FINAL REPORT

ASSESSMENT PROCESS REVIEW
RESIDENTIAL REASSESSMENT PROCESSES

Prepared for

THE CITY OF VIRGINIA BEACH
DEPARTMENT OF MANAGEMENT SERVICES

By

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EXECUTIVE SUMMARY

The City of Virginia Beach contracted with the firm of Almy, Gloudemans, Jacobs & Denne (AGJD) for an independent, objective review of both commercial and residential reassessment procedures. This report presents the findings of our residential review. It is based on interviews and observations made during 28-30 November 2007. In preparation for our visit, we reviewed property assessment statutes, forms, manuals, and other relevant documentation. We also analyzed data proved by the City in a "ratio study", the standard method used to evaluate the accuracy and equity of residential property values. (The report of our review of commercial reassessment processes was submitted on 12 March 2007. That report also examined the setting for real estate assessment in Virginia and some aspects of the management of the assessor's office in more detail than this report does.)

The law requires the assessor to value real estate annually at 100 percent of its fair market value, a challenging task in active real estate markets, but one that ensures a high degree of real estate tax equity. We find that the Real Estate Assessment Office does a credible, effective job of valuing residential properties at fair market value levels. The office is fortunate to have strong leadership and an experienced, well-qualified residential staff that effectively employs acceptable valuation methods. Residential values closely track the market and exhibit good uniformity among properties. Our ratio study analyses revealed good uniformity in assessment levels between commercial and residential property, so that each component of the real estate tax base is paying its fair share of the total.

At the same time, it is important to note that residential reassessment processes are in transition from those that were possible under the previous mainframe computer-assisted mass appraisal (CAMA) system to those that are possible under the newly installed ProVal CAMA system. There are a number of opportunities for additional improvements or refinements, some of which the office already recognizes. We summarize some of the more significant opportunities below.

- *Workload and Staffing*. Relative to the number of properties that must be valued and the number of annual events that affect the workload (such as new construction), the appraisal staff is comparatively small. The staff currently is keeping abreast of its annual work, which is all the more remarkable in view of the comparatively labor-intensive nature of field inspections and the current processes required for confirming and analyzing sales and for updating value estimates. The current staff size does not allow the staff to re-inspect all properties periodically, as professional standards recommend, which would help ensure that all are accurately described. The staff's current success partly is a result of a comparatively small number of appeals, a fortunate circumstance that could be jeopardized by the downturn in the property market. We think it prudent, therefore, for the city to consider augmenting both the number and skills of the assessor's staff. We also recommend that a current information technology policy of not allowing the assessor's office direct access to the real estate database to extract selected data for analysis be reconsidered, as such a policy inevitably impinges on the efficiency and effectiveness of

the appraisers' work and on the assessor's ability to respond to inquiries from stakeholders like city council in a timely fashion.

- *Management*. The assessor's office appears well managed. It certainly is meeting its goals of efficiently completing annual reassessments with a minimal number of appeals. The number of appeals is approximates 0.2 percent of the total number of properties, about $1/10^{th}$ of a typical rate. At the same time, the costs of assessment administration, as a percentage of total real estate tax revenues, is about 0.6 percent, which is about half the expected percentage. This is achieved by having an average workload, expressed as the number of parcels per employee of the assessor's office, of 4,200 parcels, when workloads typically are in the range of 2,500 to 3,000. The office's compact organization allows the assessor to evaluate and coordinate annual reassessment recommendations so that all categories of property are valued equitably. The assessor's office also does a credible job of communicating assessments, the assessment process, and other relevant information through a variety of media, including personal contact, printed materials, and the city's website, on which we found the neighborhood reports to be particularly exemplary.

- *Valuation procedures*. We separately examined the procedures used to appraise land, residences, and high-rise condominiums. As indicated above, we believe that the appraisal staff has the requisite skills and that professionally acceptable appraisal methods are being used. Specifically, the staff continuously monitors sales prices and construction costs and annually attempts to ensure that each year's reassessment is between 95 percent and 100 percent of the then-current market levels (bearing in mind that taxes are assessed in the following year). We did, however, identify a few areas in which procedural improvements could be made.

- *Valuation performance*. To verify our procedural evaluation, we made a separate, industry-standard "sales ratio study." Sales ratio studies are based on the premise that open-market, arm's-length sales of fee-simple interests in real property represent the best evidence of market values. In our ratio study, we compared the appraisals of residential properties that were sold recently to their sales prices. Three of the main things of interest in a sales ratio study are (1) the typical ratio of appraisals (assessments) to sales prices, as indicated by a measure of central tendency, such as the median; (2) the uniformity of individual ratios (that is, how closely they cluster about the typical ratio), which is indicated by a statistic known as the "coefficient of dispersion"; and (3) other patterns of non-uniformity (a statistic known as the "price-related differential" is used to determine whether low-value and high-value properties are assessed at equal fractions of market value). We confirmed that median ratios generally were within the target range. Equally important, coefficients of dispersion generally were less than the 10-15 percent that the profession considers acceptable in the appraisal of residential properties. We checked for the possibility that a number of common problems might affect the accuracy and equity of residential assessments, but found nothing of significance. We also noted that with the new CAMA system, the assessor's office is now in a position to make better use of ratio studies as an internal diagnostic tool. In conjunction with this, we recommend that use be made of a questionnaire designed to help determine whether each sale meets the criteria

of a usable sale (ideally, such a declaration would be required when a deed was recorded).

- *Information technology and future enhancements in performance*. In RACS, the City of Virginia Beach is making a major investment in technology. As noted, the assessor's office benefits from the new CAMA system. Further improvements in the accuracy of appraisals will require greater use of both statistical and spatial data analyses. This implies that the city should make necessary further modest investments in software and in training, as well as ensuring that the assessor's office has easy access to specialists in using the city's geographic information system (GIS).

In summary, we conclude that, while there are opportunities for improvement, the office of the real estate assessor currently does a credible, effective job of valuing residential properties at fair market value levels. Residential values closely track the market and exhibit good uniformity among properties. This achievement can be attributed to a well-planned and managed residential appraisal program, use of acceptable valuation methods, and a skilled and experienced staff.

1. INTRODUCTION

1.1 Assignment

The City of Virginia Beach asked Almy, Gloudemans, Jacobs & Denne (AGJD), property taxation and assessment consultants, to review the reassessment processes employed by the City Real Estate Assessor. The review was made in two phases. In the first, we examined commercial reassessment processes. See our report, "Assessment Process Review: Commercial Reassessment Processes," dated March 12, 2007. The commercial report examined the setting and management practices of the assessor's office in more detail than this report does. This report focuses on residential reassessment processes. It also reexamines staffing requirements in the light of residential appraisal workloads and changes in business processes associated with the new Revenue, Assessment, and Collection system (RACS). In addition, it evaluates ProVal, the new computer-assisted mass appraisal (CAMA) system that is a component of RACS.

The residential reassessment review drew on our earlier visit to Virginia Beach and on a more recent visit to the City's offices in 28-30 November 2007. During that visit we interviewed management and residential appraisal staff; we reviewed developments since our last visit; and evaluated assessment procedures for residential properties. We also reviewed progress in the conversion from the former CAMA system to ProVal, the new system. In preparation for our visit we reviewed property assessment statutes, forms, manuals, and other relevant documentation. We also have had the opportunity to analyze data provided by the City and undertake "ratio studies" used to evaluate the accuracy and equity of residential property values. Prior to leaving the City we presented a verbal summary of our preliminary findings.

This report contains our complete findings and recommendations. Below we briefly touch on the legal and institutional setting for real estate assessment. Section 2 discusses resource needs, staffing, and management. Section 3 discusses residential valuation procedures and methods and the new ProVal CAMA system. Section 4 presents our ratio study analyses. Section 5 summarizes our conclusions and recommendations.

1.2 Setting

In recent years, residential property values in the City of Virginia Beach (as with other parts of the Hampton Roads region and other parts of the nation) have risen rapidly. [1] With the current downturn in residential housing prices nationally, the future in Virginia Beach is unclear, but there are indications that the overall market is softening, particularly in the upper end of the market.

As mandated by law, real property in Virginia Beach is reassessed annually at current market value. Annual assessments are to be completed by 31 January and become effective the follow-

[1] For descriptions of the recent vibrancy of the residential market, see John L. Knapp, "Virginia's Real Property Tax," a paper presented at VACO-VMI Property Tax Symposium, Richmond, Virginia, May 25, 2005. Also see Knapp, "How the Housing Boom Affects Virginia's Real Estate Taxes," *The Virginia News Letter,* vol. 81, no. 5, October 2005.

ing 1 July, which is the assessment date for the next fiscal year. The assessment roll (land book) currently in effect for fiscal year 2007-2008 has a base assessment date of 1 July 2007. The values in this land book were based on market evidence for the period, 1 July 2005 through 30 June 2006, with some consideration given to later sales where possible. The city code also provides for quarterly supplementary assessments for physical changes.[2] The assessor currently is working on 2008-2009 assessments, which are to be completed by 31 January 2008.

The assessor receives information about real estate transfers from the clerk of the circuit court via the commissioner of revenue.[3] Sales prices are inferred from the amount of recordation tax paid; there is no requirement that the parties to a transfer complete a declaration giving the particulars of the sales. As a backup, the office also has access to sales records in the local multiple listing service (MLS). Information on building permits is received from the Permits and Inspections Department. As mentioned in our commercial report, Virginia cities and counties should lobby for a sales disclosure law, mandating the disclosure of selected sales information at time of sale. In the absence of such a declaration the City should consider adopting a sales confirmation mailer to confirm the price paid and help ascertain the circumstances of the sale and whether any significant non-realty components were included.

The new Revenue, Assessment and Collection System (RACS) integrates the records and processes of the Real Estate Assessor, the Commissioner of Revenue, and the Treasurer[4]. The GRM system of Manatron is a major part of this system. As discussed in section 3, the assessor heavily utilizes the current version of the ProVal CAMA system (also by Manatron) in its operations. The City's Communications and Information Technology Department ("ComIT") is the custodian of RACS, and RACS users rely on ComIT for crucial support. The Center for Geospatial Information Services, a part of ComIT, provides geographic information system (GIS) support.

To protect the integrity of the database and control use of system resources, ComIT requires that its personnel perform any job that involves more than read-only access to the RACS database, such as producing non-standard reports or obtaining file extracts. Offsetting the advantages of ComIT's policy are the costs they impose on users. Having to prepare job requests ("heat tickets") and wait for them to be carried out can delay work and frustrate clients like members of the city council. Even more frustrating is receiving something other than what was requested or expected, thereby necessitating additional costs and delays. If experience in other jurisdictions is any guide, the current policy could eventually result in workarounds that involve the creation of parallel databases that would have the effect of degrading the value of the RACS database. It should be possible to erect system safeguards and protocols that would make a client like the assessor responsible for the integrity of the data it collects and that would allow it unfettered access to those data for analysis and reporting.

As noted in our commercial review, taxpayers may challenge their assessment first to the assessor, second to the board of equalization, and third to the circuit court. Appeals to the assessor are

[2] These assessments would be effective on the first of October, January, and April.
[3] The commissioner also processes ownership and map changes, initiates sales records, and extends taxes.
[4] While approximately 30 other cities and counties in Virginia use ProVal, Virginia Beach is the first to obtain GRM (Roanoke also plans to do so).

informal. Regarding appeals to the board of equalization, the Virginia code (' 58.1-3379(C)) provides:

> "The burden of proof shall be upon a taxpayer seeking relief to show that the property in question is valued at more than its fair market value, that the assessment is not uniform in its application, or that the assessment is otherwise not equalized. In order to receive relief, the taxpayer must produce substantial evidence that the valuation determined by the assessor is erroneous and was not arrived at in accordance with generally accepted appraisal practice. Mistakes of fact, including computation, that affect the assessment shall be deemed not to be in accordance with generally accepted appraisal practice."

Recently, the City of Virginia Beach has enjoyed a remarkably low volume of appeals. Although it is dangerous to ascribe that fortunate circumstance to specific factors, the generally accurate and defensible assessments and the evident professionalism of the appraisal staff undoubtedly contribute. The assessor notes that appeals increase when the market slows. There already is evidence that that is happening.

2. RESOURCES, STAFFING, AND MANAGEMENT

2.1 Current Resources

The resources allocated to assessment administration are an indication of political support for accurate and equitable assessments. Of course, the nature of the assessment workload affects resource requirements. How the assessor utilizes available resources is essential to operational efficiency and effectiveness, and property tax systems must be well managed if public acceptance is to be secured.

Funding for the Office of the Real Estate Assessor in the 2007-2008 fiscal year is $2,838,696. The total complement is thirty-five. We note with approval the upgrading of a clerical position to a "business application specialist." The incumbent in the position is crucial to the office's successful use of its IT resources. This person serves as a communications bridge between the assessor's office and ComIT. While the assessor is requesting additional positions, city budget goals would dictate a staff reduction of three full-time equivalent (FTE) positions. As discussed below, we believe a strong case can be made for *increasing* the assessment staff; reducing it likely would be extremely detrimental.

The residential appraisal staff totals seventeen, with one appraiser serving as an office-wide CAMA system specialist. There are three residential supervisors and thirteen appraisers responsible for field inspections and for developing and maintaining Microsoft Excel-based neighborhood base rate models. The supervisors nominally are responsible for sets of council districts with approximately equal parcel counts. Even though each supervisor has a team of appraisers associated with him or her, the appraisers are not truly subordinate to the supervisor. They work more as roving teams, as they are assigned neighborhoods throughout the city in order to give them more-or-less equal work assignments in terms of number of parcels and valuation challenges. Assignments are revised annually.

The assessor's office has access to the IT resources provided by ComIT, although as previously mentioned we believe that current polices render those resources less useful than they could be. The office benefits from the data it receives from the Commissioner of Revenue and from the Permits and Inspections Department. A citywide 311 call center, which became operational in September 2007, has reduced call volume and the time spent responding to simple inquiries. The office has the use of ten city-owned automobiles and nine mobile telephones.

2.2 Current Workloads

Statistics on parcel counts and statistics on transactions and events such as sales, new construction and renovations, exemption applications and appeals provide an indication of workloads. Market trends obviously affect workloads. Currently, the total number of taxable parcels of land in Virginia Beach is approaching 150,000. There are more than 141,000 residential parcels (commercial parcels constitute almost 5 percent of the total or about 8,200). The rate of growth has been fairly stable since 1991 at about 1,600 parcels (1 percent) per year. In 2006, about

1,500 residential units were added (single-family residences, condominiums, townhouses, and duplexes). There were 3,000 residential building additions. In addition to inventorying and valuing new construction, the residential appraisal staff had 16,000 sales to review. The sales culminate in updated valuation models, and there are about 1,100 residential neighborhoods (which we consider excessive as discussed in section 3). Nearly two-thirds of all appeals to the assessor are residential appeals, so an annual appeal workload of 400 or more can be anticipated.

There is an important time dimension to appraisal work. The deadlines associated with finishing annual assessments by 31 January and quarterly supplemental assessments require physical field inspections of new construction in the run up to the deadlines. The ProVal system allows the assessor to work on multiple annual land books simultaneously, which allows for a more efficient use of staff resources.

2.3 Evaluation of Needs

Assessors' offices typically do not engage in cost accounting, particularly with respect to how staff members utilize their time, and many do not compile relevant workload statistics. Although the City of Virginia Beach does not compile data on time utilization, the assessor's office does compile useful workload statistics.

Table 2-1 provides a pro forma estimate of staffing needs (full-time equivalent positions or FTEs). The assumed workload statistics (column 2) are based on available workload statistics. The productivity rates (column 3) are notional and are based on rates achieved or believed to be achievable in other jurisdictions. The days of work estimates (column 4) simply are the workload estimate divided by the productivity rate. The indicated FTE need (column 5) is based on an assumed work year of 220 days. Better figures on workloads and productivity rates that reflect actual achievements in Virginia could be used to refine the estimate. Nevertheless, the estimates reveal concerns about the adequacy of staffing in a number of areas. The line captioned "Executive & technical support" shows a need of five positions where only three exist now. The additional positions are a statistical analyst and a GIS analyst. In addition, the activities identified as "field data verification" are not now carried out because available staff must spend their time on higher priority activities associated with adding new property to the rolls and carrying out annual reassessments. However, professional standards recommend that properties be inspected periodically. On the other hand, the number of residential valuation models that need to be recalibrated every year could be substantially less than the 1,100 (one per neighborhood) completed in the past, particularly if our recommended statistical analyst position were created and staffed.

It also should be noted that the estimated staffing requirement of forty in table 2-1 is consistent with the benchmark data presented in table 2-2 (which is the same as table 3-1 in our commercial review). The analysis above ignores administration of land-use assessments, and it does not take into account probable increases in homestead exemption workloads.

Table 2-1: Evaluation of Staffing Needs

Position/activity	Assumed Workload	Productivity rate/day	Days of work	Indicated staffing needed (FTEs)	Actual staffing
(1)	(2)	(3)	(4)	(5)	(6)
Executive / management				**7.0**	**5**
Real Estate Assessor				1.0	
Assistant Real Estate Assessor				1.0	
Executive & technical support				5.0	
Real Estate Clerical Operations				**6.1**	**8**
Deeds processed	22,000	50	440	2.0	
Map changes processed	600	30	20	0.1	
Permits logged	4,700	50	94	0.4	
Homestead exemptions	5,000	50	100	0.5	
Other exemptions	3,000	20	150	0.7	
Customer service	1,500	50	30	1.0	
Appeals logged	400	20	20	0.1	
Other support (file updates)	0	100	0	0.0	
Notices reviewed/mailed	145,500	500	291	1.3	
Non-residential property appraisal				**5.2**	**5**
Screen sales	1,000	20.0	50	0.2	
Inspect sales	1,000	15.0	67	0.3	
I&E questionnaires	3,600	15.0	240	1.1	
Modeling building/QA	30	0.5	60	0.3	
New work (permits)	200	2.0	100	0.5	
Change reviews	7,900	25.0	316	1.4	
Field data verification	1,400	12.5	112	0.5	
Appeals	100	0.5	200	0.9	
Residential property appraisal				**17.7**	**17**
Screen sales	10,500	30.0	350	1.6	
Inspect sales	10,500	15.0	700	3.2	
Modeling building/QA	50	0.5	100	0.5	
New work (permits)	4,500	8.0	563	2.6	
Change reviews	133,200	100.0	1,332	6.1	
Field data verification	28,400	35.0	811	3.7	
Appeals	300	10.0	30	0.1	
Sub-total				**35.9**	**35.0**
Overhead	**Number of staff**	**Hours per year**		**3.7**	**0.0**
Professional development	23	20.0	457	2.1	
Other	36	10.0	359	1.6	
Total				**39.6**	**35.0**

Table 2-2: Budget and Staffing Benchmarks

Benchmark	Virginia Beach, 2005-2006	IAAO Metropolitan Jurisdiction Council (MJC) Survey, 1999			
		Number	Low	Median	High
Budget as a percent of total property tax revenues	0.58	22	0.34	0.93	2.89
Budget per parcel ($)	18.15	29	8.84	21.20	39.32
Parcels per staff	4,231	30	1,739	2,819	6,667

Source: "1999 Major Assessment Jurisdiction Survey," Cook County Assessor's Office

In principle, values of the first benchmark (assessment expenditures as a percentage of property tax revenues) should be minimized so that the funds available for other government services are maximized while at the same time providing sufficient funding for effective assessment administration. Determining an optimal level of funding obviously requires judgment. At typical levels of property taxation in the U.S., it is generally believed that between 1.0 and 1.5 percent of property tax revenue is needed for effective assessment administration. As can be seen, Virginia Beach is considerably outside that range, and only two of the responding districts had lower ratios than Virginia Beach (one was a very large, high tax district, and the other probably served only part of a county that included a major city with a separate assessor's office). On the other hand, the Commissioner of Revenue and the GIS center process real estate transfers and mapping changes, which would be the responsibility of many assessors' offices.

The factors just mentioned also pertain to the other two benchmarks. Probable increases in costs since 1999 complicate interpretation of the second benchmark (budget per parcel). In any event, eleven of the responding districts had lower (1999) expenditures per parcel, while eighteen had higher. Regarding the third benchmark (parcels per staff member), a comparatively low number indicates (everything else being equal) a light workload, while a large number indicates a heavy workload. In comparison to the median of 2,819 parcels per staff member in the 1999 MJC survey, several earlier IAAO studies have suggested that 2,500 parcels per staff member is typical overall, while larger districts (like Virginia Beach) typically had about 3,500 parcels per staff member. In any event, only four districts had higher workloads than Virginia Beach (and two of those clearly represented unusual circumstances).

No (long-term) deficiencies were noted in office facilities. Reportedly, pairs of appraisers share a city-owned vehicle for a week, which certainly presents a scheduling challenge and may result in suboptimal use of appraisal resources.

We conclude that, while the assessor's office operates efficiently, we believe that it is under-funded and under-staffed. An argument for increased funding and staffing would be more compelling if it were accompanied by an increase in the tax base. Unfortunately, such a claim cannot be documented. However, experiences in other jurisdictions suggest that frequent re-inspections do discover un-assessed and erroneously classified property. More accurate appraisals, in addition to reducing tax mis-payments, would allow the assessor's office to raise its target assess-

ment ratio slightly, which would increase the tax base. More importantly, the risk of losing assessed value through the appeal process would be reduced.

There are several staffing needs. As emphasized in section 3, we continue to recommend a statistical analyst position. Such a specialist is needed to maintain appraiser productivity while not requiring each appraiser to develop multivariate mass appraisal model building skills and sophisticated ratio study analyses. Having such an analyst will be needed to take advantage of the capabilities of the next version 7.10 of ProVal, when it is released.

Second we recommend that, unless the Center for Geospatial Information Services itself is sufficiently staffed to provide effective support to the assessor's office, a GIS analyst position be created within the assessor's office. Recent developments in the city's GIS system have apparently robbed the assessor's office of mapping resources because earlier routines of generating maps no longer work. Neither the GIS center nor the assessor's office has sufficient staff to remedy the problem. Maps are crucial to mass appraisal processes, and the current situation cannot be endured. Appraisers are forced to rely on suboptimal paper maps and manually annotate them. Although such a tedious approach helps appraisers get a feel for the spatial pattern in sales prices, GIS could speed the process, and geostatistical analyses could reveal patterns that cannot be spotted currently. We believe meeting GIS needs should be made a priority item.

2.4 Management

The City of Virginia Beach is fortunate in having strong leadership in the assessor's office and in having an experienced staff of appraisers. It also is fortunate in having two ProVal experts. Nevertheless, there are some general professional development needs that need to be met if capabilities of the CAMA system and the City's GIS system are to be effectively used.

A general challenge is increasing the appraisers' understanding of, and support for, the improvements in processes that the ProVal system makes possible. Happily, management recognizes this and has begun to inculcate in the appraisal staff a sense of ownership of the values produced by the system. Blaming the system for any problems is not acceptable; solutions to problems must be found. Not all residential supervisors are considered to have strong mass appraisal and leadership skills, and two are nearing retirement age. There is a feeling among some of the appraisal staff that they have excess work because they rather than the clerical staff now do data entry. They also enter the sketches on new properties. Although current skills vary, most of the appraisal staff also would benefit from additional mass appraisal skills. Over and above general mass appraisal skills, the assessor's office also would benefit from the statistical and GIS analyst positions recommended above.

As noted in our commercial review, the assessor's office has a general policy and procedures manual. In addition, a new "business processes" document has been prepared in conjunction with the implementation of the ProVal system. As part of standard operating procedures, current land value rates are displayed on large-scale maps of each neighborhood, along with recent sales. The Excel worksheets that are used to develop base rates provide consistency and documentation both of the input data and the results of market analyses. In addition, summary sheets are pre-

pared that document new base rates and adjustment factors. Managers review these work products and help ensure consistency in process and results.

We also conclude that assessment procedures and results are adequately communicated to taxpayers and others. More information is provided about residential appraisal procedures than on commercial procedures, and the district neighborhood sales analyses are especially valuable.

2.5 GIS

Virginia Beach is fortunate to have the vast majority of the data resources required for the effective use of geographic information in assessment administration, although recent developments seem to have constituted a step or two backward in regard to their effective use for assessment purposes.

The city's geographic information system (GIS) is based on a combination of the GeoMedia products from Intergraph, (originally used by the assessor's office for production efficiency purposes) and the somewhat more widely used ArcGIS system from ESRI (used by the city for all other purposes). In practice, the assessor's data changes are propagated into the ESRI system approximately weekly. Thus for analytical purposes either system could be used, and advantage can easily be taken of the somewhat greater availability of tools targeting the ESRI customer base. Among such tools is Parcel Analyst, a useful software tool, licensed by the city, for developing statistical summaries of data extracted through spatial queries. Staff has yet to be trained on the tool. Finally, it should be noted that the assessor's data are indexed by a "GeoPIN," which facilitates the development of custom software and the effective use of general-purpose statistical software, inasmuch as the identifier itself embeds the X-Y (east-west, north-south) position of each parcel. Capturing and maintaining the data necessary to support a GIS constitutes the overwhelming majority of the cost of a GIS, an investment the city has made, to its great credit. In comparison to such infrastructure costs, the marginal costs of taking advantage of its capabilities for analytical purposes, or extending those capabilities, are minimal, although care must be taken to avoid conflicts that impose losses of functionality.

In recent years the assessor's office reports the loss of some of the functional benefits that accrued to it from GIS. In particular, the assessor's office made substantial and effective use of large-format, large-scale maps of selected areas on which were plotted, either automatically or by hand, a wide variety of statistical information such as sales prices and their ratios when compared to the parcels' square footage, front footage, assessment, or the like. Such resources are no longer easily generated due to changed interfaces and losses of trained personnel. As a consequence, previously generated maps are being updated through hand annotations. This practice both makes the process more subject to catastrophic loss and, more importantly, constrains the kinds of analyses that can be undertaken.

We also note that using annotated or choropleth (shaded or patterned) maps to support human inferences about the spatial distribution of trends in real estate values makes human analytical efforts more efficient, but imposes a substantial burden on personnel to perform such analyses. Best practices in this regard automate the analytical task further so that such spatial interpolation techniques as kriging (geographic interpolation), inverse distance weighting, and geographically

weighted regression can be brought to bear in estimating land values, total values, or both. However, such analyses require still more knowledge and skills.

In any case, we recommend that the training and personnel issues underlying the diminished ability of the assessor's office to undertake spatial analyses be addressed at the earliest opportunity, along with software compatibility issues, if any. We also recommend that the possibility of implementing modern geostatistical techniques in the appraisal process be given serious consideration. Providing for the GIS analytical position mentioned earlier would greatly help to address these needs.

3. VALUATION METHODS AND TECHNIQUES

In this section we summarize and evaluate the City's current methods and procedures for valuing residential properties relative to accepted best practices as set forth in the IAAO *Standard on Mass Appraisal of Real Property* (2002) and the IAAO textbooks, *Property Appraisal and Assessment Administration* (1990) and *Mass Appraisal of Real Property* (1999).

Section 3.1 discusses recent market trend, system conversion, and neighborhoods. Section 3.2 reviews practices and needs in data collection and sales analysis. Section 3.3 describes and makes recommendations regarding single-family residential valuation, including townhouses and condos of less than four stories. Section 3.4 focuses on high-rise condos. Section 3.5 discusses the ProVal comparable sales module, and section 3.6 introduces the potential for MRA modeling.

3.1 Background and System Conversion

After years of sustained and substantial increases, the Virginia Beach residential market has finally slowed and in some cases reversed direction. Aside from the most expensive luxury homes, which can attract high prices regardless of the economic cycle, newer, upper value homes with prices of, say, $450,000 and above have declined in value, some as much as 10% or more. At the other end of the market, older, lower value homes, many of which were built in the 1960s and sell in the $200,000 to $250,000 range, continued to move up in value in 2007, many in the range of 5% to 10%. Mid range homes generally held their own or increased marginally. High rise condominiums generally stayed even in value.

To its credit, the City made a number of reductions to 2007/2008 values to reflect market declines based on an analysis of "late" sales, namely those that occurred after the base valuation date of June 30, 2006 (sales as late as October/November were analyzed). These reductions, which totaled approximately $150 million, resulted in more realistic values and undoubtedly reduced the number of appeals filed. We encourage the City to continue to make similar adjustments to reflect market declines after the traditional cutoff date in future years as well.

While the number of appeals filed for 2007/2008 values was up from recent years, the number of filings (less than 700) remained very modest compared to similar sized jurisdictions elsewhere.

As noted, the City recently completed a major conversion of a legacy CAMA system to the most recent version of ProVal. Although all electronic data and sketches have been converted to the new system, data entry of other legacy data continues. This work is scheduled for completion in February 2008, leaving the City in a strong position to update values more efficiently. The work for the 2007/2008 assessments was done almost exclusively on the old system, while that for the 2008/2009 assessments is being done largely on the new system.

A major problem common to both the old and new system is the over-abundance of neighborhoods, which generally correspond to subdivisions. Currently there are approximately 1,000 neighborhoods, many with too few parcels and sales for meaningful analysis, especially with re-

cent declines in the number of sales being recorded. This is a particular problem in the ProVal systems because ProVal's valuation tables are neighborhood-driven. With few sales to work with, assessors cannot reliably determine market adjustment factors and the like (see section 3.2 below). We strongly recommend that the City restructure its neighborhoods to ensure that there are adequate sales available for market analysis. As a rule of thumb, we believe that neighborhoods should be sufficiently large to generate at least 15 and desirably 30 sales per year.

3.2 Data Collection and Sales Analysis

As noted earlier, conversion of data to the new ProVal system should be entirely complete by February 2008. Although the conversion took longer than expected and there were some problems (common for such projects), it appears to have been successful and places the Assessor's office in a much better position to take advantage of the new system's efficiencies going forward.

ProVal is sketch-driven in that areas are calculated from measurements and building component codes, and area measurements drive valuation rates. Except for high-rise condos, appraisers complete sketches of all new residential construction as part of field inspections. Appraisers describe the ProVal sketching tool as more difficult than in the old system but equally efficient after one gets over the learning curve. A major difference is that in the old system each floor of a multiple story building was sketched, whereas in the new system one only sketches the ground floor and assigns codes to vertical sections. In tract subdivisions, sketches of standard models can be selected and modified as necessary.

The strong real estate market and record numbers of sales, new construction, and remodeling activity through at least 2006 (coupled with the relative staffing shortages noted in 2.3 above) have made it difficult for the office to keep up with all the activity. The office has been able to make inspections of building permits, sales, and appeals where required[5]. Contrary to best practice, however, it has been unable to conduct periodic reinspections of all properties on a rotating basis (e.g., every 4-6 years). However, the office does have Pictometry (multiple oblique aerial photos that permit one to view building details with reasonable accuracy), which has been used in data review of selected areas. The office also plans to obtain Pictometry's automatic change detection technology, which will highlight physical additions (or destruction) to property.

As in many other jurisdictions, renovations pose a special problem. Although they are not used in value calculations, ProVal does provide for the capture of type, year, and amount (value) of renovations. Appraisers are instructed to adjust effective age and not grade or condition unless special circumstances call for doing so. We find this policy reasonable and conducive to consistency.

[5] Building permits are still maintained on the mainframe. Permits are downloaded to an Access file and printed. A clerk culls them to eliminate those that do not call for field work, sorts them between commercial and residential and by district, and places them in neighborhood folders with a copy of the site plan for field inspection. ProVal provides some workflow management support. A record is kept of the permit record number, the GeoPIN, the permit type and date, the person assigned to work the permit, and other relevant events.

As described in our commercial report, the Commissioner of Revenue works sales first. The Commissioner assigns a transaction code and determines the consideration amount from the transfer tax stamps if it is not stated on the deed. Previously the Assessor's office held sales in the mainframe until appraisers worked a neighborhood, at which time they determined the validity of sales in the neighborhood for appraisal purposes. Now appraisers are provided with a list of all sales not yet worked in their neighborhoods every two weeks and instructed to validate those sales before the next list is generated. Keeping sales validations current in this manner should make it possible to generate earlier statistics on market trends and contemporary assessment levels.

Since the current version of ProVal does not have a standalone sales file, sales data are added to property records. This can be problematic in that property data could change after the sale (e.g., the case of a room addition), which creates a mismatch between the sale price and property data. For practical purposes, however, this danger is minimal since appraisers are likely to be aware of the situation and could disqualify the sale. The next version of ProVal will purportedly have a standalone sales file that captures property characteristics at time of sale and thus address this issue, which will also make it more feasible to use multiple years of sales in appraisal analyses.

Formerly appraisers simply assigned a code of "V" (valid) or "I" (invalid) to a sale with no documentation of backup for their determinations. Fortunately, the ProVal system supports the assignment of sale validation codes indicating the reason a sale is considered invalid. We strongly recommend that the office take full advantage of this feature. We were also glad to learn that plans call for making MLS printouts (including pictures) for appraisers to use in sales validation.

While it is good for appraisers to validate sales, we are somewhat concerned with the wide dissemination of this function with each appraiser working the sales from the neighborhoods for which they are responsible. To maintain consistency and evenness in the process, we would prefer to see a small group of appraisers responsible for at least initially validating sales and assigning appropriate validation codes.

3.3 Single-Family Residential Valuation

3.3.1 Old System

The old system of residential valuation was extremely labor-intensive. Appraisers would plot sales on maps and work with spreadsheets of sales sorted by neighborhood, year built range, grade, condition, and stories. Vacant land sales were also listed for each neighborhood. Land and building rates would be manipulated to produce overall sales ratios near 95 percent. Valuation rates for thousands of combinations of these parameters were updated each year, often based on interpolation and judgment due to inadequate sales. Appraisers posted the new valuation rates to separate tables and entered new site values individually for each parcel. While the system produced accurate values in terms of sales ratio statistics, it was time-consuming and inefficient. Its success depended critically on good judgment, and the lack of sales for an individual stratum could lead to sizeable changes in values from one year to the next, although percent changes in values were also monitored.

3.3.2 New System

Assessments for 2007-2008 will be based on a hybrid of the old system and the new system (ProVal 7.9). As will be seen, it automates the bulk of the annual update process. The system has an attractive master screen displaying ownership, valuation, and assessment information, the building sketch, and the most recent photo. From there the user can display any memos on the property and navigate to other screens and functions. Of course, only authorized users can modify valuation tables and parameters. Users can generate a number of preformatted Crystal reports for which they can specify desired parameters (e.g., sale date range for a sales ratio report), but cannot modify report formats ("heat tickets" must be submitted to IT for this purpose).

3.3.3 Land Valuation

The ProVal land valuation system is neighborhood-driven. For each neighborhood, appraisers specify "land types" (e.g., residential lot, farmland, swamp, or forest) and land valuation methods (e.g., site value, front foot, or size range). Most residential land was appraised on a site value basis in the old system and converted to land type "lot" in the new system. Parcels with multiple land types (e.g., a home site plus farm land) can be assigned multiple land lines. Golf courses were converted to two land lines: one for the standard land type of the neighborhood and a second for the golf course increment. "Additional" percentage adjustments in the old system (termed "assessment-land percent") were assigned influence code "4" (shape/size adjustment) in the new system with the same percentage adjustments applied and any accompanying explanatory notes converted to "memos" in ProVal.

While we have no major quarrels with these land valuation procedures, we recommend that managers and senior staff strive to keep the system straightforward and highly automated, so that land values can be easily updated. Land type should not be used to code site features (e.g., traffic or view), which in turn should be assigned site influence codes with corresponding adjustments that can be modified for entire neighborhoods as needed. Wherever possible, only single land lines should be used (the case of golf course land comes to mind).

3.3.4 Improvement Valuation

ProVal provides users with updated Marshall & Swift costs. The updates come as an Access file, which the City copies and saves as a new file. The updates contain base rates and rates for dwelling exterior features, patios, porches, and garages, but not miscellaneous interior, exterior, and yard improvements, for which the City must maintain its own rates (and are not overridden by the updates). Rates for items with similar costs can be assigned to "groups" so that the user need only maintain a single rate.

The ProVal system allows users to adjust base improvement values in several ways. One way is through the "house type" factor tables. Each such table has pre-assigned numbers (beginning with 11, 12, 14, …) and corresponding user-assigned factors (e.g., 0.90 or 1.15). Each table has a number and is assigned to one or more neighborhoods. For now, the City has been assigning them the number of the neighborhood to which they apply. Although the factors are table-driven and can thus be easily changed, house type codes (11, 12, etc.) must be assigned and maintained

at the individual parcel level and remain permanent until changed ore removed. If ComIT would allow it, the office could write update scripts to apply batch updates.

House type factors override neighborhood factors and other adjustment factors that refine improvement values. For example, if a neighborhood is assigned a neighborhood factor of 1.10 and some parcels in the neighborhood are assigned house type factors of 14, which we will assume implies a house type factor of 1.15, parcels in the neighborhood without a house type factor would receive a factor of 1.10, while parcels with the house type factor of 14 would receive a factor of 1.15. This has the implication that one cannot update a neighborhood by changing its neighborhood factor by the desired percentage, since the update will only affect parcels without house type factors. Instead, one would have to individually modify the house type factors to affect the desired change. We find this process cumbersome.

Fortunately, Virginia Beach has not yet assigned many house type factors. ProVal also provides the ability to apply relative desirability factors to individual parcels. Although these should only be applied on an exception basis, we would think that neighborhood factors[6] in conjunction with relative desirability factors should be largely capable of fine-tuning improvement values generated by valuation tables for location influences. As a minimum, we recommend that the City carefully consider how it plans to reconcile and update neighborhood, house type, and relative desirability factors in future years.

Annual updates also contain depreciation tables, which are tied to condition ratings in the ProVal system (about 80% of Virginia Beach residences are assigned "normal" condition ratings). We were glad to note that the City bases its condition ratings on effective age relative to actual age, so that, for example, a new home is coded as being in average (not good) condition and an older home in typical condition receives only typical depreciation for its age.

Depreciation table updates override existing tables, so that users that customize their tables must reestablish them each year. While it will thus involve some extra effort, we recommend that the City conduct its own studies to derive deprecation factors from the local market. Experience has shown that the "one size fits all" approach to deprecation seldom works as rates of depreciation can vary drastically among and within jurisdictions depending on local market forces.

Economic and functional obsolescence is assigned on an individual parcel basis and is adequately supported in the ProVal system.

3.4 Hi-Rise Condominiums

Like other residential properties, hi-rise condos (defined as condo projects with more than four stories) are formally appraised on the cost approach, although the values are rooted in sales analysis. Each project is generally assigned to a separate neighborhood and a separate ProVal model is created for each. A condo association master record contains building data. Condo unit records contain details of each unit (floor level, size, view, balconies, associated parking, etc.).

[6] House type factors apply to improvements (only). Separate neighborhood factors can be applied to land and building values.

Valuation begins by analyzing sales in a project to determine the typical unit value, which is then multiplied by the number of units to estimate total project value. An estimate of land value made during "artery" studies (which were described in our commercial review) is divided by number of units to obtain estimated land value per unit, which is subtracted from total value per unit to obtain building residuals. Improvement models are then calibrated to yield required building values.

3.5 Comparable Sales Module

Like most CAMA systems, ProVal has a comparable sales module, although Virginia Beach has yet to use it. The user assigns points to selection characteristics, which include land size and various improvement characteristics (users can add several additional features to the default list). The algorithm searches the subject neighborhood for the best comparables based on the assigned points and returns the five best comps (several additional neighborhoods can be specified if desired). Optionally, the algorithm will search unsold as well as sold properties. Search parameters can be saved and the profiles reused.

The ProVal comparable sales module is typical of several others in the industry. It will find the best comparables given the selected parameters and points, but is suboptimal in terms of parameter selection and cumbersome in terms of weighting the parameters, as points are in various units corresponding to the units in which the parameters are coded (square feet, years, number of bedrooms, garage stalls, etc.) rather than true percentages. Further, once selected, comparables are not adjusted for sale date or differences from the subject property. This is not to say that the comparable sales module is not useful, but rather to put it in perspective and note that the City may find opportunities to enhance its capabilities in this area.

3.6 Multiple Regression Analysis

Many larger jurisdictions like Virginia Beach use an automated version of the direct sales comparison approach based on multiple regression analysis (MRA) for residential property. Unfortunately, ProVal currently does not support such an approach. We note, however, that Manatron, the owner of ProVal, recently acquired Sigma Systems, based in Buffalo, New York, which does support MRA and which also has a much more sophisticated comparable sales program that addresses all the shortcomings of the ProVal approach noted above. A number of Sigma's current clients (including Salt Lake City and Cape Town, South Africa) are current users of MRA.

While we see no compelling reason for Virginia Beach to implement MRA in the near term, we recommend that the City monitor developments with the Sigma acquisition and the anticipated addition of MRA and an enhanced comparable sales module in version 7.10 of the ProVal suite. When the opportunity is ripe, we recommend that the City implement the method on a pilot basis.

We also note that it may be possible to use MRA to help calibrate existing valuation tables. ProVal's largest client, Snohomish County, Washington (county immediately north of Seattle and King County), currently uses MRA for this purpose. The County has successfully replicated

the ProVal residential cost engine with SPSS, a third party statistical package. "Nonlinear" (also known as "hybrid") MRA is used to derive market-indicated base rates, depreciation rates, and neighborhood adjustments from recent sales. The results help inform the corresponding parameters that are entered into the ProVal improvement valuation tables.

As indicated in section 2.3, we strongly recommend that the City add a statistical analyst position. The position would be responsible for conducting quantitative market analyses in support of annual revaluations and for developing an MRA capability in the Assessor's office. Part of these responsibilities will be uncovering and leveraging the analytical capabilities in current and future releases of ProVal, as well as complementing them where appropriate with a third party statistical package.

A final recommendation we make with respect to valuation methods and techniques is that the office begin explicitly tracking time trends and entering them into ProVal tables provided for this purpose. In addition to helping keep abreast of the market, time adjusted sales prices can be important in appraisal analyses and permit appraisers to consider a longer period of sales, which can be especially important when the volume of sales declines. Time adjusted sales prices can also be used in comparable sales analyses and sales ratio studies (as we do in section 4 below).

4. SALES RATIO STUDY PERFORMANCE ANALYSIS

Ratio studies are the chief means by which assessment performance is measured. The primary guideline on how to perform such studies is the *Standard on Ratio Studies* (IAAO, 2007 or its predecessor, 1999). Although Virginia Beach makes good use of ratio study statistics during revaluation work, the City and the state generally have traditionally prepared only summary studies and not afforded much attention to the guidance the IAAO standard offers. The most often quoted statistics relating to the performance of the Virginia Beach Assessor's office are the remarkably low numbers of assessment appeals. The incidence of appeals in Virginia Beach has in fact remained admirably low in recent years, although with the recent changes in the economy the incidence of appeals can be expected to grow. Appeal statistics, however, can fail to illuminate the assessment situation under a variety of circumstances, so ratio statistics are essential to consider.

We were pleased to see that the new ProVal system greatly expands the capability of the assessor's office to conduct ratio analyses through its so-called Value Calibration Analysis option. Since the in-place assessments had been developed using the prior system, however, we conducted our own analyses of the quality of those assessments. The standard statistics from such analyses of the categories of residential properties used in Virginia Beach, presented in Table 4-1, indicated no overall problems.

Table 4-1: Standard Ratio Study Statistics for Residential Property Assessments for 2007 Compared to Time Adjusted Sales from 2005-2007

Group	Median	95% Confidence Interval for Median		Price Related Differential	Coefficient of Dispersion	Count
		Lower Bound	Upper Bound			
Urban SF, Vacant Residential Land	0.92	0.87	0.95	1.05	0.18	145
Urban SF, Residence	0.98	0.98	0.98	1.02	0.09	11,083
Urban SF, Outbuildings Only	0.92	0.79	1.05	1.02	0.14	15
Urban SF, Townhouse	0.96	0.96	0.97	1.01	0.08	3,986
Urban SF, Low Rise Condominium	0.98	0.98	0.99	1.01	0.07	4,078
Urban SF, High Rise Condominium	1.02	0.99	1.03	1.00	0.08	396
Urban SF, Duplex	0.92	0.85	0.98	1.04	0.14	76
Urban SF, House and Garage Apmt	1.13	0.75	1.27	1.05	0.15	5
Urban SF, House and Apartment	1.05	0.86	1.21	1.04	0.13	11
Urban SF, Historic House	0.56	.	.	1.00	-	1
Suburban SF, Vacant Resid Land	0.93	0.74	1.06	1.03	0.27	35
Suburban SF, Residence	0.99	0.96	1.02	1.04	0.12	147
Suburban SF, Outbuildings Only	0.98	0.77	1.20	1.08	0.22	2
Overall	0.98	0.98	0.98	1.01	0.08	19,980

For readers unfamiliar with these statistics, the median ratio is the middle ratio when there is an odd number of sales (or the average of the two middle-most ratios when there is an even number). The 95 percent confidence interval displays the range of ratios within which one can be 95 percent confident that the true population median lies. The confidence intervals about the median assessment ratio provide information on whether any observed differences between the median and its target level (0.95 to 1.00 in Virginia Beach) are likely to have stemmed from sampling variability alone in the absence of a failure to achieve, in the aggregate, the target level of assessment. The price-related differential (PRD), which should be between 0.98 and 1.03, indicates whether there is any suggestion of price-related biases in the assessment errors. If the PRD is below 0.98, high-value properties tend to be assessed at a higher ratio of market value than low-value properties. When the PRD is greater than 1.03, the opposite pattern, which is more common in practice, prevails. Such assessments are said to be regressive. The coefficient of dispersion (COD), which should be under 15 for residential properties, measures the relative tightness of the clustering of assessments about their target market value; in a sense it is the average percentage error of the assessments relative to market value.

There is a slight suggestion that residential vacant land (first line in Table 1) may be under assessed, possibly more so for more valuable parcels than for less valuable ones, but the evidence is not strong enough to reach that conclusion reliably. As can be seen in the table, the upper bound for the confidence interval for vacant land easily falls within five percentage points of the overall median ratio on the bottom line (0.98). Thus the standards of the IAAO guidelines are easily met. The same is true for all other (apparent) failures of median ratios to fall within 5% of the overall median ratio as called for by best-practices guidelines; the inherent variability of small samples precludes any deficiency conclusions since the observed findings could well have arisen by chance alone.

In addition to city-wide, overall analyses, we looked for any patterns that might suggest problems with particular subsets of the residential assessments. Analyses by neighborhoods, although commonly done in other contexts, were infeasible here due to the extraordinary number of neighborhoods in the city and the consequent paucity of sales in most of them, leaving too few for statistical reliability. This issue was addressed several ways. First, we plotted all the ratios geographically, as illustrated in figure 4-1, and looked for patterns, but found nothing of significance. We also prepared plots of ratios by district as illustrated in figure 4-2. Finally, we plotted neighborhoods within district (not reproduced here) to see if there were patterns different from those likely to have arisen by chance alone. We found nothing of significance.

Figure 4-1: Sales Ratios Plotted Geographically

1 (blue) indicates lower ratios, 3 (green) middle ratios, and 5 (red) highest ratios

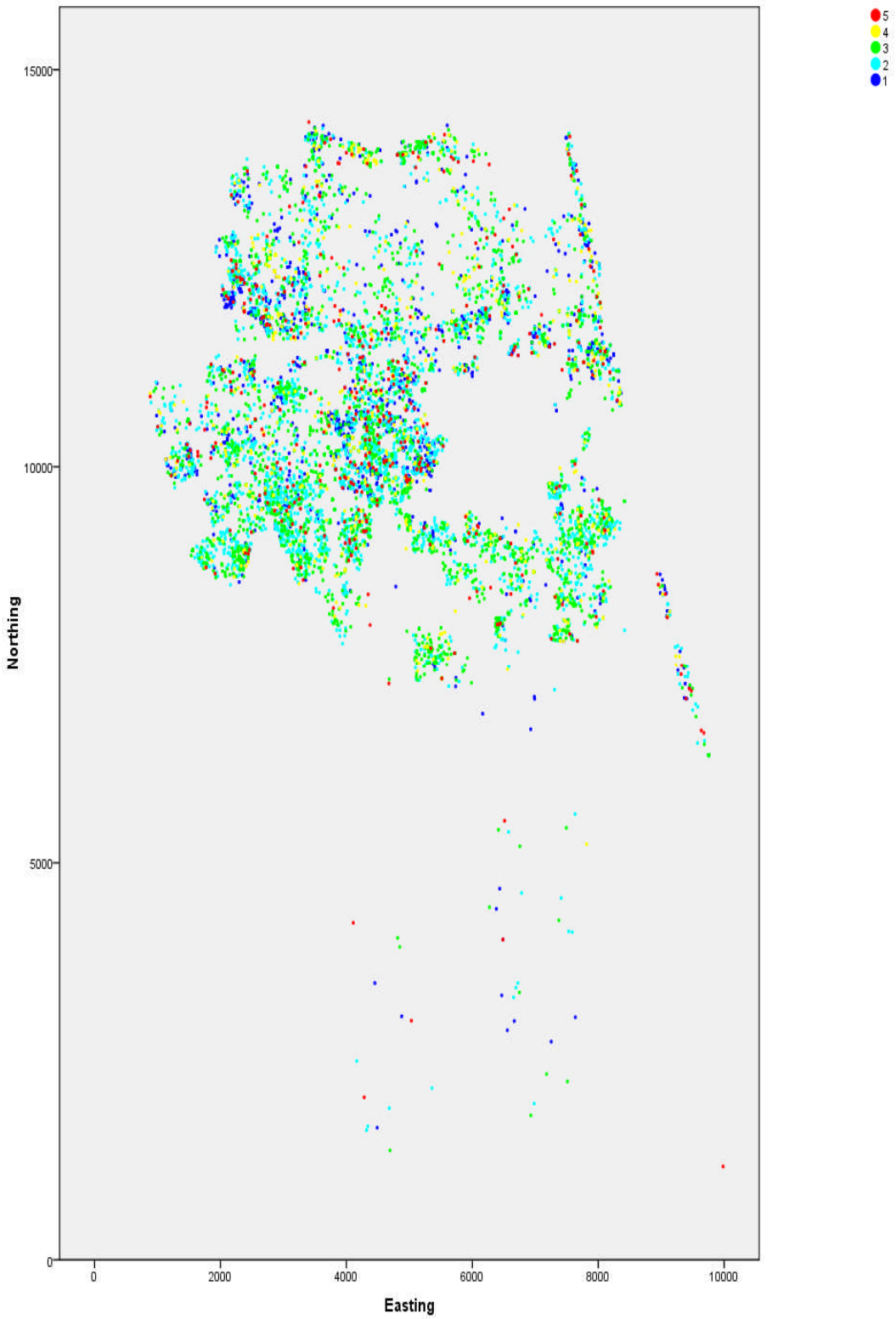
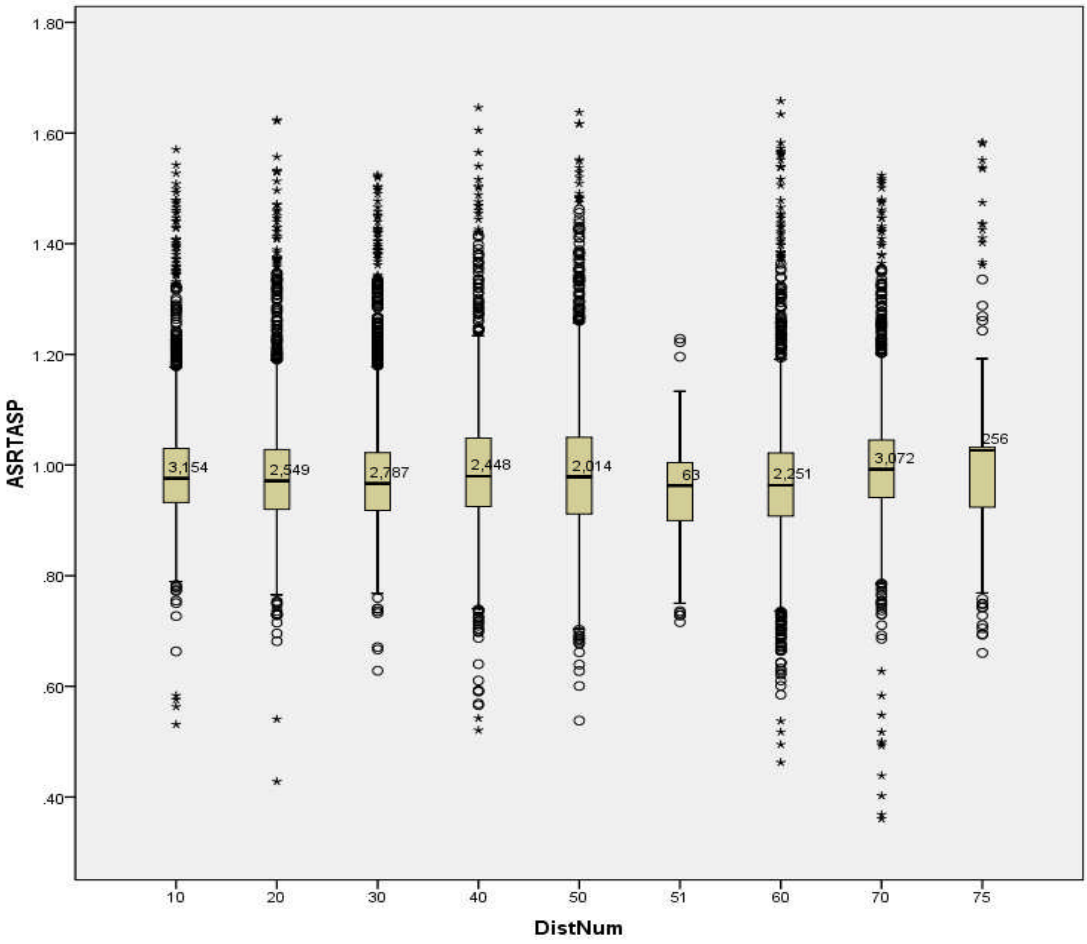


Figure 4-2: Box Plot of Sales Ratios by District



In Figure 4-2, and in all box plots, ratios of assessments to time-adjusted sales prices are plotted on the vertical axis and the other variable, in this case the district number, is plotted horizontally. The shaded boxes enclose the central fifty percent of the data, the inter-quartile range (IQR), with the tops and bottoms indicating the upper and lower quartiles and the horizontal black lines within the boxes indicating the medians. The numbers near the median indicate the number of sales in the stratum or subgroup. The vertical lines indicate the range of data that would not be considered to be either outliers, defined as observations at least 1.5 times the IQR beyond the nearer quartile, or extremes, defined as observations at least 3.0 times the IQR from the nearer quartile. Outliers are plotted as open circles and extremes as asterisks. As the box plots readily indicate, all the districts have very nearly the same median and comparatively little dispersion about those medians. It might also be noted that the degree of dispersion is approximately uniform across the districts.

As noted above, the assessments analyzed here are for fiscal year 2007-2008, which has a base assessment date of 1 July 2006, and are based on market evidence generally collected between 1 July 2005 and 30 June 2006. For the analyses reported here, sales from an augmented time window were used: 1 July 2005 to 30 June 2007, with sales adjusted for time to eliminate any dis-

torting effects that may have arisen from using the extended time frame. As with our previous report for commercial property, for sales validation purposes we relied on two layers of sales review conducted by the City: the screening performed by the office of the Commissioner of Revenue and the further validation performed by appraisers during the revaluation process.

In addition to examining sales ratios by location, we also conducted a series of analyses in which we compared ratios against key property characteristics: year built, building size, lot size, zoning, number of stories, construction grade, physical condition, property type, and value range. The balance of this section contains graphical results from those analyses. In each case, one would hope to see no significant difference in assessment levels across the range of these characteristics. For example, small, mid-size, and large homes should all be assessed near the overall city-wide median (0.98). Systematic differences would indicate a problem in valuation schedules (e.g., a failure to account for differences in building costs or popularity among small and large homes).

Figure 4-3 contains "scatter plots" of sales ratios according to the year in which a residence was built. The left-hand plot displays the full range of ages since the 18th century and the right-hand plot examines houses built since 1950. Each dot in the plots locates the ratio of a single sale. As can be seen from the left-hand plot, very few houses in Virginia Beach were built before 1950. The lines in the graph are the best fit (regression) line and its 95% confidence limits. As can be seen most clearly in the right-hand graph, assessment ratios remain closely centered near the city-wide median ratio of 0.98 regardless of year built, indicated good uniformity between newer and older homes (this further implies that the City's depreciation tables are working well).

Figure 4-4 examines ratios by improvement size and indicates good uniformity between smaller and larger homes. Figures 4-5 and 4-6 contain similar scatter plots of sales ratios against lot size. The left-hand plot of figure 4-5 displays the full range of lot areas; the right-hand plot is of a lesser range. Figure 4-6 displays ratios for the most common lot sizes. Again, the patterns indicate good uniformity.

Figure 4-3: **Plots of Sales Ratios by the Year in which Houses Were Built**

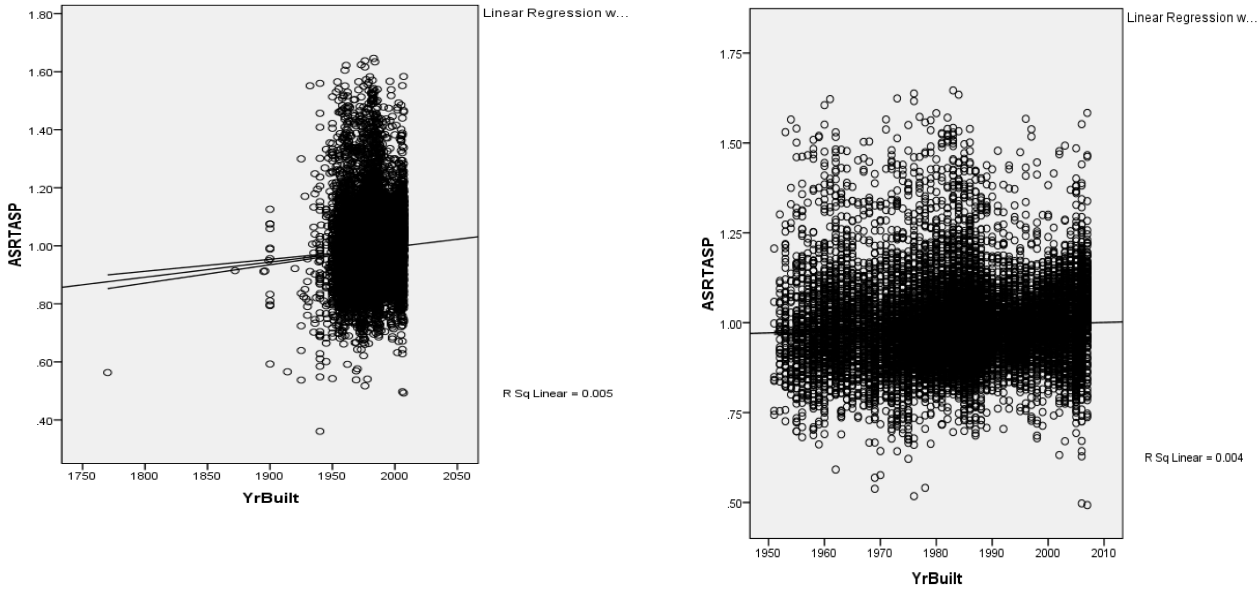


Figure 4-4: Plot of Sales Ratios by Size of House

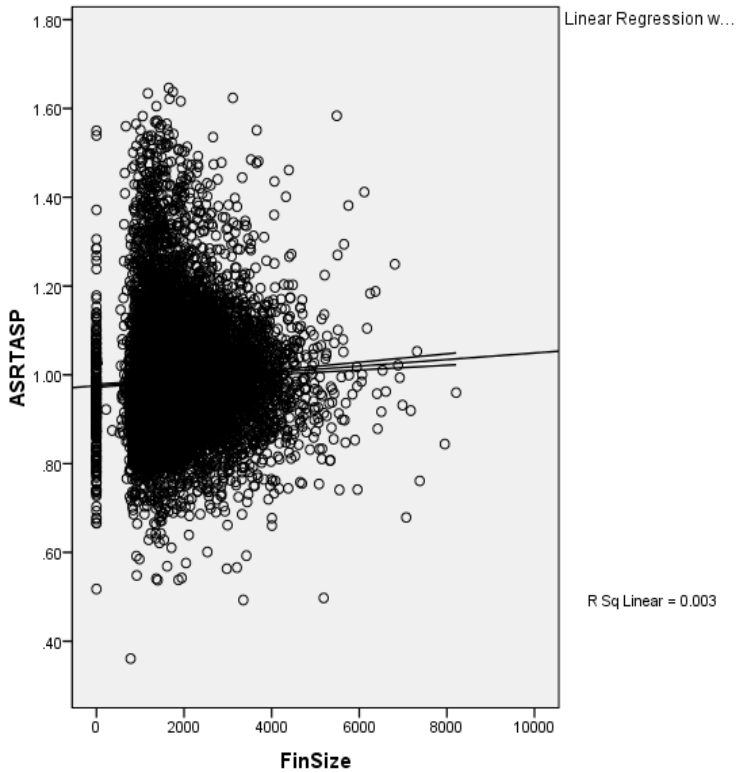


Figure 4-5: Two Plots of Sales Ratios by Lot Size

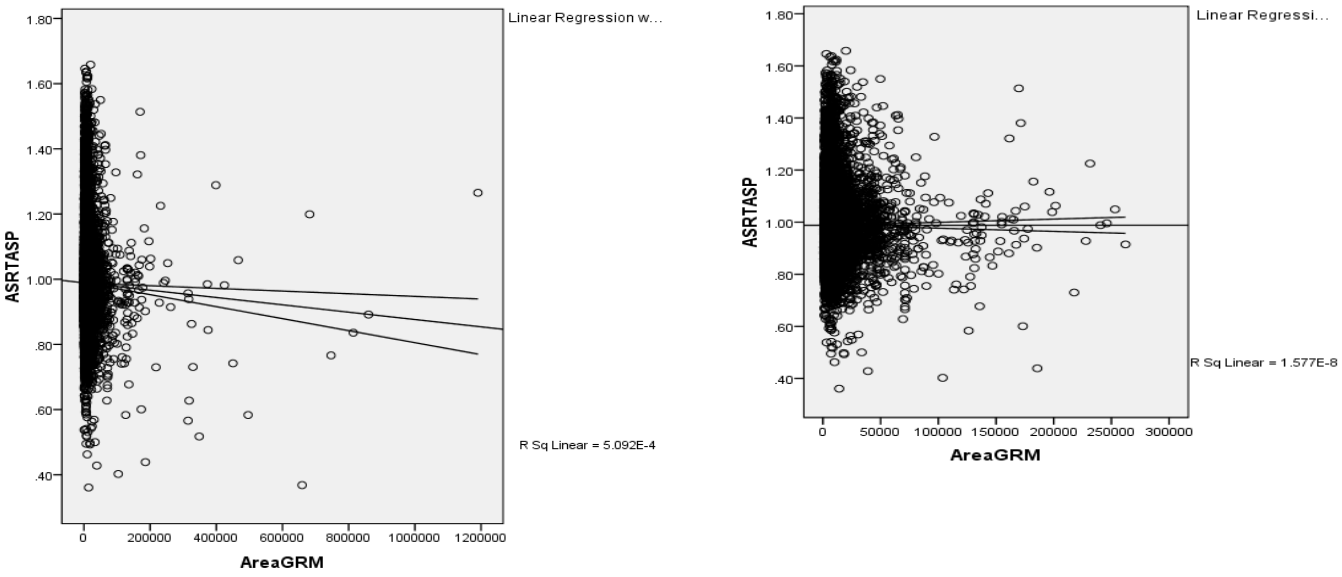
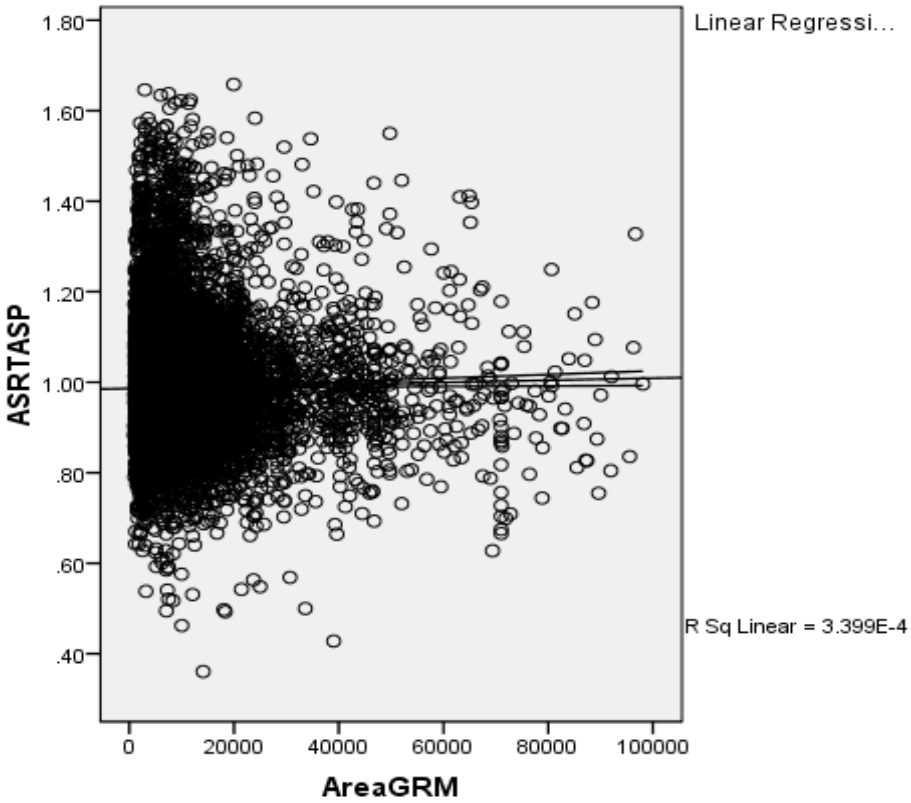


Figure 4-6: Plot of Sales Ratios by Most Common Lot Sizes



Returning to the use of box plots, we examined patterns in sales ratios according to zoning code (figure 4-7) and according to number of stories and construction grade (figure 4-8). Appropriately, the pattern of ratios by zoning code revealed no causes for concern, as also is the case with number of stories. Similarly, the grade (or quality) of the improvement revealed no biases, although typical properties were easier to appraise as indicated by their lower dispersion (more compressed box heights).

Figure 4-7: Plot of Sales Ratios by Zoning Code

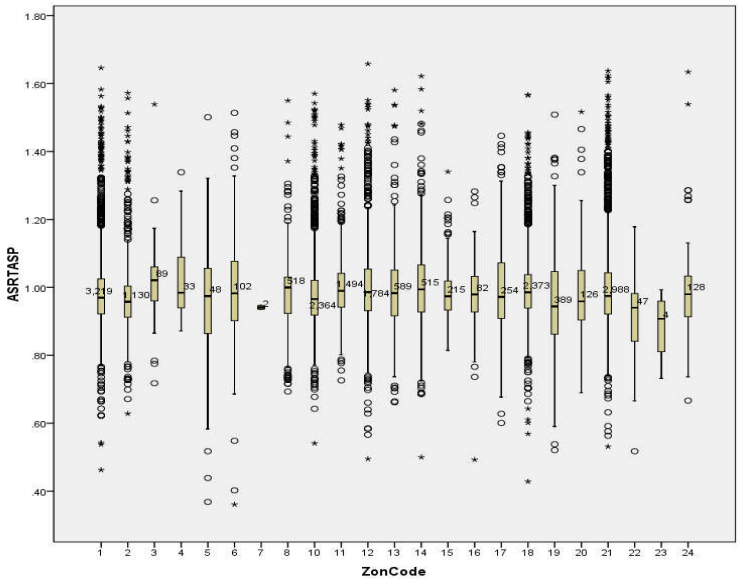
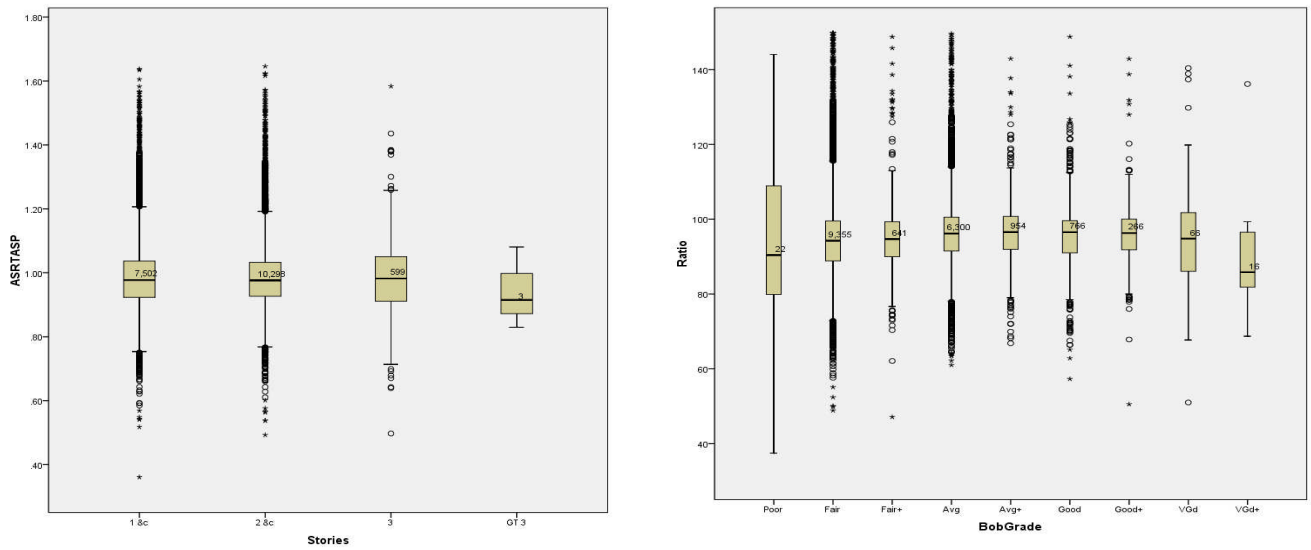


Figure 4-8: Plots of Sales Ratios by Number of Stories (Left) & Construction Grade (Right)



As suggested in figure 4-9 below, one area of some minor concern is that appraisers may have over-reacted to departures from average physical condition, assessing those in poorer condition too low and those in good condition too high. The presence of a real problem in this regard is far from established, however, due to both the small number of properties involved and the possibility of alternative causes for the phenomena, such as sales of property made in contemplation of a change in use.

Figure 4-9: Plot of Sales Ratios by Physical Condition Category

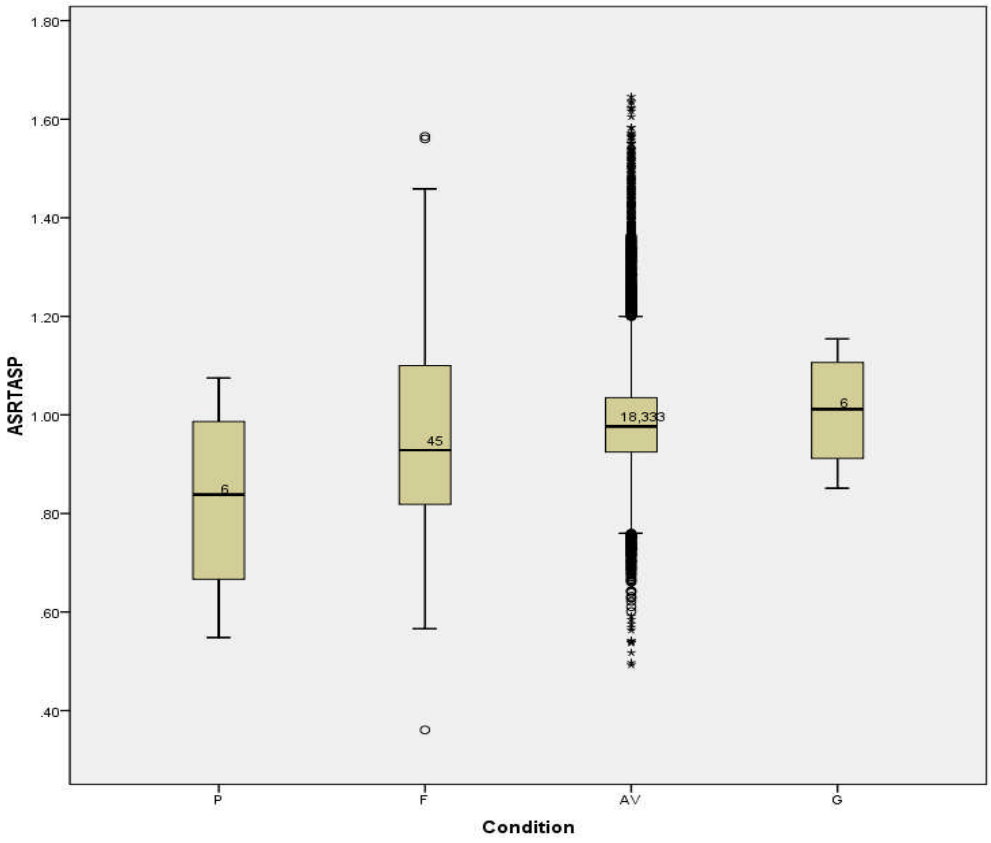
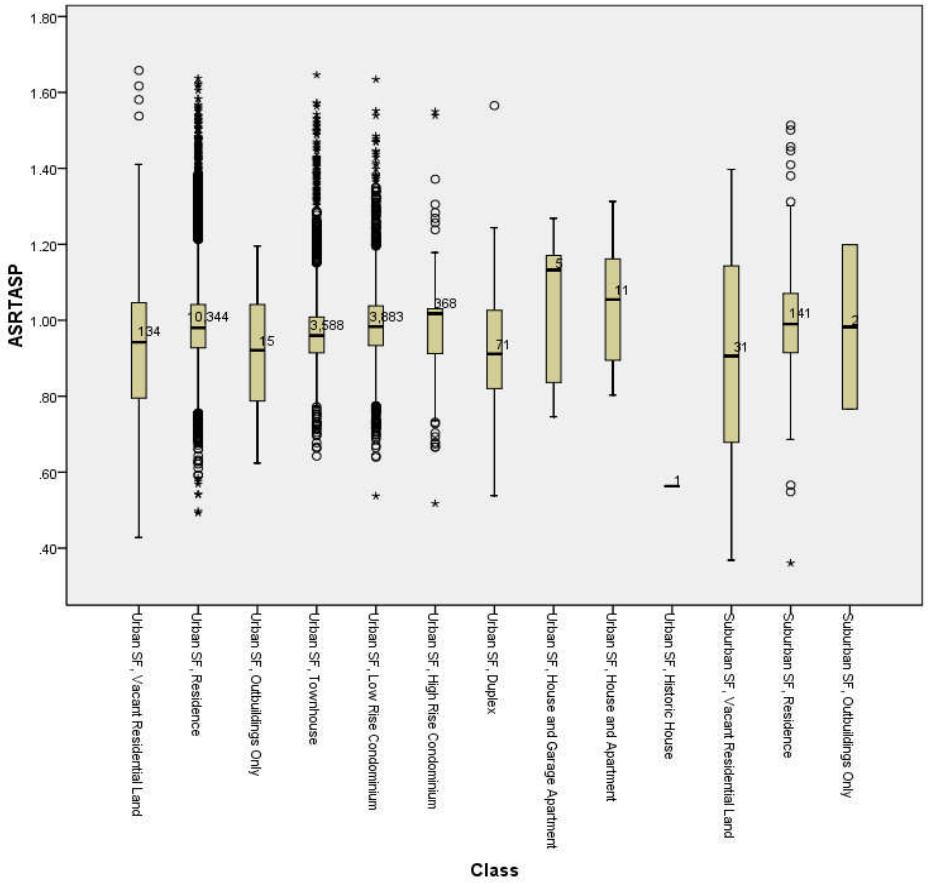


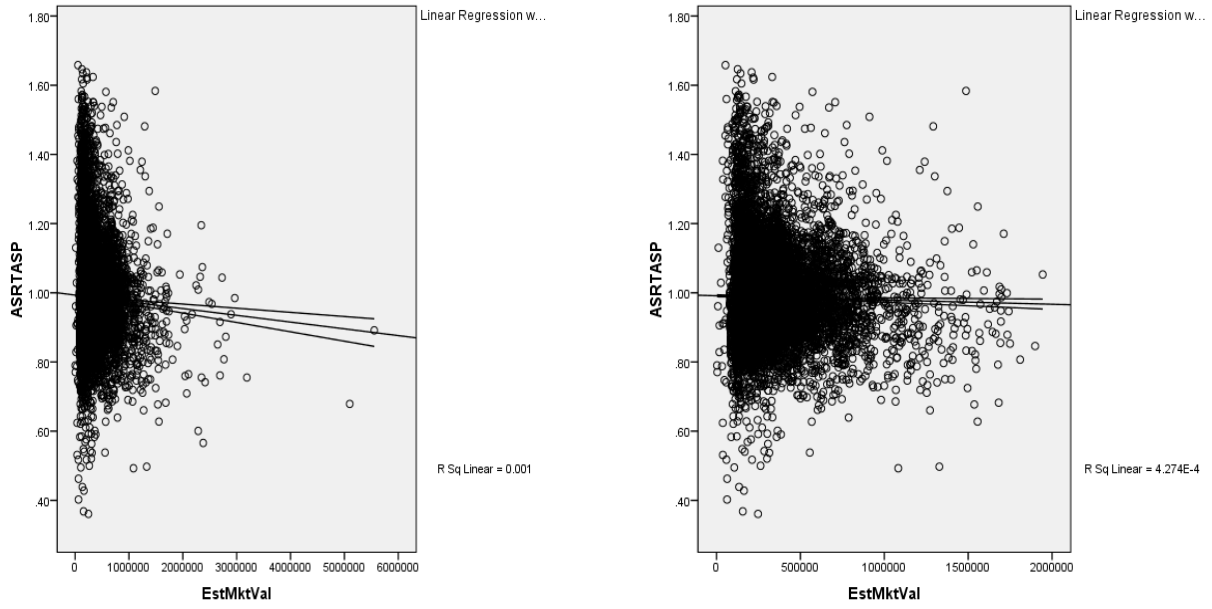
Figure 4-10 is a box plot of sales ratios by the same property categories as is table 4-1. Again, no problems are apparent aside from those categories with too few sales to draw reliable conclusions.

Figure 4-10: Plot of Sales Ratios by Property Category



Finally, we explored potential disparities in the treatment of lower vs. higher valued properties by plotting assessment ratios against market values. Since there is a known statistical problem that arises when comparing ratios to one of the terms of the ratio (either assessed values or sales prices), it is inadvisable to plot either assessments or sales prices on the horizontal axis. The best solution to this problem devised to date is to estimate market value as an average of the two for each property, which is the practice adopted here. As can be seen from the plots, any suggestion that higher value properties may be under-assessed derives from a very limited number of sales. Taking successively smaller ranges of property values as the domain for analysis, as was done in the plots in figure 4-11, quickly eliminates any suspicion of price-related biases.

Figure 4-11: Plots of Sales Ratios against Market Value



In summary, the performance of the assessor's office on residential assessments for 2007 appears to have conformed well to best practices as codified in the IAAO *Standard on Ratio Studies*. Procedurally, we are pleased to note that the software available to the assessor to monitor appraisal performance has recently been substantially improved with the introduction of the ProVal system. That system, however, is not natively capable of producing the graphical displays included above. The IAAO standard notes that graphical presentations constitute important tools for both analytical and communications purposes. Accordingly we suggest, as a matter of less than urgent priority, that consideration be given to acquiring software to enhance the ability of the office to undertake such statistical and graphical analyses. In view of the ability of ProVal to export the necessary data readily, such an upgrade should be a low-cost, high-value proposition.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Enumerated below are the main conclusions of our review of the residential reassessment processes in use in the City of Virginia Beach.

1. Residential assessments in Virginia Beach are based on acceptable methods, and they meet professional standards for level of assessment and uniformity of assessments.

2. Credit for the above is due to the strong leadership provided by the assessor and by skills and experience of the appraisal staff.

3. Based on the comparatively low number of appeals, there appears to be good public acceptance of assessments in Virginia Beach. Factors that contribute to this fortunate situation doubtless include the professionalism of the assessor's office, the good communication of information about property price trends and assessments, the recent strength of the real estate market, and comparatively low effective tax rates.

4. As the assessor's office fully recognizes, there are no grounds for complacency. A wider downturn in property prices will put pressure on the office to meet its legal and policy mandates. A large increase in the number of appeals will be difficult to manage and could jeopardize the tax base. There will be pressure to increase property tax rates. With its current level of staffing, the office is unable to take sufficient steps to ensure that all assessable property is accurately described, and property that is not accurately described cannot be accurately appraised. An increase in appeals and in the number of applications for residential property tax relief will place further strains on the staff.

5. We believe that the office is understaffed. However, the new computer-assisted mass appraisal system (ProVal) offers opportunities for greater effectiveness, although realizing the system's potential will require increasing the mass appraisal skills possessed by the assessor's office.

6. Our recommendations identify areas where we believe appraisal effectiveness and efficiency could be improved.

5.2 Recommendations

Enumerated below are our main recommendations for strengthening the residential reassessment processes used by the assessor's office. It should be noted that the assessor's office recognizes and has begun to implement improvements in a number of areas.

1. Sales disclosure declaration. The City of Virginia Beach (in conjunction with other Virginia counties and cities) should lobby for a legal requirement that, in connection with

paying the recordation tax, real estate sellers and buyers be required to complete and file a real estate transfer declaration. The purpose of the declaration would be to provide assessors and the Department of Taxation with information needed to determine whether a sale is usable for appraisal or for ratio study purposes. It would require disclosure of the particulars of each sale.

2. Sales confirmation form. In the meantime, the real estate assessor should develop a questionnaire to be used as necessary in sales confirmation and screening efforts.

3. Database access. The current requirement of ComIT that the assessor's office must prepare job requests to extract, analyze, and prepare customized reports needlessly frustrates and delays legitimate and essential operations and should be reconsidered. It should be possible to erect system safeguards and protocols that would make the assessor's office responsible for the integrity of the data it collects while allowing it unfettered access to that data for analysis and reporting.

4. Staffing. We recommend that the two specialist positions recommended below (see recommendations 5 and 13) be created and that the appraisal staff be augmented by at least two positions so that data can be maintained accurately.

5. GIS enhancements and analyst. Attention should be given to developing meaningful GIS capabilities in the Assessor's office, including the retention of a GIS analyst capable of conducting GIS mapping and spatial analyses for the support of the appraisal staff and management. We also contemplate that this individual would be potentially capable of undertaking or supporting geostatistical valuation analyses.

6. Late sales. In soft markets the Assessor's office should continue to consider late sales in setting valuation rates and factors. This works to the benefit of all concerned and should reduce the number of appeals that could otherwise be expected.

7. Sales validation. Sales validation codes (rather than a simple code of valid or invalid) documenting the reason for rejection should be assigned to sales during the validation process. To promote consistency, we recommend that the Assessor consider designating a small group to validate sales as they are received from the Commissioner of Revenue. This would also facilitate earlier studies of market trends and assessment levels.

8. Neighborhoods. To bolster sample sizes and enhance valuation stability, we recommend that the City consolidate existing residential neighborhoods into larger areas. As a general rule, neighborhoods should be sufficiently large to generate at least 15 and preferably 30 sales per year.

9. Land valuation. Managers should ensure that the system be kept straightforward with all key adjustments tabularized, so that they can be easily monitored and updated. Multiple land lines should be avoided if possible.

10. House type factors. House type factors offer a way of applying factors to subsets of properties within neighborhoods in the ProVal system. However, relative desirability factors already provide this capability on an individual parcel basis and house type factors override neighborhood factors. While the City did not use house type factors in the 2008/2009 revaluation, we recommend that it carefully consider their role going forward, so that, if applied, house type factors will be supported by adequate sales and work in harmony with other valuation factors.

11. Depreciation analysis. Rather than rely on universal depreciation tables provided by ProVal, we recommend that City staff derive depreciation factors entered into ProVal tables from local sales analyses. This can be done by graphing percent good factors (improvement residuals divided by RCN) against effective age, or from MRA models when available.

12. Multiple regression analysis. While we see no compelling need for the City to implement MRA at the present time, we recommend that it keep abreast of the technique and monitor probable enhancements of this nature to ProVal as a result of the Sigma acquisition. In particular, we see MRA as the most logical valuation method for townhouses and condominiums with potential application to detached residential properties as well.

13. Statistical analyst. Related to the recommendation above, we strongly recommend that the City retain a statistical analyst to conduct MRA analyses and leverage analytical tools in the new ProVal system and future releases thereto, which we expect to incorporate greatly expanded market modeling, comparable sales analysis, and ratio study capabilities.

14. Mass appraisal training. As the assessor's office recognizes, fully benefiting from the capabilities of the ProVal system requires that all appraisers have certain new mass appraisal skills, and desirably they would have a basic understanding of MRA so that its analytical powers and their experience could be effectively harnessed.

15. Time trend analysis. We recommend that the City begin conducting time trend analyses by major property types and market areas using standard techniques described in the IAAO literature. Such analyses will provide early feedback on market trends. Also, time-adjustments permit appraisers to expand the sales analysis period (and thus augment sample sizes) and can be highly useful in sales ratio studies and comparables sales analyses.

16. Statistical software package. As a low priority item at the present time, we recommend that the City obtain a third party statistical package (e.g., SPSS) to conduct statistical analyses, including charts and graphs depicting market trends and sales ratio patterns. This recommendation would complement the statistical analyst position recommended above and become more relevant at that point. Future enhancements to the ProVal system may also address this need, although we suspect only partially so.