Transitory Effects of Disamenities on Residential Housing Values: The Case of Public and Senior Housing

Executive Summary. *This article investigates the effect of low-income and senior housing on the value of nearby residential properties. It is unique in that, in addition to testing for the effect on establishment, it also tests for the duration of the impact. Thirteen projects, including three public senior housing facilities (two large and one moderate in size) are included in the analysis. We investigate the extent and the longevity of the effect of the projects on a sample of 6,321 residential properties. We find that while public housing in general and senior housing in particular has an initial negative impact on nearby property values the effect is neither substantial nor long lasting.*

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Introduction

The literature on the effect of disamenities (and amenities) on residential housing prices is long and exhaustive. The list of disamenities includes: power lines, power plants, hazardous waste dumps, nuclear power plants, refineries, airports, trailer parks, reservoirs, beltways, traffic flow, highway noise and others. The list of amenities (schools, shopping centers, churches, etc.) is likewise long and exhaustive. This study investigates the transitory nature of a potential disamenity, low-income housing and senior housing, on nearby residential property values.

There is a category of potential disamenities that we term "service housing." This category encompasses public housing for low-income residents, below market interest financing (BMIR), mental health facilities (mentally challenged, Alzheimer's patients, etc.), halfway houses, senior housing and other group homes or physically/mentally challenged programs. Although low-income family and senior housing are grouped together as a category here, the effect of senior housing is reported separately by including a variable that reflects that type of housing. Thus, the effect of senior housing can be isolated from that of all service housing.

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Literature Review

In regards to group homes for the mentally challenged, Gabriel and Wolch (1984) find that residential facilities for children and youth have a positive

impact in non-white sub-markets but a negative (and less significant) impact in white sub-markets. They did not investigate a distance effect, however. Wolpert (1978) found a positive (but insignificant) price effect of distance from mentally challenged group homes but no effect on turnover rates (acceleration in sales activity). In a follow-up study, Dolan and Wolpert (1982) found no long-term effects of such group homes on either prices or turnover rates. Knowles and Baba (1973) found no effect on housing turnover rates by distance from group homes for disadvantaged children. Dear (1977) found that turnover rates increased after the opening of mental health facilities in Philadelphia. He also found that the price/assessed value ratio was higher after the openings of the homes. Caution must be used here, however, because of the reliance on appraised values that may lag the general market. In one of the best studies, in terms of methodology, Farber (1986) found that for group homes for the mentally challenged, there was no price effect in high socioeconomic neighborhoods but a positive effect in low socioeconomic neighborhoods. This was consistent with the results of Gabriel and Wolch. He analyzed the sales prices of 127 nearby properties within approximately 2,500 feet of group homes. Gooddale and Wickware (1979) concluded that there was no negative impact on either the property values or marketability of residences in proximity to group homes in Ottawa, Canada. Also, Hargraves, Callahan and Maskell (1998) analyzed property values in four residential neighborhoods in New Zealand and found that community housing had no effect on nearby property values. They incorporated distance from the group home as a variable in their hedonic model. Recently, Colwell, Dehring and Lash (1998) analyzed properties in several Du Page County, Illinois neighborhoods. In addition to distance from a group home, they included variables that distinguished properties as being away from, near or in sight of the group home. They also considered if there was protest by neighbors upon the announcement of an impending establishment of a group home. Neighborhoods were defined as within 1,500 feet of a group home. They found that there was a negative effect on values that were in sight of a group home at the time of an announcement that the home would be established. There was also a decline in values for group homes where there was community protest surrounding their establishment. When they used their data to replicate the methodology of several earlier studies that had found no price effect, they also found no such effect. They attribute their results to including definitions of proximity and distinguishing between homes that did and did not experience community protests. They did not examine whether or not the negative effect was permanent or transitory.

Most of these studies involve group homes that are modest in size. Often they are converted single-family residences, perhaps with modifications such as room additions. For the most part, they do not include large facilities. Their modest size may be one reason researchers fail to find significant and lasting price effects on nearby properties.

In regards to public (subsidized) housing, several studies show mixed results. In an early study, Nourse (1963) found that the trend in the values of surrounding properties to public housing in St. Louis were not significantly different from those in a control neighborhood. De Salvo (1974) found assessed values in proximity to subsidized housing increased 9.9% annually while those in a control area increased only 4.6%. Again, the use of assessed values may be a problem. Schafer (1972) also found no price effect of subsidized (BMIR) housing. These early studies relied on a methodology that compared the average price appreciation to all properties within the affected neighborhood with those in a control neighborhood. There was neither a determination of the effect of distance nor a determination of the transitory or permanent nature of an effect. Guy, Hysom and Ruth (1985) were one of the initial studies to show a negative impact of subsidized (BMIR) housing on nearby residences. They found a positive effect of a distance variable (subsidized housing is a disamenity) but did not investigate the permanency of the effect. Since they looked at only one subsidized project, the effect of size was also not investigated. Rabiega, Lin and Robinson (1984) analyzed 373 sales of properties within 1,040 feet of six public housing facilities (four for families and two for the elderly) in Portland, Oregon, ranging in size from 18 to 188 units. They found that public housing represented a disamenity for properties in very close proximity but an overall neighborhood

Exhibit 1
Project Information for the Metropolitan Area of Las Vegas

Project	Type	# of Units	Year Built	New or Acquired	Ownership
1	Senior	356	1996	New	Private
2	Senior	360	1995	New	Private
3	Family	144	1996	New	Private
4	Family	184	1995	New	Private
5	Family	248	1995	New	Non-Profit
6	Family	100	1969	Acquired	CCHA
7	Family	129	1988	Acquired	CCHA
8	Family	119	1986	New	CCHA
9	Family	24	1996	New	Non-Profit
10	Family	4	1996	Acquired	Non-Profit
11	Family	4	1996	Acquired	Non-Profit
12	Senior	40	1984	New	CCHA
13	Family	59	1982	New	CCHA

amenity effect. That is, while properties close to public housing declined in value, properties in the neighborhood but located away from the public housing increased in value after the establishment of the public housing. They also did not differentiate any effect by size of the project.

With the exception of one or two studies, the literature appears to reject the hypothesis that "service" housing affects nearby property values. Many of the service housing units were small, however. In addition, none of the studies to date investigated the extent to which a temporary effect may have been present with the establishment of the service housing (both low-income and senior). If there is a temporary (say, negative) effect then there would be a wealth redistribution away from home sellers that sell soon after service housing is introduced and to home buyers.

The purpose of this study is to determine the effect of the size of service housing on nearby property values and to determine if the effect is transitory or permanent. To estimate the effect of size, the effect of public or subsidized housing on nearby property values is explored. It is in the domain of this type of housing (rather than group homes) that we see a sufficiently large range of unit size so as to determine the impact of size on property values. As an additional investigation we also note any effect by virtue of a low-income project being: (1) for families versus senior citizens; (2) built new or converted from another use; and (3) for profit or not-for-profit operation. By including both low-income and senior housing in the sample, we are able to focus on the later. That is, we are able to determine if senior housing, per se, has a neighborhood effect because of its nature (*i.e.*, being senior housing) or because it is part of a more generic service housing. In other words, had we focused on senior housing only one would not be able to determine if any impact was due to the housing being strictly senior or because of its more generic nature as service housing.

Methodology and Data

We look at thirteen affordable housing projects[1] for low income residents in Clark County, Nevada. Exhibit 1 shows the relevant information on each of the projects that are dispersed throughout the metropolitan area of Las Vegas. The projects range in size from four to 356 units. Three projects were designed for senior living, while ten were designed for family living. Eight of the properties were built new for affordable housing, while the Clark County Housing Authority (CCHA) acquired five. Thus, this latter set consists of properties that were built for another use prior to acquisition by CCHA. Projects were built as early as 1969 and as late as 1996. These properties are a good mix in

terms of size, age, purpose and nature of conversion to low-income use (new or existing).

For each of the projects, we analyzed the sale price of nearby residences. We look at the sales price of the last transaction for every single-family residence within one-half to three-quarters of a mile surrounding the project.[2] The selection results in a sample of 6,321 sales of single-family properties sold from 1968 through 1997. For each property, we collect data on the physical characteristics (beds, baths, etc, the usual variables used in hedonic equations), the distance to the project, the date of sale and, of course, the sales price. For each of the properties we note whether or not it was sold prior or subsequent to the establishment of the project as low income housing. Finally, for each project we collect socioeconomic census tract data from the 1990 census. We include these data because of other research, cited above, which suggests that the project can have a differential impact according to the socioeconomic character of the neighborhood. Again, we also have data on the projects in terms of their size (number of units), whether or not they were owned by the County or by a private entity, whether the private entity operated for profit or not-for-profit, whether or not they were converted to public housing or built new for that purpose, and whether the project was for families or for senior citizens. Exhibit 2 presents the descriptive statistics for the 6,321 properties, and Exhibit 3 presents the correlation coefficients for those variables.

The basic equation to be tested is:

$$P_{ijt} = f(X_i, S_j, D_{ij}, PR_j). \quad (1)$$

Where:

$P_{i,j}$ = The sales price of the i^{th} house near the j^{th} project in constant 1983 dollars;
Xi = A set of physical characteristics of the i^{th} property including the date of sale;
S_j = A set of socioeconomic variables in the census tract of project j;
$D_{i,j}$ = is the distance (in feet) of the i^{th} property from the j^{th} project; and
PR_j = A characteristic of the projects such as the number of units, whether it was acquired or built new and whether it was for families or seniors.

The model is reported in six stages in Exhibit 4. The first set of results relate the natural logarithm of the real price to a time trend and eight characteristics of the residential property, without regard to neighborhood characteristics or proximity to low income housing projects. Our results mirror the usual hedonic results. Real price decreases with the passage of time, implying declining neighborhoods. The price of the house decreases with age and the square of age, while increasing with age cubed. As with other hedonic models of this type, the presence of multicollinearity is always a possibility. However, the multicollinearity will exist among the physical characteristics of the properties and not the variables of interest, namely the distance from the projects and the time since the projects were established.

The second equation in Exhibit 4 adds the neighborhood characteristics *LBLACK*, the log of the percentage of the census track that is African-American and *LOWNOCC*, the log of the percentage of the housing units that are owner-occupied. Both these variables are extracted from the *1990 Census of Population*, and are invariant with respect to time. The negative coefficient on *LBLACK* implies a 5% reduction in housing prices for each doubling of the proportion of the population that is African-American. A doubling of the proportion of owner-occupied residential units increases property values by 7.4%.

The third equation in Exhibit 4 introduces twelve indicator variables, identifying twelve of the thirteen census tracks in which the projects (and their neighborhood properties) are located. Five census tracks are significantly positive, while one is significantly negative. The introduction of these neighborhood indicator variables weaken the impact of the two neighborhood characteristics introduced in the second equation.

The fourth column of Exhibit 4 measures the impact of proximity to project sites on residential property values. *LFEET* measures the natural log

Exhibit 2
Descriptive Statistics

	Mean	Median	Maximum	Minimum	Std. Dev.
PRICE (%)	77,160.23	76,950.00	805,000.00	10,000.00	33,503.41
RPRICE (%)	53,464.73	52,183.78	501,557.63	5,672.15	18,191.33
AGE	15.28	14	57	0	13.94
BATH	1.84	2	5	0.5	0.46
BEDS	3.11	3	6	1	0.65
ROOMS	5.43	5	12	1	0.88
SQFT	1,311.42	1,248	3,736	10,298	326.16
LOT	7,105.98	6,240	89,298	2,178	4,774.63
FIRE	30.71%	0	3	0	47.32%
GAR	57.95%	1	1	0	49.37%
POOL	8.18%	0	1	0	27.41%
TIME	26.38	29.05	32.53	0	6.61
OWNOCC	62.62%	0.657	0.93	0.05	16.67%
BLACK	13.96%	0.047	0.96	0.01	21.04%
C14	6.41%	0	1	0	24.49%
C1705	1.72%	0	1	0	13.02%
C2911	5.57%	0	1	0	22.93%
C3401	5.89%	0	1	0	23.54%
C41	8.86%	0	1	0	28.42%
C44	2.15%	0	1	0	14.51%
C5001	4.40%	0	1	0	20.51%
C5002	5.47%	0	1	0	22.75%
C507	8.99%	0	1	0	28.60%
C5302	5.00%	0	1	0	21.79%
C5402	16.48%	0	1	0	37.11%
C5403	5.32%	0	1	0	22.44%
FEET	2,036.70	2,085.42	6,594.64	36.88	749.92
AFTER	54.75%	1	1	0	49.78%
SOLD	79.78	155.93	7,646.90	−10,879.11	3,226.11
UNITS	140.42	129	360	4	124.21
NEW	67.14%	1	1	0	46.97%
PRIVATE	59.94%	1	1	0	49.01%
PROFIT	36.17%	0	1	0	48.05%
SENIOR	30.20%	0	1	0	45.92%

Note: Number of observations is 6,321.

of the distance between the residential property and the (future or current) low-income housing project. *AFTERLFEET* is an interaction term, set equal to zero if the residence was bought before the low income housing project was opened and equal to the natural logarithm of distance (in feet) if the residential property was purchased after the project had opened. The statistical insignificance of the coefficient on *LFEET* supports the null hypothesis that the project has no impact until it is opened. The statistical significance of *AFTERLFEET* implies that property values increase by about 1% for each doubling of the distance from an open project.[3]

Exhibit 3
Correlations

	LRPRICE	TIME	AGE	BATH	BEDS	ROOMS	AFTER	LBLACK	LOWNOCC	LSQFT	LLOT	FIRE
LRPRICE	1.000	−0.136	−0.475	0.405	0.234	0.253	−0.010	−0.332	0.240	0.455	0.174	0.351
TIME	−0.136	1.000	0.156	0.100	−0.029	−0.064	0.531	0.011	0.001	0.041	−0.112	0.040
AGE	−0.475	0.156	1.000	−0.499	−0.134	−0.046	0.031	0.018	−0.005	−0.244	0.211	−0.184
BATH	0.405	0.100	−0.499	1.000	0.423	0.368	0.068	−0.065	0.085	0.561	−0.069	0.225
BEDS	0.234	−0.029	−0.134	0.423	1.000	0.791	−0.021	0.054	0.059	0.570	−0.003	0.086
ROOMS	0.253	−0.064	−0.046	0.368	0.791	1.000	−0.050	0.018	0.061	0.721	0.072	0.181
AFTER	−0.010	0.531	0.031	0.068	−0.021	−0.050	1.000	−0.091	0.049	−0.010	−0.041	−0.013
LBLACK	−0.332	0.011	0.018	−0.065	0.054	0.018	−0.091	1.000	−0.626	−0.208	−0.146	−0.273
LOWNOCC	0.240	0.001	−0.005	0.085	0.059	0.061	0.049	−0.626	1.000	0.169	0.038	0.196
LSQFT	0.455	0.041	−0.244	0.561	0.570	0.721	−0.010	−0.208	0.169	1.000	0.156	0.394
LLOT	0.174	−0.112	0.211	−0.069	−0.003	0.072	−0.041	−0.146	0.038	0.156	1.000	0.165
FIRE	0.351	0.040	−0.184	0.225	0.086	0.181	−0.013	−0.273	0.196	0.394	0.165	1.000
GAR	0.412	0.176	−0.591	0.378	0.109	−0.022	0.153	−0.084	0.050	0.141	−0.054	0.254
POOL	0.173	−0.013	0.026	0.083	0.092	0.135	−0.034	−0.141	0.130	0.177	0.118	0.120
C14	−0.105	−0.038	0.369	−0.223	−0.103	−0.021	−0.140	−0.196	0.097	−0.131	−0.021	−0.100
C1705	0.099	−0.033	0.046	0.032	0.025	0.107	−0.087	−0.063	0.017	0.117	0.030	0.117
C2911	0.171	−0.073	−0.018	0.040	0.024	0.038	−0.027	−0.197	0.273	0.047	0.035	0.114
C3401	−0.023	0.069	−0.208	0.127	−0.025	−0.062	−0.093	0.308	−0.344	−0.038	−0.265	−0.067
C41	−0.189	−0.033	0.301	−0.154	−0.085	−0.056	−0.080	0.036	0.246	−0.091	−0.031	−0.119
C44	−0.133	−0.109	0.041	−0.023	0.088	0.052	−0.113	0.237	−0.165	−0.042	0.025	−0.082
C5001	0.098	0.070	−0.122	0.094	0.048	0.029	0.042	−0.148	0.030	0.109	0.045	0.016
C5002	−0.054	−0.051	0.069	−0.064	−0.040	−0.048	0.125	−0.089	0.091	−0.122	0.078	−0.089
C507	0.013	−0.050	−0.035	0.053	0.063	0.040	−0.021	0.138	0.091	−0.017	−0.002	−0.065
C5302	0.149	0.018	−0.056	0.093	0.009	0.035	−0.134	−0.338	0.230	0.182	0.047	0.118
C5402	0.072	−0.049	−0.087	0.024	0.021	−0.031	0.182	−0.240	−0.089	−0.003	0.067	0.111
C5403	0.235	0.156	−0.255	0.148	0.079	0.012	0.111	−0.401	0.332	0.245	−0.006	0.199
LFEET	0.074	−0.008	0.074	−0.057	−0.005	0.030	0.002	−0.132	0.187	0.073	0.143	0.039
AFTERLFEET	−0.004	0.530	0.034	0.065	−0.021	−0.047	0.996	−0.102	0.068	−0.001	−0.025	−0.007
SOLD	−0.073	0.707	0.112	0.093	−0.047	−0.069	0.694	−0.139	0.019	−0.022	−0.019	0.002
SOLDLFEET	−0.077	0.707	0.114	0.089	−0.047	−0.070	0.695	−0.138	0.023	−0.022	−0.012	0.0031
LUNITS	−0.151	0.025	0.112	−0.119	−0.036	−0.041	−0.091	0.228	−0.259	−0.112	−0.094	−0.096
PRIVATE	−0.164	0.034	0.141	−0.066	−0.028	−0.003	−0.246	0.241	0.043	−0.091	−0.106	−0.196
PROFIT	−0.170	0.078	0.125	−0.094	−0.043	−0.028	−0.282	0.273	0.078	−0.088	−0.174	−0.130
NEW	−0.092	0.107	−0.015	−0.042	−0.041	−0.066	−0.116	0.181	−0.167	−0.027	−0.068	0.032
SENIOR	0.009	0.151	−0.114	0.029	0.029	−0.022	−0.092	0.121	−0.121	0.017	−0.173	0.060

The innovation of this article occurs with the fifth equation in Exhibit 4, which adds the variable *SOLD* and the interaction term *SOLDLFEET*. *SOLD* measures the time (in days) between the sale of the residential property and the opening of the project. If the property is sold before the project is opened, *SOLD* is a negative number; if the property is sold after the project is opened, then *SOLD* is a positive number. The coefficient on *SOLD* implies that property appreciates by .009% each day after the project was opened. $SOLDLFEET = SOLD \times LFEET$; the elasticity of property values with respect to distance decreases by .000112% per day. Dividing the coefficient on *AFTERLFEET* by the coefficient on *SOLDLFEET* implies that it takes 391 days for the elasticity of housing price with respect to distance from a project to return to its value before the project was opened. That is,

Exhibit 3 (continued)
Correlations

	GAR	POOL	C14	C1705	C2911	C3401	C41	C44	C5001	C5002	C507	C5302
LRPRICE	0.412	0.173	−0.105	0.099	0.171	−0.023	−0.189	−0.133	0.098	−0.054	0.013	0.149
TIME	0.176	−0.013	−0.038	−0.033	−0.073	0.069	−0.033	−0.109	0.070	−0.051	−0.050	0.018
AGE	−0.591	0.026	0.369	0.046	−0.018	−0.208	0.301	0.041	−0.122	0.069	−0.035	−0.056
BATH	0.378	0.083	−0.223	0.032	0.040	0.127	−0.154	−0.023	0.094	−0.064	0.053	0.093
BEDS	0.109	0.092	−0.103	0.025	0.024	−0.025	−0.085	0.088	0.048	−0.040	0.063	0.009
ROOMS	−0.022	0.135	−0.021	0.107	0.038	−0.062	−0.056	0.052	0.029	−0.048	0.040	0.035
AFTER	0.153	−0.034	−0.140	−0.087	−0.027	−0.093	−0.080	−0.113	0.042	0.125	−0.021	−0.134
LBLACK	−0.084	−0.141	−0.196	−0.063	−0.197	0.308	0.036	0.237	−0.148	−0.089	0.138	−0.338
LOWNOCC	0.050	0.130	0.097	0.017	0.273	−0.344	0.246	−0.165	0.030	0.091	0.091	0.230
LSQFT	0.141	0.177	−0.131	0.117	0.047	−0.038	−0.091	−0.042	0.109	−0.122	−0.017	0.182
LLOT	−0.054	0.118	−0.021	0.030	0.035	−0.265	−0.031	0.025	0.045	0.078	−0.002	0.047
FIRE	0.254	0.120	−0.100	0.117	0.114	−0.067	−0.119	−0.082	0.016	−0.089	−0.065	0.118
GAR	1.000	0.045	−0.274	0.046	0.084	0.152	−0.287	−0.068	0.114	−0.147	0.122	0.029
POOL	0.045	1.000	0.007	0.178	0.136	−0.067	−0.016	−0.040	−0.013	0.020	−0.005	0.064
C14	−0.274	0.007	1.000	−0.035	−0.064	−0.065	−0.082	−0.039	−0.056	−0.063	−0.082	−0.060
C1705	0.046	0.178	−0.035	1.000	−0.032	−0.033	−0.041	−0.020	−0.028	−0.032	−0.042	−0.030
C2911	0.084	0.136	−0.064	−0.032	1.000	−0.061	−0.076	−0.036	−0.052	−0.058	−0.076	−0.056
C3401	0.152	−0.067	−0.065	−0.033	−0.061	1.000	−0.078	−0.037	−0.054	−0.060	−0.079	−0.057
C41	−0.287	−0.016	−0.082	−0.041	−0.076	−0.078	1.000	−0.046	−0.067	−0.075	−0.098	−0.072
C44	−0.068	−0.040	−0.039	−0.020	−0.036	−0.037	−0.046	1.000	−0.032	−0.036	−0.047	−0.034
C5001	0.114	−0.013	−0.056	−0.028	−0.052	−0.054	−0.067	−0.032	1.000	−0.052	−0.067	−0.049
C5002	−0.147	0.020	−0.063	−0.032	−0.058	−0.060	−0.075	−0.036	−0.052	1.000	−0.076	−0.055
C507	0.122	−0.005	−0.082	−0.042	−0.076	−0.079	−0.098	−0.047	−0.067	−0.076	1.000	−0.072
C5302	0.029	0.064	−0.060	−0.030	−0.056	−0.057	−0.072	−0.034	−0.049	−0.055	−0.072	1.000
C5402	0.150	−0.044	−0.116	−0.059	−0.108	−0.111	−0.139	−0.066	−0.095	−0.107	−0.140	−0.102
C5403	0.199	0.037	−0.062	−0.031	−0.058	−0.059	−0.074	−0.035	−0.051	−0.057	−0.074	−0.054
LFEET	−0.022	0.091	0.058	0.102	0.178	−0.138	0.052	−0.029	0.125	−0.049	−0.014	−0.072
AFTERLFEET	0.152	−0.027	−0.137	−0.084	−0.016	−0.108	−0.077	−0.113	0.055	0.119	−0.020	−0.133
SOLD	0.159	−0.042	−0.149	−0.096	−0.089	−0.083	−0.127	−0.150	0.013	0.119	−0.099	−0.091
SOLDLFEET	0.158	−0.042	−0.150	−0.101	−0.092	−0.084	−0.128	−0.148	0.018	0.118	−0.096	−0.093
LUNITS	−0.142	−0.066	0.287	−0.250	0.060	0.273	−0.013	0.126	−0.329	−0.168	−0.568	0.052
PRIVATE	−0.156	0.008	0.214	0.108	−0.297	0.204	0.255	−0.181	0.175	0.197	0.234	0.042
PROFIT	−0.158	−0.035	0.348	−0.100	−0.183	0.332	0.237	−0.112	−0.161	−0.181	−0.237	0.157
NEW	−0.103	−0.070	0.183	−0.189	−0.347	0.175	0.037	0.104	−0.170	0.168	−0.426	0.161
SENIOR	0.096	−0.063	0.398	−0.087	−0.160	0.380	−0.205	−0.098	−0.141	−0.158	−0.207	0.004

any negative impact disappears after approximately one year subsequent to the establishment of a low-income or senior project.

The final equation in Exhibit 4 adds five characteristics of the projects. Residential property values are further decreased (soon after the project opened) the greater the number of units in the project, if the project houses senior citizens (as opposed to younger families), and if the project is private (not-for-profit). Having a new (as opposed to a converted) project, or a for-profit project increases property values. Since all senior projects are new, compared to only some of the family projects, we conclude that new family projects depress property values the least. New senior projects are roughly equivalent to converted family projects. The addition of the characteristics of the project

Exhibit 3 (continued)
Correlations

	C5402	C5403	LFEET	AFTERLFEET	SOLD	SOLDLFEET	LUNITS	PRIVATE	PROFIT	NEW	SENIOR
LRPRICE	0.072	0.235	0.074	−0.004	−0.073	−0.077	−0.151	−0.164	−0.170	−0.092	0.009
TIME	−0.049	0.156	−0.008	0.530	0.707	0.707	0.025	0.034	0.078	0.107	0.152
AGE	−0.087	−0.255	0.074	0.034	0.112	0.114	0.112	0.141	0.125	−0.015	−0.114
BATH	0.024	0.148	−0.057	0.065	0.093	0.089	−0.119	−0.066	−0.094	−0.042	0.029
BEDS	0.021	0.079	−0.005	−0.021	−0.047	−0.047	−0.036	−0.028	−0.043	−0.041	0.029
ROOMS	−0.031	0.012	0.030	−0.047	−0.069	−0.070	−0.041	−0.003	−0.028	−0.067	−0.022
AFTER	0.182	0.111	0.002	0.996	0.694	0.694	−0.091	−0.246	−0.282	−0.117	−0.092
LBLACK	−0.240	−0.401	−0.132	−0.102	−0.139	−0.138	0.228	0.241	0.273	0.182	0.121
LOWNOCC	−0.089	0.332	0.187	0.068	0.019	0.023	−0.259	0.043	−0.078	−0.167	−0.121
LSQFT	−0.003	0.245	0.073	−0.001	−0.022	−0.021	−0.112	−0.091	−0.088	−0.028	0.017
LLOT	0.067	−0.006	0.143	−0.025	−0.019	−0.011	−0.094	−0.106	−0.174	−0.068	−0.173
FIRE	0.111	0.199	0.039	−0.007	0.002	0.003	−0.096	−0.195	−0.130	0.032	0.060
GAR	0.150	0.199	−0.022	0.152	0.159	0.158	−0.142	−0.155	−0.158	−0.103	0.096
POOL	−0.044	0.037	0.091	−0.027	−0.042	−0.042	−0.066	0.008	−0.035	−0.070	−0.063
C14	−0.116	−0.062	0.058	−0.137	−0.149	−0.150	0.287	0.214	0.348	0.183	0.400
C1705	−0.059	−0.031	0.102	−0.084	−0.096	−0.101	−0.250	0.108	−0.100	−0.189	−0.087
C2911	−0.108	−0.058	0.178	−0.016	−0.089	−0.092	0.060	−0.297	−0.183	−0.347	−0.160
C3401	−0.111	−0.059	−0.138	−0.108	−0.083	−0.084	0.273	0.204	0.332	0.175	0.380
C41	−0.139	−0.074	0.052	−0.077	−0.127	−0.128	−0.013	0.255	0.237	0.037	−0.205
C44	−0.066	−0.035	−0.029	−0.113	−0.150	−0.147	0.126	−0.181	−0.112	0.104	−0.098
C5001	−0.095	−0.051	0.125	0.055	0.013	0.018	−0.329	0.175	−0.161	−0.170	−0.141
C5002	−0.107	−0.057	−0.049	0.119	0.119	0.118	−0.168	0.197	−0.181	0.168	−0.158
C507	−0.140	−0.074	−0.014	−0.020	−0.099	−0.096	−0.568	0.234	−0.237	−0.426	−0.207
C5302	−0.102	−0.054	−0.072	−0.133	−0.091	−0.092	0.052	0.042	0.157	0.160	0.004
C5402	1.000	−0.105	−0.111	0.175	0.375	0.378	0.061	−0.530	−0.321	−0.278	0.059
C5403	−0.105	1.000	0.114	0.119	0.036	0.037	−0.016	−0.126	−0.011	0.163	0.182
LFEET	−0.111	0.114	1.000	0.063	−0.050	−0.046	−0.070	0.056	−0.014	−0.142	−0.055
AFTERLFEET	0.175	0.119	0.063	1.000	0.687	0.690	−0.097	−0.241	−0.283	−0.126	−0.094
SOLD	0.375	0.036	−0.050	0.687	1.000	0.998	−0.012	−0.338	−0.299	−0.158	−0.162
SOLDLFEET	0.379	0.037	−0.046	0.690	0.998	1.000	−0.013	−0.337	−0.300	−0.158	−0.160
LUNITS	0.061	−0.016	−0.070	−0.098	−0.012	−0.013	1.000	−0.115	0.649	0.562	0.371
PRIVATE	−0.530	−0.126	0.056	−0.242	−0.338	−0.337	−0.115	1.000	0.615	0.118	0.048
PROFIT	−0.321	−0.011	−0.014	−0.283	−0.299	−0.300	0.649	0.615	1.000	0.527	0.375
NEW	−0.278	0.163	−0.143	−0.126	−0.158	−0.158	0.562	0.118	0.527	1.000	0.460
SENIOR	0.059	0.182	−0.055	−0.095	−0.162	−0.160	0.371	0.048	0.375	0.460	1.000

reverses the signs on *LBLACK* (now significantly positive) and *LOWNOCC* (now negative, but statistically insignificant). The coefficient on *LFEET* is now statistically significant,[4] implying that the market anticipates the opening of the facility. The final results imply that prior to the project's opening, residential property values fall by 1.6% with each halving of the distance to the future site of the project. After the project is opened, this elasticity of value to distance is 2.1%. The coefficient on *SOLDLFEET* indicates that it now takes 605 days (1.66 years) for the relation between distance and property values to return to its position before the project had opened.

Exhibit 4
Regression Results

	Equation 1	Equation 2	Equation 3	Equation 4	Equation 5	Equation 6
Log Intercept	7.244[a]	7.859[a]	7.556[a]	7.555[a]	7.527[a]	8.148[a]
	50.59	56.16	51.73	50.49	50.12	48.94
TIME	−0.004[a]	−0.004[a]	−0.003[a]	−0.005[a]	−0.007[a]	−0.013[a]
	−8.36	−7.64	−5.81	−7.80	−7.83	−8.89
AGE	−0.009[a]	−0.011[a]	−0.014[a]	−0.015[a]	−0.014[a]	−0.013[a]
	−6.01	−7.96	−9.51	−9.54	−9.29	−8.63
AGESQ	−0.000[a]	−0.000	−1.41E−05	3.79E−07	−2.57E−05	−4.86E−05
	−2.78	−1.58	−0.16	<0.01	−0.29	−0.55
AGECB	6.54E−06[a]	5.17E−06[a]	3.69E−06[a]	3.34E−06[b]	3.68E−06[b]	3.93E−06[a]
	4.89	3.91	2.72	2.46	2.72	2.92
LSQFT	0.321[a]	0.203[a]	0.225[a]	0.224[a]	0.233[a]	0.233[a]
	14.30	9.15	9.84	9.82	10.25	10.24
LLOT	0.165[a]	0.164[a]	0.181[a]	0.182[a]	0.187[a]	0.191[a]
	17.31	17.84	19.51	19.45	19.99	20.53
ROOMS	−0.001			<0.001	−0.002	−9.47E−05
	−1.63	2.07	0.21	0.02	−0.36	−0.01
BATH	0.046[a]	0.051[a]	0.042[a]	0.042[a]	0.036[a]	0.036[a]
	4.91	5.66	4.65	4.66	3.95	4.00
BEDS	0.016[b]	0.016[b]	0.032[a]	0.033[a]	0.034[a]	0.029[a]
	20.5	2.16	4.11	4.27	4.36	3.67
FIRE	0.880[a]	0.059[a]	0.054[a]	0.580[a]	0.063[a]	0.054[a]
	12.28	8.49	7.66	8.24	8.79	7.47
POOL	0.122[a]	0.097[a]	0.072[a]	0.073[a]	0.073[a]	0.074[a]
	10.84	8.93	6.67	6.72	6.83	6.87
LOWNOCC		0.074[a]	0.049[a]	0.039[a]	0.039[a]	−0.018
		6.039	3.18	2.51	2.44	−0.94
LBLACK		−0.051[a]	−0.052[a]	−0.046[a]	−0.032[a]	0.060[a]
		−13.88	−7.57	−6.66	−4.35	4.38
C14			0.071[a]	0.096[a]	0.133[a]	0.446[a]
			3.57	4.67	5.82	9.88
C1705			0.179[a]	0.197[a]	0.218[a]	0.403[a]
			6.99	7.59	8.04	12.28
C2911			0.136[a]	0.148[a]	0.173[a]	0.458[a]
			6.73	7.23	7.89	10.30
C3401			0.033[b]	0.043[a]	0.053[a]	0.159[c]
			2.31	3.00	3.73	7.62
C41			0.010	0.024	0.045[a]	0.139[a]
			0.63	1.49	2.61	6.91
C44			−0.104[a]	0.101[a]	−0.093[a]	−0.061[b]
			−4.95	−4.81	−4.45	−2.56
C5001			−0.014	−0.004	0.032	0.288[a]
			−0.72	−0.19	1.50	8.43

Exhibit 4
(continued)

	Equation 1	Equation 2	Equation 3	Equation 4	Equation 5	Equation 6
C5002			−0.009	−0.009	<−0.001	0.266[a]
			−0.52	−0.50	−0.02	6.55
C507			0.047[a]	0.053[a]	0.070[a]	0.176[a]
			3.60	4.08	5.13	8.48
C5302			−0.004	0.030	0.072[b]	0.311[a]
			−0.18	1.19	2.67	7.82
C5402			−0.003	−0.001[a]	0.005	0.165[a]
			−0.19	−0.05	0.36	5.87
C5403			−0.046	−0.028	0.020	0.299[c]
			−1.74	−1.03	0.71	6.64
LFEET				0.004	0.006	0.016[b]
				0.65	0.92	2.44
AFTERLFEET				0.005[a]	0.004[a]	0.005[b]
				5.39	4.06	4.53
SOLD					9.07E−05[a]	8.28E−05[a]
					6.21	5.65
SOLDFEET					−1.12E−05[a]	−8.11E−06[a]
					−5.69	−4.07
LUNITS						−0.116[a]
						−8.43
NEW						0.087[a]
						4.42
SENIOR						−0.078[a]
						−4.78
PRIVATE						−0.334[a]
						−7.57
PROFIT						0.434[a]
						7.82
Adj. R^2	0.433	0.478	0.497	0.499	0.503	0.544
Multiple *F*	439.39	446.35	250.53	234.15	221.28	249.32
Significance	0	0	0	0	0	0
Partial *F*		274.83	20.47	15.22	24.26	34.68
Significance		0	0	0	3.20E−11	1.07E−15

Note: The number of observations is 6,321. Dependent vriable is log of real price. *t*-stats appear beneath the coefficients.

[a]Significantly different from zero at the .01 level, two-tailed test.

[b]Significantly different from zero st the .05 level, two-tailed test.

[c]Significantly different from zero at the .10 level, two-tailed test.

Conclusion

This study had departed from previous investigations of service housing and residential property values. By using a large sample of residential properties surrounding thirteen low-income housing projects in the Las Vegas, Nevada metropolitan area, we have confirmed that such housing acts as a transitory nuisance, without regard to racial composition or the percentage of the neighborhood that is owner occupied. We find that larger projects depress property values more than smaller projects, that projects for seniors have a greater adverse impact than projects for younger tenants and that private projects do more harm than public projects. However, the effect is transitory, disappearing in approximately one year of opening. On the other hand, new projects are better than converted apartment buildings, and that for-profit homes more than offset the disadvantage of privately operated projects.

The implications of this study for those interested in investing or financing senior housing are clear. Those interested in the establishment of such projects may face opposition from neighborhood groups concerned about the effect of the projects on the values of their residences. In fact, the short-run negative effects found in this study support the view that such projects can have a deleterious effect on nearby residential values. However, we have shown that any such effect is transitory and should disappear within approximately one year. Investors in this type of property will be wise to point out the temporary effect. In addition, they should point out the possibly beneficial effects of such projects that may occur in, otherwise, blighted neighborhoods.

Notes

1. Low income and senior housing are referred to here as *projects* and the nearby residential houses as *properties*. Therefore, we have properties surrounding each of the projects.
2. We restricted the sample selection to the radius indicated. However, when we calculated the distance variable we found that a few properties of greater distance were included. We did not expel these properties from our sample. The mean distance is 2,035 feet with a standard deviation of 751 feet.
3. While the coefficient on *LFEET* is statistically insignificant, the best estimate of the impact of low-income or senior housing on property values is the anti-log of the sum of the coefficients on *LFEET* and *AFTERLFEET*.
4. It appears that omitting the characteristics of the projects render *LFEET* insignificant. Introducing the characteristics of the projects triples the coefficient on *LFEET* and renders this coefficient statistically significant.

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