserve balances and residual receipts were not entered into HUD's Multifamily Data Warehouse.

14 Residual receipts were provided in the Annual Financial Statement file provided by HUD and were reported only for 1993 and 1994.

- Few properties reported "other reserves" (either general reserves or painting reserves), so this category has been excluded in Exhibit 4-7. However, for particular properties, they may be a significant resource.[15]

- Total reserve balances averaged $1,643 per unit. As expected, given that most reserves are in the reserve for replacement account, assisted properties had higher reserve balances on average compared with unassisted properties ($1,831 compared with $797).

Exhibit 4-7
RESOURCES FOR COVERING PHYSICAL NEEDS
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Reserve for Replacement Balance					
Mean[a]	$1,303	$755**	$1,424	$1,327*	$1,565
Standard Error	55	97	64	83	101
Median	882	$456	$1,065	$994	$1,171
Residual Receipts					
Mean[a]	$206	0**	$252	$247	$260
Standard Error	32	0	128	50	62
Median	0	0	0	0	0
Percent >$0	27%	0	31%	38%	18%
Total Reserves					
Mean[a]	$1,643	$797**	$1,831	$1,766	$1,924
Standard Error	75	97	89	119	131
Median	$1,129	$479	$1,293	$1240	$1,363

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source: Annual Financial statements.

15 General reserve information was provided on HUD's FOMNS backup tapes for 1992 for 36 of the sample properties and from HUD's AFS file for 1995 (11 properties). Paint reserves for 1992 are from HUD's backup FOMNS tape (for 256 properties, and from HUD's AFS file for 1995 (17 cases). Mean values are not provided in the exhibit, but are included in the calculation of total reserves.

Low reserve balances in themselves may not indicate problems. Reserve balances may be low, for example, because a major repair program was recently completed. However, in properties having both high backlogs of physical needs and low reserves, problems may be indicated. It is important to examine both of these together. An additional source of concern is when properties have physical needs backlogs and are not applying available reserves to address these problems. This may be an indicator of management problems in the property.

We present two indicators of the properties' financial ability to cover their backlogs of physical needs:

- **Backlog Coverage Ratio.** This ratio compares available resources with the backlog of physical needs. Available resources are defined as the sum of any amount by which the reserve for replacement balance exceeds two years' worth of annual reserve deposits,[16] plus residual receipts balance, plus other reserve balances. Available resources are then divided by the amount of the backlog.

- **Unfunded Backlog.** The unfunded backlog of physical needs is the total backlog reduced by available resources (as defined above).

Exhibit 4-8 shows the backlog coverage ratio for the insured stock. The exhibit shows that a large portion of the stock does not have sufficient resources to cover their backlogs of physical needs.

- Thirty-six percent of the stock had sufficient resources to cover their physical needs backlogs, including 13 percent with no backlog, and 23 percent with a positive backlog, but with resources available to address the backlog. While the proportion of properties that had sufficient resources was similar in unassisted and assisted properties the reasons were different. In 21 percent of unassisted properties there was no backlog, and 15 percent had backlogs but also had resources to address the backlog. In contrast, 24 percent of assisted properties had backlogs, and also had resources to cover the backlog, and only 11 percent had no backlog.

- The problem was most severe in the older assisted properties where only 30 percent had sufficient resources, and least severe in the newer assisted properties where 42 percent had. Twenty-seven percent of newer assisted properties had backlogs of physical needs, but also had resources to cover the backlog (compared with 22 percent of older assisted

16 Retaining two years' worth of deposits is in keeping with HUD's general loan servicing practices. Had we instead assumed that properties could use their entire reserves would have added only a small amount on average and would make little difference in the ability of most properties to cover their backlogs.

properties) and 15 percent had no backlog (compared with only 8 percent of older assisted properties).

- The majority of properties (65 percent), across all assistance categories lacked sufficient resources to cover their backlogs of physical needs. This includes 13 percent of properties with backlogs and no available resources, and 30 percent of properties with insufficient resources to cover one quarter of their backlogs.

- The ability to cover backlogs has declined since 1989. At that time 45 percent of the stock either had no backlog (20 percent) or sufficient resources to cover their existing backlog (25 percent). In 1995 only 35 percent of the stock had sufficient resources. Driving this decreased ability to cover backlog of physical needs is the dramatic increase in backlogs (See Section 2.1 above), rather than a decrease in resources. On average, available resources increased by over 40 percent, but backlogs increased by over 60 percent.

Exhibit 4-8
ABILITY TO COVER REPAIR NEEDS -BACKLOG COVERAGE RATIO[c]

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Backlog Coverage Ratio ≡ Available Resources/Backlog					
Insufficient Resources[a]	**64%**	**64%**	**65%**	**69%****	**57%**
Backlog >0, & no available resources	13%	15%	13%	16%	7%
Ratio 0 to <0.25	30%	32%	30%	34%	24%
Ratio 0.25 to- <0.5	11%	10%	11%	8%	15%
Ratio 0.5 to <1	10%	7%	11%	11%	11%
Sufficient Resources[a]	**36%**	**36%**	**35%**	**30%****	**42%**
Ratio > = 1	23%	15%	24%	22%	27%
Backlog <$10	13%	21%	11%	8%	15%

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.
[c] Backlog coverage ratio = available resources after deposits to reserve accounts ÷ backlog of needs if resources and backlog >0.

Note: Column sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data and Costing Program, Financial Data.

Exhibit 4-9 shows the resulting unfunded backlog of physical needs.

- The mean unfunded backlog of physical needs was $2,630, or 81 percent of the total backlog.
- The median unfunded backlog was only $684, indicating that a small portion of the stock was responsible for a large portion of the unfunded backlog.

- Almost one third (32 percent) of the stock had unfunded backlogs of over $2,000 per unit. As with most other resource problems, high levels of unfunded backlog were most common in the older assisted portion of the stock. The mean unfunded backlog for older assisted properties was $3,323 (compared with $1,134 for unassisted and $2,437 for newer assisted). Forty-four percent of older assisted properties had over $2,000 of unfunded backlog per unit, compared with 15 percent of unassisted and 25 percent of newer assisted properties.

Exhibit 4-9
ABILITY TO COVER BACKLOG - UNFUNDED BACKLOG
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
$0 [a]	35%	36%	35%	30%*	41%
$0 - <$500	12%	22%	9%	10%	9%
$500 - <$1,000	9%	5%	9%	7%	13%
$1,000 - <$2,000	12%	21%	10%	9%	12%
$2,000 - <$5,000	17%	11%	19%	22%	13%
$5,000 - <$7,500	6%	2%	7%	9%	3%
$7,500+	9%	2%	11%	13%	9%
Statistics on Unfunded Backlog					
Mean[a]	$2,630	$1,134**	$2,962	$3,323*	$2,437
Standard Error	194	233	231	270	410
Median	$684	$332	$817	$1,324	$540
Statistics on Backlog of Physical Needs					
Mean[a]	$3,236	$1,427**	$3,638	$3,929	$3,214
Standard Error	203	255	240	276	430
Median	$1,452	$545	$1,661	$2,096	$1,324

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data, Costing Program and Financial Data.

Ability to Cover Annual Accrual

Another important factor in a property's long-term viability is its ability to cover ongoing accrual of physical needs. As discussed in Chapter 3 above, we have estimated the average annual accrual of physical needs for each property. There are two potential sources of funds available to cover these accrual costs:

- **Annual Deposits to the Reserve for Replacement Accounts:** All HUD-insured or held properties are required to make monthly deposits to the reserve for replacement account. As discussed above, the amount assumed to be available to cover ongoing needs is the maximum of actual deposits as reported in the annual financial statements and the required deposits, which were approximated as 0.5 percent of the original mortgage.

- **Positive Annual Net Cash Flow:** Properties that have positive net cash flow after covering all operating and maintenance expenses, mortgage repayment and deposits to reserve accounts may use remaining funds to cover ongoing accruals.

It appears (see Exhibit 4-10) that even if the current backlog of physical needs were to be addressed, only about one fourth of insured properties would be able to keep up with their ongoing accrual needs. The average unfunded accrual was $610, and the median was $586. Differences in the ability to cover accruals results from different resources, not from different levels of accrual. As shown in Exhibit 3-7 (and repeated in Exhibit 4-10 for convenience), annual accruals averaged $1,437 across the entire stock, and there were no significant differences across assistance categories.

- Forty-one percent of newer assisted properties had no unfunded accrual, compared with only 14 percent of older assisted properties and 26 percent of unassisted properties.

- Older assisted properties contribute more on average to the reserve for replacement account, but the other source of funds for covering accruals, ongoing net cash flow is much lower in this group of properties compared with other types of properties.

Exhibit 4-10
ABILITY TO COVER ACCRUAL - UNFUNDED ACCRUAL
(IN 1995 DOLLARS PER 2-BEDROOM EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%[b]	41%[b]
Unfunded Accrual					
$0[a]	25%	26%	25%	14%**	41%
$0 - <$500	21%	19%	21%	20%	23%
$500 - <$1,000	31%	31%	31%	35%	24%
$1,000 - <$2,000	22%	25%	21%	28%	11%
$2,000+	2%	0%	2%	2%	1%
Statistics on Unfunded Accrual					
Mean[a]	$610	$634	$604	$737**	$411
Standard Error	12	30	13	19	15
Median	$586	$649	$584	$766	$276
Statistics on Annual Accrual					
Mean[a]	$1,437	$1,514	$1,420	$1,404	$1,443
Standard Error	19.6	54.1	20.7	28.2	29.8
Median	$1,362	$1,419	$1,331	$1,301	$1,399

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: 1995 Physical Inspection Data, Costing Program and Financial Data.

In order to further explore the impact of unfunded accruals on property finances, Exhibit 4-11 presents an alternative net cash flow measure that assumes that properties fund the reserve for replacement to a level that covers average accruals. As the exhibit shows, if properties were to fund the reserve for replacement at a level high enough to cover average annual accrual, three quarters would have negative net cash flow, and only one quarter percent would have positive net cash flow. As with many other financial indicators, newer assisted properties were in the best position and older assisted properties in the worst.

Eighty-five percent of older assisted properties would have negative cash flow if they funded the reserve for replacement at a level that covered average annual accrual compared with 59 percent of newer assisted properties, and seventy-five percent of unassisted properties.

Exhibit 4-11
ALTERNATIVE CASH FLOW
(ASSUMES THAT RESERVE DEPOSIT EQUALS ACCRUAL)
(IN 1995 DOLLARS PER 2 BR EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Negative Alternative Net Cash Flow[a]	**75%**	**75%**	**75%**	**85%****	**59%**
<-$1,000	29%	28%	29%	39%	15%
-$1,000-<-$500	26%	28%	26%	28%	20%
-$500-< -$250	11%	9%	11%	10%	15%
-$250 - <$0	8%	9%	8%	9%	8%
Positive Alternative Net Cash Flow [a]	**25%**	**25%**	**25%**	**15%****	**41%**
$0-<$250	9%	11%	8%	6%	11%
$250-<$500	4%	4%	4%	2%	7%
$500 -<$1,000	4%	4%	4%	2%	7%
$1,000-<$2,500	6%	2%	6%	4%	12%
$2,500+	2%	5%	2%	0%	4%
Statistics on Alternative Annual Cash Flow					
Mean[a]	$-532	$-805	$-471	$-745**	$91
Standard Error	73	331	49	54	95
Median	$-628	$-649	$-615	$-843	$-284

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.

**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Sums may not add to 100% due to rounding.

Source: Calculated from Financial Data.

4.3 Section 8 Assistance

An important source of financial assistance for HUD-insured properties is the project-based Section 8 program, which includes the New Construction and Substantial and Moderate rehabilitation programs, the Loan Management Set-Aside (LMSA) Program, the Property Disposition Program, and the Preservation Program.[17] Overall, 8744 properties receive some sort of Section 8 assistance.

Exhibit 4-12 presents information on properties that receive Section 8 assistance. Newer assisted properties generally receive assistance for nearly all property units (mean is 96 percent, median 100 percent). In contrast, LMSA assistance often covers only a portion of units (mean is 80 percent, median 98 percent). The contract amount per assisted unit averaged $4,833 per year in the newer assisted properties, and $2,224 in the LMSA properties.[18] Due to the annual increases in contract amount, the payments currently received are substantially higher than the original contract amounts. Newer assisted properties received on average $6,684 per assisted unit in tenant assistance payments, while LMSA properties received on average $3,440.

Across all categories of Section 8, assistance contracts are being renewed for shorter periods of time. In 1995, over half of all contracts (61 percent) were up for renewal within four years (through 1999).

17 Under the Section 8 New Construction/Substantial Rehabilitation Programs private developers own and construct or rehabilitate housing that they then rent to lower-income tenants. The maximum rents charged by owners to tenants are restricted. The difference between 30 percent of a tenant's adjusted income and the rent being charged for the unit is paid to the owner by HUD. The other large Section 8 program, LMSA, is a form of rent supplement that was available to help troubled multifamily properties. Like the New Construction Program, tenants pay 30 percent of their incomes towards rent, and HUD pays the owners the rest.

18 The contract amounts in the newer assisted stock are substantially lower than the assistance payment amount reported in the annual financial statements. This is likely due to the fact that assistance payments escalate annually based on the AAF.

Exhibit 4-12
SECTION 8 ASSISTANCE

	New Construction/ Substantial Rehab	LMSA (including Rent Sup/RAP conversion)	Preservation	Property Disposition	Rent Sup/RAP[19]
Number of Properties	4,076	4,011	257	134	265
Percent of Units Assisted					
Mean	96%	80%	92%	100%	54%
Median	100%	98	99%	100%	63%
Mean Contract Assistance Amount[20]					
Per Assisted Unit	$4,833	$2,224	$4,113	$4,563	$2,316
Current Tenant Assistance Payment					
Per Assisted Unit	$6,684	$3,440	$3,340	$5,321	$5,527
Next Renewal Year					
Mean	2001	1997	1998	1999	2003
1995-1996	1%	40%	39%	34%	17%
1997-1999	25%	55%	31%	50%	46%
2000-2004	73%	6%	30%	0%	0%
2005+	1%	0%	0%	16%	38%

Source: Multifamily Data Warehouse, Contracts File, 1992-1995 Annual Financial Statements.

19 Reflects 154 properties that were reported as rent sup/ rap in 1995 and 111 sample properties that were reported as active rent sup/rap in 1989 and had no Section 8 information in 1995.

20 Assistance amount was missing for 125 sample properties and was imputed per assisted unit based on the median ratio of assistance amount/rent by Section 8 type.

5.0 Measures that Combine Physical and Financial Conditions

This section develops and presents comprehensive measures of property condition for multifamily rental housing with HUD-insured (or held) mortgages that take into account both the physical and financial condition of properties. We first look at a cross tabulation of annual net cash flow by backlog of physical needs. Our goal in this analysis was two-fold: (1) to see how our primary financial measure (annual net cash flow) maps with our primary physical needs measure (backlog of physical needs); and (2) to determine the risk profile of these properties, that is, extent to which properties appear to be either physically or financially at risk or both.

By incorporating physical and financial measures, we also devised a combined "Distress Index" which enables us to compare properties and assess property condition using a single quantitative measure. We apply the Distress Index to the universe of multifamily rental housing with HUD- insured (or held) mortgages, classify properties as sound, stressed, and distressed, and describe the characteristics of properties in each of these categories. We then describe changes in the multifamily stock since 1989, as measured by the Distress Index.

Each of the two indicators has advantages. The risk profile places each property into one of four risk categories, but does not rank properties. The distress index on the other hand, provides a single, quantifiable, numerical ranking of properties, but it focuses on properties' ***financial capacity*** to meet current and future expenses. It does not distinguish between properties that are, in fact, using available funds to address their backlog of physical needs and those that are not. Thus, while the two indicators track well together, they each provide valuable information.

Risk Profile of Properties

The summary table below (Exhibit 5-1) shows key differences in the physical and financial condition of the housing stock and highlights areas of potential risk by assistance category. (Exhibit 5-2 displays this information graphically.)

- At one end of the spectrum are properties that we labeled "minimally risky". These are properties with positive annual net cash flow and normal backlogs of physical needs ($\leq$\$1,500). About half of unassisted (51 percent) and newer assisted (50 percent) properties fell into this category of "minimally risky", compared to fewer than a third (30 percent) of older assisted properties.

- At the other end of the spectrum were properties that we labeled as "high risk". These are properties with negative annual net cash flow and high backlogs of physical needs (>$1,500). Owners of properties in this category are both not meeting current operating costs with current revenues and are falling behind in the upkeep of the property. Only 9 percent of newer assisted and unassisted properties were categorized as "high risk", compared with 20 percent of older assisted properties.

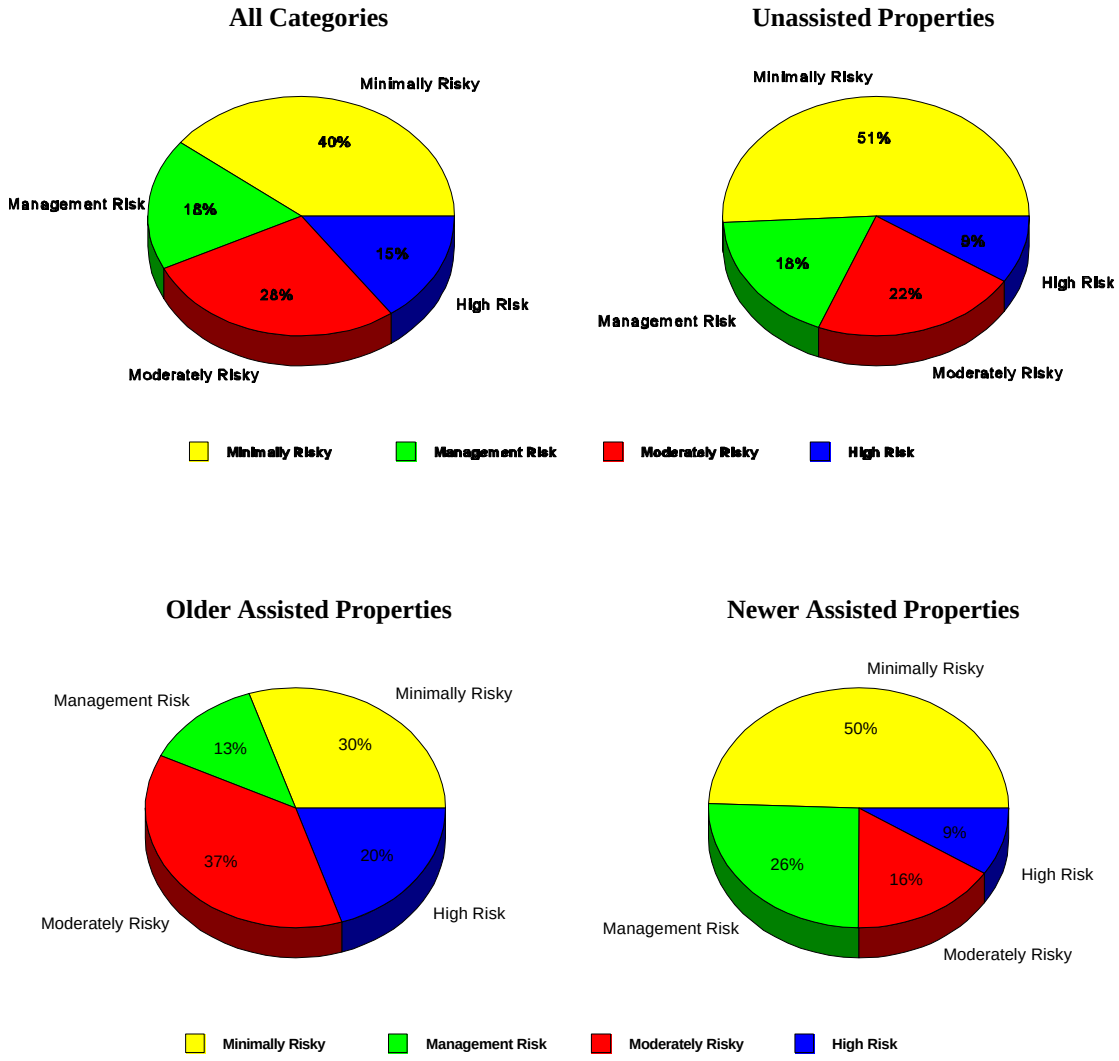
Exhibit 5-1
BACKLOG OF PHYSICAL NEEDS BY ANNUAL NET CASH FLOW
SUMMARY TABLE BY ASSISTANCE CATEGORY

	High Positive Annual Net Cash Flow (>$500)		Low Positive Annual Net Cash Flow ($0-$500)		Negative Annual Net Cash Flow (<$0)		Total
	Low/ Normal Backlog ≤$1,500	Moderate/ Severe Backlog >$1,500	Low/ Normal Backlog ≤$1,500	Moderate/ Severe Backlog >$1,500	Low/ Normal Backlog ≤$1,500	Moderate/ Severe Backlog >$1,500	
	minimally risky	management risk	minimally risky	moderately risky	moderately risky	high risk	
All Categories	25%	18%	15%	17%	11%	15%	100%
Unassisted	34%	18%	17%	6%	16%	9%	100%
Older Assisted	12%	13%	18%	24%	13%	20%	100%
Newer Assisted	39%	26%	11%	11%	5%	9%	100%

Note: Rows may not sum to 100% due to rounding.

Source: 1992-1995 Annual Financial Statements and 1995 Physical Inspection Data and Costing Program.

Exhibit 5-2
RISK PROFILE OF INSURED PROPERTIES



Source: Derived from Exhibit 5-1.

- In between these two extremes were properties that we labeled as "moderately risky". These are properties that had low positive annual net cash flow and high backlog of physical needs, or had negative annual net cash flow and normal backlog of physical needs. This group of properties is either not covering operations from current revenues, or not keeping up with physical repairs. This situation is not sustainable over time, and will likely lead to deteriorating quality of housing for residents. Thirty-seven percent of older assisted properties were classified as a "moderately risky", compared with 22 percent of unassisted and 16 percent of newer assisted properties.

- Another category were properties we labeled as "management risk". These are properties with high positive annual net cash flow but also with high physical needs backlogs. This combination of characteristics indicates a failure to address capital needs (as evidenced by a high backlog) resulting not from lack of resources, but potentially from poor management. Over one quarter (26 percent) of newer assisted properties fell into the category of "management risk", compared with 18 percent of unassisted and 13 percent of older assisted properties.

Distress Index

The second method for incorporating both physical and financial condition, involved developing a Distress Index that reflects a property's annual net cash flow, other financial resources, and backlog of physical needs. The Distress Index measures a property's financial capacity to meet current expenses, set aside reserves for future physical needs, and undertake a repair program to address its backlog of physical needs. The index is used to classify properties as sound or potentially distressed, and to identify the degree of potential distress, as measured by the extent to which properties lack required resources. In this section, we show the development of the Distress Index based on annual net cash flow, minus unfunded backlog of physical needs, adjusted for vacancy.[1] We then compare the Distress status of properties with the Risk Profile presented above, present characteristics of distressed properties, and compare the results to the results of the 1990 Study on the same set of properties to gauge the change in distress level.

Development of the Distress Index

The Distress Index is computed by taking:

(a) Net Cash Flow
(b) Minus the annual amortization of the cost of remedying the Unfunded Backlog of Physical Needs
(c) Plus added rent from improving Vacancy Losses

The computation begins with net cash flow, which measures a property's capacity to meet current expenses and make deposits to its replacement reserves account. Net cash flow is

1 This measure has been used for comparability with the 1990 Study (presented in Wallace, et al., Assessment of the HUD-Insured Multifamily Housing Stock, 1993). One could argue that a comprehensive measure would incorporate average annual unfunded accrual into the Distress Index as well. This version of the Distress Index was tested and results are very similar to the version of the Index used. As a test of the Distress Index defined in the text, we looked at the 1995 status of properties that were included in both studies, in 1989 25 percent were categorized as distressed, 15 percent as stressed and 61 percent as sound. In 1995, 15 percent of the properties that had been categorized as distressed in 1989 were HUD-held, as were 8 percent of the stressed properties and 6.5 percent of the sound properties. The difference in the HUD-held status in 1995 is statistically significant at the 95 percent confidence level. In other words, properties that were classified as distressed in 1989 were significantly more likely to be HUD-held in 1995 compared with properties that had been classified as sound.

then reduced by the amortized cost of remedying the unfunded backlog of physical needs, which represents the annual cost of undertaking a repair program. This simulates an owner's likely attempt to spread the remedial costs over time by spreading the work over time or by spreading payments by borrowing. The final step in computing the Distress Index is to add back a portion of a property's excess vacancy loss to represent the higher revenues resulting from improved operations and physical condition. These elements of the Distress Index are discussed below.

Annual Net Cash Flow

Annual net cash flow is computed as explained in Chapter Three, taking a weighted average over the most recent three years (expressed in 1995 dollars per 2BR unit) of both revenues and expenses.

Annual Net Cash Flow (Weighted 3-Year Average) =

Total Revenue (Weighted 3-Year Average)

Minus ***Operating and Maintenance Expenses*** (Weighted 3-Year Average, including expenses for administration, operations and maintenance, utilities, taxes, and insurance)

Minus ***Mortgage Debt Service*** (Interest, Principal and Mortgage Insurance Premium as required by mortgage)

Minus ***Replacement Reserve Deposit*** (using the greater of the property's actual deposit or an amount equal to 0.5 percent of the original mortgage)

Amortized Cost of Remedying the Unfunded Backlog of Physical Needs

At this step, a property's backlog of physical needs for replacements and non-routine repairs is taken into account. As explained in Chapter Three, a property's unfunded backlog of physical needs is its total backlog less available resources from the replacement reserve fund, special reserve account, and residual receipts account. Where resources exceed the total backlog of physical needs, there is no unfunded backlog.

Amortized cost of remedying the unfunded backlog of physical needs =

Annual debt service on a loan amount equal to the unfunded backlog cost (20-year term at 9 percent interest)

Where ***Unfunded Backlog Cost = Total Backlog Cost - Available Resources*** (or 0 if resources exceed the total backlog)

and where ***Available Resources =***

Replacement Reserve Balance in excess of 2 years' annual deposits

Plus ***Residual Receipts Account Balance***

Plus ***Other Reserve Account Balances*** (such as painting reserves)

Added Rent from Improving Vacancy Losses

In computing the Distress Index, the modified net cash flow figure is further adjusted by adding back a portion of the property's excess vacancy loss. This represents the income that would result if improved management and physical condition brought a property's excessive vacancy loss closer to the norm for the property's assistance category.

This computation is based on the assumption that properties whose vacancy losses rank in the highest 25 percent (among properties in their assistance category) will be able to reduce their vacancy losses down to the 75th percentile; that properties with vacancies between the median and the 75th percentile will be able to reduce vacancy losses to the median level for their assistance category; and that for all other properties, vacancy losses will remain as they are.[2]

Added rent from improving vacancy loss =

(1) For ***properties with vacancies in excess of the 75th percentile*** of vacancy losses for properties in the same assistance category
Current vacancy loss - 75th Percentile Vacancy Loss (for properties in the same assistance category); i.e., bring vacancy losses down to the 75th percentile

(2) ***For properties with vacancies between the median and 75th percentile*** of vacancy losses for properties in the same assistance category
Current vacancy loss - Median Vacancy Loss (for properties in the same assistance category); i.e., bring vacancy losses down to the median

(3) ***For all other properties—No adjustment***

The net result of these three factors yields the Distress Index, which is a modified version of net cash flow. A positive Distress Index indicates a sound property that can meet ongoing operations and cover its backlog of physical needs from internal funds. A property with a negative Distress Index is not able to cover all ongoing operations and repair of the physical needs backlog from internal funds. This situation is not sustainable over time because the property is either falling behind in its financial obligations (mortgage payments) or in property maintenance and repairs. As was done in 1989, properties with a low negative index (Distress Index of -$250 to $0) have been categorized as a "stressed", and properties with a highly negative index (Distress Index <-$250) have been categorized as a "distressed".[3]

2 For unassisted properties, the top quartile of vacancy loss was 7.0 percent and the median was 4.5 percent; for older assisted properties, the top quartile was 3.9 percent and the median was 2.2 percent; for newer assisted, the top quartile was 1.6 percent and the median was 0.1 percent.

3 Clearly, the cutoff between distressed and stressed was arbitrary, and could be set at another point. Essentially any negative index is an indicator that the property will potentially have trouble in the long run.

Application of the Distress Index

Exhibit 5-3 shows the result of applying the Distress Index to the full stock of multifamily rental housing with HUD-insured or held mortgages. The mean value of this modified net cash flow measure was highly positive for newer assisted properties ($888), intermediate for unassisted ($515), and close to zero ($5) for older assisted properties. In other words, after covering ongoing operations and payments on a loan to cover the unfunded backlog of physical needs, newer assisted properties still had, on average, $888 of cash available per unit. Similarly after covering ongoing operations and a loan on the unfunded backlog of physical needs, unassisted properties still had, on average, $515 of cash available per unit. In contrast, with an average index of $5, older assisted properties were barely able to cover ongoing operations and a loan on the unfunded backlog of physical needs.

- Overall, about one quarter (24 percent) of properties were classified as "distressed"—they had Distress Index *deficits* of more than $250 per 2BR per year (Distress Index <-$250). These properties' financial and physical needs outstripped resources available from revenues and reserves. Among the three categories of properties, older assisted properties were most likely to be classified as distressed. Nearly one third (32 percent) of these properties were classified as distressed compared with 15 percent of newer assisted and 19 percent of unassisted properties.

- At the other extreme, nearly two thirds (63 percent) of the stock was classified as "sound" -- they had positive a Distress Index. These properties had enough resources available from ongoing revenues and reserves to address their current financial and physical needs. Over three quarters (78 percent) of both unassisted and newer assisted properties were classified as sound, compared with under half (48 percent) of older assisted properties.

Exhibit 5-3
DISTRESS INDEX BY ASSISTANCE CATEGORY
(IN 1995 DOLLARS PER 2 BEDROOM EQUIVALENT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 49%[b]	4,076 33%[b]
Distressed[a]	**24%**	**19%**	**26%**	**32%****	**15%**
< -$1,000	9%	10%	8%	10%	6%
-$1,000 to <-$500	8%	5%	9%	12%	4%
-$500 to <-$250	8%	4%	9%	11%	6%
Stressed[a]	**12%**	**4%****	**14%**	**20%****	**6%**
-$250 to $0	12%	4%	14%	20%	6%
Sound[a]	**63%**	**78%****	**60%**	**48%****	**78%**
$0 to < $250	12%	10%	13%	16%	8%
$250 to <$500	12%	17%	10%	9%	12%
$500 to <$1,000	15%	16%	15%	12%	20%
$1,000 to <$1,500	9%	17%	8%	6%	10%
$1,500 to <$2,000	5%	9%	5%	1%	10%
≥ $2,000	10%	9%	10%	4%	18%
Statistics on Distress Index					
Mean[a]	$392	$515	$364	$5**	$888
Standard Error	79	347	59	57	117
Median	$275	$511	$199	-$25	$712

* Signifies that the differences between unassisted and assisted, or older and newer assisted, properties are statistically significant at the 90% confidence level.

** Signifies that the differences between unassisted and assisted, or older and newer assisted, properties are statistically significant at the 95% confidence level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add up to 100% due to rounding.

Source: Derived from 1995 Financial and Physical Condition Data.

Exhibit 5-4 compares the two measures of property risk, the Distress Index and the Risk Profile. The exhibit shows that the measures track fairly well, though each provides important

unique information. The Distress Index provides the ability to numerically rank and compare properties. Properties with a more negative Distress Index lack more resources, and properties with a higher Index have more resources available. The risk profile does not rank properties, but does it provides valuable information by highlighting whether properties are using available resources to address problems.

- Nearly all (93 percent) properties that were classified as distressed were also classified as moderately or highly risky. Similarly over three quarters (79 percent) of the properties that were classified as high risk were also classified as distressed.

- Virtually all properties that were classified as minimally risky were also classified as sound. However only 63 percent of the properties that were classified as sound were also classified as minimally risky. One quarter of sound properties were classified as management risks. This is because of the large number of properties, especially in the newer assisted category, had available resources but were not addressing existing physical needs backlogs.

- Properties that were classified as moderately risky were more likely to be classified as distressed (41 percent) or stressed (34 percent) rather than sound (25 percent).

Exhibit 5-4
COMPARISON OF DISTRESS INDEX AND RISK PROFILE OF INSURED PROPERTIES

		Distressed	Stressed	Sound	Total By Risk Profile
High Risk	**Total Properties**	1,383	256	122	1,761
	Row Percent	79%	15%	7%	14%
	Column Percent	47%	17%	2%	
Moderately Risky	**Total Properties**	1,379	1,140	847	3,366
	Row Percent	41%	34%	25%	28%
	Column Percent	46%	76%	11%	
Minimally Risky	**Total Properties**	0	22	4,870	4,892
	Row Percent	0%	0%	100%	40%
	Column Percent	0%	1%	63%	
Management Risk	**Total Properties**	206	88	1,299	2,223
	Row Percent	9%	4%	87%	18%
	Column Percent	7%	6%	25%	
Total by Distress Category		2,968	1,507	7,768	12,243
Column Percent		24%	12%	63%	100%

Source: Derived from Exhibits 5-1 and 5-3.

Characteristics of Distressed Properties

Exhibit 5-5 below summarizes tenant characteristics and Exhibit 5-6, property, and neighborhood characteristics of properties by distress categorization.

- Distressed and stressed properties had proportionately fewer tenants with very low incomes compared to sound properties. This finding reflects the high percentage of distressed properties that are older assisted properties, which include more moderate-income and fewer very low-income tenants than do newer assisted properties.[4]

- All categories of properties had more households headed by non-minority whites (58 percent) than by any other racial or ethnic group. However, distressed and stressed properties each had proportionately fewer households headed by whites and proportionately more households headed by blacks. Distressed properties had more households headed by Hispanics compared to either stressed or sound properties.

- Distressed properties had proportionately fewer single-person households or households headed by elderly persons and more family households (again, reflecting the difference between older and newer assisted properties).

- Distressed and stressed properties, compared with sound properties, were more likely to be older assisted and less likely to be newer assisted. Older assisted properties accounted for 49 percent of the insured (or held) stock, but accounted for 65 percent of the distressed properties and 78 percent of the stressed properties. By contrast, newer assisted properties accounted for 33 percent of the stock but only for 21 percent of the distressed properties and 17 percent of the stressed properties.

- Mean property size (number of units) was fairly even across distress categories.

- Distressed and stressed properties had slightly larger units (higher number of bedrooms) on average compared to sound properties. This is consistent with the higher concentration of single and elderly households in sound properties.

- There were few differences in the types of buildings that were distressed versus sound. However, stress was more common in walk ups and less common in high rises.

- Distressed and stressed properties tended to be located in neighborhoods that were in worse condition than those in which sound properties were located and were more likely than sound properties to be located in central cities.

4 Data on tenant characteristics are available only for assisted properties.

- Distressed and stressed properties were more likely than sound properties to have non-profit/cooperative or limited dividend owners and were less likely to have for-profit owners. These findings are consistent with the fact that for-profit owners predominate among newer assisted properties and non-profits are concentrated in older assisted properties.

- Distressed and stressed properties were more likely than sound properties to have rents below the local Section 8 fair market rent (FMR) levels.

- Distressed and stressed properties were less likely than sound properties to be located in neighborhoods with tight rental markets (vacancy rates under 4 percent). However, the difference between property vacancy loss and neighborhood vacancy varied little by distress category.

Exhibit 5-5
TENANT CHARACTERISTICS BY DISTRESS INDEX FOR ASSISTED PROPERTIES

	Total	Distressed (Index <-$250)	Stressed (Index between -$250 and $0)	Sound (Index >$0)
Total Properties	10,019	2,556	1,425	6,038
Percent of Properties	100%	26%	14%	60%
Race/Ethnicity				
Hispanic[a]	11%	14%	8%	10%
Non-Hispanic	89%	86%	92%	90%
White[a]	58%	54%*	55%	61%
Black[a]	37%	42%*	40%	35%
Other	5%	4%	5%	4%
Household Size				
1 Person[a]	43%	34%**	38%**	48%
2 People	24%	26%	25%	23%
3 People	17%	19%	19%	15%
4 People	10%	13%	11%	9%
5 People	4%	4%	4%	3%
Elderly Head of Household Percent[a]	33%	24%**	23%**	38%
Household Income				
Very low income[a]	78%	76%**	68%**	82%
Low income	20%	22%	31%	17%
Not low income	1%	2%	1%	1%

* Signifies that the differences between distressed and sound, or stressed and sound, properties are statistically significant at the 90% confidence level.

** Signifies that the differences between distressed and sound, or stressed and sound, properties are statistically significant at the 95% confidence level.

[a] Significance test conducted.

Note: Column sums may not add up to totals due to rounding.

Source: TRACS.

Exhibit 5-6
NEIGHBORHOOD AND PROGRAM CHARACTERISTICS BY DISTRESS INDEX MULTIFAMILY RENTAL HOUSING WITH HUD-INSURED (OR HELD) MORTGAGES

	Total	Distressed (Index Less than -$250)	Stressed (Index between -$250 and $0)	Sound (Index >$0)
Total Properties	12,243	2,968	1,507	7,768
Percent of Properties	100%	24%	12%	63%
Assistance Category				
Unassisted	18%	14%	5%	22%
Older Assisted	49%	65%	78%	37%
Newer Assisted	33%	21%	17%	41%
Sponsor Type				
Non-Profit/Coop	18%	24%	23%	15%
Limited Dividend	40%	52%	60%	32%
For-Profit	42%	24%	18%	53%
Mortgage Start Year				
Before 1970	5%	9%	7%	4%
1970-1979	55%	60%	73%	49%
1980 or later	40%	32%	20%	47%
Property Size				
<50 units[a]	17%	23%**	18%	14%
50-99 units	35%	30%	25%	39%
100-199 units	36%	35%	46%	35%
≥ 200 units[a]	12%	12%	11%	12%
Mean Units[a]	115	112	117	115
Standard Error	3.9	7	8	5
Median	96	90	100	96
Average Unit Size				
<2.25 bedrooms[a]	80%	76%**	66%**	84%
≥2.25 bedrooms[a]	20%	24%**	34%**	16%
Mean Unit Size[a]	1.7	1.8**	1.9**	1.6
Standard Error	0.02	0.04	0.07	0.03
Median	1.8	2.0	2.0	1.7
Building Type				
High rise[a]	26%	27%	10%**	28%
Walk up[a]	44%	40%	53%	44%
SF attached	31%	34%	35%	28%
SF detached	0%	0%	2%	0%

	Total	Distressed (Index Less than -$250)	Stressed (Index between -$250 and $0)	Sound (Index >$0)
Total Properties	12,243	2,968	1,507	7,768
Percent of Properties	100%	24%	12%	63%
Neighborhood Quality				
Relative to City	36%	30%	35%	39%
Better than Average	39%	38%	33%	41%
Average	23%	33%	30%	19%
Worse than Average				
Quality as Residential				
Neighborhood	67%	53%	71%	72%
Excellent/Good	33%	47%	29%	28%
Fair/Poor				
Neighborhood Vacancy				
<4%	45%	43%	41%	48%
4-7%	36%	41%	35%	35%
>7%	18%	16%	24%	17%

* Signifies that the differences between distressed and sound, or stressed and sound, properties are statistically significant at the 90% confidence level.

** Signifies that the differences between distressed and sound, or stressed and sound, properties are statistically significant at the 95% confidence level.

[a] Significance test conducted.

Note: Column sums may not add up to totals due to rounding.

Source: Inspections, windshield survey, Census, HUD, market evaluations.

Comparison of Results with 1990 Findings

Exhibit 5-7 compares the levels of distress of properties in the current study (1995 study) with the 1990 Study. Because the properties included in this exhibit are the same for both the 1990 measure of distress and the 1995 measure, this comparison allows us to analyze the change in the stock over the six-year period. It shows that the level of distress in the stock as a whole had not changed significantly. In both time periods, almost quarter (22 to 23 percent) of properties were classified as distressed, and the percentage of properties that were classified as "stressed" and "sound" did not change significantly.[5]

5 As was indicated in Chapter 3 on the physical condition of the stock, the study's estimation of physical condition was not intended to provide reliable property-level estimates, but rather reliable stratum-level estimates. Thus, we do not compare the Distress Index at a property level between the two time periods.

Exhibit 5-7
COMPARISON OF DISTRESS IN 1989 AND 1995
(BASED ON COMPARISON SAMPLE)

	Total	Un-assisted	Older Assisted	Newer Assisted	Total	Un-assisted	Older Assisted	Newer Assisted
	1989				1995			
Distressed	22%	31%	30%	7%	23%	19%	32%	13%
Stressed	14%	11%	21%	7%	12%	4%	20%	7%
Sound	64%	58%	50%	87%	64%	78%	48%	80%

Note: Column sums may not add up to totals due to rounding.

Source: 1995 data: Annual Financial Statements and 1995 Physical Inspection Data and Costing Program.
1989 data: 1990 Analysis File.

While overall the distribution of properties by distress level did not change, changes did occur within the newer assisted and unassisted categories.

- Among newer assisted properties, the percentage of distressed properties nearly doubled from 7 percent in the 1989 to 13 percent in 1995. At the same time, the percentage of newer assisted properties classified as sound decreased from 87 percent to 80 percent. Thus, while newer assisted properties are still the least distressed portion of the stock, the situation in these properties has deteriorated over the last six years, largely as a result of the deterioration in physical condition.

- Among unassisted properties, the percentage of distressed and stressed properties decreased substantially over the six-year period, and the percentage of sound properties increased. In 1989, 58 percent of unassisted properties were classified as sound and 31 percent were classified as distressed. In 1995 over three quarters (78 percent) of the unassisted stock was classified as sound, and only 19 percent were classified as distressed. This is largely a result of the significant improvement in the financial condition of this portion of the stock.

- Almost no change occurred in the older assisted portion of the stock. These properties continued to be the most distressed (30 to 32 percent), and the least likely to be classified as sound.

6.0 Market Position of Insured Properties

This chapter describes several aspects of the market position of the stock. Section 6.1 compares property financial indicators (rents, vacancy losses, operating and maintenance expenses, and operating ratios) with local market and industry norms. Section 6.2 presents a modified cost flow analysis assuming properties operate at market-rate rent and operating cost lowers. Section 6.3 reports on the potential future uses of HUD-insured properties if they were not restricted by HUD mortgage and subsidy program requirements.

6.1 Property Finances Relative to Neighborhood and Industry Data

To help place the financial indicators presented in Chapter 4 in a broader context, we conducted comparisons of several key financial variables with available neighborhood and industry data. This section shows that:

- As expected, of the three categories of properties, unassisted properties tended to operate closest to local market and industry norms compared with the two categories of assisted properties, although even these properties tended to have operating and maintenance expenses that were above industry norms for conventional properties in similar locations and similar building types.

- The majority of older assisted properties had rents that were lower than estimates of rents for comparable properties in their local markets. Most also had operating and maintenance costs that were above industry norms for conventional properties in similar locations and similar building types. The combination of lower rents and higher operating costs meant that nearly all older assisted properties had net operating income to rent ratios that were below industry norms for conventional properties in similar locations and similar building types.

- Supported by their high subsidies and very low vacancy rates, newer assisted properties generally had rents that were significantly higher than estimates of rents for comparable properties in their local markets. Although operating and maintenance expenses in these properties were also higher than industry norms for conventional properties in similar locations and similar building types, the higher operating costs did not fully offset the higher revenues. Thus, net operating income to rent ratios in newer assisted properties tended to be above the national median ratios for conventional properties in similar locations and similar building types.

Rents

Exhibit 6-1 compares property rents (gross rents paid to owners as reported on the annual financial statements) with comparable rents in their neighborhoods. As comparable rents we used the study's market evaluators' estimates of what rents would be in an unrestricted market, assuming no upgrades were made ("as is" local market rent). Exhibit 6-2 presents this information graphically. The stock was evenly divided between properties with gross rents above estimated market levels and those with gross rents below estimated market levels.

- About half (49 percent) of the stock had gross rents close to their estimated market rent (between 75 percent and 120 percent of the properties' estimated market rent). As expected, a large majority (75 percent) of unassisted properties had rents in this range.

- Most (78 percent) older assisted properties had rents below their estimated market level, including 38 percent with rents below 75 percent of their estimated market level.

- In contrast, the vast majority (86 percent) of newer assisted properties had rents above their estimated market level, including 40 percent with rents above 140 percent of their estimated market level. These properties are the focus of the portfolio reengineering efforts that aim to bring property rents in line with rents in their surrounding markets.

Exhibit 6-1
CURRENT PROPERTY RENT RELATIVE TO LOCAL MARKET "AS IS"

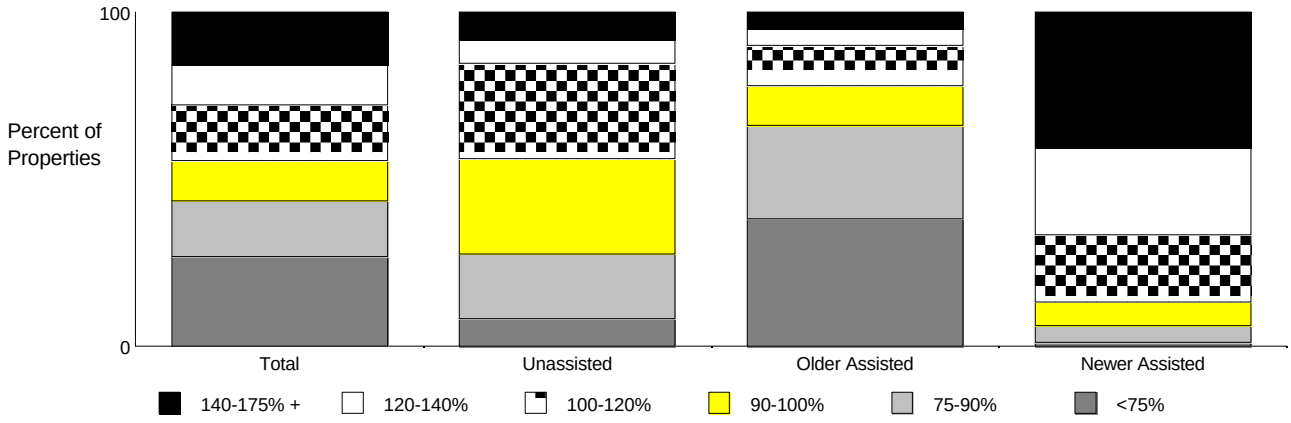
	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[a]	4,076 41%[a]
Property Rent Relative to Local Market "As Is"					
Property Rent <75% of Market	20%	9%**	23%	38%**	1%
Property Rent 75 - 90% of Market	18%	19%	18%	28%	5%
Property Rent 90 - 100% of Market	13%	28%	10%	12%	7%
Property Rent 100 - 120% of Market	18%	28%	15%	12%	20%
Property Rent 120 - 140% of Market	13%	7%	14%	5%	26%
Property Rent 140 - 175% of Market	9%	2%	10%	4%	20%
Property Rent 175% + of Market	8%	6%	9%	1%	20%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source: Financial Data, Market Valuation Summary.

Exhibit 6-2 displays rents relative to market graphically.

Exhibit 6-2
PROPERTY RENTS RELATIVE TO MARKET "AS IS" RENTS



Source: Derived from Exhibit 6-1.

Changes in Rents Relative to Market Since 1989

In Exhibit 6-3 we compare the 1995 ratios of property rents (gross rents paid to owners as reported on the annual financial statements) with comparable rents in their neighborhoods with similar calculations for 1989. The 1995 figures are slightly different from those in Exhibit 6-1 because Exhibit 6-3 relies on the comparison sample of properties that were included in both studies. The exhibit shows that for the stock as a whole, in both time periods about half the properties had rents above market levels (50 percent in 1989 and 48 percent in 1995) and about half had rents below. Similarly, in both time periods rents for about half the stock were close to market levels. In 1989, 52 percent of the stock had rents between 75 and 120 percent of the estimated market rent for comparable market-rate properties in their areas, as did 49 percent in 1995. However, within assistance categories the following changes took place:

- In both 1989 and in 1995, rents in about three quarters of unassisted properties were close to estimated market rents for comparable market-rate properties in their areas (between 75 percent and 120 percent of market). In 1995 a slightly higher percentage of unassisted properties (43 percent) had rents that were above market levels compared with 1989 (38 percent).

- In 1989, about two thirds (67 percent) of older assisted properties had rents that were below estimated market rents for comparable market-rate properties in their areas. In 1995, more than three quarters of the older assisted stock had below market rents.

- Rents in newer assisted properties tended to be above estimated market rents for comparable market-rate properties in their areas in both years. The proportion of newer assisted properties with above market rents rose from 81 percent to 86 percent during this time period.

Exhibit 6-3
PROPERTY RENTS RELATIVE TO MARKET IN 1989 AND 1995
(BASED ON COMPARISON SAMPLE)

	Total	Un-assisted	Older Assisted	Newer Assisted	Total	Un-assisted	Older Assisted	Newer Assisted
Ratio of Property to "As Is" Market Rent	**1989**				**1995**			
Property Rent < Market Rent	50%	63%	67%	18%	52%	56%	77%	14%
Property <75% of Market	18%	13%	30%	3%	20%	9%	38%	1%
75% to 90% of Market	17%	24%	23%	3%	18%	19%	27%	6%
90% to 100% of Market	15%	26%	14%	12%	14%	28%	12%	7%
Property Rent > Market Rent	49%	38%	33%	81%	48%	43%	23%	86%
100% to 120% of Market	20%	28%	17%	21%	17%	28%	12%	18%
120% to 140% of Market	9%	1%	6%	18%	13%	7%	5%	28%
140% to 175% of Market	10%	5%	6%	19%	9%	2%	4%	19%
Property > 175% of Market	10%	4%	4%	23%	9%	6%	2%	21%

Note: Column sums may not add up to 100% due to rounding.

Source: 1995: 1992-1995 financial data, market valuation summaries.
1989: 1990 Analysis File.

Vacancies

Exhibit 6-4 compares property vacancy losses with the vacancy rates in the surrounding neighborhood. Vacancy losses, as reported on the annual financial statements, include both losses from vacant units and from uncollected rents. Neighborhood vacancy rates were collected by the market analysts as part of the market valuation process, and were provided in ranges of under 4 percent, 4 to 7 percent, and 7 percent or above.

- The HUD-insured stock tended to have vacancy rates that were equal to (45 percent) or lower (39 percent) than their neighborhood averages. This is as expected, given the low mean vacancy losses reported, particularly among assisted properties.

- Both older and newer assisted properties were more likely to have lower vacancy rates then their surrounding neighborhoods (40 and 47 percent respectively) compared with unassisted properties (25 percent). Lower than average vacancy losses are expected in assisted properties because the project-based assistance these properties receive help them attract lower-income renters.

- Consistent with their very low vacancy losses, only 3 percent of newer assisted properties had vacancy rates above their local neighborhoods.

Exhibit 6-4
CURRENT PROPERTY VACANCY RELATIVE TO LOCAL MARKET

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[a]	4,076 41%[a]
Property Vacancy Relative to Local Market					
Property Vacancy less than Neighborhood	39%	25%	43%	40%	47%
Property Vacancy Same Range as Neighborhood	45%	37%	47%	45%	51%
Property Vacancy Greater than Neighborhood	15%	38%	10%	15%	3%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source: Financial Data, Market Valuation Summary.

Operating and Maintenance Expenses

Exhibit 6-5 compares property operating and maintenance expenses with private sector industry norms. Our private sector estimates relied on median values of operating and maintenance expenses per square foot of living space by region and building type for conventional apartments as compiled by the Institute of Real Estate Management (IREM) data.[1]

Most (81 percent) HUD-insured properties had operating and maintenance expenses that were above the medians for conventional properties in their region and building type. Operating and maintenance expenses were above 125 percent of the median in over half the stock (52 percent).

- Eleven percent of properties had operating and maintenance expenses that were below 90 percent of the median expenses in conventional apartments in their region and building type, 36 percent were between 90 and 125 percent of median, and 52 percent had expenses that were more than 125 of the median for their region and building type.

- Operating and maintenance expenses in the unassisted portion of the stock were distributed more closely around the medians of conventional properties compared with assisted properties, although even in this portion of the stock operating and maintenance costs tended to be above market levels. Forty-three percent of unassisted properties had operating and maintenance costs that were between 90 percent and 125 percent of the median. However only 20 percent of unassisted properties had operating and maintenance expenses below 90 percent of the median for conventional properties in their region and building type, while 37 percent had operating and maintenance expenses above 125 percent of the relevant medians.

- Assisted properties generally had higher operating and maintenance costs compared with conventional properties in their region and building type (85 percent).

- Half of older assisted properties had operating and maintenance costs that were over 125 percent of the median for their building type and region, as did nearly two thirds (63 percent) of newer assisted properties.

1 *1996 Income/Expense Analysis: Conventional Apartments*, Institute of Real Estate Management, Chicago Il.

Exhibit 6-5
CURRENT OPERATING COSTS RELATIVE TO INDUSTRY NORMS

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,019	5,943	4,076
Percent of Total Properties	100%	18%	82%	59%[a]	41%[a]
Operating Costs Relative to Industry Norms					
Property <90% of Industry Norm	11%	20%	9%	11%	7%
Property 90 - 100% of Industry Norm	7%	9%	6%	7%	4%
Property 100 - 110% of Industry Norm	12%	17%	11%	12%	10%
Property 110 - 125% of Industry Norm	17%	17%	18%	19%	15%
Property 125 - 150% of Industry Norm	22%	16%	24%	22%	26%
Property >150% of Industry Norm	30%	21%	32%	28%	37%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source: Financial Data, IREM.

Net Operating Income to Rent Ratio

The last comparison (Exhibit 6-6) conducted was between the properties' "net operating income (NOI) to rent ratios" and "median NOI to rent ratios" for conventional properties of the same building type and region as compiled by IREM. This provides an indication of how the financial situation of the insured stock compares with industry norms.

The net operating income to rent ratio is defined as total revenues less operating and maintenance expenses divided by gross potential rent. (It does not include debt service

expenses or deposits to the replacement reserve account). Higher ratios indicate more funds left for debt service and cash returns after covering operating and maintenance expenses.[2]

Exhibit 6-6
PROPERTY NET OPERATING INCOME TO RENT RATIO RELATIVE TO INDUSTRY NORM

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[a]	4,076 41%[a]
Net Operating Income to Rent Ratio Relative to Industry Norm[b]					
Property <50% of Industry Norm	12%	15%	12%	20%	0%
Property 50 - 75% of Industry Norm	24%	19%	25%	39%	6%
Property 75 - 90% of Industry Norm	17%	17%	17%	20%	13%
Property 90 - 100% of Industry Norm	13%	18%	12%	7%	18%
Property 100 - 110% of Industry Norm	14%	18%	13%	6%	23%
Property 110 - 125% of Industry Norm	12%	5%	13%	4%	26%
Property >125% of Industry Norm	8%	7%	8%	4%	14%

[a] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

[b] Net operating income to rent ratio equals (total revenue - operating and maintenance expenses)/gross potential rent.

Note: Column sums may not add up to 100% due to rounding.

Source: Financial Data, IREM.

2 Because debt service costs are very low in Section 236 properties, applying a standard NOI test to these properties would overstate their financial hardship. Although their cash available after covering operating and maintenance costs is low, their debt service payments are also low. We have added the IRPs to its revenues of these properties to account for this in this analysis.

- Two thirds of insured properties had net operating income to rent ratios below the median for conventional apartments in their building type and region.

- As expected, net operating income to rent ratios in the unassisted portion of the stock were often closely distributed around industry norms, 58 percent were between 75 and 125 percent of median for conventional apartments in their building type and region. However, over a third of the unassisted stocks (34 percent) had ratios that were below industry norms.

- In contrast, net operating income to rent ratios were below 75 percent of the median for conventional apartments in their building type and region for more than half (59 percent) of older assisted properties, including 20 percent with ratios below half the median. This is a result of both the below conventional market rents and the above conventional market operating and maintenance costs.

- As with most financial indicators, newer assisted properties had the highest relative net operating income to rent ratios. Sixty-three percent of newer assisted properties had net operating income to rent ratios that were higher than those for conventional apartments in their region and building type, including 40 percent with ratios over 110 percent of the conventional apartment median in their building type and region. Although operating and maintenance expenses in newer assisted properties were higher than industry norms, rents were much higher so that overall net operating income to rent ratios were higher than in comparable conventional apartments.

6.2 Market Scenario Distress Analysis

All of the analyses so far that emphasized the strong financial position of newer assisted properties focused on the "current" condition of the stock. As is obvious from the ongoing policy initiatives, the "current" situation is changing. In particular, in Section 8-assisted properties with above market rents, HUD is developing programs to reduce rents to market levels and at the same time reduce debt service payments so that owners can still cover expenses. Permanent legislation for "re-engineering" the portfolio has recently been passed. At present, no proposals are in process to respond to the properties that have below market rents.

In this section, we modify the Distress Index in order to project the level of distress that would be present in the HUD insured stock if property rents were "market" rents. The purpose of this modified Distress Index, which we call the Market Scenario Distress Index, is to create a model to assess the level of distress that would result if rent subsidies were removed and property rents and operating costs reverted to market levels (allowing for both increases and decreases in rents).

The Market Scenario Distress Index is computed by taking:

(a) Net cash flow, recomputed with rents set to "as is" market rents
(b) Minus the amortized cost of remedying the Unfunded Backlog of Physical Needs

As in the case of the original Distress Index, the computation begins with net cash flow, which measures a property's capacity to meet current expenses and make deposits to its replacement reserves account. This net cash flow is different from the net cash flow used in the original Distress Index in two respects: (1) revenues and operating costs are based on market estimates, rather than on actual, subsidized rents and operating costs; (2) average annual accrual is used instead of deposits to replacement reserves. Annual accrual is used instead of replacement reserve deposits because it is assumed that the "market-oriented" property owner will actively keep up with the property's capital needs. Annual accrual typically is higher than current deposits to replacement reserves.

Modified "Market Scenario" Net Cash Flow

Net Cash Flow =

Total Revenue (Weighted 3-Year Average) based on market analysts' estimate of rent obtainable in the market

Minus ***Operating and Maintenance Expenses*** (including expenses for administration, operations and maintenance, utilities, taxes, insurance, and vacancy losses, based on IREM industry norms by building type and region)

Minus ***Mortgage Debt Service*** (interest, principal and mortgage insurance premium as required by current mortgage)

Minus ***Average Annual Accrual*** over 20 years

As with the original Distress Index, net cash flow is reduced by the amortized cost of remedying the unfunded backlog of physical needs, which represents the annual cost of undertaking a repair program. No additional adjustment is made for vacancy loss, because the IREM estimate of expenses includes vacancy losses.

Exhibit 6-7 shows the result of applying the Market Scenario Distress Index to the full stock of multifamily rental housing with HUD-insured or HUD-held mortgages. Under the Market Scenario Distress Index, a dramatically higher percentage of newer assisted properties would be classified as distressed, from 15 percent under the original Distress Index to a staggering 87 percent under the Market Scenario Distress Index. The main reason for the overwhelming difference among newer assisted properties is that a high proportion of newer assisted properties currently receive total rents exceeding local market rents. Thus, reducing rents to market (or forcing properties to operate without rent subsidies) would result in substantially lower income. Further, the Market Scenario Distress Index assumes that property owners put

away into reserves every year the average annual amount of accrual, not just the required replacement reserve deposits.

Exhibit 6-7
MARKET SCENARIO DISTRESS INDEX BY ASSISTANCE CATEGORY
(ASSUMES UNSUBSIDIZED OPERATION AT "AS IS" MARKET RENTS)
(IN 1995 DOLLARS PER 2 BR EQUIVALENT UNIT)

	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties **Percent of Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Distressed[a]	**45%**	**49%**	**44%**	**15%****	**87%**
< -$1,000	30%	26%	31%	8%	65%
-$1,000 to <-$500	10%	14%	10%	4%	18%
-$500 to <-$250	5%	10%	4%	3%	4%
Stressed[a]	**6%**	**12%***	**5%**	**7%****	**3%**
-$250 to $0	6%	12%	5%	7%	3%
Sound[a]	**48%**	**38%****	**51%**	**78%****	**10%**
$0 to < $250	7%	9%	7%	9%	5%
$250 to <$500	6%	9%	5%	8%	1%
$500 to <$1,000	11%	10%	11%	19%	1%
$1,000 to <$1,500	8%	4%	9%	14%	1%
$1,500 to <$2,000	7%	4%	8%	13%	0%
≥ $2,000	9%	4%	10%	15%	2%
Statistics on Market Scenario Distress Index					
Mean[a]	-$295	-$700*	-$206	$923**	-$1,851
Standard Error	$79	$272	$75	$81	$141
Median	-$62	-$244	$23	$848	-$1,469

* Signifies that the differences between unassisted and assisted, or older and newer assisted, properties are statistically significant at the 90% confidence level.

** Signifies that the differences between unassisted and assisted, or older and newer assisted, properties are statistically significant at the 95% confidence level.

[a] Significance test conducted.

[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Note: Column sums may not add to 100% due to rounding.

Under the Market Scenario Distress Index, the proportion of unassisted properties classified as distressed was also substantially higher. The main reason for the increase is the assumption, under the market scenario that property owners are putting aside sufficient funds to cover ongoing accruals.

In contrast, older assisted properties fared best under the Market Scenario Distress Index, going from almost a third (32 percent) classified as distressed to only 15 percent. The reason for this difference is that many older assisted properties are currently receiving rents that are less than local market rents. Reverting to market rents in these cases would mean higher rents and more revenue to deal with physical backlog and annual accrual.

6.3 Market Potential of Insured Properties

This section reports on the potential future uses of the HUD-insured properties if they were not restricted by HUD mortgage and subsidy program requirements. First we present the responses the study's market analysts received to questions regarding potential uses of the property. Next we present estimates of property value and market position, if owners were able to convert all properties to their highest and best use.

Exhibit 6-8 shows that:

- The overwhelming conclusion among the study's market analysts was that most HUD-insured properties, across all assistance categories should continue operations "as is" with no major repairs or renovations (95 percent).

- It was concluded that fewer than half of the properties across all assistance categories could be physically converted or upgraded to a higher quality (44-48 percent).

- Relatively few of the unassisted properties (16 percent) and even fewer of the assisted properties (4 percent) were considered possible candidates for conversion to condominiums.

The study's market analysts estimated property rents under three alternative scenarios for physical upgrades: "as is", "with a moderate upgrade" and "with a major upgrade". As part of the physical inspection process, the inspectors identified upgrades that would be needed to position properties for higher-end market uses. For each of the three market rent options provided by the market analysts, we calculated a net market value based on the capitalized net rent stream provided and the costs (repair in all cases, and upgrade in the two "upgrade" cases, as estimated based on the physical inspection data and the costing programs) that

would be required to obtain these rents.[3] The "highest and best use" is defined as the market position that provides the highest net market value. Exhibit 6-8 shows that:

- Based on the comparison of rent streams with repair and upgrade costs, the majority of properties (80 percent) were already situated in their highest and best use, and would not benefit from physical upgrade projects. This includes 68 percent of unassisted properties and 83 percent of assisted properties.[4]

- If properties were positioned optimally in the market, the average value would be about $30,000 per 2-bedroom unit, with values of unassisted properties higher than values of assisted properties.

- Optimal market rents in unassisted properties would also be above rents in the assisted portion of the stock, although the differences are not statistically significant.

3 In particular, for each rent stream provided we calculated "net rent", i.e. rent net of operating costs. As our estimate of operating income after covering expenses, we used the Institute of Real Estate Management (IREM) median net operating income to rent ratios by building type and region for 1995. The capitalization rates used were collected by the market analysts as part of their discussions with local real estate experts.

4 This includes 5 sample properties, representing 68 properties in the universe where the net market value is negative even with no upgrades.

Exhibit 6-8
FUTURE MARKET POTENTIAL OF INSURED PROPERTIES

	Total	Total		Assisted	
		Unassisted	Assisted	Older	Newer
Total Properties **Percent of Total Properties**	12,243 100%	2,224 18%	10,019 82%	5,943 59%[b]	4,076 41%[b]
Use in Current Physical Condition					
Very / Somewhat Likely[a]	95%	97%	95%	94%	96%
Probably / Definitely Not	5%	3%	5%	6%	4%
Physical Upgrade to Higher Quality					
Very / Somewhat Likely[a]	45%	48%	44%	45%	44%
Probably / Definitely Not	55%	52%	56%	55%	56%
Conversion to Condominium Units					
Very / Somewhat Likely[a]	6%	16%**	4%	3%	4%
Probably / Definitely Not	94%	84%	96%	97%	96%
Optimal Market Position					
Low Market[a]	80%	68%**	83%	83%	83%
Moderate Market	17%	25%	15%	16%	14%
High End Market[a]	3%	7%*	2%	1%*	3%
Optimal Net Market Value per 2BR					
Mean Value[a]	$30,726	$38,160**	$29,076	$28,444	$29,998
Standard Error	833	2,818	804	1,048	1,252
Median	$26,726	$31,785	$25,439	$24,923	$26,635
Monthly Rent at Optimal Position per 2BR					
Mean Value[a]	$631	$687	$618	$608	$633
Standard Error	12	41	12	19	16
Median	$565	$611	$549	$541	$521

* Difference between unassisted/assisted or older/newer assisted significant at the 90% level.
**Difference between unassisted/assisted or older/newer assisted significant at the 95% level.
[a] Significance test conducted.
[b] Older assisted properties represent 59% of assisted properties and 49% of the universe. Newer assisted properties represent 41% of assisted properties and 33% of the universe.

Source Market Valuation Summaries, 1995 Physical Inspection Data and Costing Programs.

Status of HUD-Insured (or Held) Multifamily Rental Housing in 1995

HC-5964
Task Order #7

Final Report Appendices

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Appendix A

SAMPLING

This appendix describes the approach to estimating the numbers of properties insured by HUD in 1989/90 and in 1989/95 and setting appropriate weights for five relevant samples (i.e., the Initial, Monitoring, Analysis, Augmented, and Comparison Samples).[1]

Section A.1 describes the samples, sampling weights, and initial population estimates, taking into account current information on property types. It is sequential, developing Monitoring Sample weights from the Initial Sample weights, and Analysis Sample and Augmented Sample weights from the Monitoring Sample weights. Section A.2 discusses revised population estimates and Monitoring Sample weights, taking into account 1996 HUD data on properties insured in 1989/90 and 1989/95. Revised Analysis and Augmented weights can then be obtained by completing the steps described in Section A.1, using the revised Monitoring Sample weights.

Thus, the methodology for developing the weights involves essentially carrying the steps in Section A.2 first, and then using the revised monitoring sample weights to complete the steps in Section A.1. (However, the approach is presented in the order it is because it is helpful to understand the full approach before going into the details).

A.1 The Five Samples

Sections A.1.1 to A.1.4 describe in turn the Initial and Monitoring Samples, the Analysis Sample, the Augmented Sample, and the Comparison Sample and their sampling weights.

A.1.1 The Initial and Monitoring Samples

In 1989, Abt developed a list of the 13,667 insured properties in HUD's MIDLIS data base that appeared to meet certain criteria. Abt drew a two-stage sample of 1000 of these properties, allocated over six strata. The first stage was a Probability Proportional to Size (PPS) sample of 53 Primary Sampling Units (PSUs), using the number of properties in each PSU as the measure of size. The second stage included samples of properties within each sampled PSU, stratified by property type. Sampling rates differed among the strata. Within each stratum, sampling rates for PSU properties were inversely proportional to the PSU probability of selection, so that every property in a given stratum had the same probability of selection.

1 Discussion of the sample drawn for the 1990 Study is described in detail in Appendix A of the 1992 report.

Data collected from HUD computer files and Field Offices for this sample early in 1990 revealed that 974 of the sampled properties were in fact eligible (met the criteria). This sample of 974 population properties is the "Monitoring Sample". In addition, in reviewing discrepancies between 1990 and 1996 HUD data on property types and between these data and inspection data, we recently determined that some of the 1989 data base property type classifications were incorrect. (One unassisted property was mistakenly coded as older assisted non-family. Inspection results indicated that 16 older assisted family properties were originally classified as older assisted non-family. Three older assisted non-family properties were originally classified as older assisted family). Thus, it is useful to carry three separate property type classification variables -- one for the original classification (which determined initial sampling rates), one for the corrected classification, and one for the 1996 classification.

The relevant universes, sampling fractions, and population estimates are shown in Exhibit A-1. As indicated in the exhibit, there is a choice about sample weights. Most obviously, the original weights as shown in the third row of Exhibit A-1 can be used[2], so that the weights would be:

(1) $$w_{ij}^{MO} = w_{ij}^{O} \delta_{ij}$$

where

w_{ij}^{MO} = the adjusted original weight for the jth property in the ith true property type in the Monitoring Sample;

w_{ij}^{O} = the initial sample weight for the jth property in the ith true property type (a function of the property's 1989 data base property type, as shown in the third row of Table 1); and

δ_{ij} = a dummy variable indicating that the (i,j)th property in the Initial Sample was included in the Monitoring Sample (that is, was determined to be in the study population).

However, since the goal is to estimate means for each true category, retention of the original weights poses some problems. First, because of the reclassification, there will be some mild variation in weights within category. Second, and probably more importantly in this case, equal weights within strata means that we could avoid the analytic complication needed to estimate weighted analytic models.

2 These were adjusted to produce integral numbers of properties in the last row of Table 1.

The equal weight version for the Monitoring Sample weights would be[3]:

(2)
$$w_{ij}^{ME} = \frac{1}{n_{Mi}} \sum_j w_{ij}^{O} \delta_{ij} \qquad n_{Mi} = \sum_j \delta_{ij}$$

where

w_{ij}^{ME} = the equal weight for the jth property in the ith true property type in the Monitoring Sample;

n_{Mi} = the number of ith property type properties in the Monitoring Sample;

w_{ij}^{O} = the initial sample weight for the jth property in the ith true property type (a function of the property's 1989 data base property type, as shown in the third row of Table 1); and

δ_{ij} = a dummy variable indicating that the (i,j)th property in the Initial Sample was included in the Monitoring Sample (that is, was determined to be in the study population).

For all analyses in the report we have used the equal weight versions for each of the six sampling strata, yielding six analytic weights. Since we are not interested in reporting NHP and non-NHP results separately, we had hoped to collapse these strata for each of the two older assisted categories. However key outcomes (such as 1995 cash flow) were sufficiently different between the NHP and non-NHP strata that we decided we could not assign equal weights to the two sub-categories of each of the two older assisted strata. Thus, we were required to develop special programs to calculate standard errors for the variables.

It is worth noting that the HUD list appeared to be quite accurate in the sense that it included very few properties that were not actually in the population. Not only were few listed properties ineligible, but most of the ineligible properties reflected changes in insurance status. From 19 to 21 of the 26 ineligible properties in the sample were properties that were no longer insured at the time of data collection (reasons for ineligibility were not given for two properties). We expect such discrepancies due to lags in updating data bases. Indeed, some of these properties may have been insured when the list was drawn, but have changed status by the time that we began data collection -- that is, our actual population is not certain types of properties insured in 1990, but those insured in 1989 that were still insured in June of 1990.

3 In fact, we will never use the equal weight version of the Monitoring Sample weights, so this discussion is really to introduce the topic, which will come up again in discussing Analysis and Augmented Sample weights.

A.1.2 The Analysis Sample

A sub-sample of 598 of the 974 eligible projects was drawn as the "Analysis Sample".[4] The Analysis Sample properties were allocated across PSUs in proportion to the Monitoring Sample. Interview and inspection data collection was completed for 570 of these (95 percent). Exhibit A-2 provides details on the analysis sample. Assuming that observations were missing at random within strata and across PSUs, the weights for completed cases reflect the overall domain sampling fractions for completed cases. This gave the Analysis Sample weights shown on page A-21 of the 1992 Report.

As part of the preparation for the 1995/96 study, additional information on misclassifications in the 1989 data base was obtained. This needs to be accounted for so that the Analysis Sample would project to our estimated totals for the true classifications. Again, we have two obvious choices. First, we can retain the original sampling weights, inflating or deflating them so that the sum of the weights of completed Analysis Sample cases match the population totals for each true property category:

(3)
$$w_{ij}^{(AO)} = w_{ij}^{O}\,\alpha_{ij}\,\frac{\sum_{j\in MS} w_{ij}^{O}}{\sum_{j\in MS} w_{ij}^{O}\,\alpha_{ij}}$$

where the sums are over the Monitoring Sample, and

$w_{ij}^{(AO)}$ = the adjusted original weight for the jth completed Analysis Sample property in the ith true property type category;

w_{ij}^{O} = the original sampling weight for the jth property in the ith true property type category;

MS = the Monitoring Sample;

α_{ij} = a dummy variable indicating that the jth property in the ith true property type was a completed Analysis Sample property.

Alternatively, we could give equal weights to all completed Analysis Sample properties within a given true category -- i.e.,

4 A sample of 600 of 976 apparently eligible projects was fielded, but it later turned out that two of these were in fact ineligible. Thus, in fact attempts were made to collect information for a sample of 598 eligible projects.

(4) $$w_{ij}^{(AE)} = \frac{1}{n_{Ai}} \sum_{j \in MS} w_{ij}^{O}, \qquad n_{Ai} = \sum_{j} \alpha_{ij}$$

where

$w_{ij}^{(AE)}$ = the equal weight for the jth completed Analysis Sample property in the ith true property type category;

n_{Ai} = the number of ith true property type properties in the completed Analysis Sample;

and other terms are as in EQ(3).

A.1.3 The Augmented Sample

The new study is intended to determine the current (1995) insurance status of the 1990 population, as well as the current characteristics of the projects in that population that were still insured by HUD in 1995. It is based on 1995 information for an Augmented sample, which is a sub-sample of the 1989 Monitoring sample (specifically, the 1990 Analysis sample, less 22 that were determined to have no longer been insured in the spring of 1995, augmented by a sub-sample of other assisted Monitoring sample projects).

The Augmented sample was drawn as follows. Using data available in early 1995, HUD sorted the 974 monitoring properties into two classes -- those that were recorded as still active (926 properties) - and those that were recorded as no longer active (48 properties)

Thirty of the 48 properties listed as no longer active were part of the original analysis sample. A HUD intern called to verify the status of these 30 properties. Eight were determined to still be active (6 had been refinanced and were active under a new FHA number and 2 properties were acquired by HUD and resold to new owners with HUD purchase money mortgages). Thus 22 former analysis sample properties were eliminated from the augmented sample at this stage.

Abt drew a supplementary sample of 125 properties from among the 327 assisted monitoring sample properties that were listed as active on HUD's file (18 monitoring sample properties were listed as no longer active including 14 unassisted properties and 4 assisted properties. The supplementary sample did not include any unassisted properties. HUD did not check the true status of the 4 assisted properties listed as no longer active but they were excluded from

the sampling frame for the supplementary sample). Exhibit A-3 details the analysis, supplementary and augmented samples by stratum.

Consider first the weights for estimating 1995 insurance status. For this purpose, the weights are based on adjusting the Initial Sample weights. Thus, the weights for the "no longer active" sample are constructed by inflating the Monitoring Sample weights for these properties so that, for each true property type category, the sample weights sum to the weights of all the properties in this group -- that is:

(5)
$$w_{(OTHij)} = w_{ij}^{MO} \frac{\sum_{j \in OTH} w_{ij}^{MO}}{\sum_{j \in OTHS} w_{ij}^{MO}}$$

where $w_{OTHij} = 0$ if the insurance status has not been verified in the "no longer active" sample, the numerator sum is over all Monitoring Sample properties in the "no longer active" class, the denominator sum is over cases in the "no longer active" sample where insurance status was verified, and

w_{OTHij} = the weight for the jth property with insurance status verified in the ith true property type category in the "no longer active" sample; and

w_{ij}^{MO} = equals the original weight for the jth Monitoring Sample property in the ith true property type (see EQ(1)).

The fact that the Augmented sample of properties recorded as still active consists of the Analysis sample plus a further sample of other Monitoring sample properties is irrelevant. Being drawn for the Augmented Sample is simply a two stage lottery. Since the sampling rates at each stage is equal for all properties within a 1989 data base property type category, the overall sampling rate is also equal within 1989 data base property type -- that is,

(6)
$$R(DBi, j \in AUG \mid SI) = r_{(A|M)} + (1 - r_{(A|M)}) r_{(S,DBi)}$$

where

$R(DBi, j \in AUG \mid SI)$ = the overall sampling rate for the jth Monitoring Sample property in the ith 1989 data base property type category in selecting properties for the Augmented Sample, given that it was recorded as still insured in early 1995;

$r_{(A|M)}$ = the sampling rate for the Analysis Sample ($r_{(A|M)} = 0.6$ for all properties in the Monitoring Sample); and

$r_{(S,DBi)}$ = the Augmented Sample sampling rate for the jth Monitoring Sample property in the ith 1989 data base property type category, given that it was recorded as still insured and was not in the Analysis Sample ($r_{(S,DBi)}$ is the same for all properties in a given 1989 data base property type category).

The weights can be computed in the same way as the weights for the "no longer active" sample -- viz.

(7)
$$w_{(RSIij)} = w_{ij}^{MO} \frac{\sum_{j \in RSI} w_{ij}^{MO}}{\sum_{j \in RSIS} w_{ij}^{MO}}$$

where $w_{RSIij} = 0$ if the insurance status of the property was not verified in the 'recorded as still insured" sample, the numerator sum is over all Monitoring Sample properties in the "recorded as still insured" class, and the denominator sum is over all completed cases in the "recorded as still insured" sample.

The estimate of the number of properties still insured in 1995 is:

(8)
$$\hat{N}_{SIi} = \sum_{j \in RSIS} w_{(RSIij)} \eta_{ij} + \sum_{j \in OTHS} w_{(OTHij)} \eta_{ij}$$

where

$\hat{N}_{SIi}$ = the estimated number of ith true property type properties insured in 1989/90 that are still insured in 1995;

η_{ij} = a dummy variable indicating that the (i,j)th property was still insured in 1995;

and other terms are as defined earlier.

These weights can be retained in estimating results for properties determined to still be insured in 1995. However, they need to be adjusted to take account of missing inspections. Again, there are two versions that could be considered. The first simply adjusts the original weights by true property type:

(9)

$$w_{ij}^{AUGO} = \begin{cases} w_{(RSIij)}\eta_{ij}\epsilon_{ij}\left[\dfrac{\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}}{\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij}\epsilon_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}\epsilon_{ij}}\right] & if\ (i,j) \in RSIS \\ w_{(OTHij)}\eta_{ij}\epsilon_{ij}\left[\dfrac{\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}}{\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij}\epsilon_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}\epsilon_{ij}}\right] & if\ (i,j) \in OTHS \end{cases}$$

where

ϵ_{ij} = a dummy variable indicating that inspections were completed; and

other terms are as defined earlier.

The equal weight version collapses the "no longer active" and "recorded as still insured" strata, giving equal weight to all properties within each true property type category that are still insured in 1995 (with the sum of the weights in each category adding up to the sum of the weights for properties in that category in the "no longer active" and "recorded as still insured" samples that were determined to be still insured in 1995):

(10)

$$w_{ij}^{AUGE} = \frac{1}{n_{AUGi}}\left[\sum_{j\in RSIS} w_{(RSIij)}\eta_{ij} + \sum_{j\in OTHS} w_{(OTHij)}\eta_{ij}\right], \quad n_{AUGi} = \sum_{j\in RSIS} \epsilon_{ij}\eta_{ij} + \sum_{j\in OTHS} \epsilon_{ij}\eta_{ij}$$

The equal weight version is the most appropriate for characterizing the still insured properties. However, we were not able to collapse the NHP and non-NHP strata because they appear to differ on at key measures.

A.1.4 The Comparison Sample

The Augmented Sample properties that were still insured in 1995 are a sample of 1989 properties still insured in 1995. We will often want to compare 1990 and 1995 conditions for these properties. To do this, we would start with still insured Augmented Sample properties for which 1995 inspections were completed, using the weights shown in EQ(9). Comparison 1990 data is available for the subset of these that were also in the Analysis Sample. Accordingly the adjusted original weights for the Comparison sample would be:

(11)

$$w_{ij}^{COMPO} = \begin{cases} \gamma_{ij} w_{ij}^{AUGO} & if\ (i,j) \in OTHS \\ \gamma_{ij} w_{ij}^{AUGO} \dfrac{\sum_{j \in RSIS} w_{ij}^{AUGO}}{\sum_{j \in RSIS} \gamma_{ij} w_{ij}^{AUGO}} & if\ (i,j) \in RSIS \end{cases}$$

where

γ_{ij} = a dummy variable indicating that the jth property in the ith true property category was in both the Augmented and Analysis samples, was determined to be still insured in 1995, and was inspected in 1995.

The equal weight version would be:

(12)

$$w_{ij}^{COMPE} = \frac{\gamma_{ij}}{n_{COMPi}} \sum_j w_{ij}^{COMPO}, \qquad n_{COMPi} = \sum_j \gamma_{ij}$$

A.2 Taking Account of New Information on the 1989 Population

The 1989 HUD list from which the 1990 sample was drawn was no longer available when work began on the 1995 study. HUD constructed a new listing of the 1990 population, which we call the 1996 list. (Note that both the 1989 list and the 1996 list are lists of 1989 insured properties -- that is, the dates refer to when the list was created, not to when the properties in it existed). Comparison of the 1989 and 1996 lists for the initial 1990 sample suggests that the two lists are quite similar, but that there are some differences. In particular, we estimate that the 1996 list excludes about 3 percent of the properties in the 1989 list and that some of these properties were in fact members of the eligible 1990 population. (Most of the exclusions are properties that had become ineligible between the time the 1989 list was drawn and the time insurance status was verified -- usually due to prepayment of the mortgage). Conversely, we estimate that the 1989 list excludes about 1 percent of the properties in the 1996 list, and that almost all of these properties were in fact members of the eligible 1990 population, but were excluded to due deficiencies in the 1989 MIDLIS database, the primary source of data used to classify properties in 1989. In addition, the 1996 list reclassifies a small

number of properties in terms of property type. We have confirmed most of these reclassifications, though some are incorrect[5].

We want to estimate the number of properties in the 1989/90 population, the number still insured in 1995, and specify appropriate weights for the Augmented and Analysis samples in estimating the characteristics of these two populations. The differences between the 1989 and 1996 lists create two problems. First, while the differences are quite modest, HUD would like the population estimates to reflect the information from both lists. Second, since the sample is based on the 1989 list, there are no direct estimates for properties not included in that list, and we need to decide how to treat these properties in our estimates of population characteristics.

Of our initial sample of 1000 properties, 24 were not in the 1996 list - 5 original analysis sample properties, 4 original monitoring sample properties, and another 15 properties from among the 26 properties that were excluded from the 1989 monitoring sample. (All five of the analysis sample properties that were not in the 1996 list were included in the group of 30 analysis sample properties recorded as "no longer active" in mid-1995. Three were reclassified as "active" following the intern's calls. Three of the 4 monitoring sample properties that were not in HUD's 1996 list were included in the group of 18 monitoring sample properties that were listed as "no longer active". No follow-up occurred).

The basic approach adopted for taking the 1996 list information into account involved the following steps:

1) Define nine 1996 strata, consisting of the four 1996 property types, each further stratified by the 1995 insurance status recorded in the 1996 data base, plus a ninth stratum for 1989 properties not in the 1996 data base. This allows us to use the 1996 information on both the 1989/90 population and its 1995 insurance status.

2) Use the initial sample to estimate how many of the 1989 listed properties were in the 1996 data base. This is primarily to reassure ourselves that using estimates based on the 1989 sample involve extrapolation to a relatively small number of properties that were not included in the 1989 sample frame. We can do this by estimating:

(13)
$$\hat{O}_k = \sum_{i,j \in S_k} w_{ij}^{O}$$

where the sum is over all Initial Sample properties in the kth stratum of the 1996 data base, and

5 This was the source of the corrected property type categories, discussed in Section A.1.

$\hat{O}_k$ = the estimated number of 1989 listed properties included in the kth stratum of the 1996 data base; and

w_{ij}^{O} = the initial sample weight for the jth property in the ith true property type (a function of the property's 1989 data base property type, as shown in the third row of Table 1).

Exhibit A-4 presents these results.

3) We then assume that the relatively small number of properties not included in the 1989 sample frame can be treated as a random sample of properties in each stratum, so that we can project estimates from the 1989 sample to the entire 1996 data base. Our estimate the proportion of the properties in each of the nine 1996 strata that were in fact in the 1989 population is:

(14)

$$w_{ikj}^{RMO} = \begin{cases} w_{ikj}^{O}\delta_{ikj}\dfrac{\hat{r}_k N_k}{\sum_{ij\in S_k} w_{ikj}^{O}\delta_{ikj}} & if\ k\leq 8 \\ w_{ikj}^{O}\delta_{ikj} & if\ k=9 \end{cases}$$

where the sum is over Initial Sample properties listed in the kth stratum of the 1996 data base, and

w_{ikj}^{O} = the initial sample weight for the jth property in the ith true property category and the kth 1996 stratum; and

δ_{ikj} = a dummy variable indicating that the (i,k,j)th property was included in the Monitoring Sample (i.e., found to be eligible).

4) We can now create revised Monitoring Sample weights, reflecting the information in the 1996 data base. As usual, there are two versions. The adjusted weight version is the one that gets used; it is

(15)

$$w_{ikj}^{RME} = \frac{1}{n_{Mi}}\sum_k\sum_j w_{ikj}^{RMO}, \qquad n_{Mi} = \sum_k\sum_j \delta_{ikj}$$

where

N_k = the number of properties in the kth stratum of the 1996 data base (which is known for k < 9).

The equal weight version would be:

(16)

$$\hat{r}_k = \frac{\sum_{ij \in S_k} w_{ikj}^{O} \delta_{ikj}}{\sum_{ij \in S_k} w_{ikj}^{O}}$$

Exhibit A-5 shows the revised Monitoring Sample weights. For comparison, Exhibit A-5a presents the Monitoring Sample weights used in the 1989 study.

Exhibit A-6 shows the revised estimate of the 1989 universe taking into account the 1996 list as well as information from the 1989 list. For comparison, the exhibit also shows the 1989 estimate of the 1989 universe, and the 1996 list information.

We can then use these revised Monitoring Sample weights in carrying out the weighting for the Analysis Sample and Augmented Sample, as described in Section A.1.

Exhibit A-7 shows the revised Analysis Sample weights. For comparison, Exhibit A-7a presents the Analysis Sample weights used in the 1989 study.

Exhibit A-8 shows the estimate of the 1995 universe based on the estimate of the 1989 universe and the survival rates by stratum obtained for the original Analysis Sample and the Supplementary Sample. For comparison, Exhibit A-8a also shows the estimate of the 1995 universe using only the 1996 list information.

Exhibit A-9 shows the Augmented Sample Weights. As can be seen, within the Unassisted and Newer Assisted categories the weights are very close, and should certainly be combined to provide equal weights. Within the two Older Assisted categories there is more variation in the weights. This is because within each Older Assisted category, properties were sampled at different rates (NHP and non-NHP properties). The NHP sample was a subsample of the older assisted properties. It included older assisted properties in the continental US, eligible to pre-pay on their twentieth anniversary, insured prior to 1975, and with the same SOA exclusions as the current study.

Further, several properties that were originally sampled as Non-Family properties were reclassified as Family properties and several that were originally sampled as Family were reclassified as Non-Family.

Exhibit A-9a shows the Augmented Sample Weights under the equal weight option. As indicated above, key indicators for NHP and non-NHP properties were sufficiently different that separate weights were kept.

Finally, Exhibit A-10 shows the Comparison Sample Weights.

Exhibit A-10a shows the Comparison Sample Weights under the equal weight option.

Exhibit A- 1
INITIAL SAMPLE AND MONITORING SAMPLE:
WEIGHTS AND POPULATION ESTIMATES

	1989 LISTED STRATUM							
	Unasst	Older Asst. Non-Family		Older Asst. Family		Newer Asst.	Total	
		NHP	Non NHP	NHP	Non NHP			
Listed Universe	3,357	202	4,546	73	1,319	4,170	13,667	
Initial Sample	205	30	310	20	180	255	1,000	
Eligible Sample	188	30	304	20	178	254	974	
Weight	3357/205	202/30	4546/310	73/20	1319/180	4170/255	Est. Pop.[6]	Alt. Wgt.[7]
True Program Type	ELIGIBLE PROPERTIES SAMPLE							
Unasst	188	0	1	0	0	0	3,094	3094/189
Older Non-Fam, NHP	0	29	0	0	0	0	195	195/29
Older Non-Fam, Non-NHP	0	0	288	0	3	0	4,245	4245/291
Older Fam, NHP	0	1	0	20	0	0	80	80/21
Older Fam, Non-NHP	0	0	15	0	175	0	1,502	1502/190
Newer Asst	0	0	0	0	0	254	4,154	4154/254
Est Pop Prop: Number	3,079	202	4,458	73	1,304	4,154	13,270	NA
Percent	91.7%	100%	98.1%	100%	98.9%	99.6%	97.1%	
Pop. Wgt.[8]	3079/188	202/30	4458/304	73/20	1304/178	4154/254	NA	NA

6 Estimate is based on population weights from last row.

7 Alt. Wgt. = (Est. Pop.)/(Total Sample In Row)

8 Pop. Wgt. = (Listed Stratum Properties in Pop.)/(Listed Stratum Sample in Pop.).

Exhibit A-2
1990 Study Analysis Sample

Stratum	Monitoring Sample Size	Initial Analysis Sample Size	Expected Completion Rate	Expected Properties with Required Data	Actual Completion Rate	Actual Properties with Required Data
Unassisted	188	123	96%	118	93%	115
Older Assisted-Family	198	120	96%	115	96%	115
Older Assisted Non-Family	334	204	96%	195	95%	194
Newer Assisted	254	153	96%	147	96%	146
Total	974	600	96%	575	95%	570

Exhibit A-3

Development of the Augmented Sample of 621 Properties

Column	A	B	C	D	E	F
Stratum	1990 Analysis Sample	Less: No Longer Active	Plus: Supplementary Sample	Less: Inspection Not Complete	Plus: Stratum Changes	=: Augmented Sample
Unassisted	115[9]	16	0	19	+1	81
Older Assisted Non-Family	194	0	48	16	-10[10]	216
Older Assisted Family	115	4	36	8	+9	148
Newer Assisted	146	2	41	9		176
TOTAL	570	22	125	52		621
Source:		1995 F47 plus phone calls	Non-analysis monitoring sample still active in 1995 F47	Includes 23 properties that were determined to be no longer insured; 14 unlocateable; 9 refusals; and 6 "other"	Data Collection	Equals A-B+C-D+E

9 Includes one property where the owner owned both a newer assisted and an unassisted property. The newer assisted property was sampled, but the owner took us to the unassisted property for the inspection. In the 1989 analysis we recoded and reweighted this property as unassisted, when in fact it should have been deleted from the sample.

10 Older assisted properties were classified as "family" or "non-family" based on the unit size distribution recorded on HUD's databases. Properties with no unit size distribution were, by default, coded as non-family. Inspector counts of units resulted in reclassifying 13 properties from older assisted non-family to family, and in reclassifying 3 older assisted family properties as non-family. Thus, the net decrease in the number of older assisted non-family properties is 10, and the net increase in the number of older assisted family properties is 9. (One unassisted property was originally miscoded as older assisted family)

Exhibit A-4
Estimated Number of 1989 Listed Properties Included in the 1996 Data Base By Stratum

1996 Listed Stratum
- 1989 List of all Properties
- 1989 List of Universe

Unassisted
3,142
3,028
- Good 1995
  - 2,373
    - 2,291
- Not Good 1995
  - 769
    - 737

Older Assisted Non-Family
- 4,583
  - 4,540
- Good 1995
  - 4,568
    - 4,525
- Not Good 1995
  - 15
    - 15

Older Assisted Family
- 1,474
  - 1,466
- Good 1995
  - 1,423
    - 1,415
- Not Good 1995
  - 51
    - 51

Newer Assisted
- 4,121
  - 4,121

Good 1995
4,072
4,072
Not Good 1995
49
49

Not on 1996 List
346
115

TOTAL
13,667
13,270

Exhibit A-5

Revised Monitoring Sample Weights Taking into Account
1996 List Information by 1996 List Category
(Including 1996 list recorded insurance status and assistance category)

	Unassisted		Older Assisted Non-Family		Older Assisted Family		Newer Assisted		Not in 1996 List
Wt	Good 95	Not Good95	Good 95	Not Good 95	Good 95	Not Good 95	Good 95	Not Good 95	
3.5714						7			
3.7822					20				
6.8369			29						
6.9773					1				
7.3278									3
7.5932					168				
14.4190	1								
14.6645									3
14.8901			293						
15.1958					6				
15.6170		45							
16.0791	1								
16.1014	138								
16.3655							249		
16.3756									3
16.6275			2						
16.9454					1				
23.6667								3	
56				1					
TOTAL	140	45	324	1	196	7	249	3	9

Exhibit A-5a
1989 Monitoring Sample Weights (Based on 1989 recorded stratum)
(Weights sum to 1989 estimate of universe)

Weight	Unassisted	Older Assisted Non-Family	Older Assisted Family	Newer Assisted
3.650			20	
6.733		30		
7.328			178	
14.665		304		
16.353				254
16.376	188			

Exhibit A-6

Revised Estimate of 1989 Universe Using Revised Monitoring Sample Weights

Takes into account 1989 and 1996 information. For comparison the estimate using only 1989 information (used in the "Blue Book", and the 1996 list-based estimate are also presented.

Stratum	Estimate of 1989 Universe Using 1996 and 1989 Information	Estimate of 1989 Universe Using Only 1989 Information	Estimate of 1989 Universe Using Only 1996 List
Unassisted	3,021	3,080	3,067
Older Assisted Non-Family	4,550	4,660	4,695
Older Assisted Family	1,608	1,506	1,499
Newer Assisted	4,179	4,154	4,146
TOTAL	13,358	13,270	13,407

Exhibit A-7

Revised Analysis Sample Weights Taking into Account 1996 Information (Weights Sum to Revised Estimate of 1989 Universe)

Weight	Unassisted	Older Assisted Non-Family	Older Assisted Family	Newer Assisted
4.1634			18	
6.4601			3	
7.6258		26		
7.6804			1	
13.2547			3	
13.7348			89	
14.0431		2		
23.7110	1			
25.6811	27			
26.4777	85			
26.9286	2			
26.9336			7	
27.4865			2	
27.2122		157		
27.6760				1
28.1688				142
29.1670				1
40.7359				3
TOTAL	115	185	123	147[11]

11 Includes one property where the owner owned two properties, one unassisted and one newer assisted. The newer assisted property was sampled, but the owner took us to the unassisted property which was inspected. In the 1989 study, we re-assigned the weight as unassisted. In fact, this property should not be included in the analysis sample, and is excluded from the Augmented Sample.

Exhibit A-7a
1989 Analysis Sample Weights (Based on 1989 recorded stratum)
(Weights sum to 1989 estimate of universe)

Weight	Unassisted	Older Assisted Non-Family	Older Assisted Family	Newer Assisted
4.056			18	
7.481		27		
13.446			97	
26.694		167		
26.782	115			
28.450				146

Exhibit A-8

Estimate of 1995 Universe
(= Properties that Were Insured in 1989 and still insured in 1995)
and Survival Rate

Stratum	Estimate of 1989 Universe	Estimate of 1995 Universe (1989 Universe still active in 1995)	Survival Rate
Unassisted	3,021	2,224	73.62%
Older Assisted Non-Family	4,550	4,388	96.44%
Older Assisted Family	1,608	1,554	96.64%
Newer Assisted	4,179	4,076	97.51%
TOTAL	13,358	12,242	91.65%

Exhibit A-8a

1996 List-Based Estimate of 1995 Universe
(= Properties that were in HUD's 1996 list as insured in 1989 and still insured in 1995

Stratum	1989 Universe based on 1996 list	1995 Universe (1989 universe still active in 1995) based on 1996 list	Survival Rate
Unassisted	3,067	2,333	76.07%
Older Assisted Non-Family	4,695	4,639	98.81%
Older Assisted Family	1,499	1,474	98.33%
Newer Assisted	4,146	4,076	98.29%
TOTAL	13,407	12,522	93.39%

Exhibit A-9
Augmented Sample Weights
(Weights Sum to Estimate of 1995 Universe)

Weight	Unassisted	Older Assisted Non-Family	Older Assisted Family	Newer Assisted
4.1634			18	
7.6258		26		
7.6804			1	
8.9926			2	
10.5602			116	
11.3324		3		
20.7083			9	
21.1334			2	
22.2225		187		
23.1527				175
23.9731				1
24.6561	1			
26.7047	4			
27.5330	75			
28.0019	1			
TOTAL	81	216	148	176

Exhibit A-9a
Augmented Sample Weights, Using Equal Weights Within Strata
(Separate Weights for NHP/Non-NHP Sub-strata)

Weight	Unassisted	Older Assisted Non-Family	Older Assisted Family	Newer Assisted
4.3684			19	
7.61538		26		
11.4109			129	
22.0526		190		
23.1591				176
27.4568	81			

Exhibit A-10
Comparison Sample Weights
(Weights Sum to Estimate of 1995 Universe)

Weight	Unassisted	Older Assisted Non-Family	Older Assisted Family	Newer Assisted
4.1634			18	
7.6258		26		
7.6804			1	
12.1157			2	
14.2278			84	
14.6315		2		
24.6561	1			
26.7047	4			
27.5330	75			
27.9003			7	
28.0019	1			
28.4730			2	
28.6901		145		
29.9605				135
31.0222				1
TOTAL	81	173	114	136

Exhibit A-10a
Comparison Sample Weights, Using Equal Weights Within Strata
(Separate Weights for NHP/Non-NHP Sub-strata)

Weight	Unassisted	Older Assisted Non-Family	Older Assisted Family	Newer Assisted
4.3684			19	
7.61538		26		
15.4947			95	
27.4568	81			
28.5034		147		
29.9706				136

Appendix B

DATA COLLECTION SUMMARY

Data collection on HUD-insured (or held) multifamily properties was conducted in three phases, under three separate task orders plus an interagency agreement between HUD and the US Army Corps of Engineers (USACE). Under the first task order (Task Order 5 under contract HC-5964) and through the interagency agreement with the USACE, data on the physical condition of properties were collected. Under a second task order (Task Order 6 under contract HC-5964) data on the market position of the properties were collected. Under Task order 7 (the current task order), data on property finances, mortgages, tenants, assistance contracts, and neighborhoods were assembled from a range of HUD and other data files. For completeness, this appendix describes the data collection procedures for all three tasks. Section B.1 describes the procedures for collecting physical condition data, Section B.2 describes the market data collection, and Section B.3 describes the secondary data used.

B.1 Physical Condition

The physical condition of the stock was assessed on-site by the US Army Corps of Engineers (USACE). The purpose of the on-site physical inspections was to obtain current information on the physical condition of FHA-insured (or held) multifamily housing at a level of detail sufficient to indicate the nature of physical deficiencies and the costs that would be required to remedy the current backlog of physical needs as well as to estimate the ongoing accrual of physical needs over the next 20 years.

The backlog of repair needs was estimated using the Observable Systems Method, which was initially developed by Abt Associates for the 1985 Modernization Needs Study of Public Housing[1]. Under this method, the condition of each property's systems is observed, evaluated, and assessed on-site; and then costed in a consistent manner off-site using a regionalized data base of repair costs and a computerized costing program. The inspection protocol included observing conditions of 119 mechanical, electrical, and architectural systems. For each system, the inspector judged and recorded the level of remedial action needed to restore the system to its original condition. The action levels were "No Action", "Minor Action", "Moderate Action", "Major Action", and "Replace", based on the observed condition. Minor defects that could be corrected through routine maintenance (e.g. faucet washer replacement) were excluded.

1 Dixon Bain et al., *Study of the Modernization Needs of the Public and Indian Housing Stock* (Cambridge, MA: Abt Associates Inc., March 1988). This inspection method proved sufficiently cost-effective that it has subsequently been adapted and used by at least one commercial inspection firm.

The USACE inspectors used a standard set of seven inspection booklets (developed by Abt Associates)—Site, Building Envelope, Building Mechanical and Electrical, Unit, Takeoff, Property Quality Distribution (PQD) and Inspection Building Type and Quality (IBTQ)—to collect all relevant system-level information. For each observable system, the inspector noted presence or absence of the system; age; type, if appropriate (e.g., battery or hard-wired smoke detectors); number, if appropriate (e.g., the number of windows); and action level associated with the observed condition[2]. Using architectural drawings, when available, or "pacing off" when no plans were available, the inspectors calculated take-off measurements for site areas and distribution systems, average unit square footage for all unit sizes present at the property, and key building dimensions for up to three predominant types/sizes of buildings. These measurements were recorded in the Takeoff booklet.

The inspectors were responsible for gathering three kinds of information on each property: 1) current condition—observations that were used in the study to estimate the backlog of needs (the cost to bring all systems up to their original condition); 2) upgrade feasibility—whether a property could be physically upgraded to a higher market use, and information needed to estimate costs of upgrading; 3) property take-offs—a measurement inventory of average units, typical building dimensions, and certain systems, used by the study both in costing backlog needs and estimating future accruals of repair/replacement costs. The inspectors also conducted neighborhood windshield surveys and collected preliminary information that was used as input for the market assessment team (discussed below).

For each system, the inspector judged and recorded the level of remedial action needed to restore the system to its original condition. The action levels assigned to each observable system condition were provided to all inspectors in training sessions and a series of manuals. This uniform set of instructions assured consistency across individual inspectors. Exhibits B-1 and B-2 are samples of an inspection booklet and the action level description from the Inspector Manual. The examples are taken from the "Full Bathroom" section of the "Unit Inspection" booklet. (Exhibit B-1 is a page from this booklet.) Under the section labeled "Full Bathrooms," are the seven systems observed in the bathroom inspection. Some systems (walls and ceilings, accessories) require only an action level in order to estimate repair cost; others require a type (i.e., the materials in use or size) as well as an action level for the repair estimate. For example, under the Bathroom Floor Cover and Subbase System, "Type" is necessary because replacing a ***ceramic*** tile floor would be more costly than replacing a ***resilient*** tile floor or linoleum.

2 In this study, our assessment of physical needs *excludes* three categories of expenditures that many owners will be required to make: modifications for accessibility for the disabled, as required by Section 504 of the Rehabilitation Act of 1973, as amended; measures taken solely to mitigate hazards of lead paint or asbestos; and improvements for increasing energy efficiency. The only exception to this is that the replacement of, for example, a heating system or appliance, assumes installing a standard quality replacement according to current practice, and not simply replacing the old system.

Exhibit B-2 is taken from the ***Inspector's Manual*** of conditions and action levels. For each system, the manual defines the system, explains where and how to observe the system, and then describes the repair needs associated with each action level.

Two other forms—Project Quality Distribution and Inspection Building Type and Quality—were used to obtain overall descriptions of the building stock and the relative quality of units and buildings at the property.

In advance of the site visit, the inspector sent a Project Quality Distribution form to the site manager. The manager completed the information on the number of units by size (bedrooms and bathrooms) and condition, as well as the number of buildings by type (high-rise, walk-up, etc.) and condition. A definition guide on conditions was attached to the form to make it easier for the manager to categorize the units and buildings. When the inspectors arrived on-site, they reviewed the Project Quality Distribution form with the site manager and discussed the general characteristics of the property, including:

- Number, type (high rise or elevator buildings, low-rise, garden/townhouses, or single-family detached), and age of buildings,[3]
- Number of units by bedroom and bathroom size,[3] and
- The property manager's assessment of overall condition of buildings and units, i.e., what proportion the manager estimated were in excellent, good, fair, or poor condition.[4]

From this composite of the property, inspectors selected up to three buildings and three units to inspect, based on predominant quality categories and predominant building and unit types. If multiple quality buildings were present, inspectors were instructed to inspect the lowest quality building. Inspectors were also told to inspect at least one building containing an elevator if one existed at the property, regardless of its likelihood to be inspected under the guidelines based on predominant quality and type. For example, if the property had one high rise building and twenty townhouse buildings, the inspector would inspect the high rise and two townhouses.

3 Inspector recorded this information on the Inspector Building Type and Quality (IBTQ) form.

4 Manager and inspector recorded this information on the Project Quality Distribution (PQD) form.

UNIT BOOKLET

KITCHENS (CONTINUED)

	ABSENT	AGE	ACTION LEVEL					
			N/A	MIN	MOD	MAJ	REP	
Refrigerator	☐1 102/	_____ 103-105/	☐0				☐4	106/
Garbage Disposal	☐1 107/	_____ 108-110/	☐0				☐4	111/
Dishwasher	☐1 112/	_____ 113-115/	☐0				☐4	116/
Microwave	☐1 117/	_____ 118-120/	☐0				☐4	121/
Trash Compactor	☐1 122/	_____ 123-125/	☐0				☐4	126/

KITCHEN UPGRADE FEASIBILITY

Is an upgrade necessary for market conversion?

	NO	PARTIAL	FULL	REHAB		Rehab Feasible? NO	YES	
Kitchen	☐0	☐1	☐2	☐3	127/	☐0	☐1	128/

FULL BATHROOMS

NUMBER OF FULL BATHS PRESENT: _____ 129/

	ABSENT	TYPE	AGE	ACTION LEVEL					
				N/A	MIN	MOD	MAJ	REP	
Walls & Ceilings - Partitions & Surfaces				☐0	☐1	☐2	☐3	____% 4	130/ 131-133/
Floor Cover & Sub-base		☐1 Ceramic 134/ ☐2 Resilient	____ 135-137/	☐0			☐3	☐4	138/
Fixtures - Sink	☐1 139/		____ 140-142/	☐0	☐1			☐4	143/
Fixtures - Toilet	☐1 144/		____ 145-147/	☐0	☐1			☐4	148/
Fixtures - Tub/Shower	☐1 149/	☐1 Porcelain 150/ ☐2 Fiberglass	____ 151-153/	☐0	☐1			☐4	154/
Accessories			____ 155-157/	☐0		☐2	☐3	☐4	158/
Vanities (single = 24" double = 36")	☐1 159/	☐1 Single 160/ ☐2 Double	____ 161-163/	☐0				☐4	164/

Exhibit B-2

103. Bathroom Floor Covering and Sub-base

Definition: The floor sub-base refers to a rough floor, laid on joists, which serves as a base for the finished floor. The floor covering could consist of tile, sheetgood, or carpet. There are two types of floor covering:

- ☐ Ceramic tile
- ☐ Resilient sheetgoods

Where to Observe: The floor located in the inspected unit bathrooms should be observed.

Inspection Method:

- ☐ Record whether the floor covering is ceramic or resilient.
- ☐ Record the age of the floor.
- ☐ The actual floor sub-base cannot be observed directly, but the inspector can note if the floor is warped or buckled.

Rating of Repair Needs - Action Levels:

Minor Action: Not applicable.

Moderate Action: Not applicable.

Major Action: The sheetgoods are severely deteriorated and need to be replaced.

Replace: The floor is buckling, warped, or splintered, requiring the replacement of the floor covering and sub-base.

104. Bathroom Fixtures

Definition: There are two types of fixtures for a tub/shower (full bath):

- ☐ Porcelain
- ☐ Fiberglass

Common Elements: Bathroom fixtures include the sink, toilet and tub.

Where to Observe: These fixtures can be observed in the bathroom.

Inspection Method:

- ☐ Each fixture is rated separately.
- ☐ Record the age of the fixtures.
- ☐ Record whether the tub/shower is porcelain or fiberglass (porcelain includes tile and/or enamel on cast iron).

Rating of Repair Needs - Action Levels:

Sink:

Minor Action: The fittings need to be repaired or replaced.
Moderate Action: Not applicable.
Major Action: Not applicable.
Replace: The sink needs to be replaced.

Toilet:

Minor Action: The fittings need to be repaired or replaced.
Moderate Action: Not applicable.
Major Action: Not applicable.
Replace: The toilet needs to be replaced.

Tub/Shower:

Minor Action: The fittings need to be repaired or replaced.
Moderate Action: Not applicable.
Major Action: Not applicable.
Replace: The tub/shower needs to be replaced.

105. Bathroom Accessories

Common Elements: Common bathroom accessories include a medicine cabinet, towel bar, shower rod, and a wall-attached soap dish.

Where to Observe: These items can be observed in the bathroom.

Inspection Method:
- ☐ Record the age of the bathroom accessories.
- ☐ Observe the condition of these items directly.
- ☐ Ask the residents if the accessories are stable and operate properly.

Rating of Repair Needs - Action Levels:

Minor Action: Not applicable.

Moderate Action: Two to three accessories are broken or missing and need to be replaced (excluding the medicine cabinet).

Major Action: Replace medicine cabinet only.

Replace: A majority of the accessories and the medicine cabinet are broken or missing and need to be replaced.

106. Vanities

Definition: This item refers to the vanity structure itself and not to the sink. There are two types of vanities:
- ☐ Single = 24" long
- ☐ Double = 36" long

Where to Observe: The vanity can be observed in the bathroom.

Inspection Method:
- ☐ Record whether the vanity in the inspected unit is a single or double vanity.
- ☐ Record the age of the vanity.
- ☐ Observe the structure of the vanity by opening and closing the vanity doors; observe the condition of the vanity directly.

Rating of Repair Needs - Action Levels:

Minor Action: Not applicable.

Moderate Action: Not applicable.

Major Action: Not applicable.

Replace: The vanity is beyond repair and needs to be replaced.

For units, the inspectors were instructed to inspect units from the predominant sizes with the provision that the inspectors select units that, in the manager's opinion, were in the worst physical condition.[5] If all the units at the property were in good condition, then the inspector made the selection based solely on predominant unit size. If, however, there were units ranging in quality from poor to excellent, the inspector would select poor, fair, and good units, and not inspect units in excellent condition. This protocol was followed to obtain direct observations on the elements most costly to repair. Adjustments to property-level repair costs for the relatively less expensive repairs of better quality units are described in Appendix C.

In addition to assessing the current physical condition, inspectors provided information on the physical (but not market) feasibility of upgrading certain observable systems for a market conversion. They recorded this information in the inspection booklets, as shown in the example in Exhibit B-1 for "Kitchen Upgrade Feasibility". (This information is needed to ascertain net market value—that is, to subtract upgrade costs from capitalized net operating income for market-level unassisted rents.) In some cases, upgrading meant adding a system if one did not currently exist (e.g., a swimming pool). If the system already existed, upgrading it would involve replacing it with better quality materials.

A total of 1,248 buildings and 1,563 units were inspected across the 621 properties of the Augmented Sample.

B.2 Local Market Conditions

As was the case in the 1990 Study, Applied Real Estate Analysis, Inc. (AREA), a firm specializing in market analysis, conducted local market assessments for all 621 properties in the Augmented Sample. The local market assessments provided several types of key data:

- Potential unrestricted market rents under current condition and with moderate and major upgrades, and potential value as condominiums
- Likely use of the property in an unrestricted market
- Local market characteristics: vacancy rates, property appreciation rates, condominium absorption rates, capitalization rates
- Local Section 8 success rates, and changes in success rates

5 The value to the study of the manager's rating of units and buildings by overall condition depended primarily on the manager's ***consistency***, rather than on the manager's use of the exact definition of excellent, good, fair, or poor. The inspector conducted quick "walk-throughs" of units in the various categories, in addition to conducting the actual inspections, to verify the consistency of the manager's ratings. If discrepancies existed, the inspector adjusted the distribution to reflect the differences.

For properties that were included in the 1990 Study, AREA started out with contact lists from that study. For all properties, the inspectors provided AREA with important information about the properties and their neighborhoods. The inspectors photographed the sample properties, nearby potentially competitive properties, and some views of the neighborhood surrounding the property to aid in defining the neighborhood context. They also conducted a brief windshield survey, recording observations about the neighborhood such as age of residential structures, density, non-residential uses, major amenities (such as a park or shopping area), and any neighborhood elements that would detract from the market value (such as an old, rundown industrial area). The inspectors also provided contact information for local potentially comparable buildings. Abt provided AREA with 1990 Census data on each property's neighborhood.

AREA staff conducted all surveys by telephone. They gathered information from realtors, public housing and community development officials, and others knowledgeable about the local market on possible alternative uses (such as condominiums, market-rate rental, or nonresidential) and current rental market position (i.e., is the property currently a low-rent property, a moderate rental, or a high-end luxury complex?), vacancy rates, and trends in supply and demand. The final assessment of the possible rents and local market context of each property was summarized on a Market Valuation Summary Guide form.

B.3 Data Collection from Secondary Data Sources

Data for this study were also extracted from secondary sources, including HUD automated data bases and other existing data bases. For numerous categories of variables, multiple data sources were available and hierarchies were developed for prioritizing sources. In addition, when key data elements were missing, we developed procedures to impute variables. For each category of data, the sources and imputation procedures are described below.

B.3.1. Property Income and Expenses

Three separate data sources were used to assemble information on property finances. Financial data are derived directly from annual statements of income and expense provided by each property owner as required by HUD mortgage regulatory agreements. These data include multiple years of income and expense statements for most properties in the sample. HUD supplied us with Annual Financial Statement files for 1993 - 1995. The 1993 and 1994 files contained more complete information (including reserves). As backup to the annual financial statement files we used the financial statement file from HUD's Multifamily Data Warehouse. The file contained income and expense data for 1992 through 1994. In addition we obtained backup tapes for 1992 through 1994.

HUD financial data files were fairly complete. For example 540 of the 621 properties had ***total revenue*** data for three or four of the possible four years, 53 properties had two years of

data, 16 had one year, and 12 had no financial dat. For other financial variables the coverage was similar. The most recent year of available data was 1995, for which 354 properties had at least some financial data.

When financial variables were missing, they were imputed by assigning the median value (per unit) of the three year weighted average for all properties of the same building type and assistance category. This method was used to impute gross revenue, tenant paid rents, tenant assistance payments and total operating and maintenance costs. Vacancy losses were imputed based on the median of the three year weighted average percent vacancy loss (rather than the median dollar vacancy loss). Replacement reserve balances were imputed based on the median per unit values by assistance category and building type.

B.3.2 Property Mortgage Information

Data on mortgages including, original mortgage amount, mortgage date, term, and interest rate, and current status of the mortgage were obtained from files on HUD's Multifamily Data Warehouse. Information on additional loans (operating loss loans and Section 241 supplementary loans) was obtained from the Warehouse files and from the 1990 analysis file. From the data we computed annual mortgage payments and outstanding principal balances.

B.3.3. Assistance Contracts

Obtaining information on assistance contracts was especially important in order to verify the classification of properties as unassisted or older or newer assisted, to determine the percentage of property units that were covered by assistance contracts, the amount of assistance, and the next (and ultimate) renewal dates of assistance contracts. Several of the files provided by HUD were maintained at the contract level, and others were aggregated to the project level. Data were taken from all files to calculate the total number of contracts, contract amounts, assisted units and dates. Contract amounts were often missing and were imputed using the median contract amount per year per assisted unit by building type and type of Section 8 assistance. For properties that were missing Section 8 contract start dates or renewal dates, we used the median date by Section 8 type.

B.3.4 Tenant Characteristics

Tenant Characteristics information was obtained from a HUD file that aggregated at the project level data from HUD's MTCS data base. The MTCS data base is a household-level file that tracks tenant characteristics in assisted properties. Data were received on 460 of the 540 assisted properties in the sample (150 newer assisted and 310 older assisted) representing 8,536 of the 10,019 assisted properties in the study universe. No tenant characteristics data were available for the unassisted portion of the stock.

Imputation rules were developed for each category of tenant characteristics data. Income distributions were imputed based on assistance category. For older assisted properties we assigned the mean income distribution based on the proportion of assisted units (under 50 percent assisted, or over 50 percent assisted) in the property. For newer assisted properties, we assigned the overall mean income distribution, since nearly all newer assisted properties received assistance for all units.

Race and ethnicity were imputed based on the composition of properties in racially similar census tracts. For each property we created a flag, which indicated the dominant group in its census tract (white non-Hispanic, Black non-Hispanic, Hispanic regardless of race, other). Then, we calculated the mean racial and ethnic composition for all properties that provided data by assistance by dominant group in the Census tract. For properties that were missing racial and ethnic composition we assigned the mean distribution based on properties located in tracts with the same predominant group, by assistance category.

Household size distribution, other income characteristics (percent with some public assistance, percent with some SSI, percent with some wages), and percent elderly and percent handicapped households were imputed based on the reported occupancy type (family/elderly/handicapped) and assistance category. For each of these variables we calculated the mean distribution by assistance category and occupancy type among properties that had data. These means were assigned to properties with missing data.

B.3.5 Neighborhood Characteristics

In addition to the information obtained from the inspectors and the market analysts, characteristics of property neighborhood data included two additional categories of variables. In describing characteristics of the properties' neighborhoods, we used the characteristics of their 1990 Census tracts (or zip codes when addresses could not be geocoded), as well as FMRs and HUD median incomes.

All properties were geocoded using MapMarker version 2.0. Properties with very incomplete address information could not be geocoded (e.g. addresses such as "Orleans & Illinois" and "Kershaw St") and therefore, for 103 properties 1990 Census zip code-level data were used instead of the tract-level data. All 1990 Census dollar values were inflated to 1995 dollars using the CPI for Urban Consumers (i.e. multiplied by 153.4/126.1=1.2173), and then were rounded to the nearest $1,000. For example, the 1990 Census ranges for income distribution include "0- $9,999". On average across the stock neighborhoods 25 percent of households fell into that income category. "0 - $9,999 translates into $12,172 in 1995 dollars (9999 x 1.2173), which gets rounded to $12,000. Thus the bottom income range in the table is "0- $12,000 and includes 25 percent of households in the neighborhoods of the insured stock.

Data on 1996 Fair Market Rents (FMRs) and 1995 and 1996 local median incomes were downloaded from HUD's Web Page based on State, County and MSA.

B.3.6. Other Sources

As backup to the data sources listed above, we also used the 1990 analysis and monitoring files as well as HUD's 1996 and 1989 MIDLIS files.

Appendix C

SYSTEM FOR ESTIMATING PHYSICAL NEEDS BACKLOG AND ACCRUAL COSTS FROM INSPECTIONS

This appendix outlines the approach used to relate observations made by inspectors to costs of repairs and replacements. The first section describes the methods for arriving at costs of the ***backlog of currently needed repairs and replacements*** ("physical needs backlog costs"). The second section describes the method to obtain ***upgrade feasibility costs***, that is, costs that would have to be expended in order to convert a property to higher quality ("upgrade costs"). The third section addresses the method for estimating ***future accrual of major repair and replacement costs*** ("accrual costs").

C.1 Estimating Physical Needs Backlog Costs from Property Inspections

The process of estimating repair costs based on the property inspections involved five steps:

- Conducting a ***physical inspection*** of the overall site and up to 3 buildings and units within each project in the sample;
- Generating a system-level ***cost file*** (119 systems or groupings of physical features were inspected in the properties);
- Calculating system-level ***costs for the site and inspected units and buildings***;
- Computing ***property-level costs*** by inferring costs for uninspected units and buildings from inspected units and buildings;
- ***Regionally adjusting*** the property-level costs.

Physical Inspection of the Property

The physical inspection method—the Observable Systems Method—was described previously in "Appendix B: Data Collection Summary." The inspection produces information for each property on: the current condition and required repair action level for each of 119 systems for the site and for the buildings and units that were inspected; upgrade feasibility to higher market use; and property take-offs—a complete inventory of the presence, count, age, type, and dimensions of components.

System Level Cost File for Computing Physical Needs Backlog

As was discussed in Appendix B, under the Observable Systems Method, the costs of carrying out the repair actions recorded by the inspector were computed off-site using a computerized cost file and program. The first step in generating the cost file was developing up to five system-specific, categorized levels of repair, ranging from no action to replacement of a system, to correspond to action levels the inspector would use to describe the repairs needed to bring the system up to a safe, sound, marketable condition. The action level groups are:

- NA for no action
- MIN for minor repair
- MOD for moderate repair
- MAJ for major repair, and
- REP for replace

For any system, each action level denotes a specific repair action. For example, for Kitchen Cabinets/Counters/Sinks (a dwelling unit system), the MIN action is to replace countertop or sink faucet; the MOD action is to refinish existing cabinets, or repair doors and drawer hinges as well as replacing anything covered under MIN; MAJ includes the components of MOD as well as replacing the countertop ***and*** sink; and REP includes all MAJ components plus replacing countertop, cabinets and sink. In the above example for cabinets/countertops/sinks, the MIN cost is $732 for each kitchen requiring MIN action. MOD costs are $800 for each kitchen requiring a MOD level of repair. MAJ costs are $1,532 for each kitchen. REP costs are $2,500 per kitchen. Costs for each action level for each system are presented in Exhibit C.1. Not all systems have 5 action levels. The ***Inspection Handbook*** for this study details each allowable action level for each system.

As in the 1990 Study, we obtained the services of A.M. Fogarty and Associates, a firm with extensive experience in costing for private housing construction and modernization, to review the cost file developed for the 1990 Study and to update cost elements which corresponded to each system and action level combination.

System Level Costs for the Site and Inspected Units and Buildings

In this step, the inspector's observations and the cost files are combined to calculate, for each property, costs for repair actions on items that have been inspected. A mathematical algorithm is applied to each system the inspector checked off as needing some level of repair. The basic concept is multiplying unit cost by a quantity measure, where the quantity measure may be scaled by a percentage of the item affected.

Exhibit C.1

SYSTEMS	MINOR	MODERATE	MAJOR	REPLACE	UNIT OF MEASURE	ASSUMPTIONS
***SITE SYSTEMS						
Landscape	0.11	0.26	0.78	1.05	Landscape-SF	
Roadways	0.15	0.35	0.70	1.74	Road-SF (min 1000)	
Parking Areas-Lots	0.10	0.50	1.00	1.74	Parking-SF;# of new spaces	360 SF per space
Parking Areas-Garages	0.02	0.70	1.00	1.74	Park-SF (min 1000)	
Paved Pedestrian Areas	0.30	0.76	1.89	3.73	PvdPed SF (min 1000)	
Curbing-Bituminous	N/A	N/A	N/A	4.41	Curbing LF	
Curbing-Concrete	N/A	N/A	7.57	15.24	Curbing LF	
Curbing-Granite	N/A	2.18	7.88	N/A	Curbing LF	
Fencing-Chain Link	N/A	N/A	N/A	14.50	Fencing LF	
Fencing-Wrought Iron	N/A	N/A	N/A	57.84	Fencing LF	
Fencing-Wood Stockade	N/A	N/A	N/A	15.27	Fencing LF	
Retaining Walls-Concrete	N/A	2.99	N/A	34.04	Retain Wall-LF	
Retaining Walls-RR Ties	N/A	0.67	N/A	24.17	Retain Wall-LF	
Site Drainage-Underground	N/A	900.00	2670.00	4500.00	# Catch Basin	
Site Drainage-Surface	N/A	0.33	2.50	N/A	Landscape SF	
Pole Mounted Site Lighting	500.00	800.00	1350.00	3500.00	# Poles	
Site Furniture	36.00	120.00	120.00	120.00	# Units	Min 10% of units, Mod 25%, Maj 66%, Replace 100%
Private Yards and Enclosures	N/A	485.00	N/A	970.00	# Yards	
Dumpsters and Enclosures	1000.00	2500.00	4300.00	5700.00	# Dumpsters	
Swimming Pool	5140.00	7864.00	10588.00	34475.00	# Pools	
Tennis Courts	2678.00	2940.00	11655.00	24194.00	# Courts	Double Court
Basketball Courts	2248.00	3094.00	N/A	10024.00	# Courts	
Site Electrical Distribution-Over	N/A	N/A	95.00	130.00	Site Elec Dist-LF	
Site Electrical Distribution-Under	N/A	N/A	115.00	150.00	Site Elec Dist-LF	
Heating Water Distribution-Steam	N/A	N/A	N/A	325.00	Heat Water Dist-LF	
Heating Water Distribution-Hot Water	N/A	N/A	N/A	175.00	Heat Water Dist-LF	
Domestic Hot Water Lines	N/A	N/A	N/A	40.00	Dom Hot Water -LF	
Domestic Cold Water Lines	N/A	N/A	N/A	25.00	Dom Cold Water-LF	
Main Water Service	N/A	N/A	N/A	45.00	Main Water Serv-LF	
Gas Lines	N/A	N/A	N/A	30.00	Gas Lines-LF	
Site Sanitary Lines	N/A	N/A	N/A	40.00	Site Sanitary-LF	
Septic System	N/A	N/A	350.00	8000.00	Units	
Sewage Ejectors	800.00	1400.00	2000.00	3500.00	# Ejectors	
Hydrants	N/A	N/A	N/A	2000.00	# Hydrants	
Emergency Generator	200.00	500.00	7500.00	16000.00	1 per project	

Exhibit C.1

SYSTEMS	MINOR	MODERATE	MAJOR	REPLACE	UNIT OF MEASURE	ASSUMPTIONS
***UNIT SYSTEMS						
Walls & Ceilings: Partions (not K&B)	N/A	N/A	N/A	3.00	SF	
Floor Sub-base (not K&B)	N/A	N/A	N/A	3.35	SF	
Walls & Ceilings: Surfaces (not K&B)	0.58	1.08	N/A	1.58	SF	
Floor Covering-Carpet (not K&B)	N/A	N/A	N/A	1.65	SF	
Floor Covering-Resilient (not K&B)	N/A	N/A	N/A	2.43	SF	
Interior Doors & Frames	N/A	50.00	256.00	400.00	# Doors need act	
Kitchen Walls & Ceilings: Partions & Surfaces	0.70	1.25	N/A	3.00	SF	
Kitchen Floor Covering & Sub-base	N/A	N/A	3.30	6.65	SF	
Cabinets/Counter Top/Sink	732.00	800.00	1532.00	2500.00	# needing replacement	
Range	50.00	N/A	500.00	N/A	# needing replacement	
Range & Hood	100.00	258.00	500.00	758.00	# needing replacement	
Refrigerator	N/A	N/A	N/A	768.00	# needing replacement	
Garbage Disposal	N/A	N/A	N/A	180.00	# needing replacement	
Dishwasher	N/A	N/A	N/A	522.00	# needing replacement	
Microwave	N/A	N/A	N/A	275.00	# needing replacement	
Trash Compactor	N/A	N/A	N/A	516.00	# needing replacement	
Bathroom Walls & Ceilings: Partions & Surfaces	0.58	4.20	8.80	12.00	SF	
Bathroom Flr Cvr & Sub-base-Tile	N/A	N/A	9.24	12.59	SF	
Bathroom Flr Cvr & Sub-base-Resil			3.30	6.65	SF	
Bathroom Fixtures-Sink	N/A	N/A	N/A	393.00	# needing replacement	
Bathroom Fixtures-Toilet	150.00	N/A	N/A	361.00	# needing replacement	
Bathroom Fixtures-Tub/Shower	200.00	N/A	N/A	821.00	# needing replacement	
Bathroom Accessories	N/A	100.00	160.00	230.00	# needing replacement	
Bathroom Vanities-24"	N/A	N/A	N/A	24" 387.00	# needing replacement	
Bathroom Vanities-36"	N/A	N/A	N/A	36" 552.00	# needing replacement	
HVAC Unit-Heat Only	N/A	400.00	N/A	972.00	# needing replacement	
HVAC Unit-Heat/Cool	N/A	700.00	N/A	5370.00	# needing replacement	

Exhibit C.1

SYSTEMS	MINOR	MODERATE	MAJOR	REPLACE	UNIT OF MEASURE	ASSUMPTIONS
***UNIT SYSTEMS (Continued)						
Radiation-Hydronic	N/A	9.72	N/A	19.44	LF	
Radiation-Electric	N/A	N/A	N/A	10.54	LF	
Unit Boiler	N/A	800.00	N/A	2730.00	# needing replacement	
Unit Furnace	N/A	500.00	N/A	1110.00	# needing replacement	
Unite Dom Hot Water Generation	N/A	150.00	N/A	450.00	# needing replacement	
Temperature Controls	N/A	N/A	N/A	64.80	# Temp Controls	
Wall/Window Air Conditioner	N/A	N/A	N/A	750.00	# Wall/Window AC's	
Unit Electrical Panel	N/A	N/A	N/A	1260.00	1 per Unit	
Unit Electrical Wiring	N/A	N/A	N/A	3.50	Total Unit SF	
Bell/Intercom System	N/A	N/A	N/A	182.00	# needing replacement	
Closed Circuit TV	N/A	N/A	N/A	100.00	# needing replacement	
Emergency Call Alarm System	N/A	N/A	N/A	125.00	# needing replacement	
Smoke/Fire Detection-Battery	N/A	N/A	N/A	100.00	# needing replacement	
Smoke/Fire Detection-Hard Wire	N/A	N/A	N/A	153.00	# needing replacement	

		Exhibit C.1				
SYSTEMS	**MINOR**	**MODERATE**	**MAJOR**	**REPLACE**	**UNIT OF MEASURE**	**ASSUMPTIONS**
***BUILDING ENVELOPE**						
Foundation-4 Foot	0.65	N/A	12.52	N/A	Perimeter-LF	
Foundation-8 Foot	N/A	5.30	21.17	N/A	Perimeter-LF	
Slab--Slab	N/A	0.45	2.23	5.65	Footprint-SF	
Slab-Basement	N/A	0.45	2.46	6.40	Footprint-SF	
Exterior Wall-Masonry	1.00	N/A	3.94	14.70	Masonry-SF	
Exterior Wall-Plaster	1.00	N/A	1.44	7.20	Plaster-SF	
Exterior Wall-Wood	1.00	1.25	1.17	5.83	Wood-SF	
Exterior Wall-Vinyl/Aluminum	1.00	1.25	0.74	3.84	Vinyl/Aluminum-SF	
Insulation-Wall	N/A	N/A	0.42	N/A		
Insulation-Ceiling	N/A	N/A	0.88	N/A		
Roof Covering-EDPM	0.25	1.00	1.95	4.21		
Roof Covering-Shingle	0.18	0.80	1.46	2.10		
Roof Covering-Built-Up	0.23	1.20	1.87	4.67		
Roof Covering-Tile	0.95	1.80	7.20	8.02		
Roof Covering-Metal	1.20	2.40	9.60	10.56		
Parapet Wall	N/A	72.00	N/A	72.00	Perimeter-LF	3 ft high
Chimney (Brick)	115.75	N/A	N/A	1064.88	# Chimneys	2'x2'x4' high
Roof Hatches-Small	N/A	N/A	N/A	600.00	# Roof Hatches	< 10 SF
Roof Hatches-Medium	N/A	N/A	N/A	786.00	# Roof Hatches	10-20 SF
Roof Hatches-Large	N/A	N/A	N/A	1434.00	# Roof Hatches	20-30 SF
Skylights-Small	N/A	N/A	N/A	474.00	# Skylights	< 10 SF
Skylights-Medium	N/A	N/A	N/A	606.00	# Skylights	10-20 SF
Skylights-Large	N/A	N/A	N/A	795.00	# Skylights	20-30 SF
Penthouses-Small	N/A	N/A	2534.00	4540.00	# Penthouses	4'x10'x8'
Penthouses-Medium	N/A	N/A	5300.00	10300.00	# Penthouses	8'x14'x10'
Penthouses-Large	N/A	N/A	9600.00	19600.00	# Penthouses	20''x20'x10'
Roof Drainage-Exterior	N/A	N/A	N/A	2.00	SF	
Roof Drainage-Interior	N/A	N/A	1.00	N/A	SF	
Windows-Small	180.00	230.00	250.00	420.00	# Windows (need act)	<15 SF
Windows-Medium	360.00	410.00	500.00	630.00	# Windows (need act)	<30 SF
Windows-Large	540.00	590.00	650.00	1080.00	# Windows (need act	>30SF
Window Security Grates	N/A	N/A	75.00	297.00	# Grates (need act)	
Exterior Common Doors-Wood	200.00	N/A	605.00	747.00	# Doors (need act)	
Exterior Common Doors-Metal	200.00	N/A	670.00	812.00	# Doors (need act)	
Exterior Common Doors-Glass	200.00	N/A	845.00	987.00	# Doors (need act)	

		Exhibit C.1				
SYSTEMS	**MINOR**	**MODERATE**	**MAJOR**	**REPLACE**	**UNIT OF MEASURE**	**ASSUMPTIONS**
***BUILDING ENVELOPE**						
Unity Entry Doors-Wood	200.00	N/A	605.00	747.00	# Doors (need act)	
Unity Entry Doors-Metal	200.00	N/A	670.00	812.00	# Doors (need act)	
Unity Entry Doors-Glass	200.00	N/A	845.00	987.00	# Doors (need act)	*See Note 1
Storm/Screen Doors	N/A	N/A	N/A	325.00	# Doors (need act)	
Canopies-Small	N/A	230.00	N/A	830.00	# Canopies (need act)	6'x4'
Canopies-Medium	N/A	921.00	N/A	3321.00	# Canopies (need act)	6'x16'
Canopies-Large	N/A	2880.00	N/A	10380.00	# Canopies (need act)	10'x30'
Exterior Stairways-Wood	350.00	N/A	750.00	1980.00	# Flights need act	
Exterior Stairways-Concrete	550.00	N/A	1100.00	4550.00	# Flights need act	
Building Mounted Site Lights	N/A	300.00	N/A	600.00	# Lights (need act)	
Fire Escapes	N/A	350.00	N/A	7260.00	# escps*#stories	
Balconies-Wrought Iron	30.80	111.62	N/A	N/A	# Balconies (need act)	
Balconies-Wood	38.50	50.65	1250.00	2570.00	# Balconies (need act)	
Balconies-Masonry	36.00	120.00	N/A	N/A	# Balconies (need act)	
Porches (w/roof)	N/A	900.00	N/A	6400.00	# Porches need act	
Decks (without roof)	N/A	800.00	N/A	3840.00	# Decks need act	
Attached Storage Sheds	N/A	400.00	N/A	1100.00	# Sheds need act	
Vestibules	2..25	N/A	4.20	N/A	Vestibules SF	
Corridors	2.25	3.25	5.75	6.75	Corridors SF	
Stairways	2.75	3.75	9.00	30.85	SF^2	
Interior Lighting	N/A	1.00	N/A	2.75	SF^3	
Mail Facilities-Kiosk	N/A	N/A	N/A	1200.00	# Mail Facilities	16 per mount
Mail Facilities-Box	N/A	N/A	N/A	70.80	# Mail Boxes	
Laundry Rooms	2.25	4.75	7.00	25.00	SF	
Laundry Equipment	N/A	200.00	600.00	1000.00	# pieces of equip	
Common Rooms	2.25	4.20	N/A	7.00	Common Room -SF	
Common Kitchens	4.20	7.00	N/A	40.00	Common Kitchen -SF	
Underground Garage	0.02	0.70	1.00	N/A		

Exhibit C.1

SYSTEMS	MINOR	MODERATE	MAJOR	REPLACE	UNIT OF MEASURE	ASSUMPTIONS
****BME**						
Heating Risers	100.00	125.00	175.00	250.00	Units	
Gas Distribution	100.00	175.00	275.00	350.00	Units	
Dom. Hot & Cold Water Distribution	125.00	225.00	350.00	450.00	Units	
Sanitary Distribution-PVC	50.00	100.00	200.00	300.00	Units	
Sanitary Distribution-Cast Iron	125.00	225.00	350.00	450.00	Units	
Fire Sprinkler System	0.25	0.50	2.00	35000.00	SF for minor-major; 1 for replace	
Sump Pumps-Residential	N/A	200.00	N/A	500.00	# Sump Pumps	
Sump Pumps-Commercial	N/A	400.00	N/A	1600.00	# Sump Pumps	
Compactors-Small	N/A	1000.00	N/A	5000.00	# Compactors	
Compactors-Large	N/A	1060.00	N/A	10000.00	# Compactors	
Central Vent & Exhaust	N/A	0.75	1.25	2.00	Area SF	
Central Air Conditioning	N/A	1.50	N/A	4.50	Area SF	
Switchgear	N/A	N/A	0.35	1.50	Area SF	
Building Power Wiring	N/A	N/A	N/A	2.25	Area SF	
Emergency Lights	N/A	N/A	N/A	425.00	Bldg Units / 6	
Smoke/Fire Detection-Battery	N/A	N/A	N/A	100.00	Bldg Units / 4	
Smoke/Fire Detection-Hardwire	N/A	N/A	N/A	153.00	Bldg Units / 4	
Communication System	N/A	N/A	N/A	225.00	Bldg Units / 6	
Emergency Call Alarm System	N/A	N/A	N/A	310.00	Bldg Units / 6	
Master TV Antenna	N/A	N/A	2000.00	4500.00	Bldg Units / 6	
Closed Circuit TV	N/A	N/A	N/A	1200.00	Bldg Units / 6	
Hot Air Furnace	N/A	225.00	675.00	1500.00	Units	
Boilers	N/A	350.00	550.00	1500.00	Units	
Boiler Room-Piping	172.50	287.50	460.00	759.00	Units	
Boiler Room-Equipment	200.00	500.00	1000.00	1500.00	Units	
Boiler Room-Controls	N/A	150.00	N/A	600.00	Units	
DHW Generation	50.00	N/A	200.00	250.00	Units	
Elevator Shaftways-Hoist	2500.00	3000.00	5000.00	10000.00	Num Elevators	
Elevator Shaftways-Hydraulic	3000.00	4000.00	6000.00	12000.00	Num Elevators	
Shaftway Doors	500.00	1500.00	2000.00	3000.00	Num Floors	
Cabs	1000.00	2500.00	2500.00	3500.00	Num Elevators	
Machinery-Hoist	2000.00	4000.00	6000.00	20000.00	Num Elevators	
Machinery-Hydraulic	5000.00	10000.00	15000.00	25000.00	Num Elevators	

For example, for Roadways the algorithm first checks to see if the Roadway square feet (SF) noted on the Takeoff form is larger than 1,000—the minimum SF allowed by the calculation. The algorithm then multiplies the larger of Roadway SF or 1,000 SF by the cost element associated with the Roadway action level noted on the Site booklet. In addition, if the action level is MIN, then only 10 percent of the SF is used (still keeping 1,000 as a minimum however), as the definition of the MIN action for Roadways is to "patch, pave and regravel up to 10 percent of the roadway." Thus to calculate the MIN cost for a 25,000 SF Roadway, the algorithm would be: $0.15 (cost per SF/minimum action) * 25,000 (# of SF) * 0.10 (% of system affected) = $375. For a MOD action on the same system and property, the inspector would have noted on the Site form the percentage (between 10 and 50 percent) of the Roadway that needs to be resurfaced, regraded as well as repaved or regraveled. Thus, if the inspector estimated that 35 percent of the roadway needed repair, then the algorithm would be: $0.35 * 25,000 sq.ft. * 0.35 = $3,062.50.

A COBOL program was written to process the clean database by relating all the inspection data collection instruments to each other via the HUD Project ID. A physical needs backlog cost is then calculated for each system that required some repair or replace action. Some of the algorithms make use of the takeoff data as in the above example on Roadways. This cost element is on a per square foot basis. Other cost algorithms are based on the number, such as the number of windows, that required the action. Exhibit C.1 shows the multiplier for each cost element in addition to showing the cost for each action level.

After the per system costs are calculated, they are grouped together to form analysis groups. For example, the Envelope system group called ***Windows and Doors*** includes the inspection systems: Windows, Window Security Grates, Exterior Common Doors, Unit Entry Doors, and Storm/Screen Doors. Exhibit C.2 shows which Observable systems are included in each analysis group.

Property Level Costs

In order to generate costs for the property as a whole, costs for buildings and units that were not inspected needed to be estimated.[1]

For each property, costs were generated for the buildings and units that were *not inspected* based on their relationship to buildings and units that were inspected. During the inspection, the inspector filled out an additional form—the ***Inspector Building Type and Quality Form*** (IBTQ). For each building in the project (whether inspected or not), the inspector recorded the age, overall building quality, the building type (High rise, Walk-up, Garden, Single family

1 This is not true for Site systems because all site elements were inspected.

Exhibit C.2

System Groups and the Associated System Components for Backlog Repair Cost Estimates

System Group Name	System Component
Unit Interior Construction	Interior Walls-Partitions
	Floors: Sub-base
Unit Interior Finish	Interior Walls-Surface
	Floor Covering: Carpet
	Floor Covering: Resilient
	Interior Doors
	Kitchen Walls
	Kitchen Floor
	Bathroom Walls
	Bathroom Floor
Kitchen Fixtures	Kitchen Cabinet/Counter
	Kitchen Range
	Refrigerator
	Garbage Disposal
	Dishwasher
	Microwave
	Trash Compactor
Bathroom Fixtures	Bathroom Fixtures
	Bathroom Accessories
	Vanities
Unit Heating and Cooling	HVAC units
	Radiation
	Boiler (Unit level)
	Furnace (Unit level)
	DHW Generation (Unit level)
	Temperature Control
	Wall Air Conditioner
Unit Electric	Electrical Panel
	Electrical Wiring
	Bell/Intercom
	CCTV
	ECAS
	Smoke Detector
Building Exterior Closure	Foundation
	Slab
	Exterior Wall
	Insulation

Exhibit C.2, *continued*

Roofs	Roof Covering
	Parapet Wall
	Chimney
	Roof Hatches
	Skylight
	Penthouse
	Roof Drainage
Windows and Doors	Windows
	Security Grates
	Exterior Common Doors
	Unit Entry Doors
	Storm/Screen Doors
Exterior Features	Canopies
	Exterior Stairs
	Bldg Mounted Site Lights
	Fire Escapes
	Balconies
	Porches
	Decks
	Sheds
Common Areas	Vestibules
	Corridors
	Interior Stairways
	Interior Lights
	Mail Facilities
	Laundry Rooms
	Laundry Equipment
	Common Rooms
	Common Kitchens
	Underground Garages
Building Mechanical and Electric	Heating Risers
	Gas Distribution
	Domestic Hot/Cold Water Dist
	Sanitary Distribution
	Fire Sprinkler System
	Sump Pump
	Compactors
	Switchgear
	Building Wiring
	Emergency Lights
	Building Smoke Detector
	Communication System
	Building ECAS
	Master TV Antenna

	Building CCTV

Exhibit C.2**,** *continued*

Building Heating and Cooling	Central Vent/Exhaust
	Central Air Conditioning
	Furnace (Building level)
	Boiler (Building level)
	Boiler Room Piping
	Boiler Room Equipment
	Boiler Room Controls
	DHW Generation
Elevators	Shaftways
	Shaftway Doors
	Cabs
	Machinery
Site Areas	Landscaping
	Roadways
	Parking Lots
	Parking Garages
	Paved Pedestrian Area
	Curbing
	Fencing
	Retaining Wall
	Site Drainage
	Pole Mounted Site Lighting
Site Amenities	Site Furniture
	Yards and Enclosures
	Dumpsters
	Pool
	Tennis Courts
	Basketball Courts
Site Distribution	Emergency Generator
	Site Electrical Distribution
	Hot Water Distribution
	Domestic Hot Water Lines
	Domestic Cold Water Lines
	Main Water Service
	Gas Lines
	Site Sanitary Lines
	Septic System
	Sewage Ejectors
	Hydrants

detached), and a count of units in each size category (0BR/1Bath, 1BR/1Bath, 2BR/1Bath, 2BR/1+Baths, 3BR/1Bath, 3BR/1+Baths, 4BR/1Bath, 4BR/1+Baths) in the building. Another form, the ***Project Quality Distribution Form***, (PQD) was completed by the property manager and reviewed by the inspector. The purpose of the PQD form was to collect data, at a property level, on how many units overall (without a breakdown at the building level) in each size category (bedrooms and baths) fell into each quality category (Excellent, Good, Fair, and Poor).

In order to estimate the backlog cost for the *uninspected* units, the first step was to compute per square foot costs for each *inspected* dwelling unit (the physical needs backlog costs for the inspected units divided by the overall square feet for the particular units). The estimated backlog costs for the uninspected units was then simply their square footage multiplied by the average repair costs of inspected units of the same quality category. This was straightforward because inspectors had recorded average size in square feet of each unit size.

Estimating the backlog cost for uninspected buildings was similar, but more complex because inspectors did not collect square footages of uninspected buildings. In order to be able to apply costs from the inspected sample to the uninspected sample, the costs for the inspected buildings had to be normalized to account for differences in building sizes. We chose to normalize building costs to a per 2-bedroom equivalent. The computation to normalize the inspected building costs was as follows:

1) Overall national average square feet for each unit size category were calculated as a weighted average of the square footage of all units in all buildings in the analysis sample properties, regardless of whether the building was inspected. The weights were the unit size distributions in each building.

2) The number of 2BR/1Bath equivalent units in each building was calculated as the total square footage of living space in each building divided by the 1990 national average square footage of a 2BR/1 bath unit (843.9 sq. ft.).[2] The total square footage of living space was calculated by multiplying the national average square feet for each unit size by the number of units of that size in the building.

3) Building costs for each inspected building were normalized to a per-2BR cost equivalent by dividing total costs by the number of 2BR equivalent units in the building, thus generating a normalized cost for the inspected building which could then be applied to the uninspected buildings.

2 For comparability, the 1990 average square footage was used.

For example, Project X has 3 buildings. Building 1 is composed of 10 studio apartments, 20 1BR/1 Bath, and 10 3BR/1+ Bath. Building 2 has 20 2BR/1+ Bath. Building 3 has 10 4BR/1+ Bath. Based on the full sample of projects, the average square feet for a studio is 460.4; a 1BR/1 Bath is 640.3; a 2BR/1+ Bath is 1016.9; a 3BR/1+ Bath is 1160.3; and a 4BR/1+ Bath is 1342.7. The *national average* square feet for a 2BR/1 Bath used is 843.9. Thus, the number of 2BR equivalents for Building 1 was ((10*460.4) + (20*640.3) + (10*1160.3)) / 843.9 or 34.38. Building 2 has (20*1016.9) / 843.9 or 24.1 2BR equivalents. Building 3 has (10*1342.7) / 843.9 or 15.91 2BR equivalents. Building 1's costs were divided by 34.38; Building 2's by 24.1; and Building 3's by 15.91, to obtain cost per 2 bedroom equivalent for each building.

Based on the assumption that buildings or units of the same type within the project will have similar costs, costs for the uninspected units and properties were generated in one of three ways:

- ***Same type-same quality***. If the inspection included a building of the same type and quality as the uninspected building, the normalized 2BR equivalent cost (in the inspected building) was multiplied by the number of 2BR equivalent units in the uninspected building to produce the uninspected building's cost. Similarly, if the inspection included a unit of the same size and quality as the uninspected unit, its per square foot cost was multiplied by the total square feet of the uninspected unit to generate the cost for that uninspected unit.

- ***Same type-different quality.*** Ratios between quality categories within type were calculated using the normalized costs for the inspected buildings or units. If multiple inspected buildings (or units) of the same type but with different quality existed for the project, the inspected building (or unit) with the closest quality was used as a cost reference point. (Inspected buildings or units with poorer qualities were chosen if a choice needed to be made. In other words, if a Good high rise needed to be costed and both an Excellent and a Fair high rise had been inspected, the Fair high rise would have been chosen as the reference point.) Once the inspected reference point was chosen, the normalized cost was first multiplied by the national average ratio between the costs for the uninspected and inspected qualities for that building or unit type. In the above example, the normalized cost for the Fair high rise would have been multiplied by the ratio between the national average for a Good high rise to the national average for a Fair high rise. Next, the cost was multiplied by the appropriate factor[3] for the uninspected building or unit.

3 For buildings, the factor is the number of 2BR equivalents discussed above. The factor for units is the total square feet for the unit.

- ***Different type***.[4] If the inspection included no building of the same type (or unit of the same size), the ratio between the project cost and the national average cost for inspected buildings (or units) was applied to the national average cost for the type being costed. This ratio equals the sum of the actual inspected costs for the project divided by the sum of the national weighted costs (i.e., the costs for the inspected buildings using national average costs.). To cost buildings or units with different types than those inspected in the project, the national averages for the uninspected type and quality were multiplied first by this project-to-national ratio, and then by the appropriate factor (either number of 2BR equivalent units or square feet) for the uninspected building or unit being costed. For example, if a Good high rise existed in a project for which only Poor walk-ups had been inspected, a project-to-national ratio would have been calculated by dividing the sum of the inspected Poor walk-up building costs by the national average for a Poor walk-up multiplied by the number of 2BR equivalents for each inspected building in the project. The national average for a Good high rise would then be multiplied by this project-to-national ratio, and then multiplied by the number of 2BR equivalents in the Good high rise being costed.

Regional Adjustment to the Property Level Cost numbers

The cost element numbers created by A.M. Fogarty and Associates were based on current costs for the Washington D.C. area. Using the R.S. Means "Location Factors" from the Means Square Foot Costs Book for 1995, the property level physical needs backlog costs were adjusted by multiplying them by the ratio of the R.S. Means Index for the city where the property is located to the R.S. Means index for Washington D.C. (which is 0.95). For example, the computed cost for a New York City property would be multiplied by 1.4105 (which is the New York-to-Washington index ratio, 1.34 / 0.95).

C.2 Upgrade Feasibility Costs

In addition to assessing the current physical condition of the properties, the inspectors recorded in the inspection booklets, information on the *physical* feasibility of upgrading certain observable systems for both a moderate and major market conversion. This information is needed to ascertain net market value—that is, to subtract upgrade costs from capitalized net operating income for market-level unassisted rents. The inspector rated the feasibility of upgrading the property market level by adding amenities or improving the quality

4 Based on the inspection protocol, this occurrence was rare, arising only when a property contained a great diversity of building types and quality levels. The occurrence was greater for units, however, due to the limit of 3 unit inspections per property.

of materials in an existing system in order to make the property and its units marketable at a higher rent level. Two levels of upgrading were possible: upgrading the property to a "moderate" market quality, and upgrading the property to a high or "major" market quality. A "moderate" market quality is defined as an average quality unit, generally in good condition, with average amenities. A "major" market quality unit would command a high rent and may include such amenities as tennis courts, swimming pools, and central air conditioning.

If the current condition and amenities already positioned the property into the "moderate" market category, the upgrade feasibility rating was limited to "major" market feasibility. If the property was already at a high-end market rent, no upgrade feasibility analysis was necessary. In addition, if the layout or size of the buildings or units was not conducive to the upgrades needed, the property was deemed infeasible for that upgrade level.

Upgrade actions could also be affected by physical needs backlog. In some cases, upgrading meant adding a system if it did not currently exist (e.g., adding a swimming pool). If the system already existed, upgrading it would involve replacing it with better quality materials than would be used for repair. Some upgrade system costs are "additive" to the backlog repair cost—the backlog repair would still have to occur before upgrading the system. An example is Landscaping. If the backlog repair action requires a portion of the current Landscaping to be reseeded, this would have to occur regardless of the Landscaping upgrade.

Other systems have "instead of" costs. This means that the backlog repair action would not occur if the property were being upgraded. For example, there would be no reason to repair windows that were being replaced with better quality materials. Exhibit C.3 lists for each Upgrade system, whether its associated cost is additive to, or replaces the physical needs backlog cost.

The method of calculating upgrade costs is similar to that used for physical needs backlog costs. Cost elements were derived by A.M. Fogarty and Associates. Exhibit C.4 lists these elements for each Upgrade system as well as the dimensional multiplier. For most systems two levels of upgrade are possible. For units there is a further distinction: to Partial and Full for Moderate Upgrade, and Rehab for Major Upgrade. Site and BME systems only allow for moderate upgrades. If the system is present, then the upgrade is Moderate Yes; if the system is not present, then the upgrade is Moderate Add. Envelope systems also break down Moderate upgrade to Yes, for present systems, and Add when the system is not present. In addition, major Yes is an upgrade option for Envelope systems.

Exhibit C.3

Upgrade Systems—Additive to Repair Backlog vs Instead of Repair Backlog

Additive Systems	**Instead of Systems**

Landscaping
Emergency Generator

Parking
Site Lighting
Yards and Enclosures
Swimming Pool
Tennis Court
Basketball Courts

Exterior Stairs
Bldg Mounted Site Lights
Porches
Decks
Sheds

Exterior Wall
Windows
Exterior Common Doors
Vestibules
Interior Lights

Corridors
Stairways

Mail Facilities
Laundry Facilities
Common Rooms

Central Vent/Exhaust
Central Air
Smoke Detector
Communication System
ECAS
CCTV

Electrical Service
Emergency Lights
Furnace
Boiler
DHW Generation
Elevator Cabs

Unit Interiors
Unit Kitchen
Unit Bathroom

Exhibit C.4: Upgrade System Elements

UPGRADE COSTS	MODERATE	ADD	MAJOR	REHAB	UNIT OF MEASURE	ASSUMPTIONS
***SITE UPGRADES						
Landscape	0.65		0.65		Landscape-SF	
Parking	1.75	735.00	1.75		Parking-SF;# of new spaces	360 SF per space
Site Lighting-Upgrade	1400.00	3500.00	1400.00		# Poles for UPG; # site units/12 for add	
Site Furniture	180.00	180.00	180.00		# Sites/UPG; # site units divided by 6 for add	
Yards-Upgrade	485.00		485.00		# Yards or # Site Units	400 SF
Yards-Add		970.00			# Site Units	
Swimming Pool	30000.00	65000.00	30000.00		1 per project	20'x40'x6' deep
Tennis Courts		25000.00			1 per project	
Basketball Courts		20000.00			1 per project	
Emergency Generator	16000.00	20000.00	16000.00		1 per project	
***ENVELOPE UPGRADES						
Ext Wall-Plaster	7.20		7.20		Ext Wall-Plaster:SF	
Ext Wall-Wood	5.83		5.83		Ext Wall-Wood:SF	
Ext Wall-Vinyl	3.84		3.84		Ext Wall-Vinyl: SF	
Windows-Small	483.00		546.00		# Small Windows	
Windows-Medium	725.00		819.00		# Medium Windows	
Windows-Large	1242.00		1404.00		# Large Windows	
Common Doors	2000.00		3000.00		# Common Doors	
Exterior Stairs	2000.00		2000.00		# Stairs	
Bldg Mtd Site Lights	400.00	800.00	400.00		# Bldg Units divided by 6	
Porches		6400.00			# Bldg Units	8'x16'
Decks		3840.00			# Bldg Units	8'x16'
Storage Sheds		1100.00			# Bldg Units divided by 6	
Vestibules	10.00		45.00		Vestibule-SF	10'x12'
Corridors	6.00		6.00		Corridor-SF	6' wide
Stairs	10.00		10.00		If Avail: Int Stair-SF; Else 160 times # Stories	
Int Lights	2.00		2.00		Bldg Footprint-SF	
Mail Facilities	2500.00		2500.00		# Bldg Units/16	
Laundry Room	3500.00		3500.00		# Laundry Rooms	3 washers, 3 dryers
Laundry Equipment	600.00	800.00	600.00		# Pieces Laundry equipment (Add: # site units divided by 20 net # existing pieces of equipment)	
Common Rooms	10.00		10.00		Common Room-SF	

Exhibit C.4: Upgrade System Elements

UPGRADE COSTS	MODERATE	ADD	MAJOR	REHAB	UNIT OF MEASURE	ASSUMPTIONS
***BME UPGRADES						
Central Vent & Exhaust	1.50	4.50	1.50		Bldg Gross Area-SF	
Central Air Conditioning		7.50	2.50		Bldg Gross Area-SF	
Electrical Service	2.25		2.25		Bldg Gross Area-SF	
Emergency Lights	159.00	425.00	159.00		Bldg Units divided by 6	
Smoke Detection	153.00		153.00		Bldg Units/4	
Communication System	115.00	340.00	115.00		Bldg Units/6	
Emer Call Alarm System		310.00			Bldg Units/6	
Closed Circuit TV		1200.00			Bldg Units/6	
Hot Air Furnaces	1500.00		1500.00		Bldg Units	
Boilers	1500.00		1500.00		Bldg Units	
DHW Gneration	250.00		250.00		Bldg Units	
Elevator Cabs	3000.00		3000.00		Number Elevators	
***UNIT UPGRADES						
Interior (ex kitchen, bath)	3.00	7.00	12.00	36.00	Total Unit SF-(kit, bath SF)	
Kitchen	3000.00	7000.00	12000.00		1 per unit	
Full Baths	1500.00		2500.00	5000.00	# Full baths	
Half Baths	1000.00		1500.00	3000.00	# Half baths	

After the costs are calculated for the inspected site, units, and buildings, costs are generated for the full property (including uninspected units and buildings) using the same procedures followed for costing physical needs backlogs:

- Building upgrade costs for inspected buildings are normalized to a per 2 bedroom equivalent, and unit upgrade costs are normalized to a per square foot cost;

- Costs are generated using one of the three methods[5] that were outlined above for physical needs backlog costs; and

- Regional adjustments are applied as discussed above.

C.3 Estimating Accrual of Repair and Replacement Costs

Accrual cost estimates are the total amount a property will need to cover expected repairs and replacements for each Observable System over each of the next 20 years. Each system was given either a repair or a replacement cost depending upon the standard wear of the system. For example, boilers are expected to be replaced after a certain number of years, but landscaping only needs periodic major maintenance. Some systems were deemed inappropriate for accrual estimates because they generally will not need replacement or standard maintenance over the 20-year horizon used for this study. An example is the Site-level Domestic Hot Water Lines. Over time, a portion of the lines may need to be replaced, but this is not an expected occurrence. The repair or replacement system cost is based on the same algorithm used for the physical needs backlog costings.

In addition to a repair/replacement cost, each system is assigned an average useful lifetime (or in the case of items which will be repaired, "action-intervals" are assigned).[6] For systems requiring replacement over time, the useful life is the age the system is expected to be when it must be replaced because it is worn-out or approaching failure. Boilers are expected to last 25 years. This is the expected life for the Boiler systems. Site Landscaping is not expected to wear out, but will need to be reseeded and replanted every 5 years. This is the action interval (rather than expected life) for Landscaping. Exhibit C.5 lists for each system involved in accrual, the action level appropriate to accrual, and the useful life (or action interval).

5 Same type-same quality; same type-different quality; different type.

6 The basic reference for expected lives was Appendix B, "Accrual Actions and Expected Lives" from *Future Accrual of Capital Repair and Replacement Needs of Public Housing, Final Report*, prepared for HUD by ICF, Inc., April 1989 as an update of the Abt public housing study (Bain, 1988). Abt staff experienced in conventional residential building construction and management altered these lifetimes for some systems.

For each of the next 20 years, for each Accrual system, we test whether the system will reach the end of its useful life (or action interval) that year. As the starting point, we used the system ages where they were collected by the Inspector; otherwise, we estimated system age to be the average age of the buildings in the project. We assume, however, that any system that needed to be replaced as part of the physical needs backlog, was indeed replaced: therefore, the age of such systems is set back to zero. The age is then increased for each accrual year. In any year that a system's accrual age equals its expected life, then the repair/replace cost is added into the accrual total for that year.

The accrual yearly totals are calculated on the sites, units, and buildings that were actually inspected. These costs are then scaled up to reflect the total property. Unit level accrual costs are scaled to property totals based on the proportion of the property's total square footage the inspected units represent. Building level accrual costs are scaled to property totals based on the proportion of the property's total units the inspected buildings represent. The property totals are then regionally adjusted as discussed previously. Accrual costs are based on 1995 current dollars.

Exhibit C.5

Life Expectancies and Repair/Replace Action Levels for Accrual Systems

SYSTEM	LIFE EXPECTANCY		REPAIR ACTION LEVEL
Landscaping	5		MIN
Roadways	25		REP
Parking Lots	25		REP
Parking Garages	25		REP
Paved Pedestrian	25		REP
Curbing	25		REP
Fencing	20		REP
Retaining Walls	10		MOD
Site Drainage	25		REP
Pole Mntd Lighting	25		REP
Site Furniture	15		REP
Yards	20		REP
Dumpster	15		REP
Pool	15		MAJ
Tennis	15		MAJ
Basketball	15		MOD
Domestic Hot Water Dist	40		REP
Domestic Cold Water Dist	40		REP
Sewage Ejector	40		REP
Engineering Generator	35		REP
Unit-Carpet	10	(5)[1]	REP
Unit-Floor Resilient	20	(15)	REP
Kitchen Floor	15	(10)	REP
Kitchen Cabinet	25	(20)	REP
Kitchen Range	15		REP
Refrigerator	15	(10)	REP
Garbage Disposal	7		REP
Dishwasher	15		REP
Microwave	10		REP
Trash Compactor	15		REP
Bath Floor-Ceramic	50		REP
Bath Floor-Resilient	20	(15)	REP
Bath Fixtures	40	(25)	REP
Bath Accessories	40	(25)	REP
Bath Vanities	40	(25)	REP
Unit HVAC	20		REP
Radiation[2]	25	(20)	REP
Unit Boiler	25		REP

1 Numbers in parenthesis are life expectancies for family occupied units and buildings

2 Hydronic only.

Exhibit C.5, *continued*

Unit Furnace	25		REP
Unit DHW Generation	20		REP
Temperature Control	25		REP
Wall Air Conditioner	15		REP
Bell/Intercom	30		REP
Unit CCTV	30		REP
Unit ECAS	30		REP
Unit Smoke Detector	40	(15)	REP
Building Foundation	10		MIN
Exterior Wall	10		MIN
Roof-Membrane	40		REP
Roof-Shingles	20		REP
Roof-Builtup	40		REP
Roof Covering-Tile	30		REP
Roof Covering-Metal	30		REP
Parapet Wall	10		MOD
Chimney	10		MIN
Penthouse	10		MAJ
Roof Drainage	25		REP
Windows	40		REP
Security Grates	40		REP
Ext Common Door	60	(30)	REP
Unit Entry Door	20		MOD
Storm/Screen Door	15	(7)	REP
Canopies	20		MOD
Exterior Stairs	10		MIN
Bldg Mtd Site Lights	10	(8)	REP
Fire Escapes	40		REP
Balconies	40		REP
Porches	40		REP
Decks	25		REP
Sheds	40		REP
Vestibules	10		MIN
Corridors	10		MOD
Stairways	10		MIN
Interior Lights	25		MOD
Mail Facilities	20	(10)	REP
Laundry Rooms	15		MOD
Laundry Equipment	10		REP
Common Rooms	10		MOD
Common Kitchen	20		MAJ
Underground Garage	25		MAJ
Heating Riser	15		MOD
Gas Distribution	15		MOD
Dom Hot/Cold Water	50		REP

Exhibit C.5, *continued*

Sanitary Dist	10		MIN
Fire Sprinkler System	5		MIN
Sump Pump	20		REP
Compactor	10	(7)	REP
Central Vent/Exhaust	10		MAJ
Central Air	20		REP
Emergency Lights	35		REP
Smoke Detector	40	(20)	REP
Communication System	30		REP
Building ECAS	30		REP
Master TV Antenna	30		REP
Building CCTV	30		REP
Building Furnace	25		REP
Building Boiler	25		REP
Boiler Room Piping	50		REP
Boiler Equipment	25		REP
Boiler Room Controls	25		REP
DHW Generation	20		REP
Elevator Shaftways	15	(10)	REP
Shaftway Doors	15	(10)	REP
Elevator Cabs	30	(15)	REP
Elevator Machinery	30	(25)	REP

Appendix D

CHARACTERISTICS OF UNITS IN THE STOCK

Exhibit D-1
CHARACTERISTICS OF UNITS IN THE HUD-INSURED MULTIFAMILY STOCK
BY ASSISTANCE CATEGORY
(IN 1995 DOLLARS PER 2BR EQUIVALENT UNIT)

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Number of 2BR Units	1,314,026	350,815	963,211	643,468	319,743
Percent		27%	73%	67%	33%
Number of Units	1,405,240	354,083	1,051,157	686,309	364,848
Percent		25%	75%	65%	35%
Backlog per Unit					
$<10	13%	23%	9%	7%	13%
$10 - <1,500	39	44	38	39	36
$1,500 - <3,000	17	21	16	14	17
$3,000 - <7,500	20	7	25	26	22
$7500+	11	4	13	15	10
Mean	$3,172	$1,488	$3,785	$3,917	$3,520
Average Annual Accrual per Unit					
$<1,000	17%	7%	21%	24%	15%
$1,000 - <1,500	48	52	46	46	47
$1,500 - <2,000	27	30	25	22	32
$2,000+	8	10	7	8	5
Mean	$1,389	$1,491	$1,352	$1,323	$1,410
Cash Flow per Unit					
$< -500	9%	15%	7%	9%	3%
$-500 - <0	16	8	1	24	10
$0 - <500	34	27	36	42	25

Exhibit D-1, *continued*

Characteristic	Total	Total		Assisted	
		Unassisted	Assisted	Older Assisted	Newer Assisted
Cash Flow per Unit, *continued*					
$500 - <1,000	15	13	16	13	22
$1,000 - 2,500	20	30	16	10	29
$2,500+	6	6	5	3	11
Mean	$407	$72	$529	$278	$1,034
Property Size					
<50 Units	5%	1%	6%	4%	8%
50 - 99 Units	22	15	25	20	34
100 - 199 Units	42	39	43	44	41
200+ Units	31	45	26	31	17
Mean	115	157	105	108	78
Designated Occupancy Type					
Family	84%	93%	81%	87%	67%
Elderly/Handicapped	16	7	19	13	32

Source: 1995 Physical Inspection Data and Costing Programs, 1992-1995 finacial data, MIDLIS.

Status of HUD-Insured (or Held) Multifamily Rental Housing in 1995

HC-5964
Task Order #7

Final Report Supplements

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SUPPLEMENT 1

Risk Analysis Based on Loan-to-Value and Debt-Coverage Ratios

Commercial lenders use two key ratios to evaluate loan applications: the loan-to-value ratio (LTV) and the debt-coverage ratio (DCR), or debt service coverage ratio. LTV, defined as the mortgage balance divided by the market value, is a measure of risk due to low equity. In general, property owners with high LTVs are more prone to default on their mortgage because they have less equity in the property and a higher probability that any future drops in value could result in negative equity. Properties with LTVs greater than 1 are at greatest risk of default, all else equal, because their loan balances are greater than the value of the property, in other words they already have negative equity. At loan origination, underwriters often require an LTV of .80 or lower on multifamily properties. For the 221(d)(4) and 221(d)(3) programs LTV at origination was allowed to be higher, up to 1.0. Of course, over time, the actual LTV will change as the owner pays down the principal on the loan and/or as the market value of the property changes.

Estimating the value of assisted properties is difficult because of the uncertainty of continued subsidies. For this analysis ***LTV is defined as the current mortgage balance divided by the estimate of the market value of the property, assuming that both rents and operating costs are at market levels.*** Thus, this measure of LTV does not reflect the current operating conditions for the properties. Under current conditions both revenues and operating costs are often above or below market levels due to rent restrictions and assistance payments. The market value of the property is equal to the capitalized value of market rent net of operating and maintenance expenses. The market rent and capitalization rate estimates were provided by the market analysts. Operating cost estimates are based on medians for conventional apartments by region and building type, as compiled by IREM.[1] The net market value equals the market value net of physical needs backlog, because to achieve market rents it is assumed that all physical needs backlogs must be addressed. This approach to estimating LTV assumes that the existing mortgage loan remains, but essentially assumes that the properties receive no ongoing assistance, so that rents are equal to prevailing market rents, and operating expenses equal industry medians.[2]

DCR, defined here as total revenue net of operating and maintenance costs and deposits to the reserve for replacement account divided by debt payment, is a measure of whether operating income is sufficient to cover the mortgage payments. This measure relies on actual current revenue, operating cost, reserve deposit, and debt service. Typical multifamily

1 *1996 Income/Expense Analysis, Conventional Apartments*, Institute for Real Estate Management, Chicago IL

2 A more conservative measure of net market value could also subtract the present value of other costs of conversion to market such as evictions, advertising and redecorating.

underwriting criteria specify a DCR of 1.25 or greater. A DCR of less than 1.0 indicates financial distress due to cash flow difficulties -- cash flow after covering operating and maintenance costs and deposits to the reserve account is insufficient to cover debt service.[3]

Both of these indicators have been incorporated into numerous loan default models.[4] Most models use LTV and DCR at origination because property values are only available from the original appraisal. For this study, we have used an estimate of current property value, which may provide a better indicator of current financial condition.

As shown in Exhibit S1-1, 59 percent of all insured properties had LTVs less than 0.8, and 30 percent had LTVs greater than 1.0.[5] The proportions are similar in assisted and unassisted properties. However, older and newer assisted properties had very different LTV profiles.

3 Alternatively a DCR based on market rents and operating costs ,and reserve deposits sufficient to cover ongoing accrual costs could be developed.

4 Bogdon and Follain, An Examination of Three Sets of Indicators of Financial Risk Among Multifamily Properties, Urban Institute, April 14, 1996.

5 Five sample properties, representing 68 properties in the universe had negative net values. In other words, their capitalized rent stream could not cover both operations and repairing the backlog. For these tables, the negative value properties are included with the properties with LTVs greater than 1, though in fact their LTVs are less than zero due to the negative value.

Exhibit S1-1
LOAN TO VALUE RATIO AND DEBT COVERAGE RATIO BY ASSISTANCE CATEGORY

	Total	Unassisted	Assisted	Older Assisted	Newer Assisted
Total Properties	12,243	2,224	10,109	5,943	4,076
Percent Properties	100%	18%	82%	59%	41%
Loan to Value Ratio					
< = .80 (good)	59%	64%	58%	48%	14%
.80 - 1.0	11%	15%	10%	10%	18%
> 1.0 (bad)[6]	30%	21%	32%	7%	68%
Debt Coverage Ratio					
< 1.0 (bad)	25%	25%	24%	34%	13%
1.0 - 1.25	26%	25%	27%	18%	39%
> 1.25 (good)	49%	51%	49%	49%	48%

Source: Financial Statements, Market Valuations.

Very few older assisted properties (7%) had negative equity (LTV>1.0), because the property owners have had several years to pay down the principal on their mortgages over time through regular payments. Of concern is the high percentage of newer assisted properties (68%) that had negative equity. This may be due to the relatively few years owners of newer assisted properties have had to pay down the principal as well as declines in property values. But it is also due to the fact that these properties were often built in neighborhoods where the market was not adding to the supply of affordable housing. Thus, by design, these programs allowed LTVs above even at origination in order to promote housing development.

About half (49 percent) of properties across all assistance categories had DCRs above 1.25, and about one fourth had DCRs below 1.0. Although across all assistance categories the proportion of properties with DCRs above 1.25 was similar, the proportion with DCRs below 1 differed across assistance categories. Over one third of older assisted properties had DCRs below 1.0, in spite of their low debt service payments, compared with only 13 percent of newer assisted properties (this in spite of their high debt service payments) and 25 percent of unassisted properties.

6 Includes 5 sample properties representing 68 universe properties with negative value. These properties actually have very low (negative) calculated LTVs.

Exhibit S1-2 combines DCR and LTV to examine how these two indicators relate to each other and to estimate the number of properties that both have negative equity and cannot cover debt service. "Single Trigger" default models often assume that the property owner is at risk to default if the property has either negative equity (LTV>1) or a debt-coverage ratio of less than unity (DCR<1).[7] Forty-eight percent of insured properties fell into at least one of these risk categories. "Double Trigger" models of default assume that the owner is at risk to default only if the property has ***both*** negative equity ***and*** a debt-coverage ratio of less than 1. An estimated 701 properties, or 6 percent of all properties had both negative equity and a DCR of less than one.

Of particular interest is the percentage of properties in each assistance category that have both negative equity (LTV>1.0) and insufficient income to cover debt service (DCR<1.0). Among unassisted properties, 9 percent were in this dubious position, as were 10 percent of newer assisted properties. Because of their relatively low LTVs, only 2 percent of older assisted properties had both negative equity and insufficient income to cover debt payments.

Looking at the strongest LTVs and DCRs, 43 percent of unassisted properties and 45 percent of older assisted properties had DCRs of 1.25 or greater and LTVs less than or equal to 0.80. By contrast, only 11% of newer assisted properties meet these conditions, largely due to the high LTVs found in this group of properties.

7 Goldberg, Lawrence, Default Risk Models for FHA Multifamily Loans: The Effect of Terminating Project Based Rental Assistance, Office of Federal Housing Enterprise Oversight (no date).

Exhibit S1-2
LOAN TO VALUE RATIO AND DEBT COVERAGE RATIO
MULTIFAMILY RENTAL HOUSING WITH HUD-INSURED (OR HELD) MORTGAGES

LTV	Debt-Coverage Ratio (DCR)			Total
	< 1.0 (bad)	1.0 - 1.25	> 1.25 (good)	
Total Properties **Percent Properties**	3,072 25%	3,203 26%	5,963 49%	12,243 100%
Total				
LTV < = .80 (good)	2,112 17%	1,163 10%	4,049 33%	7,324 60%
0.8 < LTV ≤ 1	264 2%	428 3%	634 5%	1,327 11%
LTV >1 (bad)	701 6%	1,612 13%	1,280 10%	3,592 29%
Unassisted	**549** **25%**	**549** **25%**	**1,125** **51%**	**2,224** **100%**
LTV < = .80 (good)	275 12%	192 9%	961 43%	1,428 64%
0.8 < LTV ≤ 1	82 4%	165 7%	82 4%	329 15%
>1.0 (bad)	192 9%	192 9%	82 4%	467 21%
Older Assisted	**1,995** **34%**	**1,056** **18%**	**2,892** **49%**	**5,943** **100%**
LTV < = .80 (good)	1,791 30%	901 15%	2,648 45%	5,430 90%
0.8 < LTV ≤ 1	89 1%	56 1%	119 2%	256 4%
>1.0 (bad)	115 2%	100 2%	132 2%	346 6%
Newer Assisted	**533** **13%**	**1,598** **39%**	**1,945** **48%**	**4,076** **100%**
LTV < = .80 (good)	46 1%	69 2%	440 11%	556 14%
0.8 < LTV ≤ 1	92 2%	208 15%	440 11%	741 18%
>1.0 (bad)	394 10%	1,320 32%	1,065 26%	2,779 68%

Source: Financial Data and Market Valuations.

SUPPLEMENT 2

Comparison of Findings with RAMS

To compare our system of assessing property condition with HUD's current practice, we compared our measures of physical condition (physical needs backlog), financial condition (net cash flow), and overall condition (Distress Index) with HUD's Risk Assessment Management System (RAMS) for the 567 properties for which we had both sets of data. Under RAMS, each property is assigned a ranking from 0 to 40 each for physical and financial condition, with 40 representing the highest risk. Using a weighted sample to represent the universe of HUD-insured multifamily properties, we did a cross tabulation of physical needs backlog by RAMS physical rankings and another cross tabulation of annual net cash flow by RAMS financial rankings to see how our physical and financial measures mapped with RAMS. We also compared our overall summary Distress Index with the RAMS overall system rank to see how our overall measure compares with HUD's current practices.

Comparison of Physical Condition. The RAMS Physical Inspection Rank is based on the overall rating of physical condition from the latest physical inspection report. If the latest inspection report is over three years old, additional points are assigned. The physical ranking system is shown in Exhibit S2-1.

Exhibit S2-1
RAMS PHYSICAL RANKING SYSTEM

Inspection Report Evaluation	Date of Inspection Report	Points
Superior	3 years ago or less	0
	more than 3 years ago	1
Satisfactory	3 years ago or less	2
	more than 3 years ago	3
Below Average	3 years ago or less	15
	more than 3 years ago	30
Unsatisfactory	3 years ago or less	25
	more than 3 years ago	40
No Physical Inspection	n/a	40

Source: HUD RAMS Pilot Training materials (points). October 18, 1996

The following table (Exhibit S2-2) shows, for each assistance category the percentage of properties in each of three RAMS physical inspection ranking categories (superior, satisfactory, or below average/unsatisfactory) by their level of physical needs backlog.

In general, our comparison showed that properties with RAMS scores associated with below average or unsatisfactory inspection reports had the highest physical needs backlogs. In the unassisted category, 48 percent of the properties in our weighted sample had a RAMS ranking of 15 or higher, indicating a below average or unsatisfactory physical inspection report. Of these, 42 percent had backlogs of $1,500 or greater, including 15 percent with backlogs exceeding $3,000. Of the properties with satisfactory RAMS physical inspection rankings, two-thirds (67 percent) had backlogs less than $1,500, including 17 percent with no backlog. Of those unassisted properties with RAMS rankings based on superior physical inspection reports, 100 percent had backlogs of less than $1,500, including a third (33 percent) that had no backlog.

As with unassisted properties, nearly half (49 percent) of older assisted properties in our weighted sample had a RAMS ranking of 15 or higher, indicating a below average or unsatisfactory physical inspection report. Of these, 59 percent had backlogs of $1,500 or more, including 46 percent that had backlogs exceeding $3,000. Among those older assisted properties with satisfactory physical RAMS rankings, 40 percent had backlogs of less than $1,500, including 10 percent with no backlog. Of those older assisted properties with superior physical RAMS rankings, 64 percent had backlogs of less than $1,500, including 11 percent that had no backlog.

Exhibit S2-2
PHYSICAL BACKLOG BY RAMS PHYSICAL INSPECTION RANK BY ASSISTANCE CATEGORY

Total Physical Needs Backlog	RAMS Physical Inspection Rank (0 = Lowest Risk)			Total
	Superior 0-1	Satisfactory 2-3	Below Avg/ Unsatisfactory 15-40	
Unassisted	165 9%	824 43%	906 48%	1,895 100%
Backlog <$10	33%	17%	15%	17%
$10 - $1,500	67%	50%	42%	48%
$1,500 - $3,000	0%	20%	27%	22%
>$3,000	0%	13%	15%	13%
Older Assisted	317 6%	2,445 45%	2,624 49%	5,389 100%
Backlog <$10	11%	10%	5%	8%
$10 - $1,500	53%	30%	36%	34%
$1,500 - $3,000	12%	24%	13%	18%
>$3,000	24%	36%	46%	40%
Newer Assisted	440 11%	2,316 59%	1,158 30%	3,914 100%
Backlog <$10	26%	16%	8%	15%
$10 - $1,500	32%	46%	30%	40%
$1,500 - $3,000	26%	19%	22%	21%
>$3,000	16%	19%	40%	25%

Note: Column sums may not add up to totals due to rounding.

Fewer than one-third (30 percent) of newer assisted properties in our weighted sample had a RAMS ranking of 15 or higher (indicating a below average or unsatisfactory physical inspection report), compared to nearly half of unassisted and older assisted properties. Of these, 62 percent had backlogs exceeding $1,500, including 40 percent with backlogs exceeding $3,000. Of those newer assisted properties with satisfactory physical RAMS rankings, 62 percent had backlogs less than $1,500, including 46 percent with no backlog. Of those newer assisted properties with RAMS rankings based on superior physical inspection

reports, 58 percent had backlogs less than $1,500, including one-fourth (26 percent) with no backlog.

The comparison of RAMS physical rankings with backlog by assistance categories shows the following: (1) among properties with good RAMS scores, unassisted properties were more likely to have no or low backlog than either older or newer assisted properties; (2) among properties with poor RAMS scores, unassisted properties were less likely to have a high backlog than older or newer assisted properties. The correlation coefficient of the RAMS physical rankings, and physical needs backlog was 0.18, showing a relatively weak correlation between the RAMS scores and physical needs backlog.

Comparison of Financial Condition. The RAMS financial ranking is based on vacancy, percent gross rent subsidized, units, weighted average surplus cash per unit, weighted average operating cost per total revenue, reserve for replacement per total revenue, weighted average total margin, and weighted average current ratio[1].

Overall, across all assistance categories, RAMS financial rankings and this study's annual net cash flow were moderately, and negatively correlated, with a correlation coefficient of -0.34. The following table (Exhibit S2-3) shows, for each assistance category, the percentage of properties in each of three RAMS financial ranking categories by their annual net cost flow (negative cash flow, low positive cash flow ($0-$500), and high positive cash flow (>$500)).

As the table shows, unassisted properties had the worst RAMS financial rankings of the three assistance categories, with more than a third (35 percent) having scores of 24 or higher. Of these, 58 percent had negative cash flow. By the same token, only 28 percent of unassisted properties had RAMS financial rankings of 12 or lower. Of these 84 percent had high positive cash flow.

Among older assisted properties, 18 percent had RAMS ranks of 24 or worse, compared to 35 percent of unassisted properties. Of those older assisted properties with RAMS scores of 24 or worse, 59 percent had negative cash flow. At the other end of the spectrum, 52 percent of older assisted properties had scores of 12 or better, of which 81 percent had positive cash flow.

Newer assisted properties scored the best on the RAMS financial rankings, with only 4 percent having scores of 24 or worse. Of these, 50 percent had negative cash flow and 50 percent had low positive cash flow. A full 76 percent of newer assisted properties had scores of 12 or better, of which 98 percent had positive cash flow and 76 percent had high positive cash flow.

Exhibit S2-3

1 See page 4 of Appendix B of RAMS Pilot Training Materials, October 1996, for definitions of these components of RAMS financial rank.

NET CASH FLOW BY RAMS FINANCIAL RANK
BY ASSISTANCE CATEGORY

Net Cash Flow	RAMS Financial Rank (0 = Lowest Risk)			Total
	0-12	12-23	24+	
Unassisted	522 28%	714 38%	659 35%	1,895 100%
<$0	16%	4%	58%	26%
$0-$500	0%	46%	17%	23%
>$500	84%	50%	25%	51%
Older Assisted	2,796 52%	1,605 30%	988 18%	5,389 100%
<$0	19%	41%	59%	33%
$0-$500	48%	37%	28%	41%
>$500	33%	21%	14%	26%
Newer Assisted	2,988 76%	787 20%	139 4%	3,914 100%
<$0	2%	47%	50%	13%
$0-$500	22%	15%	50%	21%
>$500	76%	38%	0%	66%

Note: Column sums may not add up to totals due to rounding.

Comparison of Overall Property Condition. The RAMS Overall System Rank combines physical, financial, and management ranks, which have maximum points of 40, 40, and 20, respectively, to produce a score from 0 to 100, again with zero being the lowest risk. We compared this RAMS overall rank with Distress Index for the 567 properties for which we had both sets of data. The RAMS physical and financial rankings were described above. The RAMS management rank is based on the overall rating of project management from the latest management review report, with additional points added for management reviews conducted more than three years ago.

Using a weighted sample to represent the universe of HUD-insured multifamily properties, we did a cross tabulation of the Distress Index by RAMS overall system rank to see how the Distress Index mapped with RAMS.

The Distress Index correlated moderately and negatively with the RAMS Overall System Rank, with a correlation coefficient of -0.24. As we can see from Exhibit S2-4, of the

properties that had the RAMS ranks associated with least risk (0-40), 72 percent were sound according to the Distress Index, compared with 45 percent of properties with more risky ranks (71-100). At the same time, 40 percent of properties with higher-risk ranks (71-40) were distressed, versus 16 percent of properties with less risky ranks (0-40).

Exhibit S2-4
DISTRESS INDEX BY RAMS OVERALL SYSTEM RANK
BY ASSISTANCE CATEGORY

Distress Index	RAMS Overall System Rank (0 = Best)			Total
	Lowest Risk 0-40	Middle Risk 41-70	Highest Risk 71-100	
All Categories	5,565 50%	3,464 31%	2,168 19%	11,197 100%
Distressed (<-$250)	16%	29%	40%	25%
Stressed (-$250-0)	12%	9%	16%	12%
Sound (>$0)	72%	63%	45%	64%
Unassisted	549 29%	659 35%	686 36%	1,895 100%
Distressed (<-$250)	15%	21%	24%	20%
Stressed (-$250-0)	0%	4%	8%	4%
Sound (>$0)	85%	75%	68%	75%
Older Assisted	2,399 45%	1,786 33%	1,204 22%	5,389 100%
Distressed (<-$250)	27%	33%	44%	33%
Stressed (-$250-0)	20%	10%	23%	18%
Sound (>$0)	53%	56%	32%	49%
Newer Assisted	2,617 67%	1,019 26%	278 7%	3,914 100%
Distressed (<-$250)	7%	25%	58%	15%
Stressed (-$250-0)	6%	9%	0%	7%
Sound (>$0)	87%	66%	42%	78%

Note: Column sums may not add up to totals due to rounding.

Source: RAMS Data, and 1995 Physical Inspection Data and Costing Program, 1992-1995 AFS.

Among properties that were categorized as distressed, the RAMS system was more likely to assign a low-risk rank to older assisted properties than to unassisted or newer assisted properties. While only 15 percent of unassisted properties and 7 percent of newer assisted properties with low-risk rankings (0-40) were classified as distressed, a full 27 percent of older assisted properties with low-risk RAMS ranks were distressed according to the Distress Index. This is due largely to the fact that the RAMS physical inspection rank, which comprises 40 percent of the Overall System Rank, ranks most properties as low risk. Over half of unassisted and older assisted properties and two-thirds of newer assisted properties have RAMS physical scores of 3 or less (out of 40).

Among properties classified as sound by the Distress Index, the RAMS system was more likely to assign a high-risk score to unassisted properties than to older or newer assisted properties. While only 32 percent of older assisted and 42 percent of newer assisted properties with high-risk rankings (71-100) were classified as sound, more than two-thirds (68 percent) of unassisted properties with RAMS scores between 71-100 were sound. This discrepancy is largely due to the heavy weight RAMS attributes to vacancy in its ranking system relative to the Distress Index. Under RAMS, vacancy is assigned a weight of 4 to 7, depending on the assistance category[2], while other indicators in the RAMS ranking system are give weights of 1 to 4. Because unassisted properties had much higher vacancies than either older or newer assisted properties, they were more likely to be given a high-risk rank under RAMS even if they were categorized as sound under the Distress Index, which places less emphasis on vacancy.

2 Vacancy weights under RAMS: 4 for Section 221(d)(4) properties, 6 for older assisted housing, and 7 for other rental mortgages.

SUPPLEMENT 3

Details on Change in Physical Condition

The physical condition of the HUD-Insured Multifamily Stock is measured using the cost to remedy the backlog of physical needs. Changes in the reported physical condition between 1989 and 1995 reflect changes in the incidence and severity of reported deficiencies as well as changes in some system definitions and costs. Chapter 3 of the report described the change in physical condition of the stock between 1989 and 1995. This memorandum provides further details on changes in physical condition, and the reasons for change.

The following analysis focuses on the comparison sample of properties, the subset of 504 properties that were inspected in both 1989 and 1995. All numbers were weighted to reflect the stock of properties that was still insured in 1995.

The overall reported differences in backlog reflect both changes in actual property condition and changes made by Abt Associates in several system definitions and costs used to compute backlogs. Even after adjusting for inflation, unit cost estimates for repairing some systems increased since 1989 but decreased for other systems. We changed the definitions of actions associated with some systems as well in order to be closer to current practices in the industry. The appendix provides details on system definitions, costs and any changes for 1989 and 1995. In order to separate the total measured change in physical condition into changes resulting from costs and those resulting from condition changes, Exhibit S3-s 1 and 2 show several relevant data items for the stock as a whole and for each assistance category. Exhibit S3- 1 shows changes in mean physical needs backlogs by system group, changes in incidence of reported backlogs, and the contribution of each system group to the overall increase in mean backlog. Exhibit S3- 2 provides an indicator of the change in severity of needs by system group.

Exhibit S3- 1 shows:

- **The mean physical needs backlog by system group in 1989 using the 1989 costs** (inflated to 1995 dollars).[1]

- **The mean physical needs backlog by system group in 1989 using the 1995 costs.** Comparing this column with the 1989 backlog shows the impact of changing some system repair cost estimates on the mean backlog by system group and overall.

1 As described in Chapter 1, over 115 specific systems (such as landscaping, roadways, parking, paved pedestrian areas) were inspected in each property. These systems were combined into system groups (such as Site Areas) for property-level costing and for reporting.

- **The mean physical needs backlog in 1995 by system group.** Comparing this column with the means for 1989 condition using 1995 costs shows the impact of changes in condition and system definitions on the mean backlog by system group and overall.

- **The proportion of properties with backlogs in 1989 by system group.** This provides an indication of the incidence of problems in 1989.

- **The proportion of properties with backlogs in 1995 by system group.** This provides an indication of the incidence of problems in 1995.

- **The percentage each system group contributed to the overall change in mean backlog.** (For example, the overall change in mean backlog for the entire stock was $1,176 per 2BR ($3,058-$1,882). Site areas, thus, contributed 6 percent to the overall change in mean backlog (mean backlog in 1995 was $225 per 2BR, and in 1989 it was $152. (225-152) / 1,176 = 0.06). This allows us to focus our attention on system groups that had a significant impact on the overall change in average backlog between 1989 and 1995.

Exhibit S3- 2 shows:

- **Stock-wide and by assistance category, the mean physical needs backlog in 1989 and in 1995 by system group only for properties that had backlogs of needs within the system group** (both using the 1995 cost file). This provides an indication of the change in severity of needs, because it shows the average backlog associated with the system among properties that had backlogs within the system.

Exhibit S3- 5-1
INDICATORS OF CHANGE IN BACKLOG OF PHYSICAL NEEDS (TOTAL STOCK)

Group Systems	System Mean in 1989 (using 1989 costs)	System Mean in 1989 (using 1995 costs)	System Mean in 1995 (using 1995 costs)	Percent of Properties with Costs > 0 in 1989	Percent of Properties with Costs > 0 in 1995	Percent Contribution to Total Change
Site Areas	$152	$149	$225	52%	64%	6%
Site Amenities	35	33	22	27	30	-1
Site Distribution	4	4	5	1	3	0
Building Mechanical	24	21	74	10	14	4
Building Heating and Cooling	120	102	152	8	14	3
Building Elevators	5	7	20	5	9	1
Building Closure	182	125	181	31	38	0
Building Roof	57	48	186	23	33	11
Building Windows and Doors	101	215	367	31	41	23
Building Exterior Features	14	13	45	11	25	3
Building Common Areas	59	71	129	25	29	6
Unit Construction	16	17	31	4	8	1
Unit Finishes	699	662	791	55	59	8
Unit Kitchen Fixtures	266	256	542	40	62	24
Unit Bathrooms	79	85	151	30	44	6
Unit Heating and Cooling	23	22	85	6	19	5
Unit Electrical	47	47	52	8	13	0
Total	$1,882	$1,876	$3,058	83%	91%	100%

Note: Numbers are weighted and 1989 costs were adjusted to 1995 dollars.

Exhibit S3- 1, *continued*

INDICATORS OF CHANGE IN BACKLOG OF PHYSICAL NEEDS (OLDER ASSISTED PROPERTIES)

Group Systems	System Mean in 1989 (using 1989 costs)	System Mean in 1989 (using 1995 costs)	System Mean in 1995 (using 1995 costs)	Percent of Properties with Costs > 0 in 1989	Percent of Properties with Costs > 0 in 1995	Percent Contribution to Total Change
Site Areas	$224	$216	$320	71%	70%	9%
Site Amenities	42	39	29	29	32	-1
Site Distribution	8	8	9	2	4	0
Building Mechanical	41	37	99	13	16	5
Building Heating & Cooling	157	138	169	9	16	1
Building Elevators	5	8	18	5	7	1
Building Closure	283	196	231	42	41	-5
Building Roof	77	65	191	30	34	11
Building Windows & Doors	140	286	496	41	48	33
Building Exterior Features	26	25	58	17	28	3
Building Common Areas	86	102	132	32	28	4
Unit Construction	30	32	45	6	9	1
Unit Finishes	1,003	972	968	64	63	-3
Unit Kitchen Fixtures	422	406	656	54	65	22
Unit Bathrooms	124	132	197	39	50	7
Unit Heating & Cooling	36	34	150	8	24	11
Unit Electrical	65	64	78	12	14	1
Total	$2,770	$2,760	$3,845	92%	94%	100%

Note: Numbers are weighted and 1989 costs were adjusted to 1995 dollars.

Exhibit S3- 1, *continued*

INDICATORS OF CHANGE IN BACKLOG OF PHYSICAL NEEDS (UNASSISTED PROPERTIES)

Group Systems	System Mean in 1989 (using 1989 costs)	System Mean in 1989 (using 1995 costs)	System Mean in 1995 (using 1995 costs)	Percent of Properties with Costs > 0 in 1989	Percent of Properties with Costs > 0 in 1995	Percent Contribution to Total Change
Site Areas	$110	$119	$84	42%	49%	-5%
Site Amenities	37	37	10	23	19	-5
Site Distribution	0	0	0	0	4	0
Building Mechanical	6	5	25	7	7	4
Building Heating & Cooling	61	44	163	5	11	22
Building Elevators	6	11	5	4	9	0
Building Closure	107	68	132	19	27	5
Building Roof	52	41	127	19	28	16
Building Windows & Doors	81	217	158	21	20	17
Building Exterior Features	4	3	11	4	17	2
Building Common Areas	25	26	71	17	23	10
Unit Construction	3	4	12	2	4	2
Unit Finishes	269	246	289	33	40	4
Unit Kitchen Fixtures	146	138	272	19	51	27
Unit Bathrooms	44	49	38	15	21	-1
Unit Heating and Cooling	6	4	21	2	9	3
Unit Electrical	2	2	9	1	9	2
Total	$960	$1,016	$1,427	65%	84%	100%

Note: Numbers are weighted and 1989 costs were adjusted to 1995 dollars.

Exhibit S3- 1, *continued*
INDICATORS OF CHANGE IN BACKLOG OF PHYSICAL NEEDS (Newer Assisted Properties)

Group Systems	System Mean in 1989 (using 1989 costs)	System Mean in 1989 (using 1995 costs)	System Mean in 1995 (using 1995 costs)	Percent of Properties with Costs > 0 in 1989	Percent of Properties with Costs > 0 in 1995	Percent Contribution to Total Change
Site Areas	$72	$67	$163	40%	61%	5%
Site Amenities	23	22	18	26	32	0
Site Distribution	0	0	0	0	0	0
Building Mechanical	8	6	65	5	13	3
Building Heating & Cooling	97	81	122	6	14	1
Building Elevators	3	5	32	5	13	2
Building Closure	75	51	135	15	37	3
Building Roof	30	25	210	13	32	11
Building Windows & Doors	56	110	294	16	37	14
Building Exterior Features	2	2	44	4	25	2
Building Common Areas	38	49	157	17	35	7
Unit Construction	3	3	23	2	6	1
Unit Finishes	491	437	806	47	62	18
Unit Kitchen Fixtures	103	102	524	21	63	25
Unit Bathrooms	32	36	145	22	44	7
Unit Heating & Cooling	12	15	25	3	14	1
Unit Electrical	47	48	38	3	14	0
Total	$1,091	$1,057	$2,800	76%	88%	100%

Note: Numbers are weighted and 1989 costs were adjusted to 1995 dollars.

Exhibit S3- 2

MEAN COSTS PER 2BR FOR PROPERTIES WITH REPORTED BACKLOGS IN EACH SYSTEM GROUP

Group Systems	Total		Unassisted		Older Assisted		Newer Assisted	
	1989	1995	1989	1995	1989	1995	1989	1995
Site Areas	$271	354	282	170	310	453	165	267
Site Amenities	121	74	156	52	136	91	82	56
Site Distribution	554	201	-	8	554	284	-	-
Building Mechanical	232	558	70	335	300	634	123	495
Building Heating & Cooling	1,388	1,070	889	1,469	1,493	1,084	1,379	876
Building Elevators	140	203	302	54	133	222	89	240
Building Closure	436	482	370	485	475	550	329	366
Building Roof	226	567	222	448	233	551	204	650
Building Windows & Doors	737	944	1,034	799	695	1,044	679	799
Building Exterior Features	137	180	92	65	155	210	48	174
Building Common Areas	294	422	152	302	325	441	288	444
Unit Construction	410	426	142	317	522	459	124	383
Unit Finishes	1,268	1,383	741	734	1,548	1,596	928	1,305
Unit Kitchen Fixture	713	880	746	537	773	1,014	480	828
Unit Bathrooms	299	368	337	181	349	425	162	329
Unit Heating & cooling	415	483	172	244	420	641	508	179
Unit Electrical	713	426	150	106	573	625	1,621	275
Total	$2,312	$3,406	$1,552	$1,700	$3,042	$4,134	$1,396	$3,174

These two Exhibit S3-s together, along with the appendix on changes in system definitions, provide information on the overall change in repair backlogs and on the reason for changes, whether due to cost, incidence or severity of problems.

As is evident from comparing the first two columns of Exhibit S3- 1, overall and within each assistance category, changes in the repair cost estimates for specific systems had little impact on the overall estimate of repair backlogs in 1989, although the means for certain system groups changed. In other words, the increases in repair costs for some system groups were generally offset by decreases in costs for other systems. Thus, although the mean backlogs associated with some specific system group changed based on the updated cost estimates, the overall estimated average backlog did not. For the stock as a whole, the mean backlog in 1989 using the 1989 cost files (but inflated to 1995 dollars) was $1,882. Using the 1995 cost file, the mean backlog in 1989 (in 1995 dollars) was $1,876. (Similarly for unassisted properties the mean backlog in 1989 was $960 using the 1989 cost files and $1,016 using the 1995 cost file. For older assisted properties the numbers are $2,770 and $2,759 respectively, and for newer assisted properties the numbers are $1,091 and $1,057).

In contrast, comparing the second and third columns indicates that there were significant changes in incidence and severity of problems between 1989 and 1995. The mean backlog stock-wide in 1989 was $1,876 per 2BR (using 1989 condition and 1995 costs), and it was $3,058 per 2BR in 1995. This increase is a result of change in incidence and severity of problems as well as changes in some system definitions.

Comparing the fourth and fifth columns of Exhibit S3- 1 shows the change in incidence of problems. The two columns show the proportion of properties that had backlogs of physical needs overall and in each system group by year. For example, in 1989, 83 percent of all properties had backlogs while in 1995, 91 percent of properties had needs. Across all system groups the proportion of properties reporting backlogs increased.

As an example of how the tables can be used we look at the change in backlog for the site area system group for the stock as a whole. Exhibit S3- 1 (column 1) shows that in 1989 insured properties had an average of $152 of backlog per 2BR associated with site areas. In 1995 (column 3) the average rose to $225. Comparing columns 1, 2, and 3 shows that the overall change in backlog in site areas results from changes in condition rather than changes in costs. The mean backlog of physical needs associated with site areas in 1989 (using 1989 costs) was $152 and using the 1995 cost file with 1989 condition, the mean was slightly lower at $149.

Column 4 shows that in 1989, 52 percent of properties had backlogs in systems associated with site areas and column 5 shows that in 1995, 62 percent of properties had backlogs in this system group. Clearly the incidence of problems increased.

As indicated above, column 2 showed that the mean backlog per 2BR associated with site areas across all properties was $149 in 1989 (using the 1995 cost file). However, Exhibit S3- 2 shows that among the (52 percent of) properties that had backlogs associated with site areas the mean backlog was $354. In 1995, 64 percent of properties had backlogs in systems associated with Site Areas. The mean backlog per 2BR associated with site areas across all properties was $225, which is higher than the 1989 average. Exhibit S3- 2 shows, however, that among the (64 percent of) properties that had backlogs associated with site areas the mean backlog was only $282. Thus, the increase in overall mean backlog associated with site areas is a result of increased incidence (52 to 64 percent), rather than an increase in severity of problems because there was a decrease in mean backlog for properties that had backlogs.

System Groups Contributing to Increased Repair Backlogs

The discussion below focuses on the systems that contributed substantially (10 percent or more) to the change in mean backlog.

- There were three system groups that together accounted for over half the increase in mean backlog: unit kitchen fixtures (24 percent), building windows and doors (23 percent), and building roofs (11 percent). These three systems accounted for a major portion of the increase in mean backlog across all three assistance categories.

- In unassisted properties two additional system groups also contributed substantially to the change - building heat and cooling (22 percent), and building common areas (10 percent). Unit kitchen fixtures contributed 27 percent of the total change. Five system groups - building windows and doors, building roofs, building common areas, building heat, and unit kitchen fixtures contributed 92 percent of the increase in mean backlog in unassisted properties.

- In older assisted properties one system in addition to unit kitchen fixtures, building windows and doors and building roofs also contributed substantially to the change - unit heating and cooling (11 percent). Building windows and doors alone represented 33 percent of the increase in costs. Building windows, unit kitchen fixtures building roofs and unit heating and cooling contributed 77 percent of the increase in backlog.

- In newer assisted properties one system in addition to unit kitchen fixtures, building windows and doors and building roofs also contributed substantially to the change - unit interior finishes (18 percent). Building windows and doors, unit kitchen fixtures building roofs and unit interior finishes contributed 68 percent of the increase in backlog.

Unit Kitchen Fixtures include kitchen cabinets/counters, ranges and hoods, refrigerators, garbage disposals, microwaves and trash compactors. The mean repair backlog in 1989 estimated using the using 1995 cost file ($256 per 2BR stock-wide) was slightly lower than the 1989 estimate using the 1989 cost file ($266 per 2BR). This is due to decreases in the cost estimates for repairing/replacing cabinets and counters and ranges and hoods that were only partially offset by an increase in the cost estimate for replacing refrigerators.

In 1995, backlogs associated with kitchen fixtures averaged $542 per 2BR. This reflects a substantial increase in the proportion of properties requiring actions and an increase in the severity of actions required. In 1989, 40 percent of properties had backlogs associated with kitchen fixtures compared with 62 percent of properties in 1995. Across all assistance categories the proportion of properties requiring actions in kitchens increased (from 19 to 51 percent in unassisted properties, from 54 to 65 percent in older assisted properties, and from 21 to 63 percent in newer assisted properties).

In 1989, 24 percent of inspected units required repairs in their kitchen cabinets/counters, including 3 percent that required major repairs or total replacement. In contrast, repairs were required in 33 percent of units inspected in 1995, including 9 percent that required major repairs or total replacement. For the other kitchen fixtures the only action level available was total replacement. In 1989, 11 percent of ranges, 3 percent of refrigerators, and 1 percent of garbage disposals inspected required replacement. In 1995, 17 percent of ranges, 13 percent of refrigerators, and 9 percent of garbage disposals required replacement.[2]

Part of the increase in reported requirements for replacing kitchen fixtures may be a result of a change in the instructions in the training manual. In 1995, the manual said that refrigerators, garbage disposals, dishwashers and microwaves were to be replaced if they were over-age. [3]

Building Windows and Doors include windows, window security grates, exterior common doors, unit entry doors and storm/screen doors. The increase in the average repair backlogs for windows and doors between 1989 and 1995 reflects changes in costs, incidence and severity of problems. Costs for repairing different size windows increased by between 200 to 300 percent in the 1995 cost file, while costs for repairing doors decreased by about 16 percent. (See appendix for details). The mean backlog for windows and doors increased from $101 per 2BR using the 1989 condition with 1989 costs to $215 per 2BR using the 1989 condition and 1995 costs, largely reflecting the increase in cost estimates for repairing/replacing windows.

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2 Information is presented on the percentage of (weighted) ***properties*** requiring some action in a system group. This is calculated based on whether the costs associated with that system group property-wide were positive. However, reporting on action levels for specific systems is based on the proportion of units, buildings or sites ***inspected*** that required a specific action. We are not able to inflate this to property-wide or stock wide estimates (because, for example, each inspected unit within a property represents a different number of property units).

3 In fact, inspectors did not always follow this rule. In 1989, 19 percent of inspected refrigerators were over 15 years old and 12 percent of these were said to require replacement. In 1995, 13 percent of inspected refrigerators were over 15 years old and 52 percent were said to require replacement.

In 1995, backlogs associated with building windows and doors averaged $367 per 2BR. This increase is due to increases in the reported incidence and severity of needs in older and newer assisted properties, which was partially offset by a decrease in incidence and severity in unassisted properties. In 1989, 41 percent of older assisted properties and 16 percent of newer assisted properties had needs associated with windows and doors. In 1995 the proportions were 48 and 35 percent respectively. In addition the severity of needs increased. For example, in 1989, 2 percent of both small and medium windows inspected in older assisted building required total replacement. In 1989, 7 percent needed to be replaced. Similarly, among older assisted properties with backlogs in the windows and doors system group, the average backlog was $695 per 2BR in 1989 and $1,044 in 1995.

In contrast, in unassisted properties, the average repair need for windows decreased from $217 per 2BR in 1989 (using 1995 costs) to $158 in 1995, largely due to a decrease in the severity of reported problems (in both years about 20 percent of unassisted properties had backlogs associated with windows and doors, but the average backlog in properties with backlogs was $1,034 per 2BR in 1989 and $799 in 1995).

Building Roofs include roof coverings, parapet walls, chimneys, roof hatches, skylights and roof drainage. Comparing the mean repair backlog associated with roofs per 2BR unit using 1989 condition and 1989 cost ($57 per 2BR for the stock as a whole) with the 1989 condition using 1995 costs ($48 per 2BR), the exhibit shows a slight decrease in average backlog reflecting a slight decrease in the cost estimates for repairing/replacing roof coverings, which is the largest contributor to this system group. The estimate of backlogs for roofs was $186 per 2BR in 1995. This change is due to an increase in the incidence of reported problems (33 percent of properties required some action associated with roofs in 1995 compared with 23 percent in 1989), as well as in the severity of needs in some roof systems. For example, in 1989, 5 percent of inspected buildings required major repairs or replacements of roof coverings. In 1995, 11 percent of inspected buildings required major repairs or replacements of roof coverings. Similarly, among properties with backlogs in roofs, the average backlog was $226 per 2BR in 1989 and $567 in 1995. Thus, even though the cost estimate per square foot of roof replacement decreased slightly, the increase in incidence and the absolute high cost of replacing roofs led to an overall increase in the mean backlog associated with roof repairs.

Building Heating and Cooling includes central vent/exhaust, central air conditioning, furnace, boiler, boiler room piping, boiler room equipment, boiler room controls. The per unit repair cost estimates for each of the building heating and cooling subsystems decreased between 1989 and 1995. Thus, the estimate of 1989 backlog using 1995 costs ($102 per 2BR overall) is below the estimate for 1989 using 1989 costs ($120 per 2BR overall). However, overall the proportion of properties requiring action increased between 1989 and 1995 from 8 to 14 percent. In unassisted properties the proportion more than doubled from 5 percent to 11 percent. Because these systems are very costly ($1,070 per 2 BR on average in 1995 in the properties where any action

was required), even a slight increase in the number of properties requiring action can contribute substantially to the overall mean repair backlog.

Building Common Areas include vestibules, corridors, stairways, interior lights, and mail facilities. Most individual cost components for this system group increased moderately between 1989 and 1995, as is reflected in the comparison of mean backlog in 1989 using 1989 costs ($59 per 2BR overall) with the mean backlog in 1989 using 1995 cost estimates ($71 per 2BR).

The mean backlog associated with Building Common Areas rose to $129 per 2BR in 1995 . This is due to increased severity of reported problems. The overall percentage of properties with repair costs associated with building common areas was fairly constant, 25 percent in 1989 and 29 percent in 1995. However, among the properties with reported backlogs in common areas the mean backlog rose from $293 per 2BR in 1989 (using 1989 condition and 1995 costs) to $422 in 1995.

Building common areas contributed 10 percent of the overall increase in backlog in unassisted properties. This is only a $46 increase per unit, but given the relatively low overall increase in mean backlog in unassisted properties this represents a large percentage. (In contrast, for example the mean backlog associated with building common areas was $86 per 2BR in older assisted properties in 1989 and $132 in 1995. In this case, the same $46 increase represents only 4 percent of the overall increase in mean backlogs per unit).

Unit Heating and Cooling includes unit-level HVAC units, radiation, unit-level boilers, unit-level furnaces, temperature controls, and wall air conditioners. Overall the repair costs for this system's components stayed the same between 1989 and 1995, as can be seen from the comparison of costs in 1989 using 1989 condition and costs ($23 per 2BR overall) with the 1989 condition 1995 cost estimate ($22 per 2BR). However in older assisted properties both the incidence and severity of problems increased between 1989 and 1995. In 1989, 8 percent of older assisted properties required actions in this system group versus 24 percent in 1995. Among the properties that required action, the mean repair need rose from $420 per 2BR in 1989 (using 1995 costs) to $641 in 1995.

Unit Interior Finishes include interior walls and surfaces, floor covering, interior doors and frames, kitchen walls, kitchen floors, bathroom walls, and bathroom floors. As is shown in the appendix table, costs for some components of this system group rose and some fell, but the overall mean backlog associated with unit interior finishes fell slightly going from the 1989 cost file to the 1995 cost file (from $699 per 2BR overall to $662).

In older assisted properties the mean backlog associated with unit interior finishes actually decreased between 1989 and 1995, and in unassisted properties the mean backlog rose by $20 per 2BR unit contributing 4 percent to the total increase in mean repair backlog. However, in newer assisted properties the mean repair backlog associated with unit interior finishes rose from $491

per 2BR unit in 1989 to $806 in 1995, contributing 18 percent of the total change. This is due to both changes in incidence and severity of needs. Needs were reported in 62 percent of newer assisted properties in 1995 compared with 47 percent in 1989. The average backlog associated with unit interior finishes in newer assisted properties that reported needs was $927 in 1989 (using 1995 costs) compared with $1,305 per unit in 1995.

In Summary, between 1989 and 1995 it appears that stock-wide the condition of HUD-insured (or held) multifamily properties deteriorated. The properties were aging, and apparently property owners and managers were not keeping up with backlogs. Most of the reported changes in average backlog appear to be a result of actual changes in the condition of the stock (both incidence and severity of problems), rather than a result of changes in the costing programs or system definitions. The mean backlog in 1989 was $1,882 (in 1995 dollars). Using the 1995 cost file, the mean backlog in 1989 (in 1995 dollars) was $1,876. The mean backlog in 1995 was $3,058, a 63 percent increase over the 1989 backlog (estimated using the 1995 cost files). While the absolute backlog was highest in older assisted properties in both years, the mean backlog in both unassisted and older assisted properties rose by about 40 percent between 1989 and 1995. In contrast, the mean backlog in newer assisted properties rose by 165 percent from $1,057 per 2BR to $2,800.

Supplement 4

System by System Comparison

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
FOUNDATION	Minor	Repair Cracks	0.72	l.f.		Patch wall	0.65	-9.62	
	Moderate	N/A				N/A			
4 Foot	Major	Repair cracks and refinish. Indicate percentage to be repaired.	3.00			Repair cracks, replace interior wall surface; %	12.52	'90 costs appear to be s.f. costs although the calculation is in l.f.	317.82*
	Replace	N/A				N/A			
	Minor	N/A				N/A			
	Moderate	Repair cracks and refinish. Indicate percentage to be repaired.	1.92	l.f.		>25% of foundation cracked and deteriorated and needs to be repaired and refinished	5.30	'90 costs appear to be s.f. costs although the calculation is in l.f.	176.36*
8 Foot	Major	Repair cracks and/or exposed upper wall surface; waterproof. Indicate percentage to be repaired.	3.72			Repair cracks, replace interior wall surface; %	21.17	'90 costs appear to be s.f. costs although the calculation is in l.f.	469.75*
	Replace	N/A				N/A		'90 form allowed for replace action which was defined as N/A in the handbook.	
	Minor	N/A				N/A			
Slab	Moderate	Repair cracks.	0.48 0.48	s.f.	Slab BMT	Repair cracks.	0.45 0.45		-6.14 -6.14
	Major	Repair cracks and replace 30% of slab.	2.40 3.00		Slab BMT	Replace up to 30% of slab.	2.23 2.46		-6.97 -17.90

[1] 1990 costs have been adjusted to 1995 using a factor of 1.1986.

* Indicates absolute change of greater than 25%.

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
	Replace	Replace slab completely.	5.69 6.29		Slab BMT	Replace slab.	5.65 6.40		-0.76 1.71

[1] 1990 costs have been adjusted to 1995 using a factor of 1.1986.

* Indicates absolute change of greater than 25%.

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
EXTERIOR WALL									
Masonry	Minor	Waterproof or paint affected percentage. Indicate percentage to be repaired.	1.20	s.f.		Evidence of water penetration; %	1.00		-16.67
	Moderate	N/A				N/A			
	Major	Point and waterproof masonry.	4.79			Repair/replace up to 20% of surface (water penetration, severe damage).	3.94	Major action definition change in '95.	-17.75
	Replace	Indicate percentage to receive replacement.	17.98			>20% of surface requires repair/replace; %	14.70		-18.24
Plaster	Minor	Waterproof or paint affected percentage. Indicate percentage to be repaired.	1.20	s.f.		Evidence of water penetration; %	1.00		-16.57
	Moderate	N/A				N/A			
	Major	Prepare, paint.	2.40			Repair/replace up to 20% of surface (water penetration, severe damage).	1.44	Major action definition change in '95.	-39.93*
	Replace	Indicate percentage to receive replacement.	7.79			>20% of surface requires repair/replace; %	7.20		-7.58
Wood	Minor	Waterproof or paint affected percentage. Indicate percentage to be repaired.	0.90	s.f.		Paint wood; %	1.00		11.24
	Moderate	Prepare, paint wood.	1.50			Extensive peeling, chipped, bubbling paint.	1.25		-16.57
	Major	Repair/replace wood.	2.40			Repair/replace up to 20% of surface (water penetration, severe damage).	1.17		-51.19*
	Replace	Indicate percentage to receive replacement.	4.79			>20% of surface requires repair/replace; %	5.83		21.60

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Vinyl/Aluminum	Minor	Waterproof or paint affected percentage. Indicate percentage to be repaired.	0.90	s.f.		Paint wood; %.	1.00		11.24
	Moderate	Prepare, paint V/A.	1.50			Extensive peeling, chipped, bubbling paint.	1.25		-16.57
	Major	Repair/replace V/A.	2.10			Repair/replace up to 20% of surface (water penetration, severe damage).	0.74		-64.72*
	Replace	Indicate percentage to receive replacement.	3.00			>20% of surface requires repair/replace; %	3.84		28.15*
Insulation (add only)	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	Add insulation.	0.84 1.20	s.f.	Wall Ceiling	Add insulation.	0.42 0.88		-49.94* -26.58*
	Replace	N/A				N/A			

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Roof Covering	Minor	Patch roof; replace shingles.	0.90 0.60 1.20	s.f.	EDPM Shingle Built-up Tile Metal	Small leaks requiring repairs to isolated areas.	0.25 0.18 0.23 0.90 1.20	'95 costs reflect implied 25%; '90 calculation adjusted cost by 25% for minor action. Percent change in parenthesis respresents 25% of '90 costs. Types tile and metal aded in '95.	-72.19* (11.11) -69.96* (20.00) -80.81* (-23.33)
	Moderate	Repair up to 25% of roof area. Indicate percentage.	1.20 0.96 1.44		EDPM Shingle Built-up Tile Metal	Up to 25% of roof requires surface repair; %.	1.00 0.80 1.20 1.80 2.40		-16.57 -16.57 -16.57
	Major	Resurface over existing roof covering.	2.70 1.20 3.30		EDPM Shingle Built-up Tile Metal	Resurface roof but removal of existing roof *not* necessary	1.95 1.46 1.87 7.20 9.60		-27.69* 21.81 -43.27*
	Replace	Remove existing roof covering system, including insulation and install new roof and insulation.	3.90 1.98 5.39		EDPM Shingle Built-up Tile Metal	Removal of existing roof and installation of new roof necessary.	4.21 2.10 4.67 8.02 10.56		8.07 6.18 -13.42

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Parapet Wall	Minor	N/A				N/A			
	Moderate	Repair and replace 10% of parapet wall and coping.	35.96	l.f.		Replace brick & coping; %	72.00	'95 form collects percentage to be replaced; '90 form did not, but adjusted cost for moderate action by 10%.	100.23*
	Major	N/A				N/A			
	Replace	Replace all parapet wall and coping.	71.92			Rebuild/replace > 50% of parapet wall.	72.00	'95 form collects percentage to be replaced; '90 form did not.	0.12
Chimney (brick)	Minor	Rakeout and repoint mortar joints; waterproof.	239.72			Repoint joints, waterproof chimney.	115.75		-51.71*
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace/rebuild chimney.	958.88			Extensive deterioration; rebuild chimney.	1064.88		11.05
Roof Hatches	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace roof hatch	599.30 1078.74 1797.90		Small Medium Large	Difficult to open/close; replace.	600.00 786.00 1434.00		0.12 -27.14* -20.24

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Skylights	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace skylight.	359.58 958.88 1438.32		Small Medium Large	Deteriorated/damaged; replace.	474.00 606.00 795.00		31.82* -36.80* -44.73*
Penthouses	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	Moisture-proof penthouse and replace door.	671.22 1654.07 3595.80		Small Medium Large	Moisture penetration; replace 2 components (doors, roofing, siding).	2534.00 5300.00 9600.00	Major action scope change in '95.	277.52* 220.42* 166.98*
	Replace	Rebuild penthouse.	2157.48 7551.18 26968.5		Small Medium Large	Replace doors, roofing, siding.	4540.00 10300.00 19600.00	'90 costs did not include replacing the sides, only the top.	110.43* 36.40* -27.32*
Roof Drainage Exterior	Minor	N/A				N/A		'95 form allows for each type of drainage to have a separate action level. '90 form allowed one action level.	
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage of gutters, downspouts, and fascia.	2.40	s.f.		Replace > 50% of gutters and downspouts.	2.00		-16.57

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Interior	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	Replace accessories.	1.20	s.f.		Accessories are damaged/missing; replace	1.00		-16.57
	Replace	N/A				N/A			
Windows	Minor	Reglaze with thermopane.	59.93 89.90 119.86		Small Medium Large	Replace window glass; #	180.00 360.00 540.00	Costs were underestimated in '90.	200.35* 300.47* 350.53*
	Moderate	Replace window security devices.	89.90 149.83 209.76		Small Medium Large	Replace hardware, balances, clips, child guards, screens, locks, glass; #	230.00 410.00 590.00	Costs were underestimated in '90. Moderate action definition change in '95.	155.85* 173.65* 181.28*
	Major	Replace storm/screen windows.	89.90 113.87 161.81		Small Medium Large	Replace sashes; #	250.00 500.00 650.00	Major action definition change in '95.	178.10* 339.11* 301.70*
	Replace	Replace entire window unit.	419.51 629.27 1078.74		Small Medium Large	Replace sash, frame, storm windows; #	420.00 630.00 1080.00		0.12 0.12 0.12
Window Security Grates	Minor	N/A				N/A		System added in '95	
	Moderate	N/A				N/A			
	Major	N/A				Repair grates; #	75.00		
	Replace	N/A				Replace grates; #	297.00		

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Exterior Common Doors	Minor	Replace hardware, rehang, recondition door.	239.72 239.72 239.72		Wood Metal Glass	Damaged/missing hardware; #	200.00 200.00 200.00	'95 form allowed for all 3 types; '90 form only allowed for one type.	-16.57 -16.57 -16.57
	Moderate	N/A				N/A			
	Major	Replace building entry door.	659.23 659.23 779.09		Wood Metal Glass	Replace door; #	605.00 670.00 845.00		-8.23 1.63 8.46
	Replace	Replace building entry door and frame.	1018.81 1018.81 1138.67		Wood Metal Glass	Replace door and frame; #	747.00 812.00 987.00		-26.68* -20.30 -13.32
Unit Entry Doors	Minor	Replace hardware, rehang, recondition door.	239.72 239.72 239.72		Wood Metal Glass	Damaged/missing hardware; #	200.00 200.00 200.00	'95 form allowed for all 3 types; '90 form only allowed for one type.	-16.57 -16.57 -16.57
	Moderate	N/A				N/A			
	Major	Replace unit entry door.	659.23 659.23 779.09		Wood Metal Glass	Replace door; #	605.00 670.00 845.00		-8.23 1.63 8.46
	Replace	Replace unit entry door and frame.	898.95 898.95 1018.81		Wood Metal Glass	Replace door and frame; #	747.00 812.00 987.00		-16.90 -9.67 -3.12
Storm/Screen Doors	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace door.	299.65			Replace door; #	325.00		8.46

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Canopies	Minor	N/A				N/A			
	Moderate	Repair damaged canopy; reroof; repair/replace columns, reanchor, paint.	239.72 1018.81 2397.20		Small Medium Large	Replace roofing and minor repairs; #	230.00 921.00 2880.00		-4.05 -9.60 20.14
	Major	N/A				N/A			
	Replace	Replace canopy.	719.16 2996.50 7191.60		Small Medium Large	Structurally unsound; replace canopy; #	830.00 3321.00 10380.00		15.41 10.83 44.34
Exterior Stairways	Minor	Patch stair or refinish wood.	359.58 599.30		Wood Concrete	Chipped nosing; missing railing; #	350.00 550.00		-2.66 -8.23
	Moderate	N/A				N/A			
	Major	Patch stair; replace, refinish railing; refinish wood.	719.16 1198.60		Wood Concrete	Patch stairs, replace railings, refinish wood; #	750.00 1100.00		4.29 -8.23
	Replace	Remove and replace stair structure.	2157.48 4794.40		Wood Concrete	Remove and replace stair structure; #	1980.00 4550.00		-8.23 -5.10
Building Mounted Site Lights	Minor	N/A				N/A			
	Moderate	Replace exterior entry lights.	299.65			Replace fixtures; #	300.00		0.12
	Major	N/A				N/A			
	Replace	Replace building mounted lights.	479.44			Replace fixtures and wiring; #	600.00		25.15*

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Fire Escapes	Minor	N/A				N/A			
	Moderate	Refinish, repair, repaint.	359.58	story		Refinish; #	350.00		-2.66
	Major	N/A				N/A			
	Replace	Replace fire escapes.	1797.90			Structurally unsound; replace; #	7260.00	Costs were underestimated in '90.	303.80*
Balconies	Minor	N/A			Wrought Iron Wood Masonry	Scrape and paint railings; #	30.80 38.50 36.00	System added in '95.	
	Moderate	N/A			Wrought Iron Wood Masonry	Replace railings; #	111.62 50.65 120.00		
	Major	N/A				Replace floor (wood only); #	1250.00		
	Replace	N/A				Replace floor and railings (wood only); #	2570.00		
Porches (w/roof)	Minor	N/A				N/A			
	Moderate	Repair surface materials; paint; replace hardware; reroof.	958.88			Broken hardware, minor roof leaks; #	900.00		-6.14
	Major	N/A				N/A			
	Replace	Replace structure.	4794.40			Structurally unsound; replace; #	6400.00		33.49*
Decks (without roof)	Minor	N/A				N/A			
	Moderate	Repair surface materials; paint; replace hardware.	719.16			Broken hardware, minor repairs; #	800.00		11.24
	Major	N/A				N/A			
	Replace	Replace structure.	2996.50			Structurally unsound; replace; #	3840.00		28.15*

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Attached Storage Sheds	Minor	N/A				N/A			
	Moderate	Repair surface materials; paint; replace hardware; reroof.	419.51	s.f.		Broken hardware, minor roof leaks; #	400.00		-4.65
	Major	N/A				N/A			
	Replace	Replace structure.	1078.74			Structurally unsound; replace; #	1100.00		1.97
Vestibules	Minor	Paint interior; perform minor repairs.	1.80			Paper/paint walls; minor repairs.	2.25		25.15*
	Moderate	N/A				N/A			
	Major	Replace flooring, paint; perform repairs; recondition.	3.90	s.f.		Paper/paint walls; minor repairs; replace floor.	4.20		7.82
	Replace	N/A				N/A			
Corridors	Minor	Paint walls and ceilings; replace wallpaper.	1.80			Paper/paint walls and ceilings.	2.25		25.15*
	Moderate	Paint walls and ceilings; replace wallpaper; replace floor coverings.	3.60			Paint/paper surfaces and patch plaster.	3.25		-9.62
	Major	Paint walls and ceilings; replace wallpaper; replace floor coverings; repair/replace railings.	5.09			Paint/paper surfaces and replace floor covering.	5.75		12.88
	Replace	Replace indicated percent of walls and ceilings; paint walls and ceilings; replace wallpaper; replace floor coverings; repair/replace railings.	5.99			Replace walls, ceilings, floors; %	6.75	Major cost added to replace action in '90, but not in '95.	12.63

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Stairways	Minor	Paint walls and ceilings; replace wallpaper.	1.80	s.f.[2]		Paint walls and stairs.	2.75	The '90 action definitions were not correct for this system and did not include the costs to replace stairs.	52.96*
	Moderate	Paint walls and ceilings; replace wallpaper; replace floor coverings.	4.20			Paint walls and stairs and patch plaster.	3.75		-10.61
	Major	Paint walls and ceilings; replace wallpaper; replace floor coverings; repair/replace railings.	5.99			Paint walls and stairs and replace finish on treads and risers.	9.00		50.18*
	Replace	Replace indicated percent of walls and ceilings; paint walls and ceilings; replace wallpaper; replace floor coverings; repair/replace railings.	7.19			Replace stairs and patch walls; %	30.85	Major cost added to replace cost in '90, but not in '95. Percent change in parenthesis represents the aggregate costs.	328.97* (134.07*)
Interior Lighting	Minor	N/A				N/A			
	Moderate	Replace light fixtures.	1.20	s.f.[3]		Replace light fixtures	1.00		-16.57
	Major	N/A				N/A			
	Replace	Replace fixtures and wiring.	3.00			Replace fixtures and wiring.	2.75		8.23

2. The '90 form collected stairway s.f., the calculation used a proxy of 160 s.f. x # stories, when S.F. was missing. The '95 form did not collect stariway s.f. Thus, the claculation always used the proxy.
3. In '90, s.f. was calculated as the sum of corridor and common room s.f. In '95, s.f. was equal to the building footprint.

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Mail Facilities	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace mailboxes.	2337.27 77.91		Kiosk Box	Not secure; replace; #	1200.00 70.80	'95 form collected the number to be replaced; '90 did not.	-48.66* -9.12
Laundry Rooms	Minor	Paint laundry rooms.	1.20	s.f.		Paint room; minimal repairs.	2.25	Costs were underestimated in '90.	87.72*
	Moderate	Paint; replace floor coverings; recondition.	3.60			Paint and replace floor covering.	4.75		32.10*
	Major	Paint; replace floor coverings; recondition; perform M&E repairs.	4.20			Paint, replace floor covering and M&E repairs.	7.00		66.86*
	Replace	Paint; replace floor coverings; recondition; perform M&E repairs; replace interior components.	5.99			Gut rehab necessary.	25.00	Replace action definition change in '95.	317.15*
Laundry Equipment	Minor	N/A				N/A			
	Moderate	Repair electrical service or water supply/drain or vent.	239.72			Repair motors, belts, switches.	200.00		-16.57
	Major	N/A				Replace equipment; #	600.00	Major action added in '95 (same as replace action in '90).	
	Replace	Replace all components.	719.16			Replace equipment, electrical service, drain and vents.	1000.00	Replace action definition change in '95.	39.05*

System By System Comparison

Booklet: BUILDING ENVELOPE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Common Rooms	Minor	Paint common rooms.	1.20	s.f.		Paint and minimal repairs.	2.25	Minor action definition change in '95.	87.72*
	Moderate	Paint; replace floor coverings; recondition.	3.60			Paint, replace floor covering, additional repairs.	4.20		16.80
	Major	Paint; replace floor coverings; recondition; perform M&E repairs.	4.20			N/A		Major action dropped in '95.	
	Replace	Paint; replace floor coverings; recondition; perform M&E repairs; replace interior components.	5.99			Paint, replace floor coverings, M&E repairs.	7.00		16.80
Common Kitchens	Minor	Paint; replace floor coverings; recondition.	1.20	s.f.		Paint, replace floor covering.	4.20		250.41*
	Moderate	Paint; replace floor coverings; recondition; perform M&E repairs.	3.60			Paint, replace floor coverings, M&E repairs.	7.00		94.67*
	Major	Paint; replace floor coverings; recondition; perform M&E repairs; replace interior components.	5.99			N/A		Major action dropped in '95.	
	Replace	N/A				Gut rehab necessary.	40.00	Replace action added in '95.	
Underground Garage	Minor	N/A				Paint parking stripes.	0.02	System added in '95.	
	Moderate	N/A				Replace lighting fixtures.	0.70		
	Major	N/A				Resurface and major repairs.	1.00		
	Replace	N/A				N/A			

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Heating Risers	Minor	Replace valve stems; replace riser gate valves; replace temp probes.	89.90	unit		Repair/replace valve stems, riser gate valves, temp. probes.	100.00		11.24
	Moderate	Repair supports, patch insulation, patch or replace leaky sections, clean clogged return lines.	119.86			Replace supports, insulation piping, <25% or return lines.	125.00		4.29
	Major	Replace indicated percentage of runs; and insulate piping.	179.79			Replace 25% -2/3 of piping; insulate piping; **%**	175.00		-2.66
	Replace	Replace entire system.	239.72			Replace risers.	250.00		4.29
Gas Distribution	Minor	Replace valve stems; replace riser gate valves; replace temp probes.	89.90	unit		Repair/replace valve stems, riser gate valves, temp. probes.	100.00		11.24
	Moderate	Repair supports, patch insulation, patch or replace leaky sections, clean clogged return lines.	179.79			Replace supports, insulation piping, <25% or return lines.	175.00		-2.66
	Major	Replace indicated percentage of runs; and insulate piping.	299.65			Replace 25% -2/3 of piping; insulate piping; **%**	275.00		-8.23
	Replace	Replace entire system.	383.55			Replace risers.	350.00		-8.75

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Domestic Hot & Cold Water Distribution	Minor	Replace valve stems; repack gate valves; replace pressure gauges.	119.86	unit		Replace valve stems & pressure gauges.	125.00		4.29
	Moderate	Replace indicated percentage of piping and insulation.	239.72			Replace up to 25% of piping.	225.00	'90 form collected percentage; '95 assumes 25%. Minor cost added to moderate cost in '90, but not in '95. Percent change in parenthesis represents the aggregate cost.	-6.14 (-37.43*)
	Major	Replace hot or cold water distribution.	359.58			Replace 25% -2/3 of piping; **%**	350.00	Major action definition/scope change in '95. Minor cost added to major cost in '95, but not in '90. Percent change in parenthesis represents the aggregate cost.	-2.66 (32.10*)
	Replace	Replace entire hot and cold water distribution.	479.44			Systems corroded; replace.	450.00		-6.14
Sanitary Distribution	Minor	Replace broken floor or wall; clean out covers; rout and clean problem areas; snake floor drains.	119.86	unit	PVC Cast Iron	Backups; replace broken floor, clean covers, snake drains.	50.00 125.00	Type added in '95.	4.29
	Moderate	Replace broken floor or wall clean out covers; rout and clean problem areas; snake floor drains. Replace 10% of piping.	239.72		PVC Cast Iron	"MINOR" + pipe deterioration; replace up to 25% of piping.	100.00 225.00		-6.14
	Major	Replace indicated percentage of affected piping.	359.58		PVC Cast Iron	Corrosion, cracks; replace 25% -2/3 of piping; **%**	200.00 350.00		-2.66
	Replace	Replace entire system including vent stacks.	599.30		PVC Cast Iron	Drains clogged, systemic leaks; replace system.	300.00 450.00		-24.91

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Fire Sprinkler System	Minor	Replace 10% of heads.	0.30			Replace 10% of heads & piping.	0.25		-16.57
	Moderate	Replace indicated components.	0.60			"MINOR" + replace siamese twin connection, switches, flow control valve.	0.50		-16.57
	Major	Replace fire pump.	41951.00			Replace entire system, *except* water pump.	2.00	Major action and replace action switched in '95.	
	Replace	Replace entire system including fire pump.	2.40			Replace entire system, *including* water pump.	35000.0	Major action and replace action switched in '95.	
Sump Pumps	Minor	N/A				N/A			
	Moderate	Replace motor.	179.79 479.44		Residential Commercial	Replace motor.	200.00 400.00	'95 form allows both types of sump pump; '90 form allowed only 1 type.	11.24 -16.57
	Major	N/A				N/A			
	Replace	Replace all components.	479.44 1318.46		Residential Commercial	Replace system.	500.00 1600.00		4.29 21.35
Compactors	Minor	N/A				N/A			
	Moderate	Replace one major component.	1797.90 1797.90		Small Large	Replace pump or motor or piston cylinder.	1000.00 1060.00	'95 form allows both types of compactors; '90 form allows only 1 type	-44.38* -41.04*
	Major	Replace two major components.	2996.50 3595.80		Small Large	N/A		Major action dropped in '95.	
	Replace	Replace entire system.	5993.00 14383.2		Small Large	Replace system.	5000.00 10000.00		-16.57 -30.47*

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Central Vent & Exhaust	Minor	N/A				N/A			
	Moderate	Replace fan.	0.90	s.f.		Replace fan.	0.75		-16.57
	Major	Replace fan; replace up to 10% of ductwork.	1.50			Replace fan & up to 25% of ductwork.	1.25	Major action percentage change in '95.	-16.57
	Replace	Replace entire system.	2.40			Replace ductwork.	2.00		-16.57
Central Air Conditioning	Minor	N/A				N/A			
	Moderate	Replace components.	1.80	s.f.		Replace compressor and/or fan.	1.50		-16.57
	Major	N/A				N/A			
	Replace	Replace entire system.	5.39			Replace system.	4.50		-16.57
Switchgear	Minor	N/A				N/A		Type dropped in '95.	
	Moderate	N/A				N/A			
	Major	N/A				Additional capacity necessary; add panel.	0.35	Major action added in '95.	
	Replace	Replace entire system.	1.20 1.80	s.f.	w/out heat with heat	Replace system.	1.50		-16.57
Building Power Wiring	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace all wiring within building.	2.40	s.f.		Replace >50% of wiring.	2.25		-6.14

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Emergency Lights	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace unit and fixtures.	479.44	6 units		Replace light unit.	425.00	-11.35	
Smoke/Fire Detection	Minor	N/A				N/A		'95 form allows for both types; '90 form allowed for only 1 type.	
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace system including annunciator panel.	239.72 299.65	4 units	Battery Hardwire	Detectors & annunciator panel broken; replace system.	100.00 153.00	-58.28* -48.94*	
Communication System	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace central system.	239.72	6 units		Wiring & receiver broken; replace system.	225.00	-6.14	
Emergency Call Alarm System	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace central system.	359.58	6 units		Annunciator panel, horns, lights broken; replace system.	310.00	-13.79	

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Master TV Antenna	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				Replace antenna or master dish.	2000.00	Major action added in '95.	
	Replace	Replace antenna. Replace system.	3595.80	6 units		Replace antenna/ master dish & cables.	4500.00		25.15
Closed Circuit TV	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace CCTV central system.	1198.60	6 units		Replace system.	1200.00		0.12
Hot Air Furnace	Minor	N/A				N/A			
	Moderate	Tune-up burner, adjust/replace controls; patch small air leaks, secure loose mounts; clean/replace humidifier; lube fan; clean flue, adjust draft controls.	239.72	unit		Repair/replace minor component (burner, controls, humidifier).	225.00		-6.14
	Major	Replace the faulty component.	719.16			Replace burner or combustion chamber or fan.	675.00		-6.14
	Replace	Replace system.	1558.18			Replace system.	1500.00		-3.73

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Boilers	Minor	Replace burner.	119.86	unit		N/A		Type added in '95. Action shift in '95; major action dropped; minor became moderate; moderate became major.	
	Moderate	Replace major component.	359.58			Replace burner.	350.00		-2.66
	Major	Replace two major components.	719.16			Replace major component (boiler, cast-iron sections, insulation, combustion chamber).	550.00		-23.52
	Replace	Replace system.	1558.18			Replace system.	1500.00		-3.73
Boiler Room									
Piping	Minor	Replace piping insulation.	179.79	unit		Replace insulation.	172.50		-4.05
	Moderate	Replace indicated percentage of piping.	299.65			Replace up to 25% of piping; **%**	287.50	'90 form did not collect percentage of piping to be replaced; '95 form does.	-4.05
	Major	Replace indicated percentage of piping.	479.44			Replace 25% -2/3 of piping; **%**	460.00	'90 form did not collect percentage of piping to be replaced; '95 form does.	-4.05
	Replace	Replace entire system.	791.08			Corrosion, excessive leaks; replace system.	759.00		-4.05

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Equipment	Minor	Perform minor repairs.	599.30	unit		Isolated damage; minor repairs.	200.00	Boiler room peripherals was split into separate systems of Equipment and Controls in '95. Percent change cannot be calculated.	
	Moderate	Replace 1/3 of associated equipment.	1078.74			Repair/replace up to 25% of equipment.	500.00		
	Major	Replace 2/3 of associated equipment.	1678.04			Repair/replace 25% - 2/3 of equipment.	1000.00		
	Replace	Replace all peripheral systems.	2517.06			Replace all equipment.	1500.00		
Controls	Minor					N/A			
	Moderate	Controls included with equipment in system called peripherals IN '90.		unit		Replace up to 25% of temp. controls & zone valves.	150.00		
	Major					N/A			
	Replace					Replace temp. controls & zone valves.	600.00		

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
DHW Generation	Minor	Adjust/replace temp. controls; clean heat exchanger; tune-up burner; tighten fittings and valve packings; replace gaskets; replace small circulating pumps; patch insulation.	59.93	unit		Repair/replace minor component (temp. controls, heat exchanger, gaskets).	50.00		-16.57
	Moderate	Adjust/replace temp. controls; clean heat exchanger; tune-up burner; tighten fittings and valve packings; replace gaskets; replace small circulating pumps; patch insulation.	149.83			N/A		Moderate action dropped in '95.	
	Major	Replace either burner(s) or all of the peripherals and tank insulation or retube exchanger or replace the combustion chamber.	209.76			Replace major component (burner, combustion chamber).	200.00		-4.65
	Replace	Replace entire system.	281.67			Replace system.	250.00		-11.24
Elevator Shaftways									
Hoist	Minor	Replace dysfunctional items and perform all adjustments necessary.	239.72			Repair/replace electrical item; compensation chain rope.	2500.00	'95 form allows for both types; '90 form allowed only 1 type. Costs were underestimated in '90.	942.88*
	Moderate	Repair/replace 50% of the listed observations and perform all necessary adjustments.	599.30			Repair/replace 50% of components.	3000.00		400.58*
	Major	Replace dysfunctional components.	2397.20			Replace hoist ropes or guide rails.	5000.00	Major action definition change in '95.	108.58*
	Replace	Replace all shaftway systems.	5993.00			Replace system.	10000.00		66.86*

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Hydraulic	Minor	Replace dysfunctional items and perform all adjustments necessary.	119.86			Repair/replace electrical item; compensation chain rope.	3000.00	Costs were underestimated in '90. Minor action definition change in '95.	2402.90*
	Moderate	Repair/replace 50% of the listed observations and perform all necessary adjustments.	239.72			Repair/replace 50% of components.	4000.00		1538.6*
	Major	Replace dysfunctional components.	1198.60			Replace piston assembly or guide rails.	6000.00	Major action definition change in '95.	400.58*
	Replace	Replace all shaftway systems.	5993.00			Replace system.	12000.00		100.23*
Shaftway Doors	Minor	Replace indicated components.	359.58	floor		Replace small components (interlocks, level switches, wiring).	500.00	Costs were underestimated in '90.	39.05*
	Moderate	Replace indicated components.	599.30			Replace door gibs, rollers.	1500.00		150.29*
	Major	Replace shaftway doors and include both minor and moderate repairs.	1438.32			Replace door.	2000.00	Major action definition change in '95.	39.05*
	Replace	Replace doorway system.	2397.20			Replace door system (frame, door, equipment).	3000.00		25.15*
Cabs	Minor	Replace the indicated component(s).	359.58			Replace light fixture, fan, display lamps, buttons, telephone, handrails, toe guard.	1000.00	Costs were underestimated in '90.	178.10*
	Moderate	Replace indicated components and perform all necessary adjustments.	599.30			Replace door, guides, motor & drive & >20% of interior finish damaged.	2500.00		317.15*
	Major	Replace the components and waterproof the floor if necessary.	839.02			Replace safety blocks, rollers, cables.	2500.00		197.97*
	Replace	Replace entire system.	2996.50			Replace system.	3500.00		16.80*

System By System Comparison

Booklet: BUILDING MECHANICAL & ELECTRICAL

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Elevator Controller / Dispatcher	Minor	Replace indicated components.	599.30			N/A		System dropped in '95.	
	Moderate	Replace indicated components.	1198.60			N/A			
	Major	Replace indicated components.	1797.90			N/A			
	Replace	Replaace entire system.	5993.00			N/A			
Machinery									
Hoist	Minor	Replace/repair indicated components and perform all adjustments.	2397.20			Repair/replace worm thrust bearing, brake pads, brake pin, governor guard, governor power interlock.	2000.00	-16.57	
	Moderate	Replace brake drum, turn and undercut commutator(s), turn and undercut drive sheave vee groove, align worm and worm gear, replace/repair dysfunctional component(s) and perform all necessary adjustments.	4794.40			Repair/replace brake drum, motor generator, drive sheave, brake solenoid, cooling fan.	4000.00	-16.57	
	Major	Replace/repair dysfunctional components and perform all necessary adjustments.	7191.60			"Moderate" + replace major component.	6000.00	-16.57	
	Replace	Replace all hoist machinery.	23972.00			Replace >75% of system.	20000.00	-16.57	
Hydraulic	Minor	Replace hydraulic pump.	5993.00			Replace pump.	5000.00	-16.57	
	Moderate	Replace electric motor.	11986.00			Replace electric motor.	10000.00	-16.57	
	Major	Replace pump and motor.	17979.00			Replace pump & motor.	15000.00	-16.57	
	Replace	Replace all system components, including hydraulic fluid tank.	47944.00			Replace all components, including hydraulic fluid tank.	25000.00	-47.86*	

System By System Comparison

Booklet: SITE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Landscaping	Minor	Reseed, replant selected areas.	0.12	10% s.f.		Worn areas.	0.11		-8.23
	Moderate	Reseed, replant up to 1/3 of site.	0.24	s.f.		Up to 25% deteriorated.	0.26	Moderate action percentage change in '95.	8.46
	Major	Reseed, replant up to 2/3 of site.	0.90			25% - 2/3 deteriorated.	0.78		-13.23
	Replace	Reseed replant all of site.	1.20			>2/3 deteriorated.	1.05		-12.40
Roadways	Minor	Patch as necessary; repave, regravel less than 10% of road .	0.17	10% s.f.		Isolated damage; up to 10% requires patching, paving, regravel .	0.15		-10.61
	Moderate	Repair selected holes, curbs and resurface 10-50% of roadway. (Indicate percentage to be repaired.)	0.35	s.f.		10-50% requires repair; **%**	0.35		0
	Major	Repair selected holes, curbs and resurface 51-100% of roadway. (Indicate percentage to be repaired.)	0.61			51-100% requires resurfacing; **%**	0.70		14.51
	Replace	Demolish existing roadway and reconstruct new base and surface.	1.87			Removal of roadway; new base & surface necessary	1.74		-6.94
Parking Areas - Lots	Minor	Patch as necessary; seal coat and stripe.	0.17	10% s.f.		Isolated damage; up to 10% requires patching, paving, regravel.	0.10		-40.41*
	Moderate	Repair selected holes or ponding resurface 10-50% of paving. (Indicate percentage to be repaired.)	0.35	s.f		10-50% requires repair; **%**	0.50		43.85*
	Major	Repair selected holes, curbs and resurface 51-100% of paving. (Indicate percentage to be repaired.)	0.61			51-100% requires resurfacing; **%**	1.00		63.59*
	Replace	Demolish existing roadway and reconstruct new base and surface.	1.59			Removal of parking area; new base & surface necessary.	1.74		9.15

System By System Comparison

Booklet: SITE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Parking Areas - Garages	Minor			s.f.		Paint stripes.	0.02	System added in '95.	
	Moderate					Replace lighting fixtures; %	0.70		
	Major					Resurface garage; %	1.00		
	Replace					Removal of parking area; new base and surface necessary.	1.74		
Paved Pedestrian Areas	Minor	Spot repair less than 10% of paved areas.	0.24	10% s.f.		Isolated damage; up to 10% requires resurfacing.	0.30	'90 costs did not include removal.	25.15*
	Moderate	Resurface 10-50% of paving. (Indicate percentage to be repaired.)	0.48	s.f.		10-50% requires resurfacing; %	0.76	'90 costs did not include removal.	58.52*
	Major	Resurface 51-100% of paving. (Indicate percentage to be repaired.)	0.84			51-100% requires resurfacing; %	1.89	'90 costs did not include removal.	125.26*
	Replace	Demolish and reconstruct new pedestrian walkway.	1.73			Removal of parking area; new base & surface necessary.	3.73	'90 costs did not include removal.	116.11*
Curbing									
Bituminous	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Remove and replace curbing	3.60	l.f.		Remove and replace curb; %	4.41	Form change in '95 to collect %.	22.64
Concrete	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	Repair, patch and realign.	11.99	l.f.		Repair, patch and realign curb.	7.57		-36.84*
	Replace	Remove and replace curbing.	19.18			Remove and replace curb.	15.24		-20.53

System By System Comparison

Booklet: SITE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Granite	Minor	N/A				N/A			
	Moderate	Repoint joints.	2.40	l.f.		Repoint joints.	2.18		-9.06
	Major	Realign and replace joints.	9.59			Repair, patch and realign curb.	7.88		-17.82
	Replace	N/A				N/A			
Fencing[2]									
Chain Link	Minor	N/A				N/A		Form change in '95 to allow separate measurements per type.	
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Indicate percentage of fence to be replaced.	14.38	l.f.		Beyond repair; %	14.50	'90 costs did not include vinyl coating	0.81
Wrought Iron	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Indicate percentage of fence to be replaced.	39.55	l.f.		Beyond repair; %	57.84	Costs were underestimated in '90.	46.23*

2 Additional types (concrete, tubular) costed in 1995.

System By System Comparison

Booklet: SITE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Wood Stockade	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Indicate percentage of fence to be replaced	11.99	l.f.		Beyond repair; %	15.27		27.40*
Retaining Walls	Minor	N/A				N/A			
	Moderate	Repair walls, clean, fill cracks, reset portions.	17.98	l.f.	Concrete RR Ties	Isolated cracking, water seepage requires resetting to portions of wall; %	2.99 0.67	'90 calculatations assumed a 6 foot height--the calculation was cost by l.f.; '95 calculates l.f. x height. Percent change cannot be calculated.	
	Major	N/A				N/A			
	Replace	Indicate percentage of wall to be replaced.	179.79			Substantial heaving or settlement problems; %	34.04 24.17		
Site Drainage									
Underground	Minor	N/A				N/A			
	Moderate	Regrade and reset rims.	1066.75	Catch Basin		Catch basins ineffective requiring regrading of land & resetting of rims.	900.00		-15.63
	Major	Rebuild portions of basins.	4015.31			Rebuild catch basins.	2670.00		-33.50*
	Replace	Replace catch basins.	9409.01			Replace catch basins; #	4500.00	'95 form collects # catch basins to replace; '90 form did not.	-52.17*

System By System Comparison

Booklet: SITE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Surface	Minor	N/A				N/A			
	Moderate	Regrade up to 50% of site.	0.90	landscape s.f.		Earthwork required to offset erosion.	0.33	Tighter specs in '95.	-63.29*
	Major	Regrade up to 100% of site.	1.14			More earthwork and concrete required.	2.50		119.55*
	Replace	N/A				N/A			
Pole Mounted Site Lighting	Minor	Replace fixtures.	599.30	pole		Replace fixtures.	500.00		-16.57
	Moderate	Replace supports.	958.88			Replace supports.	800.00		-16.57
	Major	Replace supports and fixtures.	1558.18			Replace fixtures and supports.	1350.00		-13.36
	Replace	Replace wiring, supports and fixtures.	4195.10			Replace fixtures, supports, wiring.	3500.00		-16.57
Site Furniture	Minor	Repair and/or refinish appropriate elements.	35.96	10% units ('95 calc.)		Peeling paint, ,rust, minor damage; repair/refinish necessary.	36.00	Calculation change in '95. "90 costs were per 100% units.	0.12
	Moderate	Replace up to 1/3 of elements.	71.92	25% units ('95 calc.)		Up to 25% needs to be replaced.	120.00		66.86*
	Major	Replace up to 2/3 of elements.	119.86	66% units ('95 calc.)		25%-2/3 needs to be replaced.	120.00		0.12
	Replace	Replace all site furniture.	179.79	100% units ('95 calc.)		All furniture needs to be replaced.	120.00		-33.26*
Private Yards and Enclosures	Minor	N/A				N/A			
	Moderate	Repair enclosures; patch patios.	419.51	yard		Up to 1/3 needs repair.	485.00		15.61
	Major	N/A				N/A			
	Replace	Replace enclosures; remove and rebuild patios.	898.95			Replacement of enclosure and removal and construction of patio necessary.	970.00		7.90

System By System Comparison

Booklet: SITE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Dumpsters and Enclosures	Minor	Replace enclosure.	1198.60	dumpster		Replace dumpster.	1000.00	Definitions of all actions changed from '90 to '95.	-16.57
	Moderate	Replace dumpster.	4195.10			Replace dumpster & repair enclosure.	2500.00		-40.41*
	Major	Replace pad and enclosure.	2517.06			Replace dumpster & enclosure.	4300.00		70.83*
	Replace	Replace pad, enclosure and dumpster.	6712.16			Replace dumpster, enclosure & pad.	5700.00		-15.08
Swimming Pool	Minor	Paint pool with epoxy and install new filters and pumps.	5513.56	pool		Paint pool w/ epoxy & repair filters & pumps.	5140.00		-6.78
	Moderate	Repair/resurface deck.	6712.16			Paint pool w/epoxy, replace filters & pumps, patch decks.	7864.00	Moderate action changed in '95.	17.16
	Major	Drain and resurface pool interior; replace filtration system; repair/resurface deck.	16780.4			Resurface interior, repair & resurface deck, replace filtration system.	10588.0		-36.90*
	Replace	N/A				Replace pool.	34475.0	Replace action added in '95.	
Tennis Courts	Minor	Apply sealant.	3595.80	court		Surface requires sealant & relining.	2678.00		-25.52*
	Moderate	N/A				Surface requires sealant & relining & replace posts & net.	2940.00	Moderate action added in '95.	
	Major	Replace posts and net; apply sealant.	5153.98			Replace posts & net & resurface court.	11655.00	Major action scope change in '95.	126.14*
	Replace	Rebuild court, install new posts and net.	25170.60			Rebuild court; install new posts & net.	24194.00		-3.88

System By System Comparison

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System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Basketball Courts	Minor	Apply sealant.	3595.80	court		Surface requires sealant & relining.	2248.00		-37.48*
	Moderate	Install new backboards and supports.	2157.48			Surface requires sealant; replace backboards & supports.	3094.00	Moderate action scope change in '95.	43.41*
	Major	N/A				N/A			
	Replace	Rebuild court, install new backboards and supports.	13184.60			Rebuild court; install new backboards & supports.	10024.00		-23.97
Site Electrical Distribution	Minor	N/A				N/A		'90 form differentiated between with and w/out electrical heat for each type.	
	Moderate	N/A				N/A			
	Major	Replace damaged wiring, supports, conduits.	113.87 137.84	l.f.	over under	Replace up to 40% of wiring, supports, conduits.	95.00 115.00		-16.57 -16.57
	Replace	Replace entire system.	155.82 179.79			Replace system.	130.00 150.00		-16.57 -16.57
Heating Water Distribution	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage.	179.79 209.76	l.f.	Steam Hot Water	Replace lines; %	325.00 175.00	Costs were underestimated for steam in '90.	80.77* -16.57
Domestic Hot Water Lines	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage.	29.97	l.f.		Replace lines; %	40.00	Costs were under-estimated in '90.	33.49*

System By System Comparison

Booklet: SITE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Domestic Cold Water Lines	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage.	23.97	l.f.		Replace lines; %	25.00		4.29
Main Water Service	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage.	47.94	l.f.		Replace lines; %	45.00		-6.14
Gas Lines	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage.	29.97	l.f.		Replace lines; %	30.00		0.12
Site Sanitary Lines	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage.	41.95	l.f.		Replace lines; %	40.00		-4.65
Septic System	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	Replace tanks.	374.56	unit		Replace tanks.	350.00		-6.56
	Replace	Replace the entire system.	8989.50			Replace tanks and leaching fields.	8000.00		-11.01

System By System Comparison

Booklet: SITE

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Sewage Ejectors	Minor	Replace pump(s).	958.88	ejector		Replace pumps.	800.00		-16.57
	Moderate	Replace pump(s) and motor(s).	1678.04			Replace pump and pump motors.	1400.00		-16.57
	Major	Replace pump(s), motor(s) and controls.	2397.20			Replace pump, pump motors and controls.	2000.00		-16.57
	Replace	Replace the entire system	4195.10			Replace system.	3500.00		-16.57
Hydrants	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage of hydrants.	1797.90	Hydrant		Replace hydrants; #	2000.00	'90 form collected percentage of hydrants to replace; '95 form collects number of hydrants to replace.	11.24
Emergency Generators	Minor	Tune-up generator.	479.44			Tune-up generator.	200.00	'90 form collected this site-level system on the BME form.	-58.28*
	Moderate	Tune-up and perform general repairs.	1438.32			Tune-up generator; repair valves.	500.00		-65.24*
	Major	Perform general rebuilding/repairs.	5993.00			Replace engine or generator; rebuild control panel.	7500.00		25.15*
	Replace	Replace entire system.	35958.00			Replace system.	16000.00		55.50*

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Walls & Ceilings: Partitions (not kitchen & bath)	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace wall/ceiling material and paint. Indicate percentage to be replaced.	3.00	s.f		Water damage, buckling; replace; %	3.00		0.00
Floor Sub-base (not kitchen & bath)	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Indicate percentage to be replaced.	1.80	s.f.		Buckling, warped, splintered; replace; %	3.35	'90 costs do not include demolition; '95 costs do.	86.33*
Walls & Ceilings: Surfaces (not kitchen & bath)	Minor	Surface material needs to be restored with minimal prep work; paint.	0.72	s.f.		Paint.	0.58		-19.35
	Moderate	Major prep work required for surface material restoration; paint.	1.14			Surface damage (patch, spackle) but partition fine.	1.08		-5.15
	Major	Major prep work required for surface material restoration including tile replacement; paint.	1.62			N/A		Major action dropped in '95.	
	Replace	N/A				Replace & paint surface area.	1.58	Replace action added in '95.	

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Floor Covering									
Carpet (not kitchen & bath)	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage of all floor coverings.	2.70	s.f.		Carpet worn, stained; replace; %	1.65		-38.82*
Resilient (not kitchen & bath)	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace indicated percentage of all floor coverings.	1.80	s.f.		Holes & cracks; replace; %	2.43		35.16*
Interior Doors & Frames	Minor	N/A				N/A			
	Moderate	Replace hardware, rehang door.	41.95	door		Replace hardware; rehang door; #	50.00		19.19
	Major	Replace door.	239.72			Replace door; #	256.00		6.79
	Replace	Replace door and frame.	383.55			Replace door & frame; #	400.00		4.29

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Kitchen Walls & Ceilings: Partitions & Surfaces	Minor	Surface material needs to be restored with minimal prep work; paint.	0.78	s.f.		Paint.	0.70		-10.15
	Moderate	Major prep work required for surface material restoration; paint.	1.08			Patch & paint.	1.25		15.88
	Major	Major prep work required for surface material restoration including tile replacement; paint.	2.34			N/A		Major action dropped in '95.	
	Replace	Replace wall/ceiling material and paint. Indicate percentage to be replaced.	4.55			Replace & paint surface & framing system; %	3.00	Cost of major action added to replace cost in '90; cost of moderate action added to replace cost in '95. Percent change in parenthesis represents aggregate costs.	-34.13* (-38.32*)
Kitchen Floor Covering & Sub-base	Minor	N/A				N/A			
	Moderate	N/A				NA			
	Major	Replace sheetgoods.	1.92	s.f.		Replace sheetgoods.	3.30		72.08*
	Replace	Replace floor covering and sub-floor.	3.12			Replace floor covering & sub-base.	6.65	'90 costs do not include sub-base; '95 costs do.	113.39*

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Cabinets / Counter Top / Sink	Minor	Replace countertop, keep sink; replace fittings (faucet).	719.16			Replace countertop & sink faucet.	732.00		1.79
	Moderate	Refinish existing cabinets; repair drawers, replace door hinges; replace fittings (faucet).	839.02			Refinish cabinets, repair drawers & door hinges, replace sink faucet.	800.00		-4.65
	Major	Refinish existing cabinets; repair drawers, replace door hinges; replace fittings (faucet); replace countertop and sink.	1678.04			"MINOR" + "MOD" (repair/replace countertop, cabinets, sink).	1532.00		-8.70
	Replace	Replace countertop and backsplash; replace sink and fittings; remove and replace cabinet system.	2636.92			Replace countertop, cabinets, sink.	2500.00		-5.19
Range	Minor	N/A				Burner non-functional.	50.00	System added in '95. Ranges without Hoods were captured under Ranges and Hoods in '90.	
	Moderate	N/A				N/A			
	Major	N/A				Replace range.	500.00		
	Replace	N/A				N/A			
Range & Hood	Minor	Replace burner, clean hood, perform minor repairs.	149.83			Burner non-functional.	100.00		-33.26*
	Moderate	Replace hood.	239.72			Replace hood.	258.00		7.63
	Major	Replace range.	539.37			Replace range.	500.00		-7.30
	Replace	Replace range and hood.	1168.64			Replace range & hood.	758.00		-35.14*

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Refrigerator	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace refrigerator.	539.37			Nonfunctional / >useful life (15 years; 10 years / family).	768.00	Costs were underestimated in '90.	42.39*
Garbage Disposal	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace garbage disposal.	239.72			Nonfunctional / > useful life (7 years).	180.00		-24.91
Dishwasher	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace dishwasher.	539.37			Nonfunctional / > useful life (15 years).	522.00		-3.22
Microwave	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace microwave.	299.65			Nonfunctional / > useful life (10 years).	275.00		-8.23

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Trash Compactor	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace compactor.	509.41			Nonfunctional / > useful life (15 years).	516.00		1.29
Bathroom Walls & Ceilings: Partitions & Surfaces	Minor	Surface material needs to be restored with minimal prep work; paint.	0.78	s.f.		Paint.	0.58		-25.55*
	Moderate	Major prep work required for surface material restoration; paint.	1.08			Patch & paint surface.	4.20	Costs were under-estimated in '90.	289.34*
	Major	Major prep work required for surface material restoration including tile replacement; paint.	4.61			Tile replacement and Paint.	8.80	Costs were under-estimated in '90.	90.70*
	Replace	Replace wall/ceiling material and paint. Indicate percentage to be replaced.	6.89			Replace & paint surface & framing system; %.	12.00	Cost of major action added to replace cost in '90; but not in '95. Percent change in parenthesis represents aggregate costs.	74.12* (4.35)
Bathroom Floor Cover & Sub-base	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	Replace floor covering.	7.79 1.80	s.f.	Tile Resilient	Replace sheetgoods.	9.24 3.30	'90 costs do not include demolition; '95 costs do.	18.60 83.55*
	Replace	Replace floor covering and sub-floor.	9.59 3.00			Buckling, warped, splintered; replace floor covering & sub-base.	12.59 6.65	'90 costs do not include demolition; '95 costs do.	31.30* 121.93*

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Bathroom Fixtures									
Sink	Minor	Replace sink.	359.58			Repair/replace fittings.	150.00	Fixtures treated as one system in '90; minor (repair) action added in '95. Percent change cannot be calculated.	
	Moderate	N/A				N/A			
	Major	Replace sink and toilet.	719.86			N/A			
	Replace	Replace all fixtures (sink, toilet, tub).	1558.18			Replace sink.	393.00		
Toilet	Minor	N/A				Repair/replace fittings.	150.00		
	Moderate	Replace toilet	359.58			N/A			
	Major	Replace toilet and sink.	719.86			N/A			
	Replace	Replace all fixtures (sink, toilet, tub).	1558.18			Replace toilet.	361.00		
Tub/Shower	Minor	N/A				Repair/replace fittings.	200.00		
	Moderate	N/A				N/A			
	Major	Replace tub.	719.86			N/A			
	Replace	Replace all fixtures (sink, toilet, tub).	1558.18			Replace tub/shower.	821.00		
Bathroom Accessories	Minor	N/A				N/A			
	Moderate	Replace 2-3 broken or missing accessories.	89.90			Replace 2-3 accessories (*not* medicine cabinet).	100.00		11.24
	Major	N/A				Replace medicine cabinet only.	160.00	Major action added in '95.	
	Replace	Replace all accessories.	179.79			Replace accessories & medicine cabinet.	230.00		27.93*

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Bathroom Vanities	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace vanity.	329.62 389.55		24" 36"	Replace vanity.	387.00 552.00	17.41 41.70*	
HVAC Unit[2]	Minor	N/A				N/A			
	Moderate	Replace the indicated component.	431.50 1150.66		Heat only Heat/cool	Replace 1 component (fan, controls, coil, cabinet).	400.00 700.00	-7.30 -39.17*	
	Major	N/A				N/A			
	Replace	Replace entire system.	1150.66 5753.28			Replace 2 or more components.	972.00 5370.00	-15.53 -6.66	
Radiation									
Hydronic	Minor	N/A				N/A			
	Moderate	Replace or repair the indicated component.	7.19	l.f.		Replace component (cover, valves, traps).	9.72	35.16*	
	Major	N/A				N/A			
	Replace	Replace entire system.	14.38			Radiator leaks, damaged components; replace system.	19.44	35.16*	
Electric	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace entire system.	19.18			Nonfunctional; replace.	10.54	-45.04*	

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Unit Boiler	Minor	N/A				N/A			
	Moderate	Major overhaul or replacement of a major component.	958.88			Replace 1 component (burner boiler, cast-iron sections, combustion chamber).	800.00		-16.57
	Major	N/A				N/A			
	Replace	Replace entire system.	2397.20			Replace system.	2730.00		13.88
Unit Furnace	Minor	N/A				N/A			
	Moderate	Tune-up burner, adjust controls, patch air leaks, secure loose mounts, clean humidifier, lube fan, clean flue, adjust draft controls.	599.30			Repair/replace component (tune-up burner, adjust controls, lube fan).	500.00		-16.57
	Major	N/A				N/A			
	Replace	Replace entire system.	1438.32			Replace system.	1110.00		-22.83
Unit Domestic Hot Water Generation	Minor	N/A				N/A			
	Moderate	N/A				Replace component (temp. control, valves).	150.00	Moderate action added in '95.	
	Major	N/A				N/A			
	Replace	Replace entire system.	419.51			Nonfunctional / > useful life (20 years).	450.00		7.27
Temperature Controls	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace temperature control.	119.86			Nonfunctional or missing; replace.	64.80		-45.94*

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Wall / Window Air Conditioner	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace entire system.	839.02			Nonfunctional; replace.	750.00		-10.61
Unit Electrical Panel	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace entire panel.	1078.74			Panel burned-out; replace.	1260.00		16.80
Unit Electrical Wiring	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace branch wiring, outlets and fixtures.	3.60	s.f.		Deteriorated wiring, switches, outlets.	3.50		-2.66
Bell/Intercom System	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace unit level signaling component.	179.79			Nonfunctional; replace.	182.00		1.23
Closed Circuit TV	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace unit level component.	119.86			Nonfunctional; replace.	100.00		-16.57

System By System Comparison

Booklet: UNIT

System	Level	1990[1] Action	1990[1] Cost	Unit of Cost Measure	Type	1995 Action	1995 Cost	Difference Change	Difference % Change
Emergency Call Alarm System	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace unit level signaling component.	149.83			Nonfunctional; replace.	125.00		-16.57
Smoke / Fire Detection	Minor	N/A				N/A			
	Moderate	N/A				N/A			
	Major	N/A				N/A			
	Replace	Replace detector(s).	119.86 149.83	Detector	Batttery Hard Wire	Nonfunctional; replace.	100.00 153.00	'95 form allows for both types; '90 form allowed only 1 type.	-16.57 2.12