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Monica H. Braun
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November 26, 2014

VIA HAND DELIVERY

Jeff Derouen
Executive Director
Kentucky Public Service Commission
211 Sower Boulevard
Frankfort, KY 40601

RE: *In the Matter of: Application of Jessamine-South Elkhorn Water District for a Certificate of Public Convenience and Necessity to Construct and Finance a Waterworks Improvement Project Pursuant to KRS 278.020 and 278.300* – Case No. 2014-00084

Dear Mr. Derouen:

In accordance with the Commission's October 15, 2014 Order, please find and accept for filing the original and ten copies of Forest Hills Residents' Association, Inc.'s Responses to the Requests for Information propounded by Jessamine-South Elkhorn Water District.

Please acknowledge receipt of these filings by placing the stamp of your Office with the date received on the enclosed additional copies and return them to me. Should you have any questions pleased contact me at your convenience.

Sincerely,

Stoll Keenon Ogden PLLC

Monica H. Braun

Monica H. Braun

cc: Bruce E. Smith (by U.S. mail)
Anthony G. Martin (by U.S. mail)
Jennifer Black Hans (by U.S. mail)

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF JESSAMINE-SOUTH ELKHORN WATER DISTRICT FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT AND FINANCE A WATERWORKS IMPROVEMENT PROJECT PURSUANT TO KRS 278.020 AND 278.300	)	**CASE NO. 2014-00084**

CERTIFICATION OF RESPONSES TO INFORMATION REQUESTS

COMMONWEALTH OF KENTUCKY)
) **SS:**
COUNTY OF FAYETTE)

This is to certify that with regard to Forest Hills Residents' Association, Inc.'s November 26, 2014 Responses to the Requests for Information propounded by the Jessamine-South Elkhorn Water District, I have personal knowledge of the matters set forth in the responses for which I am identified as the witness, and the answers contained therein are true and accurate to the best of my information, knowledge and belief formed after a reasonable inquiry.

Date: 11-21-14

G. Michael Ritchie

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 21st day of November, 2014.

(SEAL)
Notary Public

My Commission Expires:

10/20/15

Notary I.D. Number

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF JESSAMINE-SOUTH ELKHORN WATER DISTRICT FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT AND FINANCE A WATERWORKS IMPROVEMENT PROJECT PURSUANT TO KRS 278.020 AND 278.300	)	**CASE NO. 2014-00084**

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Date: 11/21/14

E. Clark Toleman

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 21st day of November, 2014.

Notary Public (SEAL)

My Commission Expires:
2/28/2017

Notary I.D. Number 482924

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

APPLICATION OF JESSAMINE-SOUTH ELKHORN WATER DISTRICT FOR A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY TO CONSTRUCT AND FINANCE A WATERWORKS IMPROVEMENT PROJECT PURSUANT TO KRS 278.020 AND 278.300	)	**CASE NO. 2014-00084**

CERTIFICATION OF RESPONSES TO INFORMATION REQUESTS

COMMONWEALTH OF KENTUCKY)
) **SS:**
COUNTY OF FAYETTE)

This is to certify that with regard to Forest Hills Residents' Association, Inc.'s November 26, 2014 Responses to the Requests for Information propounded by the Jessamine-South Elkhorn Water District, I have personal knowledge of the matters set forth in the responses for which I am identified as the witness, and the answers contained therein are true and accurate to the best of my information, knowledge and belief formed after a reasonable inquiry.

Date: 11/21/14

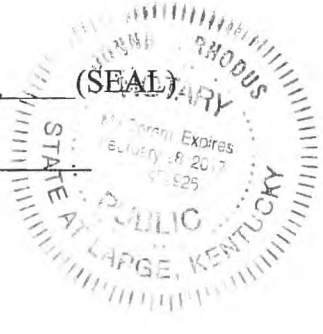
T. Logan Davis

Subscribed and sworn to before me, a Notary Public in and before said County and State, this 21st day of November, 2014.

Notary Public (SEAL)

482925
Notary I.D. Number

My Commission Expires:
2/28/2017



JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: T. Logan Davis/Counsel

1. Please provide the names, business addresses, and areas of expertise for all technical consultants who are or have been retained by, volunteers for, or otherwise engaged in assisting Forest Hills in its challenge to this CPCN application. If any claim of privilege or confidentiality is made, for this or any other response, please provide a full explanation of why such claim applies for each such claim.

RESPONSE:

The following are technical consultants who have been retained by, volunteers for, or are otherwise engaged in assisting Forest Hills Residents' Association, Inc. in Case No. 2014-00084:

E. Clark Toleman – 333 W. Vine St., Suite 300, Lexington, KY 40507. Mr. Toleman's areas of expertise were set forth in Case No. 2012-00470, his direct testimony in this proceeding and curriculum vitae attached thereto.

G. Michael Ritchie, PE, PLS, CP, PSM, FACEC - Executive Vice President, Photo Science, Inc.- 523 Wellington Way, Lexington, Kentucky 40503. Mr. Ritchie's areas of expertise were set forth in Case No. 2012-00470, his direct testimony in this proceeding and curriculum vitae attached thereto.

Jesse F. Glasgow, PLS, GISP, PMP - Director of Analytics & Software, Photo Science, Inc. 1410 Indian Trail Road, Norcross, GA 30093-2611.

Paul B. Bishop, Aerial LiDAR Processing Manager, Photo Science, Inc., 523 Wellington Way Lexington, KY 40503-1394

W. Mark Kimbrough, Geospatial Analyst, Photo Science, Inc.1410 Indian Trail Road, Norcross, GA 30093-2611

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: G. Michael Ritchie/E. Clark Toleman/Counsel

2. For each consultant assisting Forest Hills in its challenge to this CPCN application, please state whether such consultant has any business relationship, including employee, independent contractor, member or any other relationship, with the following:

a. Kentucky American Water Company, American Water Works Company, or any affiliated or associated organization;
b. Kentucky Infrastructure Authority;
c. Kentucky River Authority;
d. Kentucky Department of Water
e. Kentucky Rural Water Finance Corporation
f. Any other organization, professional services provider or consultant engaged in the provision of water or storage of water.

If so, please provide the dates of such relationship, the nature of the services performed, and the compensation for such services.

RESPONSE

Forest Hills Residents' Association, Inc. objects to this request because it is vague, overbroad and irrelevant to the subject matter of this proceeding and not reasonably calculated to lead to the discovery of admissible evidence. Notwithstanding the foregoing, with respect to subsections a through e, Mr. Toleman has provided property valuations for Kentucky-American Water Company, but believes the most recent work was performed over five years ago. Mr. Ritchie has performed subcontracting LiDAR work for URS that was performed on behalf of the Division of Water within the last year. In 2005 Mr. Ritchie also performed work with the Bluegrass Water Supply Commission in developing the *Water Main Routing Study and Pumping Station Siting Study* that identified a route for a water transmission main and pump station site between the Frankfort Water and Electric Plant Board's system to Kentucky American Water Company's transmission system. The compensation Mr. Toleman and Mr. Ritchie received from entities that are not parties to this proceeding is irrelevant to the subject matter of this proceeding and not reasonably calculated to lead to the discovery of admissible evidence. As to subsection f, Forest Hills does not have information necessary to answer the question because of its vague phrasing.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: T. Logan Davis

3. Please provide all compensation paid or obligated to date by Forest Hills or its members for all professional assistance provided to Forest Hills in its efforts to oppose this CPCN Application, and the services rendered for said compensation. Please list each individual or entity providing such professional service separately in responding to this question.

RESPONSE:

Forest Hills Residents' Association, Inc. objects to this request because it is irrelevant to the subject matter of this proceeding and not reasonably calculated to lead to the discovery of admissible evidence. Notwithstanding the foregoing, the compensation paid or obligated to date in Case No. 2014-00084 are: E. Clark Toleman, $3,000 to assess the impact of a 750,000 gallon elevated water storage tank would have on the property values of the homes in Forest Hills Estates.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: T. Logan Davis

4. If any person or entity other than the Forest Hills Neighborhood Association is compensating any person or entity to provide advice and assistance of any kind to Forest Hills in this application, please provide full details of each such arrangement, including the name and address of the individual or entity being compensated, the services being provided, and the amount of compensation that has been provided. Compensation shall include any salary and benefits paid to such persons.

RESPONSE:

None, other than the members of Forest Hills' Residents' Association, Inc.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: T. Logan Davis

5. Please provide full details of all services being provided by any person or entity associated in any manner with Kentucky American Water Company or American Water Works or any person or entity associated with either company, to assist FH in its challenge to this application, whether or not such persons or entities are being compensated for such assistance. Details should be given for each such person or entity separately.

RESPONSE:

None.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: T. Logan Davis

6. Please provide all costs incurred by Forest Hills in its challenge to this CPCN Application that have been, or will be, reimbursed to Forest Hills by some person or entity other than the Forest Hills Neighborhood Association or its members.

RESPONSE:

None.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: Counsel/T. Logan Davis

7. Provide a copy of all documents or communications in the possession of Forest Hills or its counsel with respect to communications between Kentucky American Water Company or American Water Company or any of their associates or affiliates and the City of Nicholasville or any relevant agency thereof concerning any issue involved in this CPCN application, including the status of a possible water supply connection between the District and the City of Nicholasville or the feasibility of the City of Nicholasville providing water storage for the District.

RESPONSE:

None, other than those produced by JSEWD or otherwise publicly available online.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: **G. Michael Ritchie**

8. Please provide a copy of any and all analyses, studies, reports or other documents that analyze or review the selection of the proposed site for the water tank and any and all alternative sites considered not previously produced in Case No. 2012-00470.

RESPONSE:

See the response to Request No. 23.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: E. Clark Toleman

9. Please provide all economic studies, work papers or calculations that were prepared or used by Mr. Toleman in support of his conclusion with respect to alleged decreased property values in the Forest Hills subdivision.

RESPONSE:

See attached for the economic studies, work papers and calculations prepared or used in Case No. 2014-00084.

Mauricio Rodriguez, PhD, and C, F. Sirmans, SRPA, PhD

Quantifying the Value of a View in Single-Family Housing Markets

How much is a "good view" worth in 'a single-family housing market? While the market value of a view amenity may be difficult to estimate, this article demonstrates the use of multiple regression analysis to estimate the value of a view in a residential housing market. Although the empirical results may be location specific, the basic technique illustrated here could be used in other markets.

Determining why housing prices differ, and how much this difference can be attributed to particular distinguishing features, is a difficult task. The market value of "a good view" may be difficult to estimate. Paired-sales analysis may be used to estimate the value of a view when appropriate comparables are available; however, appropriate comparables are often unobtainable, making it difficult to simultaneously examine several features that are believed to affect real estate prices.

Adjustments for items that are difficult to measure (e.g., a view amenity), however, may significantly contribute to the value of a property, and therefore should be examined by appraisers. The Appraisal Institute recommends that appraisers consider the view of a parcel of real estate when estimating property value.[1] The standard appraisal form requires, when appropriate, an adjustment for view.[2] There is little guidance, however, on how to arrive at an adjustment amount, especially when paired sales are not available.

Multiple regression analysis (MRA) can be a useful tool in estimating the appropriate adjustment for a view amenity. In this article, MRA is applied to estimate the

1. Appraisal Institute, *The Appraisal of Real Estate,* 10th ed. (Chicago: Appraisal Institute, 1992), 301.
2. Ibid., 567.

Mouriclo Rodriguez, PhD, is an assistant professor of finance in the M. J. Neely School of Business at Texas Christian University. His research interests include corporate real estate, geographic information system applications to real estate, real estate market analysis, and computer financial models.

C. F. Sirmans, SRPA, PhD, is professor of finance and real estate and Director of the Center for Real Estate and Urban Economic Studies at the University of Connecticut. The author of many real estate textbooks, Mr. Sirmans has published extensively in several real estate, finance, and economics journals.

market value of a view amenity in a residential real estate market.[3]

An informal survey of real estate professionals active in the subject area revealed that homes with attractive views are preferred to homes without such views. However, some sales agents said that the marketplace does not provide a premium for sellers of homes with good views, while others suggested that homes with good views often sell for 5% to 15% more than comparable homes that do not provide these views.[4]

DATA

The data for this study come from Fairfax County, Virginia. A typical regression model for residential real estate is employed. Models such as these traditionally include variables to control for physical and location characteristics, market conditions, and unusual conditions of sale, such as nonmarket financing. We control for location characteristics by selecting sales from the same geographic subarea of Fairfax County.

None of the transactions in our sample contains any unusual conditions of sale. Transactions involving duress (e.g., foreclosure or eminent domain cases); transfers between related parties; transfers of convenience (e.g., to correct title, to create joint tenancy, to avoid a lien); transfers to nonprofit institutions; transfer of doubtful titles (e.g., questionable special warranty deed or quit claim deed); transfer of partial interest; and transfers involving nonmarket financing are not included in the sample.

For further control purposes the data had to meet the following criteria: 1) the zoning is residential and the land use is residential, single-family, and detached; 2) the sale date must be between the start of 1985 and the end of 1991; 3) the property is not exempt from local property taxes; and 4) the property must be purchased by an owner-occupant.

There are many variables that could be included in a real estate pricing model. Any variable that is believed to significantly affect the value of real estate could be considered. To be included in a model, the characteristics should vary among at least a few of the properties being analyzed. If there is no variation in a particular characteristic, there will be no need to make adjustments for that characteristic.

Any empirical model can be subject to criticisms regarding the exclusion of particular variables or the functional form employed.[5] The best an appraiser can do is to use a model believed to most reflect the "true" model. Appraisers must of course be able to gather data to control for the characteristics of interest. In this study, we control for all of the varying characteristics that affect the value of the properties under study, and for which we were able to obtain data.

All homes in this sample have air conditioning and none are in a recorded floodplain. Therefore these characteristics are not a part of our model. The total sample contains 194 observations.

MODEL

The model to be estimated is:

$$LNSP_i = f(BED_i, BATHS_i, OTHRMS_i, LANDAREA_i, VIEW_i, YEAR_t, SQOUT_i, WF_i, AGE_i)$$

where the dependent variable $LNSP_{it}$ is the natural log of the sale price of the ith house in year t, and the independent variables are defined as follows:[6]

BED_i = Number of bedrooms[7]
$BATHS_i$ = Number of bathrooms
$OTHRMS_i$ = Number of other rooms

3. For a review of the basic issues related to MRA see Lloyd T. Murphy III, "Determining the Appropriate Equation in Multiple Regression Analysis," *The Appraisal Journal* (October 1989): 498-517. See also Appendix B in *The Appraisal of Real Estate*. For a more in-depth discussion see George G. Judge et al., *Introduction to the Theory and Practice of Econometrics*, 2d ed. (New York: John Wiley & Sons, 1988); and William H. Green, *Econometric Analysis*, 2d ed. (New York: Macmillan Publishing Company, 1993).

4. Obviously, all parcels of land provide a view of one form or another even if it is a neighbor's brick wall. In this study we are *defining* view as a "good view"; that is, something that a typical buyer is likely to find appealing.

5. Excluding variables may lead to biased estimation.

6. The results are qualitatively the same when sale price is the dependent variable.

7. We would prefer to include the square footage of living space as an explanatory variable, but only room count data were available. The model was checked for multicollinearity and little correlation was found between the variables in the model.

$LANDAREA_i$ = Lot size in thousands of square feet
$VIEW_i$ = 1 if the house has a good view and zero otherwise[8]
$YEAR_{t,}$ = 1 if the house sold in year t and zero otherwise
$SQOUT_i$ = Amount of constructed space other than the house in thousands of square feet. (This includes garages, carports, and work sheds.)
WF_i = 1 if the house has wood floors and zero otherwise
AGE_i = Age of the house in years

It is expected that buyers will pay more for more space. Therefore the number of bedrooms, bathrooms, other rooms, square feet of constructed space outside of the house, and land area are expected to be positively related to sale price. Similarly, buyers are expected to pay more for more costly amenities such as wood floors.[9] Wood floors are therefore expected to be positively related to sale price.

Further, buyers are expected to pay more for homes with nicer views than similar homes without views. If appropriate data were available, one could estimate how different views are related to house prices (e.g., views of lakes or golf courses could be examined). This study is limited to an examination of homes with a good view in general versus those without such a view. View is expected to be positively related to sale price.

Age should be negatively related to sale price because, all else being equal, older houses have experienced greater depreciation. The time variables that control for market conditions are expected to be positively related to sale price. In light of the appreciation experienced in the subject market, the time variable coefficients are expected to be positive and large in magnitude for most of the time periods studied.

Table 1 contains descriptive statistics for the variables used in the model. The average home sold for about $281,000. Twenty-seven, or about 14%, of the homes in the sample have a good view. The average age of the homes in the sample is about 14 years. Approximately 17% have wood floors. The sample is evenly distributed through time with each year containing about 15% of the sales.

RESULTS

Initially, ordinary least squares is used to estimate the model. Overall, the model is significant at the 1% level of significance (f-value = 38). The adjusted R^2 indicates that about 73% of the variance in the de-

TABLE 1 Descriptive Statistics for Sample of 194 Single-Family Detached Homes in Fairfax County, Virginia

Variable	Mean	Standard Deviation	Minimum	Maximum
SP	281,010	66,829	157,500	455,737
BED	3.845	.591	3	5
BATHS	3.263	.626	2	5
OTHRMS	4.665	.908	3	7
LANDAREA	17.426	11.341	4.743	88.818
VIEW	.139		0	1
WAR86	.170		0	1
YEAR87	.144		0	1
YEAR88	.155		0	1
YEAR89	.149		0	1
YEAR90	.129		0	1
YEAR91	.160		0	1
SQOUT*	2.322	.461	1.268	3.934
wF	.165		0	1
AGE	13.881	6.272	2	28

9n thousands of square feet.

8. The classification of which houses possess a good view was provided by the Office of Assessments of Fairfax County, Virginia.

9. In this study, the homes that did not have wood floors possessed floors made from less costly materials such as linoleum.

pendent variable is explained by the independent variables.

The results were checked for serial correlation and heteroskedasticity. [10] No problems associated with serial correlation were found, but there is evidence of heteroskedasticity. The form of heteroskedasticity is unknown; therefore, we used White's heteroskedasticity-consistent covariance matrix estimation procedure to correct for the unknown form."

Table 2 displays the results after adjusting for heteroskedasticity. All independent variables have the expected sign and all are strongly significant. The time-trend variables that control for market conditions show that house prices increased through the second half of the 1980s, followed by a decline in 1991.

Of particular interest for this study, a good view *(VIEW)* is positively related to the sale price and is significant at the 5% level. An appraiser making an adjustment in the studied geographic area would add about 8% to reflect the market value of a good view. [12]

TABLE 2 Regression Results'

Variable	Estimated Coefficient	T-Ratio
CONSTANT	11.4520	120.30
BED	.0682	3.19
BATHS	.0666	4.08
OTHRMS	.0207	1.93
LANDAREA	.0019	3.18
VIEW	.0761	2.00
WAR86	.1921	3.47
YE4R87	.2486	4.77
YEAR88	.4031	7.26
YE4R89	.4561	8.15
YEAR90	.4801	8.16
YEAR91	.4262	7.59
SQOUT	.1400	5.32
WF	.0900	3.10
AGE	-.0161	-10.09
Adjusted R^2 = .729		
N = 194		
F-Value = 38.019		

'All estimated coefficients have the expected sign and all are strongly significant. Of particular interest for this study, a good view *(VIEW)* is positively related to the dependent variable *(LNSP)*, and is significant at the 5% level.

CONCLUSION

The hypothesis that a view amenity has no effect on the market price of residential real estate is rejected for this particular dataset. [13] This article illustrates how MRA can be used to arrive at an estimate of the market value of a good view. This may be useful for appraisers to apply when the needed data are available, and especially when appropriate comparables for paired-sales analysis are not available. For the housing market examined, a good view adds about 8% to the value of a single-family house.

Appraisers should remember that there may be excluded variables for any model to be estimated and that countless potential functional forms exist. Therefore, MRA is meant to be a useful tool for analysis rather than a replacement for good judgment in appraising.

REFERENCES

Donnelly, William A "The Methodology of Housing Value Assessments: An Analysis." *The Journal of Real Estate Research* (Summer 1989):1-2.

Mark, Jonathan and Michael A Goldberg. "Multiple Regression Analysis and Mass Assessments: A Review of the Issues." *The Appraisal Journal* (January 1988): 89-109.

Meacham, Allen. "Applying Regression Analysis to Real Estate Appraisals." *The Real Estate Appraiser and Analyst* (Summer 1988): 23-27.

Plattner, Robert H, and Thomas J. Campbell. "A Study of the Effect of Water View on Site Value." *The Appraisal Journal* (January 1978): 20-25.

10. In the basic regression model, heteroskedasticity is present when the errors do not possess a homogeneous variance. When heteroskedasticity is present, the conventional least squares estimator leads to estimators that are not minimum variance estimators. Thus the standard errors of the coefficients are too small, leading to a potentially incorrect interpretation regarding the significance of the coefficients.

11. Halbert White, "A Heteroskedasticity-Consistent Covariance Matrix Estimator and Direct Test for Heteroskedasticity," *Econometrics* (May 1980): 817 886.

12. The estimated coefficient is .07614, yielding an adjustment of .07833. Interpretation of dummy variable coefficient when the dependent variable is in log form is described by Peter Kennedy, "Estimation with Correctly Interpreted Dummy Variables in Semilogrithmic Equations," *American Economic Review* (1981): 801.

13. In "Residential Property Tax Capitalization: Discount Rate Evidence from California," *National Tax Journal* (June 1994): 337-344, A. Quang Do and C. F. Sirmans found that a view amenity adds about 4% to the market value of housing for a San Diego County community. Although the magnitude is not the same as that found in this study, the significantly positive relationship between a view amenity and house price is preserved.

The Value of View

By Leonard M. Cowley

View is a highly prized asset of a home. But by its very nature it is an intangible asset which evades all attempts to weigh it precisely on the appraiser's scale. Nonetheless, its influence cannot be disregarded, especially by home builders of the future.

What Is the Value of *View?*

In each issue newspaper and magazine advertisements scream with colorful adjectives in costly space, heavy lineage—in most expensive description—that properties being offered provide something over and above brick and mortar, more than just rooms and space and livability; something beyond protection and security. That something is *VIEW.*

Mountain View, Crest View, Lake View, River View, Cedar View, Pine View, Maple View, Oak View, North View, East View, West View, South View—and just "Plain View." These are but a few, a very few, of the numerous terms, each and every one using as a part of the name the magic word *view,* which are to be found among the thousands upon thousands of subdivision names throughout the land.

View! View! View! There are connotations that reflect the meaning of *view* such as "Hilltop Estates," "Lakeside," "Ocean Side." Each of these thousands of names convey the idea that the site described pro vides something different, something personal, something individual to that special place—something that cannot be duplicated elsewhere, nor equaled anywhere. If these names mean anything, if the descriptions carried in the display and classified advertisements, if the illustrations expensively provided carry any weight—then *view* must have a *value.*

Perhaps, like love or life itself, it cannot be explained or evaluated. Yet thousands of Realtors continue to offer *view* as a marketable commodity—something with that extra special attraction which makes the advertised property better, more desirable, more unusual—and more expensive—than its neighbors.

Can *view* be valued? Can it be set apart from the other components of a property as so many segregate a property's site and structure? Is *view* an entity, having some special flavor, some added warmth, some unusual appeal that makes the property which enjoys its favor more valuable than nearby or adjoining properties of a similar nature which do not offer the same exact attraction?

View Doesn't Just Happen

It is neither a Gift from the Magi, nor a legacy from a wealthy uncle. *View* has to be selected from the mass of beauties which surround us, must be delineated, segregated,

and captured. It must be wooed, won, and extracted from the rest of the world. It must be set up as a picture, framed in a window, and everlastingly enjoyed.

The house one lives in may be a picture to a passer-by but the view it affords its tenant, the picture it presents from within its walls; these are the things which make life worth living and a home worth having. *View* transforms a house into a home. *View* is the outdoors looking in.

The Natural View

Every home must have *view*. Every home should have many *views*. Variety of scenery lifts the inmate from placidity and monotony, gives a new impetus to life, offers revitalization with every scene. A different point of view is necessary for full enjoyment so each and every picture caught and framed by the windows of the home should offer a different prospect. Variety is also created by a new field of vision with every step one takes within the room. At least one of the many views from the home should be a distant view, the far-away look. Close-up views, near views must be small to remain in perspective but the distant view, the horizon picture, the skyline vision of one's scenic wonders must be large in order to be in proper scale, to remain in proper focus. Symbolically, it is strange that even in *view*, the little things are those close at hand; the "green pastures" are the larger items, the bigger outlook.

The near views or close-ups must be carefully chosen since detail is a major item with these pictures. They can be so easily disarranged. They must be selected from the attractions provided by nature. Or, if these attractions are insufficient in number or are inadequate in quality, they may be supplanted by the creation of views. Gardens, flower beds, all artificial arrangements of natural wonders, of living plants, trees, flowers and shrubs, provide views. It is the creation, care, and orientation of these smaller pictures with relationship to the house from which they will be enjoyed that provides the attractiveness of *view*.

The distant view, the larger picture, can be more generally portrayed. One need not frame this picture too closely. The window from which the far-away look is visible offers a panoramic scene. However, some limitations must be provided. White space around an advertisement makes the written words stand out—but too much white space affords the reader an opportunity to become lost in space. Sky, water, and width of vision offer many attractive settings for a view—but too much of any one of these detract from the chosen view.

Therefore it is necessary to limit even the distant view, to cut off some sky, to refuse entree to much wonderful scenery that may lie at either side of the selected picture. Something must be done to frame the picture properly, to provide against the hazards of detraction. Limitations may be placed on the amount of sky which is required for background by the use of awnings. Draperies, shades, trellises, and other artificial methods of putting blinders on the side lines are always available. If the lower section of a picture is unattractive, lacks interest, is shabby—or just fails to reach a conclusion as to where to quit; then lower limits may be placed on the shape and size of the picture by the proper planting and trimming of shrubs and hedges.

Trees along a country road, across a stretch of unbroken prairie, or at the foot of a hill offer limiting factors important to maintaining the picture of the distant scene in proper relationship to the home.

The Artificial View

Nature is unable to supply a limitless amount of *view*. There comes a time when

the existing house—not the home created from grass roots with *view* in a prepared place and with windows, doors, shades, plantings, and all other accessories built up to frame it—cannot have the select view, the numerous pictures one may desire for it provided by nature. Here the creator comes out in each and every one of us. Here we must use ingenuity, must use imagination, must do for ourselves what nature cannot do owing to the handicaps she faces in such an endeavor.

When one cannot capture a view he must create it. Artificial view is becoming more and more a necessity in those areas where duplicate houses, similar in shape, size, color, and construction limit the possibilities of natural pictures. They cannot all have selected natural view. Here prefabricated view comes to life.

A garden, properly planted to meet the requirements of size and season, hedged by thoughtfully arranged shrubs or other plants, located in such a manner as to present itself attractively to the house it complements—such a garden is a prefabricated view, a man-made, an artificial view—but many things pictured by man are works of art equal or superior in many respects to some scenery painted by nature. A lawn, wide-spread, fringed by small walkways, offers in many places the ideal framing for the artificial view. Shrubs again may play an important part, fringing the background of greenery provided by the sweep of grass.

Often a view of distant hills, water, or some other picture is marred by the immediate foreground—the lot across the street. Unkept, disheveled, a "sorry sight," the vacant lot across the street may ruin the picture, spoil the most desirable view. It may be inadvisable to purchase the lot in order to clean it up and restore the view the lot itself has spoiled. But it should not be too great a problem, if the results are worth the effort, to obtain permission from the owner to clean, maintain, and even plant it to grass, if by so doing it is possible to regain the view loved and at the same time increase the value of the neighbor's property.

A garden is generally considered a rear view asset, holding forth in the backyard rather than in front. Sometimes a garden creeps up alongside a house but it is usually strictly a backyard beauty spot. The lawn of the average house is average. To cut it up, to mar its beauty by creating unsightly, and hard-to-maintain stepping stones, is usually most undesirable. But there are other ways of creating a prefabricated view.

Artificial view may be stretched almost to the breaking point as is the case illustrated by imported statuary, a filigree of iron chairs and tables for the lawn, the use of wheelbarrow flowerbeds which permit changing their arrangement and varying the view—all tend to provide assistance in the art of creative view.

View and the Existing House

The existing house poses a problem for the view seeker. There may be many views which lie uncaptured because the construction was carried out with no thought given to the need to capture *view*. Where such choice views do exist, it may become necessary to alter the construction in such a way as to provide windows which will open upon the views desired. Often this is neither too great nor too expensive a task. In many instances a view lies just outside the range of existing windows which, if enlarged, would reach out and include it. So the enlargement of windows, especially the widening of windows, to catch the sweep of a more expansive scene, may provide the answer to the view seeker. Widening of windows is perhaps the least expensive method of providing a wider vision since constructing new windows or even heightening or lowering those in exist-

ence are more expensive methods of construction than is widening. With the widened, or newly constructed window, plantings may be required to help keep the newly captured view in proper focus.

View has many assets besides those of providing satisfaction and pleasure for the home owner. *View* in itself often brings the prospective home owner to the decision that he must acquire one certain property. *View* is one of the greatest assets a home can have —and often is the only asset one house may possess which is not common to all other houses in the vicinity.

View lends individuality to a property. From one special place, and from that point alone, there are certain attractions—either natural or artificial, which fall properly into focus and into the line of vision with most attractive effect. That is the "point of view."

View keeps the ordinary house out of the potential class of a rental property, helps it retain its self-respect and stability as a residence—a home. With a view which cannot be duplicated, regardless of whether or not it can be equaled, a home has something no other can boast—something that is part and parcel of its existence, which is in reality its very life.

Architecture lures the prospective home buyer into a house but it is what he sees through the windows of that house that makes him wish to remain. The arrangement of rooms, the selection of colors, the entire man-made phases of home construction can be duplicated, can be reproduced. But, given a view, although the arrangement of the house may be faulty, the color selection unusual, many items of importance may be in poor taste—these can be improved with some expense. The view, however, cannot be corrected, it must be captured and framed. It is the arrangement of rooms that must be subject to correction in favor of the view.

View and the Future Builder

The creative builder of the future, once the newly enumerated populace has a roof over its head will be forced to meet the competition of builders by devoting more attention to finding and capturing *view* than he has in the recent past. Less speed in construc tion and more time for the selection of the site and in the orientation of the house will be essential to the marketing of speculatively built homes.

Value of a home lies in its individuality. Rooms are easily arranged to fit the patterns desired by the owner. Sizes, shapes, and relative position are a matter of planning with the builder for the best and most efficient construction at the most reasonable cost. But the *view*—the personality of the home—must be more than brick, mortar, windows, and wood.

Value, whether it is financial or aesthetic, lies in the individuality expressed by what one sees from a house rather than what one sees looking at a house. *View* is an intangible asset—a factor of value which can only be weighed in the human mind. Its value lies in its ability to create desire for possession or pride of ownership, and its ability to keep that attitude alive. Unlike paint, paper, or the other perishable portions of a building, *View* is an integrate part of the house which needs no refinishing, no refurbishing, no renovating, or remodeling. *View* is ever changing with the seasons, everlasting in the eyes of its possessors, selected for beauty it provides or created for the affection it engenders. *View* is a labor of love, a constant asset of a home.

James R. Rinehart, PhD, and Jeffrey J. Pompe, PhD

Estimating the Effect of a View on Undeveloped Property Values

Although a good view is likely to increase property value, quantifying the increase in value may be difficult. Using standard data and multiple regression methods, the authors estimate the value of different types of views for undeveloped property on Seabrook Island, a barrier island off the South Carolina coast. The results show that views of a creek, a golf course, or the ocean will have significant, but varying, effects on undeveloped property values.

In using the sales comparison approach, an appraiser would adjust property value downward if a negative attribute, such as airport noise, is present and upward if a positive characteristic, such as a water view, is present. Unfortunately, it is often difficult to find pairs of properties that are closely matched on more than just one particular characteristic. When comparable sales data are not available or appropriate, multiple regression methods can provide estimates of the effect that property characteristics can have on value.

Real estate appraisers recognize that view affects property value. According to *The Appraisal of Real Estate*, "The physical characteristics of a parcel of land that an appraiser must consider are size and shape, frontage, topography, location, and view."[1] However, real estate appraisers generally find it difficult to estimate the value of a view. First, all views do not impart the same monetary value to a property. In coastal areas, property owners may have many alternative view possibilities, especially of water, such as marshes, creeks, and ocean. Second, a good view, which is less tangible than other factors (e.g., a garage), is usually difficult to measure with conventional techniques.

Researchers have estimated monetary values for some types of views. Multiple regression techniques have been used to determine that location on a lake in the Kissimmee River Basin in Florida contributes

1. Appraisal Institute, *The Appraisal of Real Estate*, 11th ed. (Chicago, Illinois: Appraisal Institute, 1996), 323.

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The hedonic pricing model is based on the understanding that the value of a vacant lot is composed of a bundle of individual characteristics, each of which has an implicit value reflected in the price of the lot.

"about 65% to the total value of a typical vacant residential lot," and that location on a canal, which provides water access but little aesthetic value, increases lot value by 31%.[2] In comparing identical units in the same neighborhood—some with a water view, some without—another study finds that a view of a pond adds 4%–12% to the price of a condominium in an eastern Massachusetts market.[3] A third study finds that a good view increases the value of a house by 3.5%–7%.[4] Yet another study concludes that a good view adds 8% to the value of single-family housing in a Virginia market.[5] None of the studies, however, compares types of views or explains what determines a good view.

This article estimates the value to property owners of alternative views on a coastal barrier island using standard data readily available to real estate professionals. Vacant lots rather than developed property are used and specific types of views are considered. The advantage of using vacant lots is that amenity evaluation is not affected by housing characteristics.

This study is based on Seabrook Island, a barrier island located 23 miles south of Charleston, South Carolina, and consisting of approximately 2,200 acres of land and 2,350 privately owned properties. To the north, the island is bordered by the Kiawah River; to the east, by more than two miles of the Atlantic Ocean; to the South, by the North Edisto River; and to the west, by Bohicket Creek. Development of Seabrook began in 1970. The Island is a gated community, with access limited to property owners, their guests, and renters. Traditional commercial establishments—such as grocery stores, banks, service stations, and department stores, as well as churches and schools—are just outside the entrance gates. Most lots on Seabrook are attractively spaced along winding streets, and houses are constructed with little disruption to natural vegetation. The island is heavily wooded with live oaks, pines, palms, and magnolias, and inhabited by an abundant assortment of wildlife. Many lots are located on the numerous freshwater lakes, marshes, lagoons, and creeks. Some lots are located directly on the oceanfront.

MODEL AND DATA SET

The empirical analysis is based on data collected on Seabrook's vacant lots. Multiple regression analysis is used to estimate a hedonic model. The hedonic pricing model is based on the understanding that the value of a vacant lot is composed of a bundle of individual characteristics, each of which has an implicit value reflected in the price of the lot. Therefore, if two lots are identical, except that one has a better view, one would expect that the lot with a better view would have a higher price. The price differential between the two lots represents the value of the better view. The hedonic model has produced consistent results, as evidenced by the extensive use of this approach in the real estate pricing literature.[6]

Two hundred and ninety-seven lots sold between January 1989 and July 1994 comprise the sample. The following hedonic price model is estimated:[7]

$$SP_{it} = f(SQFT_i, TIME_i, DBHT_i, WBHT_i, GOLF_i, CRK_i, OCNV_i, LAK_i, YEAR_{it})$$

where,

SP_{it} = Natural logarithm of deflated sale price for the ith lot sold in year t

$SQFT_i$ = Natural logarithm of lot size (measured in square feet).

$TIME_i$ = Natural logarithm of the length of time on the market (from listing to sale date, measured in months).

$DBHT_i$ = Natural logarithm of the product

2. J. R. Conner, K. C. Gibbs, and J. E. Reynolds, "The Effects of Water Frontage on Recreational Property Values," *Journal of Leisure Research* (Spring 1973): 26–38.

3. Robert H. Plattner and Thomas J. Campbell, "A Study of the Effect of Water View on Site Value," *The Appraisal Journal* (January 1978): 20–25.

4. Peter W. Abelson, "Property Prices and the Value of Amenities," *Journal of Environmental Economics and Management* v. 6 (1979): 11–28.

5. Mauricio Rodriquez and C. F. Sirmans, "Quantifying the Value of a View in Single Family Housing Markets," *The Appraisal Journal* (October 1994): 600–603.

6. For an excellent overview of the strengths and limitations of hedonic models, see A. Myrick Freeman, *The Measurement of Environmental and Resource Values: Theory and Methods* (Washington, D.C.: Resources for the Future, 1993).

7. A Box-Cox transformation process was used to examine three standard functional forms: linear, semilogarithmic, and log log. Based on this method, the log log model was chosen. For a discussion of functional form and the Box Cox method, see William N. Weirick and Franklin J. Ingram, "Functional Form Choice in Applied Real Estate Analysis," *The Appraisal Journal* (January 1990): 57–73.

of distance to nearest beach and the width of high tide beach (both measured in feet).

$WBHT_i$ = Natural logarithm of the width of beach (in feet) at high tide.

$GOLF_i$ = 1 if location is directly on golf course, 0 if not.

CRK_i = 1 if there is a view of a creek or a marsh, 2 if there is a view of both a creek and a marsh, 0 if neither.

$OCNV_i$ = 1 if there is a view of the ocean, 0 if not.

LAK_i = 1 if located on a lake or a lagoon, 0 if not.

$YEAR_{it}$ = 1 if lot is sold in year t, 0 if not.

Selling price, location, and characteristics, such as square footage, were obtained from the Charleston Trident Association of Realtors® in Charleston, South Carolina. Prices are adjusted to 1989 dollars with the Boeckh Housing Index, a regional cost of building index.[8] The average lot measures 25,993 square feet and sells for $53,441. Three percent of the sample lots have an ocean view, 20% have a lake view, 26% have a creek or a marsh view, and 28% are located on a golf course. Variable descriptive statistics are listed in table 1.

TABLE 1 Descriptive Statistics for Vacant Lot Variables on Seabrook Island (N=297)

Variable	Mean	Standard Deviation
SP	53441.000	60544.000
SQFT	25992.620	12272.806
LT	11.826	10.988
DBHT	2069100.000	2129400.000
WBHT	284.426	259.359
GOLF	0.276	—
CRK	0.259	—
OCNV	0.026	—
LAK	0.202	—
Y89	0.114	—
Y90	0.080	—
Y91	0.138	—
Y92	0.205	—
Y93	0.255	—
Y94	0.205	—

Since buyers are willing to pay a higher price for more space, *SQFT*, probably the most important price determinant, can be expected to be positively related to price. A dummy variable for the year a property was sold adjusts for market conditions that may vary from year to year, and may be positive since demand has been increasing for coastal property. A variable indicating the length of time the property was listed (*LT*) is included and may be negative or positive. Some owners may sell at lower prices if a quick sale is necessary (negative) and some owners may sell at higher prices if they are extremely patient (positive).

Two variables are included in the hedonic model capturing the influence of beach width on property value (that is, the width of beach at high tide or *WBHT*) and an interaction variable *(DBHT)*. *DBHT* is created by multiplying distance to the nearest beach *(DBCH)* by beach width.[9] One would expect wider beaches to be positively related to price since greater recreational and storm protection benefits could be realized. Distance variables are derived from various area maps. Distance from the beach, measured by the road distance to the nearest beach, should be negatively related to price since less travel time to the beach is preferred.

The monetary values of the view of a creek or marsh, ocean, lake, and golf course are examined. The view variables, which are expected to be positively related to price, were determined from detailed area maps and visits to the island. Numerous visits to Seabrook were conducted to obtain and verify information requiring actual sight. A lot is defined as having a view if the property is adjacent to a body of water or a golf course. In the case of an ocean view, several properties not directly on the ocean, but with an unobstructed ocean view, are defined as having a view.

The value of a location on the water includes recreational as well as aesthetic value. Recreational benefits of location on the beach would be picked up by the beach width variable in the model. Since no properties in the sample have dock access to the water, recreational benefits are nominal.

A concern about multiple regression models is that important variables may be excluded from the model, thus biasing the estimations. One variable often included in

8. F. H. Boeckh *Boeckh Building Cost Index Numbers* (New Berlin, Wisconsin: Thomson Publishing Corporation, 1994).

9. For a discussion of the importance of adjusting for beach quality, see James R. Rinehart and Jeffrey J. Pompe "Adjusting the Market Value of Coastal Property for Beach Quality," *The Appraisal Journal* (October 1994): 604-608.

models of this type, but not included in this model, is the distance to the central business district (CBD). Since the nearest CBD for the study area, Charleston, does not provide jobs or services of any real significance for the residents of Seabrook, adjustment for CBD is not necessary. Variables that are correlated with the variables of interest must be included. No other neighborhood characteristics that would be important price determinants for the sample were noted.

EMPIRICAL RESULTS

The ordinary least squares estimates of the hedonic price model are listed in table 2 along with their t-values. The adjusted R^2 of 0.74 indicates that the model explains 74% of the variance in price. All variables are of the expected sign except for the *YEAR* dummy variables. All variables are significant at the 1% level except for *LT, LAK, Y90, Y91, Y92,* and *Y94*. *LT* is negative and significant at the 10% level. As expected, *WBHT* is positive, indicating that property buyers value wider beaches. *DBHT* is negative, indicating that lots farther from the beach decrease in value, other factors being constant. Both *WBHT* and *DBHT* are strongly significant, indicating the importance of adjusting for the beach amenity in a coastal community.

Although all *YEAR* dummy variables are negative, indicating that property values fell during this period, only *Y93* and *Y94* are significant. Several factors may explain the unexpected negative relationship. Most lots were sold after Hurricane Hugo hit the coast nearby in September 1989. Consequently, property owners in the post-Hugo period may be more concerned about the risk of damage from severe storms in coastal areas. Secondly, the 1986 federal tax reforms reduced incentives to buy real estate. Among other things, the 1986 federal tax law reduced passive losses, eliminated some interest deductions, and lengthened depreciation time for houses, apartments, and condos. Third, potential buyers were concerned about the long-term viability of the Seabrook development.

Of particular interest to the study are the view variables *CRK, OCNV, GOLF,* and *LAK*. All four are positive, while *CRK, OCNV,* and *GOLF* are strongly significant, indicating the importance of nice views to property owners. When the dependent variable is in the log form, the estimated coefficient of the dummy variable must be transformed by using the formula: $100(e^{(B1)}-1)\%$, where *B1* is the coefficient of the dummy variable. Therefore, $(e^{0.9026}-1) = 1.466$, $(e^{0.7639}-1) = 1.147$, and $(e^{0.3324}-1) = 0.3943$.[10]

The results show that ocean views add 147% to lot values, location on a creek or marsh adds 115% to lot prices, and golf course location adds 39% to lot values. Consequently, a view of the ocean, creek, and golf course would add $78,558, $61,457, and $20,842, respectively, to the average price of a vacant lot. The value added to the price of the average vacant lot for the three views is listed in the following table. The insignificance of *LAK* may result because the lakes on Seabrook are small and generally not suitable for swimming and other water sports. Also, since the lakes are small, privacy may be reduced.

TABLE 2 Estimates of Hedonic Model for Vacant Lots on Seabrook Island, South Carolina

Variable	Coefficient	T-ratio
ONE	11.3188	18.47
SQFT	0.2532	4.52
LT	-0.0522*	-1.79
DBHT	-0.3771	-20.10
WBHT	0.3500	12.58
GOLF	0.3324	5.53
CRK	0.7639	14.52
OCNV	0.9026	5.73
LAK	0.0919**	1.32
Y90	-0.0644**	-0.59
Y91	-0.0746**	-0.75
Y92	-0.0747**	-0.86
Y93	-0.3539	-4.26
Y94	-0.3408	-3.93

Notes: Dependent variable = natural logarithm of deflated selling price

$N = 297$

Adjusted $R^2 = 0.742$

$F = 66.441$

All variables are significant at 1% level except for the following: * significant at 10%, and ** not significant

Ocean view	147%	$78,558
Marsh or creek view	115%	$61,457
Golf course view	39%	$20,842

10 Peter Kennedy, "Estimation with Correctly Interpreted Dummy Variables in Semilogarithmic Equations," *American Economic Review*, v. 71 (1981): 802.

The results indicate that a good view can have a major impact on property value, but also that the value of views can vary greatly. The value of views may vary widely for different communities. Retirement property owners may place higher value on a view than other residential dwellers since retirees have more time to enjoy the view. Also, for lots that have dock access to a waterway, unlike those in the study, recreational benefits may increase the value of location on a waterbody. Alternatively, location on a busy lake or stream (i.e., excessive motor boat or jet ski activity) may negatively impact value.

CONCLUSION

The value of residential lots is determined by size, location, neighborhood characteristics, and market conditions. The literature reveals scant information on the value of good views, an important determinant of property value in many areas. This study contributes to the information that is available by examining the value of good views for unimproved lots on Seabrook Island. Using multiple regression techniques to estimate the value of alternative types of views as measured by lot prices, the study found that lot values are increased by 147% for ocean views, 115% for a creek or a marsh view, and 39% for a golf course view.

Barrier islands, such as Seabrook, offer property owners numerous amenities usually superior to those in most residential communities. Clearly, view amenities are valuable, and different types of good views can have significantly different quantitative effects on property values. As populations in coastal areas have increased, the demand for property with a view, especially of water, has also increased, thereby increasing land prices.

The method used here can be applied to other barrier islands as well as inland residential communities. The value of a good view may vary from one area to another, so that the estimates from this study should be used as guides, not as definitive values. Such information is of value not only to developers, but to tax assessors, potential property buyers, and real estate appraisers.

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Appraisers must also recognize that the sale of a property may be negotiated months or even years before its final disposition. The buyer and the seller agree as of the contract date, but the agreement does not become effective until the closing date (and there are often changes in the agreement during the interim). An adjustment for changes in market conditions between the date the contract is signed and the effective date of value may be appropriate. Sometimes appraisers may also be called on to develop an opinion of retrospective or prospective value, which requires consideration of changes in market conditions. (For guidance on the estimation of retrospective and prospective values, see Statements Nos. 3 and 4 of the Uniform Standards of Professional Appraisal Practice.)

An adjustment for changes in market conditions is usually measured as a percentage of previous prices. While change is continuous, it typically occurs in discrete intervals. If the physical and economic characteristics of a property remain unchanged, analyzing two or more sales of the same property over a period of time will indicate the percentage of price change. An appraiser should always attempt to examine several sets of sales to arrive at an appropriate adjustment. An adjustment supported by just one set of sales may be unreliable.

Sales and resales of the same properties often provide a good indication of the change in market conditions over time. If data on resales is unavailable, however, sales of similar properties in the same market can be used. In either case, the sale transactions must be examined very carefully. Analysis of sale and resale data from the same property may indicate that non-market conditions were involved in one or both transactions.

Simple linear regression analysis and scatter diagrams may also be used to extract an annual rate of change in market conditions. The reliability of such analyses is affected by the number of market transactions studied. Unit prices can be graphed over time to indicate the trend in the market. Similarly, rents can be plotted on scatter diagrams to show differences over time.

Location

An adjustment for location within a market area may be required when the locational characteristics of a comparable property are different from those of the subject property. Excessive locational differences may disqualify a property from use as a comparable. Locational differences are usually handled with quantitative adjustments.

Most comparable properties in the same market area have similar locational characteristics, but variations may exist within that area of analysis. Consider, for example, the difference between a property with a pleasant view of a park and one located two blocks away with a less attractive view. Adjustments for location may also be needed to reflect the difference in demand for various office suites within a single building, the retail advantage of a corner location, the privacy of the end unit in a residential condominium project, or the value contribution of an ocean view.

View

A property's location is analyzed in relation to the location of other properties. Although no location is inherently desirable or undesirable, an appraiser can conclude that the market recognizes that one location is better than, similar to, or worse than another. To evaluate the desirability of one location relative to other locations, appraisers must analyze sales of physically similar properties situated in different locations. Although the sale prices of properties in two different areas may be similar, properties in one area may be sold more rapidly than properties in the other.

Physical Characteristics

If the physical characteristics of a comparable property and the subject property differ in many ways, each of these differences may require comparison and adjustment. Physical differences include differences in building size, quality of construction, architectural style, building materials, age, condition, functional utility, site size, attractiveness, and amenities. On-site environmental conditions may also be considered.

The value added or lost by the presence or absence of an item in a comparable property may not equal the cost of installing or removing the item. Buyers may be unwilling to pay a higher sale price that includes the extra cost of adding an amenity. Conversely, the addition of an amenity sometimes adds more value to a property than its cost, or there may be no adjustment to value for the existence of or the lack of an item.

Economic Characteristics

Economic characteristics include all the attributes of a property that directly affect its income. This element of comparison is usually applied to income-producing properties. Characteristics that affect a property's income include operating expenses, quality of management, tenant mix, rent concessions, lease terms, lease expiration dates, renewal options, and lease provisions such as expense recovery clauses. Investigation of these characteristics is critical to proper analysis of the comparables and development of a final opinion of value.

Appraisers must take care not to attribute differences in real property rights conveyed or changes in market conditions to different economic characteristics. Caution must also be exercised in regard to units of comparison such as net operating income per unit. *NOI*s per unit reflect a mix of interactive economic attributes, many of which should only be analyzed in the income capitalization approach. Sales comparison analysis must not be presented simply as a variation of the income capitalization approach, applying the same techniques to reach an identical value indication.

Use/Zoning

Any difference in the current use or the highest and best use of a potential comparable sale and the subject property must be addressed. The appraiser must recognize the difference and determine if the sale is an appropriate comparable and, if so, whether an adjustment is required. In most cases the

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2008

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The Impact of Detrimental Conditions on Property Values

Detrimental conditions that affect property values range from temporary conditions and market perceptions to construction defects, environmental contamination, and geotechnical issues. Quantifying the impact of DCs is significantly more complex and challenging than working through the three approaches to value. The author has discovered distinctive graphic patterns in his study of DCs and grouped them into 10 general categories, each with unique characteristics. The article urges appraisers to address the costs associated with assessment, remediation, ongoing costs, and the effects of any market resistance.

There are over 200 detrimental conditions (DCs) that can affect real estate values. They include temporary easements, airport noise, construction defects, serious toxic waste, geotechnical issues, and natural disasters. Determining the diminution in property value brought about by a DC requires the application of specialized methods, procedures, and formulas. In fact, contamination and geotechnical issues present some of the most involved problems in real estate valuation.

All DCs can be classified into 10 categories, each having unique patterns and attributes that can be illustrated on a graph. Further, a DC's impact on value can vary from case to case. A DC could even be completely benign. Therefore, each situation must be independently and competently analyzed. The Bell Chart[1] defines each classification and graphs the relationship between property values and typical events (see figure 1).

DETRIMENTAL CONDITIONS MODEL

All DCs involve some or all of six basic elements that lead to an understanding of: the costs or losses associated with the assessment of the condition, the repair or remediation costs, any ongoing conditions, and any residual market resistance to the condition. The DC Model[2] illustrates the costs before, during, and after the actual remediation (see figure 2). These costs are shown as A or the value as if unaffected by

1. Randall Bell, "The Ten Standard Categories of Detrimental Conditions," *Right of Way* (July 1996): 14–16.
2. Randall Bell, "Quantifying Diminution in Value Due to Detrimental Conditions: An Application to Environmentally Contaminated Properties," *Environmental Claims Journal* (October 1996): 135.

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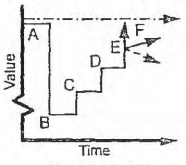
FIGURE 1 The Bell Chart: The 10 Classifications of Detrimental Conditions

Class		Detrimental Conditions	Analysis	Result
I	No Detrimental Condition (DC) or Benign Condition	Any DC If No Impact Sales Arrangement at Market *(If Over Market: II or If Under: IV)* Sale-Leaseback/Land Contract Build-to-Suit/Tenant Purchase Threat of Condemnation/Auction First Right-of-Refusal/Double Escrow	There are hundreds of Detrimental Conditions (DCs) that may impact property values. The analysis of property damages starts with the DC Model, which illustrates the array of related issues. All six elements of the DC Model should be considered in every analysis. This can yield a variety of valuation patterns based upon the inclusion, exclusion and timing of each element.	DCs have a variety of impacts which, upon analysis, vary on a case-by-case basis.
II	Non-Market Premium	Special Buyer Motivation Assemblage/Expansion Redevelopment Project Feng Shui Short-Term Windfall		
III	Market Condition	Economy/Supply & Demand Recession/Depression Lease Option/Rolling Option Exercise of Option/Takedown		
IV	Temporary Condition	Distress Sale*/Tragedy** Bulk-Portfolio Sale/Business Inc. High Vacancy/Temp. Easement Deferred Maintenance/Legal * Bankruptcy/Probate-Estate-Short Sale US Marshall/REO/Private REO/FDIC/RTC ** Crime Scene/Accident/Disease/Riot/Fire		
V	Imposed Condition	Neighboring Issue* Eminent Domain/Bond/Tax Deed Restriction/Ground Lease Leasehold/Leased Fee Physical Depreciation/Historical * Sewage-Power-Nuclear Plant/Blight Illegal Use/Jail/EMF/Traffic-Airport Noise		
VI	Building Construction Condition	Construction Defect Building Code Violations Poor Workmanship/Leaks ADA Non-Compliance Functional Depreciation		
VII	Soil or Geotechnical Construction Condition	Soil Construction Drainage/Tunneling Foundation/Cut & Fill Retaining Wall or Slope Grading/Soil Compaction		
VIII	Environmental Condition	Soil Contamination Building Contamination Hydrocarbons/Metals/Solvents Asbestos/Radioactive Ground Water/Landfill/LUST		
IX	Natural Condition	Natural Disasters Natural Habitat Flood/Earthquake/Volcano Tornado/Landslide/Soil Types Infestation/Sulfates/Wetlands		
X	Incurable Condition	Applicable to many DCs in severe situations where a complete loss or net liability exists		

Detrimental Condition Model



Key to Graphs
Unimpaired Value
Value With DC

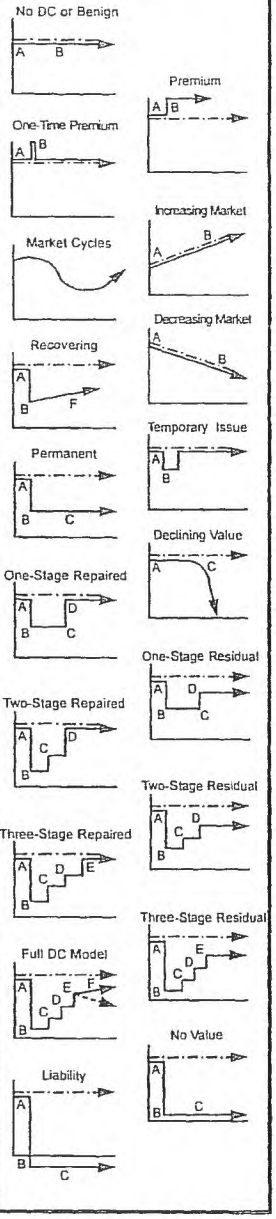
A: Unimpaired Value
B: DC Occurs or Discovered
C: Assessment Stage
Cost & Responsibility
Use
Uncertainty Factor (Risk)
D: Repair Stage
Cost & Responsibility
Use
Project Incentive (Risk)
E: On-Going Stage
Cost & Responsibility
Use
F: Market Resistance (Risk)

Damages are benchmarked against the *Unimpaired Value*. In determining the impact on value, it is critical that a distinction be made between the DC and unrelated issues. For example, market conditions may be responsible for a change in value that is unrelated to the condition being studied.

The impact of DCs on property values is ultimately an empirical question that requires the application of one or more of the three traditional approaches to value:

1. The Sales Comparison Approach utilizing market data with and without the DC.
2. The Income Capitalization Approach utilizing income and risk factors with and without the DC.
3. The Cost Approach utilizing data with and without the costs and losses associated with a DC.

The DC Model, coupled with the three approaches to value, provides the fundamental framework for the analysis of DCs.



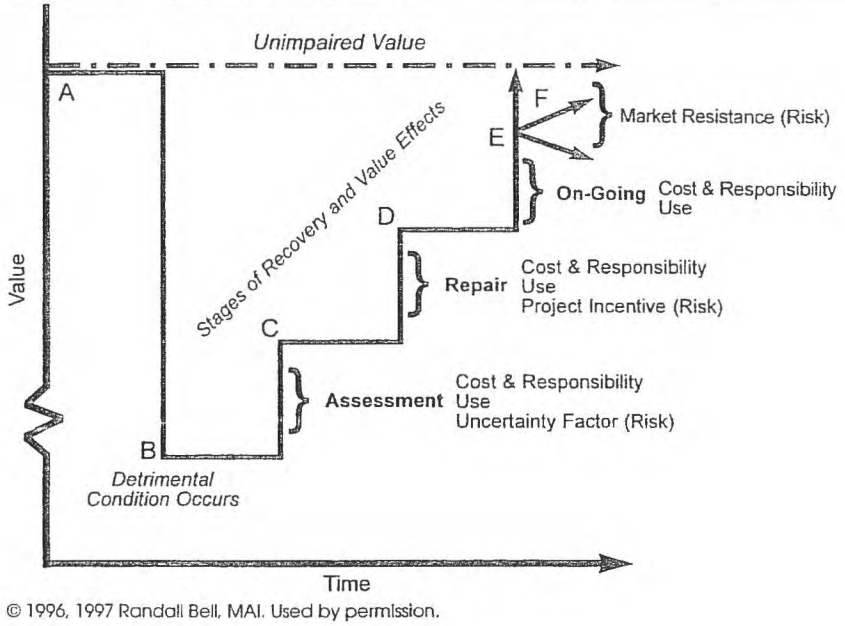
the DC; B, the value upon the realization that a DC exists; C, the value upon assessment of the situation; D, the value upon repair or otherwise resolved; E, the value upon the consideration of any ongoing costs; and F, the impact of any market resistance.

The value patterns of any DC will involve some or all of these six basic elements. For example, Classes III through VI generally utilize only components of this model, as may Classes VI and IX although they may have all the elements of the model. The point is that all elements must be considered in any DC assignment.

SIX BASIC ELEMENTS

Valuation as if no detrimental condition. The first step of a DC assignment is to value the property as if there were no DC. This es-

FIGURE 2 Detrimental Condition Model



tablishes a benchmark for the following studies.

Assessment costs. These encompass all the costs associated with monitoring and assessing the DC before any repairs or remediation, including the Phase I and II studies, soils and geotechnical studies, and other monitoring costs. These costs are provided by the engineering firms that do such monitoring, and because requests for this work are commonplace, the cost estimates are generally well established.

Remediation costs. The remediation costs represent all costs associated with the actual repairs, cleanup, and correction of the condition. A vast spectrum of costs could be included, depending on the remediation method chosen. The costs would also include any agency oversight, engineering, legal review, permits, sampling, improvement demolition, improvement reconstruction, additional scientific analysis, and backfill. Again, these costs are often provided by the engineers of the firm contracted to conduct the remediation. However, special care should be taken in reviewing the completeness of such estimates because the original cost estimates are often exceeded. The firm providing the estimates should clearly set forth whether the costs are *best case, expected case,* or *worst case* scenarios—an important point for implementing the next step.

As stated, remediation costs can exceed their original estimates. For this reason, a contingency factor may be required to adjust remediation costs to reflect a complete and reasonable cost estimate, so that the real estate market is reasonably assured that *all* reasonable remediation costs are accounted for in the estimates provided. It is important to note that the contingency factor applied to the remediation costs relate to the hard costs of remediation and should not be confused with intangible losses, such as onus or stigma. Because informed potential buyers must be reasonably assured that they have a clear indication of their potential cash liability, it is essential that the total remediation costs accurately reflect the total reasonable repair costs, not just a cursory and optimistic estimate.

Carrying costs must also be considered. During the remediation process, there may be disruptions to the property's use, resulting in a loss of rental revenues or the utility of the property. In addition, operating expenses, which may be paid by the tenant under the terms of a net lease, would also be considered.

The final element of the repair process is the project incentive. This is the entrepreneurial profit required for a buyer to purchase damaged property and make the repairs.

Ongoing costs. Some damaged properties incur ongoing costs even after repairs or remediation is completed. For example, a contaminated property may undergo continued monitoring. Formally damaged or contaminated properties may have difficulty in

obtaining financing. Lenders may not consider financing an unremediated site and may also be reluctant to finance a property that has been remediated, usually due to concerns that government agencies do not permanently certify a site as clean. The result could be an environmental review of the property, additional loan points, a higher interest rate, or a lower loan-to-value ratio. In the end, the property owner could pay additional financing costs.

A damaged property may also incur restrictions in use. For example, a formally contaminated site may be limited to industrial uses, even if it had previously been a commercial or residential use. This issue must be individually studied for any damaged property.

Market resistance. At this point, the total costs and losses are subtotaled, and an adjustment is made for the overall market resistance to the property, if any. This adjustment reflects the market's post-repair resistance to purchase the property when similar properties without a history of defectiveness are available.

Valuation as is. To derive the value, as is, all the above issues must be addressed, quantified, and deducted from the value as if no DC exists. The total losses attributable to a DC can range from being nominal to exceeding the Class I value. Additionally, the costs of remediation may actually be minor compared with all the associated costs.

DC CLASSIFICATIONS

Class I—No Detrimental Conditions or Benign Condition. Class I is the most straightforward because it involves an absence of DCs. Many DC assignments include the initial step of determining the market value as if no DC exists. The formulas relating to the concepts of Classes I through X are summarized in figure 3.

This class also involves situations in which an act or event occurs, but the issue has no effect on value. Such cases can involve any one of the DC Classes II through IX. This concept is straightforward, but it can be the grounds for litigation.

For example, a plaintiff may contend that some condition affected his or her property value, while the defendant claims that the event had no impact on value. One way to determine if an issue is, in fact, a DC is with a paired-sales analysis. In this process, market data that is clearly unaffected by the issue is collected and then compared with similar market data that is affected. If a legitimate DC exists, there will likely be a measurable and consistent difference between the two sets of market data; if not, there will likely be no significant difference between the two sets of data. When a published study about a neighborhood adjacent to a well-designed landfill in the Los Angeles area was compared with comparable neighborhoods some distance from the landfill, the results indicated no significant difference between the two neighborhoods in either current prices or appreciation rates.[3]

During the remediation process, there may be disruptions to the property's use, resulting in a loss of rental revenues or the utility of the property.

Class II—Non-market Premium. Class II includes asemblage, redevelopment zones, and other situations where the buyer paid a premium. This is a detrimental condition in terms of the higher price being paid by the buyer.

Class III—Market Condition. Class III includes the normal cycle of the real estate market when values increase, decrease, or remain level over a specific period of time. These patterns of value are simply the effects of the general economy coupled with real estate supply and demand. This is a significant classification because a certain condition might be suspected to have affected the value when, in fact, the DC was benign, and the market conditions caused the loss or gain in value.

In addition, each of the other graphs depicting the common characteristics of the impact of various DCs on value is based on level market conditions. In reality, market conditions may have an added impact in and of themselves, thereby requiring adjustments for market conditions with any one of the various classifications of DCs.

One way of measuring Class III conditions may be to study several comparable sales that resold at a later date. By comparing the initial and subsequent sales dates and values, a determination can be made about the market trends. Graphically, Class III simply reflects increased, decreased, or level market conditions over time.

Class IV—Temporary Condition. Because this class describes DCs that are only tem-

3. Donald H. Bleich, M. Chapman Findlay, III, and G. Michael Phillips, "An Evaluation of the Impact of a Well-Designed Landfill on Surrounding Property Values," *The Appraisal Journal* (April 1991): 247.

FIGURE 3 Detrimental Condition Valuation Formulas

DC Cost Approach

Unimpaired Value
- Assessment Stage Value Effects
  - Cost & Responsibility
  - Use
  - Risk (Uncertainty Factor)
- Repair Stage Value Effects
  - Cost & Responsibility
  - Use
  - Risk (Project Incentive)
- Ongoing Stage Value Effects
  - Cost & Responsibility
  - Use
  - Risk (Market Resistance)

= Impaired Value

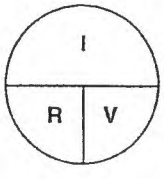
DC Sales Comparison Approach

Control Area Market Data
(No DC, Point A)
- Test Area Market Data
(With DC, Points B, C, D, E or F)

= Diminution in Value

DC Income Capitalization Approach

$$\text{Value (V)} = \frac{\text{Net Operating Income (I)}}{\text{Capitalization Rate (R)}}$$



Cost Effects, Use Effects } Impacts Income (I)

Risk Effects } Impacts Rate (R)

porary in nature, the loss in value is limited to the disruption caused by the temporary condition. The most common Class IV situation involves temporary construction easements in which a portion of a property is used by another party while adjoining construction is underway. Upon the completion of construction, the full use of the property is returned to its original state.

This temporary disruption can affect value. For example, if temporary construction disrupts the traffic patterns of a shopping center, the diminution in value may be extracted from the lost revenues, higher vacancy rates, and other related losses. The diminution in value would be in addition to the rental rate of the land being used during the temporary construction. Further, while the effects of bankruptcy are often a benign Class I DC, this situation may be a Class IV DC if there is substantial deferred maintenance or there are other temporary conditions that affect the value.

Another type of Class IV DC involves absorption losses. For example, if a particular condition causes a major tenant to vacate the building abruptly, the property value would drop upon the tenant's departure and then increase over time as the vacant space is absorbed. Absorption losses specifically include lost rents, leasing commissions, and tenant improvements.

Class IV conditions may also be the result of a crime scene or other tragic event. Media coverage of the incident might negatively influence the market's perception. Interviews with brokers and agents indicate that, when disclosed, a violent crime committed within a residence adversely affects value.[4] As depicted by the graphs, these types of conditions may either have a brief effect only or have a long-lasting effect that could diminish with time. In some extreme situations, the memories caused by the tragedy may be so unpleasant that the improvements are eventually demolished; however, the stigma tends to impact the site continously.

Measuring Class IV DCs often involve comparing the subject property to other properties in similar Class IV situations and subsequently sold to buyers informed of the tragic event. (A lower sales price is often required to entice buyers to purchase these properties.)

The Class IV graphs may reflect only a short and temporary drop in value if the condition is minor and forgotten by market participants quickly. It may also reflect a sudden drop with a gradual increase in value as the market eventually becomes more accepting of the situation.

Class V—Imposed Condition. Adverse external factors, eminent domain, undesirable acts, or forced events by another person or entity constitute Class V conditions. Specifi-

4. Sheila A. Little, "Effects of Violent Crimes on Residential Property Values," *The Appraisal Journal* (July 1988): 342.

cally, the DCs can be imposed governmental conditions such as down-zoning, special bond assessments, or the designation of a property as a historic site. Examples of adverse external factors are dumps, landfills, factories that produce noise and bad odors, neighbors that allow their property to deteriorate, and transmission lines.[5] They may also include the discovery that improvements were illegally constructed, or the development of surrounding nuisances (or perceived nuisances) such as a sewer treatment plant, airport noise, or a prison. For example, published studies illustrate that there is a measurable impact on values due to international airport noise.[6] In addition, Class VI DCs apply to eminent domain situations, especially a partial taking, and to willful acts of the property owner, such as entering into a ground lease.

In some situations, the effects of an imposed condition may be relatively easy to assess. In other cases, the imposed condition may be unclear and require special studies to predict how the market will change. Upon full investigation and assessment, the uncertainties are eliminated and the value of the property generally increases.

Graphically, Class V often reflects a sudden drop in value upon the occurrence of the DC and a permanent loss in value as a result of the imposed condition. In a situation involving diminishing effects, such as a ground lease, the leasehold value gradually decreases over time.

Class VI—Building Construction Condition. The basic premise of both Class VI and VII DCs is that they are manmade, which means that they can often be repaired. Class VI DCs involve construction issues above grade. As such, they are relatively easy to assess, and often result in the restoration of the property's full value upon completion of the repairs. Typically, the problems are self-evident, and no special studies are required to determine the scope of the problem; however, all potential losses should be addressed.

To quantify these types of DCs, the appraiser must study the cost of repairs, engineering, related services such as relocating the tenant, free rent for the tenant while repairs are being made, post-repair cleanup, and so forth. Some tenant relocation costs can partially, if not entirely, be mitigated simply by waiting until the property is vacant to make the repairs.

Depicted on a graph, a Class VI situation may show a drop in value upon the discovery of the condition and a return to full value upon the repair of the condition. In unusual circumstances, there may be an ongoing condition that remains because it is not physically or economically possible to cure, thereby resulting in a permanent loss in the value of the improvements. For example, if a construction defect cannot be economically repaired, it may be a situation similar to inadequate insulation or asbestos abatement. The most noteworthy example of this situation is asbestos-containing materials which, because they may be impractical to remove from a building, are an ongoing condition. Air monitoring may be required throughout the life of the improvements and special handing and disposal costs would be incurred if the building is eventually demolished.[7] Under this condition, the graphic illustration reflects a permanent loss of value because the condition remains, or is perceived to remain, unchanged over time.

Class VI DCs are relatively easy to assess, and often result in the restoration of the property's full value upon completion of the repairs.

Class VII—Soil or Geotechnical Construction Condition. These DCs, which involve construction issues below grade, are more difficult to assess and repair than Class VI conditions because of the challenges of assessing conditions below grade and the associated drilling, coring, and excavation. This category of DCs could include site grading; soil cut, fill, and compacting; slopes; drainage; tunneling; or retaining walls.

Often, Class VII DCs can be assessed and repaired even if the foundation must be reinforced or the improvements underpinned. Like Class VI DCs, calculating the diminution in value would involve the review of the functional utility of the property, repairs that are necessary to prevent a loss to life or property, repair costs, engineering costs, disruption to the property, etc. These conditions are manmade and can usually be corrected although in some extreme conditions, they cannot be repaired and an ongoing condition may remain, affecting the value if the functional utility of the property is dimin-

5. Hsiang-te Kung and Charles F. Seagle, "Impact of Transmission Lines on Property Values: A Case Study," *The Appraisal Journal* (July 1992): 413.

6. Marvin Frankel, "Airport Noise and Residential Property Values: Results of a Survey Study," *The Appraisal Journal* (January 1991): 96–110.

7. Randall Bell, "The Impact of Asbestos on Real Estate Values," *Right of Way* (October 1994): 10–21.

ished or the market perceives the ongoing issue to impact the value. Thus, the functional use of the property and the necessary repairs must be carefully reviewed.

For example, if a site has fill soil that is up to 100 feet deep and differential settlement occurs, it may not be economically or physically possible to install piles and extra building foundations to the bedrock to support the improvements and fully mitigate the situation. As a result, it may be reasonable to expect that the property will be more prone to earthquake damage and continued settlement damage. In this type of condition, the value of the property may be permanently impaired and beyond the other Class VI and VII categories.

No government agency will irrevocably certify a site as clean even if the site has undergone remediation and has site closure status.

On the other hand, some Class VI and VII DCs do not have any effect on the rental rates paid by tenants, or the property's liability or utility and may, therefore, be questionable as Class VI or VII DCs at all, if the capitalization rate is also unaffected.

For example, if improperly compacted shallow soils cause some minor settlement cracks on the floor of a warehouse building, and similar settlement cracks are commonly found in comparable properties with no known soils problems, the issue may not have any impact on value. This is particularly true if the tenants' use of the property is unaffected by the condition and the marketability of the space is comparable to that of similar properties.

The Class VII graph indicates a loss in value when the condition is discovered and a return to the non-impacted value upon the assessment and repair of the condition. As stated, in some unusual conditions, there may be a residual market resistance remaining even after repairs are made.

Class VIII—Environmental Condition. Class VIII involves environmental contamination such as hydrocarbons, asbestos, radioactive waste, solvents, and metals. In these situations, remediation costs must be analyzed carefully. There may be a variance between estimated and actual remediation costs.[8] However, in recent years, this concern has subsided somewhat due to the introduction of cost cap insurance and increased use of indemnifications by responsible parties. In addition, if the property is contaminated, there may be continued and justified concerns about problems and issues resurfacing in the future. The Environmental Protection Agency maintains a list of problem sites, including those yet to be investigated. These lists are available on request, and if a problem arises, a Freedom of Information Act officer can be contacted.[9] No government agency will irrevocably certify a site as clean even if the site has undergone remediation and has *site closure* status.[10] In fact, once contaminated, a site is always on *a list* and, as a result, may be reexamined in the future. Further, it is difficult to prove that all contaminants were removed and no longer exist. In other words, it is logically and scientifically impossible to prove a negative hypothesis and regardless of how much time, energy, or resources are expended, absolute assurance is impossible.[11] Figure 4 shows the general flow of activity related to a contaminated site and the possible circular nature of this process:[12] In recent years, "letters of nonresponsibility" and other mitigation techniques have elevated many of these concerns.

As shown on the chart, even with *site closure*, the sale, refinancing, or new use of a property may trigger a Phase I survey, which in turn could lead to a Phase II study. This, of course, could result in another review of the property by the government regulatory agency, with possible new political agendas or other factors altered since the previous *site closure* was issued. This means that, in rare instances, a formerly contaminated site could be subjected through the site assessment and remediation process again.

Stigma-related losses can be nonexistent, nominal or, in extreme situations, virtually destroy a property's value.[13] When environmental features are viewed as repulsive, upsetting, or disruptive, they are stigmatized as undesirable.[14] While engineering experts may possess the expertise to judge that a specific

8. Albert R. Wilson, "Emerging Approaches to Impaired Property Valuation," *The Appraisal Journal* (April 1996): 156.
9. Ralph K. Olsen "Hazardous Waste Sites," *The Appraisal Journal* (April 1989): 234.
10. Wilson, 158.
11. Albert R. Wilson, "The Environmental Opinion: Basis for an Impaired Value Opinion," *The Appraisal Journal* (July 1994): 441.
12. Randall Bell, "Quantifying Diminution in Value Due to Detrimental Conditions: An Application to Environmentally Contaminated Properties," *Environmental Claims Journal* (October 1996): 135.
13. Peter J. Patchin "Contaminated Properties and the Sales Comparison Approach," *The Appraisal Journal* (July 1994): 408.
14. Bill Mundy, "Stigma and Value," *The Appraisal Journal* (January 1992): 10.

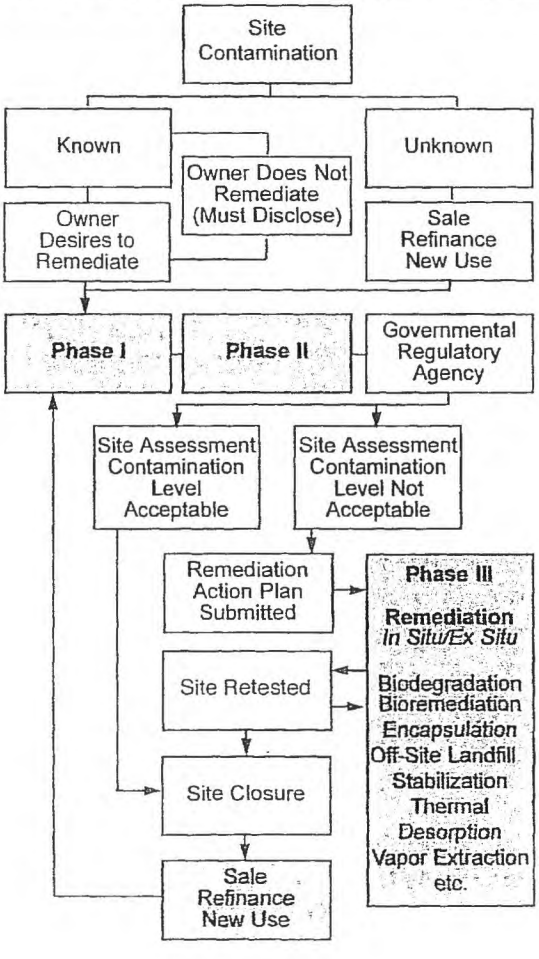
situation is not a cause for concern, the non-engineer, who is also often the potential buyer and lender, may view a formerly damaged property with skepticism. In contamination cases, the reduction in value results from the increased risk associated with the contaminated property.[15] Such ongoing concerns may create market resistance—sometimes referred to as stigma, onus, taint, or impairment—against properties that have a history of problems and have potentially incurred future liabilities or hidden cleanup costs, as well as against the general hassle involved with owning the property. With source contamination properties, all elements of the DC Model should be considered.

Class IX—Natural Condition. Class IX involves curable natural conditions that may be economically and physically repaired. These would include earthquakes, tornadoes, floods, landslides, endangered species, and other natural conditions.

These DCs may involve a significant safety issue to the occupants of the property. If the DC can be fully assessed and repaired, the property value may return to the previous level before the condition existed. However, if there is still a question about the effectiveness of the repair or remediation, there may be a residual loss of value. Again, the impact on value involves the costs to clean up or fortify the site, incidental costs, and any residual conditions. All the elements of the DC Model should be considered.

Class X—Incurable Condition. This class represents the most serious cases, for the property may not be economically or physically remedied, resulting in considerable or total loss in property value. The property may be a liability if the condition creates a

FIGURE 4 Environmental Contamination: Flow of Events



15. James A. Chalmers and Scott A. Roehr, "Issues in the Valuation of Contaminated Property," *The Appraisal Journal* (January 1993): 33.

serious hazard or the cost to repair exceeds the property value.

Examples of Class X DCs would include extreme toxic or hazardous waste issues and major landslides—situations that pose a risk to life, health, and property, and cannot be economically and physically repaired.

Even if the DC is curable, it would still be considered Class X because the problem cannot be cured by the property owner. For example, if a landslide originates in an adjoining canyon, the property owner cannot make repairs to the affected property because it belongs to another person or entity.

Class X conditions bring about a total or an overwhelming loss in value upon the discovery of the condition and are so severe that property becomes worthless or even a liability if the costs to correct the DC exceeds the property's Class I value.

Methodologies to Quantify Diminution in Value

General research sources. Regardless of the method used in quantifying the impact of a DC, market data must be collected and analyzed. The challenge is that comparable information on DCs is often not provided in typical appraisal reports. For this reason, specialized research methods must be employed. For example, if the DC is soils subsidence, a search may be conducted for all articles published on the topic. From this information, property owners and brokers may be contacted and interviewed. Also, government agencies, environmental engineers, and soils engineers often have logs of completed remediation projects from which specific projects may be identified and studied. Of course, brokers and sales agents often provide excellent leads on properties affected by DCs. Comps Infosystems, Inc., based in San Diego, California, now publishes market data nationwide that is categorized by the Bell Chart.

Paired-sales analysis. This process involves comparing sales affected by a DC with similar sales not affected by a DC. For example, a group of properties under the flight path of an airport can be compared with similar properties not located under the flight path.

Resale analysis. To conduct this analysis, the appraiser would study sales comparables and the subsequent resales of the same properties, usually to determine the increase, decrease, or level conditions of market values, or to determine the impact of a DC by comparing values before and after the DC is discovered. For example, if there is a discernible pattern to the selling prices of a specific property type, the effects and direction of the market can be determined.

Cost-to-remediate analysis. Conducting this analysis means studying the costs to remediate a DC, including engineering, tenant relocation, lost rents, demolition, repair, cleanup, new tenant improvement buildout, leasing commissions, carrying costs, etc.

Market data analysis. This analysis consists of studying the effects of DCs on other properties. Although the unique characteristics of every DC makes direct comparison difficult, market data can help support the appraiser's conclusions. A study designed to cross-reference remediation and stigma costs and losses illustrates the wide range of effects of DCs and provides market data on conditions of sales comparables (see table 1).

Direct capitalization analysis. This process capitalizes permanent lost rents brought about by a DC. For example, if a property leases for a certain rate before the construction of an adjoining sewage treatment plant and then leases for less upon the completion of the plant, the difference in the net operating income may be capitalized to determine the permanent impact of the DC. If the income and risks (capitalization or discount rates) are affected, the situation must be addressed, using specific methods.[16]

Discounted cash flow analysis. This analysis involves the calculation of the net present value of a stream of income that reflects an affected property's various costs and fluctuating revenues. If a property is undergoing asbestos abatement or soils remediation, the cash flow study would incorporate all the costs cited in the cost-to-repair approach. In addition, the cash flow would include air or ground water monitoring costs and, if some contaminants remain, any future demolition, disposal, or cleanup costs. Further, the discount rate may be increased to account for the perceived risks of property ownership, if supported by the market.

Modified cash flow studies are also required to measure the impact of a ground lease on leasehold estates. These leasehold

16. Richard A. Neustein, "Estimating Value Diminution by the Income Approach," *The Appraisal Journal* (April 1992): 283–287.

advantage studies involve the calculation of market and contract ground rents and the computation of the net present value of any difference.

ANALYZING DETRIMENTAL CONDITIONS

The basic guidelines for analyzing DCs are summarized in the following:

1. Always use market data when quantifying the impact of DCs on value. Quantifying damages based *solely* on experience and professional judgment is reckless and probably unethical, particularly when market data exists for virtually all DCs. In the absence of direct market data, surveys may be used.

   Failing to research and apply relevant market data is the single most common flaw in DC analysis. Some individuals tend to lump all DCs together when discussing or writing about various conditions. Be careful to understand the limitations of such information, as there are distinct traits for each classification of DCs.
2. Be cautious in using market data from one DC classification when attempting to quantify the diminution in value of another DC category. This is the basic concept of comparing apples to apples. The common characteristics of each class of DCs are graphically distinct. Some DCs involve repairs and some do not; some involve permanent residual conditions while others diminish over time; some involve engineering studies and others do not, and so forth.
3. An appraiser should never go beyond his or her area of expertise. It is unethical for appraisers to go beyond their area of expertise, such as assessing soils conditions, making engineering calculations, identifying contaminants, estimating the extent of damages or contamination, or estimating the time to remediate.[17]
4. Consider the reliability of remediation estimates. It is not uncommon for remediation projects to incur cost overruns. Many issues and questions should be considered, such as: Does the contractor have a contract clause that allows for additional costs? Is the property indemnified against cost overruns? Are the estimates best case, most likely, or worst case scenarios? Do bonds, cost capitalization insurance, or indemnifications exist that shift the liability overruns to the contractor, insurance company, or other party? Are the estimates itemized to reveal any additional incidental costs? Is the site assessment comprehensive enough to yield a realistic cost estimate?[18]
5. Always review the remediation costs and related engineering costs for "reasonableness." While real estate appraisers and analysts are generally not also engineers, it is not only possible but appropriate that these costs be reviewed for basic reasonableness.[19]
6. Consider all the associated repair costs. The actual cost of repair can often be relatively minor compared with all the associated costs, such as engineering costs, tenant relocation, lost rents, demolition, repair, clean-up, tenant improvement buildout, leasing commissions, and absorption. All costs should be itemized, categorized, and analyzed.
7. Never attempt to quantify damages based solely on the Bell Chart. The chart is in no way intended to quantify any loss in value. This can be accomplished only by a comprehensive study by a qualified expert. However, the Bell Chart does show the general issues, typical value patterns, and relative impact on values for various classifications.
8. Exceptions do exist, but usually only in more extreme circumstances. These charts reflect the common characteristics of DCs, but exceptions do exist. For example, a construction defect may be so major that it takes many years to repair. This situation may involve considerable disruptions to the tenants and even create media attention. In these types of conditions, the property value may be impacted by negative market reactions to the problems even after the repairs are fully completed.

Appraisers should always review the remediation costs and related engineering costs for reasonableness.

17. Appraisal Institute, "Guide Notes to The Standards of Professional Appraisal Practice, Guide Note 8—The Consideration of Hazardous Substances in the Appraisal Process" (Chicago, Illinois: Appraisal Institute, 1991): D21.
18. Ibid., Guide Note 6—Reliance on Reports Prepared by Others, D14.
19. Ibid.

TABLE 1 Soils Contamination Survey

Number	Property	Value Uncontaminated	Value Pre-remediation	Estimated Remediation	Project Incentive and Market Resistance	Actual Remediation	Estimated Versus Actual
1	Industrial	$1,100,000	$700,000	$100,000 (B)	30%	$150,000	50%
2	Service station	$550,000	$390,000	$500,000 (S)	29%	n/a	n/a
3	Subdivision	$3,800,000	$3,800,000	$250,000 (S)	0%	$100,000	-60%
4	Retail site	$9,142,368	$9,142,368	$10,000,000 (S)	0%	$20,000,000	100%
5	Industrial	$1,000,000	$400,000	$175,000 (B)	51%	n/a	n/a
6	Industrial	$700,000	$580,000	$100,000 (S)	n/a	n/a	n/a
7	Subdivision	$2,000,000	$1,268,000	$150,000 (S)	n/a	n/a	n/a
8	Auto repair	$655,000	$500,000	$100,000 (B)	10%	$30,000	-70%
9	Service station	$750,000	$340,000	$200,000 (B)	38%	$700,000	250%
10	Industrial	$500,000	$330,000	$30,000 (B)	30%	n/a	n/a

(S) = Seller paid remediation costs.

(B) = Buyer paid remediation costs.

Stigma losses computed on estimated remediation costs.

1 Project incentive and market resistance losses computed by (value uncontaminated – projected remediation) / post-remediation value.

2 Remediation still in progress at the time of interview.

3 Remediation completed by seller without a contractor, reported a savings of $150,000 on this basis.

4 The seller paid all remediation costs. The property had no value contaminated.

5 Remediation not started at time of interview.

6 Sold remediated, with $150,000 in monitoring costs.

9 Buyer purchased property believing remediation costs would be low. In actuality, they were much higher than expected.

10 Remediation not started at time of interview .

Sources: COMPS InfoSystems, Inc., San Diego, California; Orell C. Anderson of PricewaterhouseCoopers, Costa Mesa, California; and Joseph B. Haeussler, MAI, Mason & Mason, Montrose, California.

9. Study the functional utility and mitigation issues carefully. The issues related to the DC's actual impact on the utility of a property must be addressed. For example, some DCs do not require immediate repair, and the costs may be significantly mitigated by merely waiting for a naturally occurring tenant vacancy before repairing the problem. Other DCs may affect the property, but the rents, occupancy, and resale value remain unaffected. In these cases, the DC may, in fact, be benign. How the DC has had a real or perceived impact on the day-to-day use of the property must be considered. For example, a few years ago asbestos abatement was considered a necessity by many. Today the perception that asbestos is a heath risk has diminished.
10. Recognize the various dimensions of using the Bell Chart. The applications for using the standard Bell Chart classifications are far-reaching. In fact, it is possible that one property issue will involve the use of three or more classifications.

A property owner may contend that an adjoining development caused his or her property value to decline when market conditions are actually to blame. The property owner might inappropriately use the Class V criteria and presume an impact on value, but the proper analysis would involve a Class I analysis to demonstrate that the condition is benign. Class III would be used to illustrate the real cause of the declining value. By properly classifying DCs, selecting the appropriate method, and following these basic rules, each individual situation may be more effectively and accurately studied. Relevant market data can then be researched and the proper methods applied.

CONCLUSION

Quantifying the value diminution of property affected by a detrimental condition can be a challenging appraisal assignment. The appraiser must recognize six basic issues: (1) the value as if the property is unaffected by the DC; (2) the value upon the DC's occurrence or its discovery; (3) the necessity for a proper and thorough assessment of the situation; (4) the determination of value upon completion of repairs—i.e., the condition is otherwise resolved; (5) the necessity for the value conclusion to take into account any ongoing costs; and (6) the need to examine the impact of any market resistance. In other words, the appraiser must examine the full spectrum of events—before remediation, the remediation process itself, post-remediation, and any post-repair market resistance caused by the situation. The result should be a meaningful and accurate assessment of how a detrimental condition has affected the value.

The Impact of a View on the Value of Vacant Residential Lots

by R. M. Potgieter and C. E. Cloete

ABSTRACT

The purpose of this study was to investigate the impact of a view on values of vacant residential lots. The study included vacant lots (erven) of six townships situated in Tshwane, South Africa. The townships were split into an upper and lower part, representing the erven in the township that have a view and those that do not. The average purchase price and average price per square meter were calculated for each township. From the study, it was clear that higher-lying properties, which have views, were more expensive than lower-lying properties, even though some lower-lying properties also possessed a view. Furthermore, the higher-lying properties on average were 36% more expensive in terms of purchase price and 18% more expensive in terms of price per square meter.

During 2004, the case of *Paolo v. Jeeva NO and Others*,[1] put before the South African Supreme Court of Appeal, highlighted the vigorous defense property owners will use to safeguard and protect the views enjoyed from their properties.[2] Subsequent to *Paolo*, another case was put before the court, *Clark v. Faraday and Another*,[3] which reiterated the fact that property owners regard a view as being part and parcel of their properties.[4] The respondents in both court cases argued that the construction of new houses in front of their existing houses would deprive them of the view enjoyed from their properties and substantially derogate from the value of their properties. From both cases, it is evident that property owners regard their views as holy and are willing to use any means possible to protect such views. It is, however, the second issue in these cases—the value of a view—that requires further investigation and forms the crux of this study.

Since the 1960s, South African cities have experienced considerable growth, not only in terms of population size, but also in terms of physical growth and the pattern of expansion. Residential expansion specifically followed a development pattern away from the central business districts (CBDs) of cities.[5] This pattern was the inevitable result of an increase in the private ownership of motor vehicles and the subsequent freedom that this mode of transport provided. No longer was it necessary for the average person to reside in close proximity of bus and train stations in order to commute to work or purchase groceries in the CBD.

The convenience of private transportation altered the face of the South African city forever. The change in human settlement patterns, away from the historical

An earlier version of this article was presented as a research paper at COBRA 2009, the annual meeting of the Construction and Building Research Conference of the Royal Institution of Chartered Surveyors, September 10–11, 2009

1. *Paolo v. Jeeva NO and Others* [2004] (1) SA 396 (SCA)
2. S. J. Grobler, "The Right to a View," *The South African Valuer* 78 (June 2004): 8–11.
3. *Clark v. Faraday and Another* [2004] (4) SA 564 (C).
4. Chris Smal, ed., *The Valuers' Manual*, Part 3, 2nd ed. (Durban: Butterworth, 1992), 283.
5. This does not include or refer to historical segregation townships.

centers of cities, ultimately brought about a chain reaction in property development where businesses, offices, and shopping malls followed the move away from the CBDs and established themselves in close proximity to the new residential townships.

Privately owned vehicles not only increased the freedom of their owners, they also indirectly facilitated the exploration and subsequent development of areas for residential purposes, including areas previously regarded as undevelopable because of geographical features and the constraints associated therewith. Public transport, such as buses, is limited to a specific gradient; motorcars are not. The result is that residential dwellings were increasingly built on ridges and in mountainous areas. These areas were widely viewed as and marketed as prestigious areas, and the areas were characterized by higher-than-normal house prices. These higher prices were not only the result of expensive building costs due to the mountainous terrain, but also because of the well-known phrase uttered by so many, especially estate agents, "...and the house has such a beautiful view!" The aim of the study presented here was to investigate the validity of that remark, with specific reference to the contribution made by a view to the value of residential properties.

Literature Survey

It is generally accepted that the type of view that can be seen from a residential house or unit can have a positive impact on the price or value of the property. Studies have found that buyers are willing to pay more for a scenic view and that houses with a good view can attract a premium.

Most of the studies done in the past have been related to water-based views, whether an ocean view or a view overlooking a lake. One study reports price premiums for superior, good, and poor partial ocean views of 30.8%, 29.4%, and 8.2% respectively.[6] In terms of lake views, another study finds that properties with a water view of Lake Erie attracted a premium of 56% or a premium paid of $115,000.[7]

Some studies have not been based on water views. Correll, Lillydahl, and Singell examine the quasi-public good of greenbelts on residential property values in Boulder, Colorado,[8] and find the view variable to be statistically insignificant. A reviewer of that study suggested that a variable should be included to capture the differences of existing views over the valley because of varying degrees in elevation. (No mention is made, however, of who the reviewer was or in what capacity the suggestion was made.)

In his study, Janmaat also finds the view variable to be statistically insignificant.[9] That study examines the effect of noise pollution, generated by a provincial highway situated on the southern boundary of a university town called Wolfville, Nova Scotia, on house prices. Of the two externalities measured—sound levels and the presence of a view—only the peak sound level was significant. In another study not based on water views, Gillard reports that although a view lot added only $3,887 to the price of residential properties, that lot premium was not trivial as the mean selling price of the housing units in the sample was $42,128.[10]

From the literature reviewed, only the studies by Janmaat and by Correll, Lillydahl, and Singell find that a view does not significantly contribute to the value of residential properties.

Data and Methodology

The study presented in this article focuses only on vacant residential erven. *Erven* is the South African term for residential lots or stands (the singular form of *erven* is *erf*). An erf is a plot of land, in this case contained in a residential development on which a dwelling house can be constructed. An erf can vary in size depending on the type of development and the zoning; size can vary from 600 square meters and smaller, up to 2000 square meters and larger. Only single-residential erven were included in the study, i.e., only erven where one house may be constructed per erf. The reason for using vacant erven was that the inclusion of residential properties characterized by existing dwelling houses complicates relevant information to

6. E. D. Benson, J. L. Hansen, A. L. Schwartz, and G. T. Smersh, "Pricing Residential Amenities: The Value of a View," *Journal of Real Estate Finance and Economics* 16, no. 1 (1998): 55–73.

7. Michael J. Seiler, Michael T. Bond, and Vicky L. Seiler, "The Impact of World Class Great Lakes Water Views on Residential Property Values," *The Appraisal Journal* (July 2001): 287–295.

8. Mark R. Correll, Jane H. Lillydahl, and Larry D. Singell, "The Effects of Greenbelts on Residential Property Values: Some Findings on the Political Economy of Open Space," *Land Economics* 542 (1978): 207–217.

9. John A. Janmaat, "Factors Affecting Residential Property Values in a Small Historic Canadian University Town" (Acadia University, Department of Economics, 2005), 16.

10. Q. Gillard, "The Effect of Environmental Amenities on House Values: The Example of a View Lot," *Professional Geographer* 33, no. 2 (1981): 216–220.

be obtained regarding such properties.

In terms of the specific areas examined, this study looks at erven that have been grouped together and then compares the erven belonging to each specific group with one another. To achieve the grouping and comparison, the research examines different residential townships, each made up of a number of erven.

Keeping in mind the objective of the study, any residential township that is not situated on a prominent natural feature was excluded, thereby providing that erven in the study townships are characterized by a view. The ideal was to include townships associated with a linear natural feature, of which the Magaliesberg mountain range is the best and a near perfect example in the city of Pretoria.

The Magaliesberg is one of Pretoria's most well-known and recognizable natural features and stretches from east to west through the city (see Figure 1). The Magaliesberg is characterized by existing developments over almost its entire length. Unfortunately, in terms of the study, most of the developments along the Magaliesberg consist of well-established townships, some of which date as far back as the 1950s and 1960s. All of the erven contained in these townships are characterized by dwelling houses and other improvements, which rendered them obsolete for purposes of the study with its focus on undeveloped erven.

In view of the development in well-established neighborhoods, and in an attempt to obtain data relevant to the study, attention shifted to the far west area of the Magaliesberg, with specific reference to the area under jurisdiction of the city of Tshwane, formerly known as the Akasia City Council. This area experienced considerable growth over the past decade and is characterized by townships that not only offer views, but also are fairly new.

The preliminary study area included nine townships. Initial information was obtained regarding the townships, including the following:

- The date on which each township was promulgated (promulgation date), and therefore, the date after which individual erven could be transferred from a developer into the names of the purchasers
- Purchase date of the erven contained in each of the townships in the Deeds Office
- Extent of the individual erven in each township
- Purchase price of the individual erven in each township

Relevant information was obtained from the South African Deeds Office (Pretoria branch), and more specifically, the database made available by WinDeed, a property-information search provider linked to the Deeds Office.[11] WinDeed is usually used by property-related professionals, such as property valuers, town planners, estate agents, and conveyancers (real estate attorneys). With WinDeed itself, it was possible to obtain data regarding any given property, such as the registered owner, extent of the property, and whether any bond has been registered over the property.

To obtain the original purchase date and purchase price of any property, however, it was necessary to use a subdirectory within WinDeed called WinXfer. WinXfer enabled the researcher to obtain all relevant information regarding the initial townships included in the study. However, WinXfer has one limitation that affected the number of townships in the study: it can only retrieve township data related to erven registered in the Pretoria Deeds Office dating back to January 2002.

The aim was to look, as far as possible, at erven that were grouped together, thereby increasing the possibility to compare erven within a specific group. The only real option to achieve this was to look at different residential townships each made up of a number of erven. The attempt to keep the characteristics the same for the townships included in the study was further increased by looking at townships belonging to the same residential estate or neighborhood.

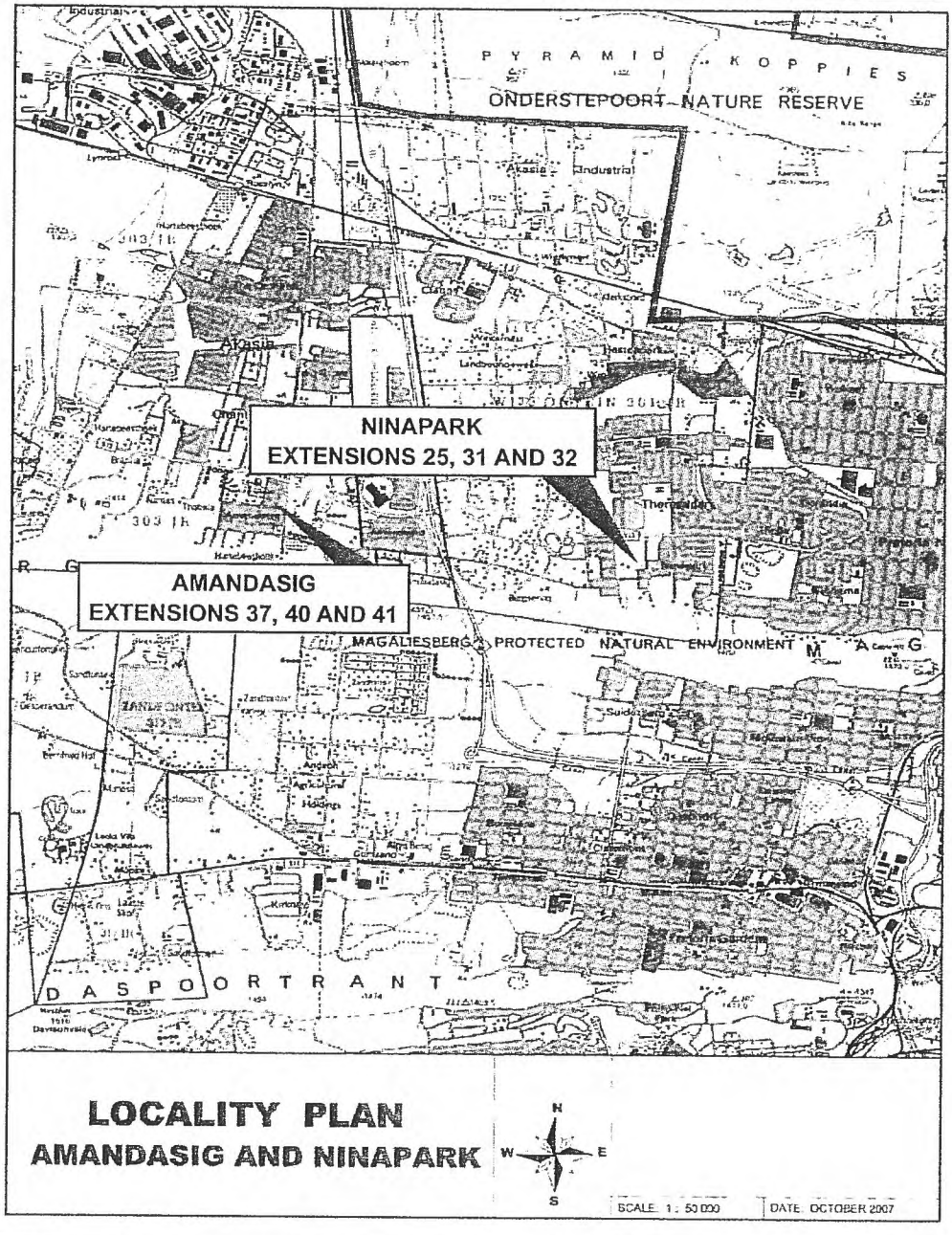
After the relevant information regarding the townships was obtained from the Deeds Office, six townships were found to be suitable for inclusion in the study: Amandasig Extension 37, Amandasig Extension 40, Amandasig Extension 41, Ninapark Extension 25, Ninapark Extension 31, and Ninapark Extension 32 (Table 1).

Amandasig Townships

The Amandasig townships form part of a residential security estate known as "Magaliesberg Country Estate." A *residential security estate* is a residential development that has controlled access with security walls and/or fences. The township is not accessible by the general public except for residents' visitors. The estate may further make use of private security guards employed by the estate's home owners association. Magaliesberg Country Estate consists of a

11. For more information about WinDeed, see http://www.windeed.co.za/.

Figure 1 Locality Plan of Study Areas



total of 10 individual townships, of which Amandasig Extensions 37, 40, and 41 are included in the study. Amandasig Extensions 37, 40, and 41 were included mainly because relevant information regarding these townships was available and because they were characterized by a slope providing some of the erven in the specific township with a view. The remaining townships comprising the Magaliesberg Country Estate were, at the time of compiling data, not yet proclaimed, i.e., formally recognized as a township, and sufficient information regarding these townships was not available.

Table 1 Townships included in the Study

Township Name	Proclamation Date	Number of Residential Erven
Amandasig Extension 37	July 2006	90
Amandasig Extension 40	July 2006	33
Amandasig Extension 41	July 2006	20
Ninapark Extension 25	August 2002	21
Ninapark Extension 31	May 2003	33
Ninapark Extension 32	October 2002	33

The Magaliesberg Country Estate is characterized by both northerly and southerly slopes (views). The townships included in the study, Amandasig Extensions 37, 40, and 41, are situated in a part of the estate characterized by a valley shape, with Extensions 37 and 40 having a view in a southerly direction, and Extension 41 having a view in a northerly direction.

The township of Amandasig Extension 37 consists of 90 erven, ranging in size from 600 square meters to 1328 square meters. The average erf size in the township is 696.43 square meters. The township has a predominant slope in an easterly direction. The whole of the township is subject to said slope and because of the position of the eastern township boundary, even the lowest-lying properties have a view of the remainder of the valley in an easterly direction. However, the slope, and thus the view applicable to the lower part of the township, is not as commanding as that of the upper part.

Furthermore, the contours applicable to the township are more or less evenly spaced except for the northwestern part of the township, which is subject to contours spaced closer together,[12] albeit for a small distance, taking into account the total distance of the township in an easterly direction (Figure 2). For this reason it was decided to split the township in two halves—erven with higher elevations and erven with lower elevations—with specific reference to the entire slope applicable to the township.

The difference in height from the highest-lying property to the lowest-lying property is 25 meters. The highest-lying erf in the township is 1385 meters above sea level, while the lowest-lying erf in the township is 1360 meters above sea level. The 1372 meter contour was accepted as being the base contour line. Each erf primarily affected by the base contour line was included in the lower part of the township (60 erven). The remainder of the erven (30 erven) in the township were included in the upper part of the township. The upper part of the township has a gradient of 1:11.25, therefore 1:11. The lower part of the township is subject to a slope of 1:13.67, therefore 1:14. By calculating the height (elevation) for each erf, it was determined that the upper and lower part of the township had an average height of respectively 1376.1 meters and 1368 meters. The mean standard deviation, variance, and coefficient of variation for the upper and lower part of the township were calculated using Microsoft Excel and are depicted in Table 2.

The standard deviation is a measure of the spread or dispersion of a set of data, calculated by taking the square root of the variances. For a normally distributed population, 68% of the data will be within one standard deviation of the mean and 95% of the data will be within two standard deviations of the mean. For example, 68% of the erven in the upper part of Amandasig Extension 37 will have a price between R338,533 – R116,799 = R221,734 and R338,533 + R116,799 = R455,332.[13]

The coefficient of variation measures the spread of a set of data as a proportion of its mean and is often expressed as a percentage. It is the ratio of the sample standard deviation to the sample mean. Although the coefficient of variation of the purchase price of the erven in the upper and the lower parts are about 35% and 26%, respectively, the coefficient of variation of the price per square meter is very similar (about 19%). These measures of dispersion are calculated for each of the townships.

Amandasig Extension 40 consists of 33 residential erven ranging in size from 577 square meters to 1309 square meters. The average erf size in the township is 837.16 square meters. It should be noted, however, that two erven in the township (Erven 1388 and 1408)

12. The closer the contour lines are to each other, the steeper the slope.
13. In 2009, the exchange rate for South Africa Rand was R8.54 = $1.00.

Figure 2 Township Layout Amandasig Extension 37

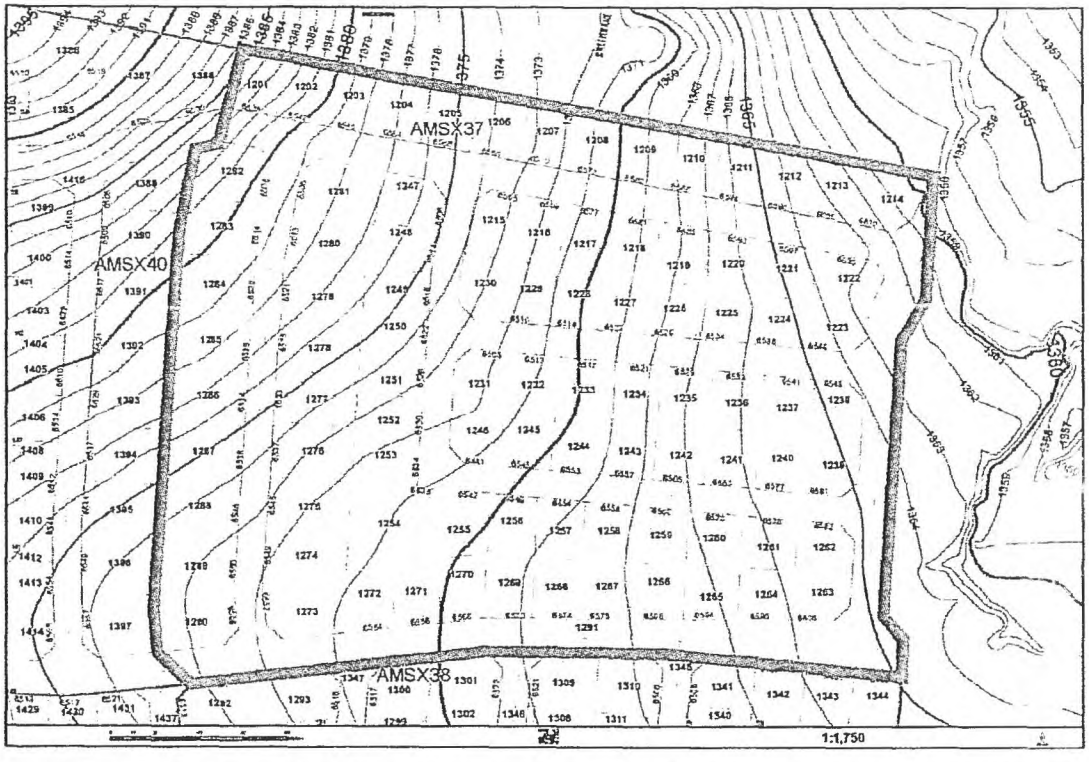


Table 2 Amandasig Extension 37: Results for Erf Height, Purchase Price, and Price per Square Meter

	Upper Part	Lower Part
Erf Height		
Mean	1376 meters	1368 meters
Standard Deviation	2.8	2.7
Variance	8.0	7.2
Coefficient of variation	0.21%	0.20%
Purchase Price		
Mean	R338,533.33	R247,633.33
Standard Deviation	R116,799.48	R63,969.26
Variance	R13,642,119,540.23	R4,092,066,666.67
Coefficient of variation	34.50%	25.83%
Price per Square Meter (price/m²)		
Mean	R426.73	R377.57
Standard Deviation	R80.53	R71.95
Variance	R6,485.55	R5,176.17
Coefficient of variation	18.87%	19.05%

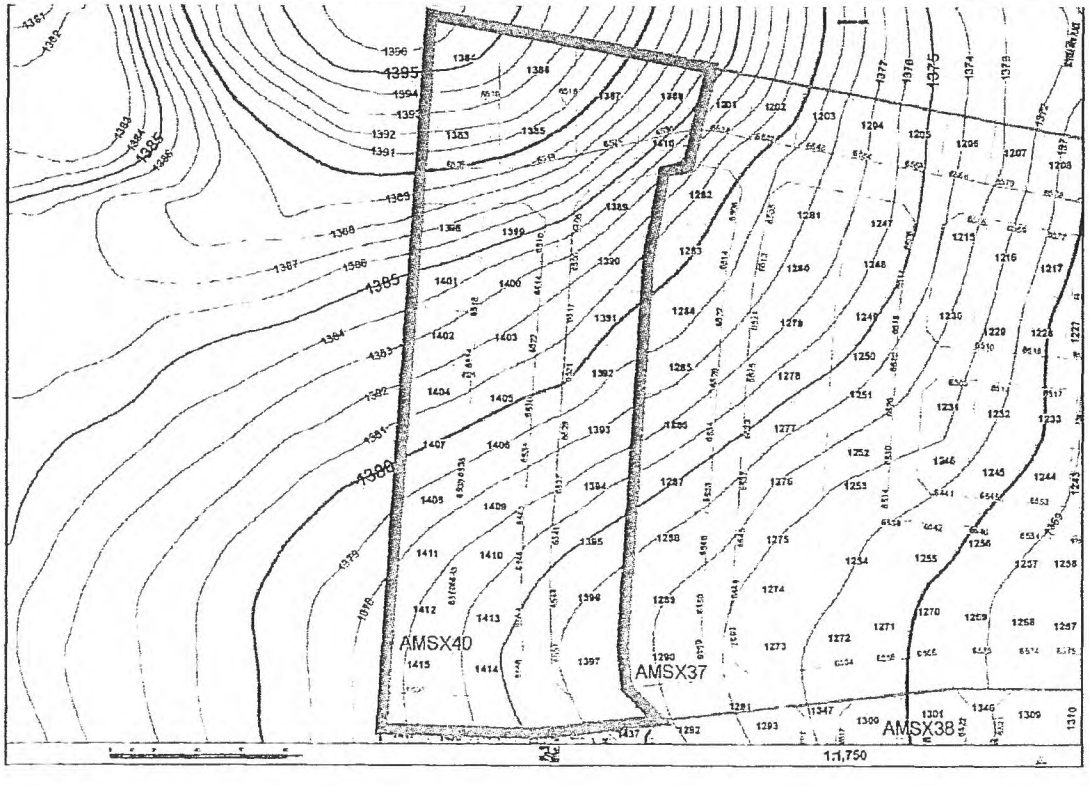
were at the time not yet sold to new owners and were still registered in the name of the township owner (developer). These two erven were therefore not included in the study.

Amandasig Extension 40 possesses the same characteristics as Amandasig Extension 37 in that the contours are more or less evenly spaced over the length of the township, with the contours being spaced

considerably closer in the northwestern part. The township has a slope in a predominantly southeasterly direction (Figure 3). Again, it was decided to split the township in half. The difference in height from the highest-lying property to the lowest-lying property is 22 meters. The 1385 meter contour was accepted as being the base contour line. Each erf affected by the base contour line was included in the upper part of the township (9 erven). The remainder of the erven (22 erven) in the township were included in the lower part of the township. The upper part of the township has a gradient of 1:10.37, therefore 1:10. The lower part of the township is subject to a slope of 1:18.37, therefore 1:18. The upper and lower part of the township has an average erf height of respectively 1388.9 meters and 1378.3 meters. The mean, standard deviation, variance and coefficient of variation for the upper and lower part of the township are depicted in Table 3.

Amandasig Extension 41 consists of 20 residential erven, ranging in size from 600 square meters to 940 square meters. The average erf size in the township is 711.95 square meters. The township is situated on the southern side of the estate and has a slope in a northeasterly direction overlooking the previous townships, Amandasig Extensions 37 and 40 (Figure 4). The contours applicable to the township are for the largest part evenly spaced. As was the case with the previous townships, it was decided to split the township in half. The difference in height from the highest-lying property to the lowest-lying property is 9 meters. The 1378 meter contour was accepted as being the base contour line. Each erf affected by the base contour line was included in the upper part of the township (8 erven). The remainder of the erven (12 erven) in the township were included in the lower part of the township. The upper part of the township has a gradient of 1:15. The lower part of this township is subject to a slope of 1:20. It is worth noting that the slopes inherent to the upper and lower part of the township are not as steep if compared to those of the previous townships. The upper and lower part of the township had an

Figure 3 Township Layout Amandasig Extension 40



average erf height of respectively 1378.75 meters and 1375.5 meters. The mean, standard deviation, variance, and coefficient of variation for the upper and lower part of the township are depicted in Table 4.

Ninapark Townships

The three Ninapark townships included in the study comprise a residential security estate known as "Shawu Security Estate." Again, the aim was, as far as possible,

Table 3 Amanadasig Extension 40: Results for Erf Height, Purchase Price, and Price per Square Meter

	Upper Part	Lower Part
Erf Height		
Mean	1389 meters	1378 meters
Standard deviation	4.3	2.9
Variance	18.4	8.2
Coefficient of variation	0.31%	0.21%
Purchase Price		
Mean	R589,888.89	R364,954.55
Standard deviation	R182,599.59	R90,611.93
Variance	R33,342,611,111.11	R8,210,521,645.02
Coefficient of variation	30.95%	24.83%
Price per Square Meter (price/m²)		
Mean	R601.38	R463.70
Standard deviation	R102.25	R86.14
Variance	R10,455.36	R7,419.56
Coefficient of variation	17.00%	18.58%

Figure 4 Township Layout Amandasig Extension 41

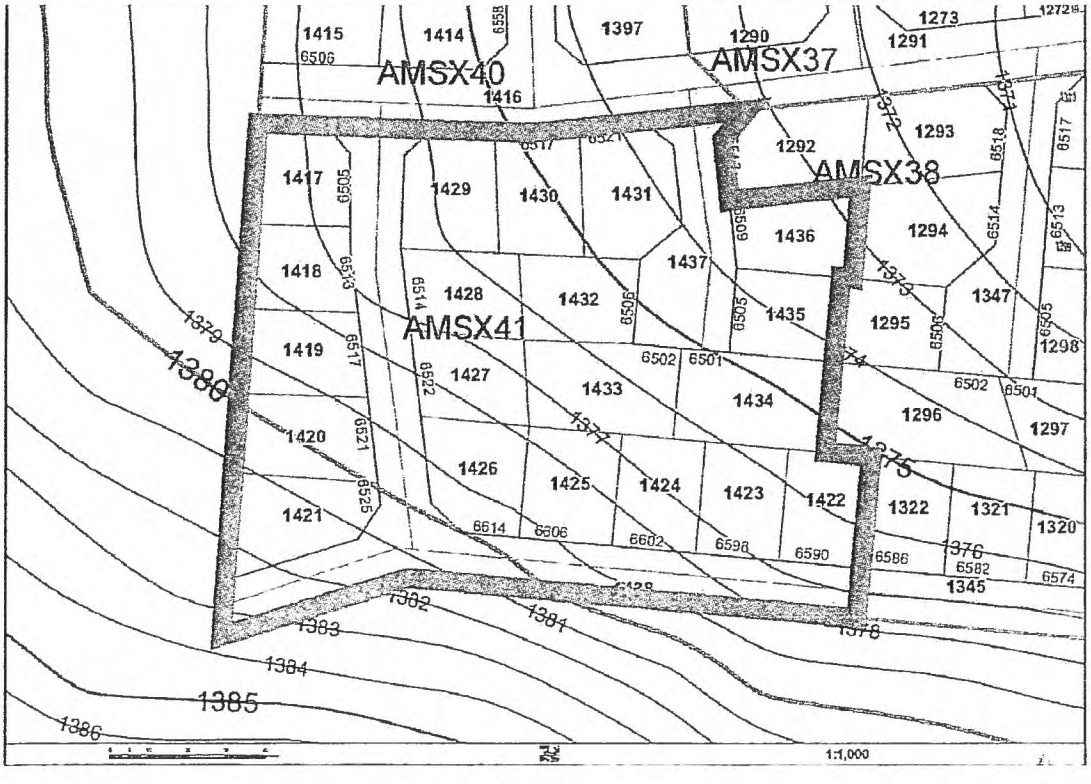


Table 4 Amanadasig Extension 41: Results for Erf Height, Purchase Price, and Price per Square Meter

	Upper Part	Lower Part
Erf Height		
Mean	1379 meters	1376 meters
Standard deviation	1.5	1.2
Variance	2.1	1.3
Coefficient of variation	0.11%	0.08%
Purchase Price		
Mean	R370,750.00	R347,500.00
Standard deviation	R101,140.28	R88,102.73
Variance	R10,229,357,142.86	R7,762,090,909.09
Coefficient of variation	27.28%	25.35%
Price per Square Meter (price/m²)		
Mean	R523.89	R497.15
Variance	R16,054.92	R24,158.06
Standard Deviation	R126.71	R155.43
Coefficient of variation	24.19%	31.26%

to establish a certain extent of homogeny regarding not only the individual townships, but also their relation to one another with specific reference to characteristics such as locality and geographical features. Shawu Security Estate is characterized by a view in a northerly direction.

With all the Ninapark townships included in the study, both the upper and lower part of the townships were characterized by erven smaller and larger than the township average. Furthermore, the zoning of the lots in all the townships are the same in terms of development parameters such as coverage. Therefore, a 1000-square-meter erf with a permissible coverage of 40% means that a dwelling house having a footprint of 400-square-meter may be constructed, both in the upper and lower part of the township.

Ninapark Extension 25 consists of 21 residential erven ranging in size from 1001 square meters to 1154 square meters. The average erf size of the erven included in the study in the township is 1027.70 square meters. The township has a northerly slope that gradually flattens out and evenly spaced contours (Figure 5).

Information on four of the erven in the township could not be obtained because these erven were still registered in the name of the township owner (developer). Furthermore, two of the erven in the township were only recently registered into the names of new owners; these erven were respectively registered into the names of the new owners on May 3, 2007 and August 18, 2006. Because the mentioned erven were registered at a much later stage than the rest of the erven in the townships, it was decided not to include these erven in the study. These recently registered erven also recorded purchase prices that were much higher compared to the rest of the erven in the township. It was assumed that the atypical purchase prices of the aforementioned erven related directly to their purchase dates.

The difference in height from the highest-lying property to the lowest-lying property is 8 meters. Because of the change in gradient applicable to the township, the 1305 meter contour was accepted as being the base contour line. Each erf affected by the base contour line was included in the upper part of the township (6 erven).

The remainder of the erven (11 erven) in the township were included in the lower part of the township. The upper part of the township has a gradient of 1:17.6, therefore 1:18. The lower part of the township is subject to a slope of 1:57.

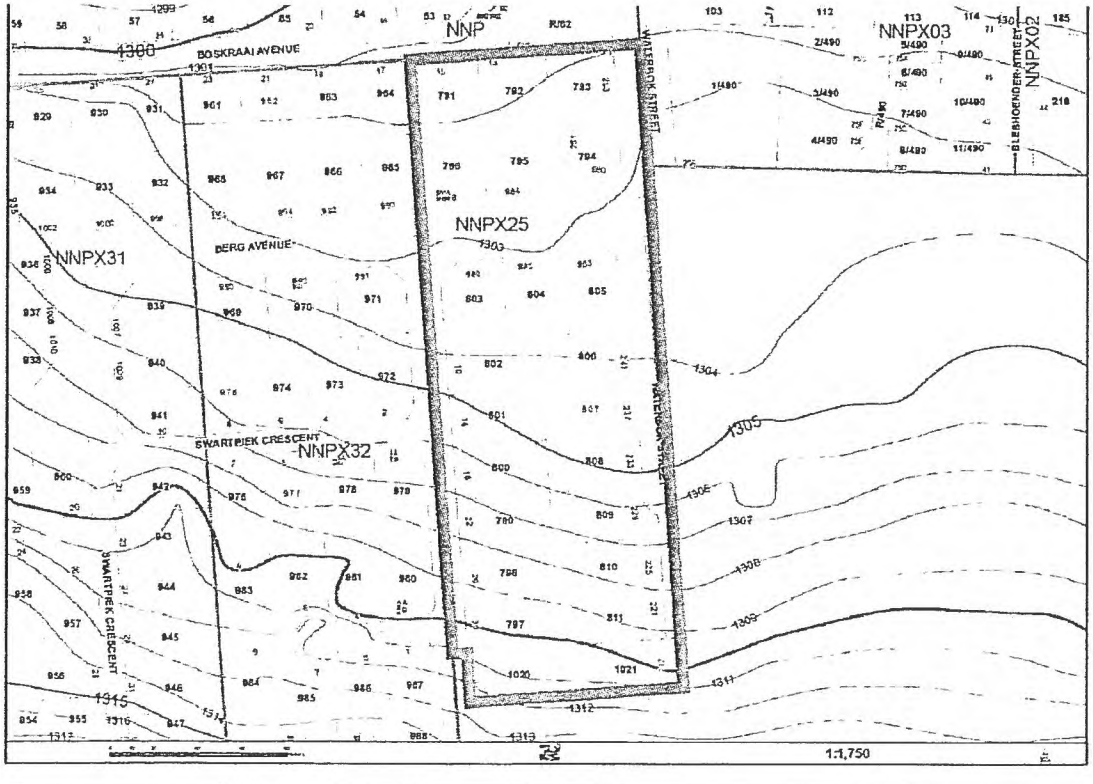
The upper and lower part of the township has an average erf height of respectively 1307.8 meters and 1302.9 meters. The mean, standard deviation, variance, and coefficient of variation for the upper and lower part of the township are depicted in Table 5.

Ninapark Extension 31 consists of 33 residential erven ranging in size from 846 square meters to 2088 square meters. The average erf size in the township is 1052.90 square meters. The slope inherent to the township bears the same characteristics as that of Ninapark Extension 25, although considerably more extreme in steepness (Figure 6). The slope applicable to the township noticeably changes at a specific street

Table 5 Ninapark Extension 25: Results for Erf Height, Purchase Price, and Price per Square Meter

	Upper Part	Lower Part
Erf Height		
Mean	1308 meters	1303 meters
Standard deviation	1.8	1.1
Variance	3.3	1.1
Coefficient of variation	0.14%	0.08%
Purchase Price		
Mean	R186,666.67	R163,636.36
Standard deviation	R13,662.60	R20,987.01
Variance	R186,666,666.67	R440,454,545.45
Coefficient of variation	7.32%	12.83%
Price per Square Meter (price/m²)		
Mean	R179.72	R160.56
Standard deviation	R15.87	R22.0
Variance	R251.87	R484.08
Coefficient of variation	8.83%	13.70%

Figure 5 Township Layout Ninapark Extension 25



in the township, called Swartpiek Crescent, when moving down in a north–south direction. The difference in height from the highest-lying property to the lowest-lying property is 46 meters. Because of the change in gradient applicable to the township, the previously mentioned street was accepted as the separation line so to speak. Each erf situated above, i.e., south of Swartpiek Crescent, was included in the upper part of the township (19 erven). The remainder of the erven (14 erven) in the township, situated below or north of

Figure 6 Township Layout Ninapark Extension 31

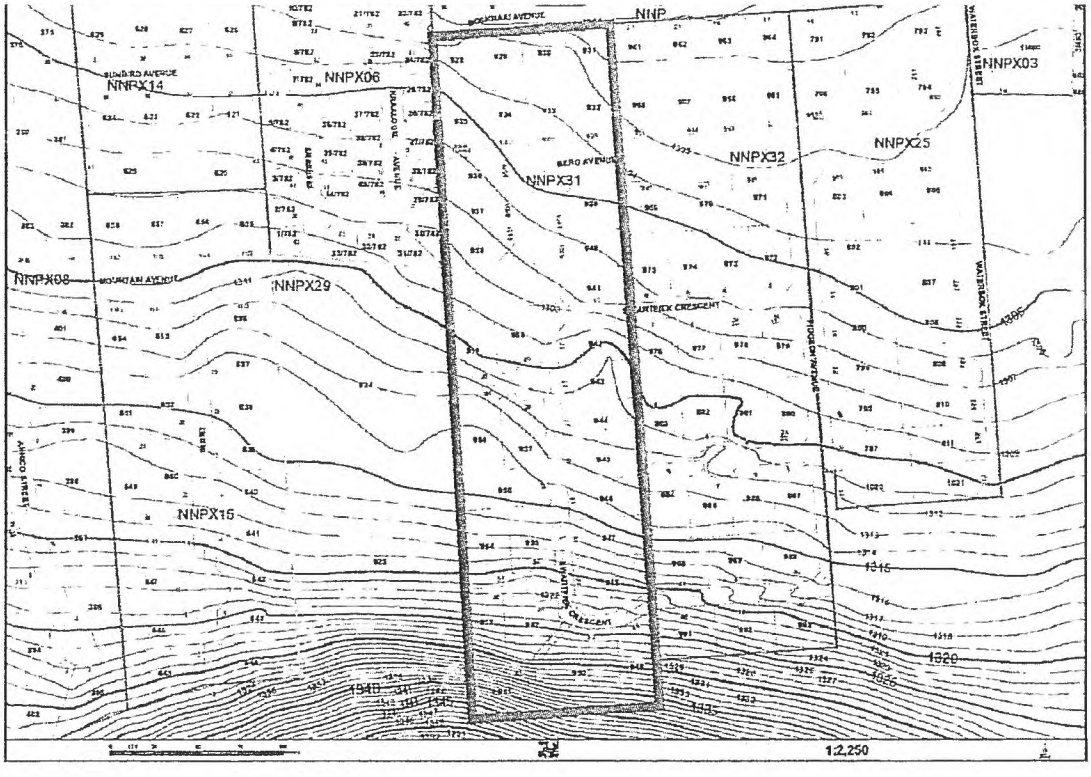


Table 6 Ninapark Extension 31: Results for Erf Height, Purchase Price, and Price per Square Meter

	Upper Part	Lower Part
Erf Height		
Mean	1318 meters	1305 meters
Standard deviation	8.8	1.7
Variance	77.0	2.9
Coefficient of variation	0.67%	0.13%
Purchase Price		
Mean	R270,842.11	R171,071.43
Standard deviation	R127,473.86	R19,824.09
Variance	R16,249,584,795.32	R392,994,505.49
Coefficient of variation	47.07%	11.59%
Price per Square Meter (price/m²)		
Mean	R227.06	R191.11
Standard deviation	R45.04	R25.29
Variance	R2,029.01	R639.82
Coefficient of variation	19.84%	13.24%

Swartpiek Crescent were included in the lower part of the township. The upper part of the township has a gradient of 1:6. The lower part of the township is subject to a slope of 1:22.

The upper and lower part of the township have average erf heights of respectively 1318.2 meters and 1304.9 meters. The mean, standard deviation, variance, and coefficient of variation for the upper and lower part of the township are depicted in Table 6. The coefficient of variation of the purchase price is much higher in the upper part of Ninapark Extension 31 than the lower part. The coefficient of variation of the price/m², however, is much lower and fairly similar.

Ninapark Extension 32 consists of 33 residential erven ranging in size from 887 square meters to 1200 square meters. The average erf size in the township is 967.54 square meters. The slope inherent to the township closely resembles that of Ninapark Extension 31. As was the case with Ninapark Extension 31, the slope applicable to the township noticeably changes at Swartpiek Crescent when moving down in a north-south direction (Figure 7). The difference in height from the highest lying property to the lowest lying property is 27 meters. Swartpiek Crescent was again accepted as the base line. Each erf situated above, i.e., south of Swartpiek Crescent was included in the upper part of the township (18 erven). The remainder of the erven (15 erven) in the township, situated below or north of Swartpiek Crescent were included in the lower part of the township. The upper part of the township has a gradient of 1:9.28, therefore 1:9. The lower part of the township is subject to a slope of 1:31.6, therefore 1:32.

The upper and lower part of the township have average erf heights of respectively 1313.6 meters and 1303.5 meters. The mean, standard deviation, variance, and coefficient of variation for the upper and lower part of the township are depicted in Table 7.

A summary of the average purchase price and prices per square meter, as well as the difference between mentioned parameters pertaining to each of the townships, are shown in Table 8. The relative differences between the upper and the lower parts of the townships are expressed in graphical form in Figure

Figure 7 Township Layout Ninapark Extension 32

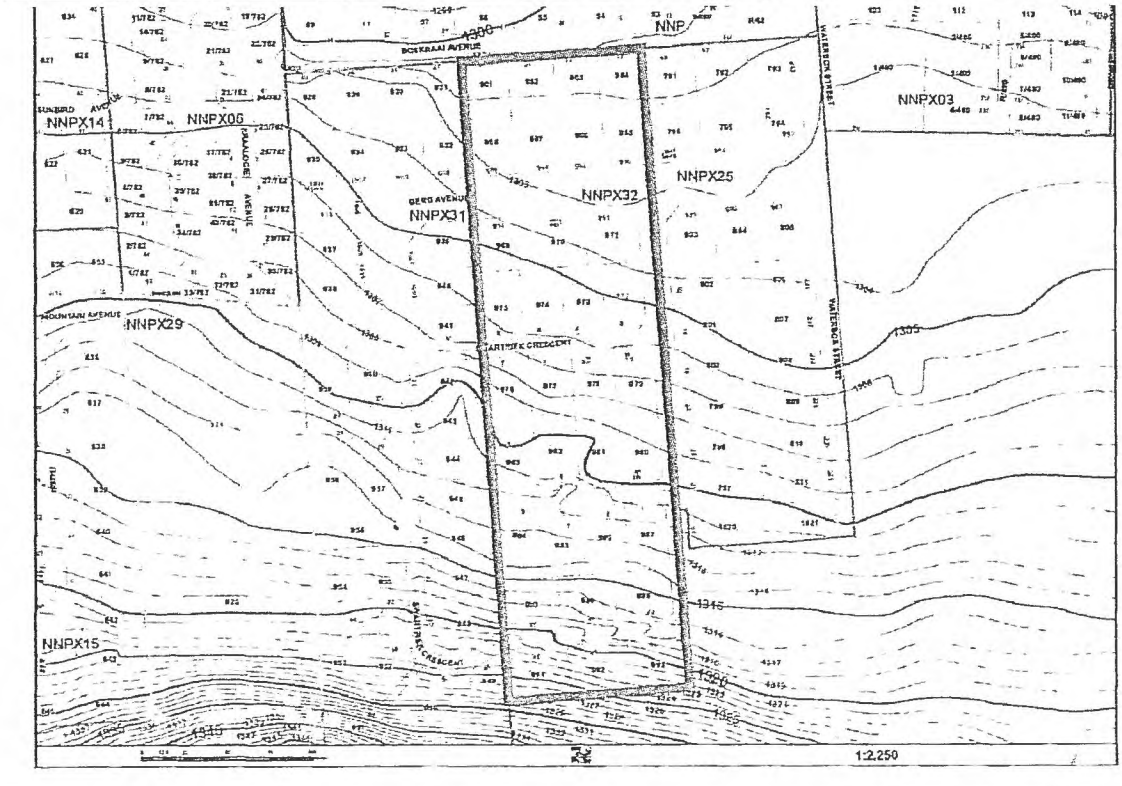


Table 7 Ninapark Extension 32: Results for Erf Height, Purchase Price, and Price per Square Meter

	Upper Part	Lower Part
Erf Height		
Mean	1314 meters	1304 meters
Standard deviation	5.3	1.4
Variance	28.1	2.1
Coefficient of variation	0.40%	0.11%
Purchase Price		
Mean	R233,888.89	R170,333.33
Standard deviation	R55,955.75	R19,036.31
Variance	R131,045,751.63	R362,380,952.38
Coefficient of variation	23.92%	11.18%
Price per Square Meter (price/m²)		
Mean	R232.48	R184.53
Standard deviation	R50.57	R15.14
Variance	R2,557.13	R229.23
Coefficient of variation	21.75%	8.21%

Table 8 Difference in Purchase Price and Price per Square Meter (Calculated for all the Townships)

		Gradient	Average Purchase Price	Average Price/m²
Amandasig Extension 37	Upper Part	1:11	R338,533.33	R426.73
	Lower Part	1:14	R247,633.33	R377.57
	Difference (%)	21%	36%	13%
Amandasig Extension 40	Upper Part	1:10	R589,888.89	R601.38
	Lower Part	1:18	R364,954.55	R463.70
	Difference (%)	44%	62%	30%
Amandasig Extension 41	Upper Part	1:15	R370,750.00	R523.89
	Lower Part	1:20	R347,500.00	R497.15
	Difference (%)	25%	7%	5%
Ninapark Extension 25	Upper Part	1:18	R186,666.67	R179.72
	Lower Part	1:57	R163,636.36	R160.56
	Difference (%)	68%	14%	12%
Ninapark Extension 31	Upper Part	1:6	R270,842.11	R227.06
	Lower Part	1:22	R171,071.43	R191.11
	Difference (%)	73%	58%	19%
Ninapark Extension 32	Upper Part	1:9	R233,888.89	R232.48
	Lower Part	1:32	R170,333.33	R184.53
	Difference (%)	72%	37%	26%
Overall Average			35.66% (36%)	17.50% (18%)

8, while the coefficients of variation for both the upper and the lower parts of the townships are summarized in graphical form in Figures 9 and 10.

Findings and Discussion

As expected, the results show that higher lying properties, that is properties having a better view, are more expensive than lower-lying properties even though some of the lower-lying properties also possess an acceptable view.

From the study it is evident that higher-lying properties are, on average, 36% more expensive in terms of purchase price and 18% more expensive in terms of price per square meter. In addition to

Figure 8 Relative Differences between Upper and Lower Parts of the Townships: Gradient, Price, and Price per Square Meter

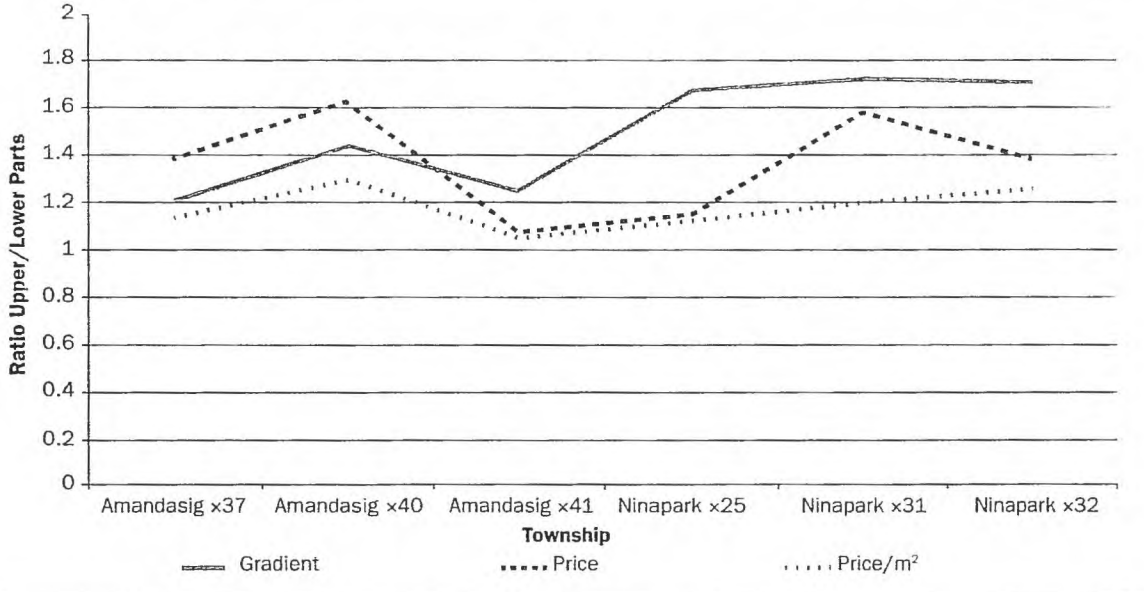


Figure 9 Coefficients of Variation: Upper Parts of Townships

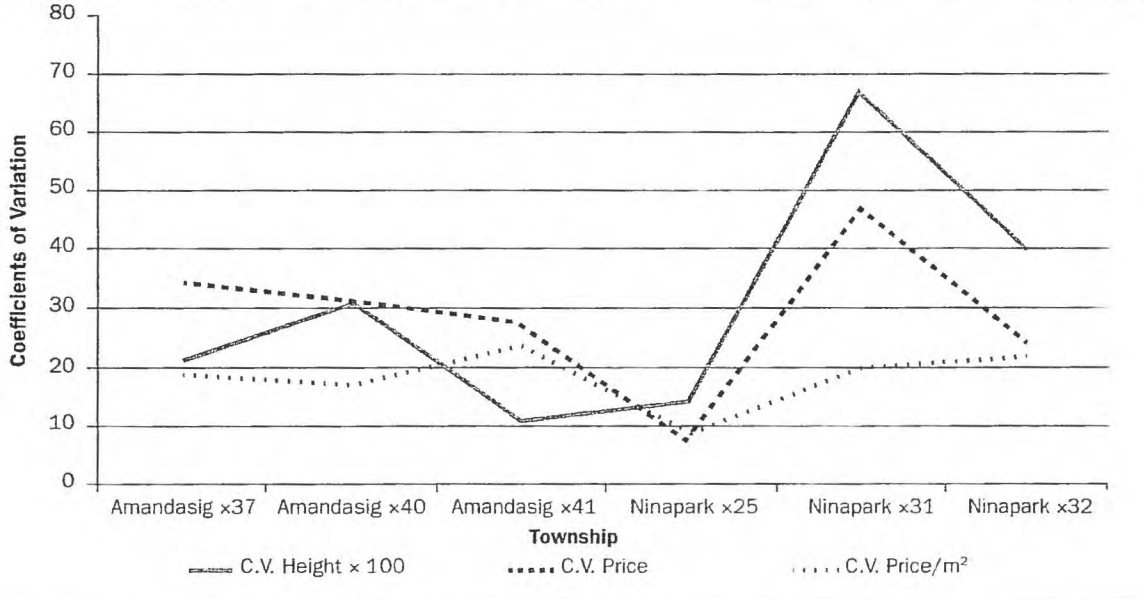
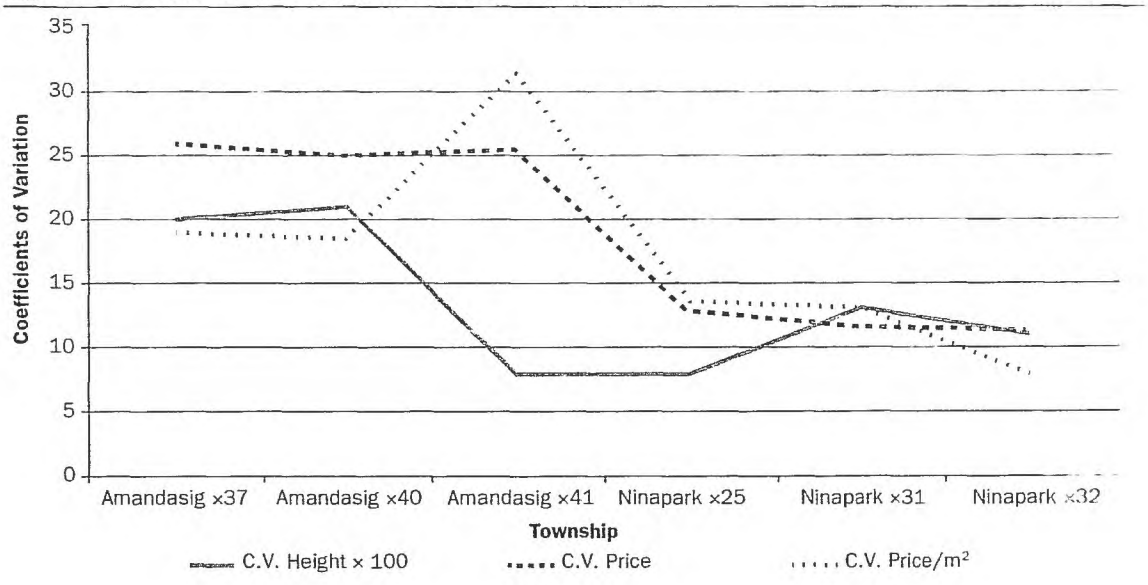


Figure 10 Coefficients of Variation: Lower Parts of Townships



establishing that higher-lying properties are more expensive than their lower-lying counterparts, two other aspects became apparent. First, the difference in the average purchase price is considerably more than the difference in the average price per square meter. Figure 8 indicates a closer correlation between the different gradients and the different prices per square meter than the correlation between different gradients and the different purchase prices for all townships. This is to be expected, as the purchase price is determined by not only the view, but also the area of the erf.

Second, the average differences in both purchase price and price per square meter are significantly more for properties situated on a steep slope than for properties situated on a moderate or gradually decreasing slope. A comparison of Figures 9 and 10 shows that the absolute values of the coefficients of variation generally are lower in the case of the lower parts of the townships. This leads to the conclusion that the price per square meter for higher erven are determined to a greater extent by the height than the price per square meter for lower-lying erven. In other words, the views from lower-lying erven do not vary as much as the views from higher erven.

This is to be expected, as all the erven in the townships investigated are against the slope of a mountain range and the slope of the mountain generally increases with height. An interesting study would therefore be to determine the coefficients of variation in heights and prices per square meter for comparable townships with different erf heights but similar gradients.

Two of the townships included in the study, Amandasig Extension 41 and Ninapark Extension 25, are subject to a relatively moderate and even slope. A possible explanation for the difference in average purchase price and price per square meter or the lack thereof with specific reference to Amandasig Extension 41 and Ninapark Extension 25 may be the extent of the slope applicable. The slopes of the lower parts applicable to the other townships are steeper than or almost as steep as the upper parts of Amandasig Extension 41 and Ninapark Extension 25 townships. The physical shape of the slopes of the other townships are therefore much more distinct, hence the considerable difference in especially the purchase prices achieved for the respective upper and lower levels of the other townships. As indicated in Table 8, the differences in the average purchase price and price per square meter of said townships are below the average mentioned above. Also noteworthy is the fact that the purchase price average is more than the price per square meter average. Again, it should be noticed that the difference between purchase price and price per square meter are only marginal for the townships

possessing a moderate slope, i.e., Amandasig Extension 41 and Ninapark Extension 25.

Unlike some of the studies in the literature that focus on water-based views, this study was conducted in inland Pretoria. It is well known that properties having an ocean view or view over a lake are orientated to maximally exploit such a view with less emphasis placed on orientation to sun and its heat or light. In terms of the study conducted here, a further question arose that deals with the orientation of the views. In the southern hemisphere, and specifically South Africa, the preference is to construct houses to face in a northerly direction in order to maximally utilize the light and heat of the sun. The latter is, almost without exception, applicable to inland properties only.

Three of the six townships—Ninapark Extensions 25, 31, and 32—have a northerly view. Amandasig Extensions 37 and 40 are subject to a slope in a predominantly southeasterly direction. Amandasig Extension 41 on the other hand has a view in a northeasterly direction. From the discussion, it is evident that the impact of a view on all of the townships was positive although to a different degree. Interestingly enough, Amandasig Extension 40, with an inherent view facing southeast, recorded the highest difference in average pertaining to both purchase price and price per square meter.

Equally so, Ninapark Extension 25 (northerly view) and Amandasig Extension 41 (northeasterly view) recorded the second most and lowest differences in average pertaining to purchase price and price per square meter. In terms of the study, the conclusion could therefore be made that a view has a positive impact on residential property values irrespective of the specific direction of such a view. The study clearly indicated that people are willing to pay more for properties with a view regardless the direction of such a view.

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Web Connections

Internet resources recommended by the Y. T. and Louise Lee Lum Library

African Real Estate Society
http://www.afres.org.za/new%20home_eng.htm

The Association of South African Quantity Surveyors
http://www.asaqs.co.za/

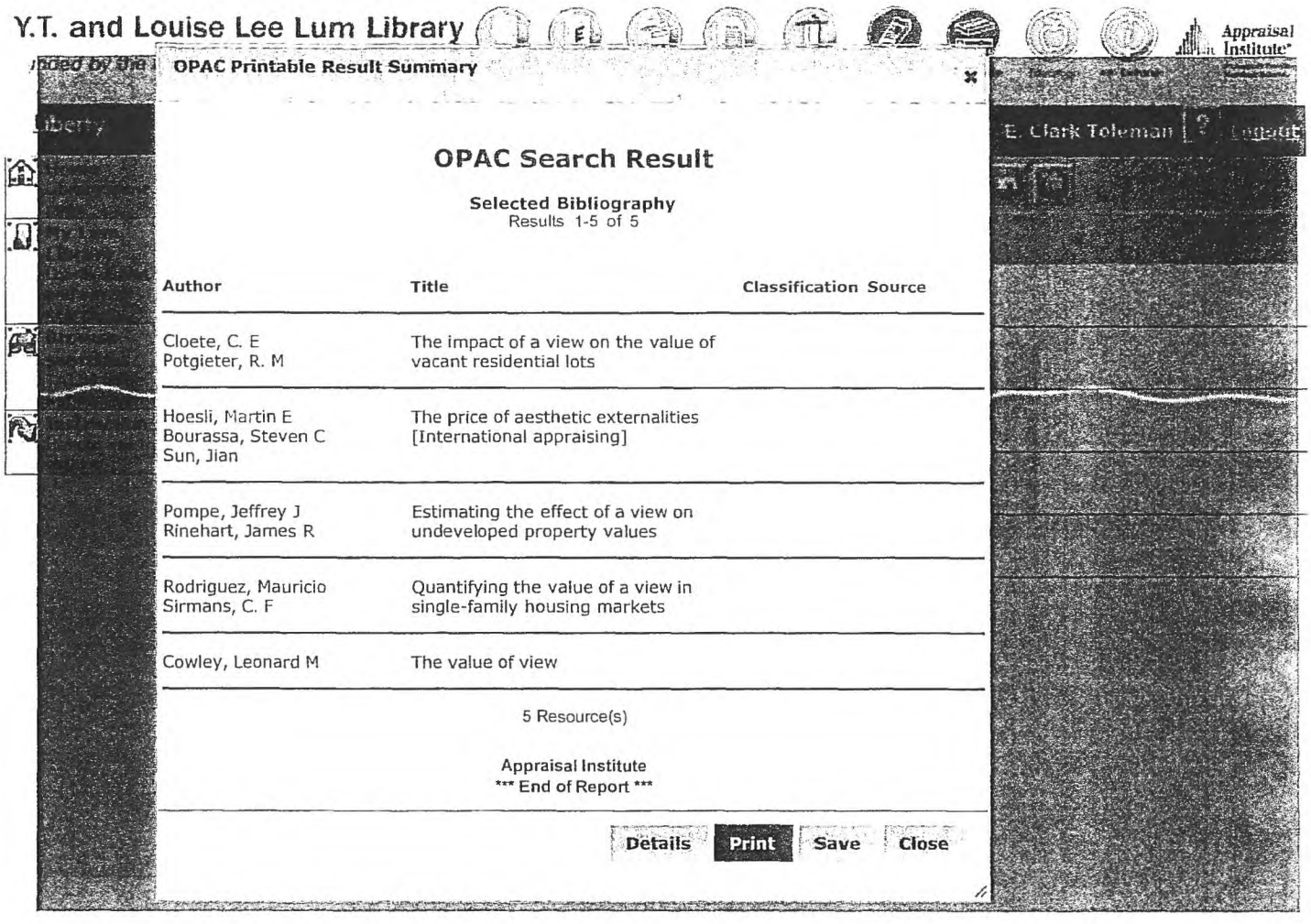
City of Tshwane, South Africa
http://www.tshwane.gov.za/

Estate Agency Affairs Board of South Africa
http://www.eaab.org.za/

South African Council for the Property Valuers Profession
http://www.sacpvp.co.za/

South African Institute of Valuers
http://www.saiv.org.za/

South African Property Owners Association
http://www.sapoa.org.za/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Rinehart, James R
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The Impact of Wireless Towers on Residential Property Values

BY CAROL C. McDONOUGH, PhD

The Telecommunications Act of 1996 authorized the Federal Communications Commission (FCC) to expand the wireless telephone industry by auctioning off six personal communication services (PCS) licenses per geographic area. Because wireless communication antennae must be mounted on high, unobstructed locations, the build out of the PCS industry has led to the need for additional communications towers.

Abutters and neighbors of these communication towers have often opposed their construction, citing aesthetic and health concerns, and alleging a consequent decrease in property values. Such opposition has primarily targeted towers located in residential zones, where such towers are generally less harmonious with surrounding structures. This article examines the impact of proximity to a wireless tower on residential property values.

Mundy (1992) and Patchin (1991) report that a nuisance feature, or source of stigma, typically reduces the market value of a property. It is the perceived undesirability of a source of stigma that leads to reduction in property value. As Farber (1998) explains, perceived risks are a function of subjective risk factors as well as statistical risks; whether the source of the perception is quantitative or subjective, the effect on property values may be the same.

In *Komis v. City of Santa Fe*, the Supreme Court of New Mexico awarded damages for the perceived decline in property value resulting from a source of stigma, even when no objective evidence demonstrated that the perceived nuisance was unsafe, and when market loss was not proven by comparable sales data. The Criscuola decision established the "fear in the marketplace" theory of damages, by allowing fear in the marketplace regarding transmission lines, rather than actual epidemiological evidence of adverse health effects from electromagnetic frequencies (EMF), to affect appraised valuation. The literature (for example, Mundy 1992, Levitt 1995, and Harrison 1989) includes high-tension wires and utility poles as sources of stigma to a property.

Are wireless towers also a source of stigma? Because most wireless towers have been constructed recently, time-series data for a valid empirical study of

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lines and California residential property values found diminutions of between 18 and 31 percent in lot values from properties abutting power line easements.

Studying residential home prices in Vancouver, Canada, Hamilton and Schwann (1995) reported that properties adjacent to 60 kV power lines lost 6.3 percent of their value due to proximity and the visual impact.

According to the Cowger, Bottemiller, Cahill study (1996), the value of Oregon single-family residential property fell by less than 10 percent because of proximity to overhead transmission lines.

Gregory and von Winterfeldt (1996) determined that the public perception of health risks associated with proximity to power lines led to a reduction in property value; post-1979 property valuation studies showed a decline in values of 5 to 10 percent.

According to Bolton and Sick (1999), real estate professionals, (even those performing studies for power line companies) believed that concern about the adverse health effects of EMF from power lines resulted in a reduction in the values of nearby properties. Bolton's earlier study (1994) found that the general public's perception that EMF were harmful drove down the values of adjacent property.

Jaconetty (2001) concluded that, on a subjective level most people believe that the electromagnetic fields generated by high-voltage towers and lines adversely influence real property values, primarily because of health concerns.

SIMILARITIES BETWEEN POWER LINES AND WIRELESS TOWERS

According to the studies cited above, proximity to electric lines and towers is associated with a reduction in residential property values because of aesthetic and health concerns. In this section, the similarities between the aesthetic and health effects of electric lines and wireless towers are examined.

Consider first aesthetic similarities. The literature states that the view enjoyed from a property may affect its value —a poor view such as that of utility pole and high-tension wires, detracts from value. The aesthetic effects of transmission lines and wireless towers are similar. Both electric lines and wireless towers rise above building height in typical single-family neighborhoods, therefore, they are visible for some distance. Unless camouflaged, these structures typically do not complement rural or suburban landscapes.

Are health concerns surrounding electric lines also applicable to wireless towers?

> ...perceived risks are a function of subjective risk factors as well as statistical risks; whether the source of the perception is quantitative or subjective, the effect on property values may be the same.

Technically, radio waves from wireless antennae differ from the electromagnetic fields produced by power lines. Although both radio waves and EMF are part of the electromagnetic spectrum, electric power in the United States operates at 60 Hz, while cellular phones operate at 860–900 MHz and PCS phones operate at about 2000 MHz. As Moulder (1998) explains, radio waves

are non-ionizing—that is, the energy of the particles is too low to break chemical bonds. Power lines are nonthermal, that is, they produce no significant nonionizing radiation. Fields from power lines do not radiate energy into space, and the fields cease to exist when power is turned off.

However, the technical distinction between radio waves emitted by wireless antennae and low-frequency EMF emitted by electric lines is not generally understood. The federal government has issued guidelines regarding safe levels of exposure for both power lines and wireless antennae, but there is ongoing controversy within the scientific community about whether these government guidelines are too lax. Because a final verdict on the safety of both electric lines and wireless antennae is still moot, many people are fearful about living in proximity to either type of structure. As Rikon (1996) points out, the fear in marketplace argument established by the Criscuola decision regarding EMF has also been invoked regarding health concerns about cell towers.

In other cases, courts have ruled for the wireless companies, finding that community opposition was not sufficient grounds for denying a permit for tower construction.

EVIDENCE OF CONCERNS ABOUT WIRELESS TOWERS

In this section, evidence is presented about the significant level of concern about the aesthetic and health effects of wireless towers. The evidence is grouped into three categories: (1) lawsuits regarding wireless tower construction, (2) organizations and conferences dealing with the harmful effects of wireless towers, and (3) municipal moratoria on wireless tower construction and mandatory visual impact studies.

Lawsuits

Numerous lawsuits have been filed regarding the actual or proposed construction of wireless towers. As Foster and Carrel (1999) discuss, case law on the issue is somewhat ambiguous. Some courts have ruled for the municipality opposing wireless tower construction. In *Franklin v. Nextel*, for instance, the court found that a 120 foot wireless tower erected in a residential neighborhood was so incongruous and damaging to the neighborhood that it must be dismantled. In Jacksonville, Florida, in 1996, community opposition to a 150 foot tower in a residential neighborhood led the wireless company, InterCel, to take it down.

In other cases, courts have ruled for the wireless companies, finding that community opposition was not sufficient grounds for denying a permit for tower construction. For instance, in *Westinghouse v. Hampton*, the court found that the Telecommunications Act preempts tower regulation based on perceived health concerns and that "aesthetics alone. . . [are not]... an adequate reason to deny... use of... property." OMPUSA, dealing specifically with the location of towers in residential neighborhoods, found that "towers cannot always be compatible with the character of the surrounding property. [I]n order to meet...demand...towers have to be... located in...residential, commercial, and rural areas."

Organizations, Conferences, and International Concerns

Concerns about wireless towers have resulted in the formation of organizations and the scheduling of conferences to voice these concerns. The EMR Alliance argues that electromagnetic radiation from wireless antennae is hazardous to life and public health. The Communication Workers of America and the EMR Alliance jointly published *Your Community Guide to Cellular Phone Towers* to help consumers mobilize against the placement of wireless transmission facilities that could adversely affect their health, safety, property values, or the aesthetics of the community.

The 2000 International Conference on Cell Tower Siting included testimony from numerous scientists on the health effects of exposure to high frequency EMF. Several questioned the safety of current standards for exposure to radiation from wireless antennae.

The US Supreme Court, in January 2001, denied a writ for certiorari filed by the Ad Hoc Association of Parties Concerned about the Federal Communications Commission Health and Safety Rules (AHA). Fifty-four petitioners filed as co-petitioners; similar appeals by the Communications Workers of America and The Cellular Phone Task Force were consolidated with the AHA case. The AHA had charged that the FCC's ruling, that adverse health effects cannot be discussed in reviewing zoning rules or permit applications for cell towers, denies the public their first amendment right to free speech.

In Europe, opposition to cell tower construction has led to lawsuits and the destruction of wireless equipment. In an attempt to quell concerns about the health effects of wireless towers, one Italian mobile phone operator, Omnitel, launched an Internet site on which residents can check the amount of electromagnetic radiation emitted by nearby cell phone towers and antennas.

Municipal Regulations

Responding to community concerns about the negative impact of wireless towers, more than 150 municipalities have adopted temporary moratoria on wireless tower construction. Although the Telecommunications Act prevents a municipality from permanently banning wireless tower construction, the Act does allow municipalities to establish criteria based on aesthetic—but not health— considerations.

Community concern has also led to municipal enactment of zoning ordinances regulating wireless tower construction by

- Requiring that the visual impact of wireless towers be disclosed prior to construction
- Limiting tower construction to municipal sites, or encouraging such sites
- Encouraging co-location and the use of concealed structures

In response to community concerns about the aesthetics of wireless towers, so-called stealth towers—in the form of pine and palm trees—have been erected in more than 200 locations in the United States. The issue of the visual impact of wireless towers has also been addressed by placing antennas on silos, church steeples, tall buildings, and water towers.

CONCLUSION

It has been shown that aesthetic and health concerns about electric lines and towers lead to a reduction in the valuation of nearby residential properties. There are similar concerns about wireless towers; these concerns are widespread and have been expressed in multiple venues. Therefore proximity to a wireless tower needs to be considered as a negative amenity that may reduce residential property valuation. However, the severity of the aesthetic impact may be mitigated by screening and concealment of the wireless towers.

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Broadcasting, Wireless cell towers

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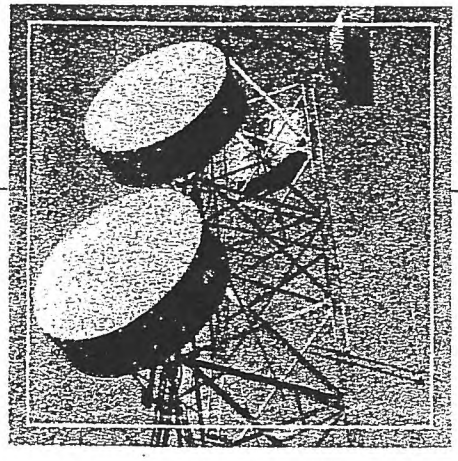


The Impact of Communication Towers on Residential Property Values

Overview

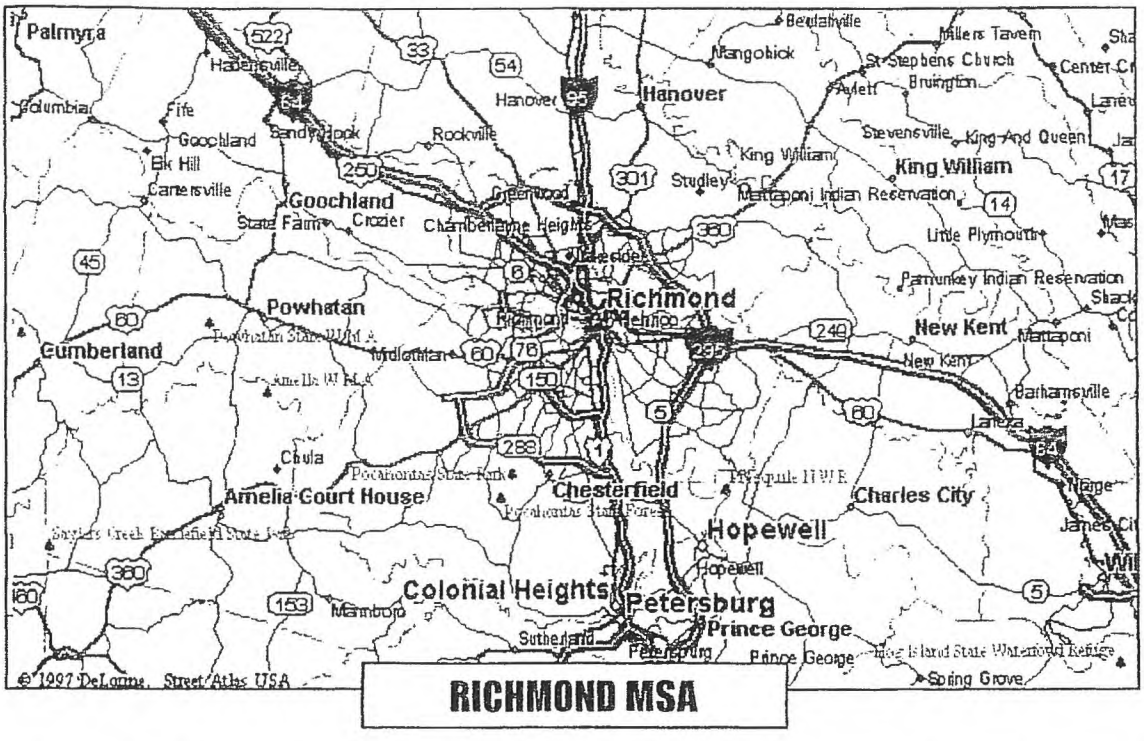
A major cellular phone provider recently hired our firm to conduct a study of the impact on residential property values due to proximity or view of communication towers. A sufficient amount of empirical data was available to develop a comparative analysis model to demonstrate the findings of this study.

By Allen G. Dorin, Jr., MAI, SRA and Joseph W. Smith, III

8p.

ROW March/April 1999

Broadcast



RICHMOND MSA

The methodology employed indicated that the presence of communication towers resulted in essentially no impact on residential values in the price range of $70,000 to $150,000 in those areas investigated. The upper part of this range is above the average sales price of a single-family dwelling in the Richmond MSA.

Introduction

The crux of the market study was to inform the client of the economic impact that communication towers may have on nearby improved residential housing values within the Richmond Metropolitan Statistical Area. The client specifically wanted to use the findings of the study to determine whether there was sufficient market evidence to conclude that the presence of communication towers does in fact, negatively influence the market value of improved residential dwellings by reason of proximity or view. In turn, the client intends to use the findings and conclusions of the report to assist in the acquisition of new tower sites.

Background

The subject study area is in the Richmond-Petersburg Metropolitan Statistical Area (MSA), which consists of the cities of Richmond, Petersburg, Colonial Heights, and Hopewell; and the counties of Chesterfield, Henrico, Hanover, Goochland, Powhatan, New Kent, Charles City, Dinwiddie, and Prince George in central Virginia. The following map provides a brief overview of the Richmond MSA market study area.

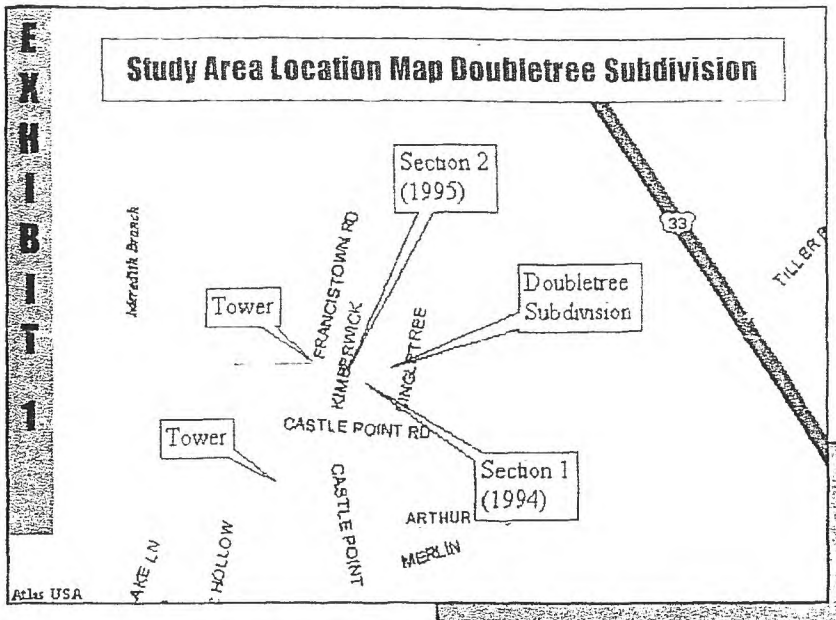
At the request of the client, the market study was restricted to the counties of Chesterfield, Goochland, Hanover, Henrico, and New Kent and the city of Richmond. A thorough search for adequate market data on which to base the findings of the study required a great deal of research and analysis from the counties previously mentioned. By process of elimination, the study parameters were reduced to the counties of Chesterfield and Henrico. The counties of Goochland, Hanover, New Kent, and city of Richmond were excluded, due to the lack of sufficient market evidence available to prove the existence, if any, of any adverse effects upon residential values because of an individual tower location. The individual test sites were eliminated for reasons such as location in remote undeveloped areas, industrial neighborhoods, commercial corridors, or along interstate highways.

From the research available, six test sites were located. These tower sites were selected based on their proximity to or visibility from residential properties that were deemed to have the possibility of potential negative impact upon property values.

Location of Test Sites

The county of Chesterfield, located in the south and southwest quadrants of the MSA had one test site located just east of a townhouse project. This county was traditionally a bedroom community of the city of Richmond until the 1970s during a period when a building boom occurred. It has become a heavily populated suburban county with a full complement of residential, commercial, and industrial land uses.

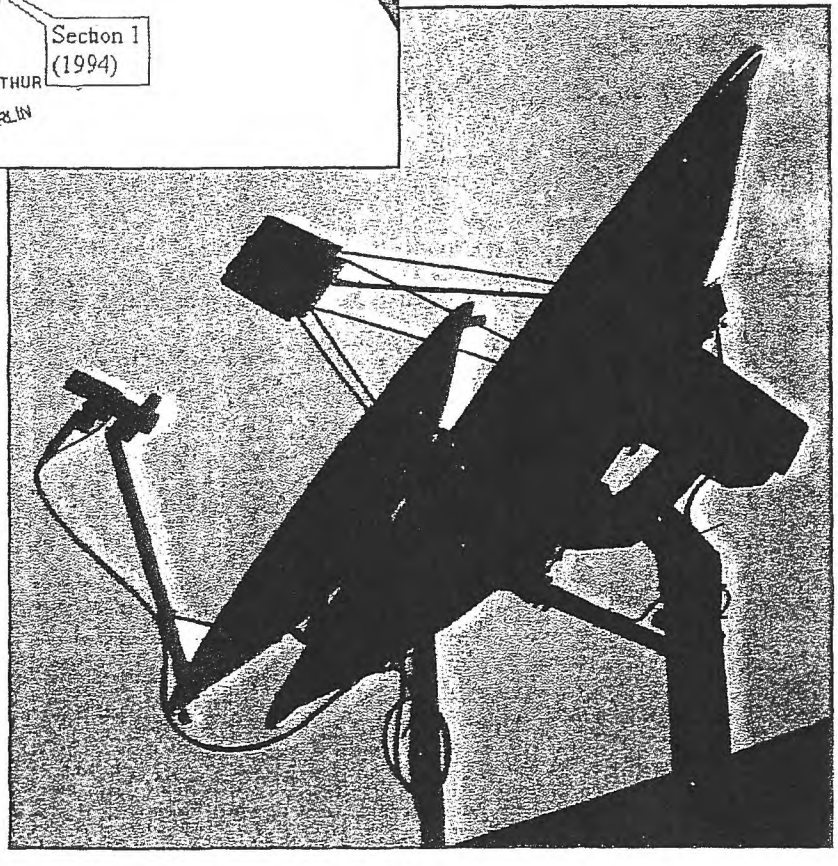
The county of Henrico, located in the western, northern, and eastern quadrants of the MSA had the remaining



five test sites used in this study. The county was the original bedroom community of the city of Richmond. Because of proximity to major linkages with the city of Richmond, its establishment as a significant suburban entity preceded that of Chesterfield County.

Tower Research

The client was particularly interested in identifying and locating communication towers in excess of 150 feet in height that may have potential negative impact on nearby residential property values. Only six existing tower sites were deemed applicable to this study out of the 77 sites inspected. The structure of the towers varied from steel lattice type to steel columnar type with guy-wire supports. Three of the tower sites were located within close proximity of single family detached residential subdivisions ranging in price from $70,000 to $150,000. This price range is typical of most first time homebuyers in the areas investigated. Of the three remaining tower sites, one was located near a multi-family residential apartment complex and the other two within view of a single family townhouse development. To clarify the methodology and analysis used to arrive at a conclusion, only one of the three residential subdivisions studied will be discussed.



Explanation of Research Methodology

Research was conducted at each of the respective localities previously mentioned in order to locate existing communication tower sites. This task was primarily accomplished by interviewing planning department officials familiar with this type improvement, obtaining copies of meeting minutes of the governing boards or council authorizing the construction of the towers, and familiarity with the general vicinity of the Richmond MSA. Based on the data obtained from research, the tower sites were plotted on maps showing their relative proximity to residential development.

Primary attention was focused upon residential properties adjacent to or surrounding each of the tower sites investigated. Those properties deemed to be located in sparsely developed areas, industrial neighborhoods, or commercial corridors were eliminated from further study.

After selecting the six test sites, further information was gathered including physical information on the respective towers, correspondence regarding the permitting process, specific public data on the residential sites deemed to be

within the potential impact area of the tower, and sales/physical data on similarly improved properties in the general vicinity but not considered impacted by the tower. If possible, interviews were conducted with property owners and real estate agents who had current listings of properties included in the analysis.

After assimilating the gathered data, a summary of each test site neighborhood was prepared by means of quantitative and qualitative adjustment techniques for a comparative analysis.

Brief Overview of Analysis

According to the Eleventh Edition of *The Appraisal of Real Estate*, published by the Appraisal Institute (Chicago: 1996, page 414), "A comparative analysis includes the consideration of both quantitative and qualitative factors. Quantitative adjustments are developed as either dollar or percentage amounts. Factors that cannot be quantified are dealt with in qualitative analysis." In essence, the quantitative method is a mathematical procedure that is typically accomplished through a paired sales or cost comparison analysis. The qualitative analysis is much more subjective in its approach, and is commonly used when no basis for a quantitative adjustment can be concluded.

The sales of the properties included in the analysis were sorted according to price paid per square foot of dwelling area after adjusting each property to a common denominator (quantitative). The potential impact of the respective tower sites was rated for each property based upon observation. The impact rating was then compared to the adjusted prices paid per square foot as an indication of any definitive correlation (qualitative)

Analysis

Doubletree Subdivision, one of the three subdivisions studied, will be examined in order to explain the methodology and thought process used throughout the study analysis. Doubletree is a 67-lot subdivision located

in a developing area in Henrico County on the east line of Francistown Road between Hungary and Springfield Roads (See Exhibit 1, page 11). Section 1 was approved in 1994 and Section 2 in 1995. Construction of the dwellings began in 1995. The majority of the lots sold over a two-year period, a rate considered average for this price range. The average lot size is .204 acre (8,903 square feet) with a minimum width of 63 feet. Improved properties sold mostly in the $135,000 to $145,000 price range. All of the dwellings are two story and most have front-loading garages.

There are two communication towers visible to properties in this subdivision. One is located on the west side of Francistown Road at the west end of Wildtree Drive. It is a 168-foot high steel lattice structure, which was built in 1964. It is visible from all of the front yards of the lots fronting on Wildtree Drive and the rear yards of those lots backing to Francistown Road.

Those property owners adjacent to Francistown Road did state that the seller discounted the lots for exposure to that road.

The other tower is also located on the west side of Francistown Road but south of the subdivision. It is a 305-foot high steel lattice tower, which was constructed in 1982. Because of the wooded area between it and the subject subdivision, its visual impact is less dramatic; however, it is within noticeable sight of the lots in Section 1 backing to Francistown Road.

Out of 67 lots, 25 improved properties were studied within the subdivision. In analyzing the properties, all those adjacent and nearby lots deemed to be impacted by their proximity to and/or view of the two towers in question were researched. In addition, several other properties in the subdivision considered to have only minor or no impact at all were also researched. The recorded sales price for each of the 25 properties was broken down to a unit price per square foot for the purposes of comparison. The unit prices, before adjustments, range from $64.54 to $93.75 per square foot, with a median unit price of $77.47 per square foot.

For the comparative analysis model, a hypothetical base dwelling was created to represent the typical improved dwelling in Doubletree Subdivision. The hypothetical dwelling was a 1,800 square foot two story, colonial style having central air and heat, 2 1/2 baths, no fireplace, attached one car garage, no frontage on Francistown Road, and sold in 1997. All of the 25 improved sales were then compared to the base dwelling with adjustments being made relative to time of sale and major physical and location differences. A 5 percent annual appreciation rate for time was used in the model.

In an effort to achieve total sellout, the lots abutting Francistown Road were given a $4,000 discount, according to the developer/builder. Thus, an upward adjustment of $4,000 was made to the improved lots that abut Francistown Road for inferior location on a busy thoroughfare.

The remaining adjustments were based on differences in the costs of the various building components. After application of the adjustments, the properties were then sorted in ascending order by the indicated adjusted sale price per square foot. The spreadsheet in (See Exhibit 2.) provides a descriptive summary of the comparative analysis model.

Primary attention was focused upon seven improved lots that were deemed to have major impact potential due to their proximity to the tower located on the west side of Francistown Road directly across from the entrance of the subdivision via Wildtree Drive. Two out of the eight lots are situated at the northeast entrance of Doubletree Subdivision fronting the intersection of Wildtree and Kimberwick Drives. The remaining six contiguous lots are located along the northeast line of the subdivision fronting Kimberwick Drive. Each of these lots has direct rear exposure to Francistown Road and the 168-foot high tower.

A total of seven improved lots were classified as having significant impact potential due to their exposure to the two towers. Five of the lots are located along the northeastern line of the subdivision facing Kimberwick Drive and abutting Francistown Road to the rear. The two remaining lots in this classification are located along the northern line of the subdivision facing the intersection of Kimberwick Drive.

The classifications of minor and no impact were given to properties that were considered to have little or no impact at all due to a buffered view or sufficient proximity away from the two towers.

Eleven of the lots studied in this subdivision, located along the northwestern and southwestern lines of the subdivision via Singletree Lane, Singletree Court, and Wildtree Court fell under these two classifications.

Summary of Analysis

The adjustment process used was an attempt to equalize the properties. Overall, the range in unit prices paid per square foot was narrower after adjustments were made in the comparative analysis model. After making adjustments for the major items categorized in the adjustment grid (See Exhibit 2.), a range of $66.29 to $92.31 in indicated price per square foot was reflected. Even after making adjustments for these items, a significant range in unit price per square foot remained evident.

However, the fluctuation in these

adjusted unit prices per square foot can be attributed to a variety of amenity packages that the individual homeowner may have purchased in an attempt to customize their homes, such as upgrades in appliances or finish features. Although, no adjustments for the varying degree of amenities or custom work were made, the range of adjusted unit prices per square foot is deemed to be supportive of showing the effect, if any, of the two towers on property values within the subdivision.

From on site observations, each property was rated relative to the impact of the tower due to proximity or view in one of four categories: major, significant, minor, or none. Those properties in which the tower was deemed to have a "major" impact were mostly adjacent to and/or having full view of the tower. "Significant" impact was assigned to those properties having full or obvious view of the tower.

"Minor" impact was assigned to those having a "winter view" or noticeable presence of the tower. Those rated as "none" had little or no view of the tower.

The rationale behind this rating system is that if there were a noticeable trend where those properties rated as having a major or significant impact were at the lower end of the range of unit prices paid per square foot, further research would then be warranted as to the cause of this tendency. In an effort to further substantiate the findings of the comparative model, personal interviews were held with property owners whose property was ranked in the major to significant categories. All of the respondents stated the towers had no impact on their purchase decisions. However, those property owners adjacent to Francistown Road did state that the seller discounted the lots for exposure to that road.

Summary of Study

The chart on page 16 is a summary categorizing the results of the investigation of the six existing communications towers in each of the localities included in this study:

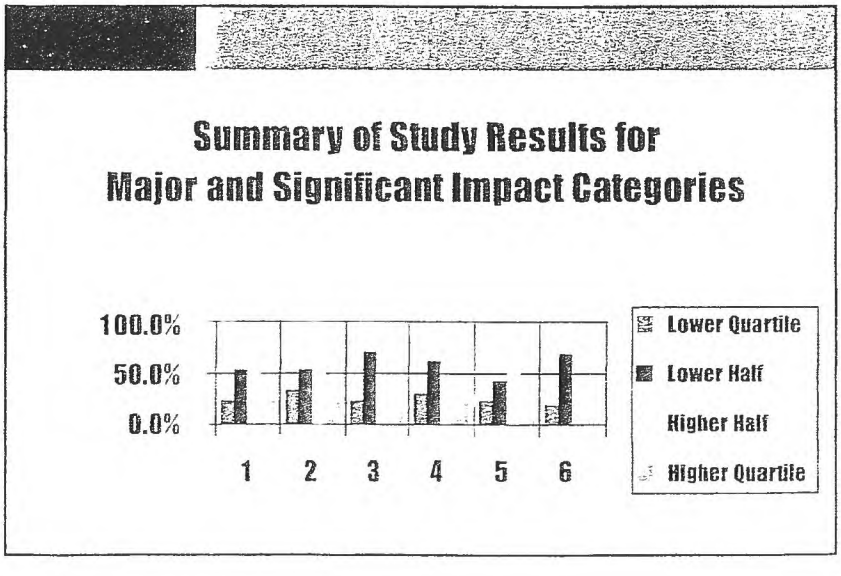
SUMMARY OF STUDY

Locality	Subdivision	No. of Properties Studied	No./Percentage of Properties Considered as Being Impacted to Either a Major or Significant Category	Lower Quartile Major or Significant Impact *	Lower Half Major or Significant Impact *	Higher Half Major or Significant Impact *	Higher Quartile Major or Significant Impact *
(1) Chesterfield	Rolling Hills at Buford	23	10/44%	20.0%	50.0%	50.0%	20.0%
(2) Henrico	*Doubletree*	*25*	*17/68%*	*29.4%*	*47.1%*	*52.9%*	*23.5%*
(3) Henrico	Eagles Ridge	18	9/50%	22.2%	66.7%	33.3%	11.1%
(4) Henrico	Edenberry	21	11/52%	27.3%	59.1%	40.9%	18.2%
(5) Henrico	The Timbers	22	10/46%	20.0%	40.0%	60.0%	30.0%
(6) Henrico	Wilkinson Estates	31	14/45%	14.3%	64.3%	35.7%	7.1%

* Allocation of the percentage of properties considered as being impacted in a major or significant category; range in comparison units based on adjusted sale price per square foot of finished living area.

The graph below represents the results of the investigation of the six existing communication towers. Graphical representation is a useful technique that provides the reader with an overall picture of the empirical data previously mentioned.

In each of the study areas, approximately half the properties were deemed as being impacted in a Major or Significant category. The remaining properties were in the Minor or None category. The allocation of the percentages was based upon the number of properties impacted in the Significant or Major categories in the lower and upper quartiles and lower and upper halves divided by the total number of properties impacted as such.



For example, in the Doubletree subdivision, 25 properties were included in the study. Of those 25 properties, 17 were considered as being in the Significant or Major impact category (68 percent). Five of those 17 properties impacted as such, (representing 29.4 percent of the total number of properties in those categories) were in the lower quartile (bottom 25 percent) of the range in adjusted unit prices paid. Eight properties (47.1 percent) were in the lower half of the range. However, nine (52.9 percent) were in the upper half and four (23.5 percent) in the upper quartile of the range in unit prices paid.

Because of the diversity of representation in each of the allocated segments of the range in adjusted unit prices, it is concluded that there is insufficient evidence to suggest there was any measurable impact on value. This is further supported by the responses from personal interviews with the property

owners who stated that the towers had no detrimental impact on their decision to purchase their homes. Several listing agents and the builder stated that the two towers were never an issue. The impact of Francistown Road was the only concern that came from potential purchasers and a discount of $4,000 was made for this reason.

Statistical analysis can provide background information to enhance the understanding of a given environment and directly assist in making specific decisions. It can range from simple summaries of data to the identification of patterns of data that can form the basis for a conclusion of central tendencies. For the purpose of this study, measures of relative standing for characterizing the distribution of empirical data were used. This technique served as a useful alternative to frequency distribution and was indicative of particular data values relative to the entire data set for each test site.

Similar findings occurred with the other study areas where properties in the Significant and Major impact categories were found at both ends of the range in adjusted unit prices paid. Again, interviews with the affected property owners revealed no impact upon purchase decisions. On site managers were interviewed in regards the potential tower impact upon individual units for both the apartment complex and town house development in an effort to establish a basis for any potential rent loss. Not one negative impact response could be attributed to the towers.

Overall, there were 52 interviews conducted with individual property owners. None of the interviews resulted in a negative response. In fact, several of the interviewees said that they paid a premium for their homes in order to be within close proximity to the towers. When asked the reasoning behind this decision, the most common reply was that the tower was perceived as being a potential asset because it served as a buffer against further development. The only adversities noted throughout the entire interviewing process were towards busy thoroughfares running adjacent to the residential developments and close proximity to shopping/retail centers.

Conclusion

Based upon the comparative analysis methodology used in this study, as well as interviews with purchasers of properties located adjacent to and/or in full view of communication tower structures, it was concluded that there was no consistent market evidence suggesting any negative impact upon improved residential properties exposed to such facilities in the areas included in the study.

The model used in this study could be applied to any type of perceived adverse influence such as a water tower, overhead transmission line or sanit ary landfill. The validity of the study is enhanced where the comparative analysis includes similar type properties that require minimal and well supported adjustments as well as interviews with market participants potentially affected by the respective adverse influence. The statistical measure of central tendency not only validates a typical variate but also the lack thereof. ■

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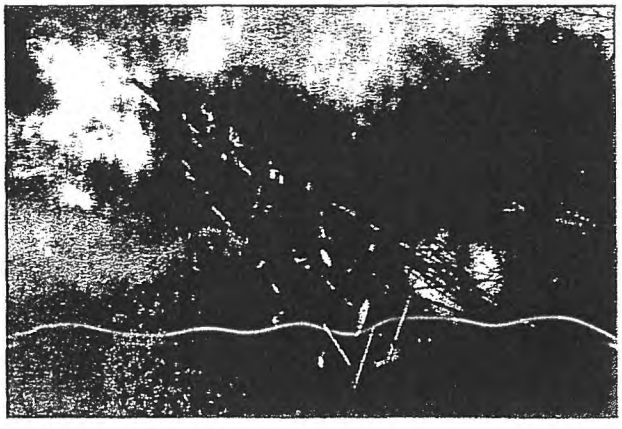
Joseph Smith is an MAI candidate in the Appraisal Institute's Graduate Valuation Program at Virginia Commonwealth University located in Richmond, Virginia. He is currently working as intern for the appraisal firm of Knight, Dorin & Rountrey gaining experience credit hours to apply toward his MAI designation. Mr. Smith earned his bachelor's degree in history from Hampden-Sydney College, Hampden-Sydney, Virginia.

The Problem of Faulty Analyses

Can we rely on current methods in determining right of way impact on neighboring properties?



BY ALBERT R. WILSON, CRE

Much has been written in the past several decades concerning the influence of Right of Way (ROW) on neighboring property values, whether the ROW involved is highway, pipeline, High-Voltage Transmission Lines (HVTL), cell phone towers or something else. A substantial portion of the literature discussing this issue has come from the academic community and frequently indicates that neighboring property values are negatively impacted by ROWs. Much of this literature is based on faulty analyses and this article seeks to provide a brief overview of some these problems.

The first issue is the confusion in some of the literature concerning the difference between "damage" and a "locational premium".[1]

A locational premium—whether it results from a factor that enhances value, such as a nice lake, or one that is not desirable such as a landfill—is simply the premium that the market attaches to the value of the subject due to physical location. It is in fact the embodiment of the old adage of "location, location, location." It may prove to be true in certain circumstances that properties adjacent to a ROW carry a negative locational premium, but that is not necessarily a damage to value.

A damage to value is specific to the ownership of the property and in particular is specific to a negative change to the market value imposed after purchase.

For example, suppose that a residential development takes place next to a pre-existing HVTL and the property developer offers the lots adjacent to the line for sale at a discount from similar lots elsewhere in the development. This represents a negative locational premium, but not a damage. The developer was well aware of the presence of the lines prior to purchase and presumably discounted for their existence at the time of purchase, if any discount was applicable.

The parties purchasing the discounted lots, so long as they enjoy the same or a similar rate of appreciation compared to other property owners in the area after purchase, also do not suffer a damage because their market value — although starting at a lower point due to the discount — is increasing at the same rate, and therefore their return on investment is the same. An analysis of sales in the development may indicate a negative locational premium for those properties adjacent to the line, but it is not a damage under these circumstances.

It is not the absolute difference in market values between two otherwise similar properties that determines a damage, but whether or not the owner of a specific property has suffered a reduced rate of return on investment as a result of the imposed condition. When viewed in this way, using the fundamental definition of real estate value[2], many alleged damages to value are found not to exist.

In recent years, statements have indicated that the existence of a damage to value must be based on a condition of "full knowledge" on the part of the buyer, implying that the price paid must reflect information that the analyst believes should be in the buyer's possession.

This is an erroneous idea and not in keeping with the Uniform Standards of Professional Appraisal Practice (USPAP). A fact or piece of information is important to the analysis of market value

if the market participants generally are concerned with it at the date of value. If the market participants are generally not concerned with or are not aware of it, then it is inappropriate to include that factor in a market value analysis.[3]

An example of a situation where a known issue did not influence value — contrary to expectations — is the contamination of an aquifer by chlorinated solvents and a surface water spill of approximately 5,000 gallons of nitric acid, plus the allegation of nuclear waste having been disposed of on the plant site in the immediate vicinity of residential property in Grafton, Massachusetts.

A careful study of nearly 500 repeat sales of residential properties within 2,000 feet of the plant and in nearby control areas clearly demonstrated that these issues had no influence on sale prices.[4] Anecdotal interviews with several buyers and sellers in the immediate area revealed that the attitude was simply that, since the conditions had no influence on the owner's use or enjoyment of the property, no discount was considered necessary or acceptable. This attitude was apparently the controlling factor in the marketplace, not the knowledge of the contamination of the nearby plant. Similar situations have appeared in conjunction with highways, pipelines, powerlines, cell towers and the like.

DOES A LOCATIONAL PREMIUM EXIST?

It is interesting to note that much of the literature simply assumes that a ROW creates a negative locational premium and then proceeds to attempt to measure it without first testing to determine if it actually exists. In some cases, the analyst at least gives a passing reference to this issue by stating that the coefficient representing damage in a "hedonic analysis" is "statistically significant" and therefore is measuring a negative locational premium. However, that statement is mathematically unsupportable.[5]

To demonstrate a negative locational premium, it is necessary to show, by independent analysis, that there are scientifically sound reasons to believe that such a premium exists. This might be demonstrated by a sufficient number of paired sales analyses using carefully validated sales, or through a set of explicit statistical tests of similar information. In the few instances reported in the literature where such tests have been carried out by competent appraisers and/or statisticians, the results have frequently shown that a negative locational premium does not exist.[6]

This may be a surprising result given the large number of articles and studies that appear to state the contrary, but many of those are based on badly flawed analytical approaches. The gold standard of property value analysis has been, and is, the proper application of the three classic approaches and particularly the sales comparison approach.

Other methods, such as "hedonic analysis" or "contingent valuation," contain flaws that compromise the reliability and accuracy of any results to the point where they provide not just incorrect results, but misleading results with the aura of scientific precision.

TWO FLAWED APPROACHES

Two methods frequently used in the attempt to analyze the influence of ROWs on neighboring property values are "hedonic analysis" and "contingent valuation" or more properly hypothetical market surveys.

Hedonic Analysis

Hedonic analysis is an attempt by economists to interpret the results of a statistical regression. Regression, as a mathematical technique, is a powerful tool that can assist the user in predicting the probable sale prices of properties. In that application, it is both mathematically supportable and develops error rates that can be analyzed and employed in property valuation. The mathematically appropriate objective of a regression is the estimation of the most likely sale price for the average property in the database.[7]

A regression relationship might take the form of:

Sale Price =
$a_0 + a_1$ Size + a_2 Bedrooms + a_3 Baths + a_4 Garage + ... + a_i Pipeline + ...

Where:
a_0 = Intercept
a_1 = Coefficient of independent variable 1 (Size of House)
a_2 = Coefficient of independent variable 2 (Bedrooms)
a_3 = Coefficient of independent variable 3 (Baths)
a_4 = Coefficient of independent variable 4 (Garage)
...
a_i = Coefficient of independent variable i (Distance to pipeline)

This relationship, for the purpose of estimating the value of Sale Price, may be quite acceptable and does a reasonably precise job of making that estimate.

Hedonic analysis, however, attempts to quantitatively interpret the coefficients of the independent variables (the a's in the above relationship) as meaningful estimates of the contribution of that variable to the sale price. For example, the value of **ai** — the coefficient of the distance of the house from the pipeline, say some number like -250 — would be interpreted by the hedonic analyst as indicating that for each foot the house is closer to the pipeline the sale price of the house would be decreased by $250.

This interpretation has virtually no mathematical support and the results are generally both highly misleading and prone to very wide confidence intervals. The mean 95% confidence interval for such relationships would indicate that the true value would lie between $90 and $-590. That is, the pipeline might subtract $590 from value for each foot closer, or it might add $90, or it might be anything in between. This level of precision is virtually meaningless, and because the range of values within the confidence interval includes zero, the value of the coefficient cannot be mathematically distinguished from zero. That is, the distance to pipeline variable mathematically has no influence on value. This is a very common occurrence with hedonic analyses.

When an analyst using hedonic analysis states that a given coefficient should be interpreted as in the foregoing example, for instance, there is absolutely no guarantee, nor any means of guaranteeing that this value has any meaning whatever. An analysis of the confidence intervals surrounding predicted "damage" coefficient values from 37 published articles indicates that the average confidence interval is plus or minus 136%–assuming that the "damage" variable has any meaning at all. Any confidence interval equal to or greater than 100% means the variable has no influence on value.

To add to the unreliability issue for hedonic analysis, the regression relationship on which the hedonic analysis is formed and the data used in the analysis are subject to manipulation to achieve desired results without any objective means of determining if the results are in fact appropriate or in some sense the "best" results for the situation. The analyst can construct a relationship to achieve almost any desired result.

Without going into great mathematical detail, the primary problem is that there are, as all appraisers are well aware, a very great number of factors that influence the sale price of a property. For each such factor that one wishes to include in a hedonic analysis, a reasonable rule of thumb is that at least 20 and preferably 30 sales are needed. To simply form a regression for the basic factors of size of living area, number of bedrooms, number of bathrooms, size of garage, size of lot, style of house, and age of house, a regression would have to be based on sales of similar houses in similar locations within a reasonable period of time as of the date of value. Just this simple regression would require 210 to 350 sales from a database of homogeneous (similar) property sales. There are many more factors to consider such as condition, treed lots versus no trees, schools, crime rates, access to shopping and work, and others.

To appreciate this issue, consider how difficult it can be to find just three or four good comparable sales, and try to imagine finding 300 more. The point is that it is virtually impossible to develop a regression relationship that would allow even a reasonable chance of having sufficient data to allow for a quantitative analysis of the independent variable coefficients.

There is, however, an even larger issue. Many of the "independent" variables are not independent. Consider size of house and number of bedrooms. Generally, the larger the number of bedrooms, the larger the house size. Further, there are variables that may be related to others that are not included in the regression relationship, the omitted variable problem. This interrelationship, referred to mathematically as correlation, means that if one of the variables is omitted or a variable is related to other variables, the existing coefficients will be increased or decreased to an unpredictable extent. The value of the existing coefficients are generally unreliable and do not represent what they are said to represent.

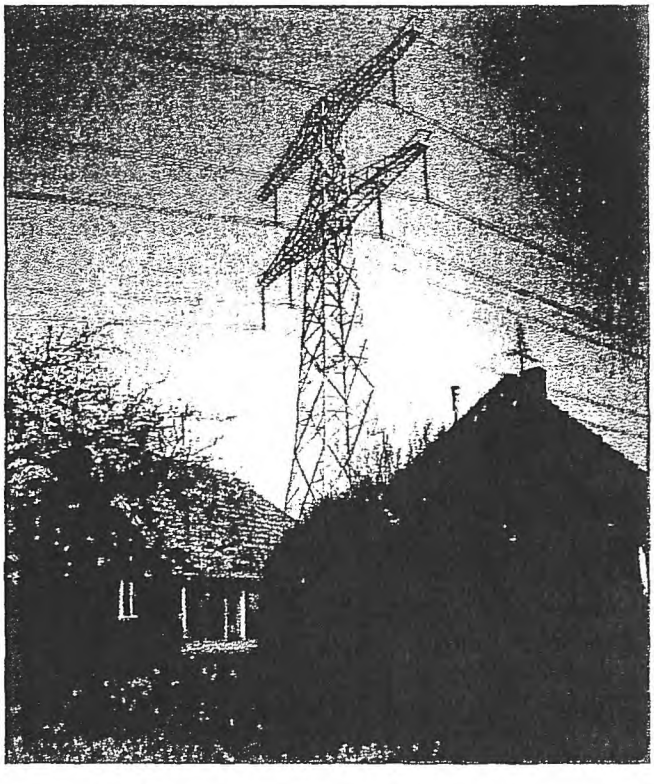
Put simply, hedonic analysis is generally meaningless and frequently very misleading — a statement that may be made for very sound scientific reasons and that is generally not difficult to prove for any given situation.

Contingent Valuation

The use of so-called "contingent valuation" methods, more accurately hypothetical market surveys, has gained prominence recently in the valuation literature. This method calls for setting up a hypothetical transaction involving a specific alleged disamenity of interest, such as a cell phone tower or pipeline ROW, then surveying a group of individuals to determine how much they would discount a property's value in return for purchasing it when close to the alleged disamenity. Loosely, this methodology is based on the Contingent Valuation (CV) method sometimes used in natural resource damages cases where the rights to be valued do not trade in a traditional market.

The list of requirements on how to properly conduct a CV study is quite lengthy and very expensive to fulfill.[8] The consequence of failure to fulfill those requirements are the degradation of the results even beyond the already high error rates normal to the method. Essentially, however, they are moot since even the strong advocates of CV as an approach for valuing public and quasi-public goods clearly state that the methodology is not applicable to private goods.[9]

The results obtained from even a very carefully constructed hypothetical market survey will tend to be useless for other reasons as well. For example, most such surveys look only at the buyer's side of the relationship – that is, how much do you want taken off the purchase price? The seller's side is rarely examined, resulting in no information as to whether such a discount would receive serious consideration, let alone acceptance.



A SPECIFIC EXAMPLE: "THE IMPACT OF CELL PHONE TOWERS ON HOUSE PRICES IN RESIDENTIAL NEIGHBORHOODS"

A recent article by Bond and Wang[10] concerning the alleged impact of cell phone towers on house prices stated that, "The opinion survey results were generally confirmed by the market sales analysis using a hedonic house price approach. The results of the sales analysis show prices of properties were reduced by around 21% after a CPBS (Cellular Phone Base Station) was built in the neighborhood." This article provides an excellent example of the issues outlined above for surveys and hedonic analysis.

Bias: This article appears to be biased in favor of a high damage result. First, it rejects two studies conducted by professional appraisers that could find no statistically significant difference in property values between homes close-to and not close-to cell phone towers.[11] Second, the authors discounted their own survey results of respondents close-to the cell phone towers in favor of significantly higher results from respondents who were in areas without cell towers on the basis of the authors' apparently unsupported belief that those close-to were unwilling to provide honest answers to the survey.[12] Note, however, that the answers from the close-to respondents were still used in the analysis.

Survey: There is no evidence in the article that the survey was subjected to pre-testing for respondent understanding, bias, or other critical issues as required by recognized survey protocols, or that it would provide a comprehensive understanding of the respondents answers (no questions in evidence to determine if respondents were not providing unbiased and well-considered answers).

The results of the survey are inconsistent. For example, most of the close-to respondents (51.4%) said that the cell towers had no influence on value, but 71% also said that they would pay less for a home in the area. If we assume that the survey is honestly representative of the area residents, then these results would strongly indicate something other than the cell phone towers is undesirable about the close-to area. This issue was apparently not investigated by the researchers.

Of primary concern is the fact that the results of the survey are not statistically meaningful with respect to the universe of residents. The survey was conducted by mail and, although the response rate after prompting was reasonable (46%), mail survey respondents are not randomly selected from the underlying population – they are self-selected. As noted by the Blue Ribbon Panel report and in the "Reference Guide on Survey Research"[13], a mail survey will not provide a scientifically reliable basis for drawing any generally applicable conclusions concerning cell phone tower effects.

Hedonic Analysis: The hedonic exercise reported in this article is particularly poor for a number of reasons. There was no reported attempt to test the null hypothesis of no effect except by the professional appraisers and, as noted above, these analyses were discounted. The authors are therefore assuming, in the face of contrary evidence, that the cell towers negatively influence value.

There were at least six regression models employed in order to achieve the four reported results. This strongly implies specification searching to achieve a desired result. It appears that the authors chose to ignore the indications from the survey of another problem in the area and kept searching for specifications that would support their pre-conceived notions. Hedonic analysis is a nearly perfect tool for exactly this type of manipulation–whether conscious or unconscious on the part of the authors.

Excepting gross land area, gross living area and age, none of the other recognized factors of value consistently appear in the regressions. Inconsistently used in the reported models were such factors as whether the property was single family or multifamily, whether it has a particular type of siding or roof construction, and the quality of the property. Other key known value-influencing factors were not used (e.g. number of bedrooms, number of bathrooms, number of garage spaces, etc). In addition, income producing property (rental units) was included in the regression database along with owner-occupied property sales. A regression model that does not consistently use the recognized factors of market value and separate clearly distinct types of property (income producing versus owner-occupied) must be considered highly suspect.

In their literature review, the authors noted that high voltage overhead transmission lines—an artifact they consider similar to cell towers–have a reported impact on value ranging from positive (i.e. they increase the value of neighboring properties) to negative. In a separate study by one of the authors, a maximum negative influence on value of 20% at 10 meters from a high voltage tower declining rapidly to zero at 100 meters was cited. Further, the authors stated that another study reported 50% of all high voltage studies indicated no impact on value, and 50% indicated from 2% to 10% negative impact. For a less obtrusive artifact (the cell towers are described as being significantly less obtrusive), the authors report a significantly greater damage estimate–10% to 23% for properties within 300 meters.

IN SUMMARY

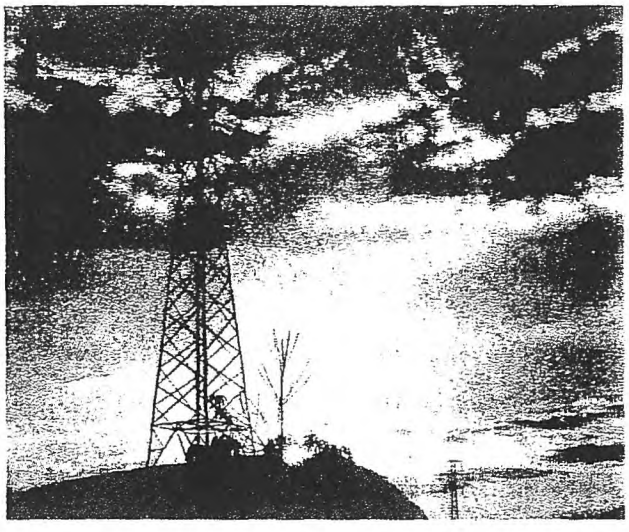
In summary, the hedonic approach is unreliable and the particular regression models employed in this article are illogical, unrepresentative of the market, and produce results that are not credible.

The following key points should be noted:

1) Generally, when traditional appraisal methodologies are properly employed and the results analyzed, a positive or neutral influence on market value will frequently be indicated. This statement applies generally to existing and upgraded ROWs, but may not apply to a new ROW.

2) The hedonic analysis and hypothetical surveys (frequently referred to as contingent valuation (CV) surveys) are methods that cannot yield scientifically reliable or creditable results.

3) Virtually every article using these two methods examined by this author and other competent researchers, particularly when the raw data supporting the analyses has been available, show that the research is fatally flawed. Particularly with hedonic analysis, it is easily possible to show that, using the same data and software, an opposing result can be obtained.



The published research is of very poor quality and the peer review process that allows publication is unreliable. The literature may be badly flawed when certain analytical techniques are employed.

To add to the problem, it appears that most of the "peer reviewed" journals in the field have a policy of refusing to publish articles that directly contradict or point out the flaws in a previously published article. On this basis, the reader will never be informed of the existence of serious flaws in a published article. Citation to these articles as authoritative should be undertaken only with very great caution. ◙

References

[1]Wilson, Albert R., Peter D. Bowes, Douglas C. Brown, Damage to Market Value and Locational Premiums, Real Estate Issues, Winter, 2005, Volume 29, Number 4

[2]"Value: (2) The present worth of the future benefits that accrue to real property ownership." The Appraisal of Real Estate, Twelfth Edition, Appraisal Institute, Chicago, 2001, page 20

[3]Advisory Opinion 22 of the Uniform Standards of Professional Appraisal Practice states in pertinent part. "A market value appraisal is also based on whatever the "normal" or "typical" conditions are in the marketplace for the property appraised in a time frame that is consistent with the date of value in the appraisal." Electronic USPAP 2005 Edition, The Appraisal Foundation.

[4]Wilson, Albert R. Proximity Stigma: Testing the Hypothesis, The Appraisal Journal, June, 2004

[5]For example, see Neter, John, Michael Kutner, Christopher J. Nachtsheim, William Wasserman, Applied Linear Regression Models, Third Edition, Irwin, Chicago, 1996, pages 9, 10, or 14.

[6]SEE for an example of appropriate tests Wolverton, Marvin L., Steven Bottemiller, Further Analysis of Transmission Line Impact on Residential Property Values, The Appraisal Journal, July, 2003. This analysis indicates no basis to believe that any locational premium and therefore damage–results from proximity to HVTLs.

[7]NOTE: A regression can assist in the prediction of sale prices, but sale prices are not necessarily market values. This discussion would be too lengthy for this paper but the distinction is very important, particularly in litigation.

[8]FEDERAL REGISTER, Vol. 58, No. 10, Proposed Rules, Department of Commerce, 15 CFR Chapter IX, Natural Resource Damage Assessments Under the Oil Pollution Act of 1990, 58 FR 4601, Appendix I Report of the NOAA Panel on Contingent Valuation dated January 15, 1993 (the "Report"). SEE ALSO Wilson, Albert R., Contingent Valuation: Not an Appropriate Valuation Tool, The Appraisal Journal, forthcoming in Winter, 2006.

[9]Carson, Richard T., Nicholas E. Flores, Norman F. Meade, Contingent Valuation: Controversies and Evidence, Environmental and Resource Economics, Vol. 19, 2001. SEE ALSO Carson, Richard T., Nicholas E. Flores, Kerry M. Martin and Jennifer L. Wright, Contingent Valuation and revealed Preference Methodologies: Comparing the Estimates for Quasi public Goods, Land Economics, February, 1996, 72(1):80-99. SEE specifically footnote 6

[10]Bond, Sandy, PhD Ko-Kang Wang, The Impact of Cell Phone Towers on House Prices in Residential Neighborhoods, The Appraisal Journal, Summer, 2005

[11]"Two studies have been conducted to ascertain the adverse health and visual effects of CPBSs on property values. Telecom commissioned Knight Frank (NZ) Ltd to undertake a study in Auckland in 1998/00 and commissioned Telfer Young (Canterbury) Ltd to undertake a similar study in Christchurch in 2001. Although the studies show that there is not a statistically significant effect on property prices where CPBSs are present, the research in both cases involves only limited sales data analysis. Further, no surveys of residents' perceptions were undertaken, and the studies did not examine media attention to the sites and the impact this may have on saleability of properties in close proximity to CPBSs. Finally, as the sponsoring party to the research was a telecommunications company it is questionable whether the results are completely free from bias." Bond, ibid, pages 260, 261

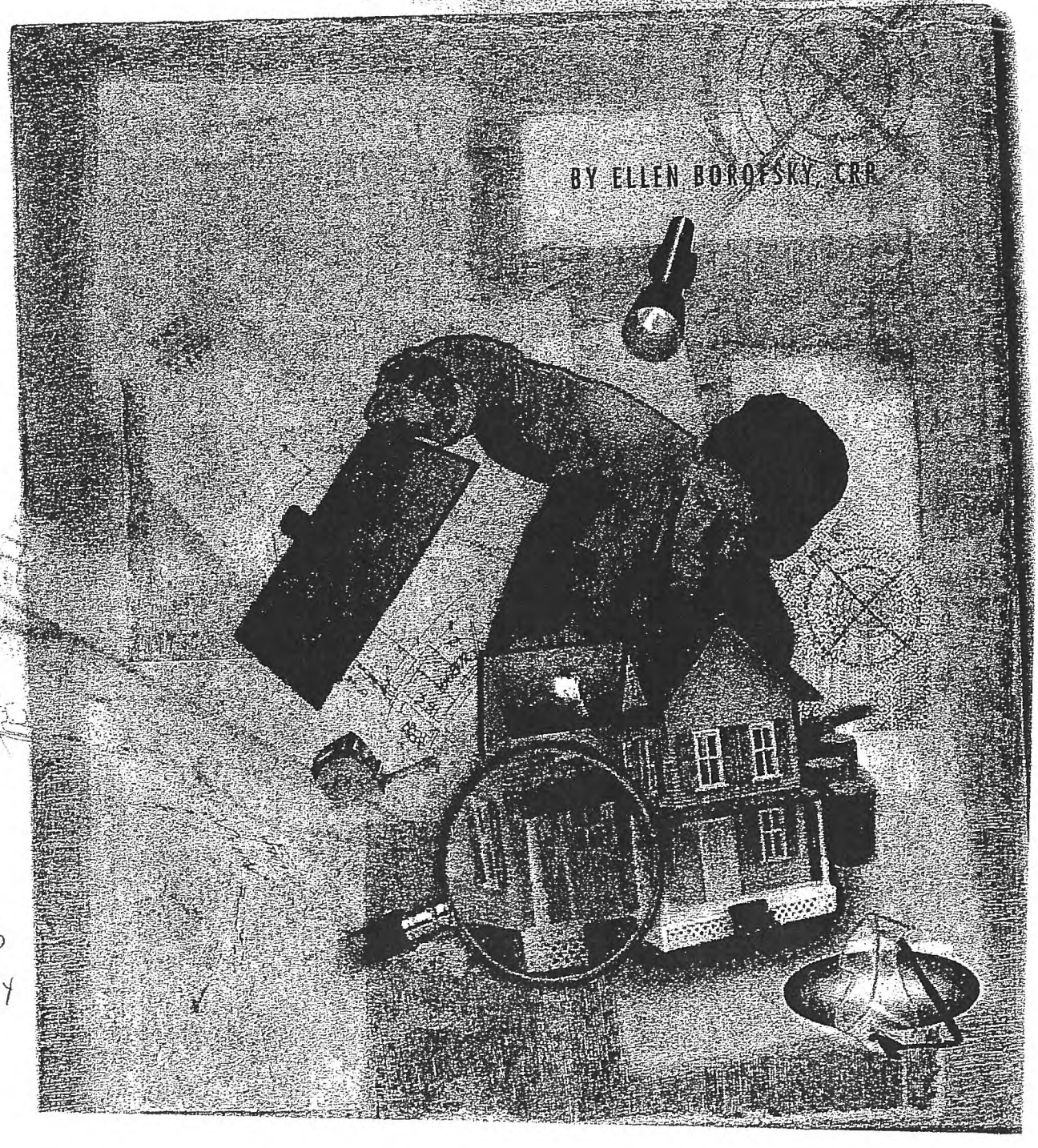
[12]"In general, those people living in areas farther from CPBSs were much more concerned about issues related to proximity to CPBSs that residents who lived near CPBSs. ... Alternatively, the apparent lower sensitivity to CPBSs of case study residents compared to the control group residents may be due to cognitive dissonance reduction. In this case, respondents may be unwilling to admit, due to the large amounts of money already paid, that they may have made a poor purchase or rental decision in buying or renting property located near a CPBSs. Similarly, the homeowners may be unwilling to admit there are concerns about CPBSs when the CPBSs were built after they had purchased their homes, because to do so might have a negative impact on property values." Bond, ibid, pages 265, 266

Diamond, Shari Seidman, Reference Guide on Survey Research, Moore's Federal Practice: Reference Manual on Scientific Evidence, Federal Judicial Center, Washington, DC, 1994 and later S J Bond and J Hopkins, The Impact of Transmission Lines on Residential Property Values: Results of a Case Study in a Suburb of Wellington, New Zealand, Pacific Rim Property Research Journal 6, No. 2 (2000) C. Kroll and T. Priestley, The Effects of Overhead Transmission Lines on Property Values: A review and Analysis of the Literature., Edison Electric Institute (July 1992)

Looking Under the Hood

Adjusting for Unique Property Characteristics

BY ELLEN BOROFSKY, CRB



Placing a dollar value on a home can be a complex process, particularly when the home in question has a unique feature or characteristic. Borofsky explains the challenges of evaluating these special types of properties.

Anyone with experience in third-party homesales realizes that determining the appraised value of a home often seems more art than science. This is particularly true when faced with a property with a unique characteristic.

As an industry, this is a fundamental concern: we are often faced with properties that have a unique characteristic, and we are challenged with evaluating them appropriately. Buyer behavior—even when well understood—is often difficult to predict, and how it will affect the ultimate value is equally difficult to pinpoint.

This Car Has Been in a Wreck!

Imagine that you are given the choice between buying a brand new car and one that has been fully repaired after an accident. Both are the same price—$20,000—and both come with full warranties. Are the cars equally appealing? The answer is fairly obvious—most buyers will say, "this car has been in a wreck! Sure, it's been fixed, but has it been fixed properly?"

In spite of the fact that the previously damaged car comes with the same warranty as the undamaged one, the typical buyer will not want to risk purchasing a car that may be harboring hidden defects. In fact, a certain percentage of buyers will say that they would not buy the repaired car for ANY amount, but in all probability they would be lining up to purchase the car for $20! The real challenge is to determine what discount to apply and to negotiate a price between $20 and $20,000 that is acceptable to both the buyer and seller.

The same holds true for the sale of real estate. Appraisers, third-party companies, and clients all share the concern that a property may be at risk of coming into inventory, and that the client may be unable to sell it without greatly discounting the sales price to reflect the market reaction to a specific issue.

Explaining the value to transferring employees presents other challenges. In fact, one of the most commonly asked questions is, "where is the 'book' that you used to make your appraisal adjustments?" Some savvy transferees seek specific sources in an attempt to have the appraisers justify, or in the very least, provide support for, the specific amounts of their adjustments. Would it not be wonderful if we could get a copy of the appraisal adjustment "book?"

In the absence of a resource book or library of scenarios, how do you arrive at the appropriate adjustment to apply to the property to attract a buyer?

Appraisers often will comment that they cannot find a paired sales analysis to help them decide how much to adjust; therefore, they would rather not apply an adjustment than risk being told that it is "unprofessional to guess!" Other appraisers report that because they do not have enough information to decide how much to adjust, they make a modest attempt at applying an adjustment for a nominal amount. Neither solution is effective, as the following case studies will illustrate.

Photoillustration: Chris Grandstaff

Perception vs. Reality in Synthetic Stucco Homes

Following is a case study from a number of years ago of a synthetic stucco home that illustrates the complications that may result from not addressing all of the potential elements that can affect the appraisal value. Before the potential issues with synthetic stucco homes came to light, and without the benefit of an extensive library of case studies to use as a comparison, the appraisers in this case arrived at their appraised value using "standard" methods.

In their reports, two appraisers indicated that the home was synthetic stucco, but that there were no visible problems with the home. The Homeowner's Real Estate Disclosure form noted that there was some minor wood rot, but no problems associated with synthetic stucco that some other homes in the area had experienced. Many clients will not risk inspection costs without visible, physical evidence of a problem, and neither appraiser made any adjustments based on the quality of construction or condition to reflect what, if any, effect the mere existence of synthetic stucco might have.

The question, "how bad could it be?" was never really asked—or answered—because the scope and extent of the problems with synthetic stucco are not always visible to the naked or untrained eye, and there was not a large pool of case studies from which to draw. From the photos supplied by the appraisers, no damage was apparent, and their recommended inspection was felt to be precautionary in nature. A non-contingent offer to the transferee produced the following results:

- The home remained in inventory for more than a year because of buyer resistance and repair time for the stucco problems that were ultimately uncovered.
- Stucco repair costs exceeded 20 percent of the value of the home.
- Client expenses exceeded 69 percent of the anticipated sales price.

As a result of cases such as this, many clients have revised their relocation policy to exclude stucco homes from their relocation program.

In another case, the mere stigma of synthetic stucco—even though it had been repaired—was enough to cause market resistance. One synthetic stucco home had extensive repairs made to the sheathing, joists, and the like, because of moisture intrusion. With a concern based on the potential stigma associated with stucco, the transferee had all of it removed and replaced with vinyl siding. However, the home remained on the market for more

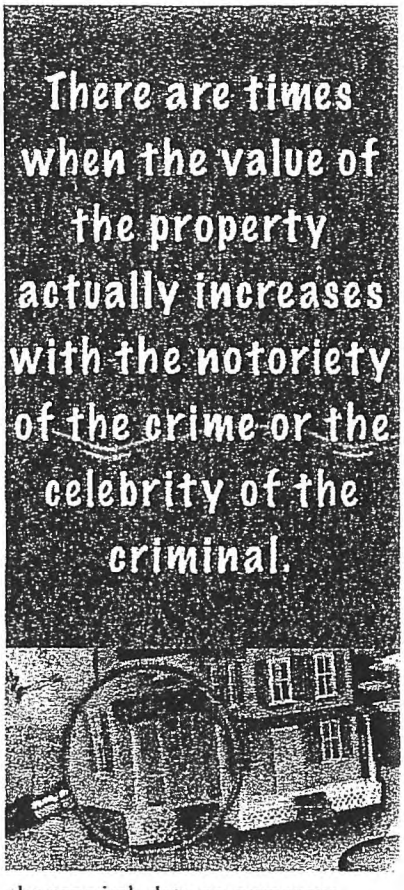
than a year because of the concern that the vinyl siding was now "hiding" an issue that could remain undetected due to the inability to inspect behind the siding.

In markets where there has been extensive media coverage or market knowledge of serious structural problems related to improperly installed synthetic stucco, it is likely that the market will develop resistance to such homes, resulting in depreciated values. Whenever possible, the appraiser should only use stucco homes as comparable sales because the extent of market devaluation will be reflected in what those comparable homes sold for. Thus, no specific adjustment would be required. In cases where there are no available comparable stucco homes, the appraiser should consider carefully whether there is, or may be, resistance in the market to homes of this type.

Unusual Historical Characteristics: Adjusting for Violent Crimes in the Area

Market resistance may not just be associated with physical repairs needed for a dwelling, but can be the result of a historical event: for example, a violent crime occurring on, or near, the property. One case from many years ago involved a property where a particularly high profile, violent crime had occurred.

During the initial research phase of the appraisal, data on numerous dwellings where violent crimes had occurred was gathered, with circumstances ranging from drug-related crimes to suicides and murders. Homes then were appraised and placed on the appraiser's "gruesome scale" as of the date prior to the violent crime—and again afterward—to see if the home sold for its true value. The brutality of the crime had some effect on appraised value, but the notoriety of the case had an even greater consequence. In the case of the subject property where the violent crime had occurred (it was the topic of numerous print and television reports), the notoriety kept this property on the minds of local residents and, therefore, potential buyers.



In charting the sales of the homes included in the group of homes stigmatized by violent crimes, there was a wide range in the percentage of loss on sale, but most clustered around a typical resale loss of 25 percent, which then was applied to the subject home. In the next few years, the appraiser was required to evaluate the home on several more occasions with the same percentage being applied due to continued market presence brought on by the facts of the crime and ensuing trial publicity. While the crime was not viewed as material to the value, any potential buyer inevitably would learn of the facts through casual conversation with anyone in the area.

The approach to appraisal in this case assumed that, even under the best of circumstances, an educated buyer would use the facts of the case as a bargaining tool. When the home ultimately sold a few years later, the original appraised value, which applied the 25 percent adjustment,

was within approximately 1 percent of the final selling price.

However, there are times when the value of the property actually increases with the notoriety of the crime or celebrity of the criminal. Take for instance the well-publicized double-murder case of Laci Peterson and her unborn child. The house in which Scott and Laci Peterson resided listed in May 2005 for $379,996 and sold for $390,000 in June 2005. Because the house is located in Modesto, CA, the market resistance was low given the high demand for property in that location.

Beauty Is in the Eye of the Appraiser

A number of other situations shed light on the challenges involved with applying adjustments to unique situations.

One example involved a home that had a very large city water tank near the rear of the property. Appraiser number one took no photos indicating the water tank; appraiser number two included a photo indicating the close proximity of the tank to the rear deck, and considered this in his value due to his opinion that it was "unattractive."

Appraiser number one justified his omission of the water tank by saying that it was, "a whole lot better than having nosy neighbors to the rear," and actually gave a positive adjustment for the tank due to the fact that it was a landmark that made it easy to give directions to the house.

In another case, a transferee spent $25,000 to have an in-ground pool built in his front yard because of space limitations in his backyard. One appraiser gave a $25,000 credit for the pool, while the other said it should be filled in because typical market acceptance is to have a pool in the backyard. In this case, the end result was that after the home was on the market for an extended period of time, it was filled in and planted with grass at a cost of $10,000.

Without the benefit of a resource that would allow for the comparison of these properties, the decision to adjust or not adjust the appraised value is in the eye of the appraiser. Could these situations have been facilitated with access to some form of data library, to help assess how the ultimate value was affected?

Finding a Match: Selling the Unusual

Once the appraisal is complete and the home is on the market, much of the outcome is dependent on the buyer pool and marketing strategy of the real estate agent. One positive example of finding a buyer to match the property follows.

A home had been built six months earlier for $165,000 for an individual who used a wheelchair. All of the kitchen counters were custom-built to accommodate the individual, which required specially designed cabinets, oven, dishwasher, and the like, that would fit under the low counter. Likewise, the upper cabinets were brought down to a level that was accessible. In addition, the master bath was designed specially for wheelchair access. During the appraisal, it was assumed that the home would not be usable for any other potential buyer. A careful cost analysis was conducted and it was determined that the cost to convert back to a standard kitchen would be approximately $25,000 and a deduction was made in that amount, making the appraisal value $140,000.

Eight months later, the same appraiser received an assignment to appraise the same home for mortgage purposes and saw that the contract price was $170,000—substantially higher than the appraised value. After contacting the real estate agent, he found that no remodeling had been done and that the agent was able to find a buyer who required the special features of the house.

Unique Property Characteristics: Multiple Considerations

There are a variety of other types of "unique properties" that may have features related to physical, functional, location, economic, and historical influences. Following are several examples.

Physical features

- Polybutelene pipes
- Asbestos
- Underground oil tanks
- Stucco—both synthetic and hard coat
- Repaired: foundations, framing, synthetic stucco, water damage, and mold
- Pet odor
- Fire
- Flooding
- Shake roof
- Metal roof

Functional features

- Indoor pool
- Indoor racquetball/basketball courts
- Elevator
- Bomb shelter/panic room
- Lack of public water or water being trucked in

Location, economic influences, or proximity to

- Power lines
- Golf course
- Commercial influence
- Sewage treatment plant
- Cemetery
- Radon

Historical influences

- Proximity to a registered sex offender/Megan's Law situation
- Famous or infamous past owners
- Positive historic event
- Violent crime committed on the site
- Famous architect
- Crime committed adjacent to property

Although the categories noted above are numerous, the list is not exhaustive. Appraisers are the industry's "eyes and ears" in the field and we look to them to determine the issues in their particular markets and rely on their opinions when they develop an anticipated sales price for a relocation property.

To Adjust or Not to Adjust

A speaker at a relocation conference once argued that it was inappropriate to adjust an appraisal if you do not have enough sales to compare against. But is it not also inappropriate to fail to adjust when the facts appear to require addressing an issue? Typical reactions from appraisers include:

- While common sense might lead them to think that a 20 percent adjustment is needed for a home, they neglect to make the adjustment because they do not have any empiri-

cal basis for their guess at how much the feature will negatively affect sales value.

- They are afraid of ending up in court and being asked on the witness stand to provide the scientific basis for their adjustment and potentially being unable to defend their stance in the absence of historical data.
- They feel that there is no reason to take the risk of guessing, and instead make no adjustment, comfortable in the knowledge that they can always say that they did not have any rational basis for making the adjustment. This potentially puts the client at risk for a considerable resale loss.

While there is no reliable standard available for appraisers to use as a resource, the industry still must put appraisers on notice that it is not acceptable to neglect making an adjustment when there is evidence available that the market would justify an adjustment for a specific problem. Based on the case studies available, one can see the effect that synthetic stucco, a violent crime, or any of a number of other potential issues could have on a home. The buying public is well-informed when considering homes for purchase. Even if a home has no visibly apparent problems, many buyers will shy away based simply on the potential for problems. The negative stigma attached to synthetic stucco homes, for example, may extend to all synthetic stucco homes, even those clad in cement stucco or those without a repair history. Today's savvy buyers use all the information at their disposal to negotiate the lowest purchase price possible. Appraisers must continue to focus on identifying any potential objections up front, and to accurately factor them into the valuation of the home. But would it not be easier if we could just get a copy of the appraisal adjustment "book?"

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Real Property Damages and Rubber Rulers

BY ALBERT R. WILSON

DURING THE PAST TWO DECADES, MANY ARTICLES AND COURT cases have involved alleged diminution and damages to the value of real property resulting from a disamenity that influences a geographic area of values. "Alleged" is the key word because highly suspect analytical techniques frequently are the basis of the argument that a given disamenity results in a diminution or damage. Notably, at least two of these techniques—hedonic analysis and contingent valuation—are "rubber rulers," techniques that may be deliberately or inadvertently manipulated to achieve a preconceived result.

This article discusses the fundamental concepts of damage and diminution to value, and appropriate and inappropriate methods for identifying and measuring diminution and damage if they exist. It also describes a set of three analytical steps required to demonstrate a damage to value.

CONSISTENTLY LOWER SALES PRICES AND DIMINUTION IN VALUE

The first step is determining if properties in a given area sell for less than comparable properties in an otherwise similar area. Analysts can demonstrate consistently lower sales prices in a given geographic area using methods such as paired sales analysis for properties in the subject area and similar properties not in the area, or by testing the null hypothesis that property is not selling for a lower price in the subject area using appropriate statistical tests on validated sales data. Other methods could include comparison of sales prices to appraisals based on comparable properties from other similar areas.

A lower sales price level is not necessarily a diminution in value or a damage to value. It is possible that an area may simply be a lower-valued area; that is, an area subject to a locational premium.[1] A diminution in value implies that a higher price level existed before a typical market participant recognizes a disamenity, and a lower price level emerges after the disamenity becomes known. To establish a diminution in value related to a disamenity, analysts would need to demonstrate that higher values prevailed in the area before market knowledge of the disamenity; and that no other negative-value

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influencing conditions occurred or, if other influences did exist, to account for all of them to isolate the influence of the relevant disamenity.

A diminution in value is a necessary but not sufficient condition for a damage.

DISAMENITY DOESN'T ALWAYS CAUSE DAMAGE TO VALUE

Damage to value is a time-sensitive, ownership-specific issue. Though the value of a property may decrease because of market recognition of a disamenity, a property owner does not automatically suffer damage. Consider the following definitions.

- *Real estate value*—"The present worth of the future benefits that accrue to real property ownership."[2]
- *Market value*—"The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress."[3] Note: "A market value appraisal is also based on whatever the 'normal' or 'typical' conditions are in the marketplace for the property appraised in a time frame that is consistent with the date of value in the appraisal."[4]
- *Damage*—"Loss or harm due to injury to persons, property, or reputation."[5]

Damage to market value can then be defined as a diminution in the market value imposed on an owner resulting from an injury recognized by the market after the purchase of property.

A damage is specific to an owner who purchases a property before the condition that led to a diminution becomes apparent to the market, and is limited to the amount by which that owner's "present worth of future benefits" is diminished. A damage to a subsequent owner generally is not possible if the normal or typical market participant was aware of the disamenity. It is the knowledge of the market that governs, not the knowledge of the individual owner—unless that owner knows of the disamenity and its likely impact on value before it becomes general market knowledge (an insider-knowledge issue).

A researcher can quantify a damage by analyzing the property's market value as if the disamenity does not exist; and given that it exists, the unimpaired or less impaired vs. the impaired market values.[6]

Analysts should not assume that a given disamenity causes a diminution or damage to value. For example, consider a plant site that had groundwater contaminated with chlorinated solvents, a nitric acid spill in surface water and allegations that radioactive waste was buried on the plant site with residential properties on two sides. These issues were highly publicized and accompanied by a local real estate recession, but during a study covering a 10-year period, analysts could not show that this situation diminished nearby residential property values using an appropriate set of statistical tests. Anecdotal interviews of buyers and sellers further supported this finding.[7] Similarly, analysts frequently cite high-voltage power lines as a cause of nearby property value diminution, but authors Martin Wolverton and Steven Bottemiller, among others, have shown exceptions to that rule.[8]

Many allegations of a diminution in value are based on hedonic analysis and contingent valuation techniques. Neither technique is scientifically valid or reliable, and both are subject to manipulation to achieve desired results. They are rubber rulers that can be stretched to provide results compatible with the objectives of the researcher, client or lawyer.

THE FIRST RUBBER RULER: REGRESSION MATHEMATICS AND HEDONIC ANALYSIS

Regression is a statistical method for the estimation of the dependent variable from a set of independent variables. To form the regression relationship, the analyst chooses a set of independent variables from—in the case of real estate—a very large set of possible variables. This hypothetical relationship hopefully expresses the analyst's interest and research objectives.[9] It can never totally and completely represent all the independent variables influencing the price of a specific piece of real estate.

There are three basic components of a regression relationship important to the following discussion: the dependent variable, for our purposes generally the sale price; the

independent variables, generally factors chosen by the analyst that are believed to influence the value of the dependent variable; and the coefficients of the independent variables, the multipliers estimated by the regression mathematics in a manner that will minimize the difference between the calculated value of the sale price using the regression model and the actual value of the sale price from the database used in developing the model.

Hedonic analysis is an interpretive technique put forth by economists, not competent statisticians. This method argues that the coefficients of the regression may be quantitatively interpreted as the marginal contribution of the specific independent variable to the sale price. This requires that two interrelated assumptions be satisfied. First, that the predictor variable have a cause-effect relationship to the sale price, a relationship allegedly measured by the statistical significance of the coefficient.[10] Second, that the coefficient is quantitatively accurate; that is, it represents only the contribution of that variable to the sale price. The interrelationship is that the size of the coefficient may be inflated by omitted variables, among other things, causing the statistical significance and apparent impact on sale price to increase. This contribution from omitted variables may influence the statistical significance to the point where the omission of variables makes an otherwise totally insignificant variable appear to be significant.

The claim of a causal relationship based on the statistical significance of the predictor variable in the hypothetical regression relationship is unsupported by regression mathematics.

> "The existence of a statistical relation between the response variable Y and the explanatory or predictor variable X does not imply in any way that Y depends causally on X. No matter how strong is the statistical relation between X and Y, no cause-and-effect pattern is necessarily implied by the regression model. ... Regression analysis by itself provides no information about causal patterns and must be supplemented by additional analyses to obtain insight about causal relations. ... A major limitation of observational data is that they often do not provide adequate information about cause-and-effect relationships."[11]

Of 37 frequently cited hedonic analysis papers indicating damage to value, none based that assertion on any analytical tests other than the claimed statistical significance of the independent variable said to represent damage or diminution. For these alleged independent variables, it was found that the mean 95 percent confidence interval was plus or minus 139 percent.[12] Mathematically, a confidence interval greater than or equal to 100 percent includes zero and the coefficient must be treated in the regression analysis as a zero value.

If any variable that makes an actual contribution to the sale price is excluded from the hypothetical regression relationship, some of its contribution will be included in the coefficients of those variables that remain. How much will be included in a given coefficient is unknown and unknowable. Therefore the coefficient of the included variables do not represent just the contribution of that variable to the sale price, but the contribution of that variable and the omitted variables, and is not quantitatively meaningful in the sense required by the hedonic analysis. Note that the inflation of the coefficients by omission of variables may not be of any major importance to the prediction of the sale prices, just to hedonic analysis.

"HPV (Hedonic Property Value) regressions have two characteristics making them a fertile area for data mining (specification searching) to obtain desired signs as well as the selective reporting of unrepresentative results," authors Scott Atkinson and Thomas Crocker state. "A pattern of considerable data mining in order to obtain significant coefficients with desired signs seems to pervade the HPV literature. ...Our empirical results indicate that the specification uncertainty caused by co-linearity is small for structural variables (e.g. floor space, age, and lot size) but substantial for neighborhood variables (e.g. air pollution, school quality, and crime); intolerance to measurement error is great for both types of variables."[13]

To illustrate the frailties of hedonic analysis, consider an investigation of a water utility benzene contamination incident on property values. Analysts used approximately 1,900 sales in the regression, but several sales were missing the year built—a datum necessary for calculating the age variable. In cases where it was missing, the regression considered the properties to be some 87 years older than their actual age. After the hedonic analyst corrected the

year built for all homes except the one that was in the allegedly impacted area, the analyst concluded to a 13 percent diminution in property values in the area that the utility served. When the one remaining missing year built was corrected using the analyst's correction procedure, the diminution in value disappeared. The correction of one single item of data in the approximately 20,900 items of data used in the study resulted in a reversal of findings with virtually no change in the regression's explanatory power or precision as measured by the proponent's measure of r^2.[14]

This particular hedonic analysis also improperly uses dummy variables in a cross-product independent variable that would independently lead to incorrect results. The error is common in hedonic analysis, and well documented.[15]

In examining the hedonic analysis for the *DeSario v. Industrial Excess Landfill* case, covered in several articles published in *The Appraisal Journal*,[16] authors report that the analysis used geographic bands defined radially outward from the landfill location and assigned each property location according the band it fell within. Using this method, hedonic analysis shows a diminution in value for properties in all but the most distant measurement band. However, if instead of bands the analysis uses the measured distance of each property to the landfill, the diminution in value disappears except for the very closest properties, reducing the estimated property damages from millions to tens of thousands. The two approaches had virtually the same r^2.[17] This same phenomena appears in an analysis by author Arthur Nelson.[18]

For any given set of data and regression specification, analysts can show that a simple change in specification or small adjustment in data can provide significantly different values for the coefficient of the independent variable of interest, generally without a significant change in the usual measures of the appropriateness of the hedonic analysis that economists use, such as r^2. Manipulating hedonic analysis to achieve a desired result is not difficult and, therefore, hedonic analysis is a rubber ruler with the appearance of scientific precision—an appearance that is wholly unjustified.

A SECOND RUBBER RULER: CONTINGENT VALUATION

The use of the contingent valuation method, or hypothetical market survey, has gained prominence recently in valuation literature. This method calls for setting up a hypothetical transaction involving an alleged disamenity such as a cell phone tower, adjacent gas station or pipeline right-of-way, then surveying individuals who play the part of buyers to determine how much they would discount a property's value when close to the alleged disamenity. This methodology is based on the contingent valuation, or CV, method sometimes used in natural resource damage cases where rights that are assigned values are not traded in a traditional market.

The list of requirements outlining how to properly conduct a CV study is quite lengthy and very expensive to fulfill.[19] Failing to meet the requirements results in the degradation of the results even beyond the already high error rates normal to the method. Essentially, however, they are moot because even strong advocates of CV as an approach for valuing public and quasi-public goods clearly state that the methodology is not applicable to private goods.[20]

The results of a hypothetical market survey tend to be useless for other reasons as well. For example, most hypothetical market surveys consider only the buyer's side of the relationship; that is, how much the buyer wants the seller to take off the purchase price. Surveys rarely examine the seller's side and collect little or no information about whether a discount would receive serious consideration, let alone acceptance.[21]

Through manipulation of specific words or phrases, interviewer bias, respondent selection and other methods, researchers can obtain virtually any desired result.

A SPECIFIC EXAMPLE: THE EFFECT OF CELL PHONE TOWERS ON RESIDENTIAL PROPERTY VALUES

An article investigating the value of residential properties near cell phone towers reports: "The opinion survey results were generally confirmed by the market sales analysis using a hedonic house price approach. The results of the sales analysis show prices of properties were reduced by around 21 percent after a CPBS (Cellular Phone Base Station) was built in the neighborhood."[22] This article provides an excellent example of issues outlined previously:

Bias

The article appears to be biased in favor of a high damage result. First, it rejects two studies conducted by professional appraisers who could find no statistically significant differences among property values of homes near and not near cell phone towers.[23] Second, because they believed respondents close to cell phone towers were unwilling to provide honest answers, authors discounted survey results from respondents near the towers in favor of significantly higher results from respondents who were in areas without towers.[24]

Survey

The article contains no evidence that the survey was pretested to measure respondent understanding, bias or other critical issues as recognized survey protocols require. Further, there is no evidence of testing to ensure the survey would provide a comprehensive understanding of respondents' answers. For example, the survey included no questions to determine if respondents were providing unbiased and well-considered answers, and no questions about whether an owner would accept the indicated discount.

The results of the survey also are inconsistent. For example, many of the respondents with homes near towers—51.4 percent—said the cell towers had no influence on value; but 71 percent said that they would pay less for a home in the area. If the survey is honestly representative of the area residents, these results would strongly indicate something other than a cell phone tower is undesirable about the area. Researchers apparently do not investigate this issue.

Another major concern is that survey results are not statistically meaningful with respect to the universe of residents. The survey was conducted by mail and—though the response rate after prompting was reasonable at 46 percent—by definition, mail survey respondents are not randomly selected; they are self-selected. As the Blue Ribbon Panel report and the *Reference Guide on Survey Research*[25] note, a mail survey does not provide a scientifically reliable basis for drawing any generally applicable conclusions concerning the population as a whole.

Hedonic analysis

There is no reported attempt to test the null hypothesis of no effect except by the professional appraisers, and authors discount these analyses. Therefore, they are assuming, in the face of contrary evidence, that the cell towers negatively influence value.

Authors use at least six regression models to achieve the four reported results. This practice strongly implies specification searching to achieve a desired result. It appears the authors choose to ignore the survey's indications of another problem in the area and keep searching for specifications that support preconceived notions. Hedonic analysis is a nearly perfect tool for exactly this type of manipulation, whether conscious or unconscious.

Except for gross land area, gross living area and age, no other recognized factors of value consistently appear in the regressions. In the reported models, authors inconsistently use factors such as whether the property is single family or multifamily, the type of siding or roof construction and the quality of the property. Authors also fail to consider other key value-influencing factors including the number of bedrooms, bathrooms and garage spaces. In addition, authors include income-producing property such as rental units in the same regression database as owner-occupied property sales. A regression model that does not consistently use recognized factors of market value and clearly separate distinct types of property—income producing vs. owner-occupied—is highly suspect.

General

In their literature review, authors note that high-voltage overhead transmission lines have a reported impact on value ranging from positive—i.e., increasing the value of neighboring properties—to negative. In a separate study, one of the paper's authors cite a maximum negative influence on value of 20 percent for properties 10 meters from a high-voltage tower, declining rapidly to zero at 100 meters.[26] Further, authors state that according to another study, 50 percent of all high-voltage studies indicate no impact on value and 50 percent indicate between 2 percent and 10 percent negative impact.[27] For a less obtrusive artifact, the authors report a significantly greater damage estimate: 10 percent to 23 percent for properties within 300 meters.

CONCLUSION

It is relatively common for damage to be confused with diminution, and a diminution to be confused with a simple locational preference. But these phenomena are not the same—a locational preference is not necessarily a diminution, and a damage cannot exist without a diminution in value. Damage is specific to the owner and the period of ownership relative to market recognition of the event that allegedly causes the damage.

Analysts must use proven methods such as classic market data analysis of arms-length and verified sales or specific statistical tests of the null hypothesis of no lower value to identify an area of lower values. Demonstrating diminution relies on these methods, which provide sound indications that—but for the alleged disamenity—a higher value would reasonably be expected in the area of demonstrated lower values.

Damage to value is specific to the property owner who purchases the property before the disamenity causing the damage becomes known in the market, and is specific only to that owner, and not to successors, because the future market will have recognized the disamenity and adjusted values accordingly. The damage may not affect an owner immediately; market recognition of a damaging impact determines the date of damage.

Therefore, three steps necessary to demonstrate a damage to value resulting from a disamenity are:

1. Does an area of lower values exist? That is, are values in the subject area lower than the norm for the property type and market?
2. Are the lower values a result of a specific disamenity? Because of the complexity of forces operating in the real estate market, this point may be difficult to demonstrate. One key factor would be to show that higher values in the area preceded the diminishment in values, and the decline followed market recognition of the disamenity.
3. Did the owner purchase before the disamenity became known in the market? If the purchase occurred after market knowledge, analysts can presume that the price paid reflects the existence of the disamenity and no damage to that owner exits.

Hedonic analysis and hypothetical market surveys are no better than rubber rulers—measurement devices that analysts can stretch knowingly or unknowingly to achieve a desired result while maintaining the superficial appearance of scientific validity. These methods are not scientifically valid or reliable.

That they are not reliable usually can be demonstrated by simply repeating the experiment, but using a slight legitimate alteration—in the wording of a CV survey, for example. A lack of reliability in hedonic analysis models may be demonstrated by changing a model specification to include common and well-understood value influences such as bedrooms, baths, age or other variables that were omitted in the original hedonic analysis. This will almost always result in an important reduction in the size and apparent significance of the damage variable. Occasionally, it may be necessary to critically examine the database or look at alternative model specifications, changing the distance measurement from artificial distance bands to more natural direct distance, for instance. These simple and very logical changes generally will provide very different results, and very frequently with the same measure of reliability as claimed in the original analysis. ■

1 Peter Bowes, Douglas C. Brown, Albert R. Wilson, "Damage to Market Value and Locational Premium," *Real Estate Issues, Vol. 29, No. 4*, Winter 2005–2006.

2 *The Dictionary of Real Estate Appraisal, Fourth Edition* (Chicago: Appraisal Institute, 2002).

3 *Ibid.*

4 *Uniform Standards of Professional Appraisal Practice, 2002 Edition,* Advisory Opinion 22 (Washington, D.C.: The Appraisal Foundation, 2002).

5 *The Merriam Webster Dictionary,* (Springfield, Mass.: Merriam Webster Inc., 1998).

6 The phrase "less impaired" addresses the emerging issue of properties that have been remediated to a standard appropriate for a specific use, but not remediated to an unimpaired environmental condition.

7 Albert R. Wilson, "Proximity Stigma: Testing the Hypothesis," *The Appraisal Journal,* June 2004.

8 Marvin L. Wolverton, Steven Bottemiller, "Further Analysis of Transmission Line Impact on Residential Property Values," *The Appraisal Journal,* July 2003.

9 Note: All regression relationships are hypothetical expressions of the analyst's idea of how various elements as represented by predictor variables might influence the value of the dependent variable. This

statement becomes obvious when one considers the variation among real estate regression models. Some regressions use a relationship that includes bathrooms and half-baths but not bedrooms; others include house size, lot size, number of bedrooms and baths, and size of garage—but not house style, age, condition, type of heat or other variables cited frequently as important to value. Published regression relationships used in hedonic analysis may contain from one or two to 90 or more independent variables. Leading textbooks on the issue of multiple regression model construction and application generally agree that such models are hypothetical in the sense that analysts choose which variables to include or exclude. Also see endnote 11.

10 Statistical significance is normally measured by the studentized t-value. The t-value is a ratio that indicates the relative contribution of the coefficient to a reduction in the variance between the calculated and actual values of the dependent variable. The larger the coefficient, the greater the significance of that coefficient to the minimization of the variance.

11 John Neter, Michael Kutner, Christopher J. Nachtsheim, William Wasserman, *Applied Linear Regression Models, Third Edition* (Chicago: Irwin, 1996).

12 Author's research files. Articles were selected based on the frequency with which they were referenced in articles by hedonic analysts. The measure was calculated as: percentage range = +/- 1.96*((Coefficient Value/t-value)/Coefficient Value).

13 Scott E. Atkinson; Thomas D. Crocker; "A Bayesian Approach to Assessing the Robustness of Hedonic Property Value Studies," *Journal of Applied Econometrics; Vol. 2, 27-45, 1987.*

14 Authors' files on report and supporting data of Barton Smith, Ph.D., prepared in the case of *Mike Adalis et al v. Neighborhood Development Corporation et al*, 369th Judicial District, 93-0464.

15 Warren Rogers, "Errors in Hedonic Modeling Regressions: Compound Indicator Variables and Omitted Variables," *The Appraisal Journal*, April 2000.

16 Alan Richert, "Impact of a Toxic Waste Superfund Site on Property Values," *The Appraisal Journal*, October 1997; and "The Persistence of Contamination Effects; A Superfund Site Revisited," *The Appraisal Journal*, April 1999.

17 Authors' research files. Note: r^2 generally is not a meaningful measure of reliability of applicability.

18 Arthur C. Nelson, "Price Effects of Proposed Landfill on Single Family House Values," *Property Reserve Inc.*, March 1991.

19 *Federal Register, Vol. 58, No. 10*, Proposed Rules, Department of Commerce, 15 CFR Chapter IX, Natural Resource Damage Assessments Under the Oil Pollution Act of 1990, 58 FR 4601, Appendix I—Report of the NOAA Panel on Contingent Valuation, Jan. 15, 1993 (the "Blue Ribbon Panel report"). Also see endnote 21.

20 Richard T. Carson, Nicholas E. Flores, Norman F. Meade, "Contingent Valuation: Controversies and Evidence," *Environmental and Resource Economics, Vol. 19*, 2001. Also see Richard T. Carson, Nicholas E. Flores, Kerry M. Martin and Jennifer L. Wright, "Contingent Valuation and Revealed Preference Methodologies: Comparing the Estimates for Quasi-public Goods," *Land Economics*, February 1996. Also see endnote 7.

21 Albert R. Wilson, "Contingent Valuation: Not an Appropriate Valuation Tool," *The Appraisal Journal*, Winter 2006.

22 Sandy Bond, Ph.D., Ko-Kang Wang, "The Impact of Cell Phone Towers on House Prices in Residential Neighborhoods," *The Appraisal Journal*, Summer 2005.

23 "Two studies have been conducted to ascertain the adverse health and visual effects of CPBSs on property values. Telecom commissioned Knight Frank (NZ) Ltd to undertake a study in Auckland in 1998/00 and commissioned Telfer Young (Canterbury) Ltd to undertake a similar study in Christchurch in 2001. Although the studies show that there is not a statistically significant effect on property prices where CPBSs are present, the research in both cases involves only limited sales data analysis. Further, no surveys of residents' perceptions were undertaken, and the studies did not examine media attention to the sites and the impact this may have on salability of properties in close proximity to CPBSs. Finally, as the sponsoring party to the research was a telecommunications company it is questionable whether the results are completely free from bias." Bond, *ibid*, pages 260-261.

24 "In general, those people living in areas farther from CPBSs were much more concerned about issues related to proximity to CPBSs that residents who lived near CPBSs. ... Alternatively, the apparent lower sensitivity to CPBSs of case study residents compared to the control group residents may be due to cognitive dissonance reduction. In this case, respondents may be unwilling to admit, due to the large amounts of money already paid, that they may have made a poor purchase or rental decision in buying or renting property located near a CPBS. Similarly, the homeowners may be unwilling to admit there are concerns about CPBSs when the CPBSs were built after they had purchased their homes, because to do so might have a negative impact on property values." Bond, *ibid*, pages 265 266.

25 Shari Seidman Diamond; "Reference Guide on Survey Research," *Moore's Federal Practice: Reference Manual on Scientific Evidence* (Washington, D.C.: Federal Judicial Center, 1994 and later).

26 S.J. Bond, J. Hopkins, "The Impact of Transmission Lines on Residential Property Values: Results of a Case Study in a Suburb of Wellington, New Zealand," *Pacific Rim Property Research Journal, Vol. 6, No. 2*, 2000.

27 C. Kroll, T. Priestley, *The Effects of Overhead Transmission Lines on Property Values: A Review and Analysis of the Literature* (Washington, D.C.: Edison Electric Institute, 1992).

[redacted]

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 2015                    *** PROPERTY TAX SUMMARY ***                    2015
MAP # >: 043-00-00-030.08     BILL NUMBER:          CARD    1 OF   1
NN>: >: HUTCHENS MARK A & RACHELLE L                DIST  >:C    CLASS >: 2
NME2 >:                                        SUBD: SWITZER ACRES
M/ADR >: 508 THAMES CIRCLE          CYS >: NICHOLASVILLE KY     ZIP >: 40356
  LOT>: PROP 8      BLK>:        UNIT>:       SECT>:
  STREET>: CATNIP HILL           IMP >: NO    SQFT>:         C/ACR >: 5.01
  PREOWN>: SWITZER SUE E         \ DB>:712/469    PC 10/107
  P/ADR >: CATNIP HILL ROAD          YR >:07/02/2014  SALE>: 150000/2
  ACREAGE:    5.00      LOT SIZE:                YR 2>:            EXCL>:
LND-             FRL-      1477 CLD-            TAX-      1477
RRE-             FRE-           CMP-            ADV-     73523
OIH-             FBN-           MOB-
MOB-             DWL-           CEL-            * DELETION *   * NEW GROWTH *
RES-         0   MOB-           COM-            RES-           RES-
FLD-     75000   AGV-      1477 ELD-            FCV-           FCV-
FMP-         0   HEX-           EMP-            AGV-           AGV-
FCV-     75000   DIS-           EXT-            COM-           COM-
COMMENTS: PREV ON ACCT 43-30.02 FOR 2014              SP C:   REASSESS:
COMMENTS: TAXPAYER OWNS ADJ PROPERTY                  DATE CMPLT:09/09/2014
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    D -Delete  H -Hardcopy  U -Update  X -Exit  F -Print Form  B -Browse
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 2015                    *** PROPERTY TAX SUMMARY ***                    2015
MAP # >: 043-00-00-030.07     BILL NUMBER:          CARD    1 OF   1
NM>: >: HUTCHENS MARK A & RACHELLE L                DIST  >:C    CLASS >: 2
NME2 >:                                        SUBD: SWITZER ACRES
M/ADR >: 508 THAMES CIRCLE         CYS >: NICHOLASVILLE KY     ZIP >: 40356
  LOT>: PROP 9      BLK>:        UNIT>:       SECT>:
  STREET>: CHINKAPIN 744         IMP >: NO    SQFT>:         C/ACR >: 5.03
  PREOWN>: SWITZER SUE           \ DB>:715/302    PC 10/107
  P/ADR >: 744 CHINKAPIN            YR >:08/28/2014  SALE>: EXCHANGE OF PROP
  ACREAGE:    5.01       LOT SIZE:               YR 2>:            EXCL>:
LND-             FRL-      1387 CLD-            TAX-      1387
RRE-             FRE-           CMP-            ADV-     73613
OIH-             FBN-           MOB-
MOB-             DWL-           CEL-            * DELETION *   * NEW GROWTH *
RES-         0   MOB-           COM-            RES-           RES-
FLD-     75000   AGV-      1387 ELD-            FCV-           FCV-
FMP-         0   HEX-           EMP-            AGV-           AGV-
FCV-     75000   DIS-           EXT-            COM-           COM-
COMMENTS: PREV ON ACCT 43-30.02 FOR 2014               SP C:   REASSESS:
COMMENTS: TAXPAYER OWNS ADJ PROPERTY    SEE NOTE       DATE CMPLT:09/09/2014
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    D -Delete  H -Hardcopy  U -Update  X -Exit  F -Print Form  B -Browse
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Jessamine County, Kentucky
Property Valuation Administrator
Brad Freeman

Property Search Results

(Please click on "View Record" for the property you want to see)

	Name	Street Address	Parcel ID
View Record	ALTAKY LLC	635 BURR OAK	043-00-00-001.05
View Record	BATES WILLIAM	626 BURR OAK DR	043-00-00-001.22
View Record	ELLIOTT JAMES L & SUZANNE H	631 BURR OAK DR	043-00-00-001.04
View Record	GALE PROPERTY MANAGEMENT LLC	618 BURR OAK	043-00-00-001.24
View Record	HALEY JAMES M & MICHELLE	BURR OAK	043-00-00-001.32
View Record	HALEY MIKE & MICHELLE	505 BURR OAK	043-00-00-001.31
View Record	HALEY MIKE & MICHELLE	505 BURR OAK	043-00-00-001.31
View Record	KRUEGER ALEX & TANYA	622 BURR OAK	043-00-00-001.23
View Record	MALIK HAMMAD & NUZHAT NAQVI	619 BURR OAK DR	043-00-00-001.01
View Record	MCBEATH MICHAEL R	623 BURR OAK DR	043-00-00-001.02
View Record	RODGERS CHRISTOPHER & LISA	627 BURR OAK DR	043-00-00-001.03
View Record	ROHDE DAVID & ERIKA	612 BURR OAK DR	043-00-00-001.25
View Record	RUTHERFORD FRED & LORI	405 BURR OAK	043-00-00-001.30
View Record	SFAR ADEL & MANAL	639 BURR OAK	043-00-00-001.06
View Record	TOMASSONI GERY F & LISA M	604 BURR OAK DR	043-00-00-001.27

Page: 1 2 Total Records: 18

← 762,019
5/15/14
LAND SALES

(To return to your Search Query, please click your browser's "back" button)

MARK HUTCHINS
12/12 $268,610 permit
744 Chinkapin
LOT 8 & 9 10ac
7/14 Switzer
ACRES 8 LOTS
150,000 10ac

Jessamine County, Kentucky
Property Valuation Administrator
Brad Freeman

Property Search Results

(Please click on "View Record" for the property you want to see)

	Name	Street Address	Parcel ID
View Record	TOMASSONI GERY F & LISA M	600 BURR OAK DR	043-00-00-001.28
View Record	UNRUG THOMAS & CARMEN ESTHER VAN	608 BURR OAK	043-00-00-001.26
View Record	WILKINSON JACK RUSSELL III	500 BURR OAK	043-00-00-001.29

Page: 1 2 Total Records: 18

(To return to your Search Query, please click your browser's "back" button)

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Sales Search Results

(Please click on "View Record" for the property you want to see)

	Sale Price	Sale Date	SqFt	Street Address
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View Record	170000	03/15/2006	0	639 BURR OAK DR
View Record	170000	04/13/2006	0	627 BURR OAK
View Record	340000	04/13/2006	0	626 BURR OAK DR
View Record	340000	04/13/2006	0	631 BURR OAK
View Record	340000	04/18/2006	0	638 BURR OAK
View Record	175000	04/18/2006	0	604 BURR OAK
View Record	175000	04/18/2006	0	600 BURR OAK
View Record	170000	04/22/2006	0	619 BURR OAK
View Record	170000	04/26/2006	0	612 BURR OAK DR
View Record	170000	05/03/2006	0	618 BURR OAK
View Record	0	07/17/2006	0	635 BURR OAK DR
View Record	0	07/17/2006	0	626 BURR OAK DR
View Record	0	07/24/2006	0	608 BURR OAK DR
View Record	937324	10/13/2006	0	639 BURR OAK

Page: 1 2 3 Total Records: 41

(To return to your Search Query, please click your browser's "back" button)

Jessamine County, Kentucky
Property Valuation Administrator
Brad Freeman

Sales Search Results

(Please click on "View Record" for the property you want to see)

	Sale Price	Sale Date	SqFt	Street Address
View Record	170000	12/01/2006	0	626 BURR OAK DR
View Record	500000	01/18/2007	4812	627 BURR OAK DR
View Record	183845	03/10/2007	0	631 BURR OAK DR
View Record	225000	03/14/2007	0	BURR OAK
View Record	225000	04/25/2007	0	BURR OAK
View Record	950000	05/25/2007	5347	623 BURR OAK DR
View Record	1450000	08/09/2007	0	619 BURR OAK DR
View Record	1260615	10/10/2007	0	604 BURR OAK DR
View Record	400000	06/02/2008	0	608 BURR OAK
View Record	340000	10/03/2008	0	608 BURR OAK
View Record	153000	06/29/2009	0	626 BURR OAK DR
View Record	1265000	07/10/2009	7311	619 BURR OAK DR
View Record	855000	07/30/2009	5658	639 BURR OAK
View Record	1495000	07/30/2009	5367	604 BURR OAK DR
View Record	165000	07/30/2009	0	600 BURR OAK DR

Page: 1 2 3 Total Records: 41

(To return to your Search Query, please click your browser's "back" button)

Jessamine County, Kentucky
Property Valuation Administrator
Brad Freeman

Sales Search Results

(Please click on "View Record" for the property you want to see)

	Sale Price	Sale Date	SqFt	Street Address
View Record	971000	12/23/2009	5647	631 BURR OAK DR
View Record	885000	02/24/2010	4532	635 BURR OAK
View Record	775000	04/09/2010	5647	631 BURR OAK DR
View Record	250000	12/30/2010	0	BURR OAK
View Record	250000	12/30/2010	0	BURR OAK
View Record	635000	11/23/2011	3884	612 BURR OAK DR
View Record	84000	05/16/2012	0	BURR OAK
View Record	120000	06/15/2012	0	BURR OAK
View Record	718500	11/20/2012	0	BURR OAK
View Record	80000	12/28/2012	0	626 BURR OAK DR
View Record	137000	08/22/2013	0	618 BURR OAK

Page: 1 2 3 Total Records: 41

(To refine your Search Query, please click your browser's "back" button)

Jessamine County, Kentucky
Property Valuation Administrator
Brad Freeman

Property Search Results

Please click on "View Record" for the property you want to see)

	Name	Street Address	Parcel ID
View Record	BATES WILLIAM D & PATRICIA A	704 CHINKAPIN	043-00-00-001.21
View Record	CADAGAN LEONEL A & RYM S	701 CHINKAPIN	043-00-00-001.07
View Record	CRABBE TIMOTHY G & KANDY KLEE	721 CHINKAPIN	043-00-00-001.11
View Record	DAVIS THOMAS L & CARRIE A	724 CHINKAPIN DR	043-00-00-001 17
View Record	DOUGLAS DONALD & CAROL	733 CHINKAPIN	043-00-00-001.14
View Record	DOYLE ROBERT & SARAH B	712 CHINKAPIN DR	043-00-00-001.19
View Record	DOYLE ROBERT & SARAH B	713 CHINKAPIN	043-00-00-001.10
View Record	ENGLISH VICTOR D & SUSAN HAHN	708 CHINKAPIN	043-00-00-001.20
View Record	FOREST HILLS RESIDENTS ASSOCIATION INC	CHINKAPIN	043-00-00-001.33
View Record	FRANKL ERIC J & LINDA G	725 CHINKAPIN	043-00-00-001.12
View Record	GALE JEFFREY S & DEANNE S	705 CHINKAPIN	043-00-00-001.08
View Record	HELM MARLENE M & GEORGE JR	720 CHINKAPIN DR	043-00-00-001.18
View Record	PBI BANK INC	732 CHINKAPIN	043-00-00-001.15
View Record	RANGNEKAR VIVEK & VIDYA	709 CHINKAPIN	043-00-00-001.09
View Record	STANLEY JEREMY	728 CHINKAPIN	043-00-00-001.16

Page: 1 2 Total Records: 16

(To return to your Search Query, please click your browser's "back" button)

Jessamine County, Kentucky
Property Valuation Administrator
Brad Freeman

Property Search Results

(Please click on "View Record" for the property you want to see)

	Name	Street Address	Parcel ID
View Record	WHEELER CAROLYN N	729 CHINKAPIN	043-00-00-001.13

Page: 1 2 Total Records: 16

(To return to your Search Query, please click your browser's "back" button)

Jessamine County, Kentucky
Property Valuation Administrator
Brad Freeman

Sales Search Results

(Please click on "View Record" for the property you want to see)

	Sale Price	Sale Date	SqFt	Street Address
View Record	165000	03/06/2006	0	708 CHINKAPIN
View Record	660000	03/13/2006	0	705 CHINKAPIN DRIVE
View Record	660000	03/13/2006	0	712 CHINKAPIN DRIVE
View Record	660000	03/13/2006	0	713 CHINKAPIN DRIVE
View Record	660000	03/13/2006	0	709 CHINKAPIN DRIVE
View Record	170000	03/31/2006	0	704 CHINKAPIN DRIVE
View Record	170000	05/08/2006	0	729 CHINKAPIN DR
View Record	330000	06/05/2006	0	720 CHINKAPIN DRIVE
View Record	330000	06/05/2006	0	721 CHINKAPIN DRIVE
View Record	180900	02/13/2007	0	709 CHINKAPIN DR
View Record	170000	03/21/2007	0	733 CHINKAPIN DRIVE
View Record	0	08/20/2007	0	CHINKAPIN
View Record	0	11/08/2007	0	CHINKAPIN
View Record	815000	12/07/2007	3557	704 CHINKAPIN
View Record	874917	02/08/2008	0	733 CHINKAPIN

Page: 1 2 3 Total Records: 39

(To return to your Search Query, please click your browser's "back" button)

Jessamine County, Kentucky
Property Valuation Administrator
Brad Freeman

Sales Search Results

(Please click on "View Record" for the property you want to see)

	Sale Price	Sale Date	SqFt	Street Address
View Record	1185802	02/27/2008	0	709 CHINKAPIN
View Record	697000	04/03/2008	0	712 CHINKAPIN DR
View Record	697000	04/03/2008	0	713 CHINKAPIN
View Record	697000	04/03/2008	0	705 CHINKAPIN
View Record	265000	07/21/2008	0	701 CHINKAPIN
View Record	809243	08/11/2008	0	720 CHINKAPIN
View Record	810000	10/03/2008	0	721 CHINKAPIN
View Record	705000	08/17/2009	3754	728 CHINKAPIN
View Record	145000	08/25/2009	0	713 CHINKAPIN
View Record	145000	09/01/2009	0	712 CHINKAPIN DR
View Record	1	05/05/2010	4600	733 CHINKAPIN
View Record	90000	07/30/2010	0	CHINKAPIN
View Record	90000	07/30/2010	0	CHINKAPIN
View Record	805000	03/28/2011	5242	709 CHINKAPIN
View Record	95000	03/05/2012	0	CHINKAPIN
Page: ⏮ ◀ 1 2 3 ▶ ⏭ Total Records: 39				

(To return to your Search Query, please click your browser's "back" button)

Jessamine County, Kentucky
Property Valuation Administrator
Brad Freeman

Sales Search Results

(Please click on "View Record" for the property you want to see)

	Sale Price	Sale Date	SqFt	Street Address
View Record	95000	03/15/2012	0	708 CHINKAPIN
View Record	83000	03/23/2012	0	725 CHINKAPIN
View Record	92000	04/09/2012	0	705 CHINKAPIN
View Record	100450	05/04/2012	0	729 CHINKAPIN
View Record	627105	10/31/2012	0	CHINKAPIN
View Record	0	12/03/2012	3360	724 CHINKAPIN DR
View Record	630000	12/13/2012	4145	701 CHINKAPIN
View Record	0	12/31/2012	0	705 CHINKAPIN
View Record	700000	04/09/2014	3914	713 CHINKAPIN

Page: 1 2 3 Total Records: 39

(To return to your Search Query, please click your browser's "back" button)

BURR

627	RODGERS	4866 SF	$800,000
612	RHODE	3875	725,000
~~OUT~~ 405	Rutherford	3561	520,000
639	SFAR	5298	880,000
604	TOMASSONI	5475	1,100,000
600	TOMASSONI	—	95,000
608	UNRUG	5295	750,000
~~OUT~~ 500	WILKINSON	2510	154,964

~~$8,101~~

$9,084,500

TOTAL Both Streets $18,102,000

X .20%

$3,620,400

Chinkapin

733
729
728 FOR SALE
725
724
721
720
712 under construction
713
709
708
705
704 BATES 701 CHINKAPIN on Right Corner Chuck & Butt
on BURR → ? end

Burr

639
635
631
627
623
622
619
618
612
608
604

505 AT END OF Burr
405

CHINKAPIN			ASSE
704	BATES	4672 sf	$ 710,000
701	CADAGAN	4145	700,000
721	CRABBE	4367	700,000
724	DAVIS	3360	650,000
733	Douglas	4695	725,000
712	Doyle	—	95,000
713	Doyle	3914	735,000
708	ENGLISH	3992	627,105
725	FRANKLE	3225	535,500
705	GALE	3370	660,000
720	HELM	4733	735,000
732	PBI BANK	—	95,000
709	RANGNEKAR	5249	805,000
728	STANLEY	4310	715,000
729	Wheeler	3118	530,450
			$9,018,055

BUR OAK			
635	ALTAKY LLC.	4645	$ 835,000
626	BATES	—	95,000
631	ELLIOTT	4745	689,000
618	GALE	—	277,000
LOT 32		—	120,000
505	HALEY	6473	1,350,000
622	KRUEGER	3639	718,500
619	MALIK	7787	1,200,000
623	McBEATH	5212	800,000


IMG_7543[1] 733


IMG_7544[1] 731


IMG_7545[1] 728


IMG_7546[1] 725


IMG_7547[1] 724


IMG_7548[1] 721


IMG_7549[1] 720


IMG_7550[1] 712


IMG_7551[1] 713


IMG_7552[1] 709


IMG_7553[1] 708


IMG_7554[1] 705


IMG_7555[1] 704


IMG_7556[1] 701


IMG_7557[1] 639


IMG_7558[1] 634


IMG_7559[1] 631


IMG_7560[1] 627


IMG_7561[1] 623


IMG_7562[1] 620


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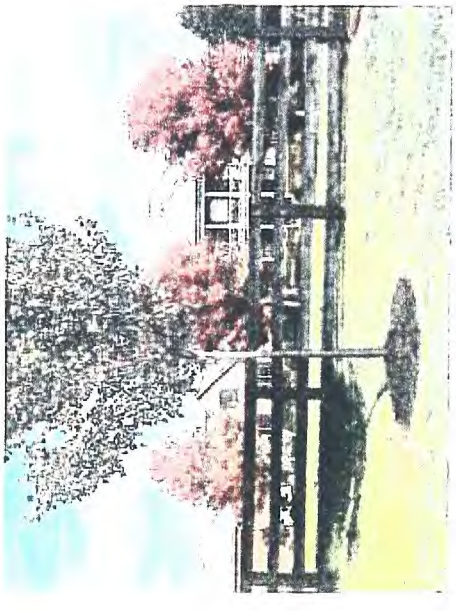
IMG_7566[1] 642

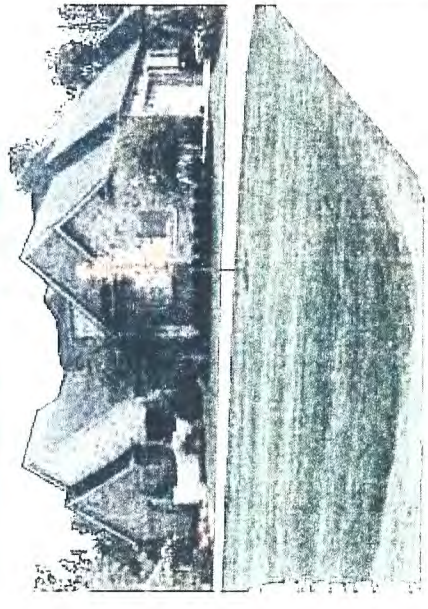
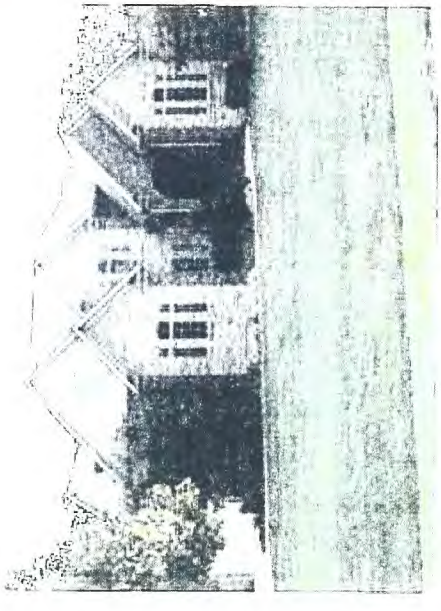

IMG_7567[2] 644







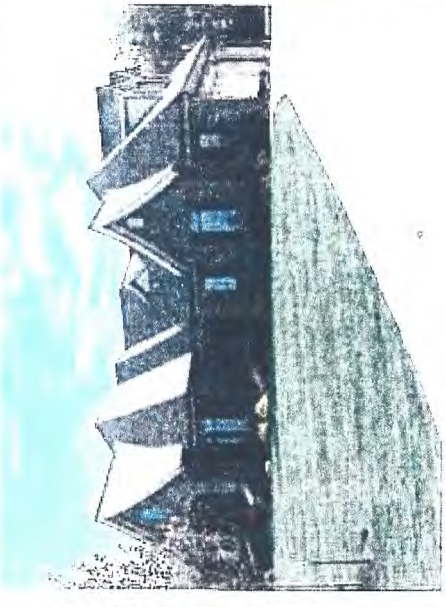


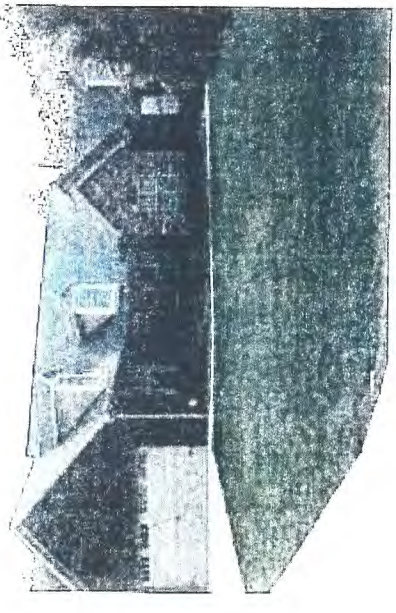











CHEVROLET

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: Counsel

10. Provide a citation to all PSC decisions known to the Association or to Mr. Toleman where the PSC has considered the impact of property values in a CPCN application for construction of a water storage tank. If none, so state.

RESPONSE:

See Case No. 2012-00470. PSC decisions are publicly available at the Commission's website, www.psc.ky.gov.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: G. Michael Ritchie / E. Clark Toleman

11. Please provide all documents not previously produced in Case No. 2012-00470 containing or relating to studies, evaluations, discussions and/or communications, prepared by or on behalf of the Association with regard to the water tank proposed in this proceeding.

RESPONSE:

See attached, as well as the response to Request No. 23.


042
054
042-00-00-022.01
042-00-00-019.01
042-00-00-032.00
043-00-00-002.00
GOLF CLUB DR
HARRODSBURG RD
043-00-00-001.00
043-00-00-001.03
043-00-00-001.29
BURR OAK DR
043-00-00-001.00
CHINKAPIN DR
CATNIP HILL RD
043
055
055-00-00-035.00
RHINEHEIMER LN
043-00-00-033.00
043-00-00-025.02
043-00-00-031.00

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: Counsel

12. Please provide any and all studies, analyses, projections and forecasts of the future demand for water and water storage by customers of JSEWD's Northwest Service territory prepared for use by the Association in this proceeding or in Case No. 2012-00470 that have not been previously provided.

RESPONSE:

None.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: Counsel/T. Logan Davis

13. Please produce all documents in the possession of the Association, its officers, or any person providing consulting or other services or advice to the Association, concerning water or storage provision to the District by the City of Nicholasville or any other water utility.

RESPONSE:

None, other than those produced by JSEWD or otherwise publicly available online.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: Counsel

14. Please provide all documents or correspondence between the Association, its officers or consultants concerning the provision of water, storage of water by JSEWD, or any other issue that the Association seeks to raise in this case and any other entity or person including but not limited to the following:

a. Kentucky American Water Company, American Water Works Company, or any affiliated or associated organization;
b. Kentucky Infrastructure Authority;
c. Kentucky River Authority;
d. Kentucky Department of Water
e. Kentucky Rural Finance Corporation
f. Any other organization, professional services provider or consultant engaged in the provision of water or storage of water.

RESPONSE:

Forest Hills Residents' Association, Inc. objects to this request because it is vague and overbroad. Notwithstanding the foregoing objection, neither Forest Hills Residents' Association, Inc. nor its officers have any documents responsive to this request. Forest Hills Residents' Association, Inc. does not know whether its consultants have any documents responsive to this request.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: T. Logan Davis

15. Please provide the minutes and attendance logs from any and all meetings of Association in which the water tank proposed in this proceeding or the storage of water was mentioned or discussed since the date of the most recent minutes produced in Case No. 2012-00470.

RESPONSE:

See attached.

Forest Hills Residents HOA

June 11, 2014

To: Forest Hills Owners

From: FH HOA Board

On April 12, 2014 a special meeting was held at the Keene Manor Clubhouse to discuss the water tower issue and to vote for or against continuing to oppose the water tower construction at the end of Chinkapin. The vote was affirmed to proceed with our intervention before the Public Service Commission opposing the construction site.

Afterwards, an objection was raised on the clarity of the special meeting notification, specifically that it was not clear that a vote would be held. The issue was forwarded to our HOA attorney, John Talbott, and after review he concurred that a revote should be held.

On May 24, 2014 a second special meeting was held at Keene Manor Clubhouse specifically to vote on the water tower issue. After much discussion, a written ballot vote was held. The results were sixteen (16) for YES to proceed with the intervention and (5) for NO to proceed. Included in the vote were four (4) YES proxy votes, and two (2) NO proxy votes. Additionally, there was One (1) YES proxy vote disqualified due to not being submitted by the required time. There was one (1) NO proxy vote disqualified for the same reason.

As we did before, we will send out an invoice to each property owner for the initial expenses associated with the WT intervention and a second invoice when it is concluded. Please submit your payment as soon as you receive the invoice so that we can keep up with our legal fees.

To date, the water board is delinquent in submitting filing documents required by the PSC. So technically, the new filing to build a water tower is not complete. If the filing proceeds, it is expected to take six to eight months for the PSC to make a decision.

Forest Hill Board

Sonny Bates
Don Douglas
Logan Davis

Jim Elliott
Lisa Tomassoni
Vidya Rangnekar

FH HOA Special Meeting 5/24/14

Sign In

* Re-vote on water tower issue.

1. Sonny Bates
2. [illegible]
3. Victor Enslee
4. Chet & Cheryl Johnson
5. Vivek and Vidya Ranganekar
6. [illegible]
7. Greg Dixon
8. Kim Balance
9. Mike Galassi
10. [illegible]
11. [illegible]

FOREST HILLS HOA

May 5, 2014

TO: ALL FH Owners

FROM: FH BOARD

After our general meeting week last, an objection was raised by one of our owners regarding the legality of the vote to intervene a second time on the water tower filing for a permit to build a water tower at the end of Chinkapin. The objection was submitted to the HOA attorney and he agreed that the letter mailed announcing the special meeting should have been clearer, stating a vote **would** be held at the meeting.

The board agreed and will now call for a second special meeting to be held May 24, 2014. The meeting will be held at the same location, Keene Manor Club House at 9:00AM.

The purpose of the special meeting will be to re-vote on whether FH HOA will intervene or not intervene a second time on the water boards petition for a permit to build a water tower at the end of Chinkapin Dr. Discussion on the issue will be allowed.

To vote, an owner must be in good standing, meaning all dues and assessments are paid current. 2014 HOA dues were due in the first quarter of this year. All past legal assessments, if not paid, are past due.

Fifty-One (51) percent of the vote is required to pass the resolutions to proceed with the second intervention.

If you cannot make the meeting, you can make a proxy vote. Submit your proxy to Jim Elliot in writing, EM ok, at **least two days in advance of the special meeting.** Jim's EM address is [redacted] His home address is 631 Burr Oak Dr., Nicholasville, KY. 40356.

This past weekend, there was an EM sent to some FH owners regarding water tower issues. Please be aware that this EM has some inaccuracies. Come to the meeting to get the information you need to make an informed decision.

4/22/14 SIGN IN

Special Meeting
Architectural Review Board
Keene Manor Public

2 6. Jimmy Bates ✓
2. [illegible] ✓ X
3. (2) Doug Hudson ✓
4. Eric Fowler ✓
5. Joe Da... ✓
6. Erika Dave Parker ✓
7. Chris Rodgers ✓ X
8. Kat Vice Llanes ✓
2 9. Lisa Tomassoni ✓
10. Alex Krieger ✓
3 11. Shelle Kelley ✓
12. [illegible] ✓
13 Adel Shair ✓
14 [illegible] ✓
15 Robert Doyle ✓
16 Vivek Ranjnekar ✓
[illegible] ✓

Chair: Bob Watt - Staff Keenan Ogden

31 Lots → 27 homeowned
1 Bank

YES 15
RWW 14
15

NO 5
6

FOREST HILLS HOA

March 31, 2014

TO: All Forest Hills Owners

FROM: HOA Board

There will be a HOA owners meeting on April 12, 2014 at 9:00AM. The meeting will be at the clubhouse at Keene Manor on Harrodsburg Rd., just North of Forest Hills on the West side.

It is important that all owners attend the 2014 HOA meeting, as there is a new development in the water tower issue. Please come and get the latest information first hand and make sure your voice is heard.

Also, it is a good time to meet your fellow homeowners.

3/29/14 FH HOA Board - Cracker B.

Sonny
Lisa
Lorin
Don
Lidya
Jim

1. CRAB/Doyle Rental

2. Water tower
4/12/14 G. mtng

* Voted to call special mtng for the water tower issue on 4/12/14

Witness: Counsel

16. Please identify with particularity and separately each and every issue or criticism that the Association has identified with the population growth study presented by Dallam Harper in this proceeding. If the Association is relying on expert assistants or consultants for any or all of such criticisms, please list any such person or entity as a respondent and provide the name, occupation, address, professional association and resume of such person or entity. Please identify respondent separately for each issue identified.

RESPONSE:

Identifying the issues or criticisms that Forest Hills has with the population growth study presented by Dallam Harper in this proceeding requires Forest Hills to reveal the contents of materials prepared in anticipation of or as a result of this proceeding and the mental impressions of its counsel, which are protected from disclosure by the work product doctrine. Without waiving the foregoing objection, Forest Hills states that their investigation, through their counsel, is ongoing.

Witness: Counsel

17. For all respondents above, please explain in detail why no testimony was filed presenting such person or entity's findings or recommendations.

RESPONSE:

Not applicable.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: Counsel

18. Please identify with particularity and separately each and every issue or criticism that the Association has identified with the studies prepared and sponsored by Horne Engineering on behalf of the District in this proceeding. If the Association is relying on expert assistants or consultants for any or all of such criticisms, please list any such person or entity as a respondent and provide the name, occupation, address, professional association and resume of such person or entity. Please identify respondent separately for each issue identified.

RESPONSE:

Identifying the issues or criticisms that Forest Hills has with the studies prepared and sponsored by Horne Engineering on behalf of the District in this proceeding requires Forest Hills to reveal the contents of materials prepared in anticipation of or as a result of this proceeding and the mental impressions of its counsel, which are protected from disclosure by the work product doctrine. Without waiving the foregoing objection, Forest Hills states that their investigation, through their counsel, is ongoing.

Witness: Counsel

19. For all respondents above, please explain in detail why no testimony was filed presenting such person or entity's findings or recommendations.

RESPONSE:

Not applicable.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: G. Michael Ritchie

20. Please admit or deny – other than Case No. 2012-00470, there is no PSC Order in a CPCN proposal for a water storage tank in which Mr. Ritchie's recommendations or similar proposal has been discussed or accepted by the Commission with respect to a proposed site for such a water storage tank. If denied, provide a full citation to all such authority known to the Association or to Mr. Ritchie and his firm.

RESPONSE:

Admit.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: Counsel

21. Provide a citation to all statutory or regulatory authority known to Mr. Ritchie or his firm that would require any water district to conduct the type of study that Mr. Ritchie recommends.

RESPONSE:

Forest Hills Residents' Association, Inc. objects to this question on the grounds that counsel for JSEWD, and not counsel for Forest Hills, should conduct legal research for the benefit of JSEWD. PSC statutes, regulations, and decisions are publicly available at the Commission's website, www.psc.ky.gov.

JESSAMINE-SOUTH ELKHORN WATER DISTRICT
CASE NO. 2014-00084
FOREST HILLS RESIDENTS' ASSOCIATION, INC.'S RESPONSE TO JESSAMINE-SOUTH ELKHORN WATER DISTRICT'S REQUESTS FOR INFORMATION

Witness: Counsel/T. Logan Davis

22. With respect to the "three prongs" approach advocated by Mr. Ritchie:

a. Provide a citation to all PSC statutes or regulations that require the consideration of such a three prong test in a water tank CPCN case;

b. Provide a citation to each and every PSC decision in which the "three prong" test has been considered or required to be used by the PSC as part of the site selection process for a proposed water tank;

c. Is it the Association's position that the "three prong" test should be required as a precondition for all water districts seeking a CPCN for a water storage tank? If not, why not?

d. Has the Association made any effort to convince the PSC to initiate a rulemaking proceeding to properly promulgate the Association's proposed new three prong requirement through the regulation adoption process established by law? If so, provide a copy of all such communications or documents with respect to such request. If not, why not?

RESPONSE:

a-b. Forest Hills Residents' Association, Inc. objects to this question on the grounds that counsel for JSEWD, and not counsel for Forest Hills, should conduct legal research for the benefit of JSEWD. PSC statutes, regulations and decisions are publicly available at the Commission's website, www.psc.ky.gov.

c. Forest Hills Residents' Association, Inc. takes no position regarding CPCN cases in which it has not intervened.

d. No. See the response to c.

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23. Provide a legible and complete copy of all photos taken on July 5, 2014, as well as any notes, communications or documents discussing, referring to, or related in any way to such photographs.

RESPONSE:

See attached CD.

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24. Identify and list the specific methodology and principles of the EPRI/GTC Transmission Line Siting Methodology ("EPRI/GTC"), referenced in the pre-filed testimony of G. Michael Ritchie, that were utilized in the Jessamine South Elkhorn Water District Tank Siting Study ("Tank Study"), attached to said testimony.

RESPONSE:

The EPRI/GTC Transmission Line Siting Methodology was developed to provide a more standard process when determining locations for new electric transmission lines. The procedures were set up to make the process, and the siting decisions, more quantifiable, consistent and defensible. The general principles of the EPRI/GTC methodology were considered during the siting process for this above ground water tank.

The EPRI/GTC methodology consists of three phases:

1. The generation of a Macro Corridor, a large geographic boundary that defines the project boundaries (this method is also used in siting electrical substations and other single point or area locations);
2. The generation of Alternate Corridors, linear areas within a Macro Corridor that are deemed most suitable when the Natural Environment, Built Environment, and Engineering Perspectives, are considered and when referring to individual sites, comparison of multiple acceptable sites; and
3. The analysis of Alternate Routes, constructible areas within the Alternate Corridors, and the selection of a Preferred Route, or the most preferred site based on all criteria.

Once the Alternate Routes have been thoroughly examined using detailed geospatial data, a Preferred Route, or site of the most suitable location for a power line, is determined through professional collaboration guided by the siting results. At each phase, aerial photography, as well as statewide and local digital data, is used to reach decisions.

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25. Identify and list the specific cells and data layer(s) used in the Tank Study.

RESPONSE:

The following data layers were used in the water tank study and are listed in the data sources section of the "Jessamine South Elkhorn Water District Water Tank Siting Study."

1. Historic Structures
2. Residences
3. Existing Water Tanks
4. Proposed Water Line Projects
5. Existing Water Lines (Greater Than 6")
6. Groundwater Wells
7. Groundwater Springs
8. Streams
9. Waterbodies
10. Wetlands
11. Floodplains
12. Roads
13. Parcels
14. Aerial Orthophotography
15. LiDAR Point Data

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26. Regarding the statement on pages 3 and 4 of the Tank Study, "Using advanced mapping technology, Photo Science created the most accurate terrain map of Jessamine County that has ever been created", please specifically identify and elaborate on the following items related to this statement:

- Method used
- Type of control employed
- Precision (horizontal & vertical)
- Was the map field checked
- Was the entire County mapped
- Does the map represent winter or summer conditions
- What is the scale of map and its accuracy

RESPONSE:

LiDAR data for the study area was collected between 04/12/2010 & 04/13/2010 and this data has a 2 foot contour accuracy. LiDAR is a remote sensing technology that measures the distance from an airplane sensor to objects on the ground at a particular location by illuminating a target with a laser and analyzing the reflected light. This process produces millions of points throughout the study area and each point has a latitude, longitude, and elevation value, allowing a GIS professional to create a three dimensional surface model of the study area and analyze visibility concerns.

- Method used: Closed GPS Static Network and RealTime Kinematic (RTK) GPS
- Type of control employed: Tied to National Geodetic Survey (NGS) network of control monuments
- Precision (horizontal & vertical): NGS monuments horizontal "0" order; vertical 1st or 2nd order class "0", "1", "2"
- Was the map field checked: No, it was adjusted to ground control
- Was the entire County mapped: Yes
- Does the map represent winter or summer conditions: Spring 2012 and Summer 2014
- What is the scale of map and its accuracy: 2014 ASPRS 1:10,000 map scale

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27. Why is the Tank Study area restricted to a 1.25 mile radius of the Switzer site (i.e., Site C on the Tank Study)?

RESPONSE:

The 1.25 mile radius distance from the Switzer site was determined to be the most suitable range when identifying a geographic boundary to define the project study area. This study area allows for the examination of multiple site alternatives within a reasonable proximity of the proposed Switzer site. This boundary includes multiple areas that exhibit suitable criteria for a water tank location, including ground elevation that lies 950 feet above sea level, close proximity to existing water main lines, close proximity to roads for access requirements, and areas that have the least visual impact to the community.

The approximate radius of 1.25 miles is a common radius selected because it encompassed a single radius including most of the affected areas, yet excluding the highly urbanized area of southern Fayette County and the urbanized area of the city of Nicholasville. Using a radius of 1.25 miles generally helps meet one criterion in staying in the general locale of a desired location of a water tank such that it supports the hydraulics for the entire system. Otherwise, selecting a much wider radius could result, for example, a tank that might be 3 or 4 miles away would not have the same pressure gradient to enhance the district's water pressure or storage if the water had to travel very far from the center area of the affected district. This radius also stayed within the suburban access the district rather than encroach on urban Fayette County or the city of Nicholasville, KY.

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28. Of the totality of the EPRI/GTC, was the GIS technology to identify the relative visual exposure from "sensitive vicinity" locations the only specific methodology used?

RESPONSE:

The general principles of the EPRI/GTC Transmission Line Siting Methodology were used in the water tank siting study. In addition to these general principles, a viewshed analysis was conducted using the three dimensional LiDAR surface to better understand the visual impacts of the water tank location alternatives. While the visual analysis was a major component of the study, other factors were considered when examining tank alternatives, including the distance to water main and distribution lines, distance to proposed water lines, distance to private and public roads, as well as the elevation at the potential site locations.

Witness: G. Michael Ritchie

29. Where would the location of the "Alternate Sites" found on page 8 of the Tank Study be (i.e., greenish-grey areas) if the viewshed of all of these alternate sites were combined into a comprehensive visual exposure map?

RESPONSE:

Photo Science did not perform this analysis as part of its siting study.

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30. List the addresses of each of the 16 residences that allegedly will likely have a view of the tank as reflected on the Site C illustration on page 9 of the Tank Study.

RESPONSE:

The 16 addresses listed below will likely have some sort of visual impact if Site C is chosen as the water tank location.

- 1245 Catnip Hill Road, Nicholasville, KY 43056
- 608, 619, 623, 627, 631, 635, & 639 Burr Oak Drive, Nicholasville, KY 43056
- 701, 704, 709, 720, 721, 724, 728, & 733 Chinkapin Drive, Nicholasville, KY 43056

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31. For each viewshed analysis depicted on Sites A-H of the Tank Study list the following:

- Elevation of viewer
- Elevation of tank
- GIS data layers utilized
- Number, location, dimensions of cells and layers utilized.
- Opacity of tree canopy summer and winter

RESPONSE:

For each viewshed analysis depicted on sites A-H of the water tank study, the elevation of the observer points represents a person at a standing height of 6 feet tall and the water tank is represented by an elevation of 145 feet tall.

The GIS data layers outlined in Request No. 25 were used in the analysis. A viewshed analysis (line of sight analysis) was conducted for every potential water tank site location using a three dimensional suitability surface derived from the LiDAR point data. The observer points and potential water tank point layers were used as inputs in the viewshed analysis. In addition, other layers were considered when examining tank alternatives, including the distance to water main and distribution lines, distance to proposed water lines, distance to private and public roads, as well as the elevation at the potential water tank site locations. All other GIS layers mentioned in Request #25 were used as general layers to determine suitable tank alternatives.

Since the LiDAR point data was collected between 04/12/2010 and 04/13/2010 the tree canopy opacity for tree lines, and areas where trees are present, will be representative of the geographic area and season of the flight dates. Tree canopies will not have leaf off conditions associated with the normal winter season. Foliage should be slightly thicker during this time period, but not full leaf on conditions that are expected during summer flying months.

Witness: **G. Michael Ritchie**

32. For each of the viewshed analyses above, explain why 0.5 mile radius was selected.

RESPONSE:

The viewshed analysis radius of 0.5 miles was determined to be an appropriate distance for a "true" visual impact. Certain observers beyond this distance would still be able to see the water tank, but it would not be as overpowering when compared to the visual impact of closer observers. For example, a water tank that is 145 to 150 feet tall can be visible from several miles away in various locations, based on elevation and the location of tree lines and other objects in the line of sight, but the observer would experience an extremely slight visual disturbance. The viewshed radius used in the water tank study attempts to remedy this effect.

Most people located at least .5 mile away would not be adversely impacted by the view of a water tank. Closer than .5 mile, begins to not only be visible but possibly impact your view in the general landscape. Locating a water tank beyond .5 mile reduces the visibility and impact.

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33. The Tank Study uses a tank elevation position of 145' above the ground. Why wasn't the actual over flow elevation used?

RESPONSE:

The tank position of 145 feet above ground was used to represent a "true" visual impact as similarly outlined in the response for Request No. 32. The actual overflow elevation would extend the tank to a greater height, impacting more observers and allowing them to see the extreme top portion of the tank. This additional height would have a slight visual impact on observers, so it was deemed unnecessary for use in the viewshed analysis.

The actual elevation could have been used; however, after reviewing the hydraulics from the previous testimony and data supplied, it was apparent that the tank would not empty and was incapable of turning the entire storage over in a 24-hour period as required by the Ten State Standards. This has been modified in the most recent submittal by the District with new on/off settings that possibly completes the water turnover, but obviously changed elevations. The actual elevation represents a point in space. What Photo Science attempted to do was to factor in the ground elevations given the approximate 160' high proposed tank elevation. The least cost point procedure was not utilized in the previous site selection process, mainly because the detailed cost analysis and data was not supplied by JSEWD. Photo Science no knowledge of the cost, age, and other criteria of the entire system. Limited information was provided to Photo Science about the entire system.

Witness: **G. Michael Ritchie**

34. Was the least cost path (LCP) procedure utilized in the alternate site selection process?

RESPONSE:

The least cost path procedure was not used in the alternate site selection process. The least cost path algorithm in GIS is primarily used to delineate linear or corridor related features that allow for the establishment of the best route or path between two point locations. The water tank study did not allow for this type of analysis.

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35. For each of the alternate site locations selected in the Tank Study and reflected in the illustrations on pages 10-16 of the tank Study, specifically identify each of the following:

- GIS Database layers used;
- Layer evaluation; and
- Who were the stakeholders?
- Cell number & composition

RESPONSE:

For each of the alternate site locations illustrated on pages 10-16 of the water tank study, the GIS data layers outlined in Request No. 25 were used in the analysis. A viewshed analysis (line of sight analysis) was conducted for every potential water tank site location using a three dimensional suitability surface derived from the LiDAR point data. The observer points and potential water tank point layers were used as inputs in the viewshed analysis. In addition, other layers were considered when examining tank alternatives, including the distance to water main and distribution lines, distance to proposed water lines, distance to private and public roads, as well as the elevation at the potential water tank site locations. All other GIS layers mentioned in Request No. 25 were used as general layers to determine suitable tank alternatives.

Mr. Ritchie did not use stakeholders or cell composition or numbers in his siting study.

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36. What are the differences in the impacts that are considered when evaluating the location of electric transmission lines as compared to elevated storage tanks?

RESPONSE:

They are very similar except a water tank may be a larger feature on the landscape with more visibility when compared to a transmission tower or pole or electrical substation.

The largest single impact is the fact that an electric transmission line is a linear feature and varies by thin wire lines in space versus location of power poles or transmission towers. The location of the towers itself could have a huge impact on the site. On the other hand, an elevated storage tank creates a single point source of visual impact. However, taken into account the three-pronged approach, other criteria creep in as to the natural features of the site versus other manmade impacts to the site. This would mean such things as soil types, endangered species, wildlife, habitat, and erosion control for some of the natural features versus manmade features such as streets, roads, houses, building, other utilities, access, terrain, etc.

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Witness: G. Michael Ritchie

37. Please explain in detail the differences between the red color areas reflected on the illustration on page 7 of the Tank Study as compared to the red color areas reflected on the illustrations on pages 9-16 of the Tank Study.

RESPONSE:

The red colored areas reflected on the illustrations on page 7 and 8 are the same. These red areas represent space within the study area that is visible from residences within this area. No proposed water tanks were used for this viewshed surface; so the line of sight visuals from the observer points were only impeded by the natural ground contours, the tree canopy, or any other objects within the observers view.

The red colored areas reflected on the illustrations on pages 9-16 are visible areas created from the viewshed surface that takes into consideration the 145 feet height of the water tower at the proposed locations. The same observer points were used in both sets of analysis, but these red colored visible areas are potentially impacted by the proposed water tanks.

Witness: G. Michael Ritchie

38. Please explain in detail the differences between the red color areas reflected on the illustration on page 8 of the Tank Study as compared to the red color areas reflected on the illustrations on pages 9-16 of the Tank Study.

RESPONSE:

See the response to Request No. 37.